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Machines for compacting waste materials or recyclable fractions — Vertical baling presses — Safety requirements

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National foreword

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A list of organizations represented on this committee can be obtained on request to its secretary.

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Machines for compacting waste materials or recyclable fractions - Vertical baling presses - Safety requirements

Machines de compactage pour déchets ou matières recyclables - Presses à balles verticales - Prescriptions de sécurité

Maschinen zum Verdichten von Abfällen oder recyclebaren Materialien - Vertikale Ballenpressen - Sicherheitsanforderungen

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Foreword

This document (EN 16500:2014) has been prepared by Technical Committee CEN/TC 397 “Project Committee - Baling presses - Safety requirements”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2015 and conflicting national standards shall be withdrawn at the latest by February 2015.

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For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard is a type C standard as stated in EN ISO 12100.

The machinery concerned and the extent to which hazards, hazardous situations and hazardous events are covered are indicated in the scope of this document.

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards for machines that have been designed and built in accordance with the provisions of this type C standard.

1 Scope

This European Standard specifies the safety requirements for the design, manufacture and information for safe use of vertical baling presses for compacting waste material or recyclable fractions (e. g. paper, plastics, textiles, cans, cardboard, mixed waste), hereafter referred to as materials.

This standard covers vertical baling presses:

— that are manually or mechanically fed; and

— with fixed enclosed baling chambers (single or multiple chamber presses); and

— with a mechanically, hydraulically or pneumatically operated compacting equipment; and

— where the compacted bale is tied manually in the baling chamber; and

— with manual unloading or mechanical ejection of the compacted bale.

The scope of this standard includes any mechanical feed equipment, such as belt type conveyors or bin lifts, forming an integral part of the baling press assembly. It also includes integral material flow control equipment.

This standard does not apply to:

— vertical baling presses without fixed enclosed baling chamber(s); or

— round balers or roll baling machines; or

— machines where the material is compacted into a bag; or

— pneumatic conveying systems; or

— equipment for transporting the bales; or

— local exhaust ventilation for the removal of dusts or vapours; or

— hazards arising from any integral pre-conditioning equipment; or

— hazards arising from the materials being processed (e.g. asbestos, clinical waste, flammable or explosive materials, unhealthy or poisonous waste).

This standard does not apply to cranes, lift trucks or other mobile plant used to load materials into the feed opening. Nor does it apply to hazards arising from loading materials into the feed opening using cranes, lift trucks or other mobile plant.

This standard does not include specifications to meet the requirements of the ATEX Directive 94/9/EC.

All hazards mentioned in Clause 4 are dealt with in this European Standard.

This European Standard is not applicable for vertical baling presses which are manufactured before the date of its publication as an EN.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 349:1993+A1:2008, *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body*

EN 574:1996+A1:2008, *Safety of machinery - Two-hand control devices - Functional aspects - Principles for design*

EN 620:2002+A1:2010, *Continuous handling equipment and systems - Safety and EMC requirements for fixed belt conveyors for bulk materials*

EN 953:1997+A1:2009, *Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards*

EN 1005-1:2001+A1:2008, *Safety of machinery - Human physical performance - Part 1: Terms and definitions*

EN 1005-2:2003+A1:2008, *Safety of machinery - Human physical performance - Part 2: Manual handling of machinery and component parts of machinery*

EN 1005-3:2002+A1:2008, *Safety of machinery - Human physical performance - Part 3: Recommended force limits for machinery operation*

EN 1005-4:2005+A1:2008, *Safety of machinery - Human physical performance - Part 4: Evaluation of working postures and movements in relation to machinery*

EN 1037:1995+A1:2008, *Safety of machinery - Prevention of unexpected start-up*

EN 60204-1:2006, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:2005, modified)*

EN 60529:1991, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 61496-1:2004, *Safety of machinery - Electro-sensitive protective equipment - Part 1: General requirements and tests (IEC 61496-1:2004, modified)*

CLC/TS 61496-2:2006, *Safety of machinery - Electro-sensitive protective equipment - Part 2: Particular requirements for active opto-electronic protective devices (AOPDs) (IEC 61496-2:2006)*

CLC/TS 61496-3:2008, *Safety of machinery - Electro-sensitive protective equipment - Part 3: Particular requirements for active opto-electronic protective devices responsive to diffuse reflection (AOPDDR) (IEC 61496-3:2008)*

EN 62262:2002, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code) (IEC 62262:2002)*

EN 82079-1:2012, *Preparation of instructions for use - Structuring, content and presentation - Part 1: General principles and detailed requirements (IEC 82079-1:2012)*

EN ISO 3744:2010, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane (ISO 3744:2010)*

EN ISO 3746:2010, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Survey method using an enveloping measurement surface over a reflecting plane (ISO 3746:2010)*

EN ISO 3747:2010, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering/survey methods for use in situ in a reverberant environment (ISO 3747:2010)*

EN ISO 4413:2010, *Hydraulic fluid power - General rules and safety requirements for systems and their components (ISO 4413:2010)*

EN ISO 4414:2010, *Pneumatic fluid power - General rules and safety requirements for systems and their components (ISO 4414:2010)*

EN ISO 4871:2009, *Acoustics - Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

EN ISO 9614-2:1996, *Acoustics - Determination of sound power levels of noise sources using sound intensity - Part 2: Measurement by scanning (ISO 9614-2:1996)*

EN ISO 11201:2010, *Acoustics - Noise emitted by machinery and equipment - Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections (ISO 11201:2010)*

EN ISO 11202:2010, *Acoustics - Noise emitted by machinery and equipment - Determination of emission sound pressure levels at a work station and at other specified positions applying approximate environmental corrections (ISO 11202:2010)*

EN ISO 11204:2010, *Acoustics - Noise emitted by machinery and equipment - Determination of emission sound pressure levels at a work station and at other specified positions applying accurate environmental corrections (ISO 11204:2010)*

EN ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13732-1:2008, *Ergonomics of the thermal environment - Methods for the assessment of human responses to contact with surfaces - Part 1: Hot surfaces (ISO 13732-1:2006)*

EN ISO 13849-1:2008, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2006)*

EN ISO 13850:2008, *Safety of machinery - Emergency stop - Principles for design (ISO 13850:2006)*

EN ISO 13855:2010, *Safety of machinery - Positioning of safeguards with respect to the approach speeds of parts of the human body (ISO 13855:2010)*

EN ISO 13856-2:2013, *Safety of machinery - Pressure-sensitive protective devices - Part 2: General principles for design and testing of pressure-sensitive edges and pressure-sensitive bars (ISO 13856-2:2013)*

EN ISO 13856-3:2013, *Safety of machinery - Pressure-sensitive protective devices - Part 3: General principles for design and testing of pressure-sensitive bumpers, plates, wires and similar devices (ISO 13856-3:2013)*

EN ISO 13857:2008, *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)*

EN ISO 14119:2013, *Safety of machinery - Interlocking devices associated with guards - Principles for design and selection (ISO 14119:2013)*

EN ISO 14122-1:2001, *Safety of machinery - Permanent means of access to machinery - Part 1: Choice of fixed means of access between two levels (ISO 14122-1:2001)*

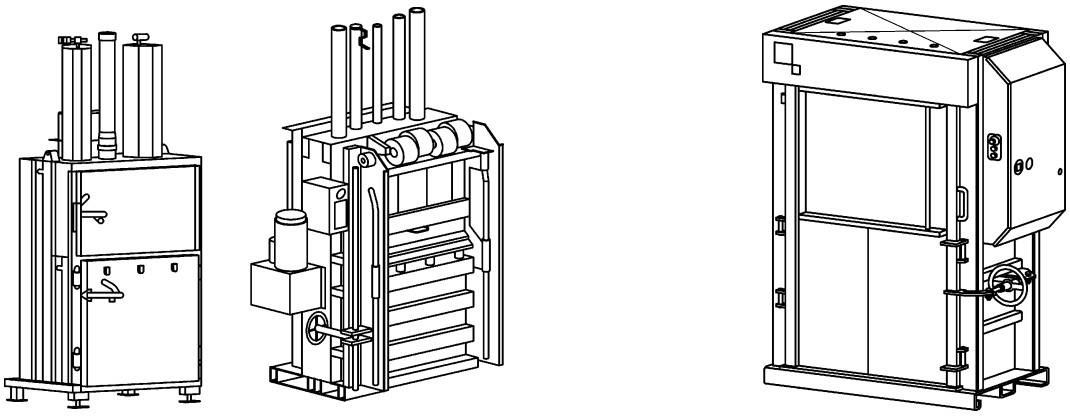
EN ISO 14122-2:2001, *Safety of machinery - Permanent means of access to machinery - Part 2: Working platforms and walkways (ISO 14122-2:2001)*

EN ISO 14122-3:2001, *Safety of machinery - Permanent means of access to machinery - Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2001)*

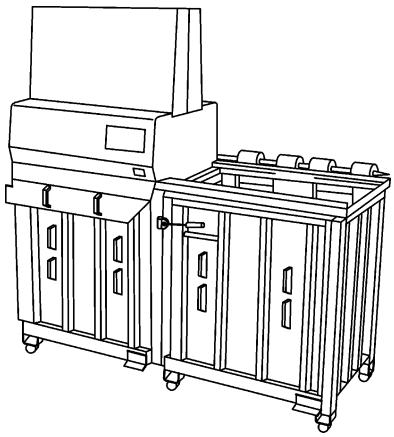
EN ISO 14122-4:2004, *Safety of machinery - Permanent means of access to machinery - Part 4: Fixed ladders (ISO 14122-4:2004)*

3 Terms and definitions

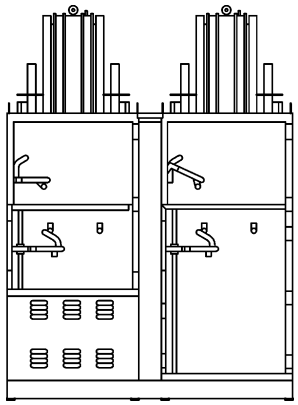
For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and the following apply.



a) Front/ side -loaded single chamber baling presses with fixed position compacting head

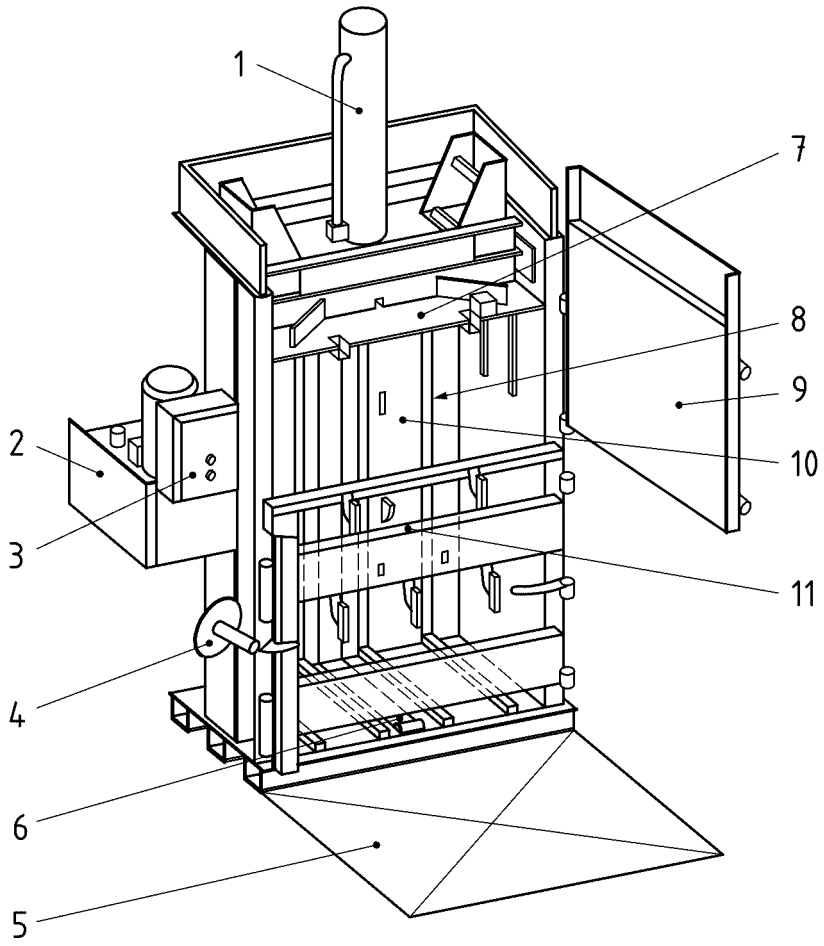


b) Top-loaded multi chamber baling press with moveable position compacting head



c) Front-loaded multi chamber baling press with fixed position compacting head

Figure 1 — Examples of vertical baling presses



Key

1 hydraulic cylinder
2 integrated power unit
3 control station
4 door locking device
5 bale ejection area
6 bale ejection device
7 compression plate
8 area for installing wires or ties
9 feed door
10 baling chamber
11 discharge door

Figure 2 — Principle drawing of a vertical baling press

3.1
vertical baling press
machine intended for compacting loose materials into a bale where the compacting pressure is applied vertically and downward from the feed opening and the bale is subsequently tied by strings, straps or wires

Note 1 to entry: A vertical baling press may consist of one or more baling chambers, a control system and control station, a compacting equipment, equipment for manually binding the bale and equipment for ejection of the bale.

3.1.1
vertical baling press with fixed position compacting head
vertical baling press that is fed at the front, side or rear of the machine, by hand or mechanical means and the compacting head is in a fixed position

Note 1 to entry: On a multiple chamber vertical baling press there will be more than one compacting head and each head is in a fixed position.

3.1.2
vertical baling press with movable position compacting head
a single or multiple chamber baling press that is fed usually from the top or sometimes from the front, side or rear of the baling press by hand or mechanical means and the compacting head position can be moved

Note 1 to entry: Whether it is a single or multiple chamber machine there will usually be a single compacting head that can be moved mechanically or by hand across the chamber(s) to allow loading. Once loaded, the head is then moved back over the chamber and the compression plate moves vertically to compact materials.

3.2
integral mechanical feed equipment
equipment used for feeding materials into the baling chamber through the feed opening i.e. conveyors or bin lifts where:

— the equipment is mounted/fixed to the vertical baling press;

— its power supply and control system are linked into the vertical baling press systems

3.3
conveyor
conveyor onto which materials are deposited and transported to the feed opening

3.4
bin (sometimes called skip)
container, usually fitted with wheels, in which materials may be collected ready for feeding into the baling press

3.5
bin lift (sometimes called skip hoist)
mechanical device for lifting a bin containing materials and tipping the contents into the baling chamber through the feed opening

3.6
manual feeding
loading materials into the baling chamber by hand

3.7
feed area
area where the operator loads the materials into the baling chamber for compaction

3.8
feed opening
opening through which the materials are loaded into the baling chamber

3.9
feed door
hinged or sliding door covering the feed opening that is opened for manually loading materials into the baling chamber

3.10
integral material flow control equipment
equipment that helps material in the feed opening flow into the compaction chamber where:

— the equipment is mounted/fixed to the vertical baling press;

— its power supply and control system are linked into the vertical baling press systems

3.11
compacting equipment
all components directly involved in compacting materials into bales (e. g. hydraulic, pneumatic or mechanical systems, compression plate and baling chamber)

3.12
compression plate
plate for compacting material by a downward vertical movement

3.13
baling chamber
the inside chamber of the baling press, where the materials are placed and compressed to form a bale

Note 1 to entry: The baling chamber extends between the bottom of the machine and the compression plate in its uppermost position.

3.14
bale ejection device
mechanical device that ejects the bale after the bale discharge door has been opened

3.15
unloading opening
opening through which the compacted bale is unloaded manually, mechanically ejected or taken by a fork-lift truck

3.16
bale discharge door
door that covers the unloading opening and forms part of the baling chamber, through which the bale is removed

3.17
bale ejection area
the area outside the unloading opening from where the bale is pushed, pulled or tipped for further transportation

3.18
cycle of the compression plate
a complete downward and reverse movement of the compression plate

3.19
control station
location from which the baling press is started, stopped or manually controlled

3.20
workstation
area in the vicinity of the machine which is intended for the operator

Note 1 to entry: Examples of workstations are where the operator loads the materials and unloads bales.

3.21
access platform
platform that allows for safe access at height for troubleshooting or maintenance

Note 1 to entry: Access platforms can be fixed to the baling press, floor or building structure, or be movable platforms.

3.22
troubleshooting
identification and rectification of operational failures

3.23
maintenance
combination of all technical, administrative and managerial actions during the life cycle of an item intended to retain it in, or restore it to, a state in which it can perform the required function

[SOURCE: EN 13306:2010, 2.1]

3.24
power operated guard
movable guard that is operated with the assistance of power from a source other than by persons or gravity

[SOURCE: EN 953:1997+A1:2009, 3.3.1]

4 List of significant hazards

Table 1 lists the significant hazards that are present on vertical baling presses. It cross-references the subclauses of this standard in which the corresponding safety requirements and/or protective measures are specified.

Table 1 — List of significant hazards

	Significant hazards	**Applicable subclauses**
4.1	**Mechanical hazards**	5.1
4.1.1	*Common for all areas* Hazards caused by inadequate mechanical strength (e.g. impact by ejected machine parts). Crushing and shearing caused by the opening or closing movement of power operated doors/guards. Impact or crushing caused by overturning of the baling press due to instability. Crushing, shearing, trapping, impact, puncture or drawing in caused by creeping movement of parts when the machine is not operating (e. g. movement of parts due to release of trapped air in pneumatic systems or due to movement of oil in hydraulic systems). Slips, trips and falls. Hazard by improper installation (e.g. crushing between doors and building installations). Hazards caused by outdoor climate conditions. (e. g. rain, frost).	5.1.1, 5.2.2, 5.5, 7.2.5
4.1.2	*Feed area* Impact from moving parts of the compacting equipment. Impact by the power operated feed door.	5.1.2, 5.2.2, 7.2.5

	Trapping, crushing or shearing between the power operated feed door and the machine frame. Impact or crushing by a hinged lid, bottom hinged feed door or vertically sliding feed door. Crushing, shearing, drawing-in or impact by integral material flow control equipment in the feed opening. Impact, shearing and crushing by a movable position compacting head. Crushing and shearing between the frame of the feed opening and the upper side of the compression plate moving upwards. Crushing and shearing between the underside of the compression plate moving downwards and the bale or the frame of the feed opening. Drawing-in by strings, sheets or other material pulled by the movement of the compression plate. Crushing and shearing by moving parts of conveyors when stepping onto conveyors. Falling onto the conveyor. Falling when walking on conveyors. Drawing-in and crushing at in-running nips between the conveyor belt and the head and tail drums and between the conveyor belt and tensioning rollers. Drawing-in and crushing between moving transmission parts of the conveyor. Being struck by material falling from the conveyor. Impact, crushing and shearing between the bin lift mechanism and fixed parts of the bin lift or baling press, or being picked up by moving parts of the bin lift mechanism. Drawing-in and crushing between moving transmission parts of the bin lift. Being struck by the bin in the event of it falling off the bin lift while in a raised position. Being struck by material falling from the bin when it is in a raised position.	
4.1.3	*Baling chamber area* Impact and crushing by unintentional movement of the compression plate due to pressure or back pressure of the compressed material or due to failure of electrical, hydraulic, pneumatic or mechanical components. Crushing or shearing by the powered or unexpected movement of the compacting equipment after accessing the baling chamber for tying or unloading bales or for maintenance. Impact by the fall or descent of the compression plate. Impact between parts of any hand tools provided for clearing channels or threading bale wires and fixed parts of the baling press resulting in injuries to the hands and arms. Punctures or impact caused by the ends of metallic wires inserted into the vertical baling press.	5.1.3, 5.2.2, 5.3.3, 5.4.2, 5.5, 7.2.2

4.1.4	*Bale ejection area* Impact, trapping, crushing and/or shearing between the discharge door and fixed parts of the machine. Whiplash by a broken string, strap or wire after bale ejection. Squeezing by mechanical parts of the bale-ejection device. Impact or crushing by an overturning bale. Impact and/or crushing by the overturning baling press, when unloading a bale by a fork-lift truck or trolley. Crushing and shearing by the upward movement of the compression plate during bale ejection or maintenance. Impact by the discharge door flying open in an uncontrolled manner due to high internal pressure from material.	5.1.1.4, 5.1.4, 5.2.2, 7.2.2, 7.2.5
4.2	**Hazards due to failures in the control system** Failure of safety functions. Unexpected start-up.	5.2.2, 5.2.3
4.3	**Hazards from hydraulic equipment** Injuries caused by unintentional release of fluids under pressure. Injuries caused by inadequate mechanical strength. Scalding by hot hydraulic oil. Impact from a loosened hydraulic hose. Injury to the eyes or skin as a result of injection of hydraulic fluid under pressure. Burns caused by contact to hot surfaces.	5.3
4.4	**Hazards from pneumatic equipment** Injuries caused by inadequate pneumatic equipment. Injuries caused by sudden release of accumulated potential energy. Injuries resulting from unexpected start or impeded stopping or malfunction of a protective device due to a failure in supply of compressed air. Injuries resulting from unexpected ascending or descending movements of moving parts. Injuries resulting from unexpected movements of hazardous parts due to a lack of means to adequately isolate the pneumatic air source.	5.4
4.5	**Electrical hazards** Electrical shock or burns due to direct or indirect contact with live parts.	5.5
4.6	**Hazards generated by noise** Hearing loss, tinnitus, physiological disorders, loss of balance or awareness, tiredness, accidents due to interference with auditory signals and poor speech communication due to generated noise.	5.6, 7.2.6, Annex A

4.7	**Hazards due to neglecting ergonomic principles in the design of the machine** Musculoskeletal disorders resulting from repeated efforts of: — manually loading materials through the feed opening — opening and closing doors — tying and manually discharging bales — moving movable compacting heads by hand.	5.1.2.3, 5.1.4.3, 5.7

5 Safety requirements and/or protective measures

5.1 Mechanical hazards

5.1.1 General

5.1.1.1 Basic requirements

Vertical baling presses shall comply with the safety requirements and/or protective measures of this clause. In addition, the machines shall be designed in accordance with the principles of EN ISO 12100:2010 for relevant but not significant hazards which are not dealt with by this document (e. g. sharp edges).

The design of the baling press shall ensure that wherever possible crushing, shearing, impact, puncture and drawing-in points are eliminated.

Moving parts shall be either non-hazardous by design or safeguarded.

A moving part can be considered non-hazardous by design provided:

— the maximum force exerted by the moving part does not exceed 75 N; and

— the maximum pressure the moving part exerts against an object is less than 25 N/cm^2; and

— the maximum dynamic energy of the moving part is less than 4 J; and

— moving parts shall not have sharp edges that may cause cutting or puncturing injuries and shall not create shearing hazards.

Hazardous moving parts shall be safeguarded in accordance with 5.1.1.2

5.1.1.2 Safeguards

To prevent injury when operating the baling press one or a combination of the following safeguards shall be used:

— fixed guards;

— movable interlocking guards

— sensitive protective equipment (SPE);

— two-hand control devices.

Fixed guards shall be in accordance with EN 953:1997+A1:2009.

Movable interlocking guards shall be in accordance with EN 953:1997+A1:2009 and EN ISO 14119:2013. The following shall also apply to movable interlocking guards:

— The interlocking guards shall be designed and positioned so that opening one of them stops the movement of any dangerous part of machinery before any part of a person enters the danger zone, see EN ISO 13855:2010. If this cannot be achieved then the guard shall be an interlocking guard with guard locking.

— After a movable interlocking guard has been opened starting the cycle of the compression plate shall require a manual reset and actuation of a start control at the control station.

— Trapped key interlocking devices shall be in accordance with Annex E of EN ISO 14119:2013. There shall be sufficient keys to allow the removal of every guard within the system.

— Interlocking guards with a start function (control guards) as defined in EN ISO 12100:2010, 3.27.6 shall meet the requirements of EN ISO 12100:2010, 6.3.3.2.5 and EN 953:1997+A1:2009, 5.4.9.

The movements of a power operated guard shall not be capable of causing injury and shall meet the requirements of EN 953:1997+A1:2009, 5.2.5.2.

The control actuator for a power operated guard shall be positioned where the operator has good view of the danger area and cannot reach the movement of the guard. This shall be achieved by:

— the opening and closing speed at the leading edge of the guard shall be ≤ 0,15 m/s; and

— where the control position for a power operated guard is less than 2 m from the leading edge of the guard then a two-hand control device shall be provided; or

— where the control position for a power operated guard is at least 2 m from the leading edge of the guard then a hold-to-run control device shall be provided.

Sensitive protective equipment (SPE) shall be designed in accordance with the relevant documents, e.g. EN ISO 13856-2:2013, EN ISO 13856-3:2013, EN 61496-1:2004, CLC/TS 61496-2:2006 and/or CLC/TS 61496-3:2008. Positioning of sensitive protective equipment shall comply with EN ISO 13855:2010.

Two-hand control devices shall be positioned in accordance with EN ISO 13855:2010 and shall be designed in accordance with EN 574:1996+A1:2008 type IIIB. However, two-hand control devices used for operating power operated guards only may be designed in accordance with type IIIA.

The safety functions of the chosen safeguards shall meet the performance levels specified in 5.2.2.

5.1.1.3 Safety distances

Where access is possible to areas with moving parts, the minimum gaps to avoid crushing shall comply with EN 349:1993+A1:2008.

Openings in fixed or movable guards shall comply with EN ISO 13857:2008, Tables 3, 4 and 7.

Guards shall be installed in accordance with Table 1 of EN ISO 13857:2008.

SPE and interlocking guards shall positioned in accordance with EN ISO 13855:2010.

5.1.1.4 Stability

Vertical baling presses shall be designed to ensure they remain stable during their intended use.

Examples of measures to prevent overturning can include:

— weight distribution;

— centre of gravity;

— dimensions of the base of the baling press;

— securing to the floor or a wall.

The stability of the machine shall be tested by means of a static test carried out at a 10° angle. The test conditions shall be set for the worst case scenario under normal use as specified by the manufacturer (e.g. doors open, loaded, unloaded, bale partially unloaded, compression plate raised). If the vertical baling press does not tilt when angled at 10° it is deemed to be stable. If the baling press does tilt at 10° it shall be secured to the floor or wall. Static calculations of stability at 10° tilt are also accepted as a means of testing stability.

See also 7.2.5.

5.1.1.5 Creeping movements of parts

The design of the baling press shall eliminate possible crushing, shearing, impact, puncture and drawing-in injuries caused by slow creeping, descending or ascending of the compression plate, a vertically sliding door or a hinged lid.

Where these hazards cannot be eliminated, creeping, descending and ascending shall be prevented or safeguarded by e.g.:

— limiting the maximum downward or upward force to less than 75 N measured at any place of a moving part; and/or

— a device that mechanically blocks the movement. The blocking shall be interlocked to the opening of any door or lid giving access to the danger zone above or beneath the possible creeping part; and/or

— an automatic mechanical brake interlocked to the opening of any door or lid giving access to the danger zone above or beneath the possible creeping part; and/or

— limiting the maximum downward/upward creeping speed to 0,1 m/s, provided the horizontal dimensions of the baling chamber are less than 1 600 mm in width and less than 1 200 mm in depth, and the baling press is fitted with mechanical means to secure the compression plate, vertically sliding door or hinged lid during repair and cleaning work; and/or

— limiting the upward or downward force to 150 N provided the press has mechanical means to secure the compression plate, vertically sliding door or hinged lid during repair and cleaning; and/or

— installing guards as specified in 5.1.1.2.

NOTE The following measures can be considered as equivalent to mechanical means to secure the compression plate:

— repair operations performed with the compression plate resting in its lowest position;

— springs capable of keeping the compression plate in its highest position;

— a cut-off valve directly on the return outlet of a hydraulic cylinder.

5.1.1.6 Slips, trips and falls

Where access is required to positions at the machinery not accessible from the floor, safe means of access shall be provided to places above floor level, to operate, adjust, clean, inspect, and maintain the machinery. Safe means of access shall be chosen using the criteria in EN ISO 14122-1:2001.

When access is required, recommended or expected to take place more than once per month, the means of access shall be provided by the manufacturer and shall meet the following requirements:

— permanent working platforms shall be in accordance with EN ISO 14122-2:2001;

— stairs shall be in accordance with EN ISO 14122-3:2001;

— step ladders shall be in accordance with EN ISO 14122-3:2001;

— fixed ladders shall be in accordance with EN ISO 14122-4:2004.

When access is required, recommended or expected to take place less than once per month safe means of access are not required to be supplied by the manufacturer, but safe means of access shall be described in the instruction handbook.

5.1.2 Feed area

5.1.2.1 General

Vertical baling presses with fixed position compacting heads shall be fitted with an interlocking guard covering the feed opening to prevent access to dangerous moving parts in the baling chamber. The guard shall be interlocked to the movement of the compression plate. Where there are multiple chambers each feed opening shall have an interlocking guard.

Vertical baling presses with movable position compacting heads shall be constructed to ensure that a person cannot be injured by the dangerous moving parts inside the baling chamber. This shall be achieved by the compacting head covering the feed opening. Any gaps between the compacting head and the baling chamber shall be safeguarded to prevent access. In addition it shall not be possible to start the movement of the compression plate until the compacting head is covering the feed opening.

Vertical baling presses with movable position compacting heads shall be constructed to ensure that a person cannot be injured by the movement of the compacting head. This shall be achieved as follows:

— on vertical baling presses where the compacting head is moved manually a device that requires both hands to be involved in the release and subsequent movement of the head shall be provided; or

— on vertical baling presses where the movement of the compacting head is power operated two-hand control devices shall be provided.

On vertical baling presses with both fixed and movable position compacting heads the operator shall have a good view of the danger zones from the position of the control device for the compression plate.

5.1.2.2 Impact from a hinged lid, a bottom-hinged feed door or a vertically sliding feed door

Impact from a hinged lid, a bottom-hinged feed door or a vertically sliding feed door falling open or closed under gravity shall be prevented. This can be achieved by e.g.:

— a power operated door or lid; or

— a counter-balanced lid or door; or

— a spring or gas dampening of the lid or door; or

— an automatic prop or catch for a hinged lid or door as a means of securing it in the open position.

5.1.2.3 Manually fed vertical baling presses

The feed opening shall be safeguarded by an interlocking guard to prevent hazards due to moving parts in the baling chamber. See also 5.2.2.

Interlocking guards may be power operated.

A control guard may be used at the feed opening. When the closing of a control guard starts the movement of the compression plate, the movements of the compression plate shall be prevented until the guard is closed.

For ergonomic reasons the lower edge of the feed opening of a vertical baling press with movable position compacting head shall be between 900 mm and 1 400 mm above the standing place for loading.

For ergonomic reasons the lower edge of the feed opening of a vertical baling press with fixed position compacting head shall be between 500 mm and 1 400 mm above the standing place for loading.

NOTE The standing place for loading may be e.g. a platform.

See also 7.2.5.

5.1.2.4 Vertical baling presses fed by conveyors

Conveyors and emergency stops on conveyors shall be in accordance with EN 620:2002+A1:2010.

Conveyors shall not be able to operate:

— when the compression plate is moving; and

— when any interlocking guard or door on the baling press is open, excluding the safeguard at the feed opening the conveyor is feeding through.

On vertical baling presses with manual cycle initiation, it shall only be possible to start a cycle once all interlocking guards or doors are closed (excluding the safeguard at the feed opening the conveyor is feeding through).

On vertical baling presses with automatic cycle initiation, it shall only be possible to reinitiate the automatic cycle by a voluntary actuation of a control actuator at the control station once all interlocking guards or doors are closed (excluding the safeguard at the feed opening the conveyor is feeding through).

Conveyors that are mounted and used horizontally shall be mounted no lower than 1 100 mm. The 1 100 mm height shall be measured from the floor or platform where a person can load. If the conveyor is mounted below 1 100 mm then additional safeguards and/or protective structures shall be provided and their top edge shall be at least 1 100 mm.

For vertical baling presses fed by a conveyor that is mounted and used horizontally, additional safeguards shall be provided to prevent access to the area where the compression plate operates. Examples of safeguards can be:

— distance guards that are in accordance with the reach distances specified in EN ISO 13857:2008, Table 1; or

— an interlocking door or guard that shall be closed when the compression plate is operating; or

— SPE in accordance with 5.1.1.2. and 5.2.2.

Conveyors that are mounted and used on an incline shall have means to prevent people falling onto the conveyor. Where the tail drum is mounted below 1 100 mm additional safeguards and/or protective structures shall be provided and their top edge shall be at least 1 100 mm above the standing place for loading. This can be achieved e.g. by providing a feed hopper as defined in EN 620:2002+A1:2010. In addition, an emergency pull wire shall be provided along the full length of both edges of the conveyor.

Conveyors that are mounted and used on an incline shall have means to prevent materials falling off the bottom of the conveyor.

If maintenance or troubleshooting is carried out at the feed area an access platform shall be provided in accordance with EN ISO 14122-3:2001. If maintenance or troubleshooting can be done from ground level an access platform is not needed.

The following measures shall be implemented to prevent persons reaching hazardous movements in the feed area and carrying out maintenance or troubleshooting from any installed platform while the machine is running:

— the edge of the conveyor at the feed area shall be at least 1 100 mm above the access platform. If there are any potential footholds that could provide a foreseeable means of access to the feed opening or the top of the conveyor this distance shall be measured from the highest foothold; and

— the external surfaces of the feed area and the conveyor side walls shall be smooth and free from potential footholds that might assist a person to climb onto the conveyor.

5.1.2.5 Vertical baling presses fed by bin lifts

Bin lifts shall not be able to operate with any interlocking guard or door open excluding the safeguard at the feed opening the bin lift is feeding through. Once interlocking guards or doors have been closed, bin lifts shall only be able to be operated by a voluntary actuation of a control actuator at the control station.

Persons shall be safeguarded against hazards arising from the movement of bin lifts. This shall be achieved by one of the following means.

a) Automatic bin lifts

On automatic bin lifts, i.e. bin lifts that do not require hold-to-run control devices for their operation, access to the moving parts of the bin lift shall be prevented by a combination of fixed guards and a movable interlocking guard or sensitive protective equipment (SPE) through which the bin can be loaded or unloaded from the bin lift while it is stopped.

The interlocking guard and the SPE shall be in accordance with 5.1.1.2 and 5.2.2 and movement of the bin lift shall only be possible if the interlocking guard is closed or the SPE is reset and a start command has been given. Where practicable any fixed and movable interlocking guards should be designed to fit as close to the machinery as possible to prevent persons being in the danger zone while the bin lift is operating.

b) Bin lifts where the bin is wheeled into the internal fixed dimensions of the baling press

On bin lifts where the bin is wheeled into the internal fixed dimensions of the baling press access to the lifting mechanism shall be prevented by one of the following means:

— an interlocking device shall ensure that the lifting mechanism can operate only when the container is positioned inside the machine in such a way that there is no access to dangerous moving parts; or

— an interlocking guard or SPE in accordance with 5.1.1.2 and 5.2.2 shall be provided to prevent access to the dangerous moving parts.

c) Manually operated bin lifts

On manually operated bin lifts the same protective measures as on automatic bin lifts should be applied.

Alternatively to the protective measures above for automatic bin lifts it is acceptable to operate the bin lift if the following conditions are met:

— a hold-to-run control device or two-hand control device in accordance with 5.1.1.2 and 5.2.2;

— the control position is in a safe distance (as referenced in the appropriate standard EN ISO 13857:2008 or EN ISO 13855:2010);

— the operator has a good view of the danger zones (i.e. bin lift mechanism, container being lifted and the surrounding areas) from the position where the control is actuated;

— the peripheral speed of the lifting device is not more than 0,5 m/s (measured with the largest bin that is allowed to be lifted);

— a visible and/or audible signal is emitted during the whole travel of the bin lift.

Access to danger zones where the operator does not have good visibility shall be prevented by fixed or interlocking guards as specified in 5.1.1.2 and 5.2.2.

On vertical baling presses with a movable position compacting head it shall not be possible to operate the bin lift with the compacting head covering the feed opening.

On vertical baling presses with a fixed position compacting head it shall not be possible to operate the bin lift when the compression plate is operating.

5.1.2.6 Vertical baling presses both manually and mechanically fed

For machines that are designed to be both manually and mechanically fed the requirements of the corresponding sections above 5.1.2.3, 5.1.2.4 and/or 5.1.2.5 shall be fulfilled.

In addition the feed door used for manual loading shall be interlocked to any integral mechanical feed equipment.

5.1.3 Baling chamber area

Access to the hazardous moving parts in the baling chamber shall be prevented.

Access doors to the front of the baling press where bales are ejected shall be interlocked to the movement of the compression plate. For bale ejection see 5.1.4.

Access to the rear of the baling chamber where there are channels to allow for threading wires shall be prevented either by an interlocking guard, the opening of which stops and prevents any movement of the compression plate or by distance guards that comply with EN 349:1993+A1:2008 and/or EN ISO 13857:2008.

Measures shall be taken to control loose wire ends and prevent them from flicking into the eyes or face of the operator threading the wire around the bale e.g. a fixed retention bar or plate, hooks or eyes shall be provided.

Where hand tools are provided for clearing or checking bale wire channels, threading wire around the bales and twisting the ends of bale wires together, the tools provided shall be ergonomically designed.

See also 5.2.2 and 7.2.2.

5.1.4 Bale ejection area

5.1.4.1 General

The baling press shall be constructed for safe mechanical bale ejection or safe manual unloading.

Impact injuries caused by the discharge door flying open in an uncontrolled manner shall be prevented, e.g. by a two-stage opening mechanism.

When the bale discharge door is open and there is access to dangerous upward movements of the compression plate, then the compression plate shall only be able to move upwards by means of a two-hand control device in accordance with 5.1.1.2 and 5.2.2.

See also 7.2.2.

5.1.4.2 Mechanical bale ejection

The bale may be mechanically ejected by e.g.:

— a device (e.g. chains, strap or belt) for tipping the bale onto the floor, a fork-lift truck or to a pallet;

— a device for pushing the bale onto the floor, a fork-lift truck or a pallet;

— the use of a transport belt.

The speed of the ejection mechanism shall be controlled to prevent a full height bale turning over more than 90° when it is ejected.

The control actuators for mechanical bale ejection shall be positioned outside the area where the bale is to be ejected and where the operator has a good view of the area.

Any safety functions that are active in operational mode and are implemented by guard interlocking or SPE shall be maintained at the same performance level during mechanical bale ejection.

Where the bale ejection is powered by retraction of the compression plate see 5.1.4.1.

Where the bale ejection is powered by an internal system that is independent of the compression plate, e. g. a cylinder, the following requirements shall apply:

— the bale ejection shall be controlled by a hold-to-run control device; and

— the return movement of the bale ejection device shall be safe by design or shall be activated by a two-hand control device in accordance with 5.1.1.2 or by a hold-to-run control device positioned so there is no access to the dangerous moving parts.

See also 5.2.2.

5.1.4.3 Manual bale unloading

Manual bale unloading is acceptable under the following circumstances:

— the bale can be removed, lifted or tipped by hand, and the manual unloading process meets the requirements of EN 1005-1:2001+A1:2008, EN 1005-2:2003+A1:2008, EN 1005-3:2002+A1:2008 and EN 1005-4:2005+A1:2008; or

— the unloading opening is designed for manual removal of the bale using a manual trolley provided by the manufacturer and the use of the manual trolley meets the requirements EN 1005-1:2001+A1:2008, EN 1005-2:2003+A1:2008, EN 1005-3:2002+A1:2008 and EN 1005-4:2005+A1:2008; or

— the baling press is equipped with a manually operated bale ejection device, which either pushes or tips the bale from the baling chamber onto a pallet, a fork-lift truck or the floor, and the handle for the manually operated ejection device is positioned outside the area where the bale is to be ejected, and the manual use of the handle meets the requirements of EN 1005-1:2001+A1:2008, EN 1005-2:2003+A1:2008, EN 1005-3:2002+A1:2008 and EN 1005-4:2005+A1:2008.

Any tool/device provided to extract bales shall be ergonomically designed and be able to withstand the forces exerted on it.

The angle of the bale discharge door in its open position shall be ≥ 90°. See also 7.2.5.

5.2 Control actuators, devices and system

5.2.1 Control actuators and devices

The control actuators shall be positioned and arranged to allow the operator to have a full view of the functions of the baling press.

Each control actuator shall be visible and clearly labelled as to its function.

Control actuators shall be designed or positioned so that unintentional operation is prevented.

Hold-to-run control devices shall be positioned so the operator cannot reach any hazardous movement initiated by the control.

Electrical stop control devices shall be designed in accordance with EN 60204-1:2006. A stop control actuator shall be reachable from all workstations of the baling press.

5.2.2 Required performance levels PL_r

The safety functions of the control system shall be designed in accordance with EN ISO 13849-1:2008. The required performance levels (PL_r) of the safety related parts of the control system in each area of the baling press shall be as follows:

- Power operated guards without a limited force (75 N) or energy (4 J) (5.1.1.2):
  - Two-hand control device — PL_r c
  - Hold-to-run control device — PL_r c
- Conveyors (5.1.2.4):
  - Interlocking with the movement of the compression plate — PL_r d
  - Interlocking on interlocking guards or doors on openings other than the feed opening — PL_r d
  - SPE — PL_r d
- Bin Lifts (5.1.2.5):
  - Interlocking with interlocking guards or doors on openings other than the feed opening — PL_r d
  - Interlocking guard or SPE for the bin lift — PL_r d
  - Hold-to run control device or two-hand control device — PL_r c
  - Interlocking with the movement of the compression plate — PL_r d
- Safety functions designed to prevent access to the compression plate (5.1.2, 5.1.3):
  - Movable interlocking guards at any opening:
    - — general case — PL_r d
    - — in the case of vertical baling presses with a fixed position compacting head, without automatic start and with one workstation — PL_r c
  - Interlocking guards with a start function (control guards) — PL_r d
  - Light curtain or any other SPE preventing access to the feed opening — PL_r d
- Upward movement of the compression plate (5.1.4.1)
  - Two-hand control device — PL_r d
- Bale ejection device (5.1.4.2):
  - Hold-to-run control device for mechanical bale ejection by an internal system independent of the compression plate — PL_r b
  - Hold- to-run control device for the return movement of the mechanical ejection device — PL_r b
  - Two-hand control device for the return movement of the mechanical ejection device — PL_r d

— Emergency stop function (5.2.4.2) PL_r c

— Two-hand control for hazardous movements where a service mode deactivates an interlocking guard: the PL_r shall be the same as the interlocking guard it replaces.

5.2.3 Prevention of unauthorised or unintentional operation or start-up

The vertical baling press shall be provided with devices for isolation and energy dissipation against unauthorised and unintentional operation.

The baling press shall be equipped with integral safety measures aimed at preventing unexpected machine start-up in accordance with EN 1037:1995+A1:2008.

Connections for external supply of hydraulic or pneumatic fluids shall either be lockable or have a quick-coupling device for isolation.

It shall be possible to secure the vertical baling press against unauthorised operation, including unauthorised operation by members of the public. Examples to achieve this include code pads, lockable control boxes, key-operated switches. The key can be mechanical or electronic. The key shall be only removable when the switch is in the “OFF” position. With the switch in the “OFF” position all movements of the vertical baling press, including any integral mechanical feed equipment such as a bin lift, shall be prevented.

5.2.4 Emergency stop

5.2.4.1 Basic requirements

Vertical baling presses shall be provided with an emergency stop device unless:

— the machine is only manually fed; and

— it has a fixed position compacting head; and

— it is small enough so that the operator has a good view of all hazardous areas e.g. the loading/unloading area; and

— it has one workstation only.

The emergency stop shall comply with 5.2.2, 5.2.4.2 and 5.2.4.3.

On presses without an emergency stop device the main switch shall be clearly visible, easily accessible from the workstation and shall be designed in the colours red/yellow.

5.2.4.2 Emergency stop function

Actuating an emergency stop device shall stop all hazardous movements of the baling press, integral material flow control equipment and integral mechanical feed equipment.

The emergency stop function shall comply with the requirements in EN ISO 13850:2008, stop categories 0 or 1, whichever provides the shorter stopping time.

5.2.4.3 Positions of emergency stop devices

Emergency stop devices shall be easily reachable from all workstations at the baling press. An emergency stop device positioned at a distance less than 1 600 mm from a dangerous part is regarded to be easily reachable.

See also 5.1.2.4 for conveyors.

5.3 Hazards from hydraulic equipment

5.3.1 Hydraulic equipment

The hydraulic equipment shall be designed, selected and installed in accordance with EN ISO 4413:2010.

The hydraulic system shall be designed or otherwise protected against pressures exceeding the maximum working pressure of the system or any part of the system or the rated pressure of any specific component.

Components shall be selected or specified with adequate characteristics to allow them to operate reliably under all intended uses of the system. Particular attention shall be paid to the reliability of components that could create a hazard in the event of their failure or malfunction.

A pressure-relief device shall be provided and shall:

— be connected as close as possible to the part of the hydraulic system it is intended to protect; and

— be installed so that it is readily accessible for inspection and repair; and

— not easily be rendered inoperative for its intended function; and

— relieve pressure in a controlled manner and lead the relieved oil to a tank or other containment device with a reservoir tank adequately sized for oil capacity, relieving pressure and dissipating heat.

An adjustable pressure-relief device shall be designed to remain sealed at the specified settings, and shall only be adjustable by a tool and it shall be easy to see if a seal has been broken or tampered with.

Alternative means, such as pressure compensator pump controls, may be used, provided these means satisfy the application requirements.

There shall be no shut-off valve between the pressure-relief means and the parts that it is intended to protect.

A check valve between the pressure-relief means and the compressing cylinder is acceptable provided the sealed-off part of the hydraulic system is designed for any rise in pressure due to a possible rise in temperature.

5.3.2 Hot surfaces of the hydraulic system

Hydraulic systems shall be designed to protect persons from surface temperatures that exceed touchable limits by either distance or safeguarding (see EN ISO 13732-1:2008).

When such protection is not possible, proper warnings shall be provided, see 7.3.

5.3.3 Hydraulic control system

The hydraulic control system shall be designed to prevent unintended hazardous movement and improper sequencing of actuators. This applies to all phases of the operation.

Controls for hydraulic valves shall have means to be held in a safe position where unintended movement of the control may cause a hazard.

Where there is more than one interrelated control device on the baling press, and where failure of any of these devices may cause a hazard, interlocks or other protective means shall be provided.

5.4 Hazards from pneumatic equipment

5.4.1 Pneumatic equipment

Pneumatic equipment shall be designed, selected and installed in accordance with EN ISO 4414:2010.

All parts of the system shall be designed or otherwise protected against pressures exceeding the maximum working pressure of the system or any part of the system or the rated pressure of any specific component.

Components shall be selected or specified with adequate characteristics to allow them to operate reliably under all intended uses of the system. Particular attention shall be paid to the reliability of components that could create a hazard in the event of their failure or malfunction.

The pneumatic system shall be designed to facilitate a positive isolation from energy sources and also to facilitate release of the pressure in the system in order to prevent unexpected start-up. This can be achieved by e. g.:

— isolation by a suitable quick-coupling device, which may need to be lockable, and isolation of any electrical supply; or

— isolation with a lockable shut-off valve having pressure-relief means, and isolation of any electrical supply.

5.4.2 Pneumatic control system

The pneumatic control system shall be designed to prevent unintended hazardous movement and improper sequencing of actuators. This applies to all phases of the operation.

Controls for pneumatic valves shall have means to be held in a safe position where unintended movement of the control may cause a hazard.

Where there is more than one interrelated control device on the baling press, and where failure of any of these devices may cause a hazard, interlocks or other protective means shall be provided.

5.5 Electrical hazards

Electrical equipment shall be in accordance with EN 60204-1:2006.

The mains power connector shall be capable of being isolated in accordance with EN 60204-1:2006.

Minimum degrees of protection shall be as follows:

— IP 54 as specified in EN 60529:1991;

— IK 8 as specified in EN 62262:2002 or a similar protection by a cover or the mechanical housing of the baling press.

5.6 Hazards generated by noise

5.6.1 Noise reduction at source by design

Vertical baling presses shall be designed and constructed so that risks resulting from the emission of noise are reduced to the lowest level. This shall take into account technical progress and the availability of means of reducing noise, particularly at source. Useful guidance is given in EN ISO 11688-1:2009.

NOTE EN ISO 11688-2 gives useful information on noise generation mechanisms in machinery.

Examples of current measures to reduce noise at source include:

— choice of low noise emission components (motors, pumps, valves, transmission systems);

— use of vibration damping material for vibrating surfaces;

— vent silencers for pneumatic systems;

— use of elastic transmission to prevent structure-borne noise from being transmitted to sound-radiating parts of the machine;

— rubber bumpers to avoid slamming of doors.

5.6.2 Noise reduction by protective measures

Protective measures that may be taken at design stage to reduce noise emissions include e,g.:

— acoustic enclosures around machine parts;

— screening of parts of the machine generating high noise levels.

5.6.3 Information connected with noise hazards

Noise shall be measured and declared according to Annex A of this document.

See also 7.2.6.

5.7 Hazards due to neglecting ergonomic principles in the design of the machine

The baling press shall be designed to avoid unnecessary physical stress of persons due to the following operations:

— manual loading of materials into the baling chamber (see 5.1.2.3);

— manual opening and closing of guards;

— tying bales;

— manual unloading of bales (see 5.1.4.3).

The manual force for opening or closing doors, lids, guards or sliding movable compacting heads shall be risk evaluated according to EN 1005-3:2002+A1:2008.

6 Verification of the safety requirements and/or protective measures

Conformity to the safety requirements and/or measures shall be verified as specified in Table 2.

Noise measurement shall be performed in accordance with Annex A.

A functional test comprises a test of function and efficiency of the protective equipment using:

— the specification in the information for use;

— the safety-relevant design documents and wiring diagrams;

— the requirements stated in Clause 5 of this standard and in the cross-referenced applicable standards.

Table 2 — Verification of the safety requirements and/or protective measures

Subclause	Visual inspection	Functional test	Measurement	Calculation
5.1.1.1 Basic requirements	x	x	x	x
5.1.1.2 Safeguards	x	x	x	
5.1.1.3 Safety distances			x	x
5.1.1.4 Stability	x		x	x
5.1.1.5 Creeping movement of parts	x	x	x	
5.1.1.6 Slips, trips and falls	x		x	
5.1.2.1 Feed area - General	x	x	x	
5.1.2.2 Impact from a hinged lid, a bottom-hinged feed door or a vertically sliding feed door	x	x	x	
5.1.2.3 Manually fed vertical baling presses	x	x	x	
5.1.2.4 Vertical baling presses fed by conveyors	x	x	x	
5.1.2.5 Vertical baling presses fed by bin lifts	x	x	x	x
5.1.2.6 Vertical baling presses both manually and mechanically fed	x	x	x	x
5.1.3 Baling chamber area	x	x	x	
5.1.4.1 Bale ejection area - General	x	x	x	x
5.1.4.2 Mechanical bale ejection	x	x	x	x
5.1.4.3 Manual bale unloading	x		x	
5.2.1 Control actuators and devices	x	x		
5.2.2 Required performance levels				x

PL_r				
5.2.3 Prevention of unauthorised or unintentional operation or start-up	x	x		
5.2.4.1 Emergency stop – Basic requirements	x			
5.2.4.2 Emergency stop function		x		
5.2.4.3 Positions of emergency stop devices	x		x	
5.3.1 Hydraulic equipment	x	x		x
5.3.2 Hot surfaces of the hydraulic system	x		x	
5.3.3 Hydraulic control system	x	x		
5.4.1 Pneumatic equipment	x	x		x
5.4.2 Pneumatic control system	x	x		
5.5 Electrical hazards	x	x	x	
5.6 and Annex A Hazards generated by noise	x		x	x
5.7 Hazards due to neglecting ergonomic principles in the design of the machine	x		x	

7 Information for use

7.1 General information

Each baling press shall be accompanied by a handbook giving general instructions for use (see EN ISO 12100:2010, 6.4.5 and EN 82079-1:2012).

7.2 Information for safe operation

7.2.1 General

The instruction handbook, supplemented by technical documentation and notices attached to the machine shall contain all the information needed for the safe operation of the machine.

7.2.2 Instructions for operation

The most important information required for safe operation of the baling press, as specified in the instruction handbook, shall be attached to the machine at the workstation. The information shall preferably be given in pictograms. The meaning of pictograms shall be explained in the instruction handbook.

The instruction handbook shall include at least the following instructions and information:

— that only fully instructed adults may operate the baling press, open the baling chamber, tie bales, unload and eject bales;

— that safety devices shall not be disabled or used improperly;

— acceptable materials to be compacted by the baling press;

— how much material can be loaded into the baling press;

— the workstation(s) for the operator;

— the functions of the control actuators, devices and system;

— where to disconnect the baling press for cleaning operations;

— how to tie, unload, eject and handle the bales;

— that appropriate personal protective equipment should be worn e.g. gloves, eye or face protection for handling metal wires;

— a warning that a partially made bale may roll over when ejected;

— a warning to keep persons out of the unloading area / bale ejection area;

— proper cleaning of the baling press and the surroundings;

— how and when to check all safety functions;

— a warning: “Stop the press immediately if there is evident danger for operators or equipment and ensure it is not restarted until the defect has been rectified”.

7.2.3 Instructions for maintenance

The instruction handbook shall give information on:

— how and where to disconnect the baling press from energy sources before performing maintenance work;

— how and when to check the safety functions of the baling press, e. g. interlocking, speed, pressure;

— how to safely carry out planned maintenance and periodic servicing in conformity with the manufacturer’s maintenance instructions;

— how to secure the compression plate against creeping during maintenance work;

— how to check the emergency stop devices;

— safe ways to perform ordinary cleaning and lubrication;

— intervals for service by a specialist (minimum of once per year);

— diagrams and list of components necessary for the use, maintenance, repair and for checking the correct functioning of the baling press.

7.2.4 Instructions for periodic examinations

The instruction handbook shall give information on:

— how to perform periodic examinations by visual and functional inspection and examination of the state of components to confirm that all safety devices are present, in a good state of repair and in effective working order;

— a visual and functional check of all safety devices and systems including associated control devices;

— a visual and functional check of all emergency stop devices, pull cords and safety switches;

— a check for leakages on hydraulic lines, pneumatic lines, valves, and cylinders;

— a check of maximum allowable pressure;

— a check of hoses for damage;

— a check of the electrical equipment.

The manufacturer shall state that where national regulations exist that require periodic examinations these should be carried out in accordance with those regulations

The manufacturer shall give advice that records of examination should be documented as required by national regulations. However, it is recommended that the results should be recorded in writing. It is also recommended that these records should contain the findings of the first and subsequent periodic examinations, as well as examinations performed following repairs and modifications. Where applicable, the records should include type test certificates and test certificates for tests performed during the baling press manufacture.

7.2.5 Information on installation

The instruction handbook shall give information on:

— how to lift and transport the baling press and a warning against unsafe means of securing it during transport;

— necessary space for installation and use of the baling press, including safe perimeter for ejection of the bale;

— any installation features needed to ensure that the minimum and maximum feed opening heights are maintained;

— characteristics of the fully loaded vertical baling press that are necessary for calculating the required strength of the surface under the machine;

— a recommendation not to install vertical baling presses on slopes, and if this cannot be avoided a statement saying that the machine shall always be fixed to the wall or floor;

— measures that need to be taken if the baling press is installed indoors or outdoors;

— connection to the power supply;

— the suitability of placing the vertical baling press for use in areas that are accessible to the public;

— supplementary means of locking against children and unauthorized persons accessing the baling press.

7.2.6 Information on noise

The instruction handbook and the technical sales literature describing the vertical baling press shall:

— give the declared noise emission values of the machine in accordance with A.7 and EN ISO 4871:2009, A.2.2, as dual-number noise emission values;

— refer to the noise test code specified in Annex A upon which the determination of the noise emission values of the machine is based and state which basic noise measurement standards have been used;

— contain information on possible methods of installation to minimize noise emission;

— inform the user that it is their responsibility to:

  — assess the noise hazards when materials compacted are different from those on which the noise declaration is based; and

  — follow national regulations to reduce the risk of being damaged by noise.

7.3 Marking

7.3.1 Manufacturer's marking plate

Each baling press or assembly shall be fitted with a manufacturer's plate containing at least the following information:

— the designation of the machinery;

— the business name and full address of the manufacturer and, where applicable, of his authorized representative;

— CE marking;

— year of construction, that is the year in which the manufacturing process was completed;

— designation of series or type;

— serial number, if any, or machine number;

— electrical, hydraulic and/or pneumatic connection values.

7.3.2 Safety signs

The baling press shall be equipped with all the signs necessary for safe use in particular the following warning sign:

Figure 3 — Warning sign against standing in front of the unloading opening

The meaning of all safety signs shall be explained in the instruction handbook.

7.3.3 Other markings

Other markings shall include:

— marking according to EN 60204-1:2006, 16.4; and

— rated hydraulic or pneumatic pressure; and

— weight.

Annex A
(normative)

Noise test code

A.1 Scope

This noise test code specifies all the information necessary to carry out efficiently and under standardised conditions the determination, declaration and verification of the noise emission of vertical baling presses. It specifies noise measurement methods and operating and mounting conditions that shall be used for the test.

Noise emission characteristics include emission sound pressure levels at workstations and the sound power level. It is necessary to determine these parameters so that:

— manufacturers can declare the noise emitted;

— users can compare the noise emitted by different vertical baling presses on the market; and

— designers can control noise at source at the design stage.

Using this noise test code ensures reproducibility when determining the noise emission characteristics within specified limits determined by the grade of accuracy of the basic airborne noise measurement method used.

A.2 Determination of emission sound pressure level at the work station(s)

A.2.1 Basic standards

A-weighted emission sound pressure levels shall be determined at each workstation defined in the instruction handbook using one of the following standards:

— EN ISO 11201:2010 (engineering grade of accuracy) that gives an engineering method for measuring emission sound pressure levels of machinery and equipment in an essentially free field over a reflecting plane with no environmental correction; or

— EN ISO 11202:2010 that gives a method for measuring emission sound pressure levels of machinery and equipment *in situ* with an environmental correction using a simplified method yielding engineering grade or survey grade; or

— EN ISO 11204:2010 that gives a method for measuring the emission sound pressure levels of machinery and equipment yielding engineering grade or survey grade.

If the machine is fed manually one of the defined workstations shall be at the feed opening.

For any baling press where the workstation(s) are undefined or cannot be defined, A-weighted sound pressure levels shall be measured at a distance of 1 m from the surface of the machinery and at a height of 1,60 m from the floor or access platform. The position and value of the maximum sound pressure level shall be indicated.

Whenever practical, an engineering method (engineering grade of accuracy) shall be used. See EN ISO 11200:2014 for further guidance.

Measurements shall be carried out at least once at each microphone position. The duration of each measurement shall be for a whole work cycle.

For vertical baling presses that emit an A-weighted sound pressure level higher than 80 dB, the sound power level shall also be measured.

A.2.2 Measurement uncertainty

If an engineering method is used, the standard deviation of reproducibility for A-weighted levels is:

$$\sigma_{RA} = 1{,}5dB$$

The standard deviation of reproducibility may be much larger if a survey method is used.

NOTE EN ISO 4871:2009 provides a method for deriving the total measurement uncertainty from the value of the standard deviation of reproducibility.

A.3 Determination of sound power levels

A.3.1 Basic standards

The A-weighted sound power level shall be determined using one of the following standards:

— EN ISO 3744:2010, EN ISO 3746:2010, EN ISO 3747:2010 that give methods for determining the sound power level of machinery and equipment from sound pressure measurements; or

— EN ISO 9614-2:1996 that gives a method for determining the sound power level of machinery and equipment using sound intensity measurements.

Whenever practical, an engineering method (engineering grade of accuracy) shall be used.

Measurements shall be carried out at least once at each microphone position. The duration of each measurement shall be a whole work cycle.

When either EN ISO 3744:2010 or EN ISO 3746:2010 is used, the measurement surface shall be a parallelepiped, and the measurement distance shall be 1 m.

A.3.2 Measurement uncertainty

If an engineering method is used, the standard deviation of reproducibility is:

$$\sigma_{RA} = 1{,}5dB$$

The standard deviation of reproducibility may be much larger if a survey method is used.

NOTE EN ISO 4871 provides a method for deriving the total measurement uncertainty from the value of the standard deviation of reproducibility.

A.4 Installation and mounting conditions for the noise measurement

The vertical baling press shall be installed and mounted as indicated by the manufacturer in the instruction manual (see 7.2).

A.5 Operating conditions

Two measurements shall be taken. One measurement shall be a work cycle under no-load conditions. The second measurement shall be a work cycle under loaded conditions at maximum bale size and the material for the test shall be chosen by the manufacturer and this information shall be included in the declaration.

A work cycle includes;

— one full cycle of the compression plate; and

— one movement of any automatic feed door, if installed; and

— one full up and down movement of the integral bin lift, if installed; and/or

— sufficient movement of the integral conveyor, if installed, to fully load the compaction chamber.

The machine and hydraulic fluid shall be at normal operating temperature.

The operating conditions shall be the same for determining both emission sound pressure level at workstations and sound power level.

A.6 Information to be recorded and reported

A.6.1 General

The information to be recorded by the person taking the measurements and reported in the test report shall include all the data that the basic standards used require to be recorded and reported, i.e. precise identification of the vertical baling press under test, mounting and operation conditions, acoustic environment, instrumentation and acoustical data.

At least the data specified in A.6.2 to A.6.6 shall be recorded and reported.

A.6.2 Vertical baling press – Data

Type, serial number, year of manufacture of the vertical baling press.

A.6.3 Standards used

This noise test code.

The basic standards used for noise measurement among those offered by this noise test code.

A.6.4 Noise data

Measured and/or calculated noise emission values, and associated measurement uncertainty.

A.6.5 Specified test parameters

Operating conditions during the noise test (see A.5).

A.6.6 Installation and operating conditions

Detailed description of the installation and operating conditions of the vertical baling press during noise measurement.

A.7 Declaration and verification of noise emission values

Declaration and verification of noise emission values shall be made in accordance with EN ISO 4871:2009.

Noise emission values generated under no load and under load (see A.5) shall be given in the noise declaration. Details of the load and test conditions i.e. work cycle, type and properties of material processed shall be given.

The noise declaration shall be a dual number declaration as defined in EN ISO 4871:2009 i.e. the measured value and the measurement uncertainty shall be indicated separately. It shall include the following:

— the A-weighted emission sound pressure level at the workstation(s):

  — if this does not exceed 70 dB, this fact shall be indicated;

  — if this exceeds 70 dB the value measured shall be indicated;

— the A-weighted sound power level where the A-weighted emission sound pressure level is above 80 dB.

The noise declaration shall mention explicitly that noise emission values have been obtained in accordance with this noise test code and indicate which basic standards have been used. The noise declaration shall clearly indicate any deviation(s) from this noise test code and/or from the basic standards used.

If undertaken, the verification shall be conducted by using the same mounting and operating conditions as those used for the initial determination of noise emission values.

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide one means of conforming to Essential Requirements of the New Approach Directive 2006/42/EC on machinery.

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements of that Directive and associated EFTA regulations.

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

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