
**Safety requirements for industrial laundry
machinery —**

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

*Exigences de sécurité pour les machines de blanchisserie industrielle —
Partie 5: Sécheuses-repasseuses, engageuses et plieuses*
(standards.iteh.ai)

ISO 10472-5:1997

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Printed in Switzerland

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 10472-5 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*

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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.

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Safety requirements for industrial laundry machinery —

Part 5:

Flatwork ironers, feeders and folders

1 Scope

This part of ISO 10472 covers, together with ISO 10472-1, most significant hazards associated with flatwork ironers, feeders and folders, such as:

- cylinder and bed ironers for flatwork finishing having a contact area (for bed ironers under pressure) > 0,25 m²;
- flatwork feeding machines for the automatic feeding of flatwork into bed or cylinder ironers, or directly to folders;
- flatwork folding machines for the automatic folding of flatwork in association with cylinder and bed ironers;
- folding machines for the automatic folding of small pieces (excluding endless towels);
- multi-function machines.

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. chemical supply pumps, 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 11111:1995, *Safety requirements for textile machinery.*

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.*

1) To be published.

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

ISO 14122-1:2000, *Safety of machinery — Interlocking devices associated with guards —*

IEC 335-1:1991, *Safety of household and similar electrical appliances — Part 1: General requirements.*

IEC 335-2-44:1987, *Safety of household and similar electrical appliances — Part 2: Particular requirements for electric ironers.*

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

3 Definitions

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

3.1

flatwork

Textile article (e.g. a bed sheet) which can be satisfactorily dried and smoothed by being passed through a flatwork ironing machine.

3.2

bed ironer

Machine for the ironing of flatwork generally providing a heated bed against which the work is pressed by one or several fabric-covered roller(s).

3.3

cylinder ironer

Machine for the ironing of flatwork in which the work to be treated is drawn against one or more heated cylinder(s) where it is held by means of an appropriate system, for example by bands.

3.4

flatwork feeding machine

Machine, into which operator(s) load damp unfinished flatwork items, that presents the items, tensioned and spread to the feed-bands of an ironer or to a folding machine.

NOTE — This machine is also used for feeding blankets, polyester sheets and similar items to folding machines.

3.5

spreader carrier

Mechanism consisting of clamp(s) for take-up and spreading of flatwork to prepare it for the feeding operation.

3.6

flatwork folding machine

Machine generally fitted in conjunction with an ironer which will automatically fold flatwork items.

NOTE — This machine is also used for folding blankets, polyester sheets and similar items.

1) To be published.

3.7**folding mechanism**

Moving part of a folding machine which folds flatwork.

3.8**folding machine for small pieces**

Machine for automatically folding towels, pillow cases and similar items.

3.9**multi-function machine**

Machine which combines feeding, ironing and folding in one unit.

3.10**raised machine part**

Conveyor bridge at the exit of a feeding machine which can be lifted to enable direct access to the feeding table of the ironer, or similar equipment.

4 Hazards**4.1 General**

The hazards common to most industrial laundry machinery are listed in ISO 10472-1. Significant particular hazards found in flatwork ironers, feeders and folders are listed in 4.2 to 4.10.

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4.2 Mechanical hazards

[ISO 10472-5:1997](#)

4.2.1 Bed and cylinder ironers**4.2.1.1 Drawing-in or trapping between:**

- a) roller and heated bed, for bed ironers;
- b) heated cylinder and idle roller or pressure roller, for cylinder ironers;
- c) roller and edge of feedbands or table.

4.2.1.2 Trapping or entanglement between feedbands and drive roller.**4.2.1.3 Falling into or from the ironers.****4.2.2 All types of feeding, folding and multi-function machines****4.2.2.1 In-running nips between rollers or belts and rollers: drawing-in or trapping.****4.2.2.2 Spreader carriers: impact from the moving clamps.****4.2.2.3 Folder mechanism: crushing, shearing or impact.****4.2.2.4 Falling into or from the folding machine or into the feeding pit.****4.2.2.5 Raised machine parts (e.g. lifting section of feeding machine): crushing and shearing.****4.2.2.6 Spreader roller: entanglement, in particular entanglement from trapped work, friction or abrasion.**

4.3 Electrical hazards

See ISO 10472-1:1997, 4.2.

4.4 Thermal hazards

Noise emitted by the vacuum device on the feeding machine may cause a hazard.
See ISO 10472-1:1997, 4.4.

4.6 Hazards caused by fire and explosion from gas-heated machines: burns

4.7 Hazards caused by harmful fumes from gas-heated machines: intoxication

4.8 Hazards due to neglect of ergonomic principles in machine design

Unhealthy posture resulting from inadequate height of the feeding table on ironing machines, or the folding table on folding machines, or inadequate location of flatwork feeding clamps.

4.9 Hazards caused by unexpected ejection of fluids from oil-heated systems: impact and burns

4.10 Failure of control systems

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 Bed and cylinder ironers

5.2.1.1 Drawing-in or trapping between:

a) roller and heated bed, for bed ironers

The nip zone between roller and bed at the feed point shall be protected by guards and safety devices (see ISO 10472-1:1997, 5.1.2) and heating system examples 1 to 4:

4.5 Hazards generated by noise

4.4.2 Radiation to the workplace close to the ironer: physiological stress.

4

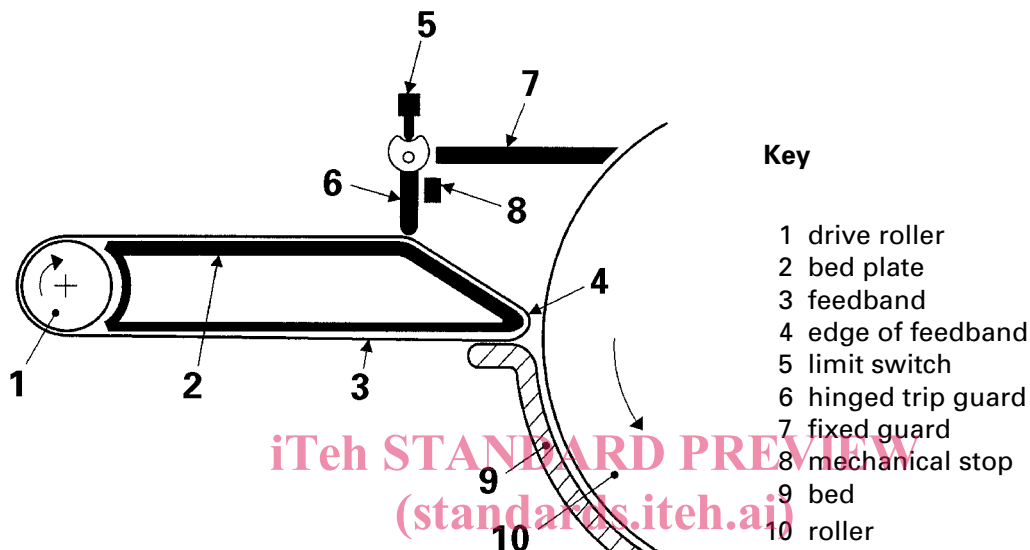
4.4.3 Ironed work: burns.

EXAMPLE 1

Drawing-in on bed ironers with feedbands:

The nip between roller and bed may be guarded by an easily activated hinged trip guard (figure 1). For bed ironers with feedbands, it shall be arranged so that the maximum gap between the trip guard and feedbands and the distance between this gap and the nip are not greater than specified in table 4 of ISO 13852:1996.

It shall not be possible to reach over the hinged trip guard to the nip, e.g. by provision of a fixed guard.



ISO 10472-5:1997
Figure 1 — Safeguarding ironers with feedbands
<https://standards.iteh.ai/catalog/standards/sist/d0619010-80d1-412e-a077-4098de1ad017/iso-10472-5-1997>

The roller and the feedbands shall be stopped by means of a limit switch if the hinged trip guard is moved towards the roller or away from the roller, see ISO 14119.

A mechanical stop shall be arranged to stop the hinged trip guard moving towards the roller immediately after the limit switch has been activated. The gap between the hinged trip plate and the feedbands shall not be reduced by moving the trip guard towards the stop.

The roller shall stop as fast as possible but within 5 s at the maximum roller speed. This does not apply if an interlocked feeding machine is installed in front of the ironer (see paragraph on automatic feeding machine below) and the hinged trip guard is used as an additional guard for maintenance work.

The trip guard shall be of substantial construction and shall maintain a parallel gap across the width of the machine as far as practicable (see clauses 6 and 7 of EN 953:1997).

It shall not be possible to increase the gap by lowering the feedbands.

An automatic feeding machine can be a guard for this hazard provided it prevents access to any part of the nip in accordance with ISO 13852. The manufacturer shall provide information for the user in the instruction handbook concerning necessary side guards.

Means shall be provided to prevent exposure to hazard when the feeder is out of position. This may be achieved by interlocking the feeder with the ironer, in which case the manufacturer of the ironer shall provide the technical means and sufficient information in the instruction handbook to enable the connection with the feeder to be made.

EXAMPLE 2

Drawing-in on bed ironers with fixed feed table:

For single-roller ironers using a fixed feed table, having a maximum speed of 6 m/min,

- the gap (x) between the hinged trip plate and the table or roller shall be the minimum practicable to feed the material and shall not exceed 18 mm (see figure 2).

NOTE — Table 4 of ISO 13852:1996 is not applicable in this case.

After the trip guard has been activated, the roller shall come to rest within a roller surface movement which does not exceed the distance (y) between the trip plate and the upper edge of the bed, and in addition the roller and bed shall be separated.

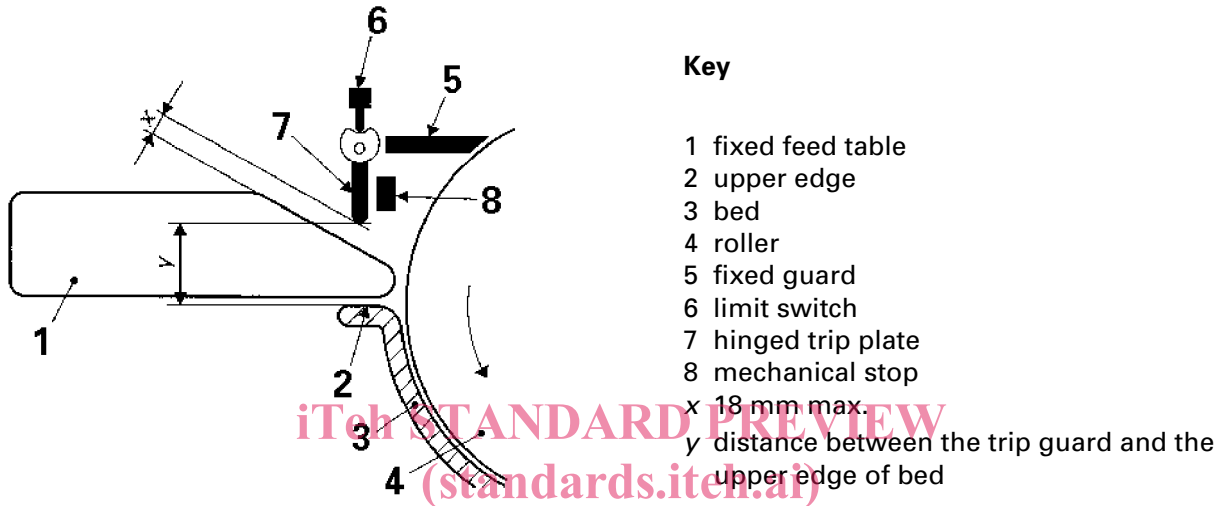


Figure 2 — Safeguarding ironers with fixed feed table

or

<https://standards.iteh.ai/catalog/standards/sist/d081901b-80d1-412c-a697-410851d0475e/iso-10472-5-1997>

- a hinged trip guard (see figure 3) shall cause the roller to stop before the nip point between roller and bed can be reached.

For multi-roller bed ironers, it shall not be possible to reach the in-running nips between beds and rollers. This may be achieved by means of side panels or covers in accordance with EN 953.

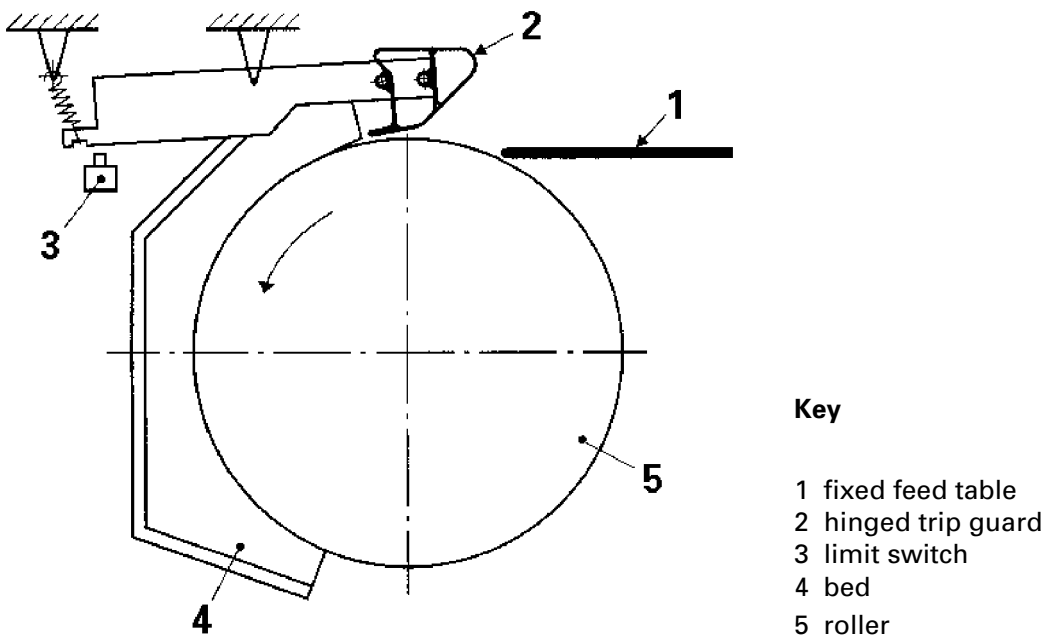


Figure 3 — Safeguarding ironers with fixed feed table - (variation)

EXAMPLE 3

Drawing-in due to reverse running:

Attention shall be given to the in-running nips created by a reversing machine.

Guards for these nips may be a combination of those described before.

For single-roller bed ironers having a roller diameter < 600 mm, the reverse running may be controlled by hold-to-run control at normal speed or slower, see EN 60204-1:1992, 9.2.5.6.

For single-roller bed ironers having a roller diameter > 600 mm and for multi-roller ironers, a hold-to-run control at normal speed or slower may be used provided that it can be actuated only when roller and bed have been separated previously.

EXAMPLE 4

Release of entrapped persons:

The machine shall be fitted with power- or hand-operated means for releasing any entrapped person, e.g. by increasing the gap between bed and roller.

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

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b) heated cylinder and idle roller or pressure roller for cylinder ironers

The safety measures shall be the same as for roller and heated bed. Table 4 of ISO 13852:1996 shall apply for the gap between trip guard and feedbands and for the distance between this gap and the nip.

Where a hinged trip guard is used, an additional mechanical stop shall prevent movement away from the roller (see figure 4).

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

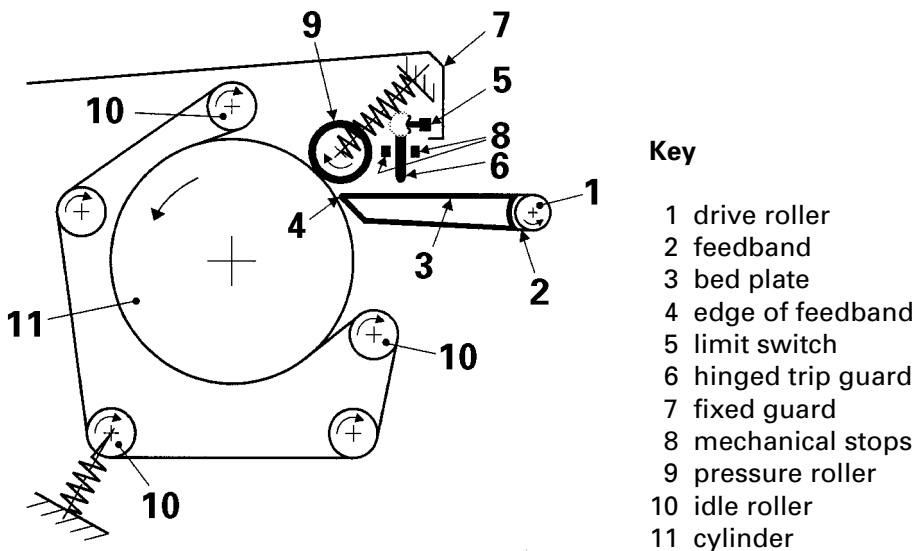


Figure 4 — Safeguarding cylinder ironers