INTERNATIONAL STANDARD

ISO 9902-6

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Textile machinery — Noise test code —

Part 6: Fabric manufacturing machinery

Matériel pour l'industrie textile — Code d'essai acoustique —

Partie 6: Machines de production des étoffes

Reference number
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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 3.

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 part of ISO 9902 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 9902-6 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 9902-6, together with ISO 9902-1, ISO 9902-2, ISO 9902-3, ISO 9902-4, ISO 9902-5 and ISO 9902-7, cancels and replaces ISO 9902:1993, which has been technically revised.

ISO 9902 consists of the following parts, under the general title *Textile machinery — Noise test code*:

— *Part 1: Common requirements*

— *Part 2: Spinning preparatory and spinning machinery*

— *Part 3: Nonwoven machinery*

— *Part 4: Yarn processing, cordage and rope manufacturing machinery*

— *Part 5: Weaving and knitting preparatory machinery*

— *Part 6: Fabric manufacturing machinery*

— *Part 7: Dyeing and finishing machinery*

Textile machinery — Noise test code —

Part 6:
Fabric manufacturing machinery

1 Scope

This part of ISO 9902, taken together with ISO 9902-1, specifies the mounting, operating and measuring conditions required for the measurement, declaration and verification of noise emitted by fabric manufacturing machinery. It is applicable to engineering (grade 2) and survey (grade 3) methods, in accordance with the International Standards to which it makes normative reference.

This part of ISO 9902 covers the different types of weaving and knitting machines defined in ISO 5247 and ISO 7839, respectively. It is applicable to full-width weaving machines with shuttles, with rigid, telescopic or flexible rapiers, with projectiles, and to those with weft insertion by hydraulic (waterjet) or by pneumatic (airjet) nozzle. It is also applicable to narrow fabric weaving machines with weft insertion by shuttles or needles, to other weaving machines of the multi-phase and circular weaving types, and to Jacquard machines. This part of ISO 9902 is applicable to knitting machinery including circular knitting, flat bed knitting, warp knitting, Raschel, cotton (flat weft weaving) and stitch bonding machines.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 9902. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 9902 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 3743-1:1994, *Acoustics — Determination of sound power levels of noise sources — Engineering methods for small, movable sources in reverberant fields — Part 1: Comparison method in hard-walled test rooms*.

ISO 3744:1994, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane.*

ISO 3746:1995, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane.*

ISO 3747:2000, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Comparison method* in situ*.*

ISO 5247:1983, *Textile machinery and accessories — Weaving machines — Classification and vocabulary.*

ISO 7839:1984, *Textile machinery and accessories — Knitting machines — Classification and vocabulary.*

ISO 9614-1:1993, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 1: Measurement at discrete points.*

ISO 9614-2:1996, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 2: Measurement by scanning.*

ISO 9902-1:2001, *Textile machinery — Noise test code — Part 1: Common requirements.*

ISO 11201:1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Engineering method in an essentially free field over a reflecting plane.*

ISO 11202:1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Survey method* in situ*.*

ISO 11203:1995, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions from the sound power level*.

ISO 11204:1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Method requiring environmental corrections.*

3 Terms and definitions

For the purposes of this part of ISO 9902, the terms and definitions given in ISO 9902-1 apply.

4 Defining the test object

See Tables 1 to 3 of this part of ISO 9902 and clause 4 of ISO 9902-1:2001.

5 Sound power level determination

5.1 International Standards required for basic measurements

5.1.1 General

See 5.1 of ISO 9902-1:2001.

5.1.2 Determination by measuring sound intensity

Determination of the A-weighted sound power level, L_{WA}, using sound intensity measurements shall be in accordance with ISO 9614-1 (discrete points) or ISO 9614-2 (scanning).

5.1.3 Determination using emission sound pressure levels on a measurement surface

Determination of the A-weighted sound power level, L_{WA}, by measurement of A-weighted emission sound pressure levels on a prescribed measurement surface shall be in accordance with one of the following:

— ISO 3744,

— ISO 3747, or

— ISO 3746, but only where use of ISO 3744 or ISO 3747 is not practicable.

Where its conditions are met (e.g. in the case of small narrow fabric weaving machines or knitting machines), ISO 3743-1 provides an alternative method which may be used.

5.2 Very large machines

See 5.2 of ISO 9902-1:2001. Very large machines are designated by the letter “L” in Tables 1 to 3 of this part of ISO 9902.

6 Emission sound pressure level determination

6.1 International Standards required for basic measurements

See 6.1 of ISO 9902-1:2001.

The A-weighted emission sound pressure level, L_{pA}, shall be determined in accordance with one of the following:

— ISO 11201,

— ISO 11204, or

— ISO 11202, but only where use of ISO 11201 or 11204 is not practicable.

Where its conditions are met (e.g. in the case of small, narrow fabric weaving machines or knitting machines with principally omnidirectional sound radiation) and the sound power level has already been determined, ISO 11203:1995 (6.2.3) gives an alternative method which may be used, providing the distance from the machine surface is 1 m.

6.2 Selection of work station and other specified positions

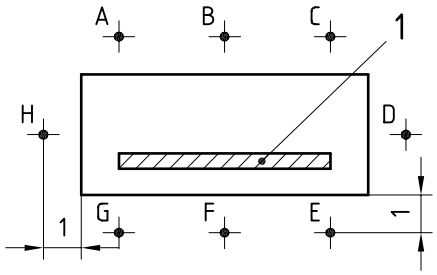
6.2.1 General

See 6.2 of ISO 9902-1:2001 and Tables 1 to 3 of this part of ISO 9902.

6.2.2 Weaving machinery other than circular and narrow fabric machines

For weaving machines that are not of the circular or narrow fabric type, select eight measurement positions, as shown in Figure 1, at a distance of 1 m and a height of 1,6 m above the floor or working platform. In areas where space is restricted, the measurement distance from the machine surface may be reduced to 0,5 m or 0,25 m (this shall be reported and declared). Use the eight values measured at the defined positions to calculate L_{pA} (see 6.1 of ISO 9902-1:2001). If the back of the machine is not accessible during operation with material, the first three positions may be excluded.

Dimensions in metres



Key

1 Sley

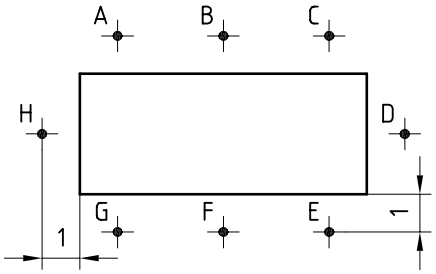
A to H are the measurement positions.

Figure 1 — Weaving machines other than circular and narrow fabric machines

6.2.3 Knitting machinery other than circular machines, but including circular flat bed knitting machines

For flatbed knitting machines, warp knitting machines, Raschel machines and stitch-bonding machines (including particular warp knitting machines such as carpet warp knitting and cotton machines) with a maximum working width of 8 m, select eight measurement positions, as shown in Figure 2, at a distance of 1 m and a height of 1,6 m above the floor or working platform. For larger machines, increase the number of positions such that the distance between two adjacent positions does not exceed 3 m. Where access to the rear is prevented by the delivered yarn, omit the measurement positions on the rear. Use the eight values measured at the defined positions to calculate L_{pA} (see 6.1 of ISO 9902-1:2001).

Dimensions in metres



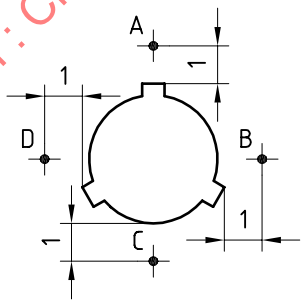
A to H are the measurement positions.

Figure 2 — Knitting machines other than circular machines

6.2.4 Circular weaving and knitting machines

For circular weaving as well as circular knitting machines, select four measurement positions, as shown in Figure 3, at a distance of 1 m and a height of 1,6 m above the floor or working platform. Use the four values measured at the defined positions to calculate L_{pA} (see 6.1 of ISO 9902-1:2001).

Dimensions in metres



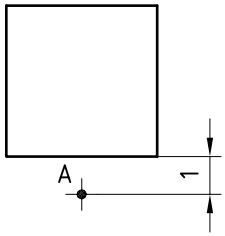
A to D are the measurement positions.

Figure 3 — Circular weaving and knitting machines

6.2.5 Narrow fabric weaving machines

For narrow fabric weaving machines, select a single measurement position, as shown in Figure 4, at a distance of 1 m from the middle of the front of the machine and at a height of 1,6 m above the floor or working platform. Use the value measured at this position to calculate L_{pA} (see 6.1 of ISO 9902-1:2001).

Dimensions in metres



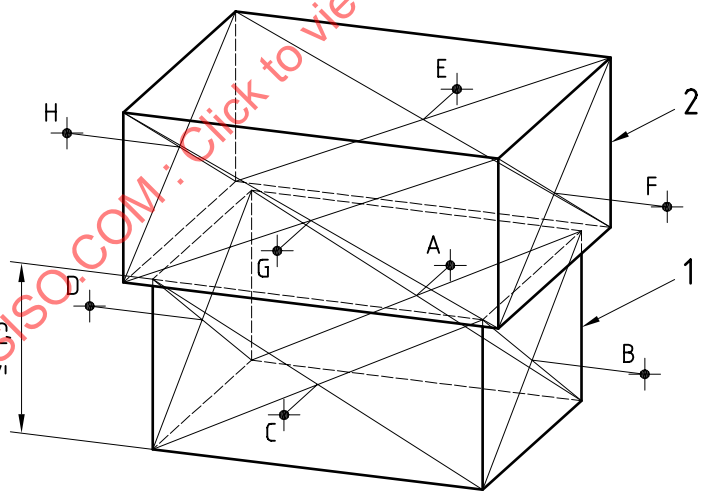
A is the measurement position.

Figure 4 — Narrow fabric weaving machines

6.2.6 Jacquard machines

For Jacquard machines, select eight measurement positions, as shown in Figure 5. Take two series of measurements at a distance of 1 m from the centre of each side. The height of measurement positions 1 to 4 shall be half the height of the frame, while the height of measurement positions 5 to 8 shall be that of the height of the centreline of the Jacquard. Use the eight values to calculate L_{pA} (see 6.1 of ISO 9902-1:2001).

Dimensions in metres



Key

1 Frame

2 Jacquard machine

A to H are the measurement positions.

Figure 5 — Jacquard machines

7 Installation and mounting conditions

See clause 7 of ISO 9902-1:2001.

8 Operating conditions

See clause 8 of ISO 9902-1:2001 and Tables 1 to 3 of this part of ISO 9902.

For weaving machines having two or more variable parameters, as an alternative to the method given in Table 1 (see clause 8 of ISO 9902-1:2001), the noise emission values depending on speed and other variable parameters (e.g. width and number of heald frames) may be determined. In such cases, the values shall be reported and declared, preferably in tabular or graphical form, or by means of a correction factor, or both.

9 Measurement uncertainties

See clause 9 of ISO 9902-1:2001.

10 Information to be recorded

See clause 10 of ISO 9902-1:2001.

11 Information to be reported

See clause 11 of ISO 9902-1:2001. The information required to be reported includes that contained in Tables 1 to 3 of this part of ISO 9902.

12 Declaration and verification of noise emission values

See clause 12 of ISO 9902-1:2001.

If the alternative given in clause 8 of this part of ISO 9902 is chosen, provide an explanation of how L_{pA} and L_{WA} can be obtained from the table or graph, or, using the correction factor, for the specified values of the variable parameters. In addition, the uncertainties K_{pA} and K_{WA} shall be declared.

Table 1 — Measurement conditions for weaving machinery

Machine family	**Test object definition** (see clause 4)				**Very large machinery** L (5.2)	**Work station** (see 6.2)	**Operating conditions** (see ISO 9902-1:2001, clause 8)		
	Equipment included for the test if applicable	Equipment excluded from the test[a]	Machine configuration (see ISO 9902-1:2001, clause 4)	Design features to be reported			Prescribed parameters	Variable parameters	Parameters to be reported
Shuttle weaving machines	see Notes 1 and 2	—	a)	type of shed formation maximum working width in centimetres where appropriate the shuttle box change type of automatic doffer equipment for pirn winding type of heald frames (e.g. material, design)	L for paper felt and carpet	see 6.2.2	with material	speed in weft insertions per minute	number of heald frames fabric data working width used in centimetres shuttle dimensions in millimetres shuttle mass in grams shuttle material type and material of the picker type and material of the back stop
Projectile weaving machines	see Notes 1 and 2	—	a)	type of shed formation maximum working width in centimetres type of heald frames (e.g. material, design) type of weft yarn supply	—	see 6.2.2	with material	speed in weft insertions per minute	number of heald frames fabric data working width used in centimetres
Rapier weaving machines	see Notes 1 and 2	—	a)	type of shed formation maximum working width in centimetres type of heald frames (e.g. material, design) type of weft yarn supply	—	see 6.2.2	with material	speed in weft insertions per minute	number of heald frames fabric data working width used in centimetres

Table 1 *(continued)*

Machine family	**Test object definition** (see clause 4)				**Very large machinery** L (5.2)	**Work station** (see 6.2)	**Operating conditions** (see ISO 9902-1:2001, clause 8)		
	Equipment included for the test if applicable	Equipment excluded from the test[a]	Machine configuration (see ISO 9902-1:2001, clause 4)	Design features to be reported			Prescribed parameters	Variable parameters	Parameters to be reported
Weaving machines with weft insertion by nozzle	see Notes 1 and 2	air preparation or water preparation	a)	type of shed formation maximum working width in centimetres type of heald frames (material design) type of weft yarn supply type of machine (air or water)	—	see 6.2.2	with material	speed in weft insertions per minute	number of heald frames fabric data nozzle pressure in pascals working width used in centimetres
Multi-phase weaving machines with weft insertion by nozzle	see Note 1	air preparation	a)	maximum working width in centimetres type of weft yarn supply	—	see 6.2.2	with material	speed in weft insertions per minute	fabric data air pressure in pascals working width used in centimetres
Narrow fabric weaving machines	see Note 1 Jacquard machine with harness	—	a)	type of shed formation maximum working width in centimetres type of heald frames type of machine (shuttle or needle type)	—	see 6.2.5 and 6.1	with material	speed in weft insertions per minute	number of heald frames fabric data working width used in centimetres number of pieces
Narrow fabric weaving machines with integrated Jacquard machine	Jacquard machine	—	a)	specification of Jacquard machine maximum working width in centimetres	—	see 6.2.5 and 6.1	with material	speed in weft insertions per minute	number of Jacquard ends working width used in centimetres fabric data number of pieces

Table 1 *(continued)*

Machine family	**Test object definition** (see clause 4)				**Very large machinery** L (5.2)	**Work station** (see 6.2)	**Operating conditions** (see ISO 9902-1:2001, clause 8)		
	Equipment included for the test if applicable	Equipment excluded from the test[a]	Machine configuration (see ISO 9902-1:2001, clause 4)	Design features to be reported			Prescribed parameters	Variable parameters	Parameters to be reported
Circular weaving machines	See Note 1	—	a)	maximum diameter in millimetres number of rotating shuttles number of dobby mechanisms	—	see 6.2.4	without material 80 % of the maximum diameter in millimetres	machine speed in revolutions per minute	—

NOTE 1 The test object is the weaving machine fitted with equipment for feed and delivery of material (e.g. warp beams, cloth beams), but excluding warp creels and freestanding equipment for cloth-take-up (e.g. fabric winding machine, folding machine).

NOTE 2 In most cases, noise tests of weaving machines and Jacquard machines will have to be conducted separately. However, in order to be able to operate the weaving machine with material, a dobby having the minimum of heald frames can be used to simulate the Jacquard machine. Knowledge of the final installation configuration can then enable calculation of the noise emission of the combined weaving machine and Jacquard machine.

[a] However, such equipment may be necessary for running the machine with material.

Table 2 — Measurement conditions for Jacquard machines

Machine family	**Test object definition** (see clause 4)				**Very large machinery** L (5.2)	**Work station** (see 6.2)	**Operating conditions** (see ISO 9902-1:2001, clause 8)		
	Equipment included for the test if applicable	Equipment excluded from the test	Machine configuration (see ISO 9902-1:2001, clause 4)	Design features to be reported			Prescribed parameters	Variable parameters	Parameters to be reported
Jacquard machines mechanically or electronically controlled	—	harness and drive (see Note 2, Table 1)	b)	maximum number of hooks description of the shed geometry	—	see 6.2.6	without material lift pattern 1:1 hook load in upper position 5 N	speed in weft insertions per minute	—

Table 3 — Measurement conditions for knitting machinery

Machine family	**Test object definition** (see clause 4)				**Very large machinery** L (5.2)	**Work station** (see 6.2)	**Operating conditions** (see ISO 9902-1:2001, clause 8)		
	Equipment included for the test if applicable	Equipment excluded from the test	Machine configuration (see ISO 9902-1:2001, clause 4)	Design features to be reported			Prescribed parameters	Variable parameters	Parameters to be reported
Circular knitting machines	integrated creel	remote creel	a)	nominal diameter of the machine in millimetres type of drive (e.g. electric hydraulic) type of machine (needle cylinder or cam box ring rotating) type of needles (latch type or compound) number of needle carriers pitch in millimetres (gauge E according to ISO 8188) number of needle carriers (sections) type of fabric take-up and take-down (doff) device type of needle selector if appropriate. with/without yarn changer with or without fans	—	see 6.2.4 and 6.1	with material pattern: machine with 1 needle carrier: RL; machine with 2 needle carriers: RR 80 % to 85 % of the maximum operation speed in revolutions per minute closed hoods or covers maximum number of needles and knitting systems	—	material data

Table 3 *(continued)*

Machine family	**Test object definition** (see clause 4)				**Very large machinery** L (5.2)	**Work station** (see 6.2)	**Operating conditions** (see ISO 9902-1:2001, clause 8)		
	Equipment included for the test if applicable	Equipment excluded from the test	Machine configuration (see ISO 9902-1:2001, clause 4)	Design features to be reported			Prescribed parameters	Variable parameters	Parameters to be reported
Flat bed knitting machines	integrated creel	remote creel	a)	maximum working width in millimetres maximum operation speed in metres per second number of needle carriers number of carriages number of systems per carriage needle pitch in millimetres (gauge E according to ISO 8188)	—	see 6.2.3	with material pattern: machine with 1 needle carrier: RL, machine with 2 or more needle carriers: RR working width: 80 % to 85 % of the maximum working width 80 % to 85 % of the maximum operation speed closed hoods or covers maximum number of needles and knitting systems	—	material data
Circular flat bed knitting machines	creel	—	a)	operation speed in metres per second nominal working width in millimetres number of needle carriers number of carriages number of systems per carriage needle pitch in millimetres (gauge E according to ISO 8188)	—	see 6.2.3	with material pattern: RR 80 % + 5 % of the maximum operation speed closed hoods or covers maximum number of needles and knitting systems	—	material data

Table 3 *(continued)*

Machine family	**Test object definition** (see clause 4)				**Very large machinery** L (5.2)	**Work station** (see 6.2)	**Operating conditions** (see ISO 9902-1:2001, clause 8)		
	Equipment included for the test if applicable	Equipment excluded from the test	Machine configuration (see ISO 9902-1:2001, clause 4)	Design features to be reported			Prescribed parameters	Variable parameters	Parameters to be reported
Warp knitting and Raschel machines	integrated feeding and delivery devices weft insertion device	remote feeding device	a)	maximum operation speed in mesh rows per minute maximum operation width in millimetres needle pitch in millimetres (gauge E according to ISO 8188) number of needle carriers type of needles type and number of guide bars type of feed (e.g. integrated beam, freestanding beam frame, creel) type of beam regulator type of weft insertion type of Jacquard machine number of needles and sinkers with or without suction device	—	see 6.2.3	without material	operation speed in mesh rows per minute	—