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Textile machinery — Safety requirements —

Part 1: Common requirements

Matériel pour l'industrie textile — Exigences de sécurité —

Partie 1: Exigences communes

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (http://www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword - Supplementary information.

The committee responsible for this document is ISO/TC 72, *Textile machinery and accessories*, Subcommittee SC 8, *Safety requirements for textile machinery*.

This third edition cancels and replaces the second edition (ISO 11111-1:2009), 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*

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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 part of ISO 11111 is a type C standard as stated in ISO 12100. 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 part of ISO 11111.

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 machines or machine equipment not dealt with in the relevant parts of ISO 11111, the designer performs a risk assessment according to ISO 12100 and provides means for reducing the risk from significant hazards. These risk reduction measures that need to be identified by the designer/manufacturer of the machinery by risk assessment are outside the scope of this standard.

This part of ISO 11111 contains a summary of safety requirements and/or measures for frequently occurring hazards of textile machinery (see Clause 5) which apply whenever referred to in this, or the other parts of ISO 11111.

Significant hazards and corresponding safety requirements and/or measures for certain machine elements (e.g. rollers) and their combination of textile machines are also described (see Clause 6).

The various parts of ISO 11111 address significant hazards and corresponding safety requirements and/or measures for specific types of textile machines. As far as possible, these are treated by way of reference to Clauses 5 and 6 and other cross-references (see general safety requirements), thus reducing considerably the volume by avoiding many repetitions. The standard for a specific textile machine will normally consist of this part of ISO 11111 and the specific part relevant to that machine. ISO 11111-2 to ISO 11111-7 may also contain exceptions or additions to the requirements given in this part of ISO 11111 (see specific safety requirements).

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Textile machinery — Safety requirements —

Part 1: Common requirements

1 Scope

This part of ISO 11111 specifies safety requirements for frequently occurring hazards common to the types of textile machinery and the hazards of certain machine elements covered by ISO 11111-2 to ISO 11111-7. The standard series is complemented by the type C standards ISO 9902 (all parts) with respect to noise emission measurement and ISO 23771 with respect to measures for the reduction of noise emissions.

This part of ISO 11111 is applicable to machinery plant and related equipment intended to be used in the textile industry for the following purposes:

— opening, cleaning, blending, carding, preparation subsequent to carding, spinning and other processing of fibres (staple and filament) and other materials to form yarn or nonwoven material (including felts);

— winding, doubling, twisting, texturing, etc., of yarns and the processing of yarns preparatory to weaving and knitting;

— weaving, knitting, lace-making and similar utilization of yarn, etc., to form fabric;

— forming of braid, cord, strand, rope, twine, net, etc., except take-up reels of stranding and laying machinery;

— processing, including the pretreatment, bleaching, dyeing, printing and finishing of fibre, yarn, fabric, braid, cord, etc., and final assembly for dispatch;

— piece-dyeing of made-up goods;

— finishing of warp and weft knitting, including hosiery, other than assembly of the finished product (e.g. sewing);

— manufacturing of carpets by weaving, tufting and other processes.

This part of ISO 11111 applies to all machinery, plant and equipment used during the processes listed above, including equipment to enable automated operation of the machines and processes in either free-standing or complex installations, such as pneumatic fibre transportation, but excluding other transportation between the interfaces of the machines.

NOTE 1 The standard for a specific textile machine will normally consist of two parts: this part of ISO 11111 and the specific part of ISO 11111 relevant to that machine. However, in the case of nonwoven lines, which are covered by ISO 11111-3, ISO 11111-2, ISO 11111-6 and ISO 11111-7 are also to be taken into account.

This part of ISO 11111 does not deal with specific requirements for pressure containment.

NOTE 2 In the EU and EFTA, specific directives for pressure vessels and electromagnetic compatibility, among others, exist.

ISO 11111 (all parts) addresses hazards arising from the transport, assembly and commissioning of the machinery, its adjustment, use, maintenance, decommissioning, dismantling and disposal. Manual loading/unloading is considered to be part of the normal operation of the machinery.

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This part of ISO 11111 and the other parts of ISO 11111 are not applicable to machinery, plant and related equipment used for

— manufacturing continuous filaments and man-made fibres up to and including the formation of the first textile package (e.g. continuous filament cheese, staple fibre bale),

— hackling and carding of flax and similar,

— manufacturing of spun-bonded and melt-blown nonwovens,

— forming and making up of garments, household and industrial textile goods, and the pressing and die cutting of nonwoven fabric,

— laundering and dry cleaning of made-up textile goods,

— servicing of textile machines (e.g. machines for card wire mounting, cleaning machines for components of printing machines), and

— certain cutting devices, e.g. log-slitting device, laser cutting, high pressure water jets, ultrasonic device.

NOTE 3 The machines and equipment listed in Annex E are used in the textile industry but are not within the scope of this part of ISO 11111.

This part of ISO 11111 and the other parts of ISO 11111 are not applicable to machinery intended for use in potentially explosive atmospheres.

This part of ISO 11111 and the other parts of ISO 11111 are not applicable to machines which are manufactured before the dates of publication of the International Standards.

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.

ISO 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

ISO 9902 (all parts), *Textile machinery — Noise test code*

ISO 10218-1:2011, *Robots and robotic devices — Safety requirements for industrial robots — Part 1: Robots*

ISO 11111-2:2005, *Textile machinery — Safety requirements — Part 2: Spinning preparatory and spinning machines*, amended by ISO 11111-2:2005/Amd 1:2009 and ISO 11111-2:2005/Amd 2:2016

ISO 11111-3:2005, *Textile machinery — Safety requirements — Part 3: Nonwoven machinery*, amended by ISO 11111-3:2005/Amd 1:2009 and ISO 11111-3:2005/Amd 2:2016

ISO 11111-4:2005, *Textile machinery — Safety requirements — Part 4: Yarn processing, cordage and rope manufacturing machinery*, amended by ISO 11111-4:2005/Amd 1:2009 and ISO 11111-4:2005/Amd 2:2016

ISO 11111-5:2005, *Textile machinery — Safety requirements — Part 5: Preparatory machinery to weaving and knitting*, amended by ISO 11111-5:2005/Amd 1:2009 and ISO 11111-5:2005/Amd 2:2016

ISO 11111-6:2005, *Textile machinery — Safety requirements — Part 6: Fabric manufacturing machinery*, amended by ISO 11111-6:2005/Amd 1:2009 and ISO 11111-6:2005/Amd 2:2016

ISO 11111-7:2005, *Textile machinery — Safety requirements — Part 7: Dyeing and finishing machinery*, amended by ISO 11111-7:2005/Amd 1:2009 and ISO 11111-7:2005/Amd 2:2016

ISO 11161:2007, *Safety of machinery — Integrated manufacturing systems — Basic requirements*

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ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 13849-1:2006, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

ISO 13849-2:2012, *Safety of machinery — Safety-related parts of control systems — Part 2: Validation*

ISO 13850, *Safety of machinery — Emergency stop function — Principles for design*

ISO 13851:2002, *Safety of machinery — Two-hand control devices — Functional aspects and design principles*

ISO 13854, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

ISO 13855:2010, *Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body*

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

ISO 14118:2000, *Safety of machinery — Prevention of unexpected start-up*

ISO 14119:2013, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

ISO/TR 14121-2, *Safety of machinery — Risk assessment — Part 2: Practical guidance and examples of methods*

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

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

ISO 14122-3, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails*

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

ISO 14123-1:1998, *Safety of machinery — Reduction of risks to health from hazardous substances emitted by machinery — Part 1: Principles and specifications for machinery manufacturers*

ISO 14123-2, *Safety of machinery — Reduction of risks to health from hazardous substances emitted by machinery — Part 2: Methodology leading to verification procedures*

ISO 23771, *Textile machinery — Guide to the design of textile machinery for reduction of the noise emissions*

IEC 60204-1:2005, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 60447:2004, *Basic and safety principles for man-machine interface, marking and identification — Actuating principles*

IEC 61310-1:2007, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals*

IEC 61496-1:2012, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests*

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

IEC 61496-3, *Safety of machinery — Electro-sensitive protective equipment — Part 3: Particular requirements for Active Opto-electronic Protective Devices responsive to Diffuse Reflection (AOPDDR)*

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IEC 62061:2005+A1:2012+A2:2015, *Safety of machinery — Functional safety of safety-related electrical, electronic and programmable electronic control systems*

EN 614-1+A1, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

EN 953+A1, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

EN 1005-1+A1, *Safety of machinery — Human physical performance — Part 1: Terms and definitions*

EN 1005-2+A1, *Safety of machinery — Human physical performance — Part 2: Manual handling of machinery and component parts of machinery*

EN 1005-3+A1, *Safety of machinery — Human physical performance — Part 3: Recommended force limits for machinery operation*

EN 1005-4+A1, *Safety of machinery — Human physical performance — Part 4: Evaluation of working postures and movements in relation to machinery*

EN 1127-1, *Explosive atmospheres — Explosion prevention and protection — Part 1: Basic concepts and methodology*

EN 12198-1+A1, *Safety of machinery — Assessment and reduction of risks arising from radiation emitted by machinery — Part 1: General principles*

EN 12198-3+A1, *Safety of machinery — Assessment and reduction of risks arising from radiation emitted by machinery — Part 3: Reduction of radiation by attenuation or screening*

EN 12464-1, *Light and lighting — Lighting of work places — Part 1: Indoor work places*

EN 60825-1, *Safety of laser products — Part 1: Equipment classification and requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100 and EN 953+A1, and the following apply.

NOTE Where values are applicable to terms defined in this clause, these values are indicated in A.1.

3.1
stopping time
time taken by a machine or machine part to reach a stand-still after the signal to stop has been given

3.2
access time
time required to reach a dangerous part from first exposure to that part

3.3
crawl speed
linear or tangential speed of machine elements which is substantially below its normal speed and has a maximum speed and a maximum stopping distance

3.4
reduced running speed
linear or tangential speed of machine elements which is substantially below its normal speed and has a maximum stopping distance

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3.5
fence guard
fixed guard to provide a barrier at a distance which prevents access to a danger zone

Note 1 to entry: It can be either fixed directly to the machine or free-standing or fixed to the floor or constructional elements of the building. Access to the space between the fence guard and the machine is controlled by interlocked doors (see Annex A).

3.6
lap
wrap
undesired wrapping of the process material around a rotating part of the machine

3.7
normal operation
entire sequence of the production process, including start-up and incidental cleaning and elimination of routine process faults

EXAMPLE Feeding and removal of process material, threading up, process surveillance, quality tests, removal of fibre fly, mending of broken ends.

3.8
special operation
procedure and action not included in normal operation

EXAMPLE Setting, tuning, major cleaning, elimination of substantial process faults, maintenance such as the removal of blockages, laps except on spinning, twisting and texturizing machines, re-sewing broken cloth, elimination of rope loops.

3.9
complex installation
combination of textile machines and service equipment, arranged to work as one integrated production unit, subject to overall control either from a central system or from distributed, communicating systems

3.10
automatic machinery [equipment]
machinery [equipment] for which systems are employed to govern its operation without further intervention from the operator once the start control has been activated

Note 1 to entry: Such machines may be either free-standing or included in a complex installation. Automatic control can apply to the operational sequence of a machine and its integrated equipment located in a permanent place, and equipment which is mobile, including handling devices (e.g. piecing devices, knotters).

4 List of significant hazards

Significant hazards frequently occurring on textile machinery are considered in Clause 5. Additional significant hazards common to certain machine elements are given in Clause 6. Specific significant hazards for individual textile machines are considered in ISO 11111-2 to ISO 11111-7.

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 textile machinery are always considered in conjunction with safety requirements.

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