
**Textile machinery — Safety
requirements —**

Part 4:

**Yarn processing, cordage and rope
manufacturing machinery**

Matériel pour l'industrie textile — Exigences de sécurité —

*Partie 4: Machines de transformation du fil et machines de production
de cordages et d'articles de corderie*

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 11111-4 was prepared by Technical Committee ISO/TC 72, *Textile machinery and machinery for dry-cleaning and industrial laundering*, Subcommittee SC 8, *Safety requirements for textile machinery*.

This first edition of ISO 11111-4, together with ISO 11111-1, ISO 11111-2, ISO 11111-3, ISO 11111-5, ISO 11111-6 and ISO 11111-7, cancels and replaces ISO 11111:1995, which has been technically revised.

ISO 11111 consists of the following parts, under the general title *Textile machinery — Safety requirements*:

- *Part 1: Common requirements*
- *Part 2: Spinning preparatory and spinning machines*
- *Part 3: Nonwoven machinery*
- *Part 4: Yarn processing, cordage and rope manufacturing machinery*
- *Part 5: Preparatory machinery to weaving and knitting*
- *Part 6: Fabric manufacturing machinery*
- *Part 7: Dyeing and finishing machinery*

Introduction

ISO 11111-1 to ISO 11111-7 were prepared simultaneously by ISO/TC 72 and CEN/TC 214 and adopted under the Vienna Agreement in order to obtain identical standards on technical safety requirements for the design and construction of textile machinery.

ISO 11111 as a whole is intended for use by any person concerned with the safety of textile machinery, for example, textile machinery designers, manufacturers, and systems integrators. It is also of interest to users of textile machines and safety experts.

This document is a type C standard as stated in ISO 12100-1. The various parts of ISO 11111 deal with significant hazards generated by machines used in the textile industry. The machinery concerned and the extent to which hazards are covered are indicated in the scope of this standard.

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.

For hazards of machines or machine elements under consideration not dealt with in the relevant part of ISO 11111, the designer is to perform a risk assessment according to ISO 14121 and evolve means for reducing the risk from significant hazards.

This part of ISO 11111 is intended to be used in conjunction with ISO 11111-1. As far as possible, the requirements of this part of ISO 11111 are treated by way of reference to Clauses 5 and 6 of ISO 11111-1. Clause 5 of ISO 11111-1 contains safety requirements and/or measures for frequently occurring hazards of textile machinery which apply whenever referred to in this part of ISO 11111, while Clause 6 describes significant hazards and corresponding safety requirements and/or measures for certain machine elements and their combinations (e.g. rollers), which also apply wherever referred to in this part of ISO 11111.

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Textile machinery — Safety requirements —

Part 4: Yarn processing, cordage and rope manufacturing machinery

1 Scope

This part of ISO 11111 is intended to be used in conjunction with ISO 11111-1. It specifies significant hazards and corresponding safety requirements and/or measures for yarn processing, cordage and rope manufacturing machinery. By taking into account the scope of ISO 11111-1 as far as is relevant, this part of ISO 11111 is applicable to all machinery, plant and related equipment intended to be used for doubling, twisting, texturing, reeling, winding, ball winding, cordage, rope manufacturing and braiding, as specified in Clause 5.

2 Normative references

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

- ISO 11111-4:2005
http://standards.iteh.ai/catalog/standard/item/4626149_4610_42ca_a56f_c23600313522/iso-11111-4-2005
- ISO 9902-1, *Textile machinery — Noise test code — Part 1: Common requirements*
- ISO 9902-4, *Textile machinery — Noise test code — Part 4: Yarn processing, cordage and rope manufacturing machinery*
- ISO 11111-1:2005, *Textile machinery — Safety requirements — Part 1: Common requirements*
- ISO 11111-2:2005, *Textile machinery — Safety requirements — Part 2: Spinning preparatory and spinning machinery*
- ISO 13849-1:1999, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*
- ISO 13852:1996, *Safety of machinery — Safety distances to prevent danger zones being reached by the upper limbs*
- ISO 13854:1996, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*
- ISO 14119:1998, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*
- EN 1760-2, *Safety of machinery — Pressure sensitive protective devices — Part 2: General principles for the design and testing of pressure sensitive edges and pressure sensitive bars*
- EN 1760-3:2004, *Safety of machinery — Pressure sensitive protective devices — Part 3: General principles for the design and testing of pressure sensitive bumpers, plates, wires and similar devices*

3 Terms and definitions

For the purposes of this part of ISO 11111, the terms and definitions given in ISO 11111-1 apply.

4 List of significant hazards

Significant hazards found in yarn processing, cordage and rope manufacturing machines which are common with those frequently occurring with other textile machines or with machine elements of other textile machines shall be considered in accordance with ISO 11111-1:2005, Clauses 5 and 6, whenever referred to under the heading “General safety requirements” in Clause 5 of this part of ISO 11111. Significant hazards which are particular to yarn processing, cordage and rope manufacturing machines are considered as “Specific hazards” in Clause 5 of this part of ISO 11111.

Before using this part of ISO 11111, it is important to carry out a check to ascertain that the specific machine has the significant hazards identified.

NOTE The significant hazards of yarn processing, cordage and rope manufacturing machines are always considered in conjunction with safety requirements.

5 Significant hazards and corresponding safety requirements and/or measures

5.1 General

Machinery shall conform to the safety requirements of ISO 11111-1:2005, Clauses 5 and 6, whenever referred to under the heading “General safety requirements” of this Clause 5 and shall conform to the additional “Specific safety requirements” of this Clause 5.

5.2 Doubling, twisting, texturing machines

Doubling machines, twisting machines (e.g. flyer doubling and twisting frames, ring doubling and twisting machines, two-for-one twisters, uptwisters, novelty twisters, draw twisters, draw winders and similar machines) are used to ply and twist yarns.

Texturing machines (e.g. false-twist texturing machines, air texturing machines and other texturing machines) are used to crimp continuous filament yarns.

General safety requirements

The safety requirements and/or measures shall be in accordance with Table 1.

Table 1 — General safety requirements relating to doubling, twisting and texturing machines

Application	Reference ISO 11111-1:2005
All machines:	
Electrical equipment in general	5.4.2.1 and 5.4.2.2
Electrical control systems	5.4.2.3
Starting and stopping	5.4.2.4
Reduction of risks by design	5.3.2
Reduction of risks by safeguarding	5.3.3
— with guards	Table 2
— with safety devices	Table 3
Noise	5.4.7, 7, 8.2
Fire	5.4.11
Ergonomics	5.4.13
Devices for special operation	5.5
Fitting of parts	5.8
Particular machine elements:	
Drive and transmission enclosures	6.2
Machine elements which normally do not require safeguarding, in particular, feed rollers, spindles, false-twist devices, thread guides	6.4
Rollers	6.5
Rotating shafts	6.6
Automatic machines and equipment	6.21

Specific hazards

Mechanical, from the rotating spindles, flyers, laps of yarn, loops of strong yarn, knives for removal of laps, in particular, cutting, entanglement, impact.

Specific risks

Frequent access during normal operation, particularly at start-up or during mending of broken ends, and special operation, including the removal of laps, leading to high probability of light-to-moderate injury.

Specific safety requirements

- For flyers used in heavy-duty twisting, particularly bast fibre processing, ISO 11111-2:2005, 5.7.8 shall apply. In addition, the frame shall be provided with fixed guards at both ends and guards below the flyer-guards to prevent access from the sides or beneath the movable guards. For bobbins and bobbin spindles used in heavy-duty twisting, the requirements given in 5.5.2.1 shall apply.
- If pushbuttons are used as an emergency stopping device, there should be one on each end section, at least.
- Information relating to safe methods for threading-up and removal of laps shall be provided in the instruction handbook in accordance with ISO 11111-1:2005, 8.2.

5.3 Reeling and winding machines

Reeling and winding machines are used to package thread or yarn in the form of a hank, bobbin or cheese either for further processing or for sale.

General safety requirements

The safety requirements and/or measures shall be in accordance with Table 2.

Table 2 — General safety requirements relating to reeling and winding machines

Application	Reference ISO 11111-1:2005
All machines:	
Electrical equipment in general	5.4.2.1 and 5.4.2.2
Electrical control systems	5.4.2.3
Starting and stopping	5.4.2.4
Reduction of risks by design	5.3.2
Reduction of risks by safeguarding	5.3.3
— with guards	Table 2
— with safety devices	Table 3
Noise	5.4.7, 7., 8.2
Fire	5.4.11
Ergonomics	5.4.13
Devices for special operation	5.5
Fitting of parts	5.8
Particular machine elements:	
Drive and transmission enclosures	6.2
Machine elements which do not require safeguarding in particular, thread guides	6.4
Rollers	6.5
Rotating shafts	6.6
Conveyors, including the conveyors of the cop preparation system and the doffing system	6.10
Automatic machines and equipment	6.21

Specific hazards

Mechanical from loops of strong yarn, laps, knives for removal of laps; from the automatic knotter or splicer unit and doffer unit; from the automated knitting or splicing mechanism; from the reels.

Specific risks

Access during normal operation, particularly threading-up, and during special operation, particularly removal of laps, leading to high probability of minor to moderate injury.

Specific safety requirements

- a) Information relating to safe methods for threading-up, particularly of strong threads and yarns, removal of laps and elimination of process faults shall be provided in the instruction handbook.
- b) Crushing and shearing points between the automatic knotter or splicer unit, doffer unit and the fixed parts shall be protected. When the units are mobile, this may be achieved by trip devices (e.g. trip bars according to EN 1760-2 or trip plates according to prEN 1760-3 on both sides extending over the whole height of the carriage).
- c) The automated knotting or splicing mechanism shall be guarded (e.g. by means of fixed or interlocked movable guards).
- d) On reeling machines, the faces of the reeling devices shall be guarded (e.g. by means of fixed or interlocked movable guards).

5.4 Ball winding machines

Multi-head machines, including automatic machines for the manufacture of balls of twine and yarn.

General safety requirements

The safety requirements and/or measures shall be in accordance with Table 3.

Table 3 — General safety requirements relating to ball-winding machines

Application	Reference ISO 11111-1:2005
All machines:	
Electrical equipment in general	5.4.2.1 and 5.4.2.2
Electrical control systems	5.4.2.3
Starting and stopping	5.4.2.4
Reduction of risks by design	5.3.2
Reduction of risks by safeguarding	5.3.3
— with guards	Table 2
— with safety devices	Table 3
Fluid power systems and components	5.4.5
Noise	5.4.7, 7, 8.2
Ergonomics	5.4.13
Devices for special operation	5.5
Escape and rescue of trapped persons	5.7
Fitting of parts	5.8
Particular machine elements:	
Drive and transmission enclosures	6.2
Rollers	6.5
Rotating shafts	6.6
Automatic machines and equipment	6.21