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**Textile machinery — Safety  
requirements —**

**Part 3:  
Nonwoven machinery**

*Matériel pour l'industrie textile — Exigences de sécurité —  
Partie 3: Machines de production de nontissés*



Reference number  
ISO 11111-3:2005(E)

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Published in Switzerland

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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 11111-3 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 11111-3, together with ISO 11111-1, ISO 11111-2, ISO 11111-4, 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 machinery 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 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 whenever referred to in this part of ISO 11111.

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# Textile machinery — Safety requirements —

## Part 3: Nonwoven machinery

### 1 Scope

This part of ISO 11111 is intended to be used in conjunction with ISO 11111-1, ISO 11111-2, ISO 11111-6 and ISO 11111-7. It specifies significant hazards and corresponding safety requirements and/or measures for nonwoven 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 opening, cleaning, blending, carding, needle punching, cylinder drying and batching, 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 9902-1, *Textile machinery — Noise test code — Part 1: Common requirements*

ISO 9902-2, *Textile machinery — Noise test code — Part 2: Spinning preparatory and spinning machinery*

ISO 9902-3, *Textile machinery — Noise test code — Part 3: Nonwoven machinery*

ISO 9902-6, *Textile machinery — Noise test code — Part 6: Fabric manufacturing machinery*

ISO 9902-7, *Textile machinery — Noise test code — Part 7: Dyeing and finishing 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 11111-6:2005, *Textile machinery — Safety requirements — Part 6: Fabric manufacturing machinery*

ISO 11111-7:2005, *Textile machinery — Safety requirements — Part 7: Dyeing and finishing machinery*

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

### 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 nonwoven 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 nonwoven 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 nonwoven 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 Opening, cleaning, blending machines

The safety requirements and/or measures shall be in accordance with ISO 11111-2:2005, 5.2.

### 5.3 Carding machines

#### General safety requirements

The safety requirements and/or measures shall be in accordance with ISO 11111-2:2005, 5.5.

#### Specific hazards

Mechanical, from the cross-folder unit, in particular, crushing, shearing impact; from the conveyors, in particular, drawing-in or trapping; from the wheels, in particular, crushing and shearing; from the web compression rollers, in particular, drawing-in and trapping.

#### Specific risks

Occasional access during special operation, in particular, to assist movement of the web, leading to a medium probability of severe injury.

#### Specific safety requirements

- a) Access to the cross-folder unit shall be prevented. Where full-height fence guards (see ISO 11111-1:2005, A.3) are provided to guard the particularly dangerous machine elements of the cards, these shall be extended along the sides of the cross-folder unit and conveyors and shall extend across the end, unless it is guarded by other means.
- b) Where there are doors in the fence guard between the cross-folder and roller-clearer card sections, these shall be interlocked with guard locking.
- c) Where openings in the fence guards to allow access to the conveyors to assist movement of the web at start-up (e.g. using long poles) are provided, they shall not allow access to the danger zone for hand or fingers in accordance with ISO 13852. Alternatively, supplementary guards shall be provided within the fence guard to prevent access to drives or other danger zones through the opening (e.g. a tunnel guard may be suitable).



- d) Where fence guards do not extend the full length of the web-forming area, guarding shall be provided in accordance with ISO 11111-1:2005, 6.10 for traps between the lattices or belts used for cross-laying the web.
- e) Access to wheels of cross-folder units shall be prevented by guards in accordance with ISO 11111-1:2005, 6.7.
- f) Access to rollers used to compress the carded web shall be prevented by guards in accordance with ISO 11111-1:2005, 6.5 (e.g. by fencing with interlocking doors or tunnel guards).

## 5.4 Needle punching machines

Needle punching machines are used to process a web or felt by means of needles which tangle and compress the fibre.

### General safety requirements

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

**Table 1 — General safety requirements relating to needle punching machines**

Application	Reference ISO 11111-1:2005
<b>All machines:</b>	
Electrical equipment in general	5.4.2.1 and 5.4.2.2
Electrical control system	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
Ergonomics	5.4.13
Devices for special operation	5.5
Elevated servicing positions	5.6
Fitting of parts	5.8
<b>Particular machine elements:</b>	
Drive and transmission enclosures	6.2
Rollers	6.5
Conveyors	6.10
Fans	6.11
Cutting devices	6.12
Work platforms and walkways	6.13

### Specific hazards

Mechanical, from the needles, the needle board, the stripper plate, the stitch plate, the conveyors, the delivery rollers, in particular, crushing, shearing, drawing-in or trapping, stabbing or puncture.

**Specific risks**

Occasional access during normal operation, particularly removal of fibres, and during special operation, particularly cleaning and changing of the needle board, leading to low probability of severe injury.

**Specific safety requirements**

- a) To prevent access to the area between the stripper plate and the stitch plate, the inlet and outlet side of the needle machine shall be guarded (e.g. by means of trip bars, trip-wires, pressure-sensitive devices or non-mechanically actuated trip devices according to ISO 11111-1:2005, Table 3, interlocked to the drive for the lifter motion of the needle board).
- b) The openings in the machine side frame at needle board level, which are used when cleaning the needles, shall be guarded by means of doors or panels interlocked with the drive for the lifter motion of the needle board. To reduce the need to move the needle board with the door open, the machine shall be designed such that the needle board comes automatically to a standstill in an open position, or else the needle board shall be moved into an open position, in preparation for access, by a separate control while the door is closed. When the door is open, the needle boards shall be movable to an open position only by means of a handwheel or similar manual device.

**5.5 Stitch bonding machines**

The safety requirements shall be in accordance with ISO 11111-6:2005, 5.3.4.

**5.6 Cylinder dryers**

The safety requirements shall be in accordance with ISO 11111-7:2005, 5.5.6.

**5.7 Batching machines**

The safety requirements shall be in accordance with ISO 11111-1:2005, 6.18.

**6 Verification of the safety requirements and/or measures**

Final verification shall be carried out when the machine is in a fully commissioned condition in accordance with ISO 11111-1:2005, Clause 7 and Annex C.

Noise emission values shall be determined for all machines covered by this part in accordance with ISO 9902-1 and ISO 9902-2 or ISO 9902-3 or ISO 9902-6 or ISO 9902-7, whichever is relevant, whether or not noise is a significant hazard.

**7 Information concerning machine use**

Information for use of the machine shall be provided in accordance with ISO 11111-1:2005, Clause 8. It shall include all elements in Clause 5.

Noise emission values shall be declared for all machines covered by this part of ISO 11111 in accordance with ISO 9902-1 and ISO 9902-2 or ISO 9902-3 or ISO 9902-6 or ISO 9902-7, whichever is relevant, whether or not noise is a significant hazard.

## Bibliography

- [1] ISO 14121, *Safety machinery — Principles of risk assessment*
- [2] ISO 12100-1, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology*

11111-3:2005

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**ICS 59.120.99**

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