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

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee MCE/3/16, Recycling machines.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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

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

Maschinen zum Verdichten von Abfällen oder recyclebaren Materialien - Horizontal arbeitende Ballenpressen - Sicherheitsanforderungen

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Foreword

This document (EN 16252:2012) 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of an identical text or by endorsement, at the latest by June 2013, and conflicting national standards shall be withdrawn at the latest by June 2013.

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

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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 horizontal baling presses for compacting waste material or recyclable fractions (e.g. paper, plastics, textiles, cans, cardboard, mixed waste), hereafter referred to as materials. It covers only machines fed by conveyors or by feed hoppers where the bales are bound manually or automatically. The feed hoppers covered by this European Standard are only fed mechanically or by hand.

The scope of this European Standard includes any mechanical feed equipment, such as belt type loading and feed conveyors or bin lifts, forming an integral part of the baling press assembly. However, pneumatic conveying systems are outside the scope of this European Standard.

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

This European Standard does not apply to pre-conditioning equipment connected at the inlet side of the feed hopper (e.g. sorter, shredder, stand-alone perforator), nor to equipment at the outlet side of the baling press.

This European Standard does not deal with suction and de-dusting mechanisms.

This European Standard does not apply to hazards arising from the materials being processed (e.g. asbestos, clinical waste, aerosol containers).

This European Standard does not cover risks arising from installation of baling presses in places accessible to the public.

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

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

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 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 1088:1995+A2:2008, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

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 60947-5-1:2004, *Low-voltage switchgear and control gear — Part 5-1: Control circuit devices and switching elements — Electromechanical control circuit devices (IEC 60947-5-1:2003)*

EN 60947-5-3, *Low-voltage switchgear and control gear — Part 5-3: Control circuit devices and switching elements — Requirements for proximity devices with defined behaviour under fault conditions (PDDE) (IEC 60947-5-3)*

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

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 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 11200:2009, *Acoustics — Noise emitted by machinery and equipment — Guidelines for the use of basic standards for the determination of emission sound pressure levels at a work station and at other specified positions (ISO 11200:1995, including Cor 1:1997)*

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

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

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

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

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

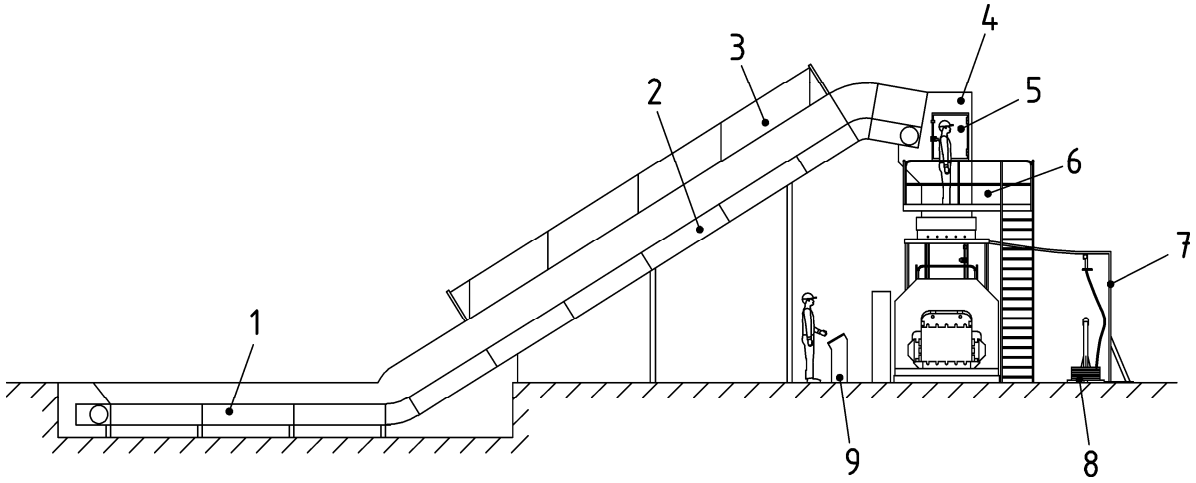
EN ISO 14122-2, *Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways (ISO 14122-2)*

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

3 Terms and definitions

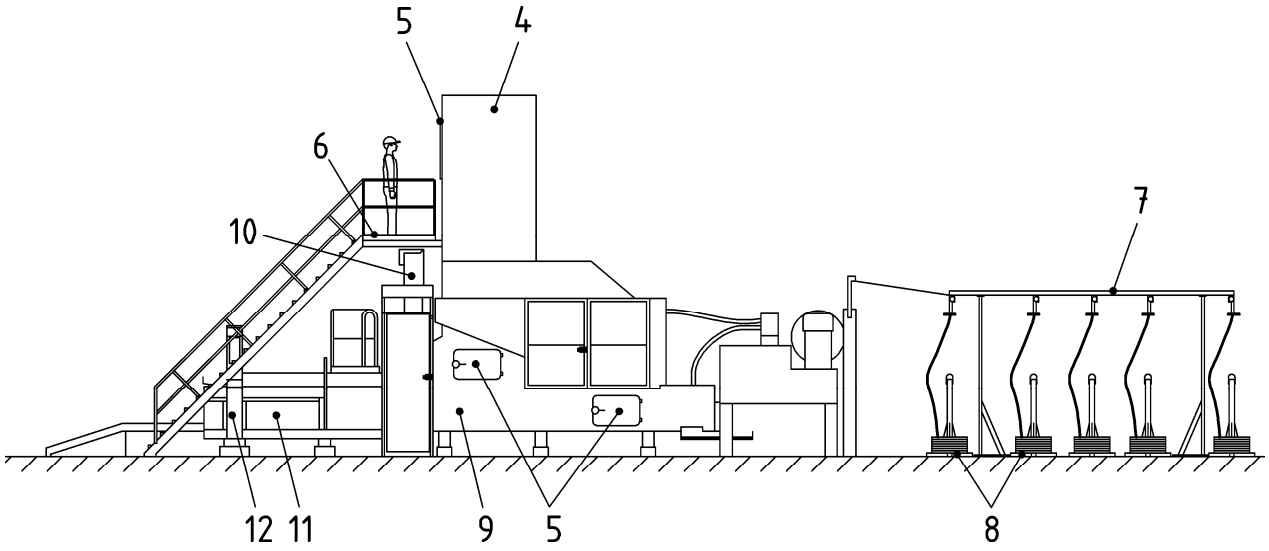
For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and the following apply.



Key

1 loading conveyor
2 feed conveyor
3 emergency stop actuator
4 feed hopper
5 access door
6 access platform
7 wire guidance zone
8 wire coils
9 control station

Figure 1a — Horizontal baling press, front view



Key

4 feed hopper
5 access door
6 access platform
7 wire guidance zone
8 wire coils
9 control station
10 bale tying equipment
11 bale channel
12 counter pressure device

Figure 1b — Horizontal baling press, side view

3.1
baling press
plant for pressing and binding loose materials into a bale (materials can include paper, plastics, textiles, cans, cardboard or mixed waste)

Note 1 to entry: A baling press can consist of a control system and control station, feed equipment, feed hopper, distributor, pressing equipment, bale tying equipment, wire-decoiling equipment and bale channel.

3.2
horizontal baling press
baling press as defined in 3.1 on which the compacting pressure is applied horizontally

Note 1 to entry: See Figure 1.

3.3
feed equipment
equipment used for feeding materials to be baled to the pressing equipment

Note 1 to entry: Feed equipment usually consists of a loading conveyor and a feed conveyor or a bin lift. Loading and feed conveyors can also be designed as one single conveying unit.

Note 2 to entry: Other types of feed equipment sometimes used to feed horizontal baling presses include cranes, lift trucks and other items of mobile plant that load the material directly into the feed hopper or into the baling chamber but these, and the hazards arising from using them, are outside the scope of this standard.

3.4
loading conveyor
conveyor onto which materials are deposited and transported to the feed conveyor

Note 1 to entry: Loading conveyors are usually recessed into the floor at the loading area.

Note 2 to entry: The loading conveyor and the feed conveyor can be one and the same conveyor.

3.5
feed conveyor
conveyor that transports materials to the feed hopper

Note 1 to entry: The loading conveyor and the feed conveyor can be one and the same conveyor.

3.6
bin (sometimes called skip)
container, usually fitted with wheels, in which materials may be collected ready for feeding into the baling press

3.7
bin lift (sometimes called skip hoist)
mechanical device for lifting a bin containing materials and tipping the contents into the feed hopper or baling chamber of the baling press

3.8
mechanical feeding
loading materials into the feed hopper or baling chamber by mechanical means, e.g. conveyors, bin lifts

3.9
manual feeding
loading materials directly into the feed hopper by hand

3.10
feed hopper
single or multiple chutes through which materials from the feed equipment are guided into the baling chamber

3.11
distributor (also known as ruffler)
device for breaking up and distributing compacted material (e.g. books, newspaper packs) before it enters the baling chamber

Note 1 to entry: This device can be inserted into, and retracted from, the feed hopper.

3.12
perforator
device used to pierce empty containers (e.g. plastic bottles) to be compacted before they enter the baling chamber

Note 1 to entry: This device can be inserted into, and retracted from, the feed hopper.

3.13
pressing equipment
all components directly involved in compressing the material into bales (e.g. hydraulic system, pre-compression plate, compression plate, baling chamber and bale channel)

3.14
pre-compression plate(s)
pivoting plate(s) that level(s) the materials and close(s) the top of the baling chamber

3.15
rear ram housing
area behind the compression plate where the hydraulic and mechanical moving parts are for the compression plate

3.16
compression plate
plate that moves horizontally by a powered ram that applies pressure to the material to be compacted

3.17
baling chamber
chamber receiving the loose material either directly or from the feed hopper and in which the compression plate moves to compress the material

Note 1 to entry: The chamber extends from the point at which the compression plate is fully retracted to the point at which it is fully extended or, in the case of baling presses that compact the material against a bale discharge door, from the point at which the compression plate is fully retracted to the bale discharge door.

3.18
bale channel
channel, extending from the point at which the compression plate is fully extended to the point at which the bales are discharged, through which the bales travel from the baling chamber to reach the discharge point

Note 1 to entry: The output cross section of the channel may reduce progressively towards the discharge end to generate the counter pressure required for forming the bales.

3.19
counter pressure device
device located at the end of the bale channel and enabling to adjust the bale density by compressing it, e.g. using a pantograph or a pressing plate

3.20
bale tying equipment
equipment for binding individual bales

3.21
wire guidance zone
zone outside the body of the baling press, in which the bale tying wires are fed from coils and guided into the bale tying mechanism

3.22
bale discharge door
door through which a completed bale is discharged from the baling chamber

Note 1 to entry: On some baling presses, the compression plate compacts the materials directly against the bale discharge door at the end of the baling chamber. The door, when closed, is held closed by a clamping/retaining mechanism.

3.23
control station
place from which the baling press is started, stopped or manually controlled

3.24
cycle of the compression plate
complete forward and reverse movement of the compression plate

3.25
automatic initiation of cycles
operating mode in which the successive cycles of the compression plate are initiated by either a sensing device detecting the presence of materials to be compacted or by time delay

3.26
access platform
permanent platform that allows access at height for operating and feeding the baling press (including viewing the interior of the feed hopper and/or baling chamber), troubleshooting or maintenance

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

3.27
troubleshooting
rectification of operational failures (e.g. clearing blockages in the feed hopper or dealing with a broken bale wire)

3.28
work station
position in the vicinity of the machine under test which is intended for the operator

EXAMPLE The control station, the feeding position, the bale tying area, the bin lift operation control.

3.29
work cycle
required number of movements of the compression plate and completion of the wire tying process to produce a bale

4 List of significant hazards

Table 1 lists the significant hazards that are present on 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 *(1 of 4)*

	Significant hazards	**Applicable subclauses**
4.1	Mechanical hazards	
4.1.1	General	5.1.1
4.1.2	*Feed equipment area* Crushing and shearing by moving parts of conveyors when stepping on conveyors. Falling into the loading conveyor pit. Falling when walking on conveyors.	5.1.1, 5.1.2, 5.2, 5.5, 7.3

Table 1 *(2 of 4)*

	Significant hazards	**Applicable subclauses**
	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 at the transfer point between the loading and feed conveyors. Drawing-in and crushing between moving transmission parts of the conveyors. Being struck by material falling from the feed 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 out of 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	*Feed hopper area* Reaching into, or falling down the feed hopper into, the baling chamber during loading or troubleshooting or maintenance, followed by crushing or shearing by the compression plate. Crushing and shearing between the distributor or perforator and fixed parts when the distributor or perforator is inserted into, or retracted from, the feed hopper. Being struck by material which is thrown up by the rotating distributor or perforator. Impact, shearing, drawing-in and crushing by the distributor or perforator when it is rotating, including residual rotation during retraction. Impact and crushing by the pre-compression plate during normal powered movement of the plate. If the feed hopper is equipped with an access door: — crushing, shearing or impact by moving parts in the baling chamber; — impact caused by the access door flying open in an uncontrolled manner; — being buried by the material when clearing a blockage.	5.1.1, 5.1.3, 5.2, 5.5, 7.2.2, 7.2.8, 7.3.2

Table 1 *(3 of 4)*

	Significant hazards	**Applicable subclauses**
4.1.4	*Baling chamber area* Impact and crushing by the main and pre-compression plates caused by unintended movement (e.g. due to pressure or counter pressure of the material or failure of electrical or hydraulic components). Fatal or severe crushing or shearing by the main and pre-compression plates after gaining access into the baling chamber through maintenance and inspection openings, openings for troubleshooting or bale discharge doors. Impact to the head when going through the door and/or intervening in the baling chamber area. Impact caused by access doors (i.e. movable guards) and/or bale discharge doors of the baling chamber flying open in an uncontrolled manner due to high internal pressure. On baling machines whose baling chambers have a power operated discharge door, being struck by the moving door and crushing and shearing by the door and/or the door clamping and retaining mechanism as the door opens and/or closes. Crushing and shearing by moving parts e.g. when reaching underneath the baling press. Being buried by the material when clearing a blockage.	5.1.1, 5.1.4, 5.2, 7.2.2, 7.2.8, 7.3.2
4.1.5	*Wire guidance zone* Impact, fall on a level, tripping and slipping on oily ground due to bale tying wires running between the coils installed outside the machine frame and the machine. Drawing-in points in the wire guidance zone. Fall from a height when replacing the coils and guiding the wires.	5.1.5, 7.2.5, Annex B
4.1.6	*Bale channel and wire tying area* Impact and crushing between a bale and fixed parts of the building in the area of pick up of the bales while the bale automatically discharges. Stabbing, crushing or puncturing by the needles/needle assembly of the wire threading and tying mechanism. Entanglement and severing by the rotating wire twisting mechanism. On machines fitted with an automatic looped wire tying system, crushing/cutting injuries to parts of the body if it is within the loop of wire as it is tightened around the bale. On baling presses at which the bales are manually bound, impact between parts of any hand tools provided for clearing channels and threading bale wires and fixed parts of the baling press resulting in injuries to the hands and arms. On baling presses at which the bales are manually bound, impact injuries to the eyes and face through being struck by ends of bale wires when threading them around the bale. Trapping and crushing arising from the counter pressure device.	5.1.1, 5.1.6, 5.2.1, 7.2.9, 7.3.2, Annex B

Table 1 *(4 of 4)*

	Significant hazards	**Applicable subclauses**
4.1.7	*Rear ram housing* Crushing, shearing and trapping between fixed and movable parts.	5.1.4
4.2	**Hazards due to failures in the control system or unexpected start-up**	5.2
4.3	**Electrical hazards** Electrical shock or burns due to direct or indirect contact with live parts.	5.3
4.4	**Hazards from hydraulic equipment** Hazards arising from unintentional release of liquids under pressure from the hydraulic system, particularly from hoses and their fittings. Crushing, shearing or trapping due to creep movement of hydraulic cylinders. Crushing, shearing or trapping due to a loss of hydraulic power resulting in gravity fall of any vertically mounted ram.	5.1.4, 5.4 ,
4.5	**Slip, trip and fall hazards**	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 speech communication due to noise, generated e.g. by: — the hydraulic system, in particular during the baling process; — movement of the pressing equipment; — operation of the distributor or perforator; — feed equipment; — bale tying mechanism.	5.6 7.2.3 Annex A
4.7	**Hazards due to neglecting ergonomic principles in the design of the machine** Musculoskeletal disorders resulting from repeated efforts of bending, lifting and reaching when loading the hopper by hand and, in the case of baling presses at which the bales are manually bound, when tying the bales and when replacing the coils of tying wires.	5.7, 7.2.5
4.8	**Hazards due to poor or non-existent organisation, training or instructions**	7

5 Safety requirements and/or protective measures

5.1 Mechanical hazards

5.1.1 General

5.1.1.1 Basic requirements

Horizontal 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).

It is advisable that a dialogue takes place between the manufacturer and the user regarding the installation and positioning of the machine (see informative Annex B).

Horizontal baling presses shall be designed in such a way that mirrors or closed circuit television cameras can be installed in order to give the operator a good view into the feed hopper or the baling chamber. Baling presses with closed feed openings are exempted from this requirement.

Horizontal baling presses shall be designed and constructed so that the risk of blockages from the material being processed is reduced to the lowest level.

NOTE Examples of measures for reducing the risk of blockages include:

— feed conveyors that operate at a greater speed than the speed of the loading conveyors from which they receive the material;

— swan neck feed conveyors;

— level detection sensors monitoring the feeding and the compacting processes;

— automatic diversion flaps and chutes that divert the continuously fed material to a separate holding container in the event of a build-up of excess material in the feed hopper;

— material levelling devices that act to limit the depth of the material travelling on the feed conveyor;

— feed hoppers with smooth internal surfaces that include no ledges (on which material might bridge);

— feed hoppers that have a uniform cross section (as opposed to a reducing cross section) for the whole of their length;

— on baling presses fed by bin lifts, ensuring that the internal volume of the baling chamber and/or feed hopper is greater than the volume of the bin;

— on baling presses fed by bin lifts where the feed hopper will not take the whole volume of the bin, ensuring that the bin lift cannot tip the contents of a bin into the feed hopper until the compression plate is fully retracted.

Horizontal baling presses shall be constructed and built so that if blockages do occur they can be cleared safely. This should be done preferably without the need for a person to gain access to hazard areas listed in 4.1.3 and 4.1.4, e.g. through a powered blockage clearance device or mechanical blockage clearance procedure e.g. diverting chute. See also 7.2.7 and 7.2.8.

5.1.1.2 Safeguards

The design of the baling press shall ensure that wherever possible crushing, shearing, impact, puncture and drawing-in points are eliminated. Where these hazards cannot be eliminated, safeguarding shall be applied using one, or a combination of the following:

a) Fixed guards that are in accordance with EN 953:1997+A1:2009.

b) Movable interlocking guards that are in accordance with EN 953:1997+A1:2009 and EN 1088:1995+A2:2008. 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. This can be achieved e.g. by the following:

   1) movable guards being equipped with at least one position switch acting on the main switching device of the power circuit (e.g. valve, contactor) via the control circuit. The position switches shall either have mechanically actuated positive opening contacts and comply with EN 60947-5-1:2004, Annex K or they shall be proximity switches that are in accordance with EN 60947-5-3. As soon as the guard is opened, the position switch shall be positively and directly actuated by the guard and the control signal for the dangerous movement shall be positively interrupted;

   2) using a trapped key interlocking device that is in accordance with EN 1088:1995+A2:2008, Annex E. There shall be sufficient keys to allow the removal of every guard within the system. See also Annex B.

c) Sensitive protective equipment (SPE) that is in accordance with the relevant type B standards, e.g. EN 1760-1:1997+A1:2009, EN 61496-1, CLC/TS 61496-2 and/or CLC/TS 61496-3.

The safety functions of the chosen safeguards shall meet the performance levels specified in 5.2.4.

5.1.1.3 Safety distances

Minimum gaps to avoid crushing shall comply with EN 349:1993+A1:2008.

The positioning of electro-sensitive protective equipment shall comply with EN ISO 13855:2010.

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

5.1.2 Feed equipment area

5.1.2.1 Horizontal baling presses fed by conveyors

Conveyor systems shall comply with EN 620:2002+A1:2010.

To protect a person who has gone, or fallen, onto the conveyor, additional emergency stop devices that act in accordance with 5.2.3 shall be fitted. These shall be actuated by pull cords located above and along the length of the feed conveyor. They shall be capable of being operated within 2 m at the beginning and the discharge point of the feed conveyor and at least every 3 m between these points.

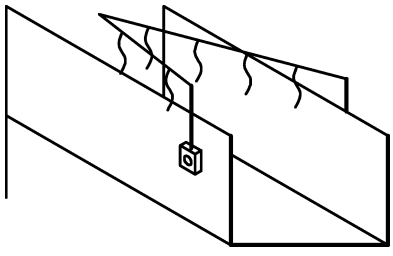


Figure 2 — Example of 'V' configuration pull cord

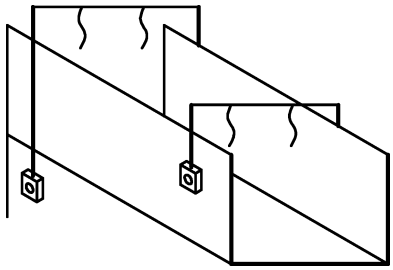


Figure 3 — Example of goalpost configuration pull cords

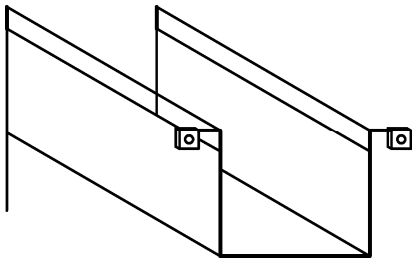


Figure 4 — Example of tripwires along the side configuration pull cords

If a danger of material falling down exists, the conveyor shall be fitted with fixed guards along the underside of the whole of its length except for the point at which the overspill is allowed to fall to the floor. At this point, a vertical chute or cage shall be fitted to direct the overspill safely to floor level and to prevent people walking into the spill zone.

On horizontal baling presses that are fed by conveyors, the edges of the conveyor shall be provided with guard rails in accordance with EN ISO 14122-3:2001 or protective structures. These shall be a minimum height of 1 100 mm measured from the reference plane. If the protective structure or guard rail is less than 1 100 mm from the reference plane then one of the following means shall be used:

a) sensitive protective equipment as defined in EN ISO 12100:2010, 3.28.5 (e.g. personal detection equipment or transponders), that causes the baling press and the conveyors to stop before a person reaches a distance of 2 m from the highest point of the feed conveyor in accordance with PL_r c (see 5.2.4);

b) a hold-to-run control device for the conveying system as defined in EN ISO 12100:2010, 3.28.3, positioned in such a way that the operator has a good visibility of the danger area in accordance with PL_r c (see 5.2.4).

The positions of the open, unprotected edges of the pit that are necessary for loading material onto the conveyor shall be clearly indicated for example by:

c) markers suspended from above, that are in line with the open edges;

d) rigid horizontal hand rails, i.e. guard rails without intermediate rails and toe boards, fixed at a height to suit operational requirements (see EN ISO 14122-3:2001, Figure 2, No. 1).

5.1.2.2 Horizontal baling presses fed by bin lifts

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

a) 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) in accordance with PL_r d (see 5.2.4) 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 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, the guards should be fitted as close as possible to the bin lift to prevent persons remaining in the area of travel of the bin lift.

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

Alternatively to the protective measures above, 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 is provided in accordance with PL_r c (see 5.2.4);

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

— good visibility of the danger zones (i.e. bin lift mechanism, container being lifted and the surrounding areas) at the position where the control is actuated is ensured;

— 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 in accordance with PL_r d (see 5.2.4).

When using the alternative protective measures they should be properly negotiated between the user and manufacturer (see Annex B).

5.1.3 Feed hopper area

5.1.3.1 Horizontal baling presses fed by conveyors

If maintenance or troubleshooting is carried out at the feed hopper and feed conveyor discharge point on conveyor-fed horizontal baling presses, an access platform shall be provided in accordance with EN ISO 12100:2010, 6.3.5.6. 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 falling down into the feed hopper and to prevent carrying out troubleshooting from this access platform while the machine is running:

— The edges of the feed hopper opening and the tops of the conveyor side walls 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 hopper opening or the top of the conveyor, this distance shall be measured from the highest of these footholds.

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

— Safeguards in accordance with 5.1.1.2 and PL_r d category 3 (see 5.2.4) shall be provided to prevent access into the feed hopper and to protect people from being struck by material thrown up by the distributor or perforator. The safeguards shall be designed so that no intervention (e.g. clearing blockages) is possible at the feed hopper when the machine is in operation.

Access to the distributor or perforator while it is rotating in the feed hopper shall be prevented in accordance with PL_r d category 3 (see 5.2.4). The insertion and retraction of the distributor or the perforator shall only be possible while that part is stationary. The crushing hazard shall be minimised (e.g. by means of a limited movement control device or hold-to-run control device in accordance with PL_r c). See also 5.1.1.2 and 5.2.4.

5.1.3.2 Horizontal baling presses fed by cranes, lift trucks, mobile plant or bin lifts

On horizontal baling presses that are designed to be fed by cranes, lift trucks, mobile plant or bin lifts, the feed hopper shall extend to a height of at least 1 400 mm above the highest point at which a person could be present (e.g. the top of the baling chamber or a foothold provided by a stiffening rib or other protruding fixture). In addition, the “reach over distance” through the feed hopper opening to the compression plate or other dangerous moving parts shall be in accordance with EN ISO 13857:2008, Table 2.

For horizontal baling presses that have no hopper, a closable interlocked lid shall be provided. The lid shall cover the whole of the feed opening and shall act as an interlocking guard in accordance with 5.1.1.2 and PL_r d category 3 (see 5.2.4).

5.1.3.3 Manually fed horizontal baling presses

On manually fed horizontal baling presses, access to the moving compression plate or other dangerous moving parts in the baling chamber by reaching or falling through the feed opening shall be prevented by fixed guards or movable interlocking guards or sensitive protective equipment (SPE) in accordance with 5.1.1.2. Interlocking guards and SPE shall be in accordance with PL_r d category 3 (see 5.2.4). Opening the movable guards or interrupting the SPE shall stop the dangerous movements of the compression plate and other dangerous parts until the guard has been closed again or the SPE has been reset and the movements have been restarted by voluntary actuation of a control actuator at the control station.

a) Where each cycle of the compression plate is initiated by a voluntary action of the operator:

1) the guards shall be installed in accordance with of EN ISO 13857:2008[1], Tables 2, 3 and/or 4, and

2) from the position of the control device for the compression plate, the operator shall have a good view of the danger zones.

b) Where the baling press is operated with automatic initiation of cycles:

Where guards are used they shall be designed in accordance with EN ISO 13857:2008[1)], Tables 2, 3 and/or 4. However, in Table 2, heights of protective structures lower than 1 200 mm are not accepted. Protective structures with a height between 1 200 mm and 1 400 mm are accepted if they are associated with complementary protective measures deterring people from climbing over. Such complementary measures can include:

1) a sensitive edge or bar in accordance with EN 1760-2, the actuation of which, shall stop any dangerous movement; or

2) a chute for introducing materials to the baling press that deter people from entering the danger area (see e.g. Figure 5); or

3) a design which allows safe and easy access to different parts of the baling press by means of an interlocked part/parts (e.g. ladder, door, guard).

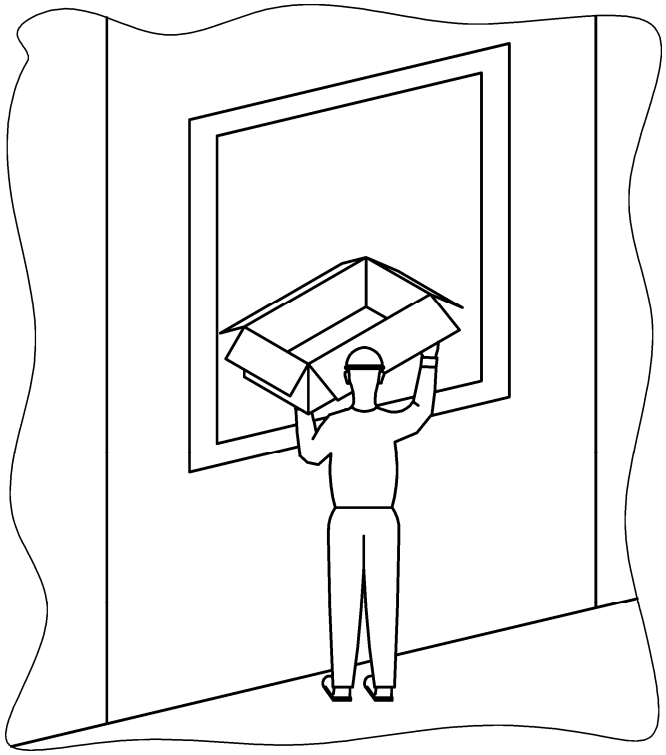


Figure 5 — Opening for chute to introduce materials

Whatever complementary protective measure has been chosen, the following additional requirements apply:

— from the location of the manual actuator used to start or restart the machine, the operator shall have a good view of the feed opening using e.g. mirrors; and

1) The height of the protective structure is calculated from the highest point where a person could stand (e.g. the top of the baling chamber or a foothold provided by a stiffening rib or other protruding fixture).

— pictograms shall remind operators of the type of danger due to automatically operated baling presses (see 7.3.2); and

— if there is no cycle during a time agreed by the manufacturer and the user, the control circuit shall stop the machine and restarting shall only be possible by actuating the start control device. The active mode shall be indicated on the machine by a visual and/or an audible display (e.g. by lamp).

5.1.3.4 Feed hoppers equipped with an access door

Movable guards covering access openings to the feed hopper shall be interlocking guards in accordance to 5.1.1.2 and PL_r d category 3 (see 5.2.4).

In case of feed hoppers having at least one cross sectional dimension greater than 600 mm, movable guards covering access openings, excluding the feed opening, shall ensure that access is only possible with the baling press isolated from power supply (e.g. by a trapped-key interlocking device that is in accordance with EN 1088:1995+A2:2008, Annex E) and it is not possible for a third person to close the movable guard and re-energise the machine..

Impact injuries caused by access doors to the feed hopper (i.e. movable guards) flying open in an uncontrolled manner shall be prevented for example by a two-stage opening mechanism.

For the risks of being buried by material when clearing a blockage, see 7.3.2.

5.1.4 Baling chamber area

Movable guards preventing access to the baling chamber shall be interlocking guards in accordance with 5.1.1.2 and PL_r d category 3 (see 5.2.4).

Movable guards preventing access to the rear ram housing shall be interlocking guards in accordance with 5.1.1.2 and PL_r c (see 5.2.4).

In case of baling chambers having at least one cross sectional dimension greater than 600 mm, movable guards covering access openings, excluding the feed opening and the bale discharge door, shall ensure that access is only possible when the baling press is isolated from the power supply (e.g. by a trapped-key interlocking device that is in accordance with EN 1088:1995+A2:2008, Annex E) and it is not possible for a third person to close the movable guard and re-energise the machine.

When the guards are opened, unintended movement of the main and pre-compression plates shall be prevented.

Impact injuries caused by access doors to the baling chamber (i.e. movable guards) or bale discharge doors flying open in an uncontrolled manner due to high internal pressure shall be prevented for example by a two-stage opening mechanism.

On baling presses with a power operated bale discharge door where access to the moving door is not prevented, the following requirements shall apply:

— The opening and closing speed of the outer edge of the door shall be ≤ than 0,15 m/s.

— Opening and closing the door shall be achieved by a hold-to-run control device. The actuators for the hold-to-run control device shall be located in a position that prevents any part of the operator’s body being able to reach the moving door or its clamping and retaining mechanism and from which there is a good view of the opening and closing movement of the door.

Access to moving parts, e.g. the wire threading needles, underneath the press shall be prevented by interlocking guards as specified in 5.1.1.2 and in accordance with PL_r c (see 5.2.4).

For the risks of being buried by the material when clearing a blockage, see 7.3.2.

5.1.5 Wire guidance zone

Coil supports and wire guidance devices shall be ergonomically designed to reduce the risks resulting from manual handling, work at height and slips, trips and falls when replacing the coils and guiding the wires (see also 7.2.5 and Annex B).

Accessible drawing-in points in the wire guidance zone shall be protected against reaching in by at least an impeding device as referenced in EN ISO 12100:2010, 3.29.

5.1.6 Bale channel and wire tying area

Access to the automatic wire tying mechanism in the area of the needles and wire twisting hooks shall be prevented by safeguards as specified in 5.1.1.2 and in accordance with PL_r d (see 5.2.4). The same requirements apply to other automatic tying systems (e.g. needle-less tying systems).

When the guards are opened or the SPE is interrupted, unintended movement of the needles and twisting mechanism shall be prevented.

For the trapping and crushing hazards arising from counter pressure devices see 7.3.2.

On baling presses at which the bales are manually bound, where hand tools are provided for clearing/checking bale wire channels, threading wire around the bales and twisting the ends of bale wires together, the tools provided shall be ergonomically designed.

On baling presses at which the bales are manually bound, a fixed retention bar or plate, hooks or eyes shall be provided to control loose wire ends and prevent them from flicking into the eyes or face of the operator threading the wire around the bale.

5.2 Hazards due to failures in the control system or unexpected start-up

5.2.1 Control devices

The control station shall be arranged to allow the operator a good view of the baling press, especially of the feed conveyor or bin lift and the opening of the feed hopper. A good view can be direct and/or with visibility aids.

Horizontal baling presses shall not be started by means of mobile/remote control devices, unless starting through a mobile/remote control device is only possible from a pre-defined, non-movable safe position. Nevertheless, see 5.2.3. Remote controls shall be in accordance with EN 60204-1:2006, 9.2.7.

Control devices shall be designed such that unintentional operation is prevented. Control devices for manual mode of operation (e.g. for limited jog movement or reversing) shall be of the hold-to-run type. On any control device the function, switching state and switching significance shall be clearly indicated, preferably by pictograms or alternatively in the operator's language.

If for certain maintenance work (e.g. lubricating the compression plate rollers), it is required to move the compression plate to defined intermediate positions, these movements should be made automatically. Alternatively, these positions shall be clearly marked and the movement of the compression plate to reach those positions shall be possible only with guards closed. See also 7.2.4.

See also EN ISO 12100:2010, 6.2.11.9 and 6.2.11.10.

5.2.2 Prevention of unauthorised operation

It shall be possible to secure the baling press against unauthorised operation, e.g. by means of a key-operated switch. The key can be mechanical or electronic. It shall be removable, but only when the switch is in the OFF position. With the switch in the OFF position all movements of the baling press, including the feed conveyor, shall be prevented.

5.2.3 Emergency stop

Emergency stop devices shall comply with EN ISO 13850:2008, stop category 0 or 1, whichever provides the shorter stopping time. Operating an emergency stop actuator shall stop the complete baling press, including the loading and feed conveyors and the bin lift, without creating additional risks. Emergency stop actuators shall be placed at readily accessible points including at least the following positions:

— at each control station;

— at both sides of the beginning of the feed conveyor;

— at the discharge point of the feed conveyor and at both sides of the feed conveyor where both sides can be accessed;

— near the baling chamber;

— at both sides at the discharge end of the bale channel;

— on manually fed baling presses at the feed position;

— in case of open topped feed hoppers, an emergency pull cord covering three sides of the hopper.

Emergency stop actuators shall be located along conveyors so that a person has to travel no more than 10 m from any point along the conveyor in order to reach an actuator. See also 5.1.2.1.

After activation of an emergency stop, the reset of the emergency stop system shall only be done at the main control station.

5.2.4 Required performance levels PL_r according to EN ISO 13849-1

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:

a) horizontal baling presses fed by conveyors:

   1) sensitive protective equipment to detect persons who have fallen on conveyors: PL_r c;

   2) hold to run control device: PL_r c;

b) horizontal baling presses fed by bin lifts:

   1) moveable interlocking guards for the bin lift; PL_r d;

   2) sensitive protective equipment: PL_r d;

   3) hold to run or two hand control device: PL_r c;

c) feed hopper area:

   1) moveable interlocking guards covering access openings in the feed hopper: PL_r d category 3;

   2) access to the rotating distributor or perforator: PL_r d category 3;

   3) insertion and retraction of distributor or perforator: PL_r c;

d) baling chamber area:

   — interlocked lid for machines fed by cranes, lift trucks and mobile plant: PL_r d category 3;

1) access into the baling chamber: PL_r d category 3;

2) access to moving parts underneath the baling press: PL_r c;

3) access to the ram(s) behind the compression plate: PL_r c;

e) wire tying area:

1) automatic tying in the area of the needles and twisting hooks: PL_r d.

5.3 Electrical hazards

Electrical equipment shall be 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.

When fitting electrical and electronic components, the machine manufacturer shall comply with the information for use given by the manufacturer of the components.

5.4 Hazards from hydraulic equipment

Hydraulic equipment shall comply with EN ISO 4413:2010.

5.5 Slips, trips and falls

Parts of the baling press that cannot be maintained from floor level shall be provided with access means in accordance with EN ISO 14122, parts 1 to 4.

5.6 Noise hazards

5.6.1 Noise reduction at source by design

Horizontal 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 machine components e.g. motors, transmission systems, pumps;

— use of noise and/or vibration damping material;

— hydraulic systems designed to prevent excessive noise levels;

— correct fitting and adjustment of machine parts to prevent elements from vibrating against other machine parts, thus generating structure-borne noise;

— design allowing adequate maintenance e.g. lubricating, adjustments and cleaning.

5.6.2 Noise reduction by protective measures

Protective measures that may be taken at design stage to reduce noise emissions include:

— fitting acoustic enclosures around machine parts;

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

— vent silencers for pneumatic systems;

— adequate maintenance e.g. lubricating, adjustments and cleaning.

5.6.3 Information connected with noise hazards

See 7.2.3 and Annex A.

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

The machine shall be designed in accordance with EN ISO 12100:2010, 6.2.8.

6 Verification of the safety requirements and/or protective measures

Conformity to the safety requirements and/or protective 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 specifications in the information for use;

— the safety-relevant design documents and wiring diagrams;

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

Table 2 — Verification of the safety requirements and/ or protective measures *(1 of 2)*

Subclause	Visual inspection	Functional test	Measurement	Calculation
5.1.1.1 Basic requirements	x	x		
5.1.1.2 Safeguards	x	x		
5.1.1.3 Safety distances			x	x
5.1.2 Feed equipment area	x	x	x	
5.1.3 Feed hopper area	x	x	x	
5.1.4 Baling chamber area	x	x	x	
5.1.5 Wire guidance zone	x	x		

Table 2 *(2 of 2)*

Subclause	Visual inspection	Functional test	Measurement	Calculation
5.1.6 Bale channel and wire tying area	x	x		
5.2.1 Control devices	x	x		
5.2.2 Prevention of unauthorised operation	x	x		
5.2.3 Emergency stop	x	x	x	
5.2.4 Required performance level PL_r				x
5.3 Electrical hazards	x	x	x	
5.4 Hazards from hydraulic equipment	x	x	x	
5.5 Slips, trips and falls	x		x	
5.6 Noise hazards			x	x
5.7 Hazards due to neglecting ergonomic principles	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).

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 operating the machine safely.

7.2.2 Summary of operating instructions

A notice containing 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 control station. The notice shall include at least the following instructions and information:

— Follow the detailed operating instructions for this machine.

— If a personal detection equipment is provided, only persons wearing this equipment may enter or remain in the press area.

— Do not go onto the loading or feed conveyors while they are operating.

— Removing covers or opening access doors (i.e. movable guards) may only be performed by an authorised person and only when the machine has been stopped safely.

— Only fully trained, authorised persons may operate the baling press.

— The function of all safety devices shall be checked at regular intervals, as specified by the machine manufacturer. Where a check reveals a malfunction of a safety device, or where there are obvious deficiencies that compromise safety, the baling press shall be taken out of use immediately and shall not be operated again until the defects have been remedied. The machine shall be also taken out of use immediately if faults that affect safety occur during operation. All faults shall be reported immediately.

— Protective devices shall not be disabled or used improperly.

— Adequate personal protective equipment shall be worn.

— When not in use the baling press shall be secured against unauthorised operation.

7.2.3 Information on noise

The instruction handbook and the technical documentation describing the horizontal 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 minimise noise emission;

— inform the user that they shall assess the noise hazard arising from baling different materials and follow national regulations to reduce the risk of being damaged by noise.

7.2.4 Setting and maintenance instructions

The manufacturer shall provide instructions for safe setting and maintenance of the baling press, containing at least the following information:

— Before performing maintenance work, ensure that the main switch (mains power isolator switch) or other separate power switches are switched off, and will remain off, by locking them in the OFF position with a personal padlock or equivalent.

— Carry out planned maintenance and periodic servicing in conformity with the manufacturer's maintenance instructions.

— Ensure that maintenance and servicing are carried out by competent persons who are fully familiar with the baling press and its associated devices.

— Ensure that components having a limited safe working life (e.g. components with fatigue limits such as hoses) are checked for wear and serviceability at predetermined intervals.

— Ensure that deficiencies or damage that compromise safety are rectified immediately or reported for repair. Stop the baling press immediately if there is evident danger for operators or equipment and ensure it is not restarted until the defect has been rectified.

— Perform maintenance work from the working positions assigned for that purpose.

The manufacturer shall give an indication of how the compression plate can reach the lubricating position.

7.2.5 Instructions for the replacement of coils

The manufacturer shall give instructions on an operating method for the safe replacement of coils to include the need to provide adequate lifting appliances, methods for work at height and safety measures to avoid being cut by the metal band.

7.2.6 Spare parts list

The manufacturer shall provide a list of spare parts and parts that wear and if possible indicate the maximum limit of wear and the length of durability.

7.2.7 Preventing faults and fault recovery

The manufacturer shall provide the user with a list of faults that may be expected to occur on the baling press and its associated devices, together with information about the measures to be taken for preventing faults and for fault recovery as specified in 7.2.8 and 7.2.9.

The manufacturer shall inform the user that preventing faults and fault recovery should only be done while the machine is stopped safely.

The manufacturer shall inform the user that walking on or accessing the conveyor shall only be done while the baling press is stopped and isolated from its power supply.

7.2.8 Information for preventing and removing blockages in the feed hopper

The manufacturer shall provide information for preventing blockages, for example:

— ensure that the type and quantity of materials to be processed are suited to the baling press capacity in accordance with the manufacturer's specification;

— pre-treat the materials before feeding them to the baling press (by pre-sorting the materials to remove items that are likely to cause blockages, passing the materials through a shredder etc.);

— select a speed for the feed conveyor that is higher than that of the loading conveyor in order ensure that the material is distributed onto the feed conveyor in a thin, uniform layer;

— use material levelling devices (e.g. horizontal spreader bars) that act to limit the depth of the material travelling on the feed conveyor;

— break up any incorrectly tied or malformed bales before re-feeding them into the machine.

The manufacturer shall provide information for troubleshooting including clearing blockages, for example:

— use the powered blockage clearance device where fitted;

— use mechanical aids such as rods, hooks and tongs.

7.2.9 Information for preventing faults and troubleshooting on the bale tying equipment (e.g. in the event of a broken bale wire)

The manufacturer shall provide information for preventing faults, for example:

— ensure the wire quality and diameter are in accordance with the baling press manufacturer's specifications;

— use uncorroded, pre-oiled bale wire;

— perform maintenance in accordance with the manufacturer's specifications;

— ensure moving parts are free to move;

— ensure the needles and twisting hooks are maintained in correct alignment;

— replace worn bearings and re-tension drive elements if they are slack;

— check wire guides for smooth running and lubricate wire deflection and guidance rollers.

The manufacturer shall provide information for troubleshooting, for example:

— remove foreign objects from the bale channel in front of the compression plate;

— remove foreign objects from the twisting hooks.

7.2.10 Information on periodic examinations and examinations following repairs and modifications

The manufacturer shall provide information detailing the periodic and other safety examinations required and specifying the records of examination to be kept.

a) Periodic examination

Periodic examination by an authorised, competent person shall be performed in accordance with national regulations. The manufacturer shall recommend an appropriate period for examination according to the operating conditions and at least every 12 months.

The periodic examination is a visual and functional inspection. It comprises an examination of the state of the components and devices of the baling press as well as confirming that all safety devices are present, in a good state of repair and in effective working order.

The examination involves at least the following:

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

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

— a check on the wire guide rollers for smooth running and slackness of bearings;

— a check on the twisting hooks and needles for play and wear;

— a check for slackness and wear of moving transmission parts such as drive chains and belts;

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

— a check of hoses for damage;

— a check of the clearances between the compression plate and the side walls and bottom of the baling chamber;

— a check of the clearance between the moving blade fixed to the top of the compression plate and the corresponding fixed blade at the entry from the feed hopper into the baling chamber;

— a check of the good condition and readability of safety and information signs;

— a check of electrical equipment.

b) Examinations following repair and modification

Following repairs and modifications which can affect the safety of the machine, the parts worked on and/or the baling press shall be examined. The extent of the examination depends on the nature and extent of the repair or modification carried out.

c) Records of examination

Records of examination should be documented as required by national regulations. However, it is recommended that the results be recorded in writing. It is also recommended that these records 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.

7.3 Marking

7.3.1 Manufacturer's 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 authorised 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 connection values.

7.3.2 Safety signs

The baling press shall be fitted with all the signs necessary for its safe use (see EN ISO 12100:2010, 6.4.4).

The following sign shall be securely fixed to the baling press to indicate that going onto the feed conveyor or entering the feed hopper is prohibited:

P024

Figure 6 —Sign access prohibited

The following sign shall be securely fixed to the counter pressure device to indicate the trapping and crushing hazard:

W024

Figure 7 — Sign trapping and crushing hazard

The following sign shall be securely fixed to the access doors to the feed hopper or baling chamber to indicate the risk of being buried by material when clearing a blockage:

W035

Figure 8 — Sign hazard of being buried under the materials

The signs shall be placed as close as possible to the hazard they represent and in a visible position.

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 horizontal 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 horizontal 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 work station defined in the instruction handbook using one of the following standards:

— EN ISO 11201:2010 (engineering grade of accuracy) - 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 – 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 – 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 work stations shall be where materials are fed in at the feed hopper.

For any baling press where the work station(s) are undefined or cannot be defined, 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 11200:2009 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 horizontal 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:

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

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.

For baling presses that have a height above ground ≥ 3 m or that have an access platform above 3 m, instead of determining the sound power level, sound pressure levels shall be measured. 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 and at 2 m intervals around the perimeter of the baling press. The position and value of the maximum A-weighted sound pressure level shall be indicated.

A.3.2 Measurement uncertainty

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

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

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 horizontal 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 taken during a work cycle under no-load conditions. The second measurement shall be taken under a work cycle under loaded conditions and the material for the test shall be determined by the manufacturer and this information shall be included in the noise declaration.

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 work stations 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 horizontal 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.6.5 shall be recorded and reported.

A.6.2 Horizontal baling press data

— type, serial number, year of manufacture of the horizontal baling press;

— type of feed equipment.

A.6.3 Standards used

— this noise test code;

— basic standards selected for noise measurement in accordance with this noise test code.

A.6.4 Noise data

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

A.6.5 Installation and operating conditions

— detailed description of the installation and operating conditions of the horizontal 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.

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 work station(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.

Noise emission values generated under load shall be included in the noise declaration and details of the load conditions, i.e. type of material processed, thickness and hardness shall be given.

Annex B
(informative)

Preliminary dialogue between manufacturer and user

A preliminary dialogue should take place between the manufacturer and the future user in particular about the following topics:

— installing the baling press in the building and its surrounding environment;

— installing and handling coils;

— managing oils and liquids leaking from the materials;

— the number of keys needed for trapped-key interlocking devices;

— appropriate safeguards for bin lifts;

— the appropriate specification of the baling press for its intended use;

— use of the sensitive protective equipment, if selected.

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 a means of conforming to Essential Requirements of the New Approach Directive 2006/42/EC.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding 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.

Bibliography

[1] EN ISO 11688-1, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning (ISO/TR 11688-1)*

[2] EN ISO 11688-2, *Acoustics. Recommended practice for the design of low-noise machinery and equipment — Part 2: Introduction to the physics of low-noise design (ISO/TR 11688-2)*

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

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

[5] CLC/TS 61496-3, *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)*

[6] EN 1760-1, *Safety of machinery — Pressure sensitive protective devices — Part 1: General principles for the design and testing of pressure sensitive mats and pressure sensitive floors*

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