INTERNATIONAL STANDARD

ISO 9902-1

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Textile machinery — Noise test code —

Part 1: Common requirements

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

Partie 1: Exigences communes

Reference number
ISO 9902-1:2001(E)

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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 9902-1 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 9902-1, together with ISO 9902-2, ISO 9902-3, ISO 9902-4, ISO 9902-5, ISO 9902-6 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*

Annex A of this part of ISO 9902 is for information only.

Introduction

Basic noise emission quantities for textile machinery include emission sound pressure levels at work stations and the sound power level. The determination of these quantities (i.e. the test) is necessary for:

— manufacturers to be able to declare the noise emitted,

— machine users to be able to compare the noise emitted by machines in the group concerned,

— experimental verification of the noise control measures taken at the design stage, and

— estimation of noise immission (exposure) in the workplace or at the work station.

ISO 9902 constitutes a comprehensive noise test code for textile machinery. Its use will ensure the reproducibility of the determination of the noise emission quantities within specified limits determined by the grade of accuracy.

Textile machinery — Noise test code —

Part 1: Common requirements

1 Scope

This part of ISO 9902 gives requirements for carrying out, efficiently and under standardized conditions, the determination, declaration and verification of basic noise emission quantities common to the types of textile machinery dealt with in ISO 9902-2 to ISO 9902-7. It specifies noise measurement methods, as well as the mounting and operating conditions, to be used for this noise test code.

This part of ISO 9902 is applicable to all machinery, plant and equipment given according to ISO 11111, including equipment enabling the automated operation of machines and processes for single machines or complex installations, but excluding equipment for transportation between the machine interfaces.

NOTE 1 The measurement of the peak, C-weighted, instantaneous sound pressure value at workstations is not dealt with in this part of ISO 9902, since peak sound pressures sufficient to require such measurement are not to be expected from textile machines.

NOTE 2 For each textile machine, two parts of ISO 9902 will normally need to be used: this part and the relevant, specific part of ISO 9902.

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 3740:2000, *Acoustics — Determination of sound power levels of noise sources — Guidelines for the use of basic 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 for 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 4871:1996, *Acoustics — Declaration and verification of noise emission values of machinery and equipment.*

ISO 7574-1:1985, *Acoustics — Statistical methods for determining and verifying stated noise emission values of machinery and equipment — Part 1: General considerations and definitions.*

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 (parts 2 to 7), *Textile machinery — Noise test code.*

ISO 11111:1995, *Safety requirements for textile machinery.*

ISO 11200:1995, *Acoustics — Noise emitted by machinery and equipment — Guidelines for the use of basic standards for the determination of emission sound pressure levels at a work station and at other specified positions.*

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.*

EN 292-2:1991/A.1:1995, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles and specifications.*

3 Terms and definitions

For the purposes of this part of ISO 9902, the terms and definitions given in ISO 4871 and the following apply.

3.1
A-weighted sound power level
L_{WA}
ten times the logarithm to the base 10 of the ratio of the A-weighted sound power radiated by the source under test to the reference sound power [W_0 = 1 pW (10^{-12} W)]

NOTE 1 Adapted from ISO 3740:2000.

NOTE 2 It is expressed in decibels.

NOTE 3 Time-averaged values of sound pressure levels are the basis for calculation of sound power levels. This is not the case for ISO 9614-1 and ISO 9614-2.

3.2
A-weighted emission sound pressure level
L_{pA}
ten times the logarithm to the base 10 of the ratio of the square of the A-weighted emission sound pressure to the square of the reference sound pressure [p_0 = 20 μPa (2×10^{-5} Pa)]

NOTE 1 Adapted from ISO 3740:2000.

NOTE 2 It is expressed in decibels.

3.3
uncertainty
K
value of the measurement uncertainty associated with a measured noise emission value

[ISO 4871:1996]

NOTE 1 It is expressed in decibels.

NOTE 2 The uncertainty is designated K_{WA} for A-weighted sound power levels and K_{pA} for A-weighted emission sound pressure levels.

4 Defining the test object

The test object is the machine in its operating condition, with or without process material, as specified in ISO 9902-2 to ISO 9902-7.

Possible machine configurations (see the tables in ISO 9902-2 to ISO 9902-7):

a) a single machine, which can be run with process material independently of other machines;

b) a coupled machine, part of an integrated line but which can be run independently without the process material;

c) an integrated machine, part of an integrated line that cannot be run independently of the other machines in the line, with or without process material.

If several textile machines form an integrated group working together, the noise emission shall be determined for each machine. This may require that the machines be run without process material.

For necessary further information concerning the test object and machine configurations, especially in relation to particular pieces of equipment required or not required to be included as part of the test object, as well as design features important for verification of the measurement, see the appropriate columns in the tables in ISO 9902-2 to ISO 9902-7.

5 Sound power level determination

5.1 International Standards required for basic measurements

A-weighted sound power levels, L_{WA}, shall be determined in accordance with the basic noise emission standards given in ISO 9902-2 to ISO 9902-7.

Grade 2 (engineering) methods shall be used wherever practicable, and only where this is not practicable may grade 3 (survey) methods be used. Permitted measurement standards are specified in ISO 9902-2 to ISO 9902-7.

5.2 Very large machines

For very large machines, sound power level determinations according to the option offered by EN 292-2:1991/A1:1995, annex A, 1.7.4 f) are not required: only the emission sound pressure levels determined using clause 6 of this and the other parts of ISO 9902. Very large machines are designated in the tables in ISO 9902-2 to ISO 9902-7 by the letter “L”.

6 Emission sound pressure level determination

6.1 International Standards required for basic measurements

The A-weighted emission sound pressure level, L_{pA}, shall be determined in accordance with the basic noise emission standards given in ISO 9902-2 to ISO 9902-7. Where more than one position (i = 1 ... N) is specified in the definition of the work station, the time-averaged emission sound pressure level L'_{pAi} shall be measured at each position.

The background noise correction, K_{1Ai}, shall be measured and the local environmental correction, K_{3Ai}, shall be calculated for each measurement position using the appropriate methods.

From the values of L'_{pAi}, K_{1Ai} and K_{3Ai} thus obtained, L_{pAi} shall be determined for each measurement position using $L_{pAi} = L'_{pAi} - K_{1Ai}$, according to ISO 11201, or $L_{pAi} = L'_{pAi} - K_{1Ai} - K_{3Ai}$, according to ISO 11202 or ISO 11204.

Grade 2 (engineering) methods shall be used wherever practicable, and only where this is not practicable may grade 3 (survey) methods be used. The basic measurement standards to be used are specified in ISO 9902-2 to ISO 9902-7.

From the individual values, with L_{pAi} thus obtained, L_{pA} shall be calculated using the formula:

$$L_{pA} = 10 \lg\left(\frac{1}{N}\sum_{i=1}^{N} 10^{0,1L_{pAi}}\right) \text{ dB}$$

where N represents the number of specified positions.

This value shall be reported and declared.

6.2 Selection of work station and other specified positions

The positions at which sound pressure levels are to be measured for the determination of L_{pA} shall be as specified in ISO 9902-2 to ISO 9902-7.

For a machine belonging to a family to which ISO 9902 is applicable but not specifically mentioned in the other parts of ISO 9902, the most appropriate work station shall be selected from the options given in those parts and then reported as required by clause 11.

If no work station or other position is specified and none of the options is appropriate, measurements shall be made at a distance of 1 m from the machine and at a height of 1,60 m above the floor or access platform. The highest emission sound pressure level value and the position at which it was obtained shall be reported and declared.

7 Installation and mounting conditions

7.1 General

The installation and mounting conditions shall be identical for the determination of both L_{WA} and L_{pA}.

Care shall be taken to ensure that any electrical conduits, piping or air ducts connected to the machinery, but not part of the machine, do not radiate significant amounts of sound energy into the test environment.

The machine under test shall be placed on a reflecting (acoustically hard) floor.

Additional requirements relating to installation and mounting conditions shall be as specified in ISO 9902-2 to ISO 9902-7. Noise reduction features that are part of the machine shall be in place during the measurement.

7.2 *In situ*

The installation and mounting conditions for the measurement shall be the same as those indicated by the manufacturer in the instruction handbook.

7.3 On the manufacturer's premises

A machine tested on the manufacturer's premises that would normally be assembled and installed on the customer's premises shall be installed and mounted, together with any applicable auxiliary equipment, following the manufacturer's written instructions and to simulate *in situ* installation and mounting conditions as closely as possible.

8 Operating conditions

The operating conditions under which the test is to be performed shall make it possible to include in the measurement all significant noises emitted by the test object (see clause 4).

The test object shall be in a clean and lubricated condition and at normal operating temperature.

In those cases where the work cycle includes several different phases, the noise emission values shall be determined for the complete cycle, unless otherwise specified in the part of ISO 9902 concerned.

The work cycle for measurement shall be representative of the machine in operation and shall exclude the doffing operation and unrepresentative stoppages.

The operating conditions shall be identical for the determination of both L_{WA} and L_{pA}.

Specific operating conditions for the machines are given in the tables in ISO 9902-2 to ISO 9902-7. For a machine belonging to a family to which ISO 9902 is applicable, but not specifically mentioned in those other parts of ISO 9902, the operating conditions shall be those within the range specified by the manufacturer giving rise to the highest noise emission values.

For textile machinery, noise-relevant operating conditions are divided into the following three categories (see the corresponding columns in the tables in ISO 9902-2 to ISO 9902-7).

Prescribed parameters: These are fixed values, defined in the tables of ISO 9902-2 to ISO 9902-7 or in manufacturers' nominal values.

Variable parameters: One or two parameters with the greatest influence on noise emission shall be varied within the practical operating range or ranges. The noise emission values shall then be determined and declared for three values — maximum, medium and low — for each parameter (the maximum of a range is the value of a parameter giving rise to the maximum noise level under production conditions).

Parameters to be reported: The values of these parameters are not prescribed in ISO 9902-2 to ISO 9902-7 but the values used for the test shall be reported.

For a machine belonging to a family to which ISO 9902 is applicable but not specifically mentioned in the other parts of ISO 9902, the following shall apply.

— For a machine with a large industrial operating range, one or two parameters with the greatest influence on noise emission shall be varied within the practical operating range or ranges. The noise emission values shall then be determined and declared for three values — maximum, medium and low — for each parameter (the maximum of a range is the value of a parameter giving rise to the maximum noise level under production conditions).

— For a machine with a narrow industrial operating range (e.g. around 80 % of its maximum speed), the noise emission values shall be determined and declared only for that value of each parameter having the greatest

influence on noise emission. The value shall be representative of the normal machine industrial conditions of use (e.g. around 80 % of its maximum speed).

9 Measurement uncertainties

9.1 Determination for a single machine

The uncertainty K_{WA} or K_{pA} shall be calculated using $K = 1{,}645 \cdot \sigma_R$, where σ_R is the standard deviation of reproducibility, determined for the relevant noise emission quantities. For the determination of σ_R, see ISO 4871:1996, 3.21, and ISO 7574-1:1985, 3.14. In the case of a machine for which the determination of σ_R is not practicable, K_{WA} or K_{pA} shall be taken from Tables 1 and 2[1)] (see, also, ISO 4871:1996, A.2.2), unless more precise values are specified in the relevant part of ISO 9902.

Table 1 — Uncertainty K_{WA} (sound power levels)

International Standard used as basic measurement standard	Uncertainty K_{WA}	
	Grade 2 dB	Grade 3 dB
ISO 3743-1	3	—
ISO 3744	3	—
ISO 3746	—	4
ISO 3747	3	4
ISO 9614-1	3	4
ISO 9614-2	3	4

Table 2 — Uncertainty K_{pA} (emission sound pressure levels)

International Standard used as basic measurement standard	Uncertainty K_{pA}	
	Grade 2 dB	Grade 3 dB
ISO 11201	3	—
ISO 11202	—	4
ISO 11204	3	4
ISO 11203	The uncertainty of sound power level shall be used.	

1) It may be possible to find values for K_{WA} or K_{pA} smaller than those given in Tables 1 and 2, using suitable tests arranged by the manufacturer to obtain reproducibility data.

9.2 Determination from measurements made on a batch of identical machinery

For a batch of machines, a sample consisting of three machines shall be used for the measurements. For the determination of the standard deviation of a sample, s, see ISO 7574-1:1985, 3.15. The total standard deviation, σ_t, for each relevant noise emission quantity (L_{pA} or L_{WA}) shall be calculated using the equation:

$$\sigma_t = \sqrt{\sigma_R^2 + \sigma_P^2}$$

For the determination of the standard deviation of reproducibility, σ_R, see ISO 4871:1996, 3.21, and ISO 7574-1:1985, 3.14. The standard deviation of production, σ_P, shall be determined from a sample of three machines (see ISO 4871:1996, 3.22, and A 2.3 and ISO 7574-1:1985, 3.15).

The uncertainty K_{WA} or K_{pA} shall be calculated using:

$$K = 1{,}5\ \sigma_t + 0{,}564\ (2{,}5 - \sigma_t) = 1{,}41 + 0{,}936\ \sigma_t$$

for grade 2 measurements, and

$$K = 1{,}5\ \sigma_t + 0{,}564\ (4 - \sigma_t) = 2{,}256 + 0{,}936\ \sigma_t$$

for grade 3 measurements.

The value of K shall be rounded to the nearest half-decibel.

If the procedure described above is not practicable, the values of K_{WA} or K_{pA} from Tables 1 and 2, increased by 1 dB, may be used.

10 Information to be recorded

Sufficient information shall be recorded to enable the report required by clause 11 to be compiled.

The forms given in annex A are recommended for this purpose where applicable. Alternatively, all information covered by these forms should be recorded in another manner.

11 Information to be reported

The information to be included in the test report shall be used by the manufacturer to prepare a noise declaration, and by a third party to verify the declared values. The test report shall be included in the manufacturer's file.

It shall contain at least the following:

— a drawing of the test object including the main dimensions, in millimetres;

— the information required by the basic noise emission standards used under "Information to be recorded", except climate data;

— information about the test object, selection of relevant work stations, and mounting and operating conditions as given in the tables in ISO 9902-2 to ISO 9902-7.

EXAMPLE 80 % of maximum feed speed: 160 m/min.

The form given in annex A should be used not only for the record but also for the report (headings indicating information to be reported are in bold face).

12 Declaration and verification of noise emission values

12.1 Declaration

For declaration purposes, the information on airborne noise emission shall be given according to EN 292-2:1991/A1:1995, annex A, 1.7.4. The declaration shall be a dual-number declaration as defined in ISO 4871:1996 and include the following.

— L_{pA} as determined in accordance with 6.1 and given in the test report. For the variable operating parameters defined in clause 8, more than one value shall be given (e.g. by a table or graph).

— L_{WA} as determined in accordance with 5.1 and given in the test report. For the variable operating parameters defined in clause 8, more than one value shall be given (e.g. by a table or graph).

— Uncertainty, K_{pA}, and K_{WA}, associated with L_{pA} and L_{WA}.

The noise information shall explicitly mention the fact that the noise emission values have been obtained according to this part of ISO 9902 and ISO 9902-2 to ISO 9902-7 and which basic standards have been used. If this statement cannot be made, the noise information shall state clearly any deviations from this part of ISO 9902 and ISO 9902-2 to 9902-7, from the basic standards used for the tests, or both.

An example for the declaration is given in ISO 4871:1996, annex B.

12.2 Verification of declared values

If verification is required, it shall be conducted using the same mounting and operating conditions as those used for the initial determination of noise emission values and given in the test report (see clause 11).

Verification of an individual machine shall be performed in accordance with ISO 4871:1996, 6.2. Verification of a batch shall be performed in accordance with ISO 4871:1996, 6.3.

Annex A
(informative)

Forms for recording and reporting noise emission data of textile machinery

A.1 General

For the record and report, use the form for general information (see A.2) and one or both of the other forms (A.3 and A.4).

The form for emission sound pressure level determination using ISO 11201 or ISO 11202 or ISO 11204 (A.3) and that for sound power level determination using ISO 3744 or ISO 3746 (A.4), are both suitable for use with the basic measurement standards indicated.

NOTE 1 Forms are not yet available for the other International Standards used as measurement standards.

NOTE 2 The whole of annex A is free of copyright and may be copied and used.

A.2 Form for general information

Record/report no.: ..... **Place and date of test:** .....

Person/organisation performing test: .....

Person requesting test: .....

Purpose of test: .....

TEST OBJECT (including ancillary equipment)

Manufacturer: .....

Type of machine and family: .....
(as specified in the relevant part of ISO 9902)

Serial no.: ..... **Year of construction:** .....

Test object definition (see Table ..... for .....; describe any deviations): .....

.....

Design features to be reported: .....

Very large machine according to 5.2 of this part of ISO 9902: Yes ☐ No ☐

Test object and environment (attached drawing):

Volume of test room ..... m^3 Surface area of test room ..... m^2

Information on sound absorption of test room surfaces .....

Acoustic environmental conditions for measurement standard used fulfilled: Yes ☐ No ☐

Mounting conditions:

.....

.....

Operating conditions: (see Table ..... for .....; describe any deviations): .....

.....

.....

Integration time / Description of work cycle over which measurements are made:

.....

.....

.....

INSTRUMENTATION

Instrument	Manufacturer	Type and serial no.	Calibration details

Microphone windscreen fitted during test: Yes ☐ No ☐

Test(s) performed:

Emission sound pressure level at operator position	☐	Declaration/ verification	☐	Sound power level	☐

Basic noise standard(s) used[2]**:**

ISO 11201[3]	☐	ISO 4871	☐	ISO 3743-1	☐
ISO 11202[3]	☐			ISO 3744[4]	☐
ISO 11203	☐			ISO 3746[4]	☐
ISO 11204[3]	☐			ISO 3747	☐
				ISO 9614-1	☐
				ISO 9614-2	☐

Method used to determine K_1: In accordance with clause ..... of ISO .....

Method used to determine K_2: In accordance with clause ..... of ISO .....

Method used to determine K_3: In accordance with 6.6 of ISO .....

2) Where a later edition of a normative standard is used, this fact shall be mentioned.

3) If ISO 11201 or 11202 or 11204 is used, use the form A.3.

4) If ISO 3744 or 3746 is used, use the form A.4.

A.3 Form for emission sound pressure level determination using ISO 11201 or ISO 11202 or ISO 11204

Record/report no.: .....

Deviations from standard test conditions/procedure, if any: .....

Location of microphone for test (as defined in 6.2 of Part ....., Figure ..... ; describe any deviations): .....

.....

Measurement point	**Measured background noise level**	**Measured sound pressure level**	**Background noise correction**	**Local environmental correction**	**Corrected sound pressure level**
i	L''_{pAi}	L'_{pAi}	K_{1Ai}	K_{3Ai}	L_{pAi}
Variable parameter:			**Value of parameter:**		
1					
2					
3					
4					
5					
6					
7					
8					
Values for declaration:				L_{pA}	dB
				Uncertainty K_{pA}	dB

$$L_{pAi} = L'_{pAi} - K_{1Ai}$$

according to ISO 11201, or

$$L_{pAi} = L'_{pAi} - K_{1Ai} - K_{3Ai},$$

according to ISO 11202 or ISO 11204.

$$L_{pA} = 10 \lg\left(\frac{1}{N}\sum_{i=1}^{N} 10^{0,1 L_{pAi}}\right) \text{ dB}$$

Uncertainty K_{pA} calculated ☐ taken from table ☐

NOTE 1 Where there are no variable parameters, a single copy of this form will be needed. Where there is one variable parameter, three copies will be needed. For two variable parameters, nine copies will be needed.

NOTE 2 Where more than eight measurement points need to be considered, further copies of this record sheet with appropriate measurement point numbering will be needed.

A.4 Form for sound power level determination using ISO 3744 or ISO 3746

Record/report no.: .....

Deviations from standard test conditions/procedure, if any: .....

Location of microphone for test (as defined in ISO, ... Fig. ..... ; describe any deviations): .....

.....

Reference box dimensions: l_1 = ... m l_2 = ... m l_3 = ... m

Measuring distance: d = ... m

Measuring surface dimensions: a = ... m b = ... m c = ... m

Area: S = ... m^2

Measurement point	**Measured sound pressure level** L'_{pAi}	**Background noise level** L''_{pAi}	**Variable parameter:** **Value of parameter:**
1			For terminology see ISO 3744:1994, clause 8 or ISO 3746:1995, clause 8.
2			
3			$\overline{L'_{pA}} = 10\lg\left(\frac{1}{N}\sum_{i=1}^{N}10^{0,1L'_{pAi}}\right)$ dB .....
4			
5			$\overline{L''_{pA}} = 10\lg\left(\frac{1}{N}\sum_{i=1}^{N}10^{0,1L''_{pAi}}\right)$ dB .....
6			
7			$\Delta L_A = \overline{L'_{pA}} - \overline{L''_{pA}}$ .....
8			
9			$K_{1A} = -10\lg\left(1-10^{-0,1\Delta L_A}\right)$ dB .....
10			K_{2A} = (environmental correction determined using ISO 3744 or ISO 3746) .....
11			
12			$\overline{L_{pfA}} = \overline{L'_{pA}} - K_{1A} - K_{2A}$ .....
13			
14			$L_{WA} = \overline{L_{pfA}} + 10\lg\left(\frac{S}{S_0}\right)$ dB .....
15			where S_0 = 1 m^2
16			Uncertainty, K_{WA}, calculated ☐
17			taken from table ☐
18			**Values for declaration:**
19			L_{WA} dB
20			Uncertainty K_{WA} dB

NOTE Where there are no variable parameters, a single copy of this form will be needed. Where there is one variable parameter, three copies will be needed. For two variable parameters, nine copies will be needed.

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Price based on 12 pages