INTERNATIONAL STANDARD

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Safety requirements for industrial laundry machinery —

Part 6:
Ironing and fusing presses

Exigences de sécurité pour les machines de blanchisserie industrielle —

Partie 6: Presses à repasser et à thermocoller

Reference number
ISO 10472-6:1997(E)

Contents

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 10472-6 was prepared by Technical Committee ISO/TC 72, *Textile machinery and machinery for dry-cleaning and industrial laundering*, Subcommittee SC 5, *Industrial laundry and dry-cleaning machinery*.

ISO 10472 consists of the following parts, under the general title *Safety requirements for industrial laundry machinery*:

— *Part 1: Common requirements*

— *Part 2: Washing machines and washer-extractors*

— *Part 3: Washing tunnel lines including component machines*

— *Part 4: Air dryers*

— *Part 5: Flatwork ironers, feeders and folders*

— *Part 6: Ironing and fusing presses*

Introduction

This part of ISO 10472 is intended to instruct the designer of industrial laundry machinery in a systematic manner, focusing on his particular type of machine, regarding the relevant essential safety requirements, and to suggest possible state-of-the-art safety solutions.

The extent to which hazards are covered is indicated in the scope of this part of ISO 10472. In addition, machinery should comply as appropriate with ISO/TR 12100-1 and ISO/TR 12100-2 for hazards which are not specifically referred to in this part of ISO 10472.

All examples given in this part of ISO 10472 represent the state of the art. Equivalent solutions are acceptable, provided they attain at least the same safety level.

The designer is presumed to have taken into account all the provisions of ISO 10472-1 before considering this part of ISO 10472.

Safety requirements for industrial laundry machinery —

Part 6:
Ironing and fusing presses

1 Scope

This part of ISO 10472 covers, together with ISO 10472-1, most significant hazards associated with ironing and fusing presses used in the laundry, garment and dry-cleaning industry, and in particular:

— scissor presses;

— cabinet presses;

— drawer presses;

— rotary presses (carousel) and other presses with multiple bucks.

This part of ISO 10472 complements the basic requirements as laid down in ISO/TR 12100-1 and ISO/TR 12100-2. It also gives guidance to the designer on assessing the risks associated with the hazards (see EN 1050) and on selecting measures for attaining the required safety level.

This part of ISO 10472 does not apply to ancillary equipment, e. g steam boilers, steam valves and supply pipe work, vent systems, work feed systems and discharge systems, and ducting to the atmosphere.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 10472. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreement based on this part of ISO 10472 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 10472-1:1997, *Safety requirements for industrial laundry machinery — Part 1: Common requirements.*

ISO/TR 12100-1:1992, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology.*

ISO/TR 12100-2:1992, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles and specifications.*

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

ISO 13850:1996, *Safety of machinery — Emergency stop — Principles for design.*

ISO 13852:1996, *Safety of machinery — Safety distances to prevent danger zones being reached by the upper limbs.*

1) To be published.

ISO 14119:—[1], *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection.*

EN 574:1996, *Safety of machinery — Two-hand control device.*

EN 626-1:1994, *Safety of machinery — Elimination or reduction of risk to health from hazardous substances emitted by machinery — Part 1: Principles and specifications for machinery manufacturers.*

EN 953:1997, *Safety of machinery — General requirements for the design and construction of guards (fixed, movable).*

EN 1050:1996, *Safety of machinery — Risk assessment.*

EN 1760-1:1997, *Safety machinery — Pressure sensitive protective devices — Part 1: General principles for the design and testing of pressure sensing mats and floors.*

EN 60204-1:1992, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements.* [IEC 204-1: modified]

3 Definitions

For the purposes of this part of ISO 10472, the following definitions apply:

3.1
ironing press
Machine for the smoothing or shaping of fabric items by pressing them between two components, at least one of which is heated and, if required, equipped with a steaming device.

3.2
fusing press
Machine for the fusing of two textile layers by pressing them between two components, at least one of which is heated to a temperature such that the coating of one layer becomes adhesive.

3.3
buck
Component of the press, covered with one or more layers of textile material, upon which the fabric item is laid, positioned and prepared if necessary.

NOTE — The buck may be heated and equipped with a steaming and/or suction device and/or blowing device.

3.4
head
Component of the press which executes the required pressure by interacting with the buck.

NOTE — Generally the head is heated and may be equipped with a steaming and/or suction device. Heads for industrial laundry machinery usually have a polished metallic pressing surface; those for outerwear are covered with one or more layers of textile material.

3.5
scissor press
Ironing or fusing press whose head is moved on a circular path or a combination of circular and linear paths against a stationary buck.

3.6
cabinet press
Machine into which a garment is placed on a vertical buck (or former) which is moved to a position between two or more vertical press heads which move horizontally to press the garment against the buck.

1) To be published.

NOTE — A cabinet press may have one or more vertical bucks which travel horizontally such that the entire equipment may be operated by two or more operators in concert.

3.7
drawer press
Ironing or fusing press whose horizontal buck is moved on a horizontal linear path under the head, then the buck (or head) is pressed against the head (or buck) on a vertical, linear path.

3.8
rotary press
Press in which the loading, unloading and pressing operations are assigned to different positions of the movement of a turntable carrying the bucks.

3.9
upstroke press
Press comprising an upper head and a lower buck, upon which the fabric item is prepared, after which the action of the press raises the lower buck to the press head either mechanically or pneumatically.

3.10
multiple-buck press
Press similar to a rotary press in which the bucks can travel in a straight path.

4 Hazards

4.1 General

The hazards common to most industrial laundry machinery are listed in ISO 10472-1. Significant particular hazards found in ironing and fusing presses are listed in 4.2 to 4.8.

4.2 Mechanical hazards

4.2.1 Closing and pressing of the head and buck of all presses:

— crushing, impact;

— shifting or swinging around of the buck of cabinet, rotary, drawer and multiple-buck presses: shearing, crushing, impact.

4.2.2 Operating mechanism of the head or buck for all presses: crushing and shearing.

4.2.3 Falling of the head of scissor presses: impact and crushing.

4.3 Electrical hazards

See ISO 10472-1:1997, 4.2.

4.4 Thermal hazards

4.4.1 Hot surfaces of all presses, covered and uncovered: burns.

4.4.2 Free steam affecting the operator, for scissor presses: burns.

4.4.3 Radiated and convected heat affecting the operator, for scissor presses: burns.

4.5 Hazards generated by noise

Noise emitted by compressed air exhaust of cabinet presses may cause a hazard. See ISO 10472-1:1997, 4.4.

4.6 Hazards caused by harmful fumes of fusing presses: intoxication.

4.7 Hazards due to neglect of ergonomic principles in machine design of all presses

4.7.1 Inappropriate posture and effort due to:

— height and position of press buck;

— height and position of automatic cabinet press buck for loading.

4.7.2 Inadequate local lighting.

4.8 Failure of energy supply or control systems, leading to closing of the head or unexpected movement of the buck

5 Safety requirements and/or measures for the hazards identified in clause 4

5.1 General

The designer shall consider the common safety requirements and measures described in ISO 10472-1 in addition to the particular hazards and measures described in this part of ISO 10472.

5.2 Mechanical hazards

5.2.1 Closing and pressing of the head and buck of all presses

a) Scissor presses: The head shall be fitted with a trip device (e.g. trip frame) which shall prevent crushing without preventing efficient machine operation (see ISO 10472-1:1997, 5.1.2).

   EXAMPLE

   The trip device shall:

   — be fitted around the periphery of the head or at the front and sides only with fixed guard at the back; and

   — have a minimum lead over the head of 60 mm; and

   — have a maximum horizontal clearance over the buck of 75 mm; and

   — be of rigid construction and require light activation pressure; and

   — operate, when contacted, to cause reversal of the movement before crushing can occur; and

   — allow restart only by activating the start control.

b) Scissor presses with fabric-covered head: The measures taken to respect safety shall conform to at least the following: the head shall be lowered with reduced force (≤ 300 N), actuated by a hand- or foot-operated hold-to-run control, until it is not possible to insert fingers into the danger zone. Full pressure shall be applied only after the head is lowered to a safe position leaving less than 6 mm clearance, and then only by two-hand control type II in accordance with EN 574.

   NOTE — For hand-operated scissor presses, none of these measures need be applied.

c) Cabinet presses: Guards and/or safety devices shall be provided to prevent hazard between head and buck and also between moving buck and fixed elements (see ISO 10472-1:1997, 5.1.2).

EXAMPLE

Fixed guards in conjunction with trip devices (e.g. trip plates, extending the full height of both sides of the opening) shall be operated by a horizontal movement of less than 6 mm. Pressure-sensitive mats or floors at least 500 mm wide and of at least the length of travel of the buck shall be provided in addition (see EN 1760-1). Both safety devices shall stop the movement of the buck before entrapment can occur and reverse the closure of the head. The machine cycle shall be started by two-hand control type II (according to EN 574) only, but it is not necessary to hold the control continuously after the cycle has been initiated.

The press shall be fitted with an emergency stop device category 1 (in accordance with ISO 13850), which shall stop the movement of the buck and reverse the closure of the head.

d) Cabinet-type presses which rotate: The complete machine shall be enclosed with a fixed guard which prevents entrance into the danger zone during normal machine operation, e.g. fence. Means shall be provided to protect any person entering the guard area for maintenance purposes; see ISO 10472-1:1997, annex A. These means may include a key switch to the cycle start control, and shall enable a clear visibility of the machine from operating positions. The manufacturer shall describe, in the instruction handbook, the measures to be taken by the operator and maintenance staff for safe operation and the training necessary.

e) Sleeve and trouser cabinet presses: Trip bars shall protect the hazard zones between head and buck and between the moving buck and fixed elements of the machine, and shall operate within a movement of 6 mm. They shall reverse the moving buck and the closure of the head. The machine cycle shall be started by two-hand control type II only (in accordance with EN 574).

f) Rotary presses and other multiple-buck presses: The danger zones created by the closing of the press and by the transfer movement of the buck shall be protected by guards and/or safety devices (see ISO 10472-1:1997, 5.1.2).

EXAMPLE 1

Enclosing guards or fences may be provided as a complete protection for these danger zones. The start control shall be located in a position where the operator can clearly see but cannot reach the danger zones (see ISO 10472-1:1997, annex A).

EXAMPLE 2

Access to the pressing zone shall be prevented by one or more devices, e.g.:

— a trip frame which reverses the closure of the head;

— a fixed guard, attached to the head, which prevents access to the danger zone.

Entry to the shearing, crushing and impact zones created by the moving buck shall be prevented by a fence guard (see ISO 10472-1:1997, annex A). The start control shall be located in a position where the operator can clearly see but cannot reach the danger zones.

NOTE — The pressing and opening parts of the cycle are controlled automatically and not manually.

g) Upstroke presses: The same measures shall be employed as for scissor presses. Alternatively, a control guard with an associated interlocking device in accordance with ISO/TR 12100-2:1992, 4.2.2.5, and ISO 14119:—, 5.7.2.1 shall be fitted, which allows the machine to start only if the guard is completely closed. The action of the guard may start the machine. For the category of the control system, the requirement of 5.8 shall apply.

h) Any machine described above: Means shall be provided for the rapid release of any person trapped within the machine. These means shall enable the separation of the head and buck, even in the case of failure of energy supply, e.g.:

— manual opening of the hinge between head and buck;

— training system for the hydraulic or pneumatic circuits.

The procedure for releasing entrapped persons shall be marked on the machine and shall be described in the instruction handbook.

An emergency stop button is not required for scissor presses, for rotary and other multiple-buck presses, nor for upstroke presses.

5.2.2 Operating mechanism of the head and buck of all presses

a) Scissor presses: The operating mechanism shall be protected by fixed guards (see ISO 10472-1:1997, 5.1.2).

b) Cabinet presses: The measures taken to protect the danger zone between head and buck shall be extended to the operating mechanism and the danger zone of the moving buck.

The transfer mechanism for the buck shall be guarded at the opening, for example by flexible covers (rubber, metal etc).

A warning notice that the operator shall not stand on the cover shall be fitted to the machine, and this information shall be contained in the instruction handbook.

If pressure sensitive mats or floors are used (see EN 1760-1), the unprotected danger zone shall be guarded by a fixed guard provided by the user in accordance with details given by the manufacturer in the instruction handbook.

c) Rotary and multiple-buck presses: The guard described in 5.2.1 shall be extended to protect the transfer mechanism, or the transfer mechanism shall be guarded separately (see ISO 10472-1:1997, 5.1.2).

5.2.3 Falling of the head of scissor presses

For maintenance, setting or repair of scissor presses, a mechanical restraint (e.g. a brace or locking pin) shall be provided to prevent inadvertent closing of the press.

Detailed information shall be given in the instruction handbook.

5.3 Electrical hazards

The requirements of EN 60204-1 shall apply to all machines covered by this part of ISO 10472 (see ISO 10472-1:1997, 5.2).

5.4 Thermal hazards

5.4.1 Hot surfaces of all presses, covered and uncovered

Measures shall be taken in accordance with ISO 10472-1:1997, 5.3. For polished heads the access to the operating surfaces shall be protected with fixed guards (see ISO 10472-1:1997, table 1). If for process reasons this is not totally possible, the manufacturer shall draw the attention, in the instruction handbook, to the residual risk. In addition, the manufacturer shall place a warning sign near the danger zone.

For presses with fabric-covered heads, the surface temperature of the fabric shall not exceed 110 °C.

5.4.2 Free steam affecting the operator (for scissor presses)

For scissor presses whose head may eject free steam, it shall not be possible for ejection to occur until the head is at a distance of < 50 mm from the buck.

5.4.3 Radiated and convected heat affecting the operator (for scissor presses)

The instruction handbook shall contain advice for the user concerning the means that may be taken to prevent the operator being exposed to unacceptable working temperatures.

The instruction handbook shall advise the user that the temperature at the normal operating position (at 1200 mm height above the floor and at 500 mm horizontal distance from the machine) shall not exceed 35 °C with a normal ambient condition of 25 °C at 65 % relative humidity. Advice for the user shall include reducing steam pressure, ventilation and other means.

5.5 Hazards generated by noise

See ISO 10472-1:1997, 5.4.

Compressed air exhausts shall be fitted with silencers.

5.6 Hazards caused by harmful fumes, for fusing presses

A warning shall be given in the instruction handbook that harmful fumes can be generated when certain fabrics are processed, and the machine shall be provided with means for fixing an exhaust system (see EN 626-1).

5.7 Hazards due to neglect of ergonomic principles in machine design of all presses

5.7.1 Inappropriate posture and effort

The advice given in ISO 10472-1:1997, 5.6 should be followed.

5.7.2 Inadequate local lighting

Information shall be given in the instruction handbook concerning correct lighting for safe and efficient operation.

5.8 Failure of energy supply or control systems

A failure of the energy supply or of the control system or unexpected movement of the buck shall not cause the press to close.

For presses with covered heads ISO 10472-1:1997, 5.7.2 applies.

For presses with uncovered heads, the safety-related part of the control system shall be at least one failure fail-safe (category 3, see ISO 13849-1:—, clause 6).

For presses which require cyclic access, the safety-related part of:

— the electrical control system shall be at least two failures fail-safe (category 4, see ISO 13849-1:—, clause 6);

— the pneumatic control system shall be at least one failure fail-safe (category 3, see ISO 13849-1:—, clause 6).

6 Verification of safety requirements and/or measures

The verification shall follow the general requirements of ISO 10472-1 and the particular requirements of clause 5 of this part of ISO 10472. Table 1 gives a list of verifications.

Table 1 — List of verifications

Sub-clause	Subject	Reference	Test method
5.2.1	Head and buck		
a)	Scissor presses		
	Trip device (trip frame)	ISO 10472-1:1997, 5.1.2	Check function
	Dimensions		Measurement
b)	Scissor presses with fabric-covered head		
	Force when lowering the head		Measurement
	Hold-to-run control		Check function and location
	Position to activate full pressing pressure		Location and measurement
	Two-hand control	EN 574	Check type, function and location
c)	Cabinet presses		
	Fixed guard	ISO 10472-1:1997, 5.1.2	Visual inspection Measurement
	Trip device		Demonstration and check function
	Pressure-sensitive mat or floor	EN 1760-1	Measurement and check function
	Two-hand control	EN 574	Check type, function and location
	Emergency stop device	ISO 13850	Demonstration and check documentation
d)	Cabinet-type presses which rotate		
	Fence	ISO 10472-1:1997, annex A	
	Key switch		Test and inspect
	Description of safe working procedure	Instruction handbook	Confirm accuracy and content
e)	Sleeve and trouser cabinet presses		
	Trip bar		Demonstration Measurement Check function
	Two-hand control	EN 574	Check type, function and location

Table 1 *(continued)*

Sub-clause	Subject	Reference	Test method
5.2.1 f)	Rotary presses and multiple-buck presses		
	EXAMPLE 1		
	Enclosing guard	ISO 10472-1:1997, 5.1.2	Visual inspection Measurement
	Fence	ISO 10472-1:1997, annex A	Visual inspection Measurement
	Start control		Test and visual inspection
	EXAMPLE 2		
	Trip device (trip frame)		Demonstration
	Barrier	EN 953 ISO 13852	Visual inspection Measurement
	Start control		Test and visual inspection
g)	Upstroke presses	See scissor presses in this table	
	Control guard	ISO/TR 12100-2:1992, 4.2.2.5 ISO 14119	Visual inspection and check function
	Category	5.8	Check manufacturer's technical file
h)	For any machine		
	Means for releasing any entrapped persons		Visual inspection
	Procedure for release	Instruction handbook	Confirm accuracy and content
	Marking		Visual inspection

Table 1 *(continued)*

Sub-clause	Subject	Reference	Test method
5.2.2	Operating mechanism of the head and buck		
a)	Scissor presses		
	Fixed guards	ISO 10472-1:1997, 5.1.2	Visual inspection
b)	Cabinet presses		
	Flexible cover		Demonstration and check function
	Warning notice	Instruction handbook	Visual inspection Confirm accuracy and content
	Pressure sensitive mats or floors	EN 1760-1	Check function
	Details for fixed guard	Instruction handbook	Confirm accuracy and content
c)	Rotary presses and multiple buck presses	See 5.2.1 in this table	
	Separate guards	ISO 10472-1:1997, 5.1.2	
5.2.3	Falling of the head		
	Mechanical restraint device		Demonstration
	Information	Instruction handbook	Confirm accuracy and content
5.3	Electrical hazards	ISO 10472-1:1997, 5.2 EN 60204-1	
5.4.1	Hot surfaces of the machine	ISO 10472-1:1997, 5.3	Measurement after 30 min of operation
	Residual risks	Instruction handbook	Confirm accuracy and content
5.4.2	Free steam affecting the operator		
	Distance between head and buck		Measurement
	Interlock with steam ejection		Test function

Table 1 *(concluded)*

Sub-clause	Subject	Reference	Test method
5.4.3	Radiated and convected heat affecting the operator Means and advice for preventing unacceptable working temperature	Instruction handbook	Confirm accuracy and content, measurement
5.5	Noise reduction measures Silencers		Demonstration
5.6	Harmful fumes	Instruction handbook	Confirm accuracy and content
5.7.1	Inappropriate posture and effort	ISO 10472-1:1997, 5.6	
5.7.2	Inadequate local lighting	Instruction handbook	Confirm accuracy and content Visual inspection
5.8	Failure of energy supply or control system Category	ISO 10472-1:1997, 5.7.2 ISO 13849-1:—, clause 6	Check manufacturer's technical file
7.1	Instruction handbook	ISO 10472-1:1997, 7.1	Check completeness
7.2	Warning signs	ISO 10472-1:1997, 7.2	Visual inspection

7 Information concerning machine use

7.1 Instruction handbook

All information called for in ISO 10472-1:1997, 7.1 shall be provided. Furthermore, the manufacturer shall provide in the instruction handbook detailed information as required in clause 5 of this part of ISO 10472 on:

5.2.1, operating rotary cabinet machine;
5.2.1, release of entrapped person;
5.2.2, warning notice for access to machine;
5.2.2, pressure mat, guarding;
5.2.3, mechanical support for head;
5.4.1, operating surfaces;
5.4.3, environmental heat;
5.6, harmful fumes;
5.7.2, lighting.

7.2 Warning signs

The manufacturer shall provide machine marking in accordance with ISO 10472-1:1997, 7.2, and in addition marking required in clause 5 of this part of ISO 10472 on:

5.2.2, flexible covers;
5.4.1, uncovered hot surfaces.

ICS 97.060

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