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

*Matériel pour l'industrie textile — Guide pour la réduction de
l'émission sonore à la conception des machines textiles*

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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 (see www.iso.org/patents).

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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*.

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Introduction

This International Standard is a type C standard as stated in ISO 12100. The machinery concerned and the extent to which hazards are covered are indicated in the scope of this International 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 over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

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Textile machinery — Guide to the design of textile machinery for reduction of the noise emissions

1 Scope

This International Standard provides technical information on the design of textile machinery with reduced noise emissions. Textile machines with a significant noise hazard are defined in ISO 11111 (all parts).

This International Standard supports the technical designer with the development of low-noise textile machinery. For this purpose, the significant sources of noise of the individual types of textile machines and suitable noise control measures are described.

Elements needed for the operation of the textile machine, which are, however, not part of the textile machine, are not covered by this International Standard (e.g. elements for transportation of process material, elements for provision of media).

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

ISO 23771:2015

ISO/TR 11688-1, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning*

ISO 23771:2015

ISO/TR 11688-2, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 2: Introduction to the physics of low-noise design*

ISO 11689, *Acoustics — Procedure for the comparison of noise-emission data for machinery and equipment*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100, ISO 9902 (all parts), and the following apply.

3.1

significant noise hazard

noise hazard corresponding to an A-weighted emission sound pressure level at an operating position higher than 70 dB

Note 1 to entry: In this case, it is probable that for the machine user under real production conditions (environmental correction, environment noise, operation of several machines) an emission value of 80 dB(A) is attained or exceeded.

3.2

significant noise source

noise source which dominates the noise emission generated by a machine

4 Concept for noise emission control

4.1 Substantial requirements

For reduction of noise emissions from textile machines, the following substantial requirements should be considered for conceiving and designing textile machinery.

The machine shall be conceived and designed so as to reduce hazards from noise emissions to the attainable lowest load by taking into consideration the technical progress and the available means for noise control, primarily at the source.

4.2 Procedure

In order to achieve the substantial aims according to 4.1, the following procedure is recommended.

Step 1: Detection of noise emission by measurement according to ISO 9902 (all parts)

With an emission value of less than or equal to 70 dB(A) at a workstation, no further measures for noise control are required.

Step 2: Identification of significant noise sources

To identify machine elements and physical processes dominating the noise emissions, the following methods might be useful:

- a) evaluation of revolutions and of the dominating frequencies of the radiated sound;
- b) comparative noise measurements with changing the parameters so as to draw conclusions with regard to significant noise sources;
- c) sound intensity measurements to be used for defining the loudest machine ranges;
- d) calculation of structure-borne noise (simulation).

Step 3: Specifying and taking noise control measures

Noise control measures should concentrate on significant noise sources to allow good prospect of success of the measures taken. Thus, a favourable relation between expenditure and benefit might be expected.

The measures shall be taken in the following order:

- a) reduction of sound generation;
- b) reduction of sound propagation;
- c) provision of conditions for installation, maintenance, inspection, repair, spare part specification, and quality of the used raw materials to be given for continuous low-noise operation of the machine;
- d) necessity to wear hearing protectors during operation of the machine.

Step 4: Verification of the success of measures taken

The success of the measure shall be verified by noise measurements according to ISO 9902 (all parts). For these measurements, the machine should be operating in a mode specified by ISO 9902 (all parts). If the noise control attained is not sufficient, the procedure is repeated beginning with step 2. The measures for noise control may be concluded, if

- the A-weighted emission sound pressure level at a workstation is less than or equal to 70 dB or
- the standard attainable according to the state-of-the-art technology of the machine type has been achieved or is below that level.

NOTE The state-of-the-art technology represents the technical possibilities given at a certain time. The state-of-the-art technology also includes its economic feasibility.

Step 5: Documentation

The results of the working steps 1 to 4 shall be recorded in the technical documentation.

The information for the machine user, which is obtained during performing working steps 1 to 4, should be included in the instruction handbook

5 Textile machinery with significant noise hazard

5.1 General

Textile machinery with significant noise hazard is defined in ISO 11111 (all parts) and listed in detail in 5.2. Clause 6 shows the significant noise sources and the usual measures for noise generation control and propagation, as well as information for low-noise load during operation, for selected machines.

5.2 List of textile machines with significant noise hazard

5.2.1 Spinning and spinning preparatory machines

Spinning and spinning preparatory machines with significant noise hazard are given in Table 1.

Table 1 — Spinning and spinning preparatory machines with significant noise hazard

Automated blending bale openers	
Tearers, willows	ISO 23771:2015
Bale breaker, hopper feeder	standards.iteh.ai/catalog/standards/sist/6008c2aa-4f05-43ca-a55f-df9d2ae1bfc9/iso-23771-2015
Moving bin emptiers	
Carding machines	
Roller and clearer cards	
Tape condensers	
Converters and stretch breaking converters	
Draw frames for short fibres, ribbon lap machine, and lap formers	
Gill boxes including “intersecting” and “chain-gill” types	
Combers	
Speed frames	
High-draft finishers	
Ring spinning machine	
Open-end spinning machine	

5.2.2 Non-woven machinery

Non-woven machines with significant noise hazard are needle punching machines.

5.2.3 Yarn processing, cordage, and rope manufacturing machinery

Yarn processing, cordage, and rope manufacturing machines with significant noise hazard are given in Table 2.

Table 2 — Yarn processing, cordage, and rope manufacturing machinery

Doubling machines
Twisting machines
Texturing machines
Reeling and winding machines
Ball winding machines
Rope manufacturing machinery
Combined stranding and closing machines
Braiding machines

5.2.4 Weaving and knitting preparatory machinery

Weaving and knitting preparatory machines with significant noise hazard are given in [Table 3](#).

Table 3 — Weaving and knitting preparatory machinery with significant noise hazard

Warping, beaming, and assembly beaming machines
Sizing machines

5.2.5 Fabric manufacturing machinery

Fabric manufacturing machines with significant noise hazard are given in [Table 4](#).

Table 4 — Fabric manufacturing machinery with significant noise hazard

Weaving machines	https://standards.iteh.ai/catalog/standards/sist/6008c2aa-4f05-43ca-a55f-df9d2ae1bfc9/iso-23771-2015
Needle-type narrow fabric weaving machines	https://standards.iteh.ai/catalog/standards/sist/6008c2aa-4f05-43ca-a55f-df9d2ae1bfc9/iso-23771-2015
Circular knitting machines	
Flatbed knitting machines	
Warp knitting machines	
Tufting machines	

5.2.6 Dyeing and finishing machinery

Dyeing and finishing machines with significant noise hazard are given in [Table 5](#).

Table 5 — Dyeing and finishing machinery with significant noise hazard

Brushing machines
Cropping machines, shearing machines
Singeing machines
Atmospheric dyeing machines and apparatus
High-temperature dyeing machines/apparatus
Jiggers
Stenters, coating, and laminating machines
Raising machines

6 Noise sources and noise control measures for particular textile machines

6.1 General

A general introduction to the physics of noise generation and noise control, as well as guidelines on the methodical development at all stages of design of noise control, are given in ISO/TR 11688-1 and ISO/TR 11688-2.

For a particular selection of textile machinery, [Table 6](#) provides a summary of the significant noise sources, the measures currently used for reduction of noise generation at source and of noise propagation, and advice to operators on means to reduce exposure noise. The measures given are only examples of good practice and not exhaustive and that other measures with the same or higher effectiveness may be used.

Insulating covers found on textile machinery for safety or technological reasons are not referred to as a particular noise control measure although they might reduce noise generation.

Noise relevant equipment which is not part of the textile machinery is not covered by this clause.

NOTE For design examples for noise control measures, see [Annex A](#).

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Table 6 — Noise sources and noise control measures for particular textile machines

Machine type	Significant noise sources	Noise generation control	Noise propagation control	Information on the reduction of noise load
6.2 Automated blending bale openers	<ul style="list-style-type: none"> a) blending bale openers (milling roller and its drive) b) fibre transport and aggregates involved (pipelines, ventilators) 	<ul style="list-style-type: none"> a) low-noise drive concepts (e.g. timing belt) b) reduction of masses moved c) aerodynamic optimized flow geometries d) elastic hanging of milling roller 	—	<ul style="list-style-type: none"> a) speed data to be complied with b) control milling rollers for smooth running c) clean milling rollers, remove flock (ropes) d) control the condition of double teeth (unbalance) e) straighten or replace bended teeth f) control or replace flyer wheel of ventilator with respect to wear and damage g) clean and control covering slivers
6.3 Tearers, willows	<ul style="list-style-type: none"> a) main drive b) tambour c) material transport 	—	—	—
6.4 Bale breakers, hopper feeders	<ul style="list-style-type: none"> a) condenser (if available) b) spiked feed lattice c) opening roller 	—	—	—
6.5 Moving bin emptiers	<ul style="list-style-type: none"> a) feeding (material transport) b) clearing (drive, lattice, material transport) 	—	—	—

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