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| <b>TEST REPORT</b><br><b>EN ISO 12100: 2010</b><br><b>Safety of machinery - General principles for design</b><br><b>- Risk assessment and risk reduction</b><br><b>Part 3: Form, fill and seal machines; fill and seal machines</b><br><b>Part 1: Terminology and classification of packaging machines and associated equipment</b> |                                                                                                                                                |
| <b>Report number.....:</b>                                                                                                                                                                                                                                                                                                          | <b>BKC24062931FS</b>                                                                                                                           |
| <b>Date of issue.....:</b>                                                                                                                                                                                                                                                                                                          | <b>Jul. 04, 2024</b>                                                                                                                           |
| <b>Testing Laboratory.....:</b>                                                                                                                                                                                                                                                                                                     | <b>Shenzhen BKC Testing Co., Ltd.</b>                                                                                                          |
| <b>Address.....:</b>                                                                                                                                                                                                                                                                                                                | Room103, 1/F, Huaya Building, Huaya Industrial Park, Yousong Community, Longhua Subdistrict, Longhua District, Shenzhen, Guangdong, China      |
| <b>Applicant's name.....:</b>                                                                                                                                                                                                                                                                                                       | <b>Foshan Popper Technology Center Firm</b>                                                                                                    |
| <b>Address.....:</b>                                                                                                                                                                                                                                                                                                                | Room A11, Room 1403, Building 2, Jiabang International Finance Center, No. 1 Shilong South Road, Guicheng Street, Nanhai District, Foshan City |
| <b>Test specification.....:</b>                                                                                                                                                                                                                                                                                                     |                                                                                                                                                |
| <b>Standard.....:</b>                                                                                                                                                                                                                                                                                                               | EN ISO 12100:2010, EN 415-3:2021, EN 415-1:2014                                                                                                |
| <b>Test procedure.....:</b>                                                                                                                                                                                                                                                                                                         | Type test                                                                                                                                      |
| <b>Non-standard test method.....:</b>                                                                                                                                                                                                                                                                                               | N/A                                                                                                                                            |
| <b>Test Report Form No.:</b>                                                                                                                                                                                                                                                                                                        | ISO 12100                                                                                                                                      |
| <b>Test Report Form(s) Originator..</b>                                                                                                                                                                                                                                                                                             | BKC                                                                                                                                            |
| <b>Master TRF.....:</b>                                                                                                                                                                                                                                                                                                             | 2021                                                                                                                                           |
| <b>Test item description.....:</b>                                                                                                                                                                                                                                                                                                  | Packaging machine                                                                                                                              |
| <b>Trademark.....:</b>                                                                                                                                                                                                                                                                                                              | N/A                                                                                                                                            |
| <b>Manufacturer.....:</b>                                                                                                                                                                                                                                                                                                           | Ruian Xinyuan Packaging Machinery Equipment Co.,Ltd                                                                                            |
| <b>Address.....:</b>                                                                                                                                                                                                                                                                                                                | NO.3 south road luofeng shuangqiao industrial park, tangxia town, ruian city, zhejiang, china                                                  |
| <b>Model/Type reference.....:</b>                                                                                                                                                                                                                                                                                                   | BSN, BSD, BSP, FQL, BF, TF, TFZ, MH, YS, XY                                                                                                    |
| <b>Ratings.....:</b>                                                                                                                                                                                                                                                                                                                | See the page 3                                                                                                                                 |
| <b>General disclaimer:</b> The test results presented in this report relate only to the object tested.                                                                                                                                                                                                                              |                                                                                                                                                |



|                                                                                                   |                                                                                                                                           |
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| <b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b> |                                                                                                                                           |
| <input checked="" type="checkbox"/> <b>Testing Laboratory:</b>                                    | Shenzhen BKC Testing Co.,Ltd                                                                                                              |
| <b>Testing location/ address.....:</b>                                                            | Room103, 1/F, Huaya Building, Huaya Industrial Park, Yousong Community, Longhua Subdistrict, Longhua District, Shenzhen, Guangdong, China |
| <b>Tested by.....:</b><br>Lucy Liu / Test Engineer                                                | Lucy Liu                                                                                                                                  |
| <b>Checked by.....:</b><br>Casey Wang / Project Engineer                                          | Casey Wang                                                                                                                                |
| <b>Approved by.....:</b><br>Jerry Liao / Project Manager                                          |                                                        |

**List of Attachments (including a total number of pages in each attachment):**

- Attachment 1: Photo documentation. (1 page)

**Summary of testing:**

Tests performed:

The submitted samples were found to comply with the requirements of:

EN ISO 12100: 2010

EN 415-3:2021

EN 415-1:2014

**Artwork of marking plate(s):**

The artwork below may be only a draft.

**Packaging machine**

**Model:** BSN

**Rated Voltage:** 380V~

**Rated Frequency:** 50Hz

**Rated Power:** 14KW



**Ruian Xinyuan Packaging Machinery Equipment Co.,Ltd**

NO.3 south road luofeng shuangqiao industrial park, tangxia town, ruian city, zhejiang, china

Importer:XXXXXX

Address:XXXXXX

**Made in China**

**Possible test case verdicts:**

- test case does not apply to the test object.....: N/A
- test object does meet the requirement.....: P (Pass)
- test object does not meet the requirement.....: F (Fail)

**Testing.....:****Date of receipt of test item.....:** Jun. 26, 2024**Date (s) of performance of tests.....:** Jun. 26, 2024 to Jul. 04, 2024**General remarks:**

"(See Enclosure #)" refers to additional information appended to the report.

"(See appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

**General product information:**

1. The equipment is a Packaging machine.
2. All models are identical except for the name, all tests are performed on BSN.

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                    |        |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Remark                                                             | Result |
| 6                  | Risk reduction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                    | P      |
| 6.1                | General                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                    | P      |
|                    | <p>The objective of risk reduction can be achieved by the elimination of hazards, or by separately or simultaneously reducing each of the two elements that determine the associated risk:</p> <ul style="list-style-type: none"> <li>-severity of harm from the hazard under consideration</li> <li>-probability of occurrence of that harm</li> </ul> <p>All protective measures intended for reaching this objective shall be applied in the following sequence, referred to as the three-step method(see also Figures 1 and 2)</p> | This requirement is complied with. See related clauses.            | P      |
| 6.2                | Inherently safe design measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                    | P      |
| 6.2.1              | General                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                    | P      |
|                    | <p>Inherently safe design measures are the first and most important step in the risk reduction process because protective measures inherent to the characteristics of the machine are likely to remain effective, whereas experience has shown that even well-designed safeguarding may fail or be violated and information for use may not be followed.</p>                                                                                                                                                                           | Appropriate machine design has been performed by the manufacturer. | P      |
|                    | <p>Inherently safe design measures are achieved by avoiding hazards or reducing risks by a suitable choice of design features of the machine itself and/or interaction between the exposed persons and the machine.</p> <p>NOTE See 6.3 for safeguarding and complementary measures that can be used to achieve the risk reduction objectives in the case where inherently safe design measures are not sufficient (see 6.1 for the three-step method).</p>                                                                            | Appropriate machine design has been performed by the manufacturer. | P      |
| 6.2.2              | Consideration of geometrical factors and physical aspects                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                    | P      |
| 6.2.2.1            | Geometrical factors such factors include the following.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                    | —      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                    |        |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Remark                                                             | Result |
|                    | <p>a) The form of machinery is designed to maximize direct visibility of the working areas and hazard zones from the control position—reducing blind spots, for example—and choosing and locating means of indirect vision where necessary(mirrors, etc.) so as to take into account the characteristics of human vision, particularly when safe operation requires permanent direct control by the operator, for example:</p> <ul style="list-style-type: none"> <li>-the travelling and working area of mobile machines;</li> <li>-the zone of movement of lifted loads or of the carrier of machinery for lifting persons;</li> <li>-the area of contact of the tool of a hand-held or hand-guided machine with the material being worked.</li> </ul> <p>The design of the machine shall be such that, from the main control position, the operator is able to ensure that there are no exposed persons in the danger zones.</p> | Appropriate machine design has been performed by the manufacturer. | P      |
|                    | <p>b) The form and the relative location of the mechanical components parts: for instance, crushing and shearing hazards are avoided by increasing the minimum gap between the moving parts, such that the part of the body under consideration can enter the gap safely, or by reducing the gap so that no part of the body can enter it (see ISO 13854 and ISO 13857).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Appropriate machine design has been performed by the manufacturer. | P      |
|                    | <p>c) Avoiding sharp edges and corners, protruding parts: in so far as their purpose allows, accessible parts of the machinery shall have no sharp edges, no sharp angles, no rough surfaces, no protruding parts likely to cause injury, and no openings which can “trap” parts of the body or clothing. In particular, sheet metal edges shall be deburred, flanged or trimmed, and open ends of tubes which can cause a “trap” shall be capped.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Appropriate machine design has been performed by the manufacturer. | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                      |        |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Remark                                                                                                                               | Result |
|                    | d) The form of the machine is designed so as to achieve a suitable working position and provide accessible manual controls (actuators).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Appropriate machine design has been performed by the manufacturer.                                                                   | P      |
| 6.2.2.2            | Physical aspects                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                      | P      |
|                    | Such aspects include the following:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                      | —      |
|                    | a) limiting the actuating force to a sufficiently low value so that the actuated part does not generate a mechanical hazard;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | The actuating force has been limited to be a sufficiently low value so that the actuated part dose not generate a mechanical hazard. | P      |
|                    | b)limiting the mass and/or velocity of the movable elements, and hence their kinetic energy;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | This have been limited.                                                                                                              | P      |
|                    | - c) limiting the emissions by acting on the characteristics of the source using measures for reducing<br>1)noise emission at source (see ISO/TR 11688-1),<br>2)the emission of vibration at source, such as redistribution or addition of mass and changes of process parameters [for example, frequency and/or amplitude of movements (for hand-held and hand-guided machinery, see CR 1030-1)],<br>3)the emission of hazardous substances, including the use of less hazardous substances or dust-reducing processes (granules instead of powders, milling instead of grinding), and<br>4)radiation emissions including, for example, avoiding the use of hazardous radiation sources, limiting the power of radiation to the lowest level sufficient for the proper functioning of the machine, designing the source so that the beam is concentrated on the target, increasing the distance between the source and the operator or providing for remote operation of the machinery [measures for reducing emission of non-ionizing radiation are given in 6.3.4.5 (see also EN 12198-1 and EN 12198-3)]. | The emissions by acting on the characteristics of the source have been limited.                                                      | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                          |                                                                |        |
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| Clause             | Requirement                                                                                                                                                                                                                                              | Remark                                                         | Result |
| 6.2.3              | Taking into account the general technical knowledge regarding machine design This general technical knowledge can be derived from technical specifications for design (e.g. standards, design codes, calculation rules). These should be used to cover : |                                                                | P      |
|                    | a) mechanical stresses such as                                                                                                                                                                                                                           |                                                                | —      |
|                    | -stress limitation by implementation of correct calculation, construction and fastening methods as regards, e.g. bolted assemblies, welded assemblies                                                                                                    | Has been taken into account                                    | P      |
|                    | -stress limitation by overload prevention, (e.g. "fusible" plugs, pressure-limiting valve, breakage points, torque-limiting devices);                                                                                                                    | Has been taken into account                                    | P      |
|                    | - avoiding fatigue in elements under variable stresses(notably cyclic stresses);                                                                                                                                                                         | Has been taken into account                                    | P      |
|                    | - static and dynamic balancing of rotating elements;                                                                                                                                                                                                     | Has been taken into account                                    | P      |
|                    | b) materials and their properties such as                                                                                                                                                                                                                |                                                                | —      |
|                    | - resistance to corrosion, ageing, abrasion and wear;                                                                                                                                                                                                    | It has appropriate coating                                     | P      |
|                    | - hardness, ductility, brittleness;                                                                                                                                                                                                                      | The materials have been treated by appropriate methods         | P      |
|                    | - homogeneity                                                                                                                                                                                                                                            | The materials have been treated by appropriate methods         | P      |
|                    | - toxicity                                                                                                                                                                                                                                               | The materials is non-toxicity                                  | P      |
|                    | - flammability                                                                                                                                                                                                                                           | The materials no flammability                                  | P      |
|                    | c) emission values for:                                                                                                                                                                                                                                  |                                                                | —      |
|                    | - noise;                                                                                                                                                                                                                                                 | No noise will result in hazard in this machine.                | P      |
|                    | - vibration;                                                                                                                                                                                                                                             | No vibration will result in hazard in this machine.            | P      |
|                    | - hazardous substances;                                                                                                                                                                                                                                  | No hazardous substances will result in hazard in this machine. | P      |
|                    | - radiation.                                                                                                                                                                                                                                             | No radiation will result in hazard in this machine.            | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                             |                                                                                                      |        |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                 | Remark                                                                                               | Result |
|                    | When the reliability of particular components or assemblies is critical for safety (e.g. ropes, chains, lifting accessories for lifting loads or persons), stress values shall be multiplied by appropriate working coefficients.                                                                           | Appropriate working coefficients have been taken into account during design and calculation.         | P      |
| 6.2.4              | Choice of an appropriate technology                                                                                                                                                                                                                                                                         |                                                                                                      | N/A    |
|                    | One or more hazards can be eliminated or risks reduced by the choice of the technology to be used in certain applications, e. g.:                                                                                                                                                                           |                                                                                                      | N/A    |
|                    | a)on machines intended for use in explosive atmospheres:<br>-fully pneumatic or hydraulic control system and machine actuators:<br>-"intrinsically safe" electrical equipment (see IEC60079-11)                                                                                                             |                                                                                                      | N/A    |
|                    | b)for particular products to be processed such as a solvent:equipment assuring that the temperature will remain far below the flash point.                                                                                                                                                                  |                                                                                                      | N/A    |
|                    | c)alternative equipment to avoid high noise level,e.g.:<br>-electrical instead of pneumatic equipment<br>- in certain conditions,water cutting instead of mechanical equipment.                                                                                                                             |                                                                                                      | N/A    |
| 6.2.5              | Applying the principle of the positive mechanical action                                                                                                                                                                                                                                                    |                                                                                                      | P      |
|                    | Positive mechanical action is achieved when a moving mechanical component inevitably moves another component along with it,either by direct contact or via rigid elements. An example of this positive opening operation of switching devices in an electrical circuit<br>(see IEC 60947-5-1 and ISO 14119) | The principle of the positive mechanical action of a component on another component has been applied | P      |
| 6.2.6              | Provisions for stability                                                                                                                                                                                                                                                                                    |                                                                                                      | P      |
|                    | Machines shall be designed to have sufficient stability to allow them to be used safely in their specified conditions of use.                                                                                                                                                                               | Satisfied it.                                                                                        | P      |
|                    | Factors to be taken into account include                                                                                                                                                                                                                                                                    |                                                                                                      | —      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                  |                                                                                      |        |
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| Clause             | Requirement                                                                                                                                                                                                                      | Remark                                                                               | Result |
|                    | -geometry of the base;<br>-weight distribution,including loading;<br>-dynamic forces due to movements of parts of the machine itself,or of elements held by the machine which may result in an overturning moment;<br>-vibration | Taken into account during design.                                                    | P      |
|                    | -oscillations of the centre of gravity;                                                                                                                                                                                          |                                                                                      | N/A    |
|                    | -characteristics of the supporting surface in case of traveling or installation on different sites (e.g. ground conditions,slope);                                                                                               | Taken into account during design.                                                    | P      |
|                    | -external forces (e.g.wind pressure,manual forces)                                                                                                                                                                               | Taken into account during design.                                                    | P      |
|                    | Stability shall be considered in all phases of the life of the machine,including handling, traveling, installation,use,de-commissioning and dismantling.                                                                         | Taken into account during design.                                                    | P      |
|                    | Other protective measures for stability relevant to safeguarding are given in 6.3.2.6                                                                                                                                            | Please see the related clause.                                                       | P      |
| 6.2.7              | Provision for maintainability                                                                                                                                                                                                    |                                                                                      | P      |
|                    | When designing a machine,the following maintainability factors shall be taken into account:                                                                                                                                      |                                                                                      | —      |
|                    | -accessibility,taking into account the environment and the human body measurements,including the dimensions of the working clothes and tools used;                                                                               | These factors have been taken into account during design.                            | P      |
|                    | -ease of handling,taking into account human capabilities;                                                                                                                                                                        | These factors have been taken into account during design.                            | P      |
|                    | -limitation of the number of special tools and equipment;                                                                                                                                                                        | These factors have been taken into account during design.                            | P      |
| 6.2.8              | Observing ergonomic principles                                                                                                                                                                                                   |                                                                                      | P      |
|                    | Ergonomic principles shall be taken into account in designing machinery to reduce mental or physical stress and strain of the operator.                                                                                          | Appropriate ergonomic principles have been taken into account in designing machinery | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                             |                                                                                                    |        |
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| Clause             | Requirement                                                                                                                                                                                                                                                                                 | Remark                                                                                             | Result |
|                    | These principles shall be considered when allocating functions to operator and machine (degree of automation) in the basic design.                                                                                                                                                          | These principles have been taken into account during allocating functions to operator and machine. | P      |
|                    | Account shall be taken of body sizes likely to be found in the intended user population, strengths and postures, movement amplitudes, frequency of cyclic actions (see ISO 10075 and ISO 10075-2)                                                                                           | All these factors have been taken into account during design.                                      | P      |
|                    | All elements of the "operator-machine" interface such as controls, signaling or data display elements, shall be designed to easily understood so that clear and unambiguous interaction between the operator and the machine is possible.(see EN 614-1, ISO 6385, EN 13861 and IEC 61310-1) | All arrangement and design of manual controls have been checked in compliance with.                | P      |
|                    | Designer's attention is especially drawn to following ergonomic aspects of machine design                                                                                                                                                                                                   |                                                                                                    | —      |
|                    | a)Avoiding stressful postures and movements during use of the machine(e.g.by providing facilities to adjust the machine to suit the various operators).                                                                                                                                     | Stressful postures and movements during use of the machine have been avoided.                      | P      |
|                    | b) Designing machines, and more especially hand-held and mobile machines to enable them to be operated easily taking into account human effort, actuation of controls and hand, arm and leg anatomy.                                                                                        | This machine has been adjusted to the human strength and convenient movement.                      | P      |
|                    | c) Limit as far as possible noise, vibration and thermal effects such as extreme temperatue                                                                                                                                                                                                 | This machine with low noise, low vibration.                                                        | P      |
|                    | d) Avoid linking the operator's working rhythm to an automatic succession of cycles.                                                                                                                                                                                                        | This situation has been avoided.                                                                   | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                        |        |
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| Clause             | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Remark                                                                                                 | Result |
|                    | e) Providing local lighting on or in the machine for the illumination of the working area and of adjusting, setting-up, and frequent maintenance zones when the design features of the machine and/or its guards render the ambient lighting inadequate. Flicker, dazzling, shadows and stroboscopic effects shall be avoided if they can cause a risk. If the position of the lighting source has to be adjusted, its location shall be such that it does not cause any risk to persons making the adjustment. |                                                                                                        | N/A    |
|                    | f) Select, locate and identify manual controls(actuators) so that                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                        | —      |
|                    | - they are clearly visible and identifiable and appropriately marked where necessary(see 6.4.4)                                                                                                                                                                                                                                                                                                                                                                                                                 | All design and arrangement are compliance with this requirement.                                       | P      |
|                    | - they can be safely operated without hesitation or loss of time and without ambiguity(e.g. a standard layout of controls reduces the possibility of error when an operator changes from a machine to another one of similar type having the same pattern of operation)                                                                                                                                                                                                                                         | All design and arrangement of the control logic have been checked in compliance with this requirement. | P      |
|                    | -their location(for push-buttons) and their movement (for levers and handwheels) are consistent with their effect (see IEC 61310-3)                                                                                                                                                                                                                                                                                                                                                                             | All the function has been checked in compliance with this requirement.                                 | P      |
|                    | Where a control is designed and constructed to perform several different actions, namely where there is no one-to-one correspondence (e.g. keyboards), the action to be performed shall be clearly displayed and subject to confirmation where necessary.                                                                                                                                                                                                                                                       |                                                                                                        | N/A    |
|                    | Controls shall be so arranged that their layout, travel and resistance to operation are compatible with the action to be performed, taking account of ergonomic principles.                                                                                                                                                                                                                                                                                                                                     | All the arrangement of the control logic have been checked in compliance with this requirement         | P      |
|                    | Constraints due to the necessary or foreseeable use of personal protective equipment(such as footwear, gloves)shall be taken into account.                                                                                                                                                                                                                                                                                                                                                                      | There factors have been taken into account during design.                                              | P      |
|                    | g)Select, design and locate indicators, dials and visual display units so that                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                        | —      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                |                                                            |        |
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| Clause             | Requirement                                                                                                                                                                                                    | Remark                                                     | Result |
|                    | -they fit within the parameters and characteristics of human perception                                                                                                                                        |                                                            | P      |
|                    | -information displayed can be detected, identified and interpreted conveniently, i.e. long lasting, distinct, unambiguous and understandable with respect to the operator's requirements and the intended use; | All the information displayed comply with this requirement | P      |
|                    | -the operator is able to perceive them from the control position                                                                                                                                               |                                                            | P      |
| 6.2.9              | Preventing electrical hazard                                                                                                                                                                                   |                                                            | P      |
|                    | For the design of the electrical equipment of machines IEC 60201-1 gives general provisions, especially in clause 6 for protection against electric shock.                                                     | Please also make reference to EN 60204-1 test report.      | P      |
|                    | For requirements related to specific machines, see corresponding IEC standards(e.g. series of IEC 61029, IEC 60745, IEC 60335).                                                                                |                                                            | N/A    |
| 6.2.10             | Preventing and hydraulic hazards                                                                                                                                                                               |                                                            | P      |
|                    | Pneumatic and hydraulic equipment of machinery shall be designed so that:                                                                                                                                      |                                                            | —      |
|                    | -the maximum rated pressure cannot be exceeded in the circuits(e.g. by means of pressure limiting devices)                                                                                                     | Appropriate limiting devices have been provided.           | P      |
|                    | -no hazard results from pressure surges or rises, pressure losses or drops or losses of vacuum;                                                                                                                | No such hazards exist.                                     | P      |
|                    | -no hazardous fluid jet or sudden hazardous movement of the hose (whiplash)results from leakage or component failures;                                                                                         |                                                            | N/A    |
|                    | -air receivers, air reservoirs or similar vessels(e.g. in gas loaded accumulators)comply with the design rules for these elements;                                                                             | The devices are designed appropriately.                    | P      |
|                    | -air elements of the equipment, and especially pipes and hoses, be protected against harmful external effects;                                                                                                 | The pipes have been protected by appropriated devices.     | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                     |                                                                 |        |
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| Clause             | Requirement                                                                                                                                                                                                                                                                                                                         | Remark                                                          | Result |
|                    | -as far as possible, reservoirs and similar vessels (e.g. in gas loaded accumulators)are automatically depressurized when isolating the machine from its power supply (see 6.3.5.4) and, if it is not possible, means are provided for their isolation, local depressurizing and pressure indication (see also ISO 14118, clause 5) |                                                                 | P      |
|                    | - all elements which remain under pressure after isolation of machine from its power supply be provided with clearly identified exhaust devices, and a warning label drawing attention to the necessity of depressurizing those elements before any setting or maintenance activity on the machine. See also ISO 4413 and ISO 4414  |                                                                 | P      |
| 6.2.11             | Applying inherently safe design measures to control system                                                                                                                                                                                                                                                                          |                                                                 | P      |
| 6.2.11.1           | General                                                                                                                                                                                                                                                                                                                             |                                                                 | P      |
|                    | The design measures of the control system shall be chosen so that their safety-related performance provides a sufficient amount of risk reduction (see ISO 13849-1 or IEC 62061)                                                                                                                                                    | Inherently safe design measures to control system have applied. | P      |
|                    | The correct measures of the control systems can avoid unforeseen and potentially hazardous machine behaviour.                                                                                                                                                                                                                       | Inherently safe design measures to control system have applied. | P      |
|                    | -an unsuitable design or modification (accidental or deliberate) of the control system logic;                                                                                                                                                                                                                                       |                                                                 | P      |
|                    | - a temporary or permanent defect or a failure of one or several components of the control system;                                                                                                                                                                                                                                  |                                                                 | P      |
|                    | - a variation or a failure in the power supply of the control system;                                                                                                                                                                                                                                                               |                                                                 | P      |
|                    | - inappropriate selection, design and location of the control devices;                                                                                                                                                                                                                                                              |                                                                 | N/A    |
|                    | Typical examples of hazardous machine behaviour are:                                                                                                                                                                                                                                                                                |                                                                 | —      |
|                    | - unintended/unexpected start-up (see ISO 14188)                                                                                                                                                                                                                                                                                    | No this kind of hazard.                                         | P      |
|                    | - uncontrolled speed change;                                                                                                                                                                                                                                                                                                        | No this kind of hazard.                                         | P      |
|                    | - failure to stop moving parts;                                                                                                                                                                                                                                                                                                     | No this kind of hazard.                                         | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                       |                                                                              |        |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                           | Remark                                                                       | Result |
|                    | - dropping or ejection of a mobile part of the machine or of a workpiece clamped by the machine;                                                                                                                                                                      | No this kind of hazard.                                                      | P      |
|                    | - machine action resulting from inhibition (defeating or failure) of protective devices                                                                                                                                                                               | No this kind of hazard.                                                      | P      |
|                    | In order to prevent hazardous machine behaviour and to achieve safety functions, the design of control systems shall comply with the principles and methods presented in this subclause 6.2.11 and in 6.2.12.                                                         | The design of control systems comply with the related principles and methods | P      |
|                    | These principles and methods shall be applied singly or in combination as appropriate to the circumstances (see ISO 13849-1 and EN 60204-1 and IEC 62061).                                                                                                            | Please see the related clause.                                               | P      |
|                    | Control systems shall be designed to enable the operator to interact with the machine safely and easily; this requires one or several of the following solutions;                                                                                                     |                                                                              | —      |
|                    | -systematic analysis of start and stop conditions;                                                                                                                                                                                                                    | Systematic analysis have been applied.                                       | P      |
|                    | -provision for specific operating modes (e.g. start-up after normal stop. restart after cycle interruption or after emergency stop. removal of the workpieces contained in the machine, operation of a part of the machine in case of a failure of a machine element) | Enough provisions have been provided.                                        | P      |
|                    | -clear display of the faults;                                                                                                                                                                                                                                         |                                                                              | P      |
|                    | -measures to prevent accidental generation of unexpected start commands (e.g. shrouded start device) likely to cause dangerous machine behaviour (see ISO 14118 figure 1)                                                                                             | Main switch with lock and related devices are provided.                      | P      |
|                    | -maintained stop commands (e.g. interlock) to prevent restarting that could result in dangerous machine behaviour (see ISO 14118:2000,figure 1)                                                                                                                       | This requirement is complied with.                                           | P      |
|                    | An assembly of machines may be divided into several zones for emergency stopping, for stopping as a result of protective devices and/or for isolation and energy dissipation.                                                                                         |                                                                              | N/A    |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                   |        |        |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                                       | Remark | Result |
|                    | The different zones shall be clearly defined and it shall be obvious which parts of the machine belong to which zone.                                                                                                                                                                                                             |        | N/A    |
|                    | Likewise it shall be obvious which control devices (e.g. emergency stop devices, supply disconnecting devices) and/or protective devices belong to which zone.                                                                                                                                                                    |        | N/A    |
|                    | The interfaces between zones shall be designed such that no function in one zone creates hazards in another zone which has been stopped for an intervention.                                                                                                                                                                      |        | N/A    |
|                    | Control systems shall be designed to limit the movements of parts of the machinery, the machine itself, or workpieces and/or loads held by the machinery, to the safe design parameters (e.g. range, speed, acceleration, deceleration, load capacity). Allowance shall be made for dynamic effects (e.g. the swinging of loads). |        | N/A    |
|                    | For example:                                                                                                                                                                                                                                                                                                                      |        | -      |
|                    | -the traveling speed of mobile pedestrian controlled machinery other than remote-controlled shall be compatible with walking speed.                                                                                                                                                                                               |        | N/A    |
|                    | -the range, speed, acceleration and deceleration of movements of the person-carrier and carrying vehicle for lifting persons shall be limited to non-hazardous values, taking into account the total reaction time of the operator and the machine.                                                                               |        | N/A    |
|                    | -the range of movements of parts of machinery for lifting loads shall be kept within specified limits.                                                                                                                                                                                                                            |        | N/A    |
|                    | When machinery is designed to use synchronously different elements which can also be used independently the control system shall be designed to prevent risks due to lack of synchronization.                                                                                                                                     |        | N/A    |
| 6.2.11.2           | Starting of internal power source/switching on an external power supply.                                                                                                                                                                                                                                                          |        | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                       |        |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                                                                                                         | Remark                                                                                                                | Result |
|                    | The starting of an internal power source or switching-on of an external power supply shall not result in a hazardous situation. For example:<br>-starting the internal combustion engine shall not lead to movement of a mobile machine;<br>-connection to mains electricity supply shall not result in the starting of working parts of a machine. See EN 60204-1, 7.5 (see also Annexes A and B). | Please also make reference to EN 60204-1 test report.                                                                 | P      |
| 6.2.11.3           | Starting/stopping of a mechanism                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                       | P      |
|                    | The primary action for starting or accelerating the movement of a mechanism should be performed by passage from state 0 to state 1(if state 1 represents the highest energy state)                                                                                                                                                                                                                  | This requirement has been taken into account during design.                                                           | P      |
|                    | The primary action for stopping or slowing down should be performed by removal or reduction of voltage or fluid pressure, or, if binary logic elements are considered, by passage from state 1 to 0 (if state 1 represents the highest energy state).                                                                                                                                               | The type of stopping of this machine belongs to state 1 and state 0.                                                  | P      |
|                    | When, in order for the operator to maintain permanent control of deceleration, this principle not observed(e.g. a hydraulic braking vice of a self-propelled mobile machine),the machine shall be equipped with a means of slowing and stopping in case of failure of the main braking system                                                                                                       | No such situation exist.                                                                                              | P      |
| 6.2.11.4           | Restart after power interruption                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                       | P      |
|                    | If it may generate a hazard,the spontaneous restart of a machine when it is re—energized alter power interruption shall be prevented (e.g. by use of a self-maintained relay, contactor or valve).                                                                                                                                                                                                  | The spontaneous restart of amachine when it is re-energized after power interruption has been prevented by contactor. | P      |
| 6.2.11.5           | Interruption of power supply situations resulting from interruption or excessive fluctuation of the power supply. At least the following requirements shall be met:                                                                                                                                                                                                                                 |                                                                                                                       | —      |
|                    | -the stopping function of the machinery shall remain;                                                                                                                                                                                                                                                                                                                                               |                                                                                                                       | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                              |                                                 |        |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                  | Remark                                          | Result |
|                    | -all devices whose permanent operation is required for safety shall operation an effective way to maintain safety(e.g. locking, clamping devices, cooling or heating devices, power-assisted steering of self-propelled mobile machinery);                   |                                                 | P      |
|                    | -parts of machinery or workpieces and/or loads held by machinery which are liable to move as a result of potential energy shall be retained for the time necessary to allow them to be safely lowered                                                        | No such situation exists.                       | N/A    |
| 6.2.11.6           | Use of automatic monitoring                                                                                                                                                                                                                                  |                                                 | P      |
|                    | Automatic monitoring is intended to ensure that a safety function(s) implemented by a protective measure do(es) not fail to be performed if the ability of a component or an element to perform its function is diminished ,or if the process conditions are | Appropriate automatic monitoring has been used. | P      |
|                    | Automatic monitoring either detects a fault immediately or carries out periodic checks so that a fault is detected before the next demand upon the safety function.                                                                                          | Appropriate automatic monitoring has been used. | P      |
|                    | In either case, the protective measure can be initiated immediately or delayed until a specific event occurs (e.g. the beginning of the machine cycle) The protective measures may be, e.g.:                                                                 | Appropriate automatic monitoring has been used. | P      |
|                    | -the stopping of the hazardous process;                                                                                                                                                                                                                      | Emergency stop is provided                      | P      |
|                    | -preventing the re-start of this process after the first stop following the failure;                                                                                                                                                                         | Reset before restart is necessary               | P      |
|                    | -the triggering of an alarm                                                                                                                                                                                                                                  |                                                 | N/A    |
| 6.2.11.7           | Safety functions implemented by programmable electronic control systems                                                                                                                                                                                      |                                                 | N/A    |
| 6.2.11.7.1         | General                                                                                                                                                                                                                                                      |                                                 | N/A    |
|                    | A control system including programmable electronic equipment(e.g. programmable controllers)can be used to implement safety functions machinery                                                                                                               |                                                 | N/A    |
|                    | equipment(e.g. programmable controllers) can be used to implement safety functions machinery                                                                                                                                                                 |                                                 | N/A    |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                           |        |        |
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| Clause             | Requirement                                                                                                                                                                                                                                                               | Remark | Result |
|                    | The design of the programmable electronic control system shall be such that the probability of random hardware failures and the likelihood of systematic failures that can adversely affect the performance of the safety—related control function(s)are sufficiently low |        | N/A    |
|                    | Where a programmable electronic control system performs a monitoring function, the system behaviour on detection of a fault shall be considered(see also IEC 61 508 series for further guidance)                                                                          |        | N/A    |
|                    | The programmable electronic control system should be installed and validated to ensure that the specified performance(e.g. safety integrity level(SIL)in IEC 61 508 series)for each safety function has been achieved                                                     |        | N/A    |
|                    | Validation comprises testing an analysis(e.g. static,dynamic or failure analysis)to show that all parts interact correctly to perform the safety function and that unintended functions do not occur                                                                      |        | N/A    |
| 6.2.11.7.2         | Hardware aspects                                                                                                                                                                                                                                                          |        | N/A    |
|                    | The hardware(including e.g. sensors, actuators,logic solvers)shall be selected (and/or designed)and installed to meet both the functional and performance requirements of the safety function(s)to be performed, in particular,by means of:                               |        | N/A    |
|                    | -architectural constraints(e.g. the configuration of the system, its ability to tolerate faults ·its behaviour on detection of a fault):                                                                                                                                  |        | N/A    |
|                    | -selecting (and/or designing) equipment and devices with an appropriate probability of dangerous random hardware failure;                                                                                                                                                 |        | N/A    |
|                    | Incorporating measures and techniques within the hardware to avoid systematic failures and control systematic faults.                                                                                                                                                     |        | N/A    |
| 6.2.11.7.3         | Software aspects                                                                                                                                                                                                                                                          |        | N/A    |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                     |                                                                                                                     |        |
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| Clause             | Requirement                                                                                                                                                                                                                                                                                                         | Remark                                                                                                              | Result |
|                    | The software (including internal operating software(or system software) and application software) shall be designed so as to satisfy the performance specification for the safety functions (see also IEC 61508-3)                                                                                                  |                                                                                                                     | N/A    |
|                    | Application software                                                                                                                                                                                                                                                                                                |                                                                                                                     | N/A    |
|                    | Application software should not be re-programmable by the user.                                                                                                                                                                                                                                                     |                                                                                                                     | N/A    |
|                    | This may be achieved by use of embedded software in a non re-programmable memory (e.g. micro-controller, application specific integrated circuit (ASIC)                                                                                                                                                             |                                                                                                                     | N/A    |
|                    | When the application requires reprogramming by the user, the access o the software dealing with safety functions should be restricted e.g. by :<br>-locks;<br>-passwords for the authorized persons                                                                                                                 |                                                                                                                     | N/A    |
| 6.2.11.8           | Principles relating to manual control                                                                                                                                                                                                                                                                               |                                                                                                                     | P      |
|                    | a)Manual control devices shall be designed and located according to the relevant ergonomic principles given in 6.2.8                                                                                                                                                                                                | Manual control devices have been designed and located according to the relevant ergonomic principles given in 4.8.7 | P      |
|                    | b)A stop control device shall be placed near each start control device. Where the start /stop function is performed by means of a hold-to-run control, a separate stop control device shall be provided when a risk can result from the hold-to-run control device failing to deliver a stop command when released. | A stop control device has been placed near each start control device.                                               | P      |
|                    | c) Manual controls shall be located out of reach of the danger zones (see IEC 61310-3), except for certain controls where, of necessity, they are located within a danger zone, such as emergency stop or teach pendant.                                                                                            | Manual controls have been located out of reach of the danger zones.                                                 | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                      |        |
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| Clause             | Requirement                                                                                                                                                                                                                                                                                                                                         | Remark                                                                                                                               | Result |
|                    | d) Whenever possible, control devices and control positions shall be located so that the operator is able to observe the working area or hazard zone.                                                                                                                                                                                               | The control devices and control positions have been located so that the operator is able to observe the working area or hazard zone. | P      |
|                    | The driver of a ride-on mobile machine shall be able to actuate all control devices required to operate the machine from the driving position, except for functions which can be controlled more safely from other positions.                                                                                                                       |                                                                                                                                      | N/A    |
|                    | On machinery intended for lifting persons, controls for lifting and lowering and, if appropriate, for moving the carrier, shall generally be located in the carrier.<br><br>If safe operation requires controls to be situated outside the carrier, the operator in the carrier shall be provided with the means of preventing hazardous movements. |                                                                                                                                      | N/A    |
|                    | e) if it is possible to start the same hazardous element by means of several controls, the control circuit shall be so arranged that only one control is effective at a given time. This applies especially to machines which can be manually controlled unit (teach pendant, for instance), with which the operator may enter danger zones.        |                                                                                                                                      | N/A    |
|                    | f) Control actuators shall be designed or guarded so that their effect, where a risk is involved, cannot occur without intentional operation (see ISO 9355-1 and ISO 447)                                                                                                                                                                           |                                                                                                                                      | P      |
|                    | g) For machine functions whose safe operation depends on permanent, direct control by the operator, measures shall be taken to ensure the presence of the operator at the control position, e.g. by the design and location of control devices.                                                                                                     |                                                                                                                                      | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                                                                                                             |        |        |
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| Clause             | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                 | Remark | Result |
|                    | g) For machine functions whose safe operation depends on permanent, direct control by the operator, measures shall be taken to ensure the presence of the operator at the control position, e.g. by the design and location of control devices.                                                                                                                                                                             |        | P      |
|                    | h) For cableless control an automatic stop shall be performed when correct control signals are not received, including loss of communication(see EN 60204-1)                                                                                                                                                                                                                                                                |        | N/A    |
| 6.2.11.9           | Control mode for setting, teaching, process changeover, fault-finding, cleaning or maintenance                                                                                                                                                                                                                                                                                                                              |        | N/A    |
|                    | Where, for setting, teaching, process changeover, fault-finding, cleaning or maintenance of machinery, a guard has to be displaced or removed and /or a protective device has to be disabled, and where it is necessary for the purpose of these operations for the machinery or part of the machinery to be put in operation, safety of the operator shall be achieved using a specific control mode which simultaneously: |        | N/A    |
|                    | -disables all other control modes;                                                                                                                                                                                                                                                                                                                                                                                          |        | N/A    |
|                    | -permits operation of the hazardous elements only by continuous actuation of an enabling device, a hold-to-run control device or a two –hand control device;                                                                                                                                                                                                                                                                |        | N/A    |
|                    | -permits operation of the hazardous elements only in reduced risk conditions (e.g. reduced speed, reduced power/force, step-operation, e. g. with a limited movement control device)                                                                                                                                                                                                                                        |        | N/A    |
|                    | Prevents any operation of hazardous functions by voluntary or involuntary action on the machine's sensors.                                                                                                                                                                                                                                                                                                                  |        | N/A    |
|                    | This control mode shall be associated with one or more of following measures:                                                                                                                                                                                                                                                                                                                                               |        | N/A    |
|                    | -restriction of access to the danger zone as far as possible.                                                                                                                                                                                                                                                                                                                                                               |        | N/A    |
|                    | -emergency stop control within immediate reach of the operator;                                                                                                                                                                                                                                                                                                                                                             |        | N/A    |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                   |        |        |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                       | Remark | Result |
|                    | h) For cableless control an automatic stop shall be performed when correct control signals are not received, including loss of communication (see EN 60204-1)                                                                                                                                                     |        | N/A    |
| 6.2.11.10          | Selection of control and operating modes                                                                                                                                                                                                                                                                          |        | N/A    |
|                    | If machinery has been designed and built to allow for its use in several control or operating modes requiring different protective measures and /or work procedures(e.g. to allow for adjustment, setting, maintenance, inspection),it shall be fitted with a mode selector which can be locked in each position. |        | N/A    |
|                    | Each position of the selector shall be clearly identifiable and shall exclusively allow one control or operating mode.                                                                                                                                                                                            |        | N/A    |
|                    | The selector may be replaced by another selection means which restricts the use of certain functions of the machinery to certain categories of operators (e.g. access codes for certain numerically controlled functions).                                                                                        |        | N/A    |
| 6.2.11.11          | Applying measures achieve electromagnetic Compatibility                                                                                                                                                                                                                                                           |        | N/A    |
|                    | For guidance on electromagnetic compatibility, see IEC60204-1, and IEC61000-6 series                                                                                                                                                                                                                              |        | N/A    |
| 6.2.11.12          | Provision of diagnostic systems to aid fault-finding                                                                                                                                                                                                                                                              |        | N/A    |
|                    | Diagnostic systems to aid fault finding should be included in the control system so that there is no need to disable any protective measures                                                                                                                                                                      |        | N/A    |
| 6.2.12             | Minimizing the probability of failure of safety functions                                                                                                                                                                                                                                                         |        | P      |
| 6.2.12.1           | General                                                                                                                                                                                                                                                                                                           |        | P      |
|                    | Safety of machinery is not only dependent on the reliability of the control systems but also on the reliability of all parts of the machine. The continued operation of the safety functions is essential for the safe use of the machine. This can be achieved by:                                               |        | P      |
| 6.2.12.2           | Use of reliable components                                                                                                                                                                                                                                                                                        |        | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                    |        |
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| Clause             | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Remark                             | Result |
|                    | “Reliable component” means components which are capable of withstanding all disturbances and stresses associated with the usage of the equipment in the conditions of intended use (including the environmental conditions), for the period of time or the probability of operations fixed for the use, with a low probability of failures generating a hazardous malfunctioning of the machine. Components shall be selected taking into account all factors mentioned above (see also 6.2.13 | Reliable components have been used | P      |
| 6.2.12.3           | Use of “oriented failure mode” components                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                    | N/A    |
|                    | “Oriented failure mode” components or systems are those in which the predominant failure mode is known in advance and which can be used so that such a failure leads to a non-hazardous alteration of the machine function                                                                                                                                                                                                                                                                     |                                    | N/A    |
|                    | The use of such components should always be considered particularly in cases where redundancy is (see 6.2.12.4) not employed                                                                                                                                                                                                                                                                                                                                                                   |                                    | N/A    |
| 6.2.12.4           | Duplication (or redundancy) of components or subsystems                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                    | N/A    |
|                    | In the design of safety-related parts of the machine, duplication (or redundancy) of components may be used so that if one component fails, another component (or other components) continue(s) to perform its (their) function, thereby ensuring that the safety function remains available                                                                                                                                                                                                   |                                    | N/A    |
|                    | In order to allow the proper action to be initiated, component failure shall be preferably detected by automatic monitoring (see 6.2.1 1.6) or in some circumstances by regular inspection,                                                                                                                                                                                                                                                                                                    |                                    | N/A    |
|                    | provided that the inspection interval is shorter than the expected lifetime of the components.                                                                                                                                                                                                                                                                                                                                                                                                 |                                    | N/A    |
|                    | Diversity of design and/or technology can be used to avoid common cause failures (e.g. from electromagnetic disturbance) or common mode failures.                                                                                                                                                                                                                                                                                                                                              |                                    | N/A    |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                             |                                                      |        |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                 | Remark                                               | Result |
| 6.2.13             | Limiting exposure to hazards through reliability of equipment                                                                                                                                                                                                               |                                                      | P      |
|                    | Increased reliability of all component parts of machinery reduces the frequency of incidents requiring rectification, thereby reducing exposure to hazards.                                                                                                                 |                                                      | P      |
|                    | This applies to power systems (operative part) as well as to control systems, to safety functions as well as to other functions of machinery.                                                                                                                               |                                                      | P      |
|                    | Safety-critical components (as e.g. certain sensors) with known reliability shall be used.                                                                                                                                                                                  | Safety-critical components are used in this machine. | P      |
|                    | The elements of guards and of protective services shall be particularly reliable, as their failure can expose persons to hazards, and also as poor reliability would encourage attempts to defeat them.                                                                     |                                                      | P      |
| 6.2.14             | Limiting exposure to hazards through mechanization or automation of loading(feeding) /unloading (removal) operations                                                                                                                                                        |                                                      | P      |
|                    | Mechanization and automation of machine loading/unloading operations and more generally of handling operations (of work pieces, materials, substances) limit the risk generated by these operations by reducing the exposure of persons to hazards at the operating points. |                                                      | P      |
|                    | Automation can be achieved e.g. by robots, handling devices. transfer mechanisms, air blast equipment.                                                                                                                                                                      |                                                      | P      |
|                    | Mechanization can be achieved, e.g. by feeding slides, push rods, hand-operated indexing tables.                                                                                                                                                                            |                                                      | P      |
|                    | While automatic feeding and removal devices have much to offer in preventing accidents to machine operators, they can create danger when any faults are being rectified.                                                                                                    | Appropriate provisions have been provided.           | P      |
|                    | Care shall be taken to ensure that the use of these devices does not introduce further hazards (e.g. trapping, crushing) between the devices and parts of the machine or workpieces/materials being processed.                                                              | These devices will not introduce further hazards     | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                            |        |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                                | Remark                                                                                                                                                                                                     | Result |
|                    | Suitable safeguards (see 6.3) shall be provided if this cannot be ensured.                                                                                                                                                                                                                                                 | Please see the related clause                                                                                                                                                                              | P      |
|                    | Automatic feeding and removal devices with their own control systems and the control systems of the associated machine shall be interconnected after thoroughly studying how all safety functions are performed in all control and operation modes of the whole equipment.                                                 |                                                                                                                                                                                                            | P      |
| 6.2.15             | Limiting exposure to hazards through location of the setting and maintenance points outside of danger zones.                                                                                                                                                                                                               |                                                                                                                                                                                                            | P      |
|                    | The need for access to danger zones shall be minimized by locating maintenance, lubrication and setting points outside these zones.                                                                                                                                                                                        |                                                                                                                                                                                                            | P      |
| 6.3                | Safeguarding and complementary protective measures                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                            | —      |
| 6.3.1              | General                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                            | —      |
|                    | Guards and protective devices shall be used to protect persons whenever inherently safe design does not reasonably make it possible either to remove hazards or to sufficiently reduce risks. Complementary protective measures involving additional equipment (e.g. emergency stop equipment )may have to be implemented. | Appropriate guards and protective devices have been used to protect persons whenever inherently safe design does not reasonably make it possible either to remove hazards or to sufficiently reduce risks. | P      |
|                    | The different kinds of guards and protective devices are defined in 3.27 and 3.28.                                                                                                                                                                                                                                         | Please see the related clause                                                                                                                                                                              | P      |
|                    | Certain safeguards may be used to avoid exposure to more than one hazard (e.g. a fixed guard preventing access to a zone where a mechanical hazard is present being used to reduce noise level and collect toxic emissions)                                                                                                | Such safeguards exist                                                                                                                                                                                      | P      |
| 6.3.2              | Selection and implementation of guards and protective devices                                                                                                                                                                                                                                                              |                                                                                                                                                                                                            | P      |
| 6.3.2.1            | General                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                            | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                     |        |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                    | Remark                                              | Result |
|                    | This subclause gives guidelines for the selection and the implementation of guards and protective devices the primary purpose of which is to protect persons against hazard generated by moving parts, according to the nature of those parts(see figure 4)and to the need for access to the danger zone(s)                                                                                                                                    | Please see the related clause                       | P      |
|                    | The exact choice of a safeguard for a particular machine shall be made on the basis of the risk assessment for that machine                                                                                                                                                                                                                                                                                                                    | Please see the related clause.                      | P      |
|                    | In selecting an appropriate safeguard for a particular type of machinery or hazard zone, it shall be borne in mind that a fixed guard is simple and shall be used where access of an operation (operation without any malfunction) of the machinery.                                                                                                                                                                                           |                                                     | P      |
|                    | As the need for frequency of access increase this inevitably leads to the fixed guard not being replaced                                                                                                                                                                                                                                                                                                                                       |                                                     | P      |
|                    | This requires the use of an alternative protective measure (movable interlocking guard, sensitive protective equipment.)                                                                                                                                                                                                                                                                                                                       | Movable interlocking guard is used.                 | P      |
|                    | A combination of safeguards may sometimes be required. For example, where, in conjunction with a fixed guard, a mechanical loading(feeding) device is used to feed a workpiece into a machine, thereby removing the need for assess to the primary hazard zone, a trip device may be requiring hazard between the secondary drawing-in or shearing hazard between the mechanical loading(feeding) device, when reachable, and the fixed guard. |                                                     | N/A    |
|                    | Consideration shall be given enclosure of control positions or intervention zones to provide combined protection against several hazards which may include:                                                                                                                                                                                                                                                                                    | This requirement has been taken into consideration. | P      |
|                    | - hazards from falling or ejected objects(e.g. falling object protection structure)                                                                                                                                                                                                                                                                                                                                                            | No such hazards exist in this machine.              | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |        |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                                                                                                                 | Remark                                 | Result |
|                    | - emission hazards(e.g. protection against noise, vibration, radiation , harmful substances)                                                                                                                                                                                                                                                                                                                | No such hazards exist in this machine. | P      |
|                    | - hazards due to the environment(e.g. protection against heat, cold, foul weather)                                                                                                                                                                                                                                                                                                                          | No such hazards exist in this machine. | P      |
|                    | - hazards due to tipping over or rolling over of machinery(e.g. roll-over or tip-over protection structure)                                                                                                                                                                                                                                                                                                 | No such hazards exist in this machine. | P      |
|                    | The design of such enclosed work stations(e.g. cabs and cabins) shall take into account ergonomic principles concerning visibility,lighting, atmospheric conditions, access, posture.                                                                                                                                                                                                                       | No such hazards exist in this machine. | P      |
| 6.3.2.2            | Where access to the hazard zone is not required during normal operation                                                                                                                                                                                                                                                                                                                                     |                                        | P      |
|                    | Where access to the hazard zone is not required during normal operation of the machinery, safeguard should be selected from the following:                                                                                                                                                                                                                                                                  |                                        | P      |
|                    | a) fixed guard (see also ISO 14120)                                                                                                                                                                                                                                                                                                                                                                         | Fixed guards are provided.             | P      |
|                    | b) interlocking guard with or without guard locking (see also 6.3.3.2.3, ISO 14119, ISO 14120);                                                                                                                                                                                                                                                                                                             | Provided.                              | P      |
|                    | c) self-closing guard (see ISO 14120, 3.3.2)                                                                                                                                                                                                                                                                                                                                                                |                                        | N/A    |
|                    | d) sensitive protective equipment, e.g. electro-sensitive protective equipment (see IEC 61496) or pressure sensitive mat (see ISO 13856)                                                                                                                                                                                                                                                                    |                                        | N/A    |
| 6.3.2.3            | Where access to the hazard zone is required during normal operation                                                                                                                                                                                                                                                                                                                                         |                                        | N/A    |
|                    | Where access to the hazard zone is required during normal operation of the machinery , safeguards should be selected from the following:<br>a)interlocking guard with or without guard locking (see also ISO 14119, ISO 14120 and 6.3.3.2.3 of this standard);<br>b)sensitive protective equipment, e.g electro-sensitive protective equipment (see IEC 61496)<br>c)two-hand control device (see ISO 13851) |                                        | N/A    |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                      |        |        |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                          | Remark | Result |
| 6.3.2.4            | Where access to the hazard zone is required for machine setting, teaching, process changeover, fault finding, cleaning or maintenance.                                                                                                                                                                               |        | N/A    |
|                    | As far as possible, machines shall be designed so that the safeguards provided for the protection of the production operator may ensure also the protection of personnel in charge of setting, teaching, process changeover, fault finding, cleaning or maintenance without hindering them in performing their task. |        | N/A    |
|                    | Such tasks shall be identified and considered in the risk assessment as parts of the use of the machine (see 5.2)                                                                                                                                                                                                    |        | N/A    |
| 6.3.2.5            | Selection and implementation of sensitive protective equipment                                                                                                                                                                                                                                                       |        | N/A    |
| 6.3.2.5.1          | Selection                                                                                                                                                                                                                                                                                                            |        | N/A    |
|                    | Due to the great diversity of the technologies on which their detection function is based, all types of sensitive protective equipment are far from being equally suitable for safety applications.                                                                                                                  |        | N/A    |
|                    | The following provisions are intended to provide the designer with criteria for selecting , for each application, the most suitable device(s).                                                                                                                                                                       |        | N/A    |
|                    | Types of sensitive protective equipment include, e.g.:                                                                                                                                                                                                                                                               |        | N/A    |
|                    | - light curtains;                                                                                                                                                                                                                                                                                                    |        | N/A    |
|                    | - scanning devices as, e.g. laser scanners;                                                                                                                                                                                                                                                                          |        | N/A    |
|                    | - pressure sensitive mats;                                                                                                                                                                                                                                                                                           |        | N/A    |
|                    | - trip bars, trip wires.                                                                                                                                                                                                                                                                                             |        | N/A    |
|                    | Sensitive protective equipment can be used:                                                                                                                                                                                                                                                                          |        | N/A    |
|                    | - for tripping purposes;                                                                                                                                                                                                                                                                                             |        | N/A    |
|                    | - for presence sensing;                                                                                                                                                                                                                                                                                              |        | N/A    |
|                    | - for both tripping and presence sensing                                                                                                                                                                                                                                                                             |        | N/A    |
|                    | - to re-initiate machine operation, a practice which is subject to stringent conditions.                                                                                                                                                                                                                             |        | N/A    |
|                    | The following characteristics of the machinery, among others, can preclude the sole use of sensitive protective equipment:                                                                                                                                                                                           |        | N/A    |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                         |        |        |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                             | Remark | Result |
|                    | - tendency for the machinery to eject materials or component parts;                                                                                                                                                                                                     |        | N/A    |
|                    | - necessity to guard against emissions (noise, radiation, dust, etc.)                                                                                                                                                                                                   |        | N/A    |
|                    | - erratic or excessive machine stopping time;                                                                                                                                                                                                                           |        | N/A    |
|                    | - inability of a machine to stop part-way through a cycle.                                                                                                                                                                                                              |        | N/A    |
| 6.3.2.5.2          | Implementation                                                                                                                                                                                                                                                          |        | N/A    |
|                    | consideration should be given to :                                                                                                                                                                                                                                      |        | N/A    |
|                    | a) size, characteristics and positioning of the detection zone (see ISO 13855, which deals with the positioning of some types of sensitive protective equipment)                                                                                                        |        | N/A    |
|                    | b) reaction of the device to fault conditions (see IEC 61496 for electro-sensitive protective equipment)                                                                                                                                                                |        | N/A    |
|                    | c) possibility of circumvention                                                                                                                                                                                                                                         |        | N/A    |
|                    | d) detection capability and its variation over the course of time (e.g. as a result of its susceptibility to different environmental conditions such as the presence of reflecting surfaces, other artificial light sources, sunlight or impurities in the air.         |        | N/A    |
|                    | sensitive protective equipment shall be integrated in the operative part and associated with the control system of the machine so that :                                                                                                                                |        | N/A    |
|                    | - a command is given as soon as a person or part of a person is detected ;                                                                                                                                                                                              |        | N/A    |
|                    | - the withdrawal of the person or part of a person detected does not, by itself, restart the hazardous machine function(s); therefore, the command given by the sensitive protective equipment shall be maintained by the control system until a new command is given ; |        | N/A    |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |        |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Remark | Result |
|                    | - restarting the hazardous machine function(s) results from the voluntary actuation , by the operator, of a control device placed outside the hazard zone , where this zone can be observed by the operator ;                                                                                                                                                                                                                                                                                                                                                                                       |        | N/A    |
|                    | -the machine cannot operate during interruption of the detection function of the sensitive protective equipment,except during muting phases ;                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        | N/A    |
|                    | - the position and the shape of detection field prevents,possibly together with fixed guards , a person or part of a person from entering the hazard zone ,or being present in it , without being detected .                                                                                                                                                                                                                                                                                                                                                                                        |        | N/A    |
| 6.3.2.5.3          | Additional requirements for sensitive protective equipment when used for cycle initiation .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        | N/A    |
|                    | In this exceptional application, starting of the machine cycle is initiated by the withdrawal of a person or of the detected part of a person from the sensing field of the sensitive protective equipment , without any additional start command , hence deviating from the general requirement given in the second point of the dashed list in 6.3.2.5.2, above .After switching on the power supply ,or when the machine has been stopped by the tripping function of the sensitive protective equipment , the machine cycle shall be initiated only by voluntary actuation of a start control . |        | N/A    |
|                    | Cycle initiation by sensitive protective equipment shall be subject to the following conditions :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        | N/A    |
|                    | a)only active optoelectronic protective devices (AOPDs) complying with IEC 61496 series shall be used ;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        | N/A    |
|                    | b) the requirements for an AOPD used as a tripping and presence-sensing device (see IEC 61496 ) are satisfied in particular, location, minimum distance (see ISO 13855),detection capability,reliability and monitoring of control and braking systems;                                                                                                                                                                                                                                                                                                                                             |        | N/A    |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                              |        |        |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                  | Remark | Result |
|                    | c) the cycle time of machine is short and the facility to re-initiate the machine upon clearing of the sensing field is limited to a period commensurate with a single normal cycle;                                                                                                         |        | N/A    |
|                    | d) entering the sensing field of the AOPD(s) or opening interlocking guards is the only way to enter the hazard zone;                                                                                                                                                                        |        | N/A    |
|                    | e) if there is more than one AOPD safeguarding the machine, only one of the AOPD(s) is capable of cycle re-initiation;                                                                                                                                                                       |        | N/A    |
|                    | f) with regard to the higher risk resulting from automatic cycle initiation, the AOPD and the associated control system comply with a higher safety-related performance than under normal conditions.                                                                                        |        | N/A    |
| 6.3.2.6            | Protective measures for stability                                                                                                                                                                                                                                                            |        | P      |
|                    | If stability cannot be achieved by inherently safe design measures such as weight distribution(see 4.6), it will be necessary to maintain it by protective measures such as the use of :                                                                                                     |        | –      |
|                    | - anchorage bolts;                                                                                                                                                                                                                                                                           |        | P      |
|                    | - locking devices                                                                                                                                                                                                                                                                            |        | N/A    |
|                    | - movement limiters or mechanical stops;                                                                                                                                                                                                                                                     |        | N/A    |
|                    | - acceleration or deceleration limiters;                                                                                                                                                                                                                                                     |        | N/A    |
|                    | - load limiters;                                                                                                                                                                                                                                                                             |        | N/A    |
|                    | - alarms warning of the approach to stability or tipping limits;                                                                                                                                                                                                                             |        | N/A    |
| 6.3.2.7            | Other protective devices                                                                                                                                                                                                                                                                     |        | N/A    |
|                    | When a machine requires continuous control by the operator(e. g. mobile machines,cranes) and an error of the operator can generate a hazardous situation, this machine shall be equipped with the necessary devices to enable the operation to remain within specified limits, in particular |        | N/A    |
|                    | - when the operator has insufficient visibility of the hazard zone;                                                                                                                                                                                                                          |        | N/A    |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                  |        |        |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                      | Remark | Result |
|                    | - when the operator lacks knowledge of the actual value of a safety-related parameter (e. g. a distance, a speed, the mass of a load, the angle of a slope)                                                                                                                                      |        | N/A    |
|                    | -when hazards may result from operation other than those controlled by the operator;                                                                                                                                                                                                             |        | N/A    |
|                    | The necessary devices include:                                                                                                                                                                                                                                                                   |        | -      |
|                    | - devices for limiting parameters of movement (distance, angle, velocity , acceleration)                                                                                                                                                                                                         |        | N/A    |
|                    | - overloading and moment limiting devices:                                                                                                                                                                                                                                                       |        | N/A    |
|                    | - devices to prevent collisions or interference with other machines;                                                                                                                                                                                                                             |        | N/A    |
|                    | -device for preventing hazards to pedestrian operators of mobile machinery or other pedestrians:                                                                                                                                                                                                 |        | N/A    |
|                    | - torque limiting devices, breakage points to prevent excessive stress of components and assemblies;                                                                                                                                                                                             |        | N/A    |
|                    | - devices for limiting pressure. temperature;                                                                                                                                                                                                                                                    |        | N/A    |
|                    | - devices for monitoring emissions;                                                                                                                                                                                                                                                              |        | N/A    |
|                    | - devices prevent operation in the absence of the operator at the control position;                                                                                                                                                                                                              |        | N/A    |
|                    | - device to prevent lifting operations unless stabilizers are in place;                                                                                                                                                                                                                          |        | N/A    |
|                    | - devices to ensure that components are in a safe position before traveling;                                                                                                                                                                                                                     |        | N/A    |
|                    | Automatic protective measures triggered by such devices which take operation of the machinery out of the control of the operator (e.g. automatic stop of hazardous movement) should be preceded or accompanied by a warning signal to enable the operator to take appropriate action (see 6.4.3) |        | N/A    |
| 6.3.3              | Requirements for the design of guards and protective devices                                                                                                                                                                                                                                     |        | P      |
| 6.3.3.1            | General requirements                                                                                                                                                                                                                                                                             |        | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                 |        |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Remark                                                          | Result |
|                    | Guards and protective devices shall be designed to be suitable for the intended use taking into account mechanical and other hazards involved. Guards and protective devices shall be compatible with the working environment of the machine and designed so that they cannot be easily defeated. They shall provide the minimum possible interference with activities during operation and other phases of machine life, in order to reduce any incentive to defeat them. | Guards and protective devices have been appropriately designed. | P      |
|                    | Guards and protective devices shall :                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                 | —      |
|                    | - be of robust construction.                                                                                                                                                                                                                                                                                                                                                                                                                                               | This requirement has been taken into account during design.     | P      |
|                    | - not give rise to any additional hazard;                                                                                                                                                                                                                                                                                                                                                                                                                                  | This requirement has been taken into account during design.     | P      |
|                    | -not be easy to by-pass or render non-operational;                                                                                                                                                                                                                                                                                                                                                                                                                         | This requirement has been taken into account during design.     | P      |
|                    | -be located at an adequate distance from the danger zone (see ISO 13857 and ISO 13855).                                                                                                                                                                                                                                                                                                                                                                                    | This requirement has been taken into account during design.     | P      |
|                    | -cause minimum obstruction to the view of the production process:                                                                                                                                                                                                                                                                                                                                                                                                          | This requirement has been taken into account during design.     | P      |
|                    | -enable essential work to be carried out on installation and/or replacement of tools and also for maintenance by allowing access only to the area where the work has to be done, if possible without the guard or protective device having to be moved;                                                                                                                                                                                                                    | This requirement has been taken into account during design.     | P      |
|                    | For openings in the guards see ISO 13857                                                                                                                                                                                                                                                                                                                                                                                                                                   | This requirement has been taken into account during design.     | P      |
| 6.3.3.2            | Requirements for fixed guards                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                 | P      |
| 6.3.3.2.1          | Functions of guards                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                 | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                   |                                                                           |        |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                       | Remark                                                                    | Result |
|                    | The functions that guards can achieve are:                                                                                                                                                                                                                                                                        | These functions are achieved by fixed guards.                             | P      |
|                    | -prevention of access to the space enclosed by guard and/or .<br>-containment/capture of materials, workpieces, chips, liquids which may be ejected or dropped by the machine and reduction of emissions(noise, radiation, hazardous substances such as dust, fumes, gases)which may be generated by the machine. | These functions are achieved by fixed guards.                             | P      |
|                    | Additionally, they may need to have particular properties relating to electricity, temperature, fire, explosion, vibration. visibility(see ISO 14120) and operator position ergonomics(e.g. usability, operator's movements, posture, repetitive movements).                                                      | These functions are achieved by fixed guards.                             | P      |
| 6.3.3.2.2          | Requirements for fixed guards                                                                                                                                                                                                                                                                                     |                                                                           | P      |
|                    | Fixed guards shall be securely held in place:                                                                                                                                                                                                                                                                     |                                                                           | P      |
|                    | - either permanently (e.g. by welding)<br>-or by means of fasteners (screws, nuts) making removal/opening impossible without using tools; they should not remain closed without their fasteners (see ISO 14120)                                                                                                   | All the fixed guards are securely held in place by appropriate fasteners. | P      |
| 6.3.3.2.3          | Requirements for movable guards                                                                                                                                                                                                                                                                                   |                                                                           | P      |
|                    | a)movable guards which provide protection against hazards generated by moving transmission parts shall:                                                                                                                                                                                                           |                                                                           | P      |
|                    | -as far as possible remain fixed to the machinery or other structure (generally by means of hinges or guides) when open;                                                                                                                                                                                          | Gemels are used for the movable guards.                                   | P      |
|                    | -be interlocking guards (with guard locking when necessary ) (see ISO 14119)                                                                                                                                                                                                                                      |                                                                           | N/A    |
|                    | b) movable guards against hazards generated by non-transmission moving parts shall be designed and associated with the machine control system so that;                                                                                                                                                            |                                                                           | —      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                    |                                                                     |        |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                        | Remark                                                              | Result |
|                    | - moving parts cannot start up while they are within the operator's reach and the operator cannot reach moving parts once they have start up; this can be achieved by interlocking guards, with guard locking when necessary.                                                                      | Interlocking guards are provided to comply with these requirements. | P      |
|                    | - they can be adjusted only by an intentional action, such as the use of tool or a key;                                                                                                                                                                                                            | This requirement is complied with.                                  | P      |
|                    | -they absence or failure of one of their components prevents starting of the moving parts or stops them; this can be achieved by automatic monitoring (see 4.11.6)                                                                                                                                 | This requirement is complied with.                                  | P      |
| 6.3.3.2.4          | Requirements for adjustable guards                                                                                                                                                                                                                                                                 |                                                                     | N/A    |
|                    | Adjustable guards may only be used where the hazard zone cannot for operational reasons be completely enclosed; they shall:<br>-be designed so that the adjustment remains fixed during a given operation<br>-be readily adjustable without the use of tools;                                      |                                                                     | N/A    |
| 6.3.3.2.5          | Requirements for interlocking guards with a start function (control guards)                                                                                                                                                                                                                        |                                                                     | N/A    |
|                    | An interlocking guard with a start function may be used provided that                                                                                                                                                                                                                              |                                                                     | N/A    |
|                    | - all requirements for interlocking guards are satisfied (see ISO 14119)                                                                                                                                                                                                                           |                                                                     | N/A    |
|                    | - the cycle time of the machine is short                                                                                                                                                                                                                                                           |                                                                     | N/A    |
|                    | -the maximum opening time of the guard is present to a low value (e.g. equal to the cycle time). When this time is exceeded, the hazardous function(s) cannot be initiated by the closing of the interlocking guard with a tart function and resetting is necessary before restarting the machine. |                                                                     | N/A    |
|                    | - the dimensions or shape of the machine do not allow a person, or part of a person, to stay in the hazard zone or between the hazard zone and the guard while the guard is closed (see ISO 14120)                                                                                                 |                                                                     | N/A    |
|                    | - all other guards whether fixed (removable type) or movable are interlocking guards;                                                                                                                                                                                                              |                                                                     | N/A    |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                        |                                                             |        |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                            | Remark                                                      | Result |
|                    | -the interlocking device associated with the interlocking guard with a start function is designed in such a way – e.g. by duplication of position detectors and use of automatic monitoring (see 4.11.6)- that its failure cannot lead to an unintended/unexpected start-up;           |                                                             | N/A    |
|                    | -the guard is securely held open(e.g. by a spring or counterweight )such that it cannot initiate a start while falling by its own weight;                                                                                                                                              |                                                             | N/A    |
| 6.3.3.2.6          | Hazards from guards                                                                                                                                                                                                                                                                    |                                                             | P      |
|                    | Care shall be taken to prevent hazards which might be generated by:                                                                                                                                                                                                                    |                                                             | P      |
|                    | - the guard construction (e.g. sharp edges or corners, material);                                                                                                                                                                                                                      | This requirement has been taken into account during design. | P      |
|                    | - the movements of the guards (shearing or crushing zones generated by power-operated guards and by heavy guards which are liable to fall )                                                                                                                                            | This requirement has been taken into account during design. | P      |
| 6.3.3.3            | Technical characteristics of protective devices                                                                                                                                                                                                                                        |                                                             | P      |
|                    | Protective devices shall be selected or designed and connected to the control system so as to ensure correct implementation of their safety function (s) is ensured.                                                                                                                   | This requirement has been taken into account during design. | P      |
|                    | Protective devices shall be selected on the basis of their having met the appropriate product standard (for example, IEC 61496 for active optoelectronic protective devices) or shall be designed according to one or several of the principles formulated in ISO 13849-1 or IEC62061. | This requirement has been taken into account during design. | P      |
|                    | Protective devices shall be installed and connected to the control system so that they cannot be easily defeated.                                                                                                                                                                      | This requirement has been taken into account during design. | P      |
| 6.3.3.4            | Provisions for alternative types of safeguards.                                                                                                                                                                                                                                        |                                                             | N/A    |
|                    | Provisions should be made to facilitate the fitting of alternative types of safeguards on machinery where it is known that this fitting will be necessary because the work to be done on it will vary.                                                                                 |                                                             | N/A    |

| EN ISO 12100: 2010 |                                                                                                                                                                                             |                        |        |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                 | Remark                 | Result |
| 6.3.4              | Safeguarding for reducing emissions                                                                                                                                                         |                        | P      |
| 6.3.4.1            | General                                                                                                                                                                                     |                        | P      |
|                    | If the measures for the reduction of emissions at source mentioned in 6.2.2.2 are not adequate, the machine shall be provided with additional protective measures (see 6.3.4.2 to 6.3.4.5). | No such hazard exists. | P      |
| 6.3.4.             | Noise                                                                                                                                                                                       |                        | P      |
|                    | Additional protective measures include, for example:<br>-enclosures (see ISO 15667)<br>-screens fitted to the machine;<br>-silencers (see ISO 14163)                                        | No such hazard exists. | P      |
| 6.3.4.3            | Vibration                                                                                                                                                                                   |                        | P      |
|                    | Additional protective measures include, for example, damping devices for vibration isolation between the source and the exposed person such as resilient mounting or suspended seats.       | No such hazard exists. | P      |
|                    | For measures for vibration isolation of stationary industrial machinery see EN 1299                                                                                                         | No such hazard exists. | P      |
| 6.3.4.4            | Hazardous substances                                                                                                                                                                        |                        | N/A    |
|                    | Additional protective measures include, for example:                                                                                                                                        |                        | N/A    |
|                    | -encapsulation of the machine (enclosure with negative pressure);                                                                                                                           |                        | N/A    |
|                    | - local exhaust ventilation with filtration.                                                                                                                                                |                        | N/A    |
|                    | - wetting with liquids;                                                                                                                                                                     |                        | N/A    |
|                    | - special ventilation in the area of the machine (air curtains, cabins for operators)                                                                                                       |                        | N/A    |
| 6.3.4.5            | Radiation                                                                                                                                                                                   |                        | N/A    |
|                    | Additional protective measures include, for example:                                                                                                                                        |                        | N/A    |
|                    | - use of filtering and absorption;                                                                                                                                                          |                        | N/A    |
|                    | - use of attenuating screens or guards                                                                                                                                                      |                        | N/A    |
| 6.3.5              | Complementary protective measures                                                                                                                                                           |                        | P      |
| 6.3.5.1            | General                                                                                                                                                                                     |                        | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                |        |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                                                                                     | Remark                                                                                         | Result |
|                    | Protective measures which are neither inherently safe design measures, nor safeguarding (implementation of guards and/or protective devices),nor information for use may have to be implemented as required by the intended use and the reasonably foreseeable misuse of the machine. Such measures include, but are not limited to, the ones dealt with in 6.3.5.2 to 6.3.5.6. | It meet the requirement.                                                                       | P      |
| 6.3.5.2            | Components and elements to achieve the emergency stop function                                                                                                                                                                                                                                                                                                                  |                                                                                                | P      |
|                    | If following a risk assessment, a machine needs to be fitted with components and elements to achieve an emergency stop function to enable actual or impending emergency situations to be averted, the following requirements apply:                                                                                                                                             |                                                                                                | —      |
|                    | -the actuators shall be clearly identifiable, clearly visible and readily accessible                                                                                                                                                                                                                                                                                            | The actuators can be clearly identifiable, clearly visible and readily aessible                | P      |
|                    | -the hazardous process shall be stopped as quickly as possible without creating additional hazards. If this is not possible or the risk cannot be reduced, it should be questioned whether implementation of an emergency stop function is the best solution;                                                                                                                   | The hazardous process can be topped as quickly as possible without creating additional hazards | P      |
|                    | -the emergency stop control shall trigger or permit the triggering of certain safeguard movements where necessary.                                                                                                                                                                                                                                                              | No this situation exists                                                                       | P      |
|                    | Once active operation of the emergency stop device has ceased following an emergency stop command, the effect of this command shall be sustained until it is rest.                                                                                                                                                                                                              | Reset is necessary before re-start.                                                            | P      |
|                    | This reset shall be possible only at that location where the emergency stop command has been initiated. The reset of the device shall not restart the machinery, but only permit restarting.                                                                                                                                                                                    | This requirement is complied with by appropriate design of the emergency stop                  | P      |
|                    | More details for the design and selection of electrical components and elements to achieve the emergency stop function are provided in EN 60204 series.                                                                                                                                                                                                                         | Please see the related clauses.                                                                | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                |                                      |        |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                    | Remark                               | Result |
| 6.3.5.3            | Measures for the escape and rescue of trapped persons                                                                                                                                                                          |                                      | N/A    |
|                    | Measures for the escape and rescue of trapped persons may consist e.g. of:                                                                                                                                                     |                                      | N/A    |
|                    | -escape routes and shelters in installations generating operator-trapping hazards                                                                                                                                              |                                      | N/A    |
|                    | -arrangements for moving some elements by hand, after an emergency stop                                                                                                                                                        |                                      | N/A    |
|                    | -arrangements for reversing the movement of some elements                                                                                                                                                                      |                                      | N/A    |
|                    | - anchorage points for descender devices;                                                                                                                                                                                      |                                      | N/A    |
|                    | -means of communication to enable trapped operators to call for help                                                                                                                                                           |                                      | N/A    |
| 6.3.5.4            | Measures for isolation and energy dissipation                                                                                                                                                                                  |                                      | P      |
|                    | Especially with regard to their maintenance and repair, machines shall be equipped with the technical means to achieve the isolation from power supply(ies) and dissipation of stored energy as a result of following actions: |                                      | P      |
|                    | a) isolating(disconnecting,separating)the machine(or defined parts of the machine) from all power supplies;                                                                                                                    | A main switch with lock is provided. | P      |
|                    | b) locking (or otherwise securing ) all the isolating units in the isolating position;                                                                                                                                         | Please see the report for EN 60204   | P      |
|                    | dissipating or , if this is not possible or practicable, restraining (containing) any stored energy which may give rise to a hazard;                                                                                           | Please see the report for EN 60204   | P      |
|                    | verifying, by means of a safe working procedure, that the actions taken according to a), b) and c) above have produced the desired effect.                                                                                     | Please see the report for EN 60204   | P      |
|                    | See ISO 14118, clause 5 and EN 60204-1: 5.5 and 5.6                                                                                                                                                                            |                                      | P      |
| 6.3.5.5            | Provisions for easy and safe handling of machines and their heavy component parts                                                                                                                                              |                                      | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                          |                                                                |        |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                              | Remark                                                         | Result |
|                    | Machines and their component parts which cannot be moved or transported by hand shall be provided or capable of being provided with suitable attachment devices for transport by means of lifting gear.                                                  | Appropriate attachments are provided.                          | P      |
|                    | These attachments may be, among others,                                                                                                                                                                                                                  |                                                                | P      |
|                    | standardized lifting appliances with slings, hooks, eyebolts, or tapped holes for appliance fixing;                                                                                                                                                      |                                                                | P      |
|                    | appliances for automatic grabbing with a lifting hook when attachment is not possible from the ground.                                                                                                                                                   | Such devices are used.                                         | P      |
|                    | guiding grooves for machines to be transported by a fork truck;                                                                                                                                                                                          |                                                                | N/A    |
|                    | lifting gear and appliances integrated into the machine.                                                                                                                                                                                                 |                                                                | N/A    |
|                    | Parts of machinery which can be removed manually in operation shall be provided with means for their safe removal and replacement; (See also 6.4.4c item 3).                                                                                             |                                                                | P      |
| 6.3.5.6            | Measures for safe access to machinery                                                                                                                                                                                                                    |                                                                | P      |
|                    | Machinery shall be so designed as to enable operation and all routine tasks relating to setting and/or maintenance, to be carried out, as far as possible, by a person remaining at ground level.                                                        | These requirements have been taken into account during design. | P      |
|                    | Where this is not possible, machines shall have built-in platforms, stairs or other facilities to provide safe access for those tasks, but care should be taken to ensure that such platforms or stairs do not give access to danger zones of machinery. |                                                                | N/A    |
|                    | The walking areas shall be made from materials which remain as slip resistant as practicable under working conditions and, depending on the height from the ground, suitable guard-rails (see ISO 14122-3) shall be provided.                            |                                                                | N/A    |
|                    | In large automated installations, particular attention shall be given to safe means of access such as walkways, conveyor bridges or crossover points.                                                                                                    |                                                                | N/A    |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                   |                                                         |        |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                       | Remark                                                  | Result |
|                    | Means of access to parts of machinery located at a height shall be provided with collective means of protection against falls(e.g. guard-rails for stairways, stepladders and platforms and/or safety cages for ladders)                          |                                                         | N/A    |
|                    | As necessary, anchorage points for personal protective equipment against falls from a height shall also be provided(e.g. in carriers of machinery for lifting persons or with elevating control stations)                                         |                                                         | N/A    |
|                    | Openings shall whenever possible open towards a safe position, They shall be designed to prevent hazards due to unintended opening.                                                                                                               |                                                         | N/A    |
|                    | The necessary aids for access shall be provided(e.g. steps, handholds).Control devices shall be designed and located to prevent their being used as aids for access.                                                                              |                                                         | N/A    |
|                    | When machinery for lifting goods and/or persons includes landings at fixed levels, these shall be equipped with inter locking guards preventing falls when the platform is not present at the level.                                              |                                                         | N/A    |
|                    | Movement of the lifting platform shall be prevented while the guards are open.                                                                                                                                                                    |                                                         | N/A    |
|                    | For detailed provisions see ISO 14122.                                                                                                                                                                                                            |                                                         | N/A    |
|                    | Information for use                                                                                                                                                                                                                               |                                                         | N/A    |
| 6.4                | General requirements                                                                                                                                                                                                                              |                                                         | P      |
| 6.4.1              | Drafting information for use is an integral part of the design of a machine(see figure2).                                                                                                                                                         | Please see the related clause.                          | P      |
| 6.4.1.1            | Information of use consists of communication links, such as texts, words, signs, signals, symbols or diagrams, used separately or in combination to convey information to the user. It is directed to professional and/or non-professional users. | All the information is stated in the appropriate place. | P      |
| 6.4.1.2            | Information shall be provided to the user about the intended use of the machine, taking into account, notably, all its operating modes.                                                                                                           |                                                         | —      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                |                                                              |        |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                    | Remark                                                       | Result |
|                    | The information shall contain all directions required to ensure safe and correct use of the machine. With this in view, it shall inform and warn the user about residual risk.                                                                                                                                 | All the information is stated in the appropriate place.      | P      |
|                    | The information shall indicate, as appropriate,                                                                                                                                                                                                                                                                |                                                              | -      |
|                    | - the need for training,                                                                                                                                                                                                                                                                                       | All the information is stated in the appropriate place.      | P      |
|                    | - the need for personal protective equipment,                                                                                                                                                                                                                                                                  | All the information is stated in the appropriate place.      | P      |
|                    | - the possible need for additional guards devices (see Figure 2, Footnote d).                                                                                                                                                                                                                                  | All the information is stated in the appropriate place.      | P      |
|                    | It shall not exclude uses of the machine that can reasonably be expected from its designation and description and shall also warn about the risk which would result from using the machine in other ways than the ones described in the information, especially considering its reasonably foreseeable misuse. | All the information is stated in the appropriate place.      | P      |
| 6.4.1.3            | Information for use shall cover, separately or in combination, transport, assembly and installation, commissioning, use of the machine (setting, teaching/programming or process changeover, operation, cleaning, fault-finding and maintenance) and, if necessary, dismantling, disabling and scrapping.      | All the information is stated in the appropriate place.      | P      |
| 6.4.2              | Location and nature of the information for use                                                                                                                                                                                                                                                                 |                                                              | P      |
|                    | Depending on the risk , the time when the information is needed by the user and the machine design , it shall be decided whether the information – or parts thereof – are to be given:                                                                                                                         | All the information is stated in the appropriate place.      | P      |
|                    | - in /on the machine itself (see 6.3 and 6.4.4)                                                                                                                                                                                                                                                                | Adequate information stated in the machine itself.           | P      |
|                    | -in accompanying documents ( in particular instruction handbook , see 6.4.5)                                                                                                                                                                                                                                   | Adequate information is stated in the accompanying documents | P      |
|                    | - on the packaging                                                                                                                                                                                                                                                                                             | Adequate information is stated on the packaging              | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                             |                                                                                            |        |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                 | Remark                                                                                     | Result |
|                    | - by other means such as signals and warnings outside the machine.                                                                                                                                                                                                                          | Adequate information is stated                                                             | P      |
|                    | Standardized phrases shall be considered where important messages such as warnings need to be given (see also IEC 62079)                                                                                                                                                                    | This requirement is considered.                                                            | P      |
| 6.4.3              | Signals and warning devices                                                                                                                                                                                                                                                                 |                                                                                            | P      |
|                    | Visual signals (e.g. flashing lights ) and audible signals (e.g. sirens) may be used to warn of an impending hazardous event such as machine start-up or overspeed.                                                                                                                         | Signals and warning devices are provided.                                                  | P      |
|                    | Such signals may also be used to warn the operator before the triggering of automatic protective measures (see last paragraph of 5.2.7)                                                                                                                                                     | Please see the related clause.                                                             | P      |
|                    | It is essential that these signals:                                                                                                                                                                                                                                                         |                                                                                            | —      |
|                    | <ul style="list-style-type: none"> <li>- be emitted before the occurrence of the hazardous event;</li> <li>- be unambiguous;</li> <li>- be clearly perceived and differentiated from all other signals used;</li> <li>- be clearly recognized by the operator and other persons.</li> </ul> | This requirement is taken into account during design and selection of the warning devices. | P      |
|                    | The warning devices shall be designed and located such that checking is easy.                                                                                                                                                                                                               | This requirement is taken into account during design and selection of the warning devices. | P      |
|                    | The information for use shall prescribe regular checking of warning devices.                                                                                                                                                                                                                | This requirement is taken into account during design and selection of the warning devices. | P      |
|                    | The attention of designers is drawn to the risks from “sensorial saturation” which results from too many visual and/or acoustic signals, which may also lead to defeating the warning devices.                                                                                              | This requirement is taken into account during design and selection of the warning devices. | P      |
| 6.4.4              | Markings, signs (pictograms), written warnings                                                                                                                                                                                                                                              |                                                                                            | P      |
|                    | Machinery shall bear all markings which are necessary:                                                                                                                                                                                                                                      |                                                                                            | —      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                   |                                   |        |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                                       | Remark                            | Result |
|                    | a) for its unambiguous identification, at least<br>- name and address of the manufacturer;<br>- designation of series or type;<br>- serial number, if any.                                                                                                                                                                        | Adequate information is provided. | P      |
|                    | b) in order to indicate its compliance with mandatory requirements;<br>- marking;<br>-written indications (e.g. for machines intended for use in potentially explosive atmosphere)                                                                                                                                                | Adequate information is provided. | P      |
|                    | c) for its safe use, e.g. :<br>- maximum speed of rotating parts;<br>- maximum diameter of tools;<br>-mass (expressed in kilograms) of the machine itself and/or of removable parts<br>- maximum working load;<br>- necessity of wearing personal protective equipment;<br>- guard adjustment data;<br>- frequency of inspection. | Adequate information is provided. | P      |
|                    | Information printed directly on the machine should be permanent and remain legible throughout the expected life of the machine.                                                                                                                                                                                                   |                                   | P      |
|                    | Signs or written warnings only saying "danger" shall not be used.                                                                                                                                                                                                                                                                 |                                   | P      |
|                    | Readily understandable signs (pictograms) should be used in preference to written warnings.                                                                                                                                                                                                                                       |                                   | P      |
|                    | Signs and pictograms should only be used if the are understood in the culture in which the machinery is to be used.                                                                                                                                                                                                               |                                   | P      |
|                    | Markings shall comply with recognized standards (see ISO 2972, ISO 7000, particularly for pictograms, symbols, colours) See EN 60204 series as regards marking of electrical equipment.                                                                                                                                           |                                   | P      |
| 6.4.5              | Accompanying documents ( in particular, instruction handbook)                                                                                                                                                                                                                                                                     |                                   | P      |
| 6.4.5.1            | Contents                                                                                                                                                                                                                                                                                                                          |                                   | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                   |        |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Remark                                                            | Result |
|                    | The instruction handbook or other written instructions (e.g. on the packaging ) shall contain among others:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                   | —      |
|                    | a) information relating to transport, handling and storage of the machine e.g. :<br>- storage conditions for the machine;<br>-dimensions , mass value(s), position of the centre (s) of gravity;<br>-indications for handling (e.g. drawings indicating application points for lifting equipment)                                                                                                                                                                                                                                                                                                                                                                                       | All the related information is stated in the instruction handbook | P      |
|                    | b) information relating to installation and commissioning of the machine, e.g.<br>- fixing/anchoring and vibration dampening requirements<br>- assembly and mounting conditions;<br>- space needed for use and maintenance;<br>- permissible environmental conditions (e.g. temperature, moisture, vibration,electromagnetic radiation);<br>-instructions for connecting the machine to power supply (particularly about protection against electrical overloading);<br>- advice about waste removal /disposal;<br>-if necessary, recommendations about protective measures which have to be taken by the user; e.g. additional safeguards, safety distances, safety signs and signals. | All the related information is stated in the instruction handbook | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                          |        |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Remark                                                                   | Result |
|                    | <p>c) information relating to the machine itself, e.g. :</p> <ul style="list-style-type: none"><li>-detailed description of the machine, its fittings, its guards and/or protective devices;</li><li>-comprehensive range of applications for which the machine is intended, including prohibited usages, if any , taking into account variations of the original machine if appropriate.</li><li>-diagrams (especially schematic representation of safety functions);</li><li>- data about noise and vibration generated by the machine, about radiation, gases, vapours, dust emitted by it, with reference to the measuring methods used.</li><li>-technical documentation about electrical equipment (see EN 60204 series)</li><li>-documents attesting that the machine complies with mandatory requirements;</li></ul>         | <p>All the related information is stated in the instruction handbook</p> | P      |
|                    | <p>d)information relating to the use of the machine, e.g. about:</p> <ul style="list-style-type: none"><li>- intended use;</li><li>- description of manual controls (actuators);</li><li>- setting and adjustment;</li><li>- modes and means for stopping (especially emergency stop )</li><li>- risks which could not be eliminated by the protective measures taken by the designer;</li><li>- particular risks which may be generated by certain applications, by the use of certain fittings, and about specific safeguards which are necessary for such applications.</li><li>-reasonably foreseeable misuse and prohibited usages;</li><li>- fault identification and location , repair, and re-starting after an intervention;</li><li>- personal protective equipment which need to be used and training required.</li></ul> | <p>All the related information is stated in the instruction handbook</p> | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                   |        |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Remark                                                            | Result |
|                    | e) information for maintenance e.g.<br>-nature and frequency of inspections for safety functions;<br>-instructions relating to maintenance operations which require a definite technical knowledge or particular skills and hence should be carried out exclusively by skilled persons (e.g. maintenance staff, specialists)<br>- instructions relating to maintenance actions (e.g. replacement of parts ) which do not require specific skills and hence may be carried out by users (e.g. operators)<br>-drawings and diagrams enabling maintenance personnel to carry out their task rationally (especially fault-finding tasks) | All the related information is stated in the instruction handbook | P      |
|                    | f) information relating to de-commissioning , dismantling and disposal;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | All the related information is stated in the instruction handbook | P      |
|                    | g) information for emergency situations , e.g. :<br>- type of fire-fighting equipment to be used.<br>- warning about possible emission or leakage of harmful substance(s), and if possible, indication of means to fight their effects.                                                                                                                                                                                                                                                                                                                                                                                              | All the related information is stated in the instruction handbook | P      |
|                    | h) maintenance instructions provided for skilled persons and maintenance instructions provided for unskilled persons, that should appear clearly separated from each other.                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All the related information is stated in the instruction handbook | P      |
| 6.4.5.2            | Production of the instruction handbook                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All the related information is stated in the instruction handbook | P      |
|                    | a) type and size of print shall ensure the best possible legibility. Safety warnings and/or cautions should be emphasized the use of colours, symbols and/or large print.                                                                                                                                                                                                                                                                                                                                                                                                                                                            | All the related information is stated in the instruction handbook | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                                                     |                                                                   |        |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                                                                         | Remark                                                            | Result |
|                    | b) information for use shall be given in the language(s) of the country in which the machine will be used for the first time and in the original version. If more than one language are to be used, each language should be readily distinguished from the other(s), and efforts should be made to keep the translated text and the relevant illustration together. | All the related information is stated in the instruction handbook | P      |
|                    | c) whenever helpful to the understanding, text should be supplemented with written details enabling, for instance, manual controls (actuators) to be located and identified; they should not be separated from the accompanying text and should follow sequential operations.                                                                                       | All the related information is stated in the instruction handbook | P      |
|                    | d) consideration should be given to presenting information in tabular form where this will aid understanding. Tables should be adjacent to the relevant text.                                                                                                                                                                                                       | All the related information is stated in the instruction handbook | P      |
|                    | e) the use of colours should be considered, particularly in relation to components requiring quick identification.                                                                                                                                                                                                                                                  | All the related information is stated in the instruction handbook | P      |
|                    | f) when information for use is lengthy, a table of contents and/or an index should be given.                                                                                                                                                                                                                                                                        | All the related information is stated in the instruction handbook | P      |
|                    | g) safety-relevant instructions which involve immediate action should be provided in a form readily available to the operator.                                                                                                                                                                                                                                      | All the related information is stated in the instruction handbook | P      |
| 6.4.5.3            | Drafting and editing information for use                                                                                                                                                                                                                                                                                                                            |                                                                   | P      |
|                    | a) relationship to model : the information shall clearly relate to the specific model of machine and, if necessary, other appropriate identification (for example, by serial number).                                                                                                                                                                               | All the related information is stated in the instruction handbook | P      |
|                    | b) communicate principles : when information for use is being prepared, the communication process “see-think-use” should be followed in order to achieve the maximum effect and should follow sequential operations. The questions “how ?” and “why ?” should be anticipated and the answers provided.                                                              | All the related information is stated in the instruction handbook | P      |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                   |        |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Remark                                                            | Result |
|                    | c) information for use shall be as simple and as brief as possible, and should be expressed in consistent terms and units with a clear explanation of unusual technical terms.                                                                                                                                                                                                                                                                                             | All the related information is stated in the instruction handbook | P      |
|                    | d) when it is foreseen that a machine will be put to non-professional use, the instructions should be written in a form that is readily understood by the non-professional users. If personal protective equipment is required for the safe use of the machine, clear advice should be given, e.g. on the packaging as well as on the machine, so that this information is prominently displayed at the point of sale.                                                     | All the related information is stated in the instruction handbook | P      |
|                    | e) durability and availability of the documents : documents giving instructions for use should be produced in durable form (i.e. they should be able to survive frequent handling by the user). It may be useful to mark them "keep for future reference". Where information for use is kept in electronic form (e.g. CD, DVD, tape) information on safety-related issues that need immediate action shall always be backed up with a hand copy that is readily available. | All the related information is stated in the instruction handbook | P      |

|          |                                                                                                                                                               |  |          |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------|
| <b>7</b> | <b>Documentation of risk assessment and risk reduction</b>                                                                                                    |  | <b>P</b> |
|          | The documentation shall demonstrate the procedure that has been followed and the results that have been achieved. This includes, when relevant, documentation |  | P        |
|          | a)the machinery for which the risk assessment has been made (for example, specifications, limits, intended use);                                              |  | P        |
|          | b) any relevant assumptions that have been made (loads, strengths, safety factors, etc.);                                                                     |  | P        |
|          | c) the hazards and hazardous situations identified and the hazardous events considered in the risk assessment                                                 |  | P        |

| EN ISO 12100: 2010 |                                                                                                                                                                                                                                                                                                 |        |        |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|
| Clause             | Requirement                                                                                                                                                                                                                                                                                     | Remark | Result |
|                    | d) the information on which risk assessment was based (see 5.2):<br>1) the data used and the sources (accident histories, experience gained from risk reduction applied to similar machinery, etc.);<br>2) the uncertainty associated with the data used and its impact on the risk assessment; |        | P      |
|                    | e) the risk reduction objectives to be achieved by protective measures;                                                                                                                                                                                                                         |        | P      |
|                    | f) the protective measures implemented to eliminate identified hazards or to reduce risk;                                                                                                                                                                                                       |        | P      |
|                    | g) residual risks associated with the machinery;                                                                                                                                                                                                                                                |        | P      |
|                    | h) the result of the risk assessment (see Figure 1);                                                                                                                                                                                                                                            |        | P      |
|                    | i) any forms completed during the risk assessment.                                                                                                                                                                                                                                              |        | P      |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                 |                 |         |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                              | Result - Remark | Verdict |
| 4             | Safety requirements                                                                                                                                                                                                                                                                                                                                             |                 | P       |
| 4.1           | General requirements                                                                                                                                                                                                                                                                                                                                            |                 | P       |
| 4.1.1         | General                                                                                                                                                                                                                                                                                                                                                         |                 | P       |
|               | All the machines in the scope of this document shall comply with the safety requirements and protective or risk reduction measures in 4.1 and the relevant machine specific measures 4.2 to 4.14 where the equivalent hazard exists. In addition, machines shall comply with clauses of EN 415-10:2014 where they are specifically referenced in this document. |                 | P       |
| 4.1.2         | Requirements to minimize mechanical risks 4.1.2.1 Inherently safe design                                                                                                                                                                                                                                                                                        |                 | P       |
|               | Inherently safe design measures shall be applied as far as possible to eliminate or reduce risks and shall comply with the requirements of EN 415-10:2014, 5.2.1.1. Subclauses 4.2 to 4.14 identify some of the mechanisms where inherently safe design measures can typically be applied, for example by limiting the forces applied by the mechanisms.        |                 | P       |
| 4.1.2.2       | Design of safeguards                                                                                                                                                                                                                                                                                                                                            |                 | P       |
|               | Safeguards shall comply with 4.1.2.2, 4.1.2.4 and EN 415-10:2014, 5.2.1.4. Interlocking guards shall comply with EN 415-10:2014, 5.2.1.5 and 5.16.2.3 and EN ISO 14120:2015, 5.2.3.                                                                                                                                                                             |                 | P       |
|               | Where the smallest dimension of a rectangular opening or diameter of a circular opening in a guard is less than or equal to 120 mm, the safety distances in Tables 3, 4 and 6 of EN ISO 13857:2019 shall apply. Where the opening is larger than 120 mm, the safety distances shown in EN 415-10:2014, 5.2.1.3 shall apply.                                     |                 | P       |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |         |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Result - Remark | Verdict |
|               | When an interlocking guard is opened, it shall not be possible to reach a hazard zone before the hazardous movement has stopped. Where this objective is not achieved, a guard locking device or internal baffle which prevents direct access to the hazard zone shall be fitted. Where a baffle is used it shall be dimensioned and positioned so that the person's movement will be impeded or slowed down sufficiently for the hazardous movement to stop before the hazard zone can be reached. |                 | N/A     |
|               | Where guards are made of a transparent material and there is a risk of someone walking into the open guard, the guard shall be marked or fitted with features which make the guard clearly visible when it is open.                                                                                                                                                                                                                                                                                 |                 | N/A     |
|               | Where there is a risk that someone could be shut inside a guarded area, the interlocking guard that gives access to this area shall be fitted with an interlocking device that minimises the risk of the guard being closed accidentally and EN 415-10:2014, 5.16.2.3 shall apply.                                                                                                                                                                                                                  |                 | N/A     |
|               | Where a good view to zones inside the machine is necessary and the design of the guards causes shadows that prevent good visibility of the process within the machine, the machine shall be equipped with interior lighting.                                                                                                                                                                                                                                                                        |                 | N/A     |
|               | The design of the guards shall ensure that it is not possible to reach hazard zones in the machine by reaching over guards when standing on a means of access described in this document. Where guards are open at the top the safety distance in Table 2 of EN ISO 13857:2019 shall apply.                                                                                                                                                                                                         |                 | P       |
|               | Where electro-sensitive protective equipment (ESPE) is used instead of a guard it shall comply with EN 61496-1:2013 and shall be positioned in accordance with EN ISO 13855:2010.                                                                                                                                                                                                                                                                                                                   |                 | N/A     |
| 4.1.2.3       | Pneumatic and hydraulic equipment                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 | P       |

| EN 415-3:2021 |                                                                                                                                                                                                                                                         |                 |         |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                      | Result - Remark | Verdict |
| 4.1.2.3.1     | General                                                                                                                                                                                                                                                 |                 | P       |
|               | The machine shall be equipped with an isolation device for each supply for fluid power which shall be located outside hazard zones and shall be readily accessible, clearly labelled, and have features to allow them to be locked in the off position. |                 | P       |
|               | The machine shall have a facility to release stored energy in a safe manner.                                                                                                                                                                            |                 | P       |
|               | The control system shall be designed to prevent unexpected start-up following the requirements of EN 415-10:2014, 5.1.6.                                                                                                                                |                 | P       |
| 4.1.2.3.2     | Pneumatic                                                                                                                                                                                                                                               |                 | P       |
|               | Pneumatic components and piping shall comply with the requirements of EN ISO 4414:2010.                                                                                                                                                                 |                 | P       |
|               | An air service unit shall be provided with an isolation valve complying with EN ISO 4414:2010, 5.2.8; a pressure build-up valve, pressure regulator, pressure gauge and condensate discharge valves shall also be provided.                             |                 | P       |
| 4.1.2.3.3     | Hydraulic                                                                                                                                                                                                                                               |                 | N/A     |
|               | Hydraulic components and piping shall comply with the requirements of EN ISO 4413:2010. Hydraulic isolation valves shall comply with EN ISO 4413:2010, 5.4.7.2.1.                                                                                       |                 | N/A     |
| 4.1.2.4       | Size or product changing                                                                                                                                                                                                                                |                 | P       |
| 4.1.2.4.1     | Design of guards                                                                                                                                                                                                                                        |                 | P       |
|               | The design of the machine and its guards shall ensure that danger zones on the machine are safeguarded without the need for adjustment of safeguards, for all the product and pack sizes for which the machine has been specified.                      |                 | P       |
|               | Where this is not possible adjustable guards or change part guards shall be used. Adjustable guards shall be either:                                                                                                                                    |                 | N/A     |
|               | a) adjusted in a positive mode by adjusting the functional parts either manually or under power, or                                                                                                                                                     |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                |                 |         |
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| Clause        | Requirement + Test                                                                                                                                                             | Result - Remark | Verdict |
|               | b) fitted with interlocking devices which ensure that the machine cannot be started or operated unless the guards are adjusted correctly.                                      |                 | N/A     |
|               | Change part guards shall be either:                                                                                                                                            |                 | N/A     |
|               | a) connected to the functional parts so that the machine cannot function without the appropriate guarding being fitted, or                                                     |                 | N/A     |
|               | b) fitted with interlocking devices so that the machine cannot be started or operated without the required guard in place.                                                     |                 | N/A     |
| 4.1.2.4.2     | Size or product changing under power                                                                                                                                           |                 | N/A     |
|               | Where parts of the machine are adjusted under power, the risks presented by these powered movements shall be eliminated using the following hierarchy of measures:             |                 | -       |
|               | a) ensuring that the movements are not hazardous by following the safety by design principles described in 4.1.2.1, or                                                         |                 | N/A     |
|               | b) if a) is not possible by ensuring that movements can only take place when the machine's interlocking movable guards are closed or;                                          |                 | N/A     |
|               | c) where it is not possible to fulfil the requirements of a) or b), the movement can only take place using a hold-to-run control device complying with EN 415-10:2014, 5.16.3. |                 | N/A     |
| 4.1.2.5       | Drive mechanisms                                                                                                                                                               |                 | P       |
|               | Drive mechanisms shall be enclosed with fixed or interlocking guards.                                                                                                          |                 | P       |
| 4.1.2.6       | Hand-wheels                                                                                                                                                                    |                 | N/A     |
|               | Where handles or hand-wheels are provided to operate mechanisms manually, they shall preferably be disconnected when the machine runs automatically.                           |                 | N/A     |
|               | If the hand-wheel is designed to rotate under power during automatic operation it shall comply with EN 415-10:2014, 5.20.5.                                                    |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                             |                 |         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                          | Result - Remark | Verdict |
| 4.1.2.7       | Measures to minimize slip, trip and fall risks                                                                                                                                                                                                                                                                                                                                                              |                 | P       |
|               | The measures described in EN 415-10:2014, 5.2.2 shall apply.                                                                                                                                                                                                                                                                                                                                                |                 | P       |
| 4.1.2.8       | Tasks requiring guards to be open while mechanisms are moved under power                                                                                                                                                                                                                                                                                                                                    |                 | N/A     |
|               | The design of the machine shall avoid the need to carry out any task where it is necessary to move machine mechanisms while a guard is open. If mechanisms need to be moved in manual mode, this shall only be possible with all the interlocking guards in the closed position.                                                                                                                            |                 | N/A     |
|               | Where for technical reasons this is not practicable, movement of the machine parts shall only be possible if all of the requirements of EN 415-10: 2014, 5.16.3 have been satisfied.                                                                                                                                                                                                                        |                 | N/A     |
| 4.1.3         | Electrical equipment                                                                                                                                                                                                                                                                                                                                                                                        |                 | P       |
| 4.1.3.1       | General requirements                                                                                                                                                                                                                                                                                                                                                                                        |                 | P       |
|               | Electrical equipment fitted to machines in the scope of this document shall comply with EN 415-10:2014, 5.3, 5.5 and 5.6 and 5.14.                                                                                                                                                                                                                                                                          |                 | P       |
| 4.1.3.2       | Emergency stop devices                                                                                                                                                                                                                                                                                                                                                                                      |                 | P       |
|               | All machines in the scope of this document shall be fitted with at least one emergency stop device that complies with EN ISO 13850:2015 and shall be positioned according to EN 415-10:2014, 5.14.                                                                                                                                                                                                          |                 | P       |
| 4.1.3.3       | Electrostatic phenomena                                                                                                                                                                                                                                                                                                                                                                                     |                 | P       |
|               | On machines where hazards may arise from the generation of static electricity, sufficient earth bonding or static elimination equipment shall be provided to ensure that hazardous levels of static electricity do not occur. This equipment shall ensure that electrostatic discharge shall lead neither to any injury nor to the ignition of potentially explosive atmospheres or combustible substances. |                 | P       |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 |         |
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| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                                                          | Result - Remark | Verdict |
|               | Electrostatic discharge elimination devices shall be protected using interlocking guards and the control system shall ensure that the static elimination devices are turned off when the interlocking guard is open.                                                                                                                                                                                                                        |                 | P       |
| 4.1.4         | Thermal hazards                                                                                                                                                                                                                                                                                                                                                                                                                             |                 | P       |
|               | The external temperature of exposed parts of the machine, like guards, control panels and electric motors, shall not exceed the burn threshold temperatures stated in EN ISO 13732-1:2008, 4.2, which take into account the contact material and the foreseen contact time.                                                                                                                                                                 |                 | P       |
|               | Where the machine includes parts, like heating mechanisms with a foreseeable temperature greater than the burn thresholds described in EN ISO 13732-1:2008, the machine design shall minimize the risk of accidental contact, for instance by fitting insulation or guards to prevent unintentional contact and by fitting the “warning hot surface” pictogram specified in 6.3 on the outside of the machine or adjacent to the hot parts. |                 | P       |
| 4.1.5         | Noise reduction                                                                                                                                                                                                                                                                                                                                                                                                                             |                 | P       |
|               | The most common sources of noise emissions from machines in the scope of this document are:                                                                                                                                                                                                                                                                                                                                                 |                 | -       |
|               | <ul style="list-style-type: none"> <li>— Drive motors;</li> <li>— Products impacting on solid surfaces;</li> <li>— Vacuum pumps;</li> <li>— Vibrating mechanisms;</li> <li>— Release of compressed air.</li> </ul>                                                                                                                                                                                                                          |                 | P       |
|               | Machines in the scope of this document shall be designed to minimize noise at its source using state of the art noise reduction technology.                                                                                                                                                                                                                                                                                                 |                 | P       |
|               | Noise shall be reduced by the methods stated in this document. Where these measures are not applicable or insufficient, additional measures stated in EN ISO 11688-1:2009 shall be applied to reduce noise at source.                                                                                                                                                                                                                       |                 | P       |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                      |                 |         |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                   | Result - Remark | Verdict |
|               | The criterion for assessing the efficiency of a noise reduction measure is the actual noise emission value of the machine and not the nature of the reduction measure itself.                                                                                                                                                        |                 | P       |
| 4.1.6         | Vibrating mechanisms                                                                                                                                                                                                                                                                                                                 |                 | P       |
|               | Machines fitted with vibrating mechanisms shall be designed so that harmful levels of vibration are not transmitted to other parts of the machine or the surface on which the machine is fixed. The vibrating mechanisms shall be designed so it is not necessary for operators to touch or hold the parts while they are vibrating. |                 | P       |
| 4.1.7         | Radiation                                                                                                                                                                                                                                                                                                                            |                 | N/A     |
|               | Where machines incorporate radiation sources other than laser devices, this equipment shall comply with the requirements of EN 415-10:2014, 5.9.                                                                                                                                                                                     |                 | N/A     |
|               | Where ultraviolet (UV) light is used to sterilize packaging materials or components, the machine shall be designed so, that no hazardous amounts of UV-light are emitted from the machine. Where the UV light causes thermal hazards, 4.1.4 shall apply.                                                                             |                 | N/A     |
| 4.1.8         | Products and substances used on machines which pose a risk                                                                                                                                                                                                                                                                           |                 | P       |
| 4.1.8.1       | Hazards from products                                                                                                                                                                                                                                                                                                                |                 | P       |
|               | Where the machine has been specified to pack a hazardous product, the machine shall comply with the requirements of EN ISO 14123-1:2015 and EN ISO 14123-2:2015.                                                                                                                                                                     |                 | P       |
|               | Where a flow of product presents a hazard, measures shall be provided to prevent a hazardous flow of product during operator interventions and instructions shall be provided on how to prevent a hazardous flow of product during maintenance interventions.                                                                        |                 | P       |
| 4.1.8.2       | Dusty products                                                                                                                                                                                                                                                                                                                       |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                           |                 |         |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                        | Result - Remark | Verdict |
|               | Where the machine is specified to pack a dusty product, it shall be supplied with either<br>— dust extraction equipment that complies with EN ISO 14123-1:2015, or<br>— dust collection spouts that can be connected to the customer's central dust extraction system.    |                 | N/A     |
| 4.1.8.3       | Potentially explosive dusty products                                                                                                                                                                                                                                      |                 | N/A     |
|               | Where the machine is specified to pack potentially explosive dusty products, the machine shall comply with the requirements of EN 1127-1:2019 and electrical equipment shall comply with EN 60079-14:2014.                                                                |                 | N/A     |
| 4.1.8.4       | Modified atmosphere packaging                                                                                                                                                                                                                                             |                 | N/A     |
| 4.1.8.4.1     | General                                                                                                                                                                                                                                                                   |                 | N/A     |
|               | Where machines are fitted with modified atmosphere packing equipment the following requirements shall apply:                                                                                                                                                              |                 | -       |
|               | a) all vessels, pipes and fittings shall be designed to safely contain the modifying gas;                                                                                                                                                                                 |                 | N/A     |
|               | b) the gas supply shall be fitted with a manual isolation valve which can be locked in the off position and shall be clearly labelled to indicate which type of gas or gases shall be used;                                                                               |                 | N/A     |
|               | c) where a non-hazardous gas like nitrogen is used to reduce oxygen levels in packages, the design of the machine or the gas control system shall ensure that oxygen levels around the machine do not fall below 19 % during normal use and during machine interventions. |                 | N/A     |
|               | d) on machines where mixtures of gases can be selected, flow meters shall be provided which display the flow rate of the different gases which are being delivered to the machine;                                                                                        |                 | N/A     |
|               | e) the machine's instructions shall detail:                                                                                                                                                                                                                               |                 | N/A     |
|               | — the gases that can be used with the machine;                                                                                                                                                                                                                            |                 | N/A     |
|               | — the maximum pressure of the gas supply;                                                                                                                                                                                                                                 |                 |         |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                 |                 |         |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                              | Result - Remark | Verdict |
|               | — the safe procedure for connecting the gas supply;                                                                                                                                                                                                                                                                             |                 | N/A     |
|               | — the specifications of the pressure reducer and safety relief valves needed to ensure safe operation;                                                                                                                                                                                                                          |                 | N/A     |
|               | — the specification for the ventilation system needed to remove or disperse the modifying gas;                                                                                                                                                                                                                                  |                 | N/A     |
|               | — that the machine shall not be operated with the modifying gas if the film is damaged or not present.                                                                                                                                                                                                                          |                 | N/A     |
| 4.1.8.4.2     | Oxygen                                                                                                                                                                                                                                                                                                                          |                 | N/A     |
|               | Where the modifying gas is oxygen, the following additional requirements shall apply:                                                                                                                                                                                                                                           |                 | N/A     |
|               | a) all components which can come into contact with oxygen, such as pumps, hoses, pipes, fittings, instruments, seals or containers, shall be suitable for use with high concentrations of oxygen;                                                                                                                               |                 | N/A     |
|               | b) the design of the oxygen flow control system shall prevent the generation of flammable atmospheres inside or around the machine;                                                                                                                                                                                             |                 | N/A     |
|               | c) to avoid overheating or setting fire to the packaging material, the heat-sealing control system shall be designed so that the sealing temperature and the sealing contact time cannot be changed by unauthorized persons. One method of achieving this objective is to require a password to be used to change the settings. |                 | N/A     |
|               | d) the design shall minimize the risk of oxygen coming into contact with fat or oil. Where there is a risk of oxygen coming into contact with fat or oil the machine design shall ensure that no lubricants or sealants are used which could self-ignite when in contact with oxygen;                                           |                 | N/A     |
|               | e) the instructions shall state:                                                                                                                                                                                                                                                                                                |                 | N/A     |
|               | — the lubricants which can be used;                                                                                                                                                                                                                                                                                             |                 | N/A     |
|               | — the parts that fat or oil shall be cleaned from before the equipment is used;                                                                                                                                                                                                                                                 |                 | N/A     |
|               | — cleaning instructions to remove any debris from parts which can come into contact with oxygen;                                                                                                                                                                                                                                |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |         |
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| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Result - Remark | Verdict |
|               | — the measures to be taken to avoid hazards caused by high oxygen concentrations when emptying the system and ensuring that no ignition sources such as hot surfaces, electrostatic or electrical ignition sparks are present during emptying;                                                                                                                                                                                                                                                                                                                                        |                 | N/A     |
|               | — the need for regular inspections of seals to prevent hazardous oxygen concentrations;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 | N/A     |
|               | — the need for oxygen measurements to be taken around the machine 500 mm from the machine during commissioning and routinely during use to ensure that the oxygen concentration around the machine does not exceed 22 %. The instructions shall provide the specification of the equipment to be used for these measurements and the required frequency for the routine measurements;                                                                                                                                                                                                 |                 | N/A     |
|               | — the ventilation requirements in the room where the machine is to be installed to ensure oxygen levels do not rise above 22 %.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | N/A     |
| 4.1.8.4.3     | Gases harmful to health                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 | N/A     |
|               | Where gases or gas mixtures harmful to health are used the following additional requirements shall apply:                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 | N/A     |
|               | a) where a space inside the machine contains a hazardous atmosphere, and opening a guard exposes the operator to this hazardous atmosphere, this guard shall be interlocked with a guard locking device and controlled so that this guard cannot be opened until the atmosphere inside the machine is safe to breathe. This guard door shall be released either by a sensor that can determine that the atmosphere inside the machine is safe to breathe or after a time delay which is sufficient for the harmful gases inside the machine to be extracted by the extraction system; |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                               |                 |         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                            | Result - Remark | Verdict |
|               | b) the design of the machine and the gas control system shall ensure that dangerous levels of the modifying gas do not build up around the machine. The concentration of the modifying gas shall be monitored at 500 mm from possible gas emission points like the gas chamber.                                                                                               |                 | N/A     |
|               | To prevent the emission of hazardous amounts of modifying gases, the machine shall be provided with:                                                                                                                                                                                                                                                                          |                 | -       |
|               | a) a solenoid valve to shut off the supply of the modifying gas automatically when the machine stops;                                                                                                                                                                                                                                                                         |                 | N/A     |
|               | b) a pressure reducer and a safety relief valve, which discharges gas to a safe location, at the interface with the gas supply. Where this equipment is not supplied with the machine, the specification for this equipment shall be stated in the operator's manual;                                                                                                         |                 | N/A     |
|               | c) extraction equipment to remove dangerous levels of the modifying gas to a safe area. Where this equipment is not supplied with the machine, the specification for this equipment shall be stated in the instructions;                                                                                                                                                      |                 | N/A     |
|               | d) where the installation incorporates flexible hoses, control devices which can sense that a hose has been damaged or the gas flow is excessive and automatically shut off the supply of modifying gas to the machine.                                                                                                                                                       |                 | N/A     |
| 4.1.8.5       | Substances used to sterilize packaging materials and components                                                                                                                                                                                                                                                                                                               |                 | N/A     |
|               | Machines using hazardous substances (for example hydrogen peroxide) to sterilize or disinfect packaging materials and components shall be designed so that all foreseen interventions inside the machine can be carried out safely and so that airborne emissions of the sterilizing substance from the machine to the work area around the machine are kept to a safe level. |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                   |                 |         |
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| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                | Result - Remark | Verdict |
|               | The sterilizing substance shall be kept in as closed a system as possible, and the seals and gaskets fitted to guard doors and other possible leakage points shall be made of materials that resist the sterilizing substance being used.                                                                                                                                                         |                 | N/A     |
|               | Access to areas of the machine where hazardous concentrations of sterilizing substances maybe present, shall be prevented by interlocking guards fitted with guard locking devices. The control system shall prevent these guards from opening as long as a hazardous concentration of the sterilizing substance is present. Measures to decrease the time to reach a safe concentration include: |                 | -       |
|               | — fitting the machine with an extraction system to extract the sterilizing substance to a safe area outside of the building or to a central extraction system;                                                                                                                                                                                                                                    |                 | N/A     |
|               | — spraying the area with water to absorb the sterilizing substance into water                                                                                                                                                                                                                                                                                                                     |                 | N/A     |
|               | If interventions are foreseen in an area while a hazardous concentration of the sterilizing substance exists, suitable additional measures shall be provided, such as fitting the machine with glove boxes to allow access while maintaining the integrity of the enclosure.                                                                                                                      |                 | N/A     |
|               | Where measures such as extraction or spraying systems are provided for the above purpose, these shall be dimensioned to function under the worst-case conditions and shall be interlocked to prevent access to the area if the extraction or spraying system is not functioning.                                                                                                                  |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                              |                 |         |
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| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                           | Result - Remark | Verdict |
|               | The supply system of the sterilizing substance shall be designed to safely contain the sterilizing substance. Pipe connections shall be used that can only be dismantled using tools. If the machine is designed to be supplied with a sterilizing substance from an external source (i.e. not from a container) the machine shall be fitted with an isolation valve that can be locked in the off position. |                 | N/A     |
|               | Equipment shall be provided to prevent the build-up of hazardous levels of the sterilizing substance near the machine, such as:                                                                                                                                                                                                                                                                              |                 | -       |
|               | — fitting extraction systems at, for example, discharge tunnels. To avoid carryover of the substances by the conveyors, the transfer from the discharge conveyor shall be positioned within the machine or the discharge tunnel;                                                                                                                                                                             |                 | N/A     |
|               | — ducting air streams to points where they can be connected to an extraction system; and                                                                                                                                                                                                                                                                                                                     |                 | N/A     |
|               | — rinsing sterilizing substances from the outside of packages within the machine.                                                                                                                                                                                                                                                                                                                            |                 | N/A     |
|               | The operator's manual shall contain the following information, where it is relevant:                                                                                                                                                                                                                                                                                                                         |                 | -       |
|               | — intervals and criteria for inspection and replacement of seals and gaskets to prevent leakage of sterilizing substances;                                                                                                                                                                                                                                                                                   |                 | N/A     |
|               | — instructions for inspection and maintenance of any fitted extraction or spraying system;                                                                                                                                                                                                                                                                                                                   |                 | N/A     |
|               | — safe working procedures for access to areas where hazardous concentrations of sterilizing substances may occur;                                                                                                                                                                                                                                                                                            |                 | N/A     |
|               | — safe working procedures to conduct maintenance on the supply system of the sterilizing substance;                                                                                                                                                                                                                                                                                                          |                 | N/A     |
|               | — the technical specifications for the room ventilation in the area where the machine will be installed; and                                                                                                                                                                                                                                                                                                 |                 | N/A     |
|               | — the specifications of any personal protective equipment to be used.                                                                                                                                                                                                                                                                                                                                        |                 | N/A     |
| 4.1.9         | Ergonomic design                                                                                                                                                                                                                                                                                                                                                                                             |                 | P       |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                        |                 |         |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                     | Result - Remark | Verdict |
| 4.1.9.1       | Loading points for packaging materials                                                                                                                                                                                                                                 |                 | P       |
|               | The requirements of EN 415-10:2014, 5.11.4 shall apply.                                                                                                                                                                                                                |                 | P       |
| 4.1.9.2       | Product loading or unloading points                                                                                                                                                                                                                                    |                 | P       |
|               | The requirements of EN 415-10:2014, 5.11.5 shall apply.                                                                                                                                                                                                                |                 | P       |
| 4.1.9.3       | Hand-wheels                                                                                                                                                                                                                                                            |                 | N/A     |
|               | Where a hand-wheel is used to move a mechanism by hand, the force that shall be applied to the circumference of the hand-wheel to move the mechanism shall not exceed 50 N if one hand is used and 75 N if two hands are used.                                         |                 | N/A     |
| 4.1.9.4       | Change parts                                                                                                                                                                                                                                                           |                 | N/A     |
|               | On machines where change parts are used, hazards from excessive effort or strain shall be eliminated or reduced by the following measures:                                                                                                                             |                 | -       |
|               | a) designing the machine and its change parts so that their handling operations are assessed as acceptable according to EN 1005-2:2003+A1:2008, selecting 25 kg as the reference mass, $M_{ref}$ , for the adult users as stated in Table 1 of EN 1005-2:2003+A1:2008; |                 | N/A     |
|               | b) designing the machine and its change parts so that their handling operations can be performed by two persons and are assessed as acceptable according to EN 1005-2:2003+A1:2008, selecting 40 kg as the reference mass $M_{ref}$ ;                                  |                 | N/A     |
|               | c) Where the measures described in a) and b) are not possible for technical reasons, and specially designed lifting equipment is necessary, this lifting equipment shall be provided with the machine.                                                                 |                 | N/A     |
|               | The maximum mass shall be calculated using the $M_{ref}$ given in this document following the procedure described in EN 1005-2:2003+A1:2008, 4.3.                                                                                                                      |                 | N/A     |
| 4.1.10        | Hygienic design requirements                                                                                                                                                                                                                                           |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                               |                 |         |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                            | Result - Remark | Verdict |
|               | Machines intended to pack foodstuffs shall comply with the requirements of EN 1672-2:2020. Machines intended to pack cosmetics, pharmaceuticals or other products where hygiene is a concern shall comply with the requirements of EN ISO 14159:2008. In addition, the machine manufacturer shall:                                            |                 | -       |
|               | a) identify the level of hygienic design appropriate for the product. When the machine manufacturer is unable to find this information, he shall define the limitation of use for the machine and clearly state this in the instructions, for example "This machine has been designed to pack foodstuffs with the following characteristics"; |                 | N/A     |
|               | b) describe appropriate and safe cleaning procedures in the instructions including information on the cleaning or disinfection agents that shall be used;                                                                                                                                                                                     |                 | N/A     |
|               | c) design the machine so that fallen packs or spilled products or substances can be easily detected and removed from the machine.                                                                                                                                                                                                             |                 | N/A     |
| 4.2           | Safety requirements for a flow-wrapping machine                                                                                                                                                                                                                                                                                               |                 | N/A     |
| 4.2.1         | General                                                                                                                                                                                                                                                                                                                                       |                 | N/A     |
|               | The hazards described in A.1.2 shall be eliminated or safeguarded by the following measures and those described in 4.1.                                                                                                                                                                                                                       |                 | N/A     |
|               | These safety requirements also apply to a lower reel flow-wrapping machine (3.3.1) and an edge sealing machine (3.3.3) where the equivalent hazard exists.                                                                                                                                                                                    |                 | N/A     |
|               | Figure 15 shows the guards on atypical flow-wrapping machine.                                                                                                                                                                                                                                                                                 |                 | N/A     |
| 4.2.2         | Product feed 4.2.2.1 General                                                                                                                                                                                                                                                                                                                  |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |         |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                                     | Result - Remark | Verdict |
|               | On machines which are to be fed by hand, the feeding area shall be designed to eliminate shearing, crushing and entanglement hazards, but at the same time shall allow access to the product pushing devices, using the methods described in 4.2.2.2, 4.2.2.3 and 4.2.2.4.                                                                                                                                             |                 | N/A     |
| 4.2.2.2       | Chains and drives                                                                                                                                                                                                                                                                                                                                                                                                      |                 | N/A     |
|               | The return chain run with its pushing devices and drive and tail sprockets of the chain infeed conveyor shall be safeguarded with fixed or interlocking guards.                                                                                                                                                                                                                                                        |                 | N/A     |
|               | If these guards need to be removed once a day or more frequently, they shall be fitted with interlocking devices complying with EN ISO 14119:2013 and comply with the requirements for interlocking guards. Where cables make this area of the machine difficult to clean, mechanical trapped key interlocking devices complying with EN ISO 14119:2013 type 2 can be used, if they have a suitable performance level. |                 | N/A     |
|               | The tail sprocket guard shall be designed to avoid shearing hazards for example by creating a tunnel guard.                                                                                                                                                                                                                                                                                                            |                 | N/A     |
|               | Where machines are equipped with product side guides which are adjustable without the need for tools, movement of these guides shall not expose any hazard.                                                                                                                                                                                                                                                            |                 | N/A     |
| 4.2.2.3       | Product pushing devices                                                                                                                                                                                                                                                                                                                                                                                                |                 | N/A     |
|               | Product pushing devices shall be designed so that they do not present cutting, shearing or crushing hazards in the hand loading area and where they enter the folding box.                                                                                                                                                                                                                                             |                 | N/A     |
|               | The risk of impact between a pusher and the hand of an operator in the hand loading area can be considered negligible if the pusher has no sharp edges, there is no risk of entanglement or drawing-in and the speed of the conveyor is lower than 2 m/s.                                                                                                                                                              |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                         |                 |         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                      | Result - Remark | Verdict |
|               | Other methods of eliminating hazards from pushing devices include the following:                                                                                                                                                                                        |                 | -       |
|               | a) pushing devices designed so that they come away from the chain in the event of a lateral force greater than 135 N being applied to them. The impact force shall not exceed 180 N and the static pressure on the body surface shall not exceed 60 N/cm <sup>2</sup> ; |                 | N/A     |
|               | b) pushing devices designed so that they can bend when a lateral force greater than 135 N is applied to them. The impact force shall not exceed 180 N and the static pressure on the body surface shall not exceed 60 N/cm <sup>2</sup> .                               |                 | N/A     |
|               | c) pushing device linkages designed so that the pushing devices are free to bend backwards as they enter the folding box;                                                                                                                                               |                 | N/A     |
|               | d) a trip guard fitted with an interlocking device complying with EN ISO 14119:2013 like the one shown in Figure 16.                                                                                                                                                    |                 | N/A     |
| 4.2.2.4       | Flat belt infeed conveyor                                                                                                                                                                                                                                               |                 | N/A     |
|               | Where flat belt conveyors are used to feed products, they shall comply with EN 415-10:2014, 5.20.4.                                                                                                                                                                     |                 | N/A     |
| 4.2.2.5       | Automatic product feeding mechanisms                                                                                                                                                                                                                                    |                 | N/A     |
|               | Where automatic product feeding mechanisms are not safe by design as defined by EN 415-10:2014, 5.2.1.1, they shall be closed with interlocking guards complying with 4.1.2.2.                                                                                          |                 | N/A     |
| 4.2.3         | Film reel unwind mechanism                                                                                                                                                                                                                                              |                 | N/A     |
| 4.2.3.1       | General                                                                                                                                                                                                                                                                 |                 | N/A     |
|               | The film reel unwind mechanism shall be designed and positioned in accordance with 4.1.9.1.                                                                                                                                                                             |                 | N/A     |
|               | Film reel unwind mechanisms shall either be made safe by design using the measures indicated in 4.1.2.1 or they shall be closed with interlocking guards.                                                                                                               |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Result - Remark | Verdict |
|               | Where the moving film edge presents a cutting hazard, the film path shall be enclosed with fixed or interlocking guards.                                                                                                                                                                                                                                                                                                                                                                  |                 | N/A     |
| 4.2.3.2       | Tension roller assembly                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 | N/A     |
|               | The shearing hazard between the tension roller assembly and the machine frame shall be eliminated either by ensuring that the moving assembly is at least 25 mm from the frame or by incorporating one of the devices shown in Figure 17.                                                                                                                                                                                                                                                 |                 | N/A     |
|               | Where the film braking or compensating mechanism cannot be made safe by design, it shall be enclosed with interlocking guards.                                                                                                                                                                                                                                                                                                                                                            |                 | N/A     |
| 4.2.3.3       | Coders                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 | N/A     |
|               | Where a coding device is integrated with the film reel unwind mechanism, the power supplies for the coder (for example electricity and compressed air) shall be isolated when the machine's isolators are turned off.                                                                                                                                                                                                                                                                     |                 | N/A     |
|               | The coder shall be installed following the coder manufacturer's instructions.                                                                                                                                                                                                                                                                                                                                                                                                             |                 | N/A     |
|               | Hot foil coders shall be guarded or insulated so touchable surfaces do not exceed the burn thresholds indicated in EN ISO 13732-1:2008. Where there is a residual risk of burning a "warning hot surface" pictogram shall be fitted.                                                                                                                                                                                                                                                      |                 | N/A     |
|               | Laser coders rated as class 3 or 4 shall be mounted in a class 1 safety enclosure that complies with EN 60825-4:2006 and shall be provided with a suitable extraction system. For all classes of laser coder, a laser hazard warning pictogram (EN ISO 7010:2020/ W004) shall be fixed on the machine housing next to the coder or on the class 1 safety enclosure. Instructions for safe use, adjustment and maintenance of the laser coder shall be included in the instruction manual. |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                 |                 |         |
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| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                              | Result - Remark | Verdict |
|               | Where the coder is fitted in a hazard zone, the machine's hazardous functions shall be stopped and maintained in a stopped condition by a safety-related stop function complying with PLr "d" of EN ISO 13849-1:2015, when the coder needs to be accessed, for example because of a malfunction or to change the foil.                                                                          |                 | N/A     |
| 4.2.3.4       | Power unwind mechanism                                                                                                                                                                                                                                                                                                                                                                          |                 | N/A     |
| 4.2.3.5       | Automatic splicing mechanism                                                                                                                                                                                                                                                                                                                                                                    |                 | N/A     |
|               | Where the automatic splicing mechanism cannot be made safe by design using the methods described in 4.1.2.1 or the mechanism incorporates a cutting device, the mechanism shall be enclosed with an interlocking guard or ESPE. This interlocking guard shall be interlocked so that the splicer cannot operate when the splicer guard is open, but allows the main machine to continue to run. |                 | N/A     |
|               | The design of the guards shall ensure that hazard zones on the main machine cannot be reached when the splicer's guard is open.                                                                                                                                                                                                                                                                 |                 | N/A     |
| 4.2.3.6       | Static elimination equipment                                                                                                                                                                                                                                                                                                                                                                    |                 | N/A     |
|               | Where elimination equipment presents a hazard, it shall comply with 4.1.3.3.                                                                                                                                                                                                                                                                                                                    |                 | N/A     |
| 4.2.3.7       | Reclose feature mechanism                                                                                                                                                                                                                                                                                                                                                                       |                 | N/A     |
|               | Mechanisms for attaching a reclose feature to a package shall be enclosed with interlocking guards. The reclose feature reel unwind mechanism shall comply with 4.2.3.2. Where heat is used to attach the reclose feature, 4.1.4 shall apply.                                                                                                                                                   |                 | N/A     |
| 4.2.4         | Longitudinal sealing mechanism                                                                                                                                                                                                                                                                                                                                                                  |                 | N/A     |
|               | The longitudinal sealing mechanism shall be safeguarded in one of the following ways:                                                                                                                                                                                                                                                                                                           |                 | N/A     |
|               | a) enclosing the mechanism with an interlocking guard fitted with a trip guard as described in 4.2.2.3 d) and in Figure 16, or                                                                                                                                                                                                                                                                  |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |         |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Result - Remark | Verdict |
|               | b) using a series of curved fixed guards in front of each set of rollers as shown in Figure 19 a). The clearance between the curved fixed guards “E” and the drive rollers “A” shall be less than or equal to 4 mm. Where the film opening “B” is less than or equal to 4 mm, the safety distance to the danger zone “C” shall be at least 2 mm. Where the film opening “B” is less than or equal to 6mm, the safety distance to the danger zone “C” shall be at least 10 mm. Where the film opening is greater than 6 mm the safety distance shall comply with Table 4 of EN ISO 13857:2019. |                 | N/A     |
| 4.2.5         | Transverse sealing and cutting mechanisms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 | N/A     |
|               | The transverse sealing and cutting mechanisms shall be safeguarded with interlocking guards which prevent access to the mechanisms through both the infeed and discharge openings as illustrated by the guards marked as “D” and “E” in Figure 15.                                                                                                                                                                                                                                                                                                                                            |                 | N/A     |
|               | Where the transverse sealing mechanism is pneumatically operated, it shall incorporate a brake mechanism or solenoid valve to ensure that the mechanism does not move unexpectedly when the guards are open or the compressed air supply is disconnected.                                                                                                                                                                                                                                                                                                                                     |                 | N/A     |
|               | Where the transverse sealing mechanism is heated, the requirements of 4.1.4 shall apply.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 | N/A     |
|               | When the transverse sealing mechanism interlocking guard is open the control system shall ensure that the mechanisms cannot move unexpectedly, however it is not necessary for the heating circuit to be disconnected.                                                                                                                                                                                                                                                                                                                                                                        |                 | N/A     |
| 4.2.6         | Discharge mechanism                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 | N/A     |
|               | Where the discharge mechanism is a flat belt conveyor it shall comply with EN 415-10:2014, 5.20.4. Other discharge mechanisms which are not safe by design shall be enclosed with interlocking guards.                                                                                                                                                                                                                                                                                                                                                                                        |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 |         |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                                                | Result - Remark | Verdict |
| 4.2.7         | Integrity of safety related control systems                                                                                                                                                                                                                                                                                                                                                                                       |                 | N/A     |
|               | The safety related control systems of flow-wrapping machines shall as a minimum comply with the following performance levels of EN ISO 13849-1:2015.                                                                                                                                                                                                                                                                              |                 | N/A     |
| 4.3           | Safety requirements for a vertical form, fill and seal machine                                                                                                                                                                                                                                                                                                                                                                    |                 | N/A     |
| 4.3.1         | General                                                                                                                                                                                                                                                                                                                                                                                                                           |                 | N/A     |
|               | The hazards described in A.1.3 shall be safeguarded by the following methods and those described in 4.1.                                                                                                                                                                                                                                                                                                                          |                 | N/A     |
|               | These requirements also apply to a stick packing machine (3.3.2), vertical sachet form, fill and seal machine (3.3.4), strip packing machine (3.3.5) and vertical form, fill and seal machine for carton board (3.3.6) where the equivalent hazards exist.                                                                                                                                                                        |                 | N/A     |
|               | Figure 21 shows the guards on atypical vertical form, fill and seal machine.                                                                                                                                                                                                                                                                                                                                                      |                 | N/A     |
| 4.3.2         | Product feeding devices                                                                                                                                                                                                                                                                                                                                                                                                           |                 | N/A     |
|               | The safety requirements for four typical feeding devices are described in 4.11, 4.12, 4.13 and 4.14. The product feeding device shall be guarded and interlocked with the vertical form fill and seal machine in such away that it is not possible to reach hazard zones inside the product feeding device from inside the guards of the machine or hazard zones inside the machine from inside the guards of the feeding device. |                 | N/A     |
| 4.3.3         | Packing material reel unwind mechanism                                                                                                                                                                                                                                                                                                                                                                                            |                 | N/A     |
|               | The requirements of 4.2.3 also apply to a vertical form fill and seal machine.                                                                                                                                                                                                                                                                                                                                                    |                 | N/A     |
| 4.3.4         | Longitudinal sealing mechanism                                                                                                                                                                                                                                                                                                                                                                                                    |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                       |                 |         |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                    | Result - Remark | Verdict |
|               | The longitudinal sealing mechanism shall be guarded with interlocking guards similar to the one marked "C" in Figure 21. Where the interlocking guard is open at the top, the minimum height of the guard shall be 1600 mm and the distance measured from the highest possible standing level over the upper edge of the guard to the nearest hazard zone shall be at least 2 700 mm. |                 | N/A     |
|               | Where the longitudinal sealing mechanism is heated, the requirements of 4.1.4 shall apply.                                                                                                                                                                                                                                                                                            |                 | N/A     |
|               | The longitudinal sealing mechanism shall not present a risk of burning when changing the packaging material.                                                                                                                                                                                                                                                                          |                 | N/A     |
|               | When the longitudinal sealing mechanism interlocking guard is open the safety-related control system shall ensure that the mechanisms cannot move unexpectedly, however it is not necessary for the heating circuit to be disconnected.                                                                                                                                               |                 | N/A     |
| 4.3.5         | Packaging material transport mechanism                                                                                                                                                                                                                                                                                                                                                |                 | N/A     |
|               | The packaging material transport mechanism shall be guarded with interlocking guards and a tunnel guard as illustrated by the guards marked "C" and "D" in Figure 21.                                                                                                                                                                                                                 |                 | N/A     |
|               | Where the interlocking guard is open at the top, the minimum height of the guard shall be 1 600 mm and the distance measured from the highest possible standing level over the upper edge of the guard to the nearest hazard zone shall be at least 2 700 mm.                                                                                                                         |                 | N/A     |
| 4.3.6         | Transverse sealing and associated mechanisms                                                                                                                                                                                                                                                                                                                                          |                 | N/A     |
|               | The transverse sealing and associated mechanisms shall be guarded with interlocking guards and a tunnel guard as illustrated by those marked "C" and "D" in Figure 21.                                                                                                                                                                                                                |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                                                  | Result - Remark | Verdict |
|               | Where the height of the discharge opening is less than or equal to 120 mm the safety distance from the discharge opening in the tunnel guard to the nearest hazard zone shall comply with EN ISO 13857:2019, Tables 3, 4 or 6.                                                                                                                                                                                                      |                 | N/A     |
|               | Where the height of the discharge opening is more than 120 mm but less than or equal to 200 mm the safety distance from the discharge opening in the tunnel guard to the nearest hazard zone shall be at least 900 mm.                                                                                                                                                                                                              |                 | N/A     |
|               | Where the height of the opening is greater than 200 mm but less than or equal to 400 mm and the width of the aperture does not exceed 500 mm the safety distance from the discharge opening in the tunnel guard to the nearest hazard zone shall be at least 1 000 mm. Where the aperture is larger than the above dimensions, EN 415-10:2014, 5.2.1.3 shall apply.                                                                 |                 | N/A     |
|               | To prevent access by reaching with an arm under the interlocking guard, for example to remove empty packages from the sealing mechanism, the gap under the guard and the safety distance to the nearest hazard zone shall comply with Table 4 of EN ISO 13857:2019. Where additional guards are fitted that restrict the movement of an arm or hand, the safety distances shown in Tables 3 and 6 of EN ISO 13857:2019 can be used. |                 | N/A     |
|               | Where the transverse sealing mechanism is heated, the requirements of 4.1.4 shall apply.                                                                                                                                                                                                                                                                                                                                            |                 | N/A     |
|               | The machine shall be provided with a facility to feed packaging material through the machine automatically or the design of the sealing mechanism shall allow packaging material to be threaded through the jaws while they are hot without a risk of burning.                                                                                                                                                                      |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                              |                 |         |
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| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                           | Result - Remark | Verdict |
|               | When the transverse sealing mechanism interlocking guard is open the control system shall ensure that the mechanisms cannot move unexpectedly, however it is not necessary for the heating circuit to be disconnected.                                                                                                       |                 | N/A     |
| 4.3.7         | Cutting and perforating mechanisms                                                                                                                                                                                                                                                                                           |                 | N/A     |
|               | The design of the cutting and perforating mechanism shall minimize the risk of injury during a typical operator intervention to thread packaging material or clear a jam. This can be achieved by designing the cutting or perforating mechanism so it retracts into an enclosed area when the interlocking guard is opened. |                 | N/A     |
|               | The machine shall be fitted with a facility to inhibit the cutting mechanism during setup or at the start of production to ensure that empty packages will be discharged without the need for an operator intervention.                                                                                                      |                 | N/A     |
| 4.3.8         | Discharge conveyor                                                                                                                                                                                                                                                                                                           |                 | N/A     |
|               | Where a discharge conveyor is present, the conveyor shall be interlocked with the machine so that when the interlocking guard of the machine is open the conveyor stops.                                                                                                                                                     |                 | N/A     |
|               | Where the conveyor forms part of the guarding, it shall either be fixed in relationship to the machine, or interlocked so that the machine cannot operate unless the conveyor is in its correct position.                                                                                                                    |                 | N/A     |
|               | All types of conveyor shall comply with EN 415-10:2014, 5.20.4.2.                                                                                                                                                                                                                                                            |                 | N/A     |
| 4.3.9         | Discharge into bins                                                                                                                                                                                                                                                                                                          |                 | N/A     |
|               | On machines where the product is discharged into bins without the use of a discharge conveyor, one of the following safeguarding solutions shall be used:                                                                                                                                                                    |                 | -       |
|               | a) the machine guards shall enclose the bin or;                                                                                                                                                                                                                                                                              |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |         |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Result - Remark | Verdict |
|               | b) the combination of the bin and the machine guards shall ensure compliance with 4.1.2.2 and the correct position of the bin shall be detected by an interlocking device complying with EN ISO 14119:2013.                                                                                                                                                                                                                                                                                                                                                   |                 | N/A     |
| 4.3.10        | Provision for changing the forming tube                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | N/A     |
|               | The forming tube shall be designed so it can be installed and removed without a manual handling risk. Methods of achieving this include:                                                                                                                                                                                                                                                                                                                                                                                                                      |                 | N/A     |
|               | a) lightweight forming tubes;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 | N/A     |
|               | b) mechanisms to support the forming tube during the installation and removal process;                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 | N/A     |
|               | c) trolleys to support the forming tube.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 | N/A     |
|               | The requirements of EN 415-10:2014, 5.20.6.3 shall also apply.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 | N/A     |
|               | Where it is likely that operators will stand on either the discharge conveyor or the tunnel guard to change the forming tube, the conveyor or the tunnel guard shall be designed so they are safe to stand on, as shown in Figure 22, or provide an alternative means of access and make it clear using the "Do not stand here" pictogram where it is not safe to stand. Where the tunnel guard is used as a step it shall comply with EN ISO 14122-3:2016 which requires handrails to be provided where a step has a height greater than or equal to 500 mm. |                 | N/A     |
|               | The guards shall ensure that it is not possible to reach danger zones in the machine over guards when standing on the means of access described in this clause. Where guards are open at the top the safety distances in Table 2 of EN ISO 13857:2019 shall apply.                                                                                                                                                                                                                                                                                            |                 | N/A     |
| 4.3.11        | Integrity of safety related control systems                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 | N/A     |
|               | The safety related control systems of vertical form, fill and seal machines shall as a minimum comply with the following performance levels of EN ISO 13849-1:2015.                                                                                                                                                                                                                                                                                                                                                                                           |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                 |                 |         |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                              | Result - Remark | Verdict |
| 4.4           | Safety requirements for a horizontal sachet form, fill and seal machine                                                                                                                                                                                         |                 | N/A     |
| 4.4.1         | General                                                                                                                                                                                                                                                         |                 | N/A     |
|               | The hazards described in A.1.4 shall be safeguarded by the following methods and those described in 4.1. Figure 23 shows a linear transport system, but the safety requirements are the same on machines where the transport system is rotary or partly rotary. |                 | N/A     |
| 4.4.2         | Film reel unwind mechanism                                                                                                                                                                                                                                      |                 | N/A     |
|               | The requirements of 4.2.3 also apply to atypical horizontal sachet form fill and seal machine.                                                                                                                                                                  |                 | N/A     |
| 4.4.3         | Vertical seal mechanism                                                                                                                                                                                                                                         |                 | N/A     |
|               | The vertical seal mechanism shall be guarded with interlocking guards that comply with 4.1.2.2. Where the closing medium is heat 4.1.4 shall apply.                                                                                                             |                 | N/A     |
| 4.4.4         | Transport mechanism                                                                                                                                                                                                                                             |                 | N/A     |
|               | The transport mechanism shall be guarded with interlocking guards that comply with 4.1.2.2.                                                                                                                                                                     |                 | N/A     |
| 4.4.5         | Product feeding devices                                                                                                                                                                                                                                         |                 | N/A     |
|               | The safety requirements for typical feeding devices are described in 4.11, 4.12, 4.13 and 4.14 and EN 15180:2014.                                                                                                                                               |                 | N/A     |
| 4.4.6         | Product settling mechanism                                                                                                                                                                                                                                      |                 | N/A     |
|               | The requirements of 4.1.6 shall apply.                                                                                                                                                                                                                          |                 | N/A     |
| 4.4.7         | Top sealing mechanism                                                                                                                                                                                                                                           |                 | N/A     |
|               | The top seal mechanism shall be guarded with interlocking guards that comply with 4.1.2.2. Where the closing medium is heat, 4.1.4 shall apply.                                                                                                                 |                 | N/A     |
| 4.4.8         | Cutting mechanism                                                                                                                                                                                                                                               |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                           |                 |         |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                        | Result - Remark | Verdict |
|               | The cutting mechanism shall be enclosed with interlocking guards, interlocked so the cutting mechanism cannot operate when the guard is open. The blade of this device shall be designed either to withdraw into a recess or befitted with a guard to prevent injury when the interlocking guard is open.                                                 |                 | N/A     |
| 4.4.9         | Discharge chute or conveyor                                                                                                                                                                                                                                                                                                                               |                 | N/A     |
|               | Where the height of the discharge opening is 20 mm or less the opening shall be at least 120 mm away from the nearest hazard zone. Where the height of the opening is greater than 20 mm but less than 120 mm the distance from the discharge end of the opening to the nearest hazard zone shall be 850 mm, which may require the use of a tunnel guard. |                 | N/A     |
|               | Where the discharge mechanism is a flat belt conveyor it shall comply with EN 415-10:2014, 5.20.4.2.                                                                                                                                                                                                                                                      |                 | N/A     |
| 4.4.10        | Integrity of safety related control systems                                                                                                                                                                                                                                                                                                               |                 | N/A     |
|               | The safety related control systems of horizontal sachet form, fill and seal machines shall as a minimum comply with the following performance levels of EN ISO 13849-1:2015.                                                                                                                                                                              |                 | N/A     |
| 4.5           | Safety requirements for a thermoform, fill and seal machine                                                                                                                                                                                                                                                                                               |                 | P       |
| 4.5.1         | General                                                                                                                                                                                                                                                                                                                                                   |                 | P       |
|               | The hazards described in A.1.5 shall be safeguarded by the following methods and those described in 4.1. Figure 24 shows a linear pack transport system, but the safety requirements are the same on machines where the pack transport system is rotary or partly rotary.                                                                                 |                 | P       |
|               | These requirements also apply to a deep draw fill and seal machine (3.3.7) where the equivalent hazard exists.                                                                                                                                                                                                                                            |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                      |                 |         |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                   | Result - Remark | Verdict |
|               | Where the interlocking guards are open at the top, the minimum height of the guards shall be 1600 mm and the distance measured from the highest possible standing level over the upper edge of the guard to the nearest hazard zone shall be at least 2700 mm.                                                                                       |                 | N/A     |
| 4.5.2         | Lower web reel unwind mechanism                                                                                                                                                                                                                                                                                                                      |                 | P       |
|               | The requirements of 4.2.3 shall apply to the lower web reel unwind mechanism.                                                                                                                                                                                                                                                                        |                 | P       |
| 4.5.3         | Transport mechanism                                                                                                                                                                                                                                                                                                                                  |                 | P       |
| 4.5.3.1       | General                                                                                                                                                                                                                                                                                                                                              |                 | P       |
|               | Transport mechanisms shall be safeguarded as follows.                                                                                                                                                                                                                                                                                                |                 | P       |
| 4.5.3.2       | Counter rotating rollers                                                                                                                                                                                                                                                                                                                             |                 | P       |
|               | The transport mechanisms of machines of this type shall be guarded with fixed or interlocking guards that comply with 4.1.2.2.                                                                                                                                                                                                                       |                 | P       |
| 4.5.3.3       | Chains and clamps                                                                                                                                                                                                                                                                                                                                    |                 | P       |
|               | Machines with chain and clamp transport mechanisms where products are manually fed shall be safeguarded with fixed guards which incorporate a slot for the lower film web no wider than 4 mm. Where this cannot be achieved the relationship between the slot width and the distance from the hazard shall comply with Table 4 of EN ISO 13857:2019. |                 | P       |
|               | Where the machine is automatically fed, the mechanisms shall be guarded as in paragraph 1 or with interlocking guards that also guard the automatic feeding mechanisms.                                                                                                                                                                              |                 | P       |
| 4.5.4         | Heating chamber                                                                                                                                                                                                                                                                                                                                      |                 | P       |
|               | The machine shall be designed in such a way that when the machine stops there is no risk of the film catching fire.                                                                                                                                                                                                                                  |                 | P       |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                  |                 |         |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                               | Result - Remark | Verdict |
|               | The heating chamber and forming die shall be safeguarded with interlocking guards. In addition, the control system shall ensure that the heating chamber and forming die cannot move under gravity when the power supplies are disconnected. This may involve fitting a mechanical or pneumatic device which prevents the die from moving when power is removed. |                 | P       |
|               | The safety distance through openings in these guards shall be in accordance with Table 2.                                                                                                                                                                                                                                                                        |                 | P       |
|               | The requirements of 4.1.4 shall apply. Where necessary to comply with 4.1.4, a cooling system shall be provided to control the temperature of components like the forming die that may be touched by operators.                                                                                                                                                  |                 | P       |
|               | A “warning hot surface” pictogram shall be fitted to the heating chamber to warn of a residual burning hazard if this exists.                                                                                                                                                                                                                                    |                 | P       |
| 4.5.5         | Forming die                                                                                                                                                                                                                                                                                                                                                      |                 | P       |
|               | The forming die shall be guarded with interlocking guards that comply with 4.1.2.2. The side guards shall be interlocking guards that comply with 4.1.2.2.                                                                                                                                                                                                       |                 | P       |
|               | Where for hygiene reasons the gap under the machine frame must be greater than 180 mm, additional measures shall be taken to prevent access to hazard zones under the machine for instance:                                                                                                                                                                      |                 | -       |
|               | — fitting fixed or interlocked baffles inside the hazard zone which prevent direct access to hazard zones as shown in Tables 3 and 6 of EN ISO 13857:2019;                                                                                                                                                                                                       |                 | P       |
|               | — extending the side guards so they are lower than the machine frame.                                                                                                                                                                                                                                                                                            |                 | P       |
| 4.5.6         | Guarding of infeed and discharge apertures for materials and packages                                                                                                                                                                                                                                                                                            |                 | P       |
| 4.5.6.1       | General                                                                                                                                                                                                                                                                                                                                                          |                 | P       |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                       |                 |         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                    | Result - Remark | Verdict |
|               | The risk of impact from the moving parts of the packaging material transport mechanism in the loading area can be considered negligible if the moving parts are smooth without sharp edges and the speed is lower than 2 m/s.                                                                         |                 | P       |
|               | The apertures for the packaging material and packages shall be safeguarded using one of the methods described in 4.5.6.2, 4.5.6.3, 4.5.6.4, 4.5.6.5 or 4.5.6.6.                                                                                                                                       |                 | P       |
|               | The methods described in 4.5.6.3, 4.5.6.4, 4.5.6.5 or 4.5.6.6 shall only be used where the stopping time of the hazardous movement does not exceed 0,5 s.                                                                                                                                             |                 | P       |
|               | The objective of all the safeguarding solutions described is to ensure that the machine stops before a hazard zone can be reached. A test shall be carried out to ensure that the chosen safeguarding method achieves this objective using the methods described in EN ISO 13855:2010.                |                 | P       |
|               | Where the opening is less than 20 mm the safety distances in Table 4 of EN ISO 13857:2019 shall apply. Where the opening is greater than 200 mm the safety distances in EN 415-10:2014, 5.2.1.3 shall apply.                                                                                          |                 | P       |
| 4.5.6.2       | Fixed guards                                                                                                                                                                                                                                                                                          |                 | P       |
|               | Where fixed guards alone are used to prevent access to hazard zones, access to the forming and sealing dies shall be limited by fitting a false base in the product loading area and the safety distance through openings in the guards to the danger zones shall comply with dimension B in Table 2. |                 | P       |
| 4.5.6.3       | Trip guard                                                                                                                                                                                                                                                                                            |                 | P       |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |         |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Result - Remark | Verdict |
|               | This comprises a moveable interlocking guard which can move easily if someone reaches into the opening. The maximum force to lift and activate the guard shall not exceed 50 N. The interlocking device fitted to the guard shall comply with EN ISO 14119:2013 and shall be interlocked in such away that if the guard is lifted by 10 mm or less, the hazardous movements shall stop or reverse to a safe position. For this type of guard, safety distance C, in Table 2 and Figure 25 shall be used. The stopping time of the hazardous machine functions shall not exceed 0,5 s. |                 | P       |
|               | The instructions shall warn the user that this type of guard can become ineffective if a heavy object is placed on top of the guard.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 | P       |
| 4.5.6.4       | Trip guard with AOPD device                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 | N/A     |
|               | This comprises a moveable interlocking guard supplemented with an Active Opto-electronic Protective Device (AOPD). The AOPD shall comply with EN 61496-2:2013 and the interlocking device fitted to the guard shall comply with EN ISO 14119:2013. The control system shall ensure that if the guard is lifted 10 mm or the AOPD is activated the hazardous movements shall stop or if safe to do so reverse. The maximum force to lift and activate the guard shall not exceed 50N. For this type of guard, safety distance D, in Table 2 and Figure 26 shall be used.               |                 | N/A     |
| 4.5.6.5       | Linked automatic guard                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |         |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Result - Remark | Verdict |
|               | This comprises a guard which is attached to the moving part of the forming or sealing die mechanism which moves into place when the hazardous movements of the forming or sealing dies begin. The guard shall be interlocked with the machine to stop hazardous movements/or bring the die into a safe position, if an obstruction is detected. The control system shall ensure that if the guard is lifted 10mm the hazardous movements shall stop or if safe to do so reverse. The maximum force to lift and activate the guard shall not exceed 50N. The control circuit shall comply with PL "d" of EN ISO 13849-1:2015. |                 | N/A     |
|               | Where the force of the guard exceeds those listed in EN 415-10:2014, 5.2.1.1 for fingers and wrists, a pressure sensitive device, complying with EN ISO 13856-2:2013 shall be fitted to the guard, that will stop the hazardous movement if an obstruction is detected.                                                                                                                                                                                                                                                                                                                                                      |                 | N/A     |
|               | The interlocking device shall comply with EN ISO 14119:2013.<br>The distance between the vertical part of the linked automatic guard and fixed parts shall not exceed 4 mm in any position.<br>For a linked automatic guard, the safety distance F, in Table 2 and Figure 27 shall be used.                                                                                                                                                                                                                                                                                                                                  |                 | N/A     |
| 4.5.6.6       | Automatic guard                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 | P       |
|               | The automatic guard is powered independently of other movements on the machine and moves into place after the transport cycle ends and before the forming and sealing cycles start. Dimension "G" shown in Figure 28, will depend on the gap "H" under the automatic guard in its closed position. Dimension G shall comply with Table 4 of EN ISO 13857:2019, so for example if H is $\leq 4$ mm G shall be 2mm and if H is $\leq 6$ mm, G shall be 10 mm.                                                                                                                                                                  |                 | P       |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                |                 |         |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                             | Result - Remark | Verdict |
|               | The control system shall ensure that the forming and sealing cycles cannot start until the automatic guard is in the closed position and shall comply with PL “d” of EN ISO 13849-1:2015.                                                                                      |                 | P       |
|               | Where the force of the automatic guard exceeds those forces listed in EN 415-10:2014, 5.2.1.1, a pressure sensitive device, complying with EN ISO 13856-2:2013 shall be fitted to the guard, that will stop the movement of the automatic guard if an obstruction is detected. |                 | P       |
| 4.5.7         | Automatic product feeding devices                                                                                                                                                                                                                                              |                 | P       |
|               | Automatic product feeding devices shall be safeguarded with interlocking guards.                                                                                                                                                                                               |                 | P       |
|               | Where the automatic feeding device is a belt conveyor it shall comply with EN 415-10:2014, 5.20.4.                                                                                                                                                                             |                 | P       |
| 4.5.8         | Upper film reel unwind mechanism                                                                                                                                                                                                                                               |                 | P       |
|               | The requirements of 4.2.3 shall apply to the upper web reel unwind mechanism.                                                                                                                                                                                                  |                 | P       |
|               | Where the machine is fitted with a coder that moves across the film web to apply several codes, the coding assembly shall either be made safe by design as indicated in 4.1.2.1 or it shall be enclosed with interlocking guards.                                              |                 | P       |
| 4.5.9         | Sealing die                                                                                                                                                                                                                                                                    |                 | P       |
|               | The sealing die shall be safeguarded with interlocking guards. Where the sealing die is heated 4.1.4 shall apply.                                                                                                                                                              |                 | P       |
| 4.5.10        | Cutting devices                                                                                                                                                                                                                                                                |                 | P       |
|               | Rotary and reciprocating cutting devices shall be safeguarded with interlocking guards that comply with 4.1.2.2.                                                                                                                                                               |                 | P       |
| 4.5.11        | Scrap reel                                                                                                                                                                                                                                                                     |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                   |                 |         |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                | Result - Remark | Verdict |
|               | The drawing-in hazard on the scrap reel shall be reduced in one of the following ways:<br>— enclosing the scrap reel with an interlocking guard, or<br>— limiting the torque of the reel drive mechanism, so that the reel stops when a force of 60 N is applied to it.           |                 | N/A     |
| 4.5.12        | Discharge mechanism                                                                                                                                                                                                                                                               |                 | N/A     |
|               | Where the discharge mechanism is a conveyor it shall comply with EN 415-10:2014, 5.20.4.2.<br>Access to hazard zones inside the machine through the discharge opening shall be prevented using a tunnel guard or interlocked trip guard which provides an 850 mm safety distance. |                 | N/A     |
| 4.5.13        | Pad or leaflet inserters                                                                                                                                                                                                                                                          |                 | N/A     |
|               | The requirements for carton magazines in 4.7.5 shall apply.                                                                                                                                                                                                                       |                 | N/A     |
| 4.5.14        | Integrity of safety related control systems                                                                                                                                                                                                                                       |                 | P       |
|               | The safety related control systems of thermoform, fill and seal machines shall as a minimum comply with the following performance levels of EN ISO 13849-1:2015.                                                                                                                  |                 | P       |
| 4.6           | Safety requirements for a tubular bag form, fill and seal machine                                                                                                                                                                                                                 |                 | N/A     |
| 4.6.1         | General                                                                                                                                                                                                                                                                           |                 | N/A     |
|               | The hazards described in A.1.6 shall be safeguarded by the following methods and those described in 4.1. Figure 29 shows the guards on atypical tubular bag form, fill and seal machine.                                                                                          |                 | N/A     |
| 4.6.2         | Film reel unwind mechanism                                                                                                                                                                                                                                                        |                 | N/A     |
|               | The requirements of 4.2.3 shall apply to the film reel unwind mechanism.                                                                                                                                                                                                          |                 | N/A     |
|               | If the film reel loading mechanism is not guarded, it shall be provided with a hold to run control placed where there is a clear view of the hazard zone.                                                                                                                         |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                           |                 |         |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                        | Result - Remark | Verdict |
|               | The design of the machine shall allow the film reel to be transported and loaded into the film reel unwind mechanism using standard lifting equipment such as a forklift truck. If film reels can only be lifted using specially designed lifting equipment, this special lifting equipment shall be supplied with the machine.                                           |                 | N/A     |
| 4.6.3         | Transverse or corner sealing and cutting mechanism                                                                                                                                                                                                                                                                                                                        |                 | N/A     |
|               | This mechanism shall be guarded with a combination of fixed and interlocking guards that comply with 4.1.2.2. Where the sealing mechanism is heated, 4.1.4 shall apply.                                                                                                                                                                                                   |                 | N/A     |
| 4.6.4         | Openings in guards                                                                                                                                                                                                                                                                                                                                                        |                 | N/A     |
|               | The safety distance from any openings in the guards shall be as follows:                                                                                                                                                                                                                                                                                                  |                 | N/A     |
| 4.6.5         | Cutting and perforating mechanisms                                                                                                                                                                                                                                                                                                                                        |                 | N/A     |
|               | The requirements of 4.1.2.2 and EN 415-10:2014, 5.20.1 shall apply.                                                                                                                                                                                                                                                                                                       |                 | N/A     |
| 4.6.6         | Film draw and compensator                                                                                                                                                                                                                                                                                                                                                 |                 | N/A     |
|               | The requirements of EN 415-10:2014, 5.2.1.2 shall apply.                                                                                                                                                                                                                                                                                                                  |                 | N/A     |
| 4.6.7         | Cooling mechanism                                                                                                                                                                                                                                                                                                                                                         |                 | N/A     |
|               | The requirements of EN 415-10:2014, 5.2.1.2 shall apply.                                                                                                                                                                                                                                                                                                                  |                 | N/A     |
| 4.6.8         | Filling station                                                                                                                                                                                                                                                                                                                                                           |                 | N/A     |
|               | The filling station shall be guarded with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                                                                                                                                                                                                        |                 | N/A     |
|               | Where the machine is specified to pack a hazardous or dusty product, 4.1.8 shall apply. Where the dust extraction system is not delivered with the machine, the machine manufacturer shall provide a detailed specification for the extraction system in the instructions which includes the details for the connection and the required airflow at the connection point. |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                     |                 |         |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                  | Result - Remark | Verdict |
| 4.6.9         | Bag opening mechanism                                                                                                                                                                                                                               |                 | N/A     |
|               | The bag opening mechanism shall be guarded with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                                                                            |                 | N/A     |
| 4.6.10        | Product settling mechanism                                                                                                                                                                                                                          |                 | N/A     |
|               | The product settling mechanism shall be guarded with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                                                                       |                 | N/A     |
| 4.6.11        | Bag sealing mechanism                                                                                                                                                                                                                               |                 | N/A     |
|               | This mechanism shall be guarded with a combination of fixed and interlocking guards that comply with 4.1.2.2. Where the bag sealing mechanism is heated 4.1.4 shall apply.                                                                          |                 | N/A     |
| 4.6.12        | Discharge conveyor                                                                                                                                                                                                                                  |                 | N/A     |
|               | The discharge conveyor shall comply with EN 415-10:2014, 5.20.4. The gap between the moving belt and fixed parts like guide rails shall either be less than 5 mm or more than 50 mm.                                                                |                 | N/A     |
| 4.6.13        | Conveyor height adjustment                                                                                                                                                                                                                          |                 | N/A     |
|               | The requirements of EN 415-10:2014, 5.2.1.2 shall apply.                                                                                                                                                                                            |                 | N/A     |
|               | Where the conveyor adjustment mechanism is not guarded as required by 4.1.2.2 or safe by design, as defined by 4.1.2.1, it shall be fitted with a hold to run control device which shall be located where there is a clear view of the hazard zone. |                 | N/A     |
| 4.6.14        | Bag transport mechanism                                                                                                                                                                                                                             |                 | N/A     |
|               | On automatic machines, the bag transport mechanism shall be guarded by a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                                                     |                 | N/A     |
|               | The safety distance from openings in guards to the nearest hazard zone shall comply with 4.3.7.                                                                                                                                                     |                 | N/A     |
| 4.6.15        | Integrity of safety related control systems                                                                                                                                                                                                         |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                            |                 |         |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                         | Result - Remark | Verdict |
|               | The safety related control systems of tubular bag form, fill and seal machines shall as a minimum comply with the following performance levels of EN ISO 13849-1:2015.                                                                                                                                                                                                                                     |                 | N/A     |
| 4.7           | Safety requirements for a mandrel form, fill and seal machine                                                                                                                                                                                                                                                                                                                                              |                 | N/A     |
| 4.7.1         | General                                                                                                                                                                                                                                                                                                                                                                                                    |                 | N/A     |
|               | The hazards described in A.1.7 shall be safeguarded by the following methods and those described in 4.1. Figure 30 shows the guards on atypical mandrel form, fill and seal machine.                                                                                                                                                                                                                       |                 | N/A     |
| 4.7.2         | Packaging material reel unwind mechanism                                                                                                                                                                                                                                                                                                                                                                   |                 | N/A     |
|               | On machines fitted with a reel unwind mechanism, the requirements of 4.2.3 shall apply.                                                                                                                                                                                                                                                                                                                    |                 | N/A     |
| 4.7.3         | Cutting mechanism                                                                                                                                                                                                                                                                                                                                                                                          |                 | N/A     |
|               | On machines fitted with a cutting mechanism, the cutting mechanism shall be enclosed with a combination of fixed and interlocking guards that comply with 4.1.2.2, interlocked so the cutting mechanism cannot operate when the guard is open. The blade of this device shall be designed either to withdraw into a recess or befitted with a guard to prevent injury when the interlocking guard is open. |                 | N/A     |
| 4.7.4         | Sealing mechanisms                                                                                                                                                                                                                                                                                                                                                                                         |                 | N/A     |
|               | Heat sealing mechanisms and hot melt glue sealing systems shall comply with 4.1.4 and EN 415-10:2014, 5.20.7.                                                                                                                                                                                                                                                                                              |                 | N/A     |
| 4.7.5         | Carton blank magazine                                                                                                                                                                                                                                                                                                                                                                                      |                 | N/A     |
|               | On machines fitted with a carton blank magazine that is loaded by hand, the following requirements shall apply:                                                                                                                                                                                                                                                                                            |                 | -       |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                         |                 |         |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                      | Result - Remark | Verdict |
|               | a) where the carton magazine is adjustable for different sizes of carton, the design shall ensure that it is not possible to reach around the stack of cartons to danger zones in the machine for every size of carton for which the machine has been specified, as shown in Figure 31; |                 | N/A     |
|               | b) where change part guards or manually adjustable guards are used, interlocking devices complying with EN ISO 14119:2013 shall be fitted to prevent the machine from running when these guards are not in place or not adjusted correctly;                                             |                 | N/A     |
|               | c) the carton magazine shall be fitted with at least two carton sensing devices, which stop the machine                                                                                                                                                                                 |                 | N/A     |
|               | when a pre-determined number of cartons are left in the carton magazine or if the cartons are removed from the magazine, exposing the carton transfer mechanism;                                                                                                                        |                 | N/A     |
|               | d) The carton sensing system shall be designed to minimize the risk of being deliberately defeated. Methods of minimizing the risk of deliberate defeat include:                                                                                                                        |                 | -       |
|               | 1) sensors mounted on both sides of the magazine or above and on one side of the magazine;                                                                                                                                                                                              |                 | N/A     |
|               | 2) monitoring a pre-determined sequence of signals;                                                                                                                                                                                                                                     |                 | N/A     |
|               | 3) sensors looking for an object at a pre-determined distance from the sensor.                                                                                                                                                                                                          |                 | N/A     |
|               | Where the carton blank magazine is fitted with an automatic carton loading mechanism, this mechanism shall be guarded with interlocking guards.                                                                                                                                         |                 | N/A     |
| 4.7.6         | Mandrel former                                                                                                                                                                                                                                                                          |                 | N/A     |
|               | This mechanism shall be safeguarded with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                                                                                                                       |                 | N/A     |
| 4.7.7         | Compression mechanism                                                                                                                                                                                                                                                                   |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |         |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                                                                         | Result - Remark | Verdict |
|               | This mechanism shall be safeguarded with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                                                                                                                                                                                                                                                                                          |                 | N/A     |
| 4.7.8         | Transfer mechanisms                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 | N/A     |
|               | These mechanisms shall be safeguarded with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                                                                                                                                                                                                                                                                                        |                 | N/A     |
| 4.7.9         | Transport section                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 | N/A     |
|               | This mechanism shall be safeguarded with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                                                                                                                                                                                                                                                                                          |                 | N/A     |
| 4.7.10        | Product feed                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 | N/A     |
|               | The safety requirements for typical feeding mechanisms are indicated in 4.11, 4.12, 4.13 and 4.14.                                                                                                                                                                                                                                                                                                                                                         |                 | N/A     |
|               | The product feed device and the connection to the machine shall be designed so that it is not possible to reach hazard zones in the machine from the product feed device and vice versa. Where these hazard zones could be reached through interlocking guards the interlocking shall stop both the machine and the product feed device. Movable elements like hoppers that will be opened once a week or more often shall be interlocked in the same way. |                 | N/A     |
| 4.7.11        | Product settling devices                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 | N/A     |
|               | Where the device uses vibration to settle the product, the requirements of 4.1.6 shall apply.                                                                                                                                                                                                                                                                                                                                                              |                 | N/A     |
|               | This mechanism shall be guarded with interlocking guards, interlocked so that the vibration devices stop vibrating when the guards are opened.                                                                                                                                                                                                                                                                                                             |                 | N/A     |
|               | Noise generated by the product settling device shall be minimised using the methods described in EN 415-10:2014, 5.8.                                                                                                                                                                                                                                                                                                                                      |                 | N/A     |
| 4.7.12        | Sterilization section                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                 |                 |         |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                              | Result - Remark | Verdict |
|               | This mechanism shall be safeguarded with a combination of fixed or interlocking guards that comply with 4.1.2.2 and with the relevant requirements of 4.1.8.                                                                                                                    |                 | N/A     |
| 4.7.13        | Auxiliary media injection                                                                                                                                                                                                                                                       |                 | N/A     |
|               | This mechanism shall be safeguarded with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                                                                                                               |                 | N/A     |
| 4.7.14        | Package closing mechanism                                                                                                                                                                                                                                                       |                 | N/A     |
|               | The pack closing mechanism shall be guarded with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                                                                                                       |                 | N/A     |
|               | Where the closing medium is heat or hot melt adhesive, 4.1.4 shall apply. Hot melt gluing systems shall comply with EN 415-10:2014, 5.20.7.                                                                                                                                     |                 | N/A     |
|               | Where a spray gluing system or hot melt gluing system, is fitted the guards shall be capable of containing any foreseeable glue over spray.                                                                                                                                     |                 | N/A     |
| 4.7.15        | Vacuum sealing mechanism                                                                                                                                                                                                                                                        |                 | N/A     |
|               | This mechanism shall be safeguarded with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                                                                                                               |                 | N/A     |
| 4.7.16        | Discharge or compression conveyor                                                                                                                                                                                                                                               |                 | N/A     |
|               | The discharge conveyor shall comply with EN 415-10:2014, 5.20.4. Where the discharge conveyor applies compression to the packs it shall be fitted with interlocking guards and a tunnel guard which has a safety distance to the nearest hazard zone which complies with 4.3.7. |                 | N/A     |
| 4.7.17        | Pack reject mechanism                                                                                                                                                                                                                                                           |                 | N/A     |
|               | Where the pack reject mechanism cannot be made safe by design according to 4.1.2.1, it shall be guarded according to 4.1.2.2.                                                                                                                                                   |                 | N/A     |
| 4.7.18        | Integrity of safety related control systems                                                                                                                                                                                                                                     |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                   |                 |         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                | Result - Remark | Verdict |
|               | The safety related control systems of mandrel form, fill and seal machines shall as a minimum comply with the following performance levels of EN ISO 13849-1:2015.                                                                                                |                 | N/A     |
| 4.8           | Safety requirements for a pre-made bag fill and close machine                                                                                                                                                                                                     |                 | N/A     |
| 4.8.1         | General                                                                                                                                                                                                                                                           |                 | N/A     |
|               | The hazards described in A.1.8 shall be safeguarded by the following methods and those described in 4.1. The drawing shows a rotary transport system, but the safety requirements are the same on machines where the transport system is linear or partly linear. |                 | N/A     |
|               | Figure 32 shows the guards on atypical pre-made bag fill and close machine.                                                                                                                                                                                       |                 | N/A     |
| 4.8.2         | Bag magazine                                                                                                                                                                                                                                                      |                 | N/A     |
|               | The bag magazine shall comply with 4.7.5.                                                                                                                                                                                                                         |                 | N/A     |
| 4.8.3         | Bag erecting mechanism                                                                                                                                                                                                                                            |                 | N/A     |
|               | This mechanism shall be guarded with a combination of fixed and interlocking guards complying with 4.1.2.2.                                                                                                                                                       |                 | N/A     |
| 4.8.4         | Transport mechanism                                                                                                                                                                                                                                               |                 | N/A     |
|               | This mechanism shall be guarded with a combination of fixed and interlocking guards complying with 4.1.2.2.                                                                                                                                                       |                 | N/A     |
| 4.8.5         | Product feed                                                                                                                                                                                                                                                      |                 | N/A     |
|               | The safety requirements for typical feeding mechanisms are indicated in 4.11, 4.12, 4.13 and 4.14 and EN 15180:2014.                                                                                                                                              |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |         |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                                                    | Result - Remark | Verdict |
|               | The product feed and the connection to the machine shall be designed so that it is not possible to reach hazard zones in the machine from the product feed and vice versa. Where these hazard zones could be reached through interlocking guards the interlocking shall stop both the machine and the product feed. Movable elements like hoppers that will be opened once a week or more often shall be interlocked in the same way. |                 | N/A     |
| 4.8.6         | Product settling devices                                                                                                                                                                                                                                                                                                                                                                                                              |                 | N/A     |
|               | This mechanism shall be guarded with a combination of fixed and interlocking guards complying with 4.1.2.2, interlocked so that the vibration devices stop vibrating when the guards are opened.                                                                                                                                                                                                                                      |                 | N/A     |
|               | The requirements of 4.1.6 shall apply.                                                                                                                                                                                                                                                                                                                                                                                                |                 | N/A     |
| 4.8.7         | Bag closing mechanism                                                                                                                                                                                                                                                                                                                                                                                                                 |                 | N/A     |
|               | The bag closing mechanism shall be guarded with a combination of fixed and interlocking guards complying with 4.1.2.2.                                                                                                                                                                                                                                                                                                                |                 | N/A     |
|               | Where a spray gluing system or hot melt gluing system, is fitted the guards shall be capable of containing any foreseeable glue over spray and the system shall comply with the requirements of EN 415-10:2014, 5.7.                                                                                                                                                                                                                  |                 | N/A     |
|               | Where the closing medium is heat or hot melt adhesive, 4.1.4 shall apply. Hot melt gluing systems shall comply with EN 415-10:2014, 5.20.7.                                                                                                                                                                                                                                                                                           |                 | N/A     |
| 4.8.8         | Discharge or compression conveyor                                                                                                                                                                                                                                                                                                                                                                                                     |                 | N/A     |
|               | The discharge conveyor shall comply with EN 415-10:2014, 5.20.4. Where the discharge conveyor applies compression to the packs it shall be fitted with interlocking guards and a tunnel guard with safety distances that comply with 4.3.7.                                                                                                                                                                                           |                 | N/A     |
| 4.8.9         | Integrity of safety related control systems                                                                                                                                                                                                                                                                                                                                                                                           |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                   |                 |         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                | Result - Remark | Verdict |
|               | The safety related control systems of a bag erect, fill and close machine shall as a minimum comply with the following performance levels of EN ISO 13849-1:2015.                                                                                                 |                 | N/A     |
| 4.9           | Safety requirements for a cup or tub fill and seal machine                                                                                                                                                                                                        |                 | N/A     |
| 4.9.1         | General                                                                                                                                                                                                                                                           |                 | N/A     |
|               | The hazards described in A.1.9 shall be safeguarded by the following methods and those described in 4.1. The drawing shows a linear transport system, but the safety requirements are the same on machines where the transport system is rotary or partly rotary. |                 | N/A     |
|               | Figure 33 shows the guards on atypical cup or tub fill and seal machine.                                                                                                                                                                                          |                 | N/A     |
| 4.9.2         | Cup magazine and dispensing mechanism                                                                                                                                                                                                                             |                 | N/A     |
| 4.9.2.1       | General                                                                                                                                                                                                                                                           |                 | N/A     |
|               | The guards and safety protection devices around the cup magazine and cup dispensing mechanism shall ensure that it is not possible to reach around the stacks of cups or through an empty magazine to mechanisms inside the machine.                              |                 | N/A     |
|               | Where it is not possible to load the magazine from floor level, without risk of strain injuries or falling, one of the following shall be provided:                                                                                                               |                 | -       |
|               | a) a mechanism to lower the magazine so it can be loaded from floor level;                                                                                                                                                                                        |                 | N/A     |
|               | b) an access platform complying with EN ISO 14122-2:2016, equipped where specified by EN ISO 14122-2:2016 with stairs, handrails and toe guards complying with EN ISO 14122-3:2016.                                                                               |                 | N/A     |
| 4.9.2.2       | Manually loaded cup magazines                                                                                                                                                                                                                                     |                 | N/A     |
|               | On machines where stacks of cups are loaded manually directly into the magazines the following requirements shall apply.                                                                                                                                          |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                              |                 |         |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                           | Result - Remark | Verdict |
|               | The cup magazine shall be designed so that when a stack of cups is in place it is not possible to reach around the stack to hazards zones in the machine. The safety distances from any openings around the stack to the nearest hazard zone shall comply with Table 4 of EN ISO 13857:2019. |                 | N/A     |
|               | Two methods for designing the cup magazine are shown in Figure 34.                                                                                                                                                                                                                           |                 | N/A     |
|               | Each cup magazine shall be fitted with two sensing devices, which stop the machine when a pre-determined number of cups are left in the cup magazine or if the cups are removed from the magazine, exposing the cup dispensing mechanism;                                                    |                 | N/A     |
|               | The cup sensing system shall be designed to minimise the risk of it being deliberately defeated. Methods of minimizing the risk of deliberate defeat include:                                                                                                                                |                 | N/A     |
|               | — sensors mounted on both sides of the magazine;                                                                                                                                                                                                                                             |                 | N/A     |
|               | — monitoring a pre-determined sequence of signals;                                                                                                                                                                                                                                           |                 | N/A     |
|               | — sensors looking for an object at a pre-determined distance from the sensor.                                                                                                                                                                                                                |                 | N/A     |
|               | Where the cup magazine is a change part, each change part shall be fitted with an interlocking device complying with EN ISO 14119:2013 which ensures that it is not possible to run the machine without a cup magazine in place.                                                             |                 | N/A     |
| 4.9.2.3       | Automatic cup stack loading mechanism                                                                                                                                                                                                                                                        |                 | N/A     |
|               | Where the machine incorporates an automatic cup stack loading mechanism, this mechanism and the cup magazine and dispensing mechanism shall be guarded with interlocking guards that comply with 4.1.2.2.                                                                                    |                 | N/A     |
|               | The cup stack loading area shall be guarded with interlocking guards complying with 4.1.2.2 or electro- sensitive protective equipment complying with EN IEC 61496-3:2019 which is active during the cycle when the cup stack is moved.                                                      |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                          |                 |         |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                       | Result - Remark | Verdict |
|               | Any exposed parts of the cup stack conveyor shall comply with EN 415-10:2014, 5.20.4.2.                                                                                                  |                 | N/A     |
| 4.9.3         | Transport mechanism                                                                                                                                                                      |                 | N/A     |
|               | This mechanism shall be guarded with a combination of fixed and interlocking guards complying with 4.1.2.2.                                                                              |                 | N/A     |
| 4.9.4         | Product feed devices                                                                                                                                                                     |                 | N/A     |
|               | The safety requirements for volumetric piston depositors can be found in EN 15180:2014. The safety requirements for other feeding mechanisms are indicated in 4.11, 4.12, 4.13 and 4.14. |                 | N/A     |
| 4.9.5         | Manual product loading                                                                                                                                                                   |                 | N/A     |
|               | Where the product is loaded by hand 4.1.9.1 shall apply.                                                                                                                                 |                 | N/A     |
| 4.9.6         | Foil and lid magazines                                                                                                                                                                   |                 | N/A     |
|               | The requirements of 4.9.2 shall apply.                                                                                                                                                   |                 | N/A     |
| 4.9.7         | Reel unwind mechanisms                                                                                                                                                                   |                 | N/A     |
|               | Reel unwind mechanisms shall comply with 4.2.3.                                                                                                                                          |                 | N/A     |
| 4.9.8         | Foil sealing mechanisms                                                                                                                                                                  |                 | N/A     |
|               | Foil sealing mechanisms shall comply with 4.5.9.                                                                                                                                         |                 | N/A     |
| 4.9.9         | Scrap reels                                                                                                                                                                              |                 | N/A     |
|               | Scrap reels shall comply with 4.5.11.                                                                                                                                                    |                 | N/A     |
| 4.9.10        | Lid placing mechanism                                                                                                                                                                    |                 | N/A     |
|               | This mechanism shall be guarded with a combination of fixed and interlocking guards complying with 4.1.2.2.                                                                              |                 | N/A     |
| 4.9.11        | Discharge mechanism and conveyor                                                                                                                                                         |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                                                        | Result - Remark | Verdict |
|               | The discharge mechanism and conveyor shall be fitted with interlocking guards and a tunnel guard which provide an 850 mm safety distance from the discharge end of the tunnel guard to the nearest hazard zone where the height of the opening is $\leq$ 120 mm. Where the height of the discharge opening is greater than 120 mm the requirements of 4.3.7 shall apply. The discharge conveyor shall comply with EN 415-10:2014, 5.20.4. |                 | N/A     |
| 4.9.12        | Integrity of safety related control systems                                                                                                                                                                                                                                                                                                                                                                                               |                 | N/A     |
|               | The safety related control systems of cup or tub fill and seal machines shall as a minimum comply with the following performance levels of EN ISO 13849-1:2015.                                                                                                                                                                                                                                                                           |                 | N/A     |
| 4.10          | Safety requirements for a sack fill and seal machine                                                                                                                                                                                                                                                                                                                                                                                      |                 | N/A     |
| 4.10.1        | Safety requirements for an in-line sack fill and seal machine                                                                                                                                                                                                                                                                                                                                                                             |                 | N/A     |
| 4.10.1.1      | General                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 | N/A     |
|               | The hazards described in A.1.10 shall be safeguarded by the following methods and those described in 4.1.                                                                                                                                                                                                                                                                                                                                 |                 | N/A     |
|               | Figure 35 shows the guards on atypical in-line sack fill and seal machine.                                                                                                                                                                                                                                                                                                                                                                |                 | N/A     |
| 4.10.1.2      | Product feed mechanism                                                                                                                                                                                                                                                                                                                                                                                                                    |                 | N/A     |
|               | The safety requirements for typical product feeding mechanisms are indicated in 4.11, 4.12, 4.13 and 4.14.                                                                                                                                                                                                                                                                                                                                |                 | N/A     |
|               | The product feed and the connection to the machine shall be designed so that it is not possible to reach hazard zones in the machine from the product feed and vice versa. Where these hazard zones could be reached through interlocking guards the interlocking shall stop both the machine and the product feed. Movable elements like hoppers that will be opened once a week or more often shall be interlocked in the same way.     |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                              |                 |         |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                           | Result - Remark | Verdict |
| 4.10.1.3      | Sack holding mechanism                                                                                                                                                                                                                       |                 | N/A     |
|               | On automatic machines, this mechanism shall be guarded with a combination of fixed and interlocking guards complying with 4.1.2.2.                                                                                                           |                 | N/A     |
|               | On semi-automatic machines, at least one of the following measures shall be applied:                                                                                                                                                         |                 | -       |
|               | a) ensuring the gap between the holding mechanism and the filling spout is no greater than 5 mm;                                                                                                                                             |                 | N/A     |
|               | b) where the gap is greater than 5 mm, ensuring the static force applied by the mechanism is no greater than 135 N and the pressure applied is no greater than 60 N/cm <sup>2</sup> ;                                                        |                 | N/A     |
|               | c) providing a two-hand control which complies with type III A of EN ISO 13851:2019. The control system shall ensure that movement is stopped or, if no hazard is generated, reversed, when one of the two hand control devices is released; |                 | N/A     |
|               | d) electro-sensitive protective equipment (ESPE) that complies with 4.1.2.2. This ESPE shall be positioned and designed according to EN ISO 13855:2010.                                                                                      |                 | N/A     |
| 4.10.1.4      | Sealing mechanism                                                                                                                                                                                                                            |                 | N/A     |
|               | On automatic machines, this mechanism shall be guarded with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                                                         |                 | N/A     |
|               | On semi-automatic machines, at least one of the following measures shall be applied:                                                                                                                                                         |                 | -       |
|               | a) providing a two-hand control which complies with type III A of EN ISO 13851:2019. The control system shall ensure that movement is stopped or, if no hazard is generated, reversed, when one of the two hand control devices is released; |                 | N/A     |
|               | b) electro-sensitive protective equipment (ESPE) that complies with 4.1.2.2. This ESPE shall be positioned and designed according to EN ISO 13855:2010.                                                                                      |                 | N/A     |
| 4.10.1.5      | Filling spout area                                                                                                                                                                                                                           |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                        |                 |         |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                     | Result - Remark | Verdict |
|               | The machine shall be fitted with an extraction system complying with 4.1.8.2.                                                                                                                                                                                                                                                                                                                          |                 | N/A     |
|               | Where the machine is specified to pack a hazardous or dusty product, EN 415-10:2014, 5.10.2.1 shall apply. Where the dust extraction system is not delivered with the machine, the machine manufacturer shall provide a detailed specification for the dust extraction system in the operator's manual which includes the details for the connection and the required airflow at the connection point. |                 | N/A     |
|               | Where the machine is specified to pack a hazardous product or a product which has a temperature greater than 55 °C, the filling spout shall be fitted with a sack sensor which ensures that filling cannot start if there is no sack on the filling spout.                                                                                                                                             |                 | N/A     |
| 4.10.1.6      | Sack holding and positioning mechanism                                                                                                                                                                                                                                                                                                                                                                 |                 | N/A     |
|               | On automatic machines, this mechanism shall be guarded with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                                                                                                                                                                                                                   |                 | N/A     |
|               | On semi-automatic machines, where the sack holding mechanism cannot be made safe by design as defined by EN 415-10:2014, 5.2, at least one of the following measures shall be applied:                                                                                                                                                                                                                 |                 | -       |
|               | a) providing a two-hand control which complies with type III A of EN ISO 13851:2019. The control system shall ensure that movement is stopped or, if no hazard is generated, reversed, when one of the two hand control devices is released;                                                                                                                                                           |                 | N/A     |
|               | b) electro-sensitive protective equipment (ESPE) that complies with 4.1.2.2. This ESPE shall be positioned and designed according to EN ISO 13855:2010.                                                                                                                                                                                                                                                |                 | N/A     |
| 4.10.1.7      | Flow regulating mechanism                                                                                                                                                                                                                                                                                                                                                                              |                 | N/A     |
|               | The flow regulating mechanism shall be fitted with fixed or interlocking guards that comply with 4.1.2.2.                                                                                                                                                                                                                                                                                              |                 | N/A     |
| 4.10.1.8      | Product feeding system                                                                                                                                                                                                                                                                                                                                                                                 |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                            |                 |         |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                         | Result - Remark | Verdict |
|               | The product feeding system shall be fitted with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                   |                 | N/A     |
| 4.10.1.9      | Sack placer                                                                                                                                                                |                 | N/A     |
|               | On automatic machines, this mechanism shall be guarded with fixed or interlocking guards.                                                                                  |                 | N/A     |
|               | The control system shall ensure that all hazardous movements of the sack placer are stopped before the in-line sack fill and seal machine can be operated in manual mode.  |                 | N/A     |
| 4.10.1.10     | Sack discharge conveyor                                                                                                                                                    |                 | N/A     |
|               | The conveyor shall comply with EN 415-10:2014, 5.20.4. The gap between the moving belt and fixed parts like guide rails shall either be less than 5 mm or more than 50 mm. |                 | N/A     |
|               | The safety distance from the end of the discharge opening to the nearest hazard zone shall comply with 4.3.7.                                                              |                 | N/A     |
| 4.10.1.11     | Integrity of safety related control systems                                                                                                                                |                 | N/A     |
|               | The safety related control systems of an in-line sack fill and seal machine shall as a minimum comply with the following performance levels of EN ISO 13849-1:2015.        |                 | N/A     |
| 4.10.2        | Safety requirements for a rotary sack fill and seal machine                                                                                                                |                 | N/A     |
| 4.10.2.1      | General                                                                                                                                                                    |                 | N/A     |
|               | The hazards described in A.1.10.2 shall be safeguarded by the following methods and those described in 4.1.                                                                |                 | N/A     |
|               | Figure 36 shows the guards on atypical rotary sack fill and seal machine.                                                                                                  |                 | N/A     |
| 4.10.2.2      | Carousel                                                                                                                                                                   |                 | N/A     |
|               | On automatic machines, access to the carousel shall be prevented by a combination of fixed and interlocking guards.                                                        |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                         |                 |         |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                      | Result - Remark | Verdict |
|               | Where it is necessary to move around the carousel inside the guards, the minimum distance between these guards and parts of the carousel shall be 600 mm. Where there is insufficient space to allow this method of access, the carousel guard "E" shall comprise a series of interlocking guards so the carousel can be accessed from outside the guards.                                              |                 | N/A     |
|               | In the area for manual sack placing "H", the distance between the guards and the carousel shall be at least 1 000 mm. Access to areas where there is less than 1 000 mm clearance shall be prevented by a trip guard like the one marked "F" in Figure 36.                                                                                                                                              |                 | N/A     |
|               | The trip guard "F" shall be designed so that it can move easily both in the direction of rotation of the carousel and in the opposite direction if it is pushed by the operator. The trip guard "F" shall be interlocked and positioned following the requirements of EN ISO 13855:2010 and EN 415-10:2014, 5.14.7 to ensure that the carousel has stopped before the operator can reach a hazard zone. |                 | N/A     |
|               | It shall only be possible to select manual mode using a key or password with a control device positioned on the main control panel located outside the hazard zone.                                                                                                                                                                                                                                     |                 | N/A     |
|               | In addition to the emergency stop device on the control panel, a pull-cord operated emergency stop device shall be installed in the interior of the safeguarded area all around the machine.                                                                                                                                                                                                            |                 | N/A     |
| 4.10.2.3      | Sack holding mechanism                                                                                                                                                                                                                                                                                                                                                                                  |                 | N/A     |
|               | On automatic machines, this mechanism shall be guarded with a combination of fixed and interlocking guards complying with 4.1.2.2.                                                                                                                                                                                                                                                                      |                 | N/A     |
|               | On machines where sacks are placed manually, the sack holding mechanism shall be safeguarded by a trip guard.                                                                                                                                                                                                                                                                                           |                 | N/A     |
| 4.10.2.4      | Flow regulating mechanism                                                                                                                                                                                                                                                                                                                                                                               |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |         |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                                                  | Result - Remark | Verdict |
|               | On automatic machines, this mechanism shall be guarded with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                                                                                                                                                                                                                                |                 | N/A     |
|               | On machines where sacks are placed manually, the flow regulating mechanism shall be safeguarded by a trip guard.                                                                                                                                                                                                                                                                                                    |                 | N/A     |
| 4.10.2.5      | Sack holding and positioning mechanism                                                                                                                                                                                                                                                                                                                                                                              |                 | N/A     |
|               | On machines where manual sack placing is foreseen, the holding and positioning mechanism shall be safeguarded by a trip guard.                                                                                                                                                                                                                                                                                      |                 | N/A     |
| 4.10.2.6      | Sealing mechanism                                                                                                                                                                                                                                                                                                                                                                                                   |                 | N/A     |
|               | On machines where manual sack placing is foreseen, the sealing mechanism shall be safeguarded by a trip guard.                                                                                                                                                                                                                                                                                                      |                 | N/A     |
| 4.10.2.7      | Filling spout area                                                                                                                                                                                                                                                                                                                                                                                                  |                 | N/A     |
|               | Where the machine is specified to pack a hazardous or dusty product, EN 415-10:2014, 5.10.2.1 shall apply. Where the dust extraction system is not delivered with the machine, the machine manufacturer shall provide a detailed specification for a suitable extraction system in the operator's manual which includes details for the connection to the machine and the required airflow at the connection point. |                 | N/A     |
|               | On automatic machines, this mechanism shall be guarded with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                                                                                                                                                                                                                                |                 | N/A     |
|               | On machines where manual sack placing is foreseen, the filling process shall only be started in the zone which is safeguarded by the trip guard.                                                                                                                                                                                                                                                                    |                 | N/A     |
| 4.10.2.8      | Sack magazine                                                                                                                                                                                                                                                                                                                                                                                                       |                 | N/A     |
|               | The requirements of 4.7.5 shall apply.                                                                                                                                                                                                                                                                                                                                                                              |                 | N/A     |
| 4.10.2.9      | Sack transfer mechanism                                                                                                                                                                                                                                                                                                                                                                                             |                 | N/A     |
|               | The sack transfer mechanism shall be safeguarded with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                                                                                                                                                                                                                                      |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                     |                 |         |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                  | Result - Remark | Verdict |
| 4.10.2.10     | Sack placing mechanism                                                                                                                                                                                              |                 | N/A     |
|               | On automatic machines, the sack placing mechanism shall be safeguarded with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                |                 | N/A     |
|               | The sack placing mechanism shall not operate when the machine is in manual mode. The sack placing mechanism shall only operate when the interlocked access door marked "G" in Figure 36 is closed.                  |                 | N/A     |
| 4.10.2.11     | Sack discharge conveyor                                                                                                                                                                                             |                 | N/A     |
|               | The discharge conveyor shall comply with EN 415-10:2014, 5.20.4.1. The gap between the moving belt and fixed parts like guide rails shall either be less than 5 mm or more than 50 mm.                              |                 | N/A     |
|               | The safety distance from the end of the discharge opening to the nearest hazard zone shall comply with 4.3.7.                                                                                                       |                 | N/A     |
| 4.10.2.12     | Integrity of safety related control systems                                                                                                                                                                         |                 | N/A     |
|               | The safety related control systems of a rotary sack fill and seal machine shall as a minimum comply with the following performance levels of EN ISO 13849-1:2015.                                                   |                 | N/A     |
| 4.11          | Safety requirements for an auger filler                                                                                                                                                                             |                 | N/A     |
| 4.11.1        | General                                                                                                                                                                                                             |                 | N/A     |
|               | The hazards described in A.1.11 shall be safeguarded by the following methods and those shown in 4.1. These requirements apply when an auger filler is fitted to one of the machines in the scope of this document. |                 | N/A     |
|               | Figure 37 shows the guards on atypical auger filler.                                                                                                                                                                |                 | N/A     |
| 4.11.2        | Auger, stirrers and hopper                                                                                                                                                                                          |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                    |                 |         |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                 | Result - Remark | Verdict |
|               | The hopper and top cover of the auger filler shall act as a guard for the auger and stirring mechanisms. Where the hopper can be removed from the top cover without the use of a tool it shall be fitted with an interlocking device which complies with EN ISO 14119:2013, integrated with the control system so that the auger cannot run unless the hopper is fitted correctly. |                 | N/A     |
| 4.11.3        | Screw feeder                                                                                                                                                                                                                                                                                                                                                                       |                 | N/A     |
|               | The screw feeder shall be guarded with fixed guards. The socks that connect the screw feeder to the auger and the screw feeder to the product feed system shall be attached with fixings which can only be removed using a tool.                                                                                                                                                   |                 | N/A     |
| 4.11.4        | Auger discharge and cut off devices                                                                                                                                                                                                                                                                                                                                                |                 | N/A     |
|               | The control system of the auger shall be integrated with the packaging machine in such a way that the auger and cut-off devices cannot run when the interlocking guards of the packaging machine are open.                                                                                                                                                                         |                 | N/A     |
| 4.11.5        | Power supplies                                                                                                                                                                                                                                                                                                                                                                     |                 | N/A     |
|               | The power supplies for the auger shall be integrated with those of the packaging machine so that the auger is isolated when the packaging machine is isolated.                                                                                                                                                                                                                     |                 | N/A     |
| 4.11.6        | Ergonomic design requirements                                                                                                                                                                                                                                                                                                                                                      |                 | N/A     |
|               | The hopper, auger, auger funnel and any other components which must be removed regularly for cleaning, shall be designed to avoid the risk of injury due to excessive effort. Subclause 4.1.9.4 shall apply.                                                                                                                                                                       |                 | N/A     |
| 4.11.7        | High level access                                                                                                                                                                                                                                                                                                                                                                  |                 | N/A     |
|               | If the filler is mounted in a position where it cannot be reached for cleaning or maintenance from the floor, one of the following shall be provided:                                                                                                                                                                                                                              |                 | -       |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                      |                 |         |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                   | Result - Remark | Verdict |
|               | a) a permanent means of access complying with EN ISO 14122-2:2016 and EN ISO 14122-3:2016, or;                                                                                                                                                                                                       |                 | N/A     |
|               | b) a permanent platform around the filler which complies with EN ISO 14122-2:2016 that can be accessed safely from mobile steps that comply with EN ISO 14122-3:2016.                                                                                                                                |                 | N/A     |
| 4.11.8        | Dusty products                                                                                                                                                                                                                                                                                       |                 | N/A     |
|               | 4.1.8.2 shall apply.                                                                                                                                                                                                                                                                                 |                 | N/A     |
| 4.11.9        | Integrity of safety related control systems                                                                                                                                                                                                                                                          |                 | N/A     |
|               | The safety related control systems of the auger filler shall as a minimum comply with the following performance levels of EN ISO 13849-1:2015.                                                                                                                                                       |                 | N/A     |
| 4.12          | Safety requirements for a volumetric cup filler                                                                                                                                                                                                                                                      |                 | N/A     |
| 4.12.1        | General                                                                                                                                                                                                                                                                                              |                 | N/A     |
|               | The hazards described in A.1.12 shall be safeguarded by the following methods and the requirements in 4.1. These requirements apply when a volumetric cup filler is fitted to one of the machines in the scope of this document.                                                                     |                 | N/A     |
|               | Figure 38 shows the guards on atypical volumetric cup filler.                                                                                                                                                                                                                                        |                 | N/A     |
| 4.12.2        | Hopper                                                                                                                                                                                                                                                                                               |                 | N/A     |
|               | Where the hopper is fed automatically, the connection between the feeding equipment and the hopper shall be fixed and any openings shall be dimensioned and positioned using appropriate tables of EN ISO 13857:2019, so it is not possible to reach danger zones in the machine through the hopper. |                 | N/A     |
|               | Where the hopper is fed from a mezzanine floor above the hopper, it is foreseeable that someone may put their feet into the hopper and so in that case Table 7 of EN ISO 13857:2019 shall be used to determine safety distances when designing fixed or interlocking guards.                         |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                             |                 |         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                          | Result - Remark | Verdict |
|               | Where the hopper is fed manually, the hopper shall either be fitted with a fixed mesh or fixed bars dimensioned using Table 4 of EN ISO 13857:2019 or fitted with an interlocking guard as shown as "B" in Figure 38.                                                                                                                                       |                 | N/A     |
| 4.12.3        | Cup plates                                                                                                                                                                                                                                                                                                                                                  |                 | N/A     |
|               | The cup plates shall be enclosed with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                                                                                                                                                                                              |                 | N/A     |
|               | To avoid an accident during cleaning, the cup filler shall either be equipped with an isolator, accessible from the cleaning area or the discharge hopper and other guards giving access to the shearing hazard, shall be interlocked with devices complying with EN ISO 14119:2013 to prevent the machine operating when the hopper or guards are removed. |                 | N/A     |
| 4.12.4        | Discharge hopper                                                                                                                                                                                                                                                                                                                                            |                 | N/A     |
|               | The discharge hopper shall be designed to prevent access to danger zones in the cup filler when it is fitted in place on the packaging machine and shall either be fixed with fixings which can only be undone with a tool or fitted with an interlocking device which complies with EN ISO 14119:2013.                                                     |                 | N/A     |
| 4.12.5        | Ergonomic design requirements                                                                                                                                                                                                                                                                                                                               |                 | N/A     |
|               | The hopper, cups, cup plates and any other components which must be removed regularly for cleaning, shall be designed to avoid the risk of injury due to excessive effort. Subclause 4.1.9.4 shall apply.                                                                                                                                                   |                 | N/A     |
| 4.12.6        | High level access                                                                                                                                                                                                                                                                                                                                           |                 | N/A     |
|               | If the cup filler is mounted in a position where it cannot be reached for cleaning or maintenance from the floor, 4.11.7 shall apply.                                                                                                                                                                                                                       |                 | N/A     |
| 4.12.7        | Dusty products                                                                                                                                                                                                                                                                                                                                              |                 | N/A     |
|               | 4.1.8.2 shall apply.                                                                                                                                                                                                                                                                                                                                        |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                               |                 |         |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                            | Result - Remark | Verdict |
| 4.12.8        | Integrity of safety related control systems                                                                                                                                                                                                                                                                                                                                                   |                 | N/A     |
|               | The safety related control systems of a cup filling machine shall as a minimum comply with the following performance levels of EN ISO 13849-1:2015.                                                                                                                                                                                                                                           |                 | N/A     |
| 4.13          | Safety requirements for a nett weigher                                                                                                                                                                                                                                                                                                                                                        |                 | N/A     |
| 4.13.1        | General                                                                                                                                                                                                                                                                                                                                                                                       |                 | N/A     |
|               | The hazards described in A.1.13 shall be safeguarded by the following methods and those described in 4.1.                                                                                                                                                                                                                                                                                     |                 | N/A     |
|               | These requirements also apply to a count filling machine (3.3.8) where the equivalent hazard exists. Figure 39 shows the guards on atypical nett weigher.                                                                                                                                                                                                                                     |                 | N/A     |
| 4.13.2        | Product feed                                                                                                                                                                                                                                                                                                                                                                                  |                 | N/A     |
|               | The feed conveyor shall comply with clause 5.20.4.5 of EN 415-10:2014. The feed conveyor shall be equipped with its own isolator.                                                                                                                                                                                                                                                             |                 | N/A     |
|               | The feed conveyor and its isolator shall be accessible from floor level or by the means of access for the weigher as stated in 4.13.5 without the need for an additional means of access.                                                                                                                                                                                                     |                 | N/A     |
| 4.13.3        | Vibratory feeders                                                                                                                                                                                                                                                                                                                                                                             |                 | N/A     |
|               | The vibration tray linkages shall either be safe by design as defined in 4.1.2.1 or shall be designed in accordance with EN ISO 13854:2019 to ensure that they do not present crushing hazards, or they shall be enclosed with fixed or interlocking guards. The method of mounting of these mechanisms shall ensure that no hazardous vibration is transmitted to the supporting structures. |                 | N/A     |
| 4.13.4        | Weigh hopper                                                                                                                                                                                                                                                                                                                                                                                  |                 | N/A     |
|               | Where the opening and closing mechanisms of the weigh hopper are not safe by design, as defined by 4.1.2.1, they shall be enclosed with a combination of fixed or interlocking guards that comply with 4.1.2.2.                                                                                                                                                                               |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                            |                 |         |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                         | Result - Remark | Verdict |
| 4.13.5        | High level access                                                                                                                                                                                                                                                                          |                 | N/A     |
|               | If the weigher is mounted in a position where it cannot be reached for cleaning or maintenance from the floor, 4.11.7 shall apply.                                                                                                                                                         |                 | N/A     |
|               | For nett weighers which are mounted on moveable packaging machines, the means of access may be a fixed ladder complying with EN ISO 14122-4:2016.                                                                                                                                          |                 | N/A     |
| 4.13.6        | Integrity of safety related control systems                                                                                                                                                                                                                                                |                 | N/A     |
|               | The safety related control systems of a nett weigher shall as a minimum comply with the following performance levels of EN ISO 13849-1:2015.                                                                                                                                               |                 | N/A     |
| 4.14          | Safety requirements for a multi-head weigher                                                                                                                                                                                                                                               |                 | N/A     |
| 4.14.1        | General                                                                                                                                                                                                                                                                                    |                 | N/A     |
|               | The hazards described in A.1.14 shall be safeguarded by the following methods and the requirements in 4.1. These requirements apply when a multi-head weigher is fitted to one of the machines in the scope of this document.                                                              |                 | N/A     |
|               | Figure 40 shows the guards on atypical multi-head weigher.                                                                                                                                                                                                                                 |                 | N/A     |
| 4.14.2        | Feed conveyor                                                                                                                                                                                                                                                                              |                 | N/A     |
|               | Where the feed conveyor is a flat belt conveyor it shall comply with EN 415-10:2014, 5.20.4. Where the feed conveyor is a trough belt it shall comply with EN 620:2002+A1:2010. Where the feed conveyor is some other kind of bulk feed conveyor it shall comply with EN 618:2002+A1:2010. |                 | N/A     |
|               | The feed conveyor shall be equipped with its own isolator which is accessible from the weigher support platform without the need for mobile steps.                                                                                                                                         |                 | N/A     |
| 4.14.3        | Vibratory conveyor, dispersion feeder and radial feeders                                                                                                                                                                                                                                   |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                       |                 |         |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                    | Result - Remark | Verdict |
|               | The vibration tray linkages shall either be designed in accordance with EN ISO 13854:2019 to ensure that they do not present crushing hazards or shall be enclosed with fixed guards. The method of mounting of these mechanisms shall ensure that no hazardous vibration is transmitted to the supporting structure. |                 | N/A     |
| 4.14.4        | Pool and weigh hoppers                                                                                                                                                                                                                                                                                                |                 | N/A     |
|               | Where the opening and closing mechanisms of the pool and weigh hoppers are not safe by design, as defined by 4.1.2.1 they shall be enclosed with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                                             |                 | N/A     |
| 4.14.5        | Timing hopper                                                                                                                                                                                                                                                                                                         |                 | N/A     |
|               | Where the opening and closing mechanism of the timing hopper is not safe by design, as defined by 4.1.2.1 it shall be enclosed with a combination of fixed and interlocking guards that comply with 4.1.2.2.                                                                                                          |                 | N/A     |
| 4.14.6        | Cleaning weigher components                                                                                                                                                                                                                                                                                           |                 | N/A     |
|               | Where the weigher components need to be dismantled and cleaned more than once a week, provision for cleaning shall be provided on the same level as the multi-head weigher so it is not necessary to carry components up and down access stairs.                                                                      |                 | N/A     |
| 4.14.7        | High level access                                                                                                                                                                                                                                                                                                     |                 | N/A     |
|               | The support platform shall comply with EN ISO 14122-2:2016 and shall be provided with access stairs and handrails which comply with EN ISO 14122-3:2016.                                                                                                                                                              |                 | N/A     |
| 4.14.8        | Dusty products                                                                                                                                                                                                                                                                                                        |                 | N/A     |
|               | 4.1.8.2 shall apply.                                                                                                                                                                                                                                                                                                  |                 | N/A     |
| 4.14.9        | Noise reduction                                                                                                                                                                                                                                                                                                       |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                         |                 |         |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                      | Result - Remark | Verdict |
|               | Where the sound pressure level of the weigher running with the specified product is potentially hazardous, one of the following actions shall be taken: |                 | -       |
|               | a) reduce noise at source by reducing product falling heights, for example using servomotors to close flaps or changing contact materials or;           |                 | N/A     |
|               | b) enclosing the weigher in an acoustic enclosure which reduces the sound pressure level outside the enclosure to a safe level.                         |                 | N/A     |
| 4.14.10       | Integrity of safety related control systems                                                                                                             |                 | N/A     |
|               | The safety related control systems of a multi-head weigher shall as a minimum comply with the following performance levels of EN ISO 13849-1:2015.      |                 | N/A     |

|       |                                                                                                                                                                    |  |     |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----|
| 5     | Verification of safety requirements                                                                                                                                |  | P   |
| 5.1   | General                                                                                                                                                            |  | P   |
|       | The following verification procedures shall be adhered to for each machine unless stated otherwise hereafter. The results of the verification shall be documented. |  | P   |
| 5.2   | Visual inspections with the machine stopped                                                                                                                        |  | P   |
| 5.2.1 | Mechanical parts                                                                                                                                                   |  | P   |
|       | Check that mechanical components are securely fixed, and all unnecessary sharp edges have been removed.                                                            |  | P   |
| 5.2.2 | Pneumatic systems                                                                                                                                                  |  | P   |
|       | Check that pneumatic components and piping conform to the safety requirements of EN ISO 4414:2010 and are correctly installed.                                     |  | P   |
| 5.2.3 | Hydraulic systems                                                                                                                                                  |  | N/A |
|       | Check that hydraulic components and piping conform to the safety requirements of EN ISO 4413:2010 and are correctly installed.                                     |  | N/A |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                        |                 |         |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                     | Result - Remark | Verdict |
| 5.2.4         | Electrical systems                                                                                                                                                                                                                                                                                                                     |                 | P       |
|               | Check that documentation complies with Clause 17 of EN 60204-1:2018.                                                                                                                                                                                                                                                                   |                 | P       |
| 5.2.5         | Guards                                                                                                                                                                                                                                                                                                                                 |                 | P       |
|               | Check that all guards are in place and securely fixed and that the guards and their dimensions are suitable for the hazards expected and their dimensions are according to the design. Check that all interlocking devices are fitted. Check that adjustable guards can be properly adjusted to the specified products and pack sizes. |                 | P       |
| 5.2.6         | Design requirements                                                                                                                                                                                                                                                                                                                    |                 | P       |
|               | Check for each type of machine, that the design features stipulated in Clause 4 have been incorporated.                                                                                                                                                                                                                                |                 | P       |
|               | Check for each type of machine, that the appropriate design requirements for the packaging materials intended to be used and the product intended to be packed have been followed.                                                                                                                                                     |                 | P       |
| 5.2.7         | Marking and warning signs                                                                                                                                                                                                                                                                                                              |                 | P       |
|               | Check that the required markings and warning signs are fitted permanently and at the required position.                                                                                                                                                                                                                                |                 | P       |
| 5.3           | Measurements with the machine stopped                                                                                                                                                                                                                                                                                                  |                 | P       |
| 5.3.1         | Guards                                                                                                                                                                                                                                                                                                                                 |                 | P       |
|               | For every type of machine, check that the dimensions of the guards comply with the relevant part of Clause 4 and that the relationship between the size of any openings in the guards and their safety distance from the nearest hazard zone comply with the requirements.                                                             |                 | P       |
| 5.3.2         | Electrical testing                                                                                                                                                                                                                                                                                                                     |                 | P       |
|               | Carryout the tests required by Clause 18.1 of EN 60204-1:2018.                                                                                                                                                                                                                                                                         |                 | P       |
| 5.4           | Visual inspections with the machine running                                                                                                                                                                                                                                                                                            |                 | P       |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                             |                 |         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                          | Result - Remark | Verdict |
| 5.4.1         | Guards                                                                                                                                                                                                                                                                                                                                                      |                 | P       |
|               | Check with the machine running that the guards conform to the safety requirements and that the interlocking movable guards and ESPE are working correctly.                                                                                                                                                                                                  |                 | P       |
| 5.4.2         | Safety related functions                                                                                                                                                                                                                                                                                                                                    |                 | P       |
|               | Check the operation of all safety related functions. Check that following the operation of an emergency stop or interlocking device all hazardous functions cease within the required stopping time and that the machine does not restart without resetting the emergency stop device or the interlocking devices and without an intentional start command. |                 | P       |
| 5.4.3         | Dissipation of stored energy                                                                                                                                                                                                                                                                                                                                |                 | P       |
|               | For each type of machine check that stored energy is either dissipated automatically or a manual means of releasing this stored energy has been provided.                                                                                                                                                                                                   |                 | P       |
| 5.5           | Measurements or tests with the machine running                                                                                                                                                                                                                                                                                                              |                 | P       |
| 5.5.1         | Electrical testing                                                                                                                                                                                                                                                                                                                                          |                 | P       |
|               | For each machine, carryout the functional tests stated in 18.6 of EN 60204-1:2018.                                                                                                                                                                                                                                                                          |                 | P       |
| 5.5.2         | Measurement of noise emission                                                                                                                                                                                                                                                                                                                               |                 | P       |
|               | For each type of machine, measure the noise emission values as stated in Annex B.                                                                                                                                                                                                                                                                           |                 | P       |
| 5.5.3         | Temperature                                                                                                                                                                                                                                                                                                                                                 |                 | P       |
|               | For every type of machine, with the machine fully warmed up, identify all the areas of the machine where the temperature will be greater than the burn thresholds indicated in EN ISO 13732-1:2008 and record these in the operator's manual.                                                                                                               |                 | P       |
| 5.6           | Verification procedures                                                                                                                                                                                                                                                                                                                                     |                 | P       |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                        |                 |         |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                     | Result - Remark | Verdict |
|               | General verification procedures for each safety requirement valid for all types of machines, detailed in 4.1, are shown in Table 3. Additional verification procedures for form, fill and seal machines are in Table 4, those for fill and seal machines are in Table 5 and those for filling machines are in Table 6. |                 | P       |

|     |                                                                                                                                                    |                       |     |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----|
| 6   | Information                                                                                                                                        |                       | P   |
| 6.1 | General                                                                                                                                            |                       | P   |
|     | The information provided with the machine shall comply with the following clauses and EN ISO 12100:2010, 6.4.                                      |                       | P   |
| 6.2 | Marking                                                                                                                                            |                       | P   |
|     | All machinery in the scope of this document shall be marked visibly legibly and indelibly with the following minimum information:                  |                       | -   |
|     | a) the business name and full address of the machine manufacturer and, where applicable, his authorized representative;                            | See the marking plate | P   |
|     | c) mandatory marks if appropriate, for example the CE marking if the machine complies with all relevant EU Directives;                             | See the marking plate | P   |
|     | d) designation of series or type;                                                                                                                  | See the marking plate | P   |
|     | e) serial number, if any;                                                                                                                          | See the marking plate | P   |
|     | f) year of construction, that is the year in which the manufacturing process is completed;                                                         | See the marking plate | P   |
|     | g) electrical markings as indicated in EN 60204-1:2018, 16.4;                                                                                      | See the marking plate | P   |
|     | h) rating information required for lifting equipment, if appropriate, e.g. carrying capacity, working load limit, centre of gravity, gross weight. |                       | N/A |
| 6.3 | Warning of residual risks                                                                                                                          |                       | P   |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                                                                                           |                 |         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                                                                                        | Result - Remark | Verdict |
|               | Where required in Clause 4, the following pictograms shall be fitted to the machine permanently and in such away that the related hazard is clearly identifiable (see Figure 41). These warning pictograms shall comply with EN ISO 7010:2020, reproduced below. The shape and colour of these warning pictograms shall comply with ISO 3864-1:2011, ISO 3864-2:2016 and ISO 3864-3:2012. |                 | P       |
| 6.4           | Instructions                                                                                                                                                                                                                                                                                                                                                                              |                 | P       |
| 6.4.1         | General                                                                                                                                                                                                                                                                                                                                                                                   |                 | P       |
|               | The operator's manual shall contain all the information necessary to install, operate, clean, maintain and decommission the machine safely.                                                                                                                                                                                                                                               |                 | P       |
|               | This will typically include the information listed in subclause 6.4.5.1 of EN ISO 12100:2010, where the equivalent hazard exists, the information listed in 6.4.2 and 6.4.3 and the information that is specific to the machines in the scope of this document as stated in 6.4.4.1 to 6.4.4.13.                                                                                          |                 | P       |
| 6.4.2         | All the machines in the scope of this document                                                                                                                                                                                                                                                                                                                                            |                 | P       |
|               | The operator's manual shall contain the following information:                                                                                                                                                                                                                                                                                                                            |                 | -       |
|               | a) an explanation of the markings on the machine as stipulated in 6.2;                                                                                                                                                                                                                                                                                                                    |                 | P       |
|               | b) a description of the intended use for the machine;                                                                                                                                                                                                                                                                                                                                     |                 | P       |
|               | c) a description of the workstations likely to be occupied by operators;                                                                                                                                                                                                                                                                                                                  |                 | P       |
|               | d) instructions on how to move the machine safely;                                                                                                                                                                                                                                                                                                                                        |                 | P       |
|               | e) instructions on routine maintenance, inspection and testing;                                                                                                                                                                                                                                                                                                                           |                 | P       |
|               | f) where there is a risk of products or liquids spilling onto the floor around the machine, the instructions shall indicate the importance of clearing these spills to avoid slip hazards;                                                                                                                                                                                                |                 | P       |

| EN 415-3:2021 |                                                                                                                                                                                                                                                |                 |         |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                             | Result - Remark | Verdict |
|               | g) where access is required above floor level to parts of the machine, the operator's manual shall explain how this can be done safely without the risk of slipping, tripping and falling;                                                     |                 | N/A     |
|               | h) details of how to install steps and platforms supplied with the machine;                                                                                                                                                                    |                 | P       |
|               | i) details of temporary means of access that the user is to provide for other purposes than operation, cleaning or routine maintenance;                                                                                                        |                 | P       |
|               | j) a description of any tests that shall be carried out by the user before the machine is used for the first time;                                                                                                                             |                 | P       |
|               | k) instructions on how to fit change parts, the fitting of change part guards and the adjustment of adjustable guards so that the machine is safe to use following a size or product change;                                                   |                 | P       |
|               | l) a record and explanation of all the warning devices, signs or pictograms attached to the machine and the warning signals provided by the machine;                                                                                           |                 | P       |
|               | m) details of the control systems including circuit diagrams for the electrical, pneumatic and hydraulic systems. Wiring diagrams and documentation of the electrical equipment shall comply with EN 60204-1:2018, Clause 17;                  |                 | P       |
|               | n) the declared noise emission values of the machinery, determined using the method described in Annex B:                                                                                                                                      |                 | P       |
|               | o) where appropriate, instructions on how the machine shall be installed to minimize noise;                                                                                                                                                    |                 | P       |
|               | p) where harmful dusts, smoke, aerosols, gas or fumes maybe emitted by the machine, information on a suitable collection and extraction system for these substances, including the required air speed at the emission point shall be provided; |                 | P       |
|               | q) specifications of fluids to be used in the machine e.g. lubricating oil, hydraulic fluid;                                                                                                                                                   |                 | P       |

| EN 415-3:2021 |                                                                                                                                                                                                                                                                                                                     |                 |         |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                                                                                                                                                  | Result - Remark | Verdict |
|               | r) details of drainage requirements and any residual spillage risks;                                                                                                                                                                                                                                                |                 | P       |
|               | s) a statement indicating whether the machine is or is not suitable for use in a potentially explosive atmosphere.                                                                                                                                                                                                  |                 | P       |
|               | t) the specifications of spare parts to be used, when these affect the health and safety of operators;                                                                                                                                                                                                              |                 | P       |
|               | u) a description of the method to be used to fix the machine to the floor, another machine or a supporting structure if this is required for the machine to be stable during use.                                                                                                                                   |                 | P       |
| 6.4.3         | Machines for use with food, cosmetics or pharmaceuticals                                                                                                                                                                                                                                                            |                 | N/A     |
|               | The operator's manual for machines intended to pack foodstuffs shall comply with the requirements of EN 1672-2:2020. The operator's manual for machines intended to pack cosmetics, pharmaceuticals or other products where there are hygiene requirements shall comply with the requirements of EN ISO 14159:2008. |                 | N/A     |
| 6.4.4         | Machine specific requirements                                                                                                                                                                                                                                                                                       |                 | P       |
| 6.4.4.1       | Flow-wrapping machine                                                                                                                                                                                                                                                                                               |                 | N/A     |
|               | In addition to the requirements of 6.4, the operator's manual for a flow-wrapping machine shall include the following information:                                                                                                                                                                                  |                 | -       |
|               | a) where removable feeding devices are fitted, information on how the machine can be operated safely when the devices have been removed;                                                                                                                                                                            |                 | N/A     |
|               | b) the correct way to lift film reels onto the film reel unwind mechanism to avoid strain injuries;                                                                                                                                                                                                                 |                 | N/A     |
|               | c) the method of earthing the reel unwind mechanisms to avoid static buildup;                                                                                                                                                                                                                                       |                 | N/A     |
|               | d) the correct temperature for the sealing jaws for each packaging material to avoid the risk of fire;                                                                                                                                                                                                              |                 | N/A     |
|               | e) the ventilation requirements to remove fumes from packaging materials;                                                                                                                                                                                                                                           |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                                                      |                 |         |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                                                                   | Result - Remark | Verdict |
|               | f) the correct method for controlling modified atmosphere packing systems;                                                                                                           |                 | N/A     |
|               | g) the correct method of operating material sterilizing systems.                                                                                                                     |                 | N/A     |
| 6.4.4.2       | Vertical form, fill and seal machine                                                                                                                                                 |                 | N/A     |
|               | In addition to the requirements of 6.4, the operator's manual for a vertical form, fill and seal machine shall include the following information where the equivalent hazard exists: |                 | -       |
|               | a) the method of installing feeding devices;                                                                                                                                         |                 | N/A     |
|               | b) the correct way to lift film reels onto the film reel unwind mechanism to avoid strain injuries;                                                                                  |                 | N/A     |
|               | c) the method of earthing the reel unwind mechanisms to avoid static buildup;                                                                                                        |                 | N/A     |
|               | d) the correct parameters for sealing each packaging material to avoid the risk of fire;                                                                                             |                 | N/A     |
|               | e) the ventilation requirements to remove fumes from packaging materials;                                                                                                            |                 | N/A     |
|               | f) the correct method of operating modified atmosphere packing systems;                                                                                                              |                 | N/A     |
|               | g) the correct method of operating materials sterilizing systems.                                                                                                                    |                 | N/A     |
| 6.4.4.3       | Horizontal sachet form, fill and seal machines                                                                                                                                       |                 | N/A     |
|               | In addition to the requirements of 6.4, the operator's manual for a horizontal sachet form, fill and seal machine shall include the following information:                           |                 | -       |
|               | a) the method of installing feeding devices;                                                                                                                                         |                 | N/A     |
|               | b) the correct way to lift film reels onto the film reel unwind mechanism to avoid strain injuries;                                                                                  |                 | N/A     |
|               | c) the method of earthing the reel unwind mechanisms to avoid static buildup;                                                                                                        |                 | N/A     |
|               | d) the correct temperature for each packaging material for the sealing jaws to avoid the risk of fire;                                                                               |                 | N/A     |
|               | e) the ventilation requirements to remove fumes from packaging materials;                                                                                                            |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                      |                 |         |
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| Clause        | Requirement + Test                                                                                                                                   | Result - Remark | Verdict |
|               | f) the correct method of operating modified atmosphere packing systems.                                                                              |                 | N/A     |
| 6.4.4.4       | Thermoform, fill and seal machine                                                                                                                    |                 | P       |
|               | In addition to the requirements of 6.4, the operator's manual for a thermoform, fill and seal machine shall include the following information:       |                 | -       |
|               | a) the method of installing feeding devices;                                                                                                         |                 | P       |
|               | b) the correct way to lift film reels onto the film reel unwind mechanisms to avoid strain injuries;                                                 |                 | P       |
|               | c) the method of earthing the machine to avoid static buildup;                                                                                       |                 | P       |
|               | d) the correct temperature for each packaging material for the heating chamber and sealing dies to avoid the risk of fire;                           |                 | P       |
|               | e) the ventilation requirements to remove fumes from packaging materials.                                                                            |                 | P       |
| 6.4.4.5       | Tubular bag form, fill and seal machine                                                                                                              |                 | N/A     |
|               | In addition to the requirements of 6.4, the operator's manual for a tubular bag form, fill and seal machine shall include the following information. |                 | -       |
|               | a)the method of installing feeding devices;                                                                                                          |                 | N/A     |
|               | b) the correct way to lift film reels onto the film reel unwind mechanism to avoid strain injuries;                                                  |                 | N/A     |
|               | c) the method of earthing the film reel unwind mechanisms to avoid static buildup;                                                                   |                 | N/A     |
|               | d) the correct temperature for each packaging material for the sealing jaws and adhesive heating devices to avoid the risk of fire;                  |                 | N/A     |
|               | e) the ventilation requirements to remove fumes from packaging materials or adhesives.                                                               |                 | N/A     |
| 6.4.4.6       | Mandrel form fill and seal machine                                                                                                                   |                 | N/A     |
|               | In addition to the requirements of 6.4, the operator's manual for a mandrel form, fill and seal machine shall include the following information:     |                 | -       |
|               | a) the method of installing feeding devices;                                                                                                         |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                                  |                 |         |
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| Clause        | Requirement + Test                                                                                                                               | Result - Remark | Verdict |
|               | b) the correct way to lift film reels onto the film reel unwind mechanism to avoid strain injuries;                                              |                 | N/A     |
|               | c) the method of earthing the film reel unwind mechanisms to avoid static buildup;                                                               |                 | N/A     |
|               | d) the correct temperature for each packaging material for the sealing jaws and adhesive heating devices to avoid the risk of fire;              |                 | N/A     |
|               | e) the ventilation requirements to remove fumes for packaging materials or adhesives.                                                            |                 | N/A     |
| 6.4.4.7       | Pre-made bag fill and seal machine                                                                                                               |                 | N/A     |
|               | In addition to the requirements of 6.4, the operator's manual for a pre-made bag fill and close machine shall include the following information: |                 | -       |
|               | a) the method of installing feeding devices;                                                                                                     |                 | N/A     |
|               | b) the way to load the bag magazine to avoid strain injuries;                                                                                    |                 | N/A     |
|               | c) the method of earthing the machine to avoid static buildup;                                                                                   |                 | N/A     |
|               | d) the correct temperature for each packaging material for the sealing jaws to avoid the risk of fire;                                           |                 | N/A     |
|               | e) the ventilation requirements to remove fumes from packaging materials.                                                                        |                 | N/A     |
| 6.4.4.8       | Cup or tub fill and seal machine                                                                                                                 |                 | N/A     |
|               | In addition to the requirements of 6.4, the operator's manual for a cup or tub fill and seal machine shall include the following information:    |                 | -       |
|               | a) the method of installing feeding devices;                                                                                                     |                 | N/A     |
|               | b) the correct method of loading cups, lids and foils;                                                                                           |                 | N/A     |
|               | c) the correct way to load film reels onto the film reel unwind mechanisms to avoid strain injuries;                                             |                 | N/A     |
|               | d) the method of earthing the machine to avoid static buildup;                                                                                   |                 | N/A     |
|               | e) the correct temperature for each packaging material for the heating chamber and sealing dies to avoid the risk of fire;                       |                 | N/A     |

| EN 415-3:2021 |                                                                                                                                         |                 |         |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                                      | Result - Remark | Verdict |
|               | f) the ventilation requirements to remove fumes from packaging materials.                                                               |                 | N/A     |
| 6.4.4.9       | Sack fill and seal machine                                                                                                              |                 | N/A     |
|               | In addition to the requirements of 6.4, the operator's manual for a sack fill and seal machine shall include the following information: |                 | -       |
|               | a) the method of installing feeding devices;                                                                                            |                 | N/A     |
|               | b) the way to load sacks into the sack magazine to avoid strain injuries;                                                               |                 | N/A     |
|               | c) the method of earthing the reel unwind mechanisms to avoid static buildup.                                                           |                 | N/A     |
| 6.4.4.10      | Auger filler                                                                                                                            |                 | N/A     |
|               | In addition to the requirements of 6.4, the operator's manual for an auger filler shall include the following information:              |                 | -       |
|               | a) the method of installing the filler onto a form, fill and seal or fill and seal machine;                                             |                 | N/A     |
|               | b) the way to clean the filler to avoid strain injuries and the risk of falls;                                                          |                 | N/A     |
| 6.4.4.11      | Volumetric cup filler                                                                                                                   |                 | N/A     |
|               | In addition to the requirements of 6.4, the operator's manual for a volumetric cup filler shall include the following information:      |                 | -       |
|               | a) the method of installing the filler onto a form, fill and seal or fill and seal machine;                                             |                 | N/A     |
|               | b) the way to clean the filler to avoid strain injuries and the risk of falls;                                                          |                 | N/A     |
| 6.4.4.12      | Nett weigher                                                                                                                            |                 | N/A     |
|               | In addition to the requirements of 6.4, the operator's manual for a nett weigher shall include the following information:               |                 | -       |
|               | a) the method of installing the filler onto a form, fill and seal or fill and seal machine;                                             |                 | N/A     |
|               | b) the way to clean the weigher to avoid strain injuries and the risk of falls;                                                         |                 | N/A     |

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|---------------|---------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause        | Requirement + Test                                                                                                              | Result - Remark | Verdict |
| 6.4.4.13      | Multi-head weigher                                                                                                              |                 | N/A     |
|               | In addition to the requirements of 6.4, the operator's manual for a multi-head weigher shall include the following information: |                 | -       |
|               | a) the method of installing the weigher onto a form, fill and seal or fill and seal machine;                                    |                 | N/A     |
|               | b) the way to clean the weigher to avoid strain injuries and the risk of falls.                                                 |                 | N/A     |



A large, light blue watermark of the BKC logo is centered on the page. It features the letters "BKC" in a bold, sans-serif font, with the letters partially overlapping a circular emblem composed of concentric blue rings and a central white circle.

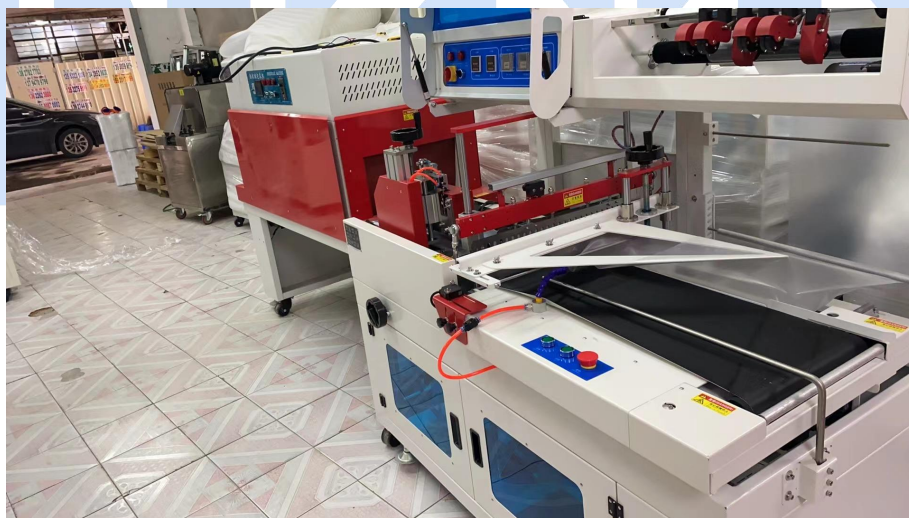
**Attachment 1:**

**Photo-documentation**

Photo 1



Photo 2



\*\*\*\*\* END OF REPORT \*\*\*\*\*