

INTERNATIONAL  
STANDARD

**ISO**  
**7960**

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**Airborne noise emitted by machine  
tools — Operating conditions for  
woodworking machines**

*Bruit aérien émis par les machines-outils — Conditions de fonctionnement  
des machines à bois*



Reference number  
ISO 7960:1995(E)

## 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.

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.

International Standard ISO 7960 was prepared by Technical Committee ISO/TC 39, *Machine tools*, Subcommittee SC 6, *Noise of machine tools* and ISO/TC 43, *Acoustics*.

Annexes A to H, J to N and P to U form an integral part of this International Standard. Annex V is for information only.

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# Airborne noise emitted by machine tools — Operating conditions for woodworking machines

## 1 Scope

This International Standard, together with basic noise emission International Standards, describes the mechanical and acoustical specifications necessary for a reproducible test method for the determination of airborne noise emitted by woodworking machines.

NOTE 1 Acoustic measurement procedures and noise data reporting are given in the basic acoustic Standards selected from the ISO 3740 series, ISO 4871 and the ISO 11200 series (see annex V).

This International Standard specifies operating conditions and microphone positions for the measurement of noise emitted by woodworking machines.

It applies to:

- Single-blade circular saw benches (annex A);
- planing machines (annex B);
- thickness planing machines (annex C);
- single-spindle moulding machines (annex D);
- double-end profiling machines (annex E);
- edge banding machines (annex F);
- double-end sizing and edge banding machines (annex G);
- two-side and multi-side planing machines and moulding machines (annex H);
- bandsawing machines (annex J);
- Single-end tenoning machines (annex K);
- routing machines (annex L);
- double-end trim circular machines (nonstroke) (annex M);

- Single-blade stroke circular sawing machines for cross cutting (annex N);
- vertical and horizontal panel sizing sawing machines (annex P);
- multiblade circular sawing machines (for ripping) (annex Q);
- sanding machines (annex R);
- double-edging circular sawing machines (for rough cutting) (annex S);
- double-blade stroke circular sawing machines for cross cutting (annex T);
- double-end tenoning machines (for tenoning only) (annex U).

The existence of special-purpose machines, for which such Standard operating conditions cannot be specified, is acknowledged. This International Standard applies to the types of woodworking machines listed above. Additional types will be covered in future editions of this International Standard (ISO 7960).

## 2 Normative reference

The following Standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All Standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the Standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 7984:1988, *Woodworking machines — Technical classification of woodworking machines and auxiliary machines for woodworking.*

### 3 Definitions

For the purposes of this International Standard, the definitions given in ISO 7984 apply.

### 4 General provisions for machine installation and Operation

Specified operating conditions for particular types of machines are given in the annexes. When testing multi-purpose machines, each function shall be mounted separately according to the requirements specified in the annexes.

#### 4.1 Machine installation

The machine shall be installed according to the manufacturer's instructions. If the manufacturer does not provide such instructions, this shall be stated in the test report, together with the installation method used.

The machine shall be installed in such a way that access to all sides is possible.

#### 4.2 Machine Operation

The Operation during measurement shall be representative of the noisiest normal and typical use of the machinery that is reproducible. Standard operating conditions shall be those specified in the relevant annex. Where conditions are not specified in annexes, manufacturer's instructions shall be followed. Where neither specifications nor instructions exist, the machine shall be set up to give maximum noise emission.

The machine shall be tested when carrying out a sequence of operations deemed to be representative of the use of the machine, using test materials and operating conditions specified in the relevant annex. In addition, a test shall be performed under no load. The level of the no-load noise is that produced when the machine is running, ready for load test, unless otherwise specified in the annex.

NOTE 2 Distinctive features of noise within the machine-cycle may have to be measured separately or may be included in a single measurement of equivalent continuous sound pressure level sampled over the whole operating cycle.

Machines with Provision for dust extraction shall be tested with the extraction working, under both idling and operating conditions.

In order to determine the influence of the dust extraction system on the total noise, an additional measurement shall be carried out at a point at the Operator position (see suggested figures in the annexes), with the dust extraction switched off.

The operating conditions and the sequence of operations shall be defined, recorded and reported.

New or re-sharpened tools shall be used for all tests under load and the machine shall be running at normal operating temperature.

General safety requirements shall take precedence over conditions specified in the annexes.

#### 4.3 Specification of test materials

The test material shall be one of the materials specified in 4.3.1 to 4.3.3.

**4.3.1 Particle board**, made from particles of wood bonded with synthetic resin and/or organic binder, density 500 kg/m<sup>3</sup> to 750 kg/m<sup>3</sup>, three-layer construction and moisture content 6 % to 10 %.

**4.3.2 Coated particle board**, of the type specified in 4.3.1, coated on both sides with a rigid plastic of the melamine type, of maximum 0,2 mm thickness, moisture content 6 % to 10 %.

**4.3.3 Softwood**, pre-planed resinous (similar to spruce, Norway spruce or Scots pine), in good condition and of uniform quality, with average annual growth ring thickness of 5 mm or less. The grain should run parallel to the longest edge but a general gradient of less than 12 % on at least one side is tolerable. Moisture content shall be between 8 % and 14%. Density shall be between 300 kg/m<sup>3</sup> and 600 kg/m<sup>3</sup>.

#### 4.4 Microphone positions

Microphone positions for measurement of the noise at the operator's position(s) are given in the annexes. Some forms of acoustical enclosure or hood may require redefinition of the Operator microphone position in some cases; in such case the microphone shall be positioned to be representative of the noise at the position of the operator's head.

Provision of data for the noisiest position is optional.

Prescribed microphone positions for the determination of sound power level are given in the annexes.

The use of additional microphone positions is optional.

## 5 Test report (see annexes)

For measurements that are made according to the requirements of this International Standard, the following information shall be compiled as completely as possible and recorded:

- a) description of the machine under test (including its dimensions);
- b) mounting conditions (including auxiliary equipment, safety devices and noise control measures);
- c) operating conditions and sequence of operations;
- d) details of machine tool and cutting data (cutters saw-blades, etc.);
- e) details of test material;
- f) photo or detailed illustration of the machine tested;
- g) name and address of the firm/institution that has carried out the measurements (including date and place).

NOTE 3 The above requirements are met if the data sheets given in the annexes are used.

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## Annex A (normative)

### Woodworking machines — Operating conditions for single-blade circular saw benches

#### A.1 General

This annex contains a series of standard operating conditions to be applied in connection with measurement of noise from circular saws. Microphone positions are specified to allow measurement of sound pressure level at the operator's position and for determining the sound power level of a machine of this type.

These standard conditions shall be complied with as closely as possible. If, in a specific situation, it is necessary to deviate from standard conditions, the actual condition applied for the test shall be recorded where a blank space in the column "Condition chosen within permitted range or conditions deviating from standard" allows for such a situation.

Mandatory and standard safety attachments shall be mounted and in use during the tests.

This annex may also serve as a data sheet on which information on operating conditions is recorded.

This annex shall be used in connection with measurement of noise from the following machines.

	<b>Machine classification number</b> (see ISO 7984)
Circular saw bench with or without travelling table	12.131.36
Circular sawing machine with travelling table	12.131.372

This annex may also be applied for measurement of noise from special-purpose machines having a similar construction and function.

#### A.2 Noise measurements

The machine shall be tested under the following conditions.

- a) Testing under no load with operating arrangement and tool and cutting data as specified in this annex.
- b) Testing under load as specified in this annex. The measurement result is the average of a series of at least three operations. During the first part of the work cycle, when the test material is fed into the tool, a higher level of noise may be emitted which depends on the infeed rate. On manually fed machines the infeed rate is difficult to control and therefore this part of the operating cycle shall not be included in the measurement.
- c) Operator microphone position for test purpose (see figure A.1):
  - 1,5 m above floor level;
  - 0,4 m forward of the spindle centreline;
  - 0,2 m to the left side of the sawblade.

NOTE 4 The use of integrating sound level meters is recommended but is not mandatory.

Dimensions in metres

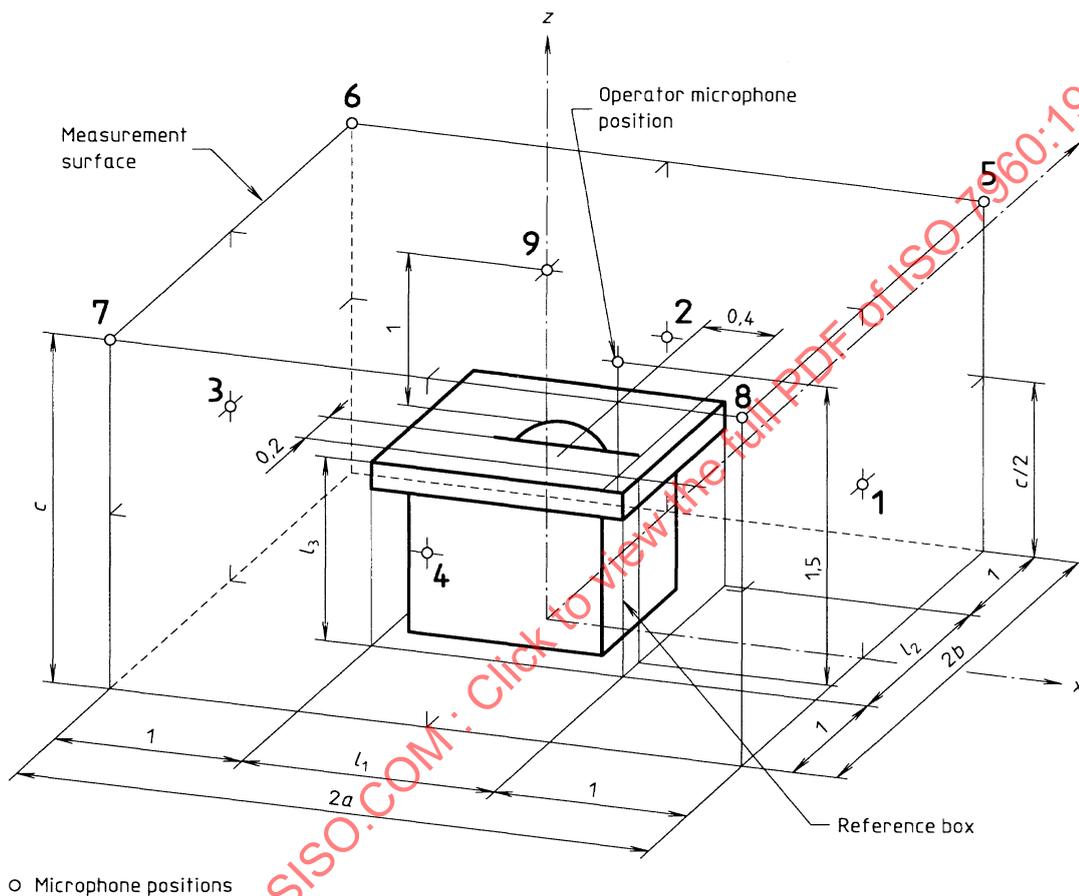
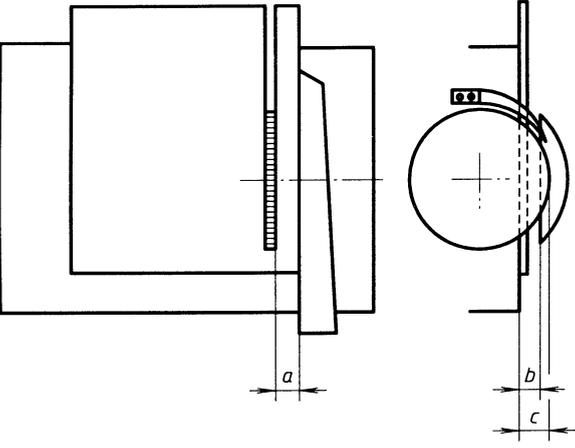


Figure A.1 — Measurement surface and microphone array for determination of sound power level for single-blade circular saw benches (see ISO 3740 series for explanation of symbols)

**A.3 Data sheet for Single-blade circular saw benches**

<b>Machine data</b>	
Make: .....	
Model: .....	
Year of manufacture: .....	Serial No.: .....
Overall dimensions of machine?	
length .....	width ..... mm height ..... mm
Maximum blade diameter .....	mm Clamp flange diameter ..... mm
Nominal rotational speed:	
motor .....	r/min blade ..... r/min
<b>Machine installation</b>	
Machine installed according to manufacturer's instructions	Remarks/description: ..... ..... .....
yes <input type="checkbox"/>	no <input type="checkbox"/>
Machine installed with dust extraction according to manufacturer's specifications	..... ..... .....
yes <input type="checkbox"/>	no <input type="checkbox"/>
Machine mounted on Vibration isolators	..... ..... .....
yes <input type="checkbox"/>	no <input type="checkbox"/>
Machine equipped with noise-reducing hood	..... ..... .....
yes <input type="checkbox"/>	no <input type="checkbox"/>
Other noise control measures	..... ..... .....
yes <input type="checkbox"/>	no <input type="checkbox"/>
1) Those elements which protrude from the machine and which are not likely to contribute to the noise emission (for example hand-wheels, levers) may be disregarded.	

Data sheet for single-blade circular saw benches (continued)

<p><b>Testing operation</b></p> <p>Cutting strips of particle board</p> <p><b>Operating arrangement</b></p>  <p>Parallel fence position, <i>a</i></p> <p>Saw guard position, <i>h</i></p> <p>Sawblade projection, <i>c</i></p>	<p><b>Units</b></p>	<p><b>Standard condition(s)</b></p>	<p><b>Condition chosen within permitted range or conditions deviating from standard</b></p>
<p><b>Tool and cutting data</b></p> <p>Type of tool: standard sawblade with carbide-tipped teeth</p> <p>Tooth profile: double alternate helix (staggered)</p> <p>Spindle speed</p> <p>Feed rate</p> <p>Blade diameter <math>\leq 315</math> mm</p> <p>    sawblade diameter</p> <p>    cutting speed</p> <p>    number of teeth</p> <p>    tooth width</p> <p>    actual blade thickness</p> <p>Blade diameter <math>&gt; 315</math> mm</p> <p>    sawblade diameter</p> <p>    cutting speed</p> <p>    number of teeth</p> <p>    tooth width</p> <p>    actual blade thickness</p>	<p>r/min</p> <p>m/min</p> <p>mm</p> <p>m/s</p> <p>mm</p> <p>mm</p> <p>mm</p> <p>m/s</p> <p>mm</p> <p>mm</p>	<p>4 000 <sup>1)</sup></p> <p><math>6 \pm 2</math></p> <p>250</p> <p>.....</p> <p>48 to 60</p> <p><math>3,2 \pm 0,1</math></p> <p><math>2,2 \pm 0,1</math></p> <p>355 (350)</p> <p>.....</p> <p>54 to 60</p> <p><math>3,2</math> to <math>3,6 (\pm 0,1)</math></p> <p><math>2,2</math> to <math>2,6 (\pm 0,1)</math></p>	
<p>1) Spindle speed shall be as close as possible to 4 000 r/min.</p>			

**Data sheet for Single-blade circular saw benches (concluded)**

**Testing material**

Material: particle board, three-layer construction (see 4.3)  
Moisture content: 6 % to 10%  
Board thickness: 16 mm  
Board length: 600 mm to 800 mm  
Board width: 600 mm to 800 mm, processed down to a final minimum width of 150 mm  
Preliminary processing: none

**Photo or detailed illustration of the machine tested**

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**Testing laboratory**

Firm/institution: .....  
Add ress: .....  
Telephone: .....  
Date: ..... Signature: .....  
Test carried out:  
place: .....  
date: .....

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## Annex B (normative)

### Woodworking machines — Operating conditions for planing machines

#### B. 1 General

This annex contains a series of Standard operating conditions to be applied in connection with measurement of noise from planing machines. Microphone positions are specified to allow measurement of sound pressure level at the operator's position and for determining the sound power level of a machine of this type.

These Standard conditions shall be complied with as closely as possible. If, in a specific Situation, it is necessary to deviate from Standard conditions, the actual condition applied for the test shall be recorded where a blank space in the column "Condition chosen within permitted range or conditions deviating from Standard" allows for such a Situation.

Mandatory and Standard safety attachments shall be mounted and in use during the tests.

This annex may also serve as a data sheet on which information on operating conditions is recorded.

This annex shall be used in connection with measurement of noise from the following machines.

	<b>Machine classification number</b> (see ISO 7984)
Planing machine	12.211.1
Combined planing and thickness planing machine used as a planing machine (separate testing shall also be performed in accordance with annex C)	{ 12.81 (used as planing machine) 12.82 12.83 (used as planing machine)

This annex may also be applied for measurement of noise from special-purpose machines having a similar construction and function.

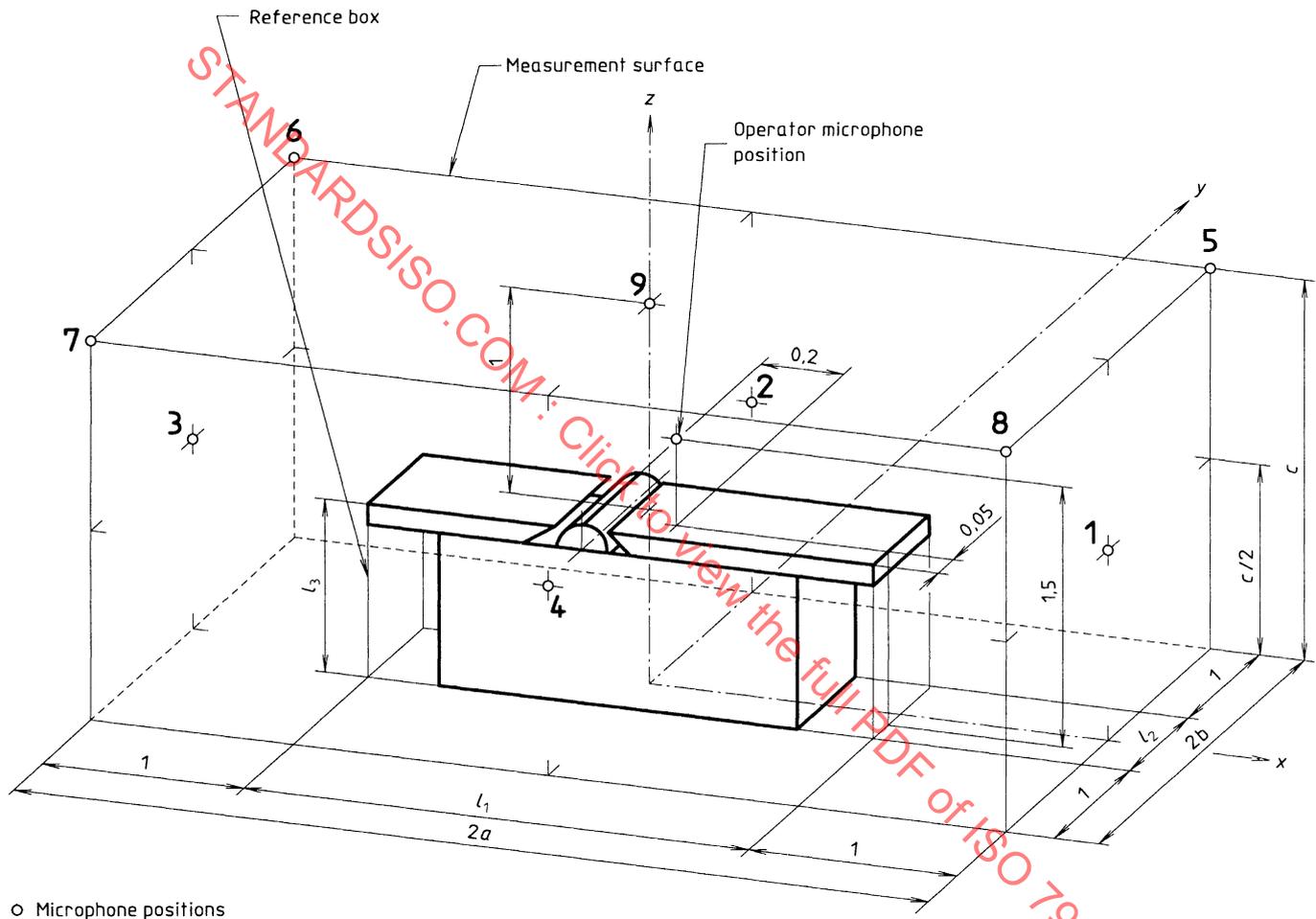
#### B.2 Noise measurements

The machine shall be tested under the following conditions.

- a) Testing under no load with operating arrangement and tool and cutting data as specified in this annex.
- b) Testing under load as specified in this annex. The measurement result is the average of a series of at least three operations. During the first part of the work cycle, when the test material is fed into the tool, a higher level of noise may be emitted which depends on the infeed rate. On manually fed machines the infeed rate is difficult to control and therefore this part of the operating cycle shall not be included in the measurement.
- c) Operator microphone position for test purpose (see figure B.1):
  - 1,5 m above floor level;
  - 0,2 m forward of the cutter centreline;
  - 0,05 m to the right of forward left edge of the table.

NOTE 5 The use of integrating sound level meters is recommended but is not mandatory.

Dimensions in metres

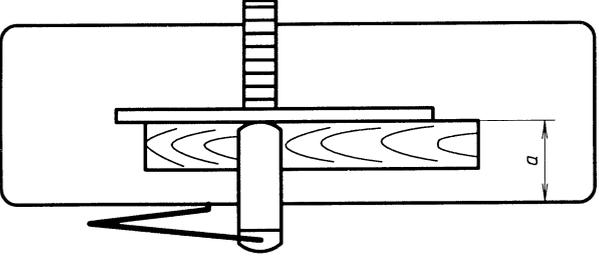


○ Microphone positions

**Figure B.1 — Measurement surface and microphone array for determination of sound power level for planing machines (see ISO 3740 series for explanation of symbols)**



Data sheet for planing machines (continued)

<p><b>Testing operation</b></p> <p>Surface planing of softwood</p> <p><b>Operating arrangement</b></p>  <p>Parallel fence position, <i>a</i></p>	<p><b>Units</b></p> <p>mm</p>	<p><b>Standard condition(s)</b></p> <p>150</p>	<p><b>Condition chosen within permitted range or conditions deviating from standard</b></p>
<p><b>Tool and cutting data</b></p> <p>Type of cutter-block: Circular with straight knives</p> <p>Spindle speed</p> <p>Cutting circle diameter</p> <p>Cutting speed</p> <p>Projection of cutting knives</p> <p>Distance from cutting circle to table lips</p> <p>Cutting width</p> <p>Cutting depth</p> <p>Feed rate</p>	<p>r/min</p> <p>mm</p> <p>m/s</p> <p>mm</p> <p>mm</p> <p>mm</p> <p>mm</p> <p>m/min</p>	<p>..... max.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>100</p> <p>2</p> <p>6 ± 2</p>	

**Data sheet for planing machines (concluded)**

**Testing material**

Material: softwood, medium grade  
Moisture content: 8 % to 14 %  
Material length: 1 000 mm  
Material width: 100 mm  
Material height: max. 80 mm, processed down to a final minimum height of 50 mm  
Preliminary processing: planing on four sides

**Photo or detailed illustration of the machine tested**

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**Testing laboratory**

Firm/institution: .....  
Address: .....  
Telephone: .....  
Date: ..... Signature: .....  
Test carried out:  
place: .....  
date: .....

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## Annex C (normative)

### Woodworking machines — Operating conditions for thickness planing machines

#### C. 1 General

This annex contains a series of Standard operating conditions to be applied in connection with measurement of noise from thickness planing machines. Microphone positions are specified to allow measurement of sound pressure level at the operator's position and for determining the sound power level of a machine of this type.

These Standard conditions shall be complied with as closely as possible. If, in a specific Situation, it is necessary to deviate from Standard conditions, the actual condition applied for the test shall be recorded where a blank space in the column "Condition chosen within permitted range or conditions deviating from Standard" allows for such a Situation.

Mandatory and Standard safety attachments shall be mounted and in use during the tests.

This annex may also setve as a data sheet on which information on operating conditions is recorded.

This annex shall be used in connection with measurement of noise from the following machines.

	<b>Machine classification number</b> (see ISO 7984)
Thickness planing machine	12.212
Combined planing and thickness planing machine used as a thickness planing machine (separate testing shall also be performed in accordance with annex B)	{ 12.81 (used as thickness planing machine) 12.83 (used as thickness planing machine)

This annex may also be applied for measurement of noise from special-purpose machines having a similar construction and function.

#### C.2 Noise measurements

The machine shall be tested under the following conditions.

- a) Testing under no load with operating arrangement and tool and cutting data as specified in this annex.
- b) Testing under load as specified in this annex. The measurement result is the average of a series of at least three operations. During the first part of the work cycle, when the test material is fed into the tool, a higher level of noise may be emitted which depends on the infeed rate. On manually fed machines the infeed rate is difficult to control and therefore this part of the operating cycle shall not be included in the measurement.
- c) Operator microphone positions for test purpose (see figure C.1)

Position A:

- 1,5 m above floor level;
- in the plane of the front face of the measurement surface;
- in line with the middle of the table.

Position B:

- 1,5 m above floor level;
- in the plane of the rear face of the measurement surface;
- in line with the middle of the table.

NOTE 6 The use of integrating sound level meters is recommended but is not mandatory.

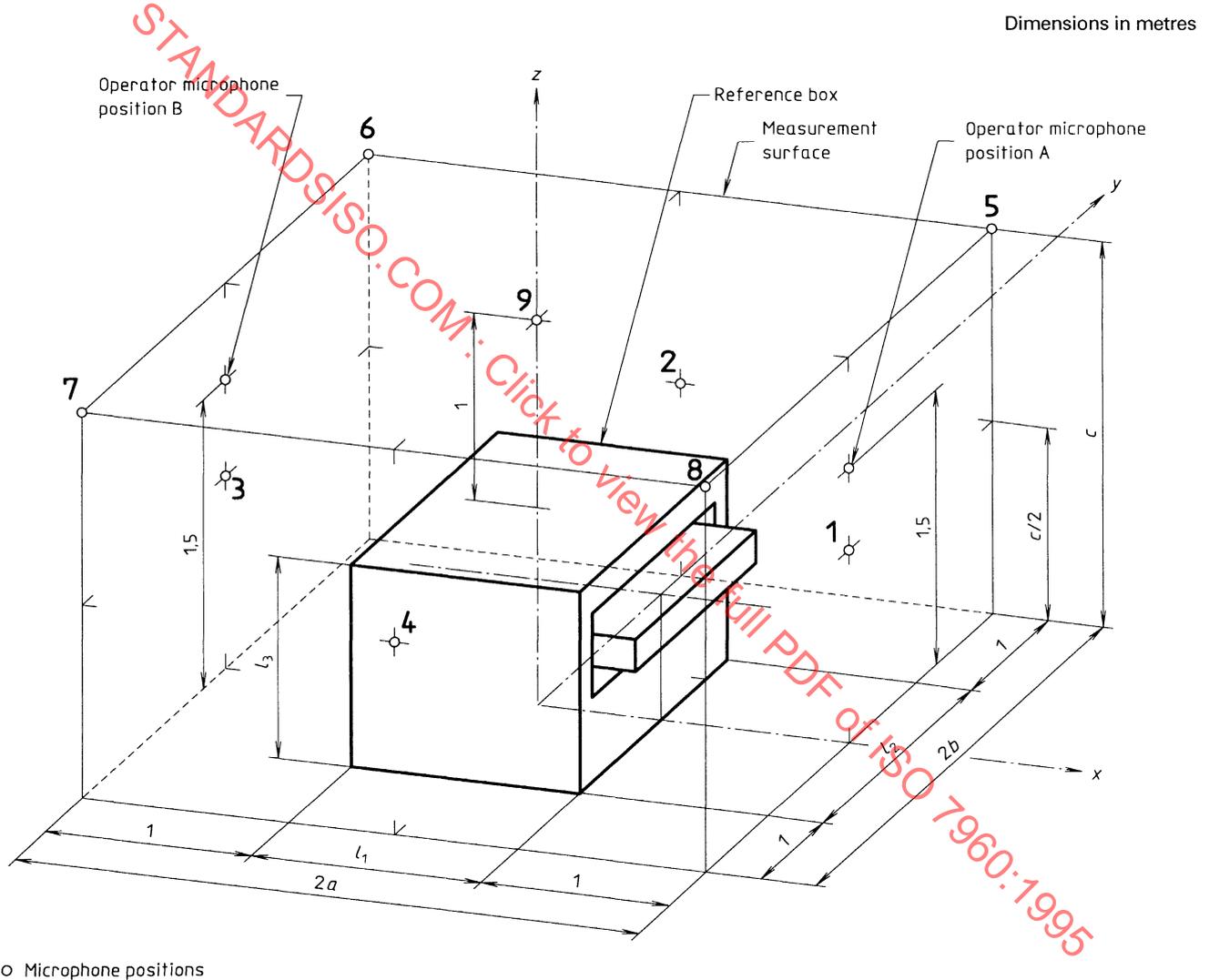
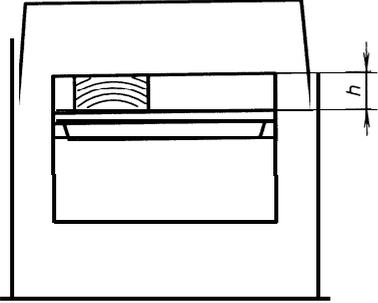


Figure C.1 — Measurement surface and microphone array for determination of sound power level for thickness planing machines (see ISO 3740 series for explanation of symbols)

**C.3 Data sheet for thickness planing machines**

<b>Machine data</b>	
Make: .....	.....
Model: .....	.....
Year of manufacture: .....	Serial No.: .....
Overall dimensions of machine <sup>1)</sup> :	
length ..... mm	width ..... mm height ..... mm
Cutter length ..... mm	Cutting diameter ..... mm
Number of cutting knives: .....	
Nominal rotational speed:	
motor ..... r/min	cutter ..... r/min
<b>Machine installation</b>	
Machine installed according to manufacturer's instructions	Remarks/description: ..... ..... .....
yes <input type="checkbox"/> no <input type="checkbox"/>	
Machine installed with dust extraction according to manufacturer's specifications	..... .....
yes <input type="checkbox"/> no <input type="checkbox"/>	
Machine mounted on vibration isolators	..... .....
yes <input type="checkbox"/> no <input type="checkbox"/>	
Machine equipped with infeed and outfeed noise-reducing arrangements	..... .....
yes <input type="checkbox"/> no <input type="checkbox"/>	
Machine equipped with helical cutter-block	..... .....
yes <input type="checkbox"/> no <input type="checkbox"/>	
Machine fitted with noise enclosure	..... .....
yes <input type="checkbox"/> no <input type="checkbox"/>	
Other noise control measures	..... .....
yes <input type="checkbox"/> no <input type="checkbox"/>	
<p>1) Those elements which protrude from the machine and which are not likely to contribute to the noise emission (for example hand-wheels, levers) may be disregarded.</p>	

Data sheet for thickness planing machines (continued)

Testing Operation	Units	Standard condition(s)	Condition chosen within permitted range or conditions deviating from Standard
<p>Thickness planing of softwood</p> <p><b>Operating arrangement</b></p>  <p>Passage height at idling, <i>h</i></p>	mm	50	
<p><b>Tool and cutting data</b></p> <p>Type of Cutter-block: Circular with straight knives</p> <p>Spindle speed</p> <p>Cutting circle diameter</p> <p>Cutting speed</p> <p>Projection of cutting knives</p> <p>Cutting width</p> <p>Cutting depth</p> <p>Feed rate</p>	<p>r/min</p> <p>mm</p> <p>m/s</p> <p>mm</p> <p>mm</p> <p>m/min</p>	<p>.....max.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>100</p> <p>2</p> <p>10 ± 2</p>	

**Data sheet for thickness planing machines (concluded)**

**Testing material**

Material: softwood, medium grade  
 Moisture content: 8 % to 14%  
 Material length: 1000 mm  
 Material width: 100 mm  
 Material height: 80 mm max., processed down to a final minimum height of 50 mm  
 Previous processing: planing on four sides

**Photo or detailed illustration of the machine tested**

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**Testing laboratory**

Firm/institution: .....  
 Address: .....  
 Telephone: .....  
 Date: ..... Signature: .....  
 Test carried out:  
     place: .....  
     date: .....

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## Annex D (normative)

### Woodworking machines — Operating conditions for single-spindle moulding machines

#### D. 1 General

This annex contains a series of Standard operating conditions to be applied in connection with measurement of noise from single-spindle moulding machines. Microphone positions are specified to allow measurement of sound pressure level at the operator's position and for determining the sound power level of a machine of this type.

These Standard conditions shall be complied with as closely as possible. If, in a specific Situation, it is necessary to deviate from Standard conditions, the actual condition applied for the test shall be recorded where a blank space in the column "Condition chosen within permitted range or conditions deviating from Standard" allows for such a Situation.

Mandatory and Standard safety attachments shall be mounted and in use during the tests.

This annex may also serve as a data sheet on which information on operating conditions is recorded.

This annex shall be used in connection with measurement of noise from the following machine.

#### Machine classification number (see ISO 7984)

Single-spindle moulding machine	12.311
---------------------------------	--------

This annex may also be applied for measurement of noise from special-purpose machines having a similar construction and function.

#### D.2 Noise measurements

The machine shall be tested under the following conditions.

- a) Testing under no load with operating arrangement and tool and cutting data as specified in this annex.
- b) Testing under load as specified in this annex. The measurement result is the average of a series of at least three operations. During the first part of the work cycle, when the test material is fed into the tool, a higher level of noise may be emitted which depends on the infeed rate. On manually fed machines the infeed rate is difficult to control and therefore this part of the operating cycle shall not be included in the measurement.
- c) Operator microphone position for test purpose (see figure D.1):
  - 1,5 m above floor level;
  - 0,2 m forward of spindle centreline;
  - 0,4 m to the right of spindle centreline.

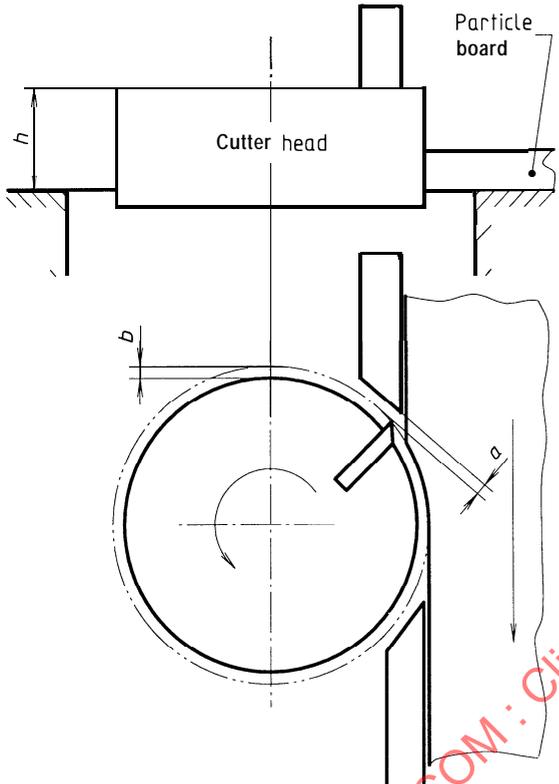
NOTE 7 The use of integrating sound level meters is recommended but is not mandatory.



**D.3 Data sheet for single-spindle moulding machines**

<b>Machine data</b>	
Make: .....	.....
Model: .....	.....
Year of manufacture:.....	Serial No.: .....
Overall dimensions of machine <sup>1)</sup> :	
length .....	width..... mm height .....
	mm mm
Drive of spindle: .....	
Nominal rotational speed:	
motor .....	r/min spindle .....
	r/min
<b>Machine installation</b>	
Remarks/description:	
Machine installed according to manufacturer's instructions	
yes <input type="checkbox"/>	no <input type="checkbox"/>
Machine installed with dust extraction according to manufacturer's specifications	
yes <input type="checkbox"/>	no <input type="checkbox"/>
Machine mounted on Vibration isolators	
yes <input type="checkbox"/>	no <input type="checkbox"/>
Machine equipped with cutter guard designed as a noise-reducing hood	
yes <input type="checkbox"/>	no <input type="checkbox"/>
Other noise control measures	
yes <input type="checkbox"/>	no <input type="checkbox"/>
<p><small>1) Those elements which protrude from the machine and which are not likely to contribute to the noise emission (for example hand-wheels, levers) may be disregarded.</small></p>	

Data sheet for single-spindle moulding machines (continued)

Testing Operation	Units	Standard condition(s)	Kondition chosen within permitted range or conditions deviating from Standard
<p>Moulding in particle board edges</p> <p><b>Operating arrangement</b></p>  <p>Distance, <i>a</i></p> <p>Projection of cutting knives, <i>b</i></p> <p>Upper tool edge above table, <i>h</i></p>			
<p><b>Tool and cutting data</b></p> <p>Type of tool: Circular cutter with straight knives</p> <p>Spindle speed</p> <p>Cutting circle diameter</p> <p>Cutting speed</p> <p>Number of knives</p> <p>Tool width</p> <p>Cutting width</p> <p>Cutting depth</p> <p>Feed rate</p> <p>Cutting principle: cutter rotation opposing feed</p>		<p><math>1 \pm 0,1</math></p> <p>1,1 max.</p> <p>45</p> <p>r/min</p> <p>mm</p> <p>m/s</p> <p></p> <p>mm</p> <p>mm</p> <p>mm</p> <p>m/min</p> <p>6 000 <sup>1)</sup></p> <p>125</p> <p>40</p> <p>2</p> <p>50</p> <p>16</p> <p>10</p> <p><math>6 \pm 2</math></p>	
<p>1) Spindle speed shall be as close as possible to 6 000 r/min.</p>			

**Data sheet for single-spindle moulding machines (concluded)**

**Testing material**

Material: particle board, three-layer construction (see 4.3)  
Moisture content: 6 % to 10 %  
Board thickness: 16 mm  
Board length: 600 mm to 800 mm  
Board width: 600 mm to 800 mm, processed down to a final minimum width of 150 mm  
Previous processing: none

**Photo or detailed illustration of the machine tested**

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**Testing laboratory**

Firm/institution: .....  
Address: .....  
Telephone: .....  
Date: ..... Signature: .....  
Test carried out:  
place: .....  
date: .....

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## Annex E (normative)

### Woodworking machines — Operating conditions for double-end profiling machines

#### E. 1 General

This annex contains a series of Standard operating conditions to be applied in connection with measurement of noise from double-end profiling machines. Microphone positions are specified to allow measurement of sound pressure level at the operator's position and for determining the sound power level of a machine of this type.

These Standard conditions shall be complied with as closely as possible. If, in a specific Situation, it is necessary to deviate from Standard conditions, the actual condition applied for the test shall be recorded where a blank space in the column "Condition chosen within permitted range or conditions deviating from Standard" allows for such a Situation.

Mandatory and Standard safety attachments shall be mounted and in use during the tests.

This annex may also serve as a data sheet on which information on operating conditions is recorded.

This annex shall be used in connection with measurement of noise from the following machine.

	<b>Machine classification number (see ISO 7984)</b>
Double-end profiling machine	<b>82.4</b>

This annex may also be applied for measurement of noise from special purpose machines having a similar construction and function.

#### E.2 Noise measurements

The machine shall be tested under the following conditions.

- a) Testing under no load with operating arrangement and tool and cutting data as specified in this annex.
- b) Testing under load as specified in this annex. A continuous supply of test pieces should be fed with a minimum distance between successive test pieces so that measurements are made during simultaneous Operation of all working units.
- c) Operator microphone positions for test purpose (see figure E.1)

Position A:

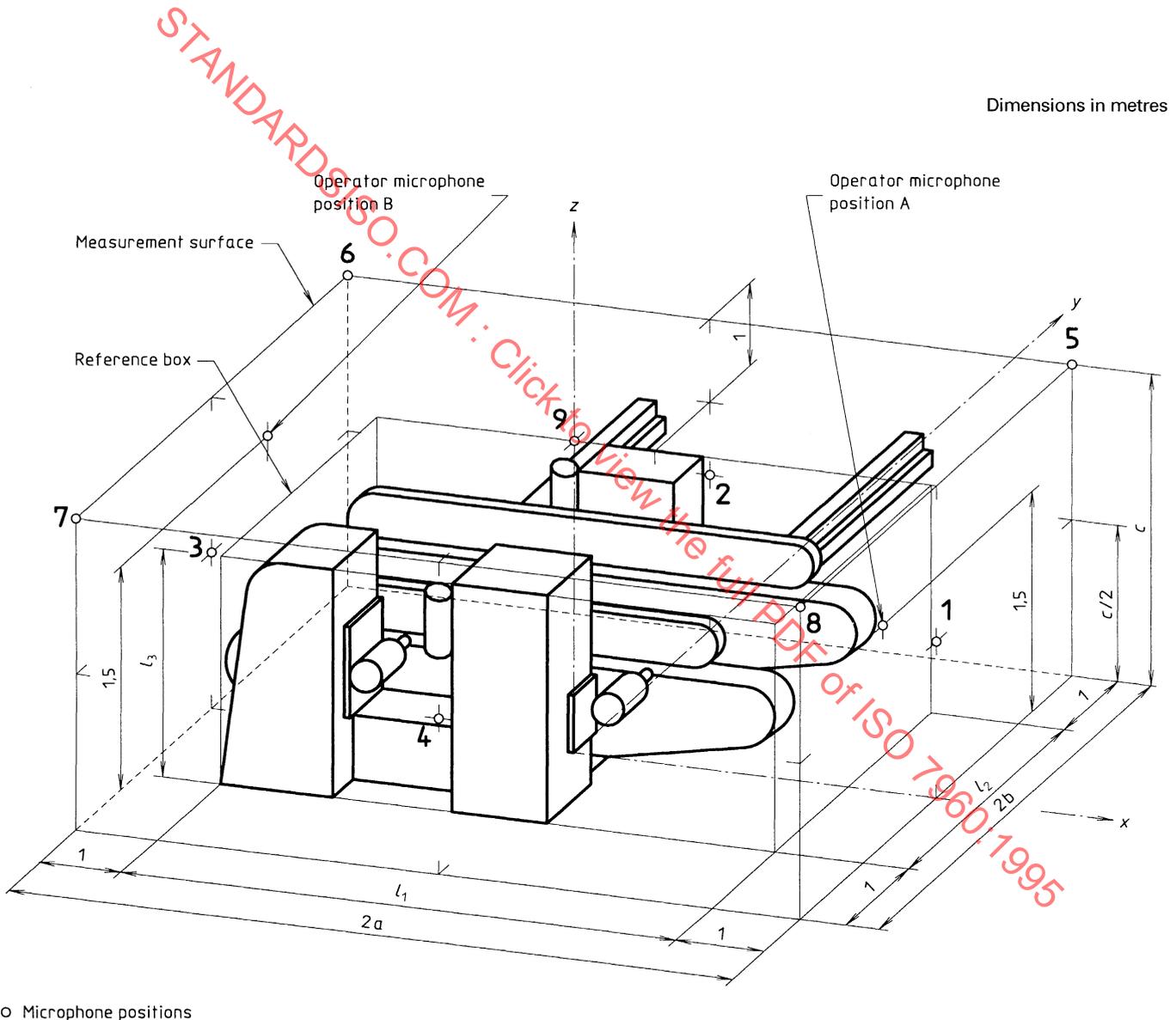
- 1,5 m above floor level;
- in the plane of the front face of the measurement surface;
- in line with the middle of the infeed referred to a constant material width of 600 mm.

Position B:

- 1,5 m above floor level;
- in the plane of the rear face of the measurement surface;
- in line with the middle of the outfeed referred to a constant material width of 600 mm.

d) The reference box shall enclose all elements of the machine which are significant radiators of sound energy. The reference box shown in figure E.1 refers to a machine set-up for a 600 mm board width.

NOTE 8 The use of integrating sound level meters is recommended but is not mandatory.



○ Microphone positions

**Figure E.1 — Measurement surface and microphone array for determination of sound power level for double-end profiling machines (see ISO 3740 series for explanation of symbols)**

**E.3 Data sheet for double-end profiling machines**

**Machine data**

Make: .....

Model: .....

Year of manufacture: ..... Serial No.: .....

Overall dimensions of machine<sup>1)</sup>:

length ..... mm width ..... mm height ..... mm

Spindle No. <sup>1)</sup>	Spindle function	Maximum tool diameter mm	Nominal rotational speed	
			Motor r/min	Spindle r/min
1				
2				
3				
4				
5				
6				
7				
8				

1) By reference to the fixed side of the machine.

Attached frequency converter

Separate frequency converter

**Machine installation**

Remarks/description:

Machine installed according to manufacturer's instructions

yes

no

Machine installed with dust extraction according to manufacturer's specifications

yes

no

Machine mounted on vibration isolators

yes

no

Machine fitted in separate noise enclosure

yes

no

Machine equipped with integral noise enclosure

yes

no

Machine equipped with noise-reducing hoods

yes

no

Other noise control measures

yes

no

1) Those elements which protrude from the machine and which are not likely to contribute to the noise emission (for example hand-wheels, levers) may be disregarded.

Data sheet for double-end profiling machines (continued)

Testing operations

Sizing and grooving in particle board edges.

One of the following procedures is used:

Procedure S using:

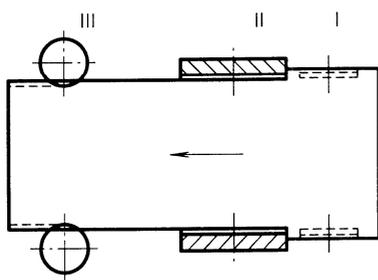
- Scoring sawblade (I)
- Hogging cutter (II)
- Grooving saw (III)

Procedure M using:

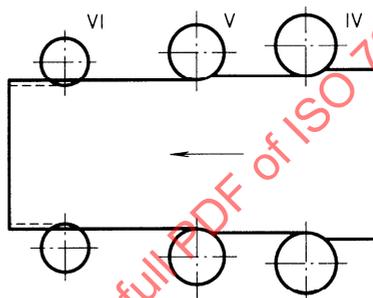
- Edge moulding, relieving cutter (IV)
- Edge moulding, finish planing cutter (V)
- Grooving saw (VI)

8 mm shall be cut off at each side of the machine.

Processing operations shall be symmetrical.



Procedure S

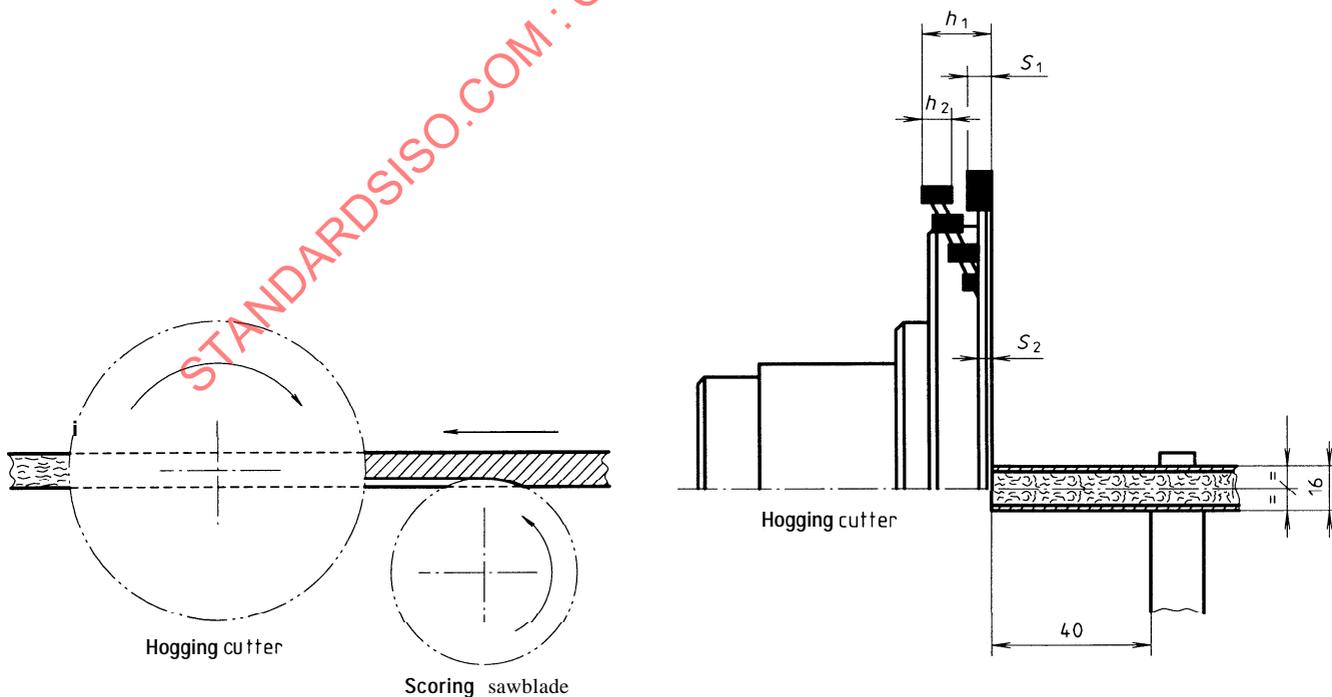


Procedure M

Operating arrangement

Procedure S: Sizing Operation with scoring sawblade and hogging Cutter. Hogging cutter axis situated at centreline of test piece.

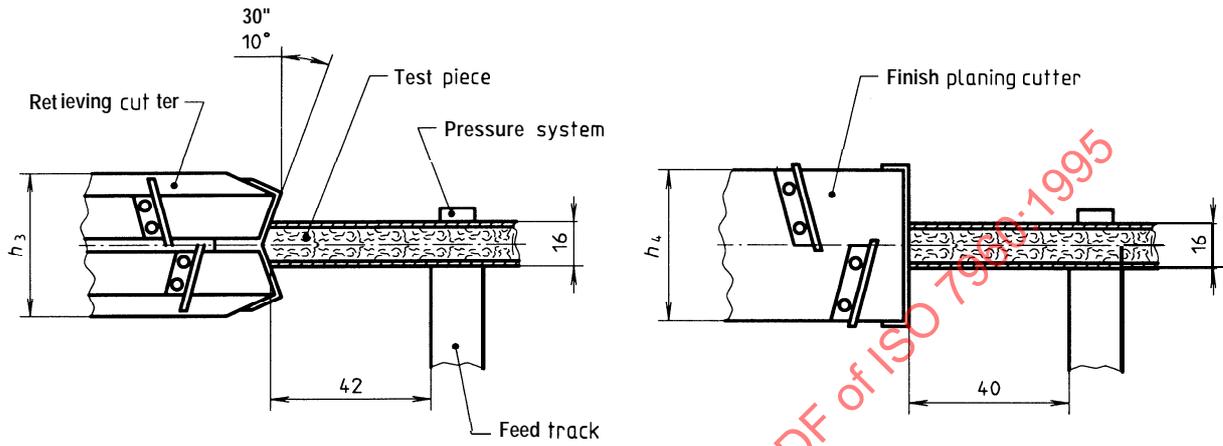
Dimension in millimetres



**Data sheet for double-end profiling machines (continued)**

**Procedure M:** Sizing Operation with relieving cutter and finish planing cutter.

Dimension in millimetres



## Data sheet for double-end profiling machines (continued)

Tool and cutting data	Units	Standard condition(s)		Condition chosen within permitted range or conditions deviating from standard
<b>Procedure S</b>				
Scoring, sawing and hogging				
a) Spindle I (horizontal)				
Scoring sawblade (spindle rotation in direction of feed)				
Type of saw: Standard sawblade with carbide-tipped teeth				
spindle speed	r/min	3 000 <sup>1)</sup> or 6 000 <sup>1)</sup>		
blade diameter	mm	180 to 200		
cutting speed	m/s	.....		
number of teeth		36 to 48		
tooth profile				
tooth width	mm	3,2 ± 0,1		
actual blade thickness	mm	2,2 ± 0,1		
scoring depth	mm	2		
b) Spindle II (horizontal)				
Sawing and hogging cutter (cutting in opposition to scoring sawblade)				
Type of saw: Standard sawblade with carbide tipped teeth				
spindle speed	r/min	3 000	6 000 <sup>1)</sup>	
blade diameter	mm	280 to 300	200	
cutting speed	m/s	.....	.....	
number of teeth		72 to 84	48 to 60	
tooth profile				
tooth width, $S_1$	mm	3,2 ± 0,1	4 ± 0,1	
actual blade thickness, $S_2$	mm	2,2 ± 0,1	2,8 ± 0,1	
Type of saw: Hogging cutter (helical) with carbide-tipped teeth				
diameter	mm	280 to 300	200	
number of teeth per row		6 to 12	4 to 6	
total cutting width, $h_1$	mm	20 to 24	20 to 24	
cutting width per tooth, $h_2$	mm	4 min.	4 min.	
c) Spindle III (vertical)				
Grooving saw (spindle rotation opposing feed)				
Type of saw: Grooving saw with carbide-tipped teeth				
spindle speed	r/min	3 000	6 000 <sup>1)</sup>	
cutting circle diameter	mm	180	180	
cutting speed	m/s	.....	.....	
number of teeth		12	18	
tooth width	mm	4	4	
grooving depth	mm	5	5	
d) Feed rate	m/min	15 <sup>2)</sup>		
e) Distance, feed track-tool	mm	40		
1) If available, 6 000 r/min shall be used.				
2) If this feed is unobtainable, the nearest available shall be used.				

**Data sheet for double-end profiling machines (continued)**

Tool and cutting data (continued)	Units	Standard condition(s)	Condition chosen within permitted range or conditions deviating from standard
<b>Procedure M</b>			
Edge planing			
a) Spindle IV (vertical)			
Relieving (spindle rotation opposing feed)			
Relieving cutter with carbide knives			
spindle speed	r/min	3 000 <sup>1)</sup> or 6 000 <sup>1)</sup>	
cutting circle diameter	mm	200	
cutting speed	m/s	-----	
number of cutting knives		2 × 4	
cutter width, <i>h</i> <sub>3</sub>	mm	56	
cutting depth	mm	6	
b) Spindle V (vertical)			
Planing (spindle rotation opposing feed)			
Finish planing cutter with carbide knives			
spindle speed	r/min	3 000 <sup>1)</sup> or 6 000 <sup>1)</sup>	
cutting circle diameter	mm	180	
cutting speed	m/s	-----	
number of cutting knives		2 × 3	
cutter width, <i>h</i> <sub>4</sub>	mm	56	
cutting depth	mm	2	
c) Spindle VI (vertical)			
Grooving (spindle rotation opposing feed)			
Grooving saw with carbide-tipped teeth			
spindle speed	r/min	3 000 <sup>1)</sup> or 6 000 <sup>1)</sup>	
cutting circle diameter	mm	180	
cutting speed	m/s	-----	
number of teeth		12   18	
tooth width	mm	4	
cutting depth	mm	5	
d) Feed rate	m/min	15 <sup>2)</sup>	
e) Distance, feed track-tool	mm	40	
<p>1) If available, 6 000 r/min shall be used.</p> <p>2) If this feed rate is unobtainable, the nearest available shall be used.</p>			

**Data sheet for double-end profiling machines (concluded)**

<b>Testing material</b>	
Material:	uncoated particle board, three-layer construction (see 4.3)
Moisture content:	6 % to 10 %
Board thickness:	16 mm
Board length:	2 000 mm
Board width:	600 mm, processed down to a final minimum width of 400 mm
Previous processing:	none
<b>Photo or detailed illustration of the machine tested</b>	
STANDARDSISO.COM : Click to view the full PDF of ISO 7960:1995	
<b>Testing laboratory</b>	
Firm/institution: .....	
Address: .....	
Telephone: .....	
Date: .....	Signature: .....
Test carried out:	
place: .....	
date: .....	

## Annex F (normative)

### Woodworking machines — Operating conditions for edge-banding machines

#### F. 1 General

This annex contains a series of Standard operating conditions to be applied in connection with measurement of noise from edge-banding machines. Microphone positions are specified to allow measurement of sound pressure level at the operator's position and for determining the sound power level of a machine of this type.

These Standard conditions shall be complied with as closely as possible. If, in a specific Situation, it is necessary to deviate from Standard conditions, the actual condition applied for the test shall be recorded where a blank space in the column "Condition chosen within permitted range or conditions deviating from Standard" allows for such a Situation.

Mandatory and Standard safety attachments shall be mounted and in use during the tests.

This annex may also serve as a data sheet on which information on operating conditions is recorded.

This annex shall be used in connection with measurement of noise from the following machine.

#### Machine classification number (see ISO 7984)

Edge-banding machine, single and double-sided	83.15
---	-------

This annex may also be applied for measurement of noise from special-purpose machines having a similar construction and function.

#### F.2 Noise measurements

The machine shall be tested under the following conditions.

- a) Testing under no load with operating arrangement and tool and cutting data as specified in this annex.
- b) Testing under load as specified in this annex. A continuous supply of test pieces should be fed with a minimum distance between successive test pieces so that measurements are made during simultaneous Operation of all working units.
- c) Operator microphone positions for test purpose (see figure F.1)

Position A:

- 1,5 m above floor level;
- in the plane of the front face of the measurement surface;
- 0,3 m to the right of the left fence (viewed from infeed direction).



**F.3 Data sheet for edge-banding machines**

**Machine data**

Make: .....  
 Model: .....  
 Year of manufacture: ..... Serial No.: .....  
 Overall dimensions of machine<sup>1)</sup>:  
 length ..... mm width ..... mm height ..... mm

Spindle No. <sup>1)</sup>	Spindle function	Maximum tool diameter mm	Nominal rotational speed	
			Motor r/min	Spindle r/min
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

1) By reference to the fixed side of the machine.

- Attached frequency converter       Separate frequency converter

**Machine installation**

Remarks/description:

Machine installed according to manufacturer's instructions

yes  no

Machine installed with dust extraction according to manufacturer's specifications

yes  no

Machine mounted on vibration isolators

yes  no

Machine fitted in separate noise enclosure

yes  no

Machine equipped with integral noise enclosure

yes  no

Machine equipped with noise-reducing hoods

yes  no

Other noise control measures

yes  no

.....  
 .....  
 .....  
 .....  
 .....  
 .....  
 .....  
 .....  
 .....  
 .....

1) Those elements which protrude from the machine and which are not likely to contribute to the noise emission (for example hand-wheels, levers) may be disregarded.

Data sheet for edge-banding machines (continued)

Testing operations

Edge-banding of particle board and final processing.

a) Edge-banding, using one of the following procedures:

**Procedure P:** Plastic edge is banded by machines constructed for banding of plastic edges as well as wooden edges.

**Procedure H:** Hardwood edge is banded by machines constructed for that purpose only.

b) Final processing of the banded edge, by means of the following operations:

**Process A:** end trimming

**Process B:** edge trimming

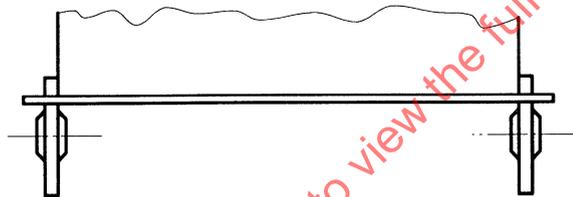
**Process C:** chamfering

**Process D:** grooving

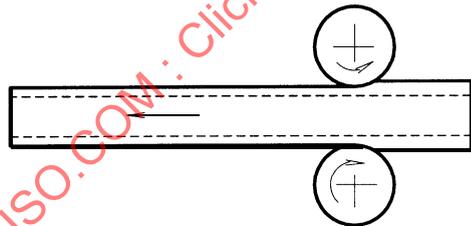
Processing operations shall be symmetrical for double-sided machines.

Operating arrangements

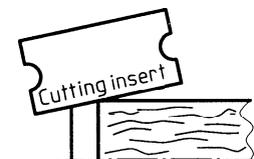
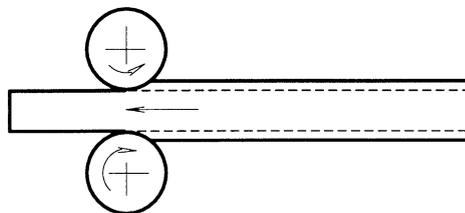
Process A: End trimming



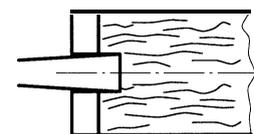
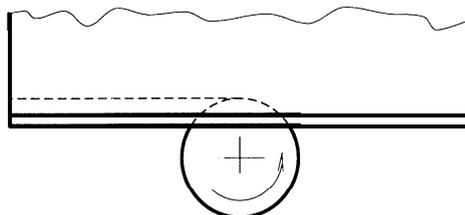
Process B: Edge trimming



Process C: Chamfering



Process D: Grooving



**Data sheet for edge-banding machines (continued)**

Tool and cutting data	Units	Standard condition(s)	Condition chosen within permitted range or conditions deviating from standard
<p><b>Procedure P</b> <input type="checkbox"/></p> <p><b>Procedure H</b> <input type="checkbox"/></p>			
<p>a) End trimming saw</p>			
<p>Type of saw: Specify according to make of machine</p>			
<p>spindle drive</p>	r/min	.....	
<p>sawblade diameter</p>	mm	.....	
<p>cutting speed</p>	m/s	.....	
<p>number of teeth</p>		.....	
<p>tooth profile</p>		.....	
<p>tooth width</p>	mm	.....	
<p>actual blade thickness</p>	mm	.....	
<p>b) Edge trimming cutter</p>			
<p>Type of tool:.....</p>			
<p>spindle speed</p>	r/min	.....	
<p>cutting circle diameter</p>	mm	70	
<p>cutting speed</p>	m/s	.....	
<p>number of teeth/knives</p>		4	
<p>cutter width</p>	mm	12 min.	
<p>cutting depth</p>	mm	.....	
<p>cutting principle: spindle rotation opposing feed</p>			
<p>c) Chamfering cutter</p>			
<p>Type of tool:.....</p>			
<p>spindle speed</p>	r/min	.....	
<p>cutting circle diameter</p>	mm	70	
<p>cutting speed</p>	m/s	.....	
<p>number of teeth/knives</p>		4	
<p>cutting width</p>	mm	12 min.	
<p>cutting depth</p>	mm	.....	
<p>cutting principle: spindle rotation opposing feed</p>			
<p>d) Grooving saw</p>			
<p>Type of tool:.....</p>			
<p>spindle speed</p>	r/min	.....	
<p>cutting circle diameter</p>	mm	.....	
<p>cutting speed</p>	m/s	50 min.	
<p>number of teeth</p>		.....	
<p>tooth width</p>	mm	4	
<p>cutting depth</p>	mm	5	
<p>cutting principle: spindle rotation in direction of feed</p>			
<p>e) Feed rate</p>	m/min	15 min.	

**Data sheet for edge-banding machines** *(concluded)*

<b>Testing material</b>		
	<b>Procedure P</b>	<b>Procedure H</b>
Board material:	plastic-coated decorative particle board (see 4.3)	uncoated particle board, three-layer construction (see 4.3)
Moisture content:	6 % to 10 %	
Board thickness:	16 mm	
Board length:	2 000 mm	
Board width:	600 mm, processed down to a final minimum width of 400 mm	
Previous processing:	none	
Edge material:	plastic edge	hardwood edge
Edge width:	0,3 mm to 1,5 mm	15 mm
Edge height:	20 mm	19 mm
<b>Photo or detailed illustration of the machine tested</b>		
<p>STANDARDSISO.COM : Click to view the full PDF of ISO 7960:1995</p>		
<b>Testing laboratory</b>		
Firm/institution: .....		
Address: .....		
Telephone: .....		
Date: .....		Signature: .....
Test carried out:		
place: .....		
date: .....		

## Annex G (normative)

### Woodworking machines — Operating conditions for double-end sizing and edge-banding machines

#### G.1 General

This annex contains a series of Standard operating conditions to be applied in connection with measurement of noise from double-end sizing and edge-banding machines. Microphone positions are specified to allow measurement of sound pressure level at the operator's position and for determining the sound power level of a machine of this type.

These Standard conditions shall be complied with as closely as possible. If, in a specific Situation, it is necessary to deviate from Standard conditions, the actual condition applied for the test shall be recorded where a blank space in the column "Condition chosen within permitted range or conditions deviating from Standard" allows for such a Situation.

Mandatory and Standard safety attachments shall be mounted and in use during the tests.

This annex may also serve as a data sheet on which information on operating conditions is recorded.

This annex shall be used in connection with measurement of noise from the following machine.

#### Machine classification number (see ISO 7984)

Combined double-end sizing and edge-banding machine

83. 21

This annex may also be applied for measurement of noise from special-purpose machines having a similar construction and function.

#### G.2 Noise measurements

The machine shall be tested under the following conditions.

- a) Testing under no load with operating arrangement and tool and cutting data as specified in this annex.
- b) Testing under load as specified in this annex. A continuous supply of test pieces should be fed with a minimum distance between successive test pieces so that measurements are made during simultaneous Operation of all working units.
- c) Operator microphone positions for test purpose (see figure G.1)

Position A:

- 1,5 m above floor level;
- in the plane of the front face of the measurement surface;
- 0,3 m to the right of the left fence (viewed from infeed direction).

Position B:

- 1,5 m above floor level;
- in the plane of the rear face of the measurement surface;
- 0,3 m to the right of the left fence (viewed from infeed direction).

d) The reference box shall enclose all elements of the machine which are significant radiators of sound energy. The reference box shown in figure G.1 refers to a machine set-up for a 600 mm board width.

NOTE 10 The use of integrating sound level meters is recommended but is not mandatory.

Dimensions in metres

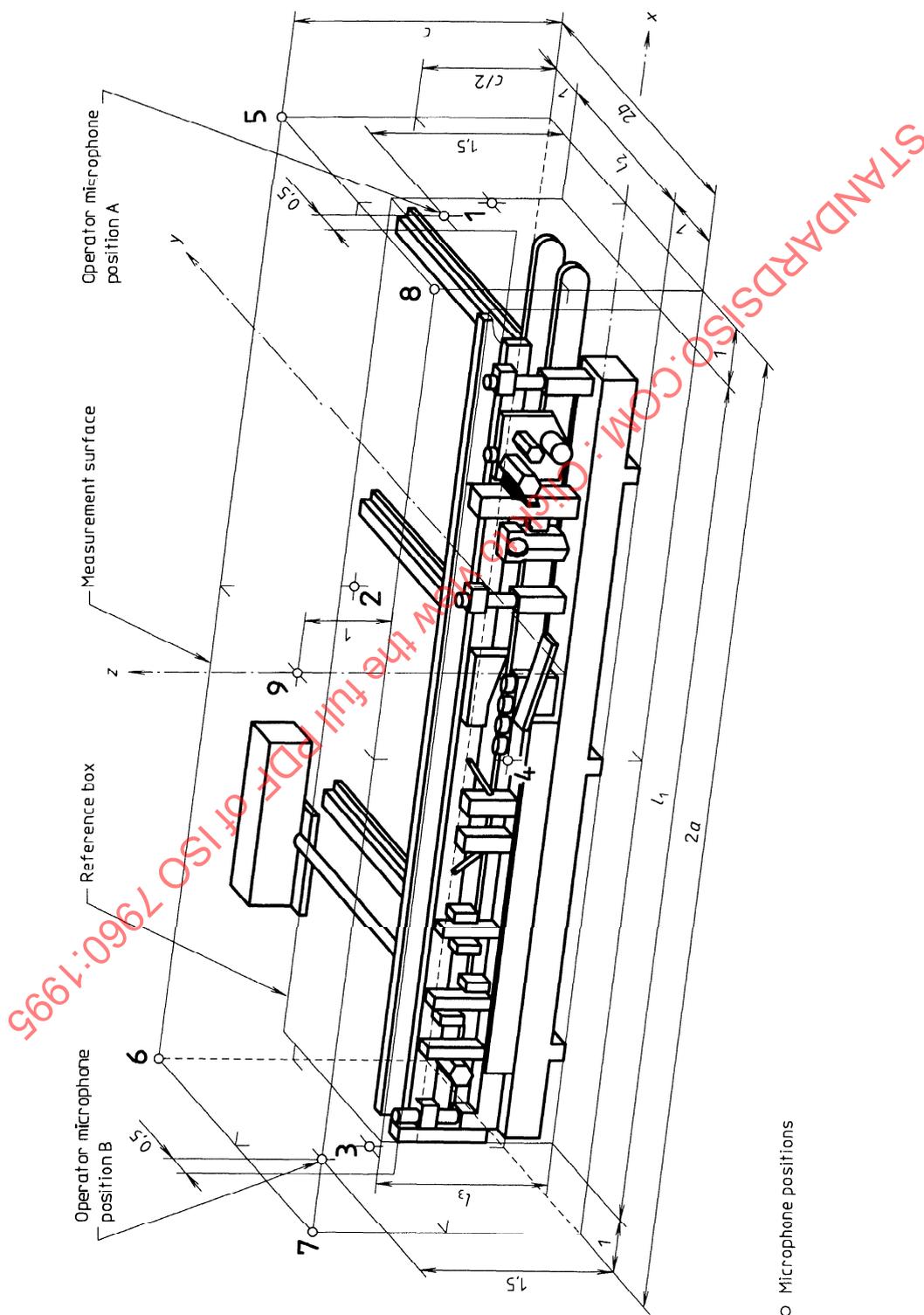


Figure G.1 — Measurement surface and microphone array for determination of sound power level for double-end sizing and edge-banding machines (see ISO 3740 series for explanation of symbols)



Data sheet for double-end sizing and edge-banding machines (*continued*)

## Testing operations

Sizing and edge-banding of particle board and final processing.

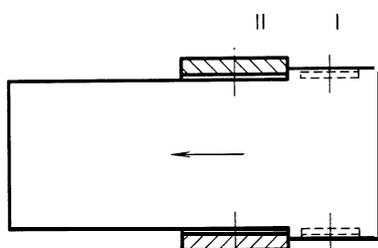
a) Sizing, using one of the following procedures:

**Procedure S:** Scoring sawblade (I)  
Hogging cutter (II)

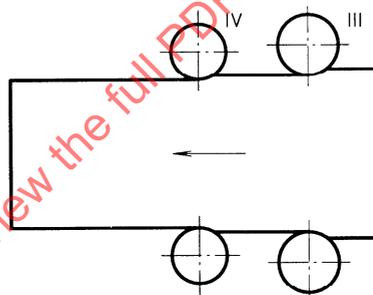
**Procedure M:** Edge-moulding, relieving cutter (III)  
Edge-moulding, finish planing cutter (IV)

8 mm shall be cut off at each side of the machine.

Processing operations shall be symmetrical.



Procedure S



Procedure M

b) Edge-banding, using one of the following procedures:

**Procedure P:** Plastic edge is banded by machines constructed for banding of plastic edges as well as wooden edges.

**Procedure H:** Hardwood edge is banded by machines constructed for that purpose only.

c) Final processing of banded edges, carried out by means of the following operations:

**Process A:** end trimming

**Process B:** edge trimming

**Process C:** chamfering

**Process D:** grooving

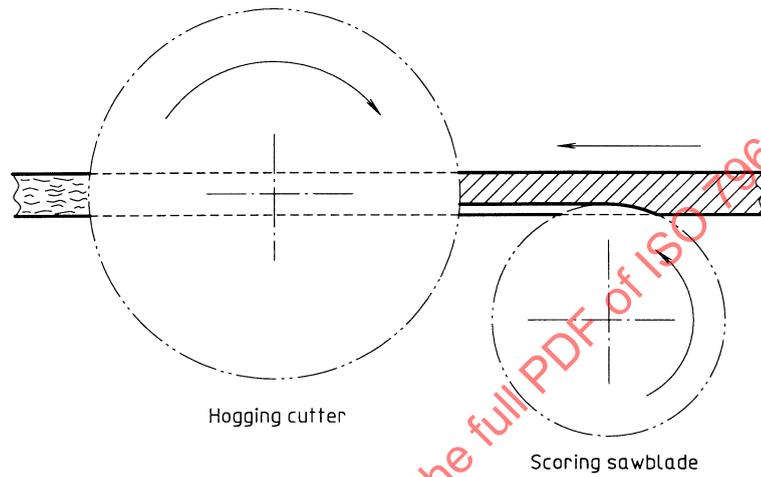
Processing operations shall be symmetrical.

Data sheet for double-end sizing and edge-banding machines (continued)

Operating arrangements

a) Procedure S

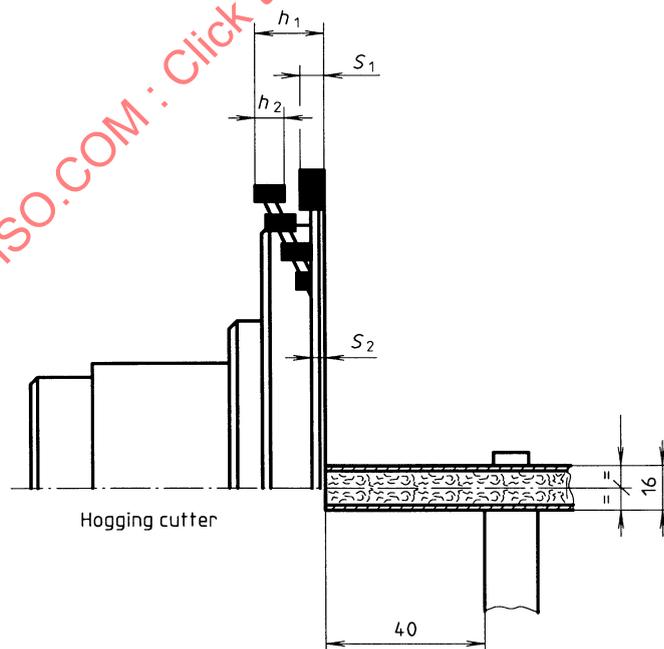
Sizing operation with scoring sawblade and hogging cutter



Hogging cutter

Scoring sawblade

Dimensions in millimetres



Hogging cutter

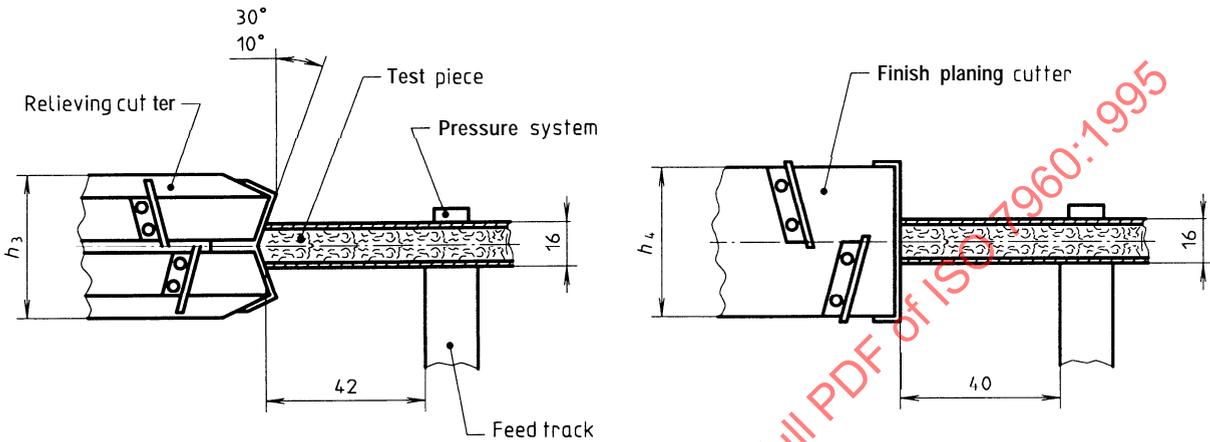
Hogging cutter, axis situated at centreline of test piece

Data sheet for double-end sizing and edge-banding machines (continued)

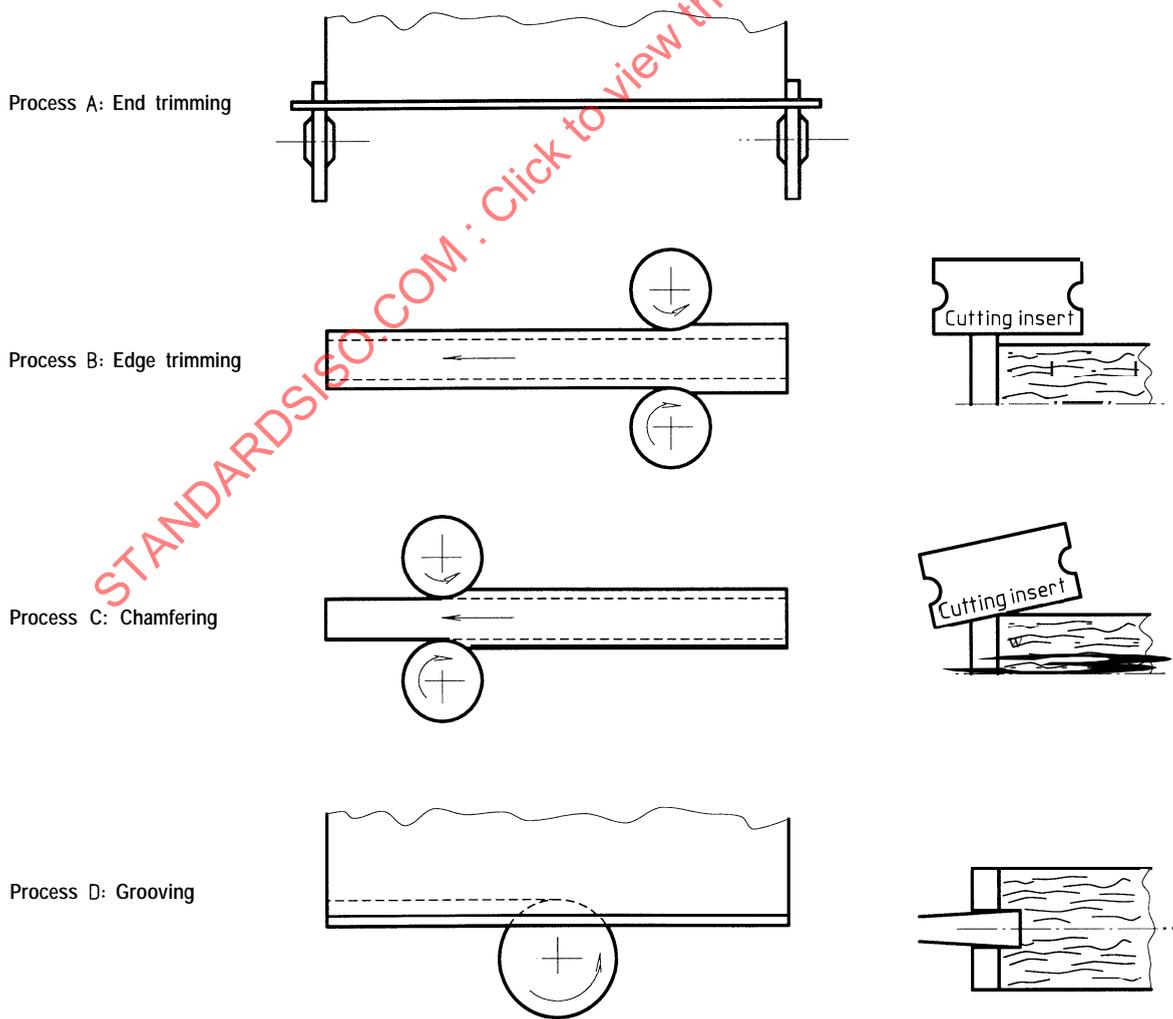
**b) Procedure M**

Sizing Operation with relieving cutter and finish planing cutter

Dimensions in millimetres



**Operating arrangements for final processing, if possible**



## Data sheet for double-end sizing and edge-banding machines (continued)

Tool and cutting data	Units	Standard condition(s)	Condition chosen within permitted range or conditions deviating from standard
<b>Procedure S</b>			
Scoring, sawing and hogging			
a) Spindle I (horizontal)			
Scoring (spindle rotation in direction of feed)			
Type of saw: Standard sawblade with carbide-tipped teeth			
spindle speed	r/min	3 000 <sup>1)</sup> or 6 000 <sup>1)</sup>	
blade diameter	mm	180 to 200	
cutting speed	m/s	.....	
number of teeth		36 to 48	
tooth profile			
tooth width	mm	3,2 ± 0,1	
actual blade thickness	mm	2,2 ± 0,1	
scoring depth	mm	2	
b) Spindle II (horizontal)			
Sawing and hogging cutter (cutting in opposition to scoring cutter)			
Type of saw: Standard sawblade with carbide-tipped teeth			
spindle speed	r/min	3 000	6 000 <sup>1)</sup>
blade diameter	mm	280 to 300	200
cutting speed	m/s	.....	.....
number of teeth		72 to 84	48 to 60
tooth profile			
tooth width, $S_1$	mm	3,2 ± 0,1	4 ± 0,1
actual blade thickness, $S_2$	mm	2,2 ± 0,1	2,8 ± 0,1
Type of saw: Hogging cutter (helical) with carbide-tipped teeth			
diameter	mm	280 to 300	200
number of teeth per row		6 to 12	4 to 6
total cutting width, $h_1$	mm	20 to 24	20 to 24
cutting width per tooth, $h_2$	mm	4 min.	4 min.
c) Feed rate	m/min	15 <sup>2)</sup>	
d) Distance, feed track-tool	mm	40	
1) If available, 6 000 r/min shall be used.			
2) If this feed is unobtainable, the nearest available shall be used.			

Data sheet for double-end sizing and edge-banding machines (*continued*)

Tool and cutting data ( <i>continued</i> )	Units	Standard condition(s)	Condition chosen within permitted range or conditions deviating from standard
<b>Procedure M</b> Edge planing			
a) Spindle III (vertical) Relieving (spindle rotation opposing feed)			
Relieving cutter with carbide knives			
spindle speed	r/min	3 000 or 6 000 <sup>1)</sup>	
cutting circle diameter	mm	200	
cutting speed	m/s	.....	
number of cutting knives		2 × 4	
cutting width, $h_3$	mm	56	
cutting depth	mm	6	
b) Spindle IV (vertical) Planing (spindle rotation opposing feed)			
Finish planing cutter with carbide knives			
spindle speed	r/min	3 000 or 6 000 <sup>1)</sup>	
cutting circle diameter	mm	180	
cutting speed	m/s	.....	
number of cutting knives		2 × 3	
cutter width, $h_4$	mm	56	
cutting depth	mm	2	
c) Feed rate	m/min	15 <sup>2)</sup>	
d) Distance, feed track-tool	mm	40	
1) If available, 6 000 r/min shall be used. 2) If this feed is unobtainable, the nearest available shall be used.			

**Data sheet for double-end sizing and edge-banding machines (continued)**

Tool and cutting data (continued)	Units	Standard condition(s)	Condition chosen within permitted range or conditions deviating from standard
<p><b>Procedure P</b> <input type="checkbox"/></p>			
<p><b>Procedure H</b> <input type="checkbox"/></p>			
<p>a) End trimming saw</p>			
<p>Type of saw: Specify according to make of machine</p>			
<p>    spindle drive</p>	r/min	.....	
<p>    sawblade diameter</p>	mm	.....	
<p>    cutting speed</p>	m/s	.....	
<p>    number of teeth</p>		.....	
<p>    tooth profile</p>		.....	
<p>    tooth width</p>	mm	.....	
<p>    actual blade thickness</p>	mm	.....	
<p>b) Edge trimming cutter</p>			
<p>Type of tool:.....</p>			
<p>    spindle speed</p>	r/min	.....	
<p>    cutting circle diameter</p>	mm	70	
<p>    cutting speed</p>	m/s	.....	
<p>    number of teeth/knives</p>		4	
<p>    cutter width</p>	mm	12 min.	
<p>    cutting depth</p>	mm	.....	
<p>    cutting principle: spindle rotation opposing feed</p>			
<p>c) Chamfering cutter</p>			
<p>Type of tool:.....</p>			
<p>    spindle speed</p>	r/min	.....	
<p>    cutting circle diameter</p>	mm	70	
<p>    cutting speed</p>	m/s	.....	
<p>    number of teeth/knives</p>		4	
<p>    cutting width</p>	mm	12 min.	
<p>    cutting depth</p>	mm	.....	
<p>    cutting principle: spindle rotation opposing feed</p>			
<p>d) Grooving saw</p>			
<p>Type of tool:.....</p>			
<p>    spindle speed</p>	r/min	.....	
<p>    cutting circle diameter</p>	mm	.....	
<p>    cutting speed</p>	m/s	50 min.	
<p>    number of teeth</p>		.....	
<p>    tooth width</p>	mm	4	
<p>    cutting depth</p>	mm	5	
<p>    cutting principle: spindle rotation in direction of feed</p>			
<p>e) Feed rate</p>	m/min	15 min.	

**Data sheet for double-end sizing and edge-banding machines (concluded)**

<b>Testing material</b>		
	<b>Procedure P</b>	<b>Procedure H</b>
Board material:	plastic-coated decorative particle board (see 4.3)	uncoated particle board, three-layer construction (see 4.3)
Moisture content:	6 % to 10 %	
Board thickness:	16 mm	
Board length:	2 000 mm	
Board width:	600 mm, processed down to a final minimum width of 400 mm	
Previous processing:	none	
Edge material:	plastic edge	hardwood edge
Edge width:	0,3 mm to 1,5 mm	15 mm
Edge height:	20 mm	19 mm
<b>Photo or detailed illustration of the machine tested</b>		
<b>Testing laboratory</b>		
Firm/institution: .....		
Address: .....		
Telephone: .....		
Date: .....		Signature: .....
Test carried out:		
place: .....		
date: .....		

## Annex H (normative)

### Woodworking machines — Operating conditions for two-side and multi-side planing machines and moulding machines

#### H. 1 General

This annex contains a series of Standard operating conditions to be applied in connection with measurement of noise from two-side and multi-side planing machines and moulding machines. Microphone positions are specified to allow measurement of sound pressure level at the operator's position and for determining the sound power level of a machine of this type.

These Standard conditions shall be complied with as closely as possible. If, in a specific Situation, it is necessary to deviate from Standard conditions, the actual condition applied for the test shall be recorded where a blank space in the column "Condition chosen within permitted range or conditions deviating from Standard" allows for such a Situation.

Mandatory and Standard safety attachments shall be mounted and in use during the tests.

This annex may also serve as a data sheet on which information on operating conditions is recorded.

This annex shall be used in connection with measurement of noise from the following machines.

	<b>Machine classification number</b> (see ISO 7984)	
Two-side and multi-side planing and moulding machines	12.22	12.32
	12.23	12.33
	12.24	12.34

For the purpose of this annex the following distinction applies:

- planing machines refers to machines with fixed Cutters;
- moulding machines refers to machines with all Cutters interchangeable.

Moulding machines are subdivided into:

- those having a feed rate  $\leq 60$  m/min, which are classed normal duty; and
- those having a feed rate  $> 60$  m/min, which are classed heavy duty.

This annex may also be applied for measurement of noise from special-purpose machines having a similar construction and function.

## H.2 Noise measurements

The machine shall be tested under the following conditions.

- a) Testing under no load with operating arrangement and tool and cutting data as specified in this annex.
- b) Testing under load as specified in this annex. A continuous supply of test pieces should be fed with a minimum distance between successive test pieces so that measurements are made during simultaneous operation of all working units.
- c) Operator microphone positions for test purpose (see figure H.1)

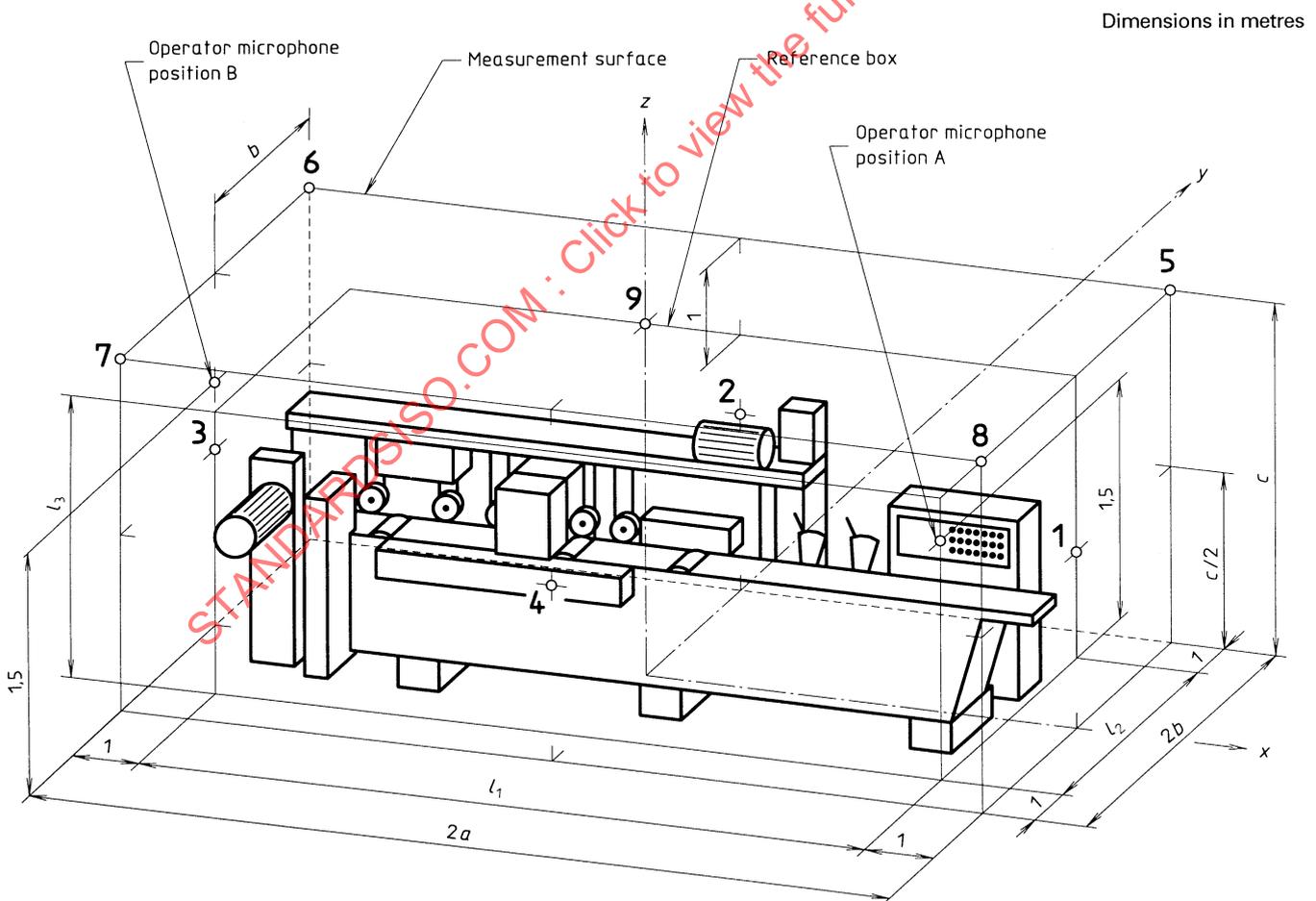
Position A:

- 1,5 m above floor level;
- in the left corner of the front face of the reference box.

Position B:

- 1,5 m above floor level;
- in the plane of and in the middle of the rear face of the measurement surface.

NOTE 11 The use of integrating sound level meters is recommended but is not mandatory.



○ Microphone positions

**Figure H.1 — Measurement surface and microphone array for determination of sound power level for two-side and multi-side planing machines and moulding machines (see ISO 3740 series for explanation of symbols)**

### H.3 Data sheet for two-side and multi-side planing machines and moulding machines

**Machine data**

Make: .....

Model: .....

Year of manufacture: ..... Serial No.: .....

Overall dimensions of machine<sup>1)</sup>:

length ..... mm width ..... mm height ..... mm

Spindle No. <sup>1)</sup>	Spindle function	Maximum tool diameter mm	Nominal rotational speed	
			Motor r/min	Spindle r/min
1				
2				
3				
4				
5				
6				

1) By reference to the fixed side of the machine.

Maximum feed rate: ..... m/min

Attached frequency converter

Separate frequency converter

**Machine installation**

Remarks/description:

Machine installed according to manufacturer's instructions

yes  no

Machine installed with dust extraction according to manufacturer's specifications

yes  no

Machine mounted on vibration isolators

yes  no

Machine fitted in separate noise enclosure

yes  no

Machine equipped with integral noise enclosure

yes  no

Machine equipped with noise-reducing hoods

yes  no

Machine equipped with slotted table lips

yes  no

Machine equipped with helical cutter block

yes  no

Machine equipped with segment cutter block

yes  no

Other noise control measures

yes  no

1) Those elements which protrude from the machine and which are not likely to contribute to the noise emission (for example hand-wheels, levers) may be disregarded.

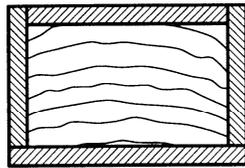
**Data sheet for two-side and multi-side planing machines and moulding machines**  
(continued)**Testing operations**

Planing of softwood on maximum number of sides.

**Operating arrangements**

- a) Moulding machines, class normal duty, and planing machines, all sizes.

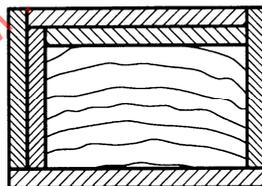
Moulding machines with a feed rate of  $\leq 60$  m/min, and planing machines (all sizes).



Planing on max. four sides with front bottom to top heads and front right side and left side heads.

- b) Moulding machines, class heavy duty.

Moulding machines with a feed rate  $> 60$  m/min.



Planing on max. four sides with front bottom to top head and front right side and left side heads.  
Additional planing on one horizontal and one vertical surface, if possible.

**Data sheet for two-side and multi-side planing machines and moulding machines**  
(continued)

Tool and cutting data	Units	Standard condition(s)	Condition chosen within permitted range or conditions deviating from Standard
Type of Cutter: Standard cutter-block with straight knives			
Spindle speed	r/min	6 000 <sup>1)</sup>	
Cutter width, bottom to top heads	mm	120 min.	
Cutter width, side heads	mm	100 min.	
Projection of cutting edges	mm	1,5 max.	
Cutting depth, Overall	mm	3	
Cutting principle: spindle rotation opposing feed			
Clearance distance table lip to cutter (if adjustable)	mm	4	
Planing machines			
feed rate	m/min	15 <sup>1)</sup>	
number of Cutters in action		4 max.	
cutting circle diameter	mm	125 <sup>2)</sup>	
cutting speed	m/s	39	
number of knives		4	
Moulding machines, class normal duty			
feed rate	m/min	15 <sup>1)</sup>	
number of cutters in action		4 max.	
cutting circle diameter	mm	125 <sup>2)</sup>	
cutting speed	m/s	39	
number of knives		4	
Moulding machines, class heavy duty			
feed rate	m/min	60 <sup>1)</sup>	
number of Cutters in action	m/min	6 max.	
cutting circle diameter	mm	160	
cutting speed	m/s	50	
number of knives		6	
<p>1) Spindle speed and feed rate shall be as close as possible to indicated values.</p> <p>2) If the spindle diameter is over 40 mm, then a cutting circle diameter greater than 125 mm may be chosen.</p>			

**Data sheet for two-side and multi-side planing machines and moulding machines**  
*(concluded)*

<b>Testing material</b>	
Material:	softwood, medium grade
Moisture content:	8 % to 14%
Material length:	planing machines: 1 000 mm moulding machines, normal duty: 1 000 mm moulding machines, heavy duty: 2 000 mm min.
Material width:	100 mm
Material height:	80 mm max., processed down to a final minimum height of 50 mm
Previous processing:	planed on four sides
<b>Photo or detailed illustration of the machine tested</b>	
<p>STANDARDSISO.COM : Click to view the full PDF of ISO 7960:1995</p>	
<b>Testing laboratory</b>	
Firm/institution:	.....
Add ress:	.....
Telephone:	.....
Date:.....	Signature: .....
Test carried out:	
place:	.....
date:	.....

## Annex J (normative)

### Woodworking machines — Operating conditions for band sawing machines

#### J. 1 General

This annex contains a series of Standard operating conditions to be applied in connection with measurement of noise from band sawing machines. Microphone positions are specified to allow measurement of sound pressure level at the operator's position and for determining the sound power level of a machine of this type.

These Standard conditions shall be complied with as closely as possible. If, in a specific Situation, it is necessary to deviate from Standard conditions, the actual condition applied for the test shall be recorded where a blank space in the column "Condition chosen within permitted range or conditions deviating from Standard" allows for such a Situation.

Mandatory and Standard safety attachments shall be mounted and in use during the tests.

This annex may also serve as a data sheet on which information on operating conditions is recorded.

The present annex shall be used in connection with measurement of noise from the following machines.

	<b>Machine classification number</b> (see ISO 7984)
Band resawing machine, vertical	12.121.42
Table band sawing machine	12.121.5

This annex may also be applied for measurement of noise from special kinds of machines having a similar construction and function.

#### J.2 Noise measurements

The machine shall be tested under the following conditions.

- a) Testing under no load with operating arrangement and tool and cutting data as specified in this annex.
- b) Testing under load as specified in this annex. The measurement result is the average of a series of at least three operations. During the first part of the work cycle, when the test material is fed into the tool, a higher level of noise may be emitted which depends on the infeed rate. On manually fed machines the infeed rate is difficult to control and therefore this part of the operating cycle shall not be included in the measurement.
- c) Operator microphone position for test for band sawing machines (see figure J.1):
  - 1,5 m above floor level;
  - in a plane perpendicular to the table and including the infeed edge of table;
  - in vertical plane of sawblade.

d) Operator microphone positions for test for band resawing machines (see figure J.2)

Position A:

- 1,5 m above the surface on which the operator stands:
- 1 m forward of the machine table:
- 0,5 m to the left of sawblade (viewed from infeed direction).

Position B:

- 1,5 m above the surface on which the operator stands;
- 1 m rearwards from machine table;
- 0,5 m to the left of the sawblade (viewed from infeed direction).

NOTE 12 The use of integrating sound level meters is recommended but is not mandatory.

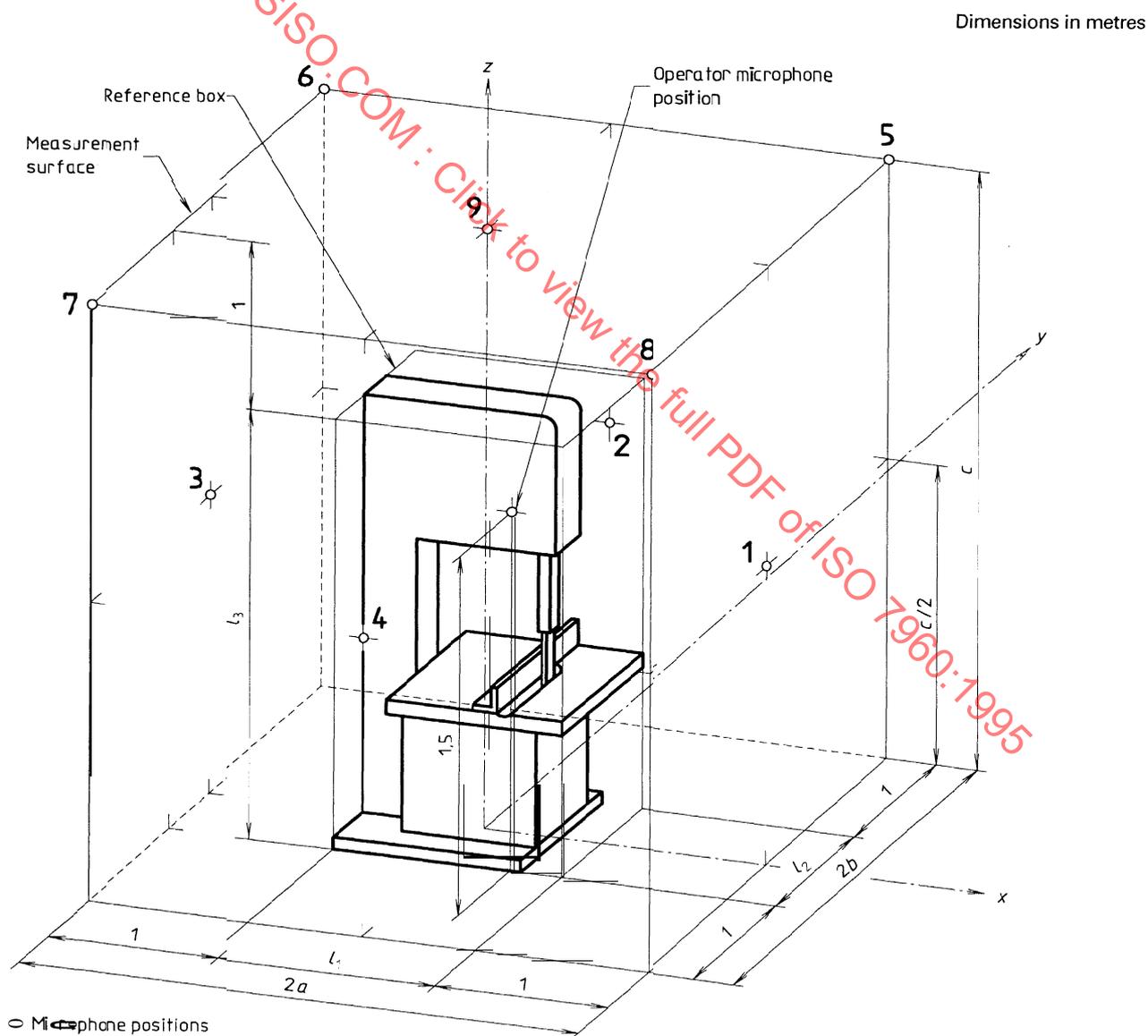


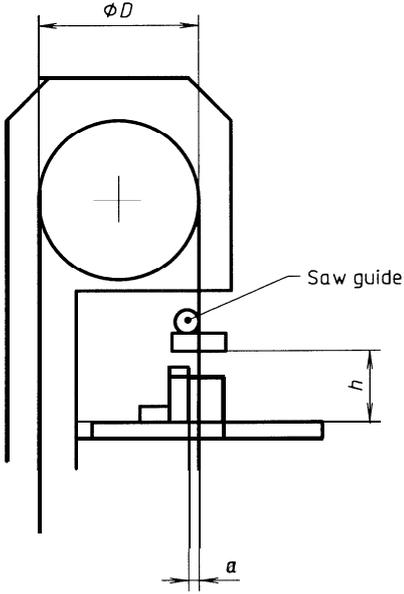
Figure J.1 — Measurement surface and microphone array for determination of sound power level for band sawing machines (see ISO 3740 series for explanation of symbols)



**J.3 Data sheet for band sawing machines**

<b>Machine data</b>	
Make: .....	Serial No.: .....
Model: .....	
Year of manufacture: .....	Serial No.: .....
Overall dimensions of machine <sup>1)</sup> :	
length ..... mm	width ..... mm height ..... mm
Pulley diameter: ..... mm	Max. sawblade width: ..... mm
Nominal rotational speed:	
motor ..... r/min	
pulley	
max.: ..... r/min	
min.: ..... r/min	
<b>Machine installation</b>	
Remarks/description:	
Machine installed according to manufacturer's instructions	.....
yes <input type="checkbox"/>	no <input type="checkbox"/>
Machine installed with dust extraction according to manufacturer's specifications	.....
yes <input type="checkbox"/>	no <input type="checkbox"/>
Machine mounted on Vibration isolators	.....
yes <input type="checkbox"/>	no <input type="checkbox"/>
Machine fitted in separate noise enclosure	.....
yes <input type="checkbox"/>	no <input type="checkbox"/>
Machine equipped with integral noise enclosure	.....
yes <input type="checkbox"/>	no <input type="checkbox"/>
Machine equipped with noise-reducing hoods	.....
yes <input type="checkbox"/>	no <input type="checkbox"/>
Other noise control measures	.....
yes <input type="checkbox"/>	no <input type="checkbox"/>
.....	
.....	
.....	
1) Those elements which protrude from the machine and which are not likely to contribute to the noise emission (for example hand-wheels, levers) may be disregarded.	

Data sheet for band sawing machines (continued)

Testing Operation	Units	Standard condition(s)	Condition chosen within permitted range or conditions deviating from Standard
<p>Cutting of softwood</p> <p>Operating arrangement</p>  <p>Fence Position, a:</p> <p>Height to saw guide, h:</p>	<p>Table band saw Band resawing machine</p> <p>mm mm</p>	<p>10 25</p> <p>min. possible</p>	

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## Data sheet for band sawing machines (continued)

Tool and cutting data	Units	Standard condition(s)	Condition chosen within permitted range or conditions deviating from standard
a) Table band sawing machines			
<input type="checkbox"/> Pulley diameter, $D \leq 500$	mm		
pulley diameter	mm	.....	
spindle speed	r/min	max. possible	
cutting speed	m/s	.....	
sawblade width	mm	16	
tooth pitch	mm	6 to 8	
sawblade thickness	mm	0,5	
feed rate	m/min	$4 \pm 2$	
<input type="checkbox"/> Pulley diameter, $500 < D \leq 900$	mm		
pulley diameter	mm	.....	
spindle speed	r/min	max. possible	
cutting speed	m/s	.....	
sawblade width	mm	25	
tooth pitch	mm	8 to 10	
sawblade thickness	mm	$\leq 0,001 D$	
feed rate	m/min	$6 \pm 2$	
<input type="checkbox"/> Pulley diameter, $D > 900$	mm		
pulley diameter	mm	.....	
spindle speed	r/min	max. possible	
cutting speed	m/s	.....	
sawblade width	mm	40	
tooth pitch	mm	10 to 12	
sawblade thickness	mm	$\leq 0,001 D$	
feed rate	m/min	$6 \pm 2$	
b) Band resawing machines			
<input type="checkbox"/> Pulley diameter, $D$ , unspecified	mm		
pulley diameter	mm	.....	
spindle speed	r/min	max. possible	
cutting speed	m/s	.....	
sawblade width	mm	max. recomm.	
tooth pitch	mm	30 to 50	
sawblade thickness	mm	$\leq 0,001 D$	
feed rate			
manual feed	m/min	$6 \pm 2$	
mechanical feed	m/min	15	

**Data sheet for band sawing machines (concluded)**

<b>Testing material</b>		
Material:	softwood, medium grade	
Moisture content:	8 % to 14 %	
	<b>Table band saw</b>	<b>Band resawing machine</b>
Material length:	1 000 mm	2 000 mm
Material width:	80 mm processed down to a final minimum width of 40 mm	150 mm processed down to a final minimum width of 50 mm
Material height:	40 mm	150 mm
Previous processing:	none	
<b>Photo or detailed illustration of the machine tested</b>		
<p style="color: red; font-size: 2em; transform: rotate(-45deg); opacity: 0.5;">STANDARDSISO.COM : Click to view the full PDF of ISO 7960:1995</p>		
<b>Testing laboratory</b>		
Firm/institution: .....		
Address: .....		
Telephone: .....		
Date: .....		Signature: .....
Test carried out:		
place: .....		
date: .....		

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## Annex K (normative)

### Woodworking machines — Operating conditions for single-end tenoning machines

#### K. 1 General

This annex contains a series of Standard operating conditions to be applied in connection with measurement of noise from Single-end tenoning machines. Microphone positions are specified to allow measurement of sound pressure level at the operator-3 position and for determining the sound power level of a machine of this type.

These Standard conditions shall be complied with as closely as possible. If, in a specific Situation, it is necessary to deviate from Standard conditions, the actual condition applied for the test shall be recorded where a blank space in the column "Condition chosen within permitted range or conditions deviating from Standard" allows for such a Situation.

Mandatory and Standard safety attachments shall be mounted and in use during the tests.

This annex may also serve as a data sheet on which information on operating conditions is recorded.

This annex shall be used in connection with measurement of noise from the following machine.

	<b>Machine classification number</b> (see ISO 7984)
Single-end tenoning machine with two spindles	82.1 (two spindles only)

This annex may also be applied for measurement of noise from special kinds of machines having a similar construction and function.

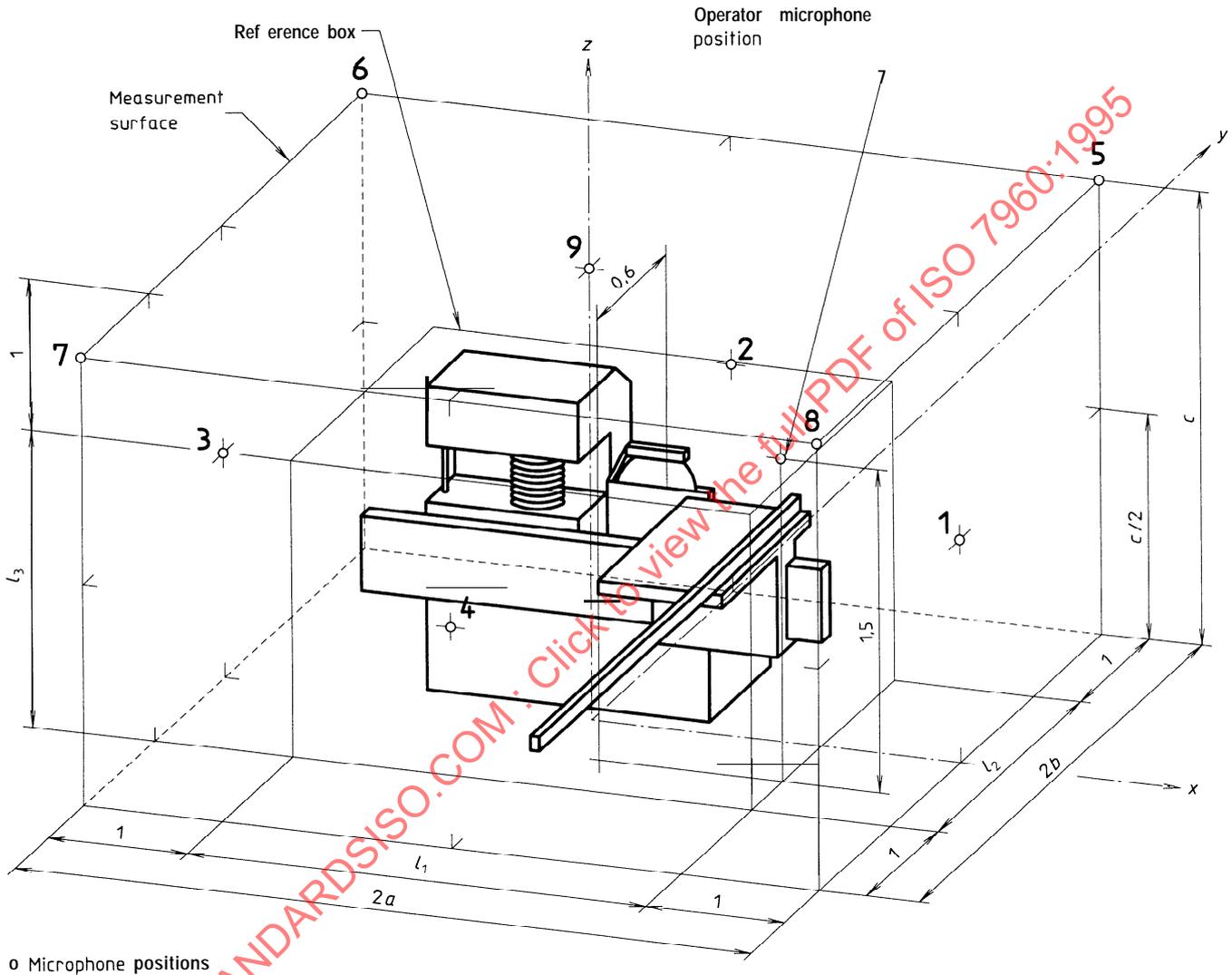
#### K.2 Noise measurements

The machine shall be tested under the following conditions.

- a) Testing under no load with operating arrangement and tool and cutting data as specified in this annex.
- b) Testing under load as specified in this annex. The measurement result is the average of a series of at least three operations. For each Operation the equivalent continuous sound pressure level is measured over a full working cycle from when the tool/workpiece starts moving until the tool/workpiece has returned to the start Position. The time period for each working cycle shall be reported.
- c) Operator microphone position for test purpose (see figure K.1):
  - 1,5 m above floor level;
  - 0,6 m sideways from the sawblade;
  - in the plane of the front face of the reference box.
- d) The reference box shall enclose the moving table but shall exclude the protruding fence.

NOTE 13 In practice, such a measurement can only be carried out by using integrating sound level meters.

Dimensions in metres

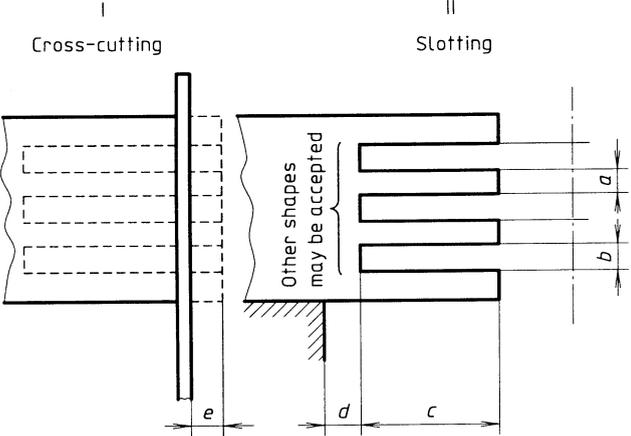


o Microphone positions

**Figure K.1 — Measurement surface and microphone array for determination of sound power level for single-end tenoning machines (see ISO 3740 series for explanation of Symbols)**



Data sheet for single-end tenoning machines (continued)

Testing operation	Units	Standard condition(s)	Condition chosen within permitted range or conditions deviating from standard
<p>Tenoning and slotting of softwood</p> <p><b>Operating arrangement</b></p>  <p>Tenoning thickness, <i>a</i> mm                      Slot width, <i>b</i> mm                      Tenon depth, <i>c</i> mm                      Distance to support, <i>d</i> mm                      Surplus for cross-cutting, <i>e</i> mm</p>		<p>8                      8                      60 to 65                      min. possible                      2 to 20</p>	
<p><b>Tool and cutting data</b></p> <p>a) Spindle I                      Cross-cutting sawblade (standard sawblade with carbide-tipped teeth)</p> <p>spindle speed r/min                      sawblade diameter mm                      cutting speed m/s                      number of teeth                      tooth profile: alternate top-level                      tooth width mm                      actual blade thickness mm</p> <p>b) Spindle II                      Slotting cutters (cutter rotation opposing feed)</p> <p>spindle speed r/min                      cutting circle diameter mm                      cutting speed m/s                      number of cutting knives                      blade projection</p> <p>c) Feed rate during tenoning m/min</p>		<p>3 000 <sup>1)</sup>                      355 (350)                      .....                      48 to 64                      3,2 to 3,6                      2,2 to 2,6</p> <p>3 000 <sup>1)</sup>                      300                      .....                      2 to 3</p> <p>6 ± 2</p>	
<p>1) Spindle speed shall be as close as possible to 3 000 r/min.</p>			

**Data sheet for Single-end tenoning machines (concluded)**

**Testing material**

Material: softwood, medium grade  
 Moisture content: 8 % to 14%  
 Material length: 1000 mm to 2 000 mm  
 Material width: 58 mm to 65 mm  
 Material height: 58 mm to 65 mm  
 Previous processing: planed on four sides

**Photo or detailed illustration of the machine tested**

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**Testing laboratory**

Firm/institution: .....  
 Address: .....  
 Telephone: .....  
 Date: ..... Signature: .....  
 Test carried out:  
     place: .....  
     date: .....

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## Annex L (normative)

### Woodworking machines — Operating conditions for routing machines

#### L. 1 General

This annex contains a series of Standard operating conditions to be applied in connection with measurement of noise from routing machines. Microphone positions are specified to allow measurement of sound pressure level at the operator's position and for determining the sound power level of a machine of this type.

These Standard conditions shall be complied with as closely as possible. If, in a specific Situation, it is necessary to deviate from Standard conditions, the actual condition applied for the test shall be recorded where a blank space in the column "Condition chosen within permitted range or conditions deviating from Standard" allows for such a Situation.

Mandatory and Standard safety attachments shall be mounted and in use during the tests.

This annex may also serve as a data sheet on which information on operating conditions is recorded.

This present annex shall be used in connection with measurement of noise from the following machines.

	<b>Machine classification number</b> (see ISO 7984)
Routing machines	12.315.12 12.315.22

This annex may also be applied for measurement of noise from special kinds of machines, for example NC-controlled machines, having a similar construction and function.

#### L.2 Noise measurements

The machine shall be tested under the following conditions.

- a) Testing under no load with operating arrangement and tool and cutting data as specified in this annex.
- b) Testing under load as specified in this annex. The measurement result is the average of a series of at least three operations. During the first part of the work cycle, when the test material is fed into the tool, a higher level of noise may be emitted which depends on the infeed rate. On manually fed machines the infeed rate is difficult to control and therefore this part of the operating cycle shall not be included in the measurement.
- c) Operator microphone position for test purpose (see figure L.1):

- 1,5 m above floor level;
- in middle of table in vertical plane of front edge of table.

NOTE 14 The use of integrating sound level meters is recommended but is not mandatory.

Dimensions in metres

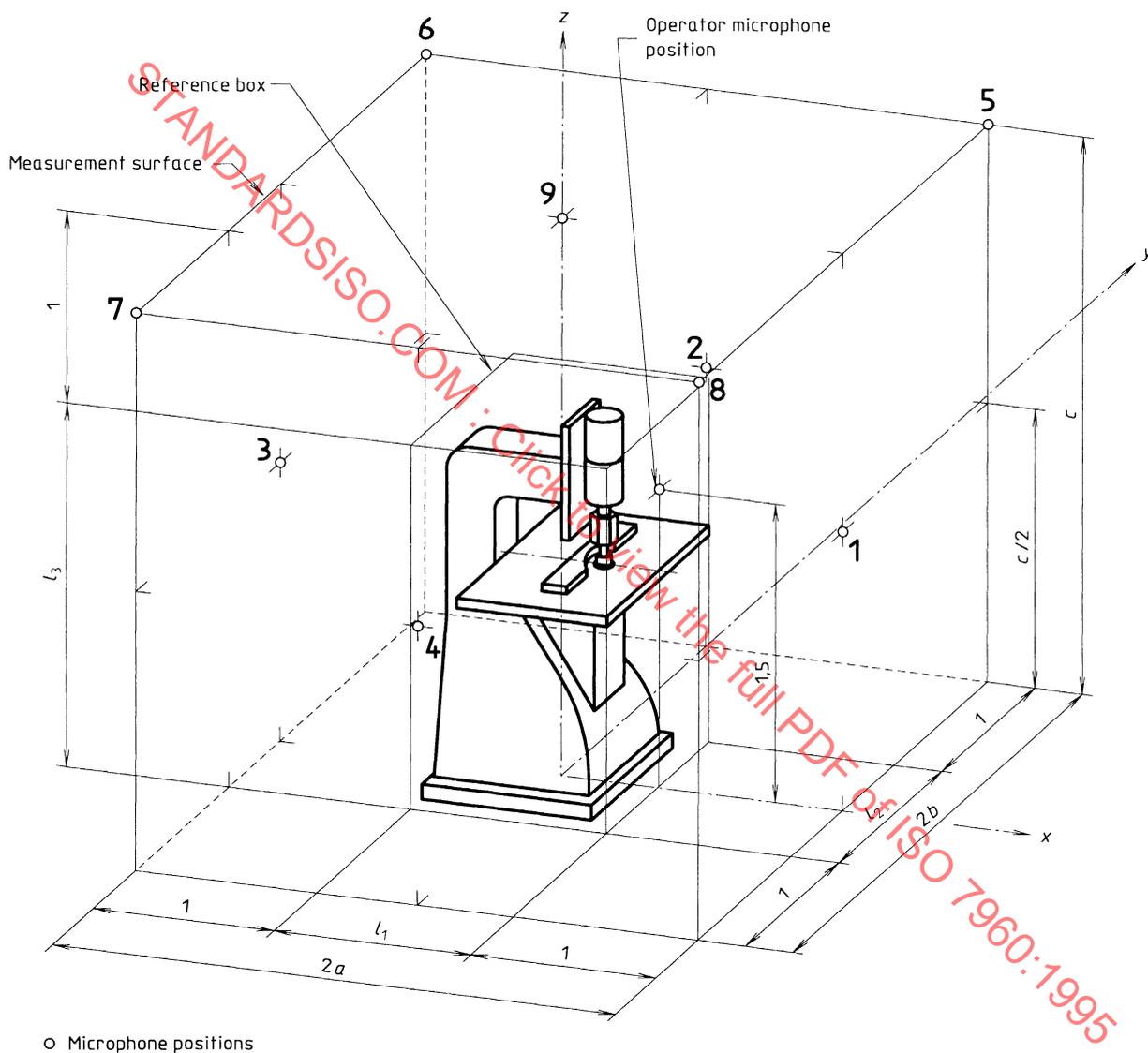
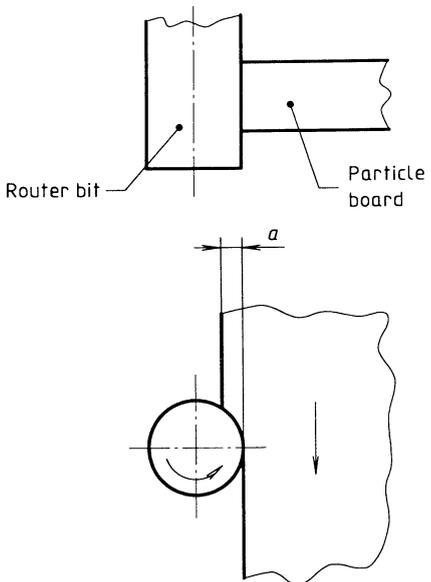


Figure L.1 — Measurement surface and microphone array for determination of sound power level for routing machines (see ISO 3740 series for explanation of symbols)



Data sheet for routing machines (continued)

<p><b>Testing operation</b></p> <p>Routing particle board edges</p> <p><b>Operating arrangement</b></p> 	<p><b>Units</b></p>	<p><b>Standard condition(s)</b></p>	<p><b>Condition chosen within permitted range or conditions deviating from standard</b></p>
<p><b>Tool and cutting data</b></p> <p>Type of tool: Router bit with shaft</p> <p>spindle speed</p> <p>cutting circle diameter</p> <p>cutting speed</p> <p>number of knives</p> <p>cutting knife length</p> <p>cutting depth, <i>a</i></p> <p>feed rate</p> <p><b>Cutting principle:</b></p> <p>cutter rotation opposing feed</p>	<p>r/min</p> <p>mm</p> <p>m/s</p> <p>mm</p> <p>mm</p> <p>m/min</p>	<p>18 000 <sup>1)</sup></p> <p>25</p> <p>.....</p> <p>2</p> <p>40 to 50</p> <p>5</p> <p>6 ± 2</p>	
<p>1) Spindle speed shall be as close as possible to 18 000 r/min.</p>			

**Data sheet for routing machines (concluded)**

**Testing material**

Material: particle board, three-layer construction  
Moisture content: 6 % to 10 %  
Board thickness: 16 mm  
Board length: 600 mm to 800 mm  
Board width: 600 mm to 800 mm, processed down to a final minimum width of 150 mm  
Previous processing: none

**Photo or detailed illustration of the machine tested**

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**Testing laboratory**

Firm/institution: .....  
Address: .....  
Telephone: .....  
Date: ..... Signature: .....  
Test carried out:  
place: .....  
date: .....

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## Annex M (normative)

### Woodworking machines — Operating conditions for double-end trim circular sawing machines (nonstroke)

#### M. 1 General

This annex contains a series of Standard operating conditions to be applied in connection with measurement of noise from double-end trim circular sawing machines. Microphone positions are specified to allow measurement of sound pressure level at the operator's position and for determining the sound power level of a machine of this type.

These Standard conditions shall be complied with as closely as possible. If, in a specific Situation, it is necessary to deviate from Standard conditions, the actual condition applied for the test shall be recorded where a blank space in the column "Condition chosen within permitted range or conditions deviating from Standard" allows for such a Situation.

Mandatory and Standard safety attachments shall be mounted and in use during the tests.

This annex may also serve as a data sheet on which information on operating conditions is recorded.

This present annex shall be used in connection with measurement of noise from the following machines.

#### Machine classification number (see ISO 7984)

Nonstroke double and multiple trim circular sawing machines	12.132.31
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This annex covers only double-end trimming machines with sawblade spindles below the table.

This annex may also be applied for measurement of noise from special kinds of machines having a similar construction and function.

#### M.2 Noise measurements

The machine shall be tested under the following conditions.

- a) Testing under no load with operating arrangement and tool and cutting data as specified in this annex.
- b) Testing under load as specified in this annex. The measurement result is the average of a series of at least three operations. During the first part of the work cycle, when the test material is fed into the tool, a higher level of noise may be emitted which depends on the infeed rate. On manually fed machines the infeed rate is difficult to control and therefore this part of the operating cycle shall not be included in the measurement.

If the machine includes a table circular saw, that part of the machine should be tested according to the operating conditions specified in annex A.

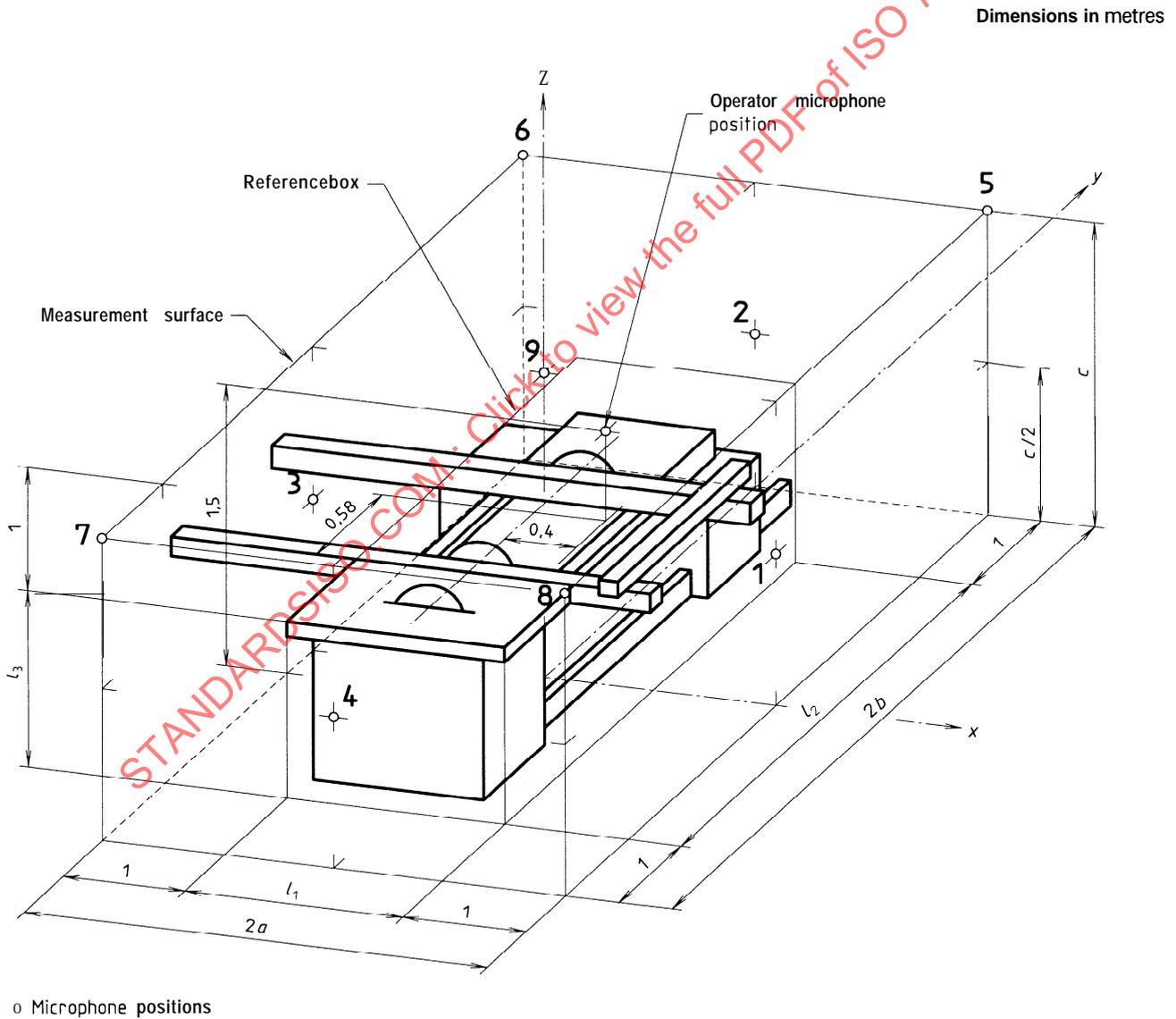
c) Operator microphone position for test purpose (see figure M.1):

- 1,5 m above floor level;
- 0,4 m forward of spindle centreline;
- 0,58 m to the right of the left-hand sawblade.

Tests taken at the operator-3 position shall be chosen as shown for idling conditions.

d) The reference box encloses the tables and excludes the sliding frame. The reference box shown in figure M.1 refers to a machine set-up for a 1 200 mm board width.

NOTE 15 The use of integrating sound level meters is recommended but is not mandatory.

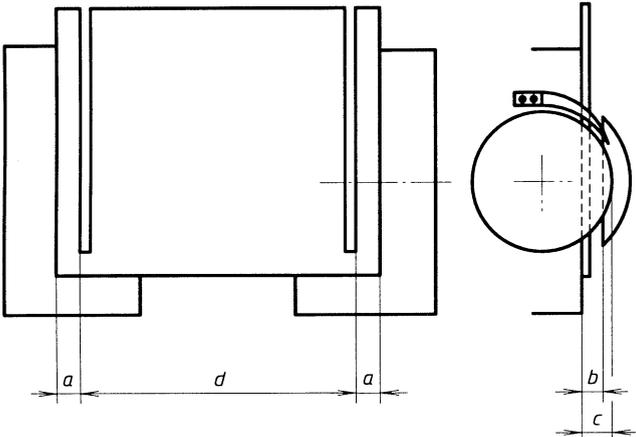


**Figure M.1 — Measurement surface and microphone array for determination of sound power level for double-end trim circular sawing machines (see ISO 3740 series for explanation of Symbols)**

**M.3 Data sheet for double-end trim circular sawing machines (nonstroke)**

<b>Machine data</b>	
Make: .....	.....
Model: .....	.....
Year of manufacture: .....	Serial No.: .....
Overall dimensions of machine <sup>1)</sup> :	
length ..... mm	width ..... mm height ..... mm
Max. blade diameter .....	Clamp flange diameter ..... mm
<input type="checkbox"/> With scoring sawblade	<input type="checkbox"/> Without scoring sawblade
Nominal rotational speed:	
motor: ..... r/min	.....
sawblade max. .... r/min	.....
min. .... r/min	.....
scoring sawblade: ..... r/min	.....
<b>Machine installation</b>	
	Remarks/description:
Machine installed according to manufacturer's instructions	.....
yes <input type="checkbox"/>	.....
no <input type="checkbox"/>	.....
Machine installed with dust extraction according to manufacturer's specifications	.....
yes <input type="checkbox"/>	.....
no <input type="checkbox"/>	.....
Machine mounted on vibration isolators	.....
yes <input type="checkbox"/>	.....
no <input type="checkbox"/>	.....
Machine equipped with noise-reducing hoods	.....
yes <input type="checkbox"/>	.....
no <input type="checkbox"/>	.....
Other noise control measures	.....
yes <input type="checkbox"/>	.....
no <input type="checkbox"/>	.....
<small>1) Those elements which protrude from the machine and which are not likely to contribute to the noise emission (for example hand-wheels, levers) may be disregarded.</small>	

Data sheet for double-end trim circular sawing machine (nonstroke) (continued)

<p><b>Testing operation</b></p> <p>Trimming of particle board</p> <p><b>Operating arrangement</b></p>  <p>Width of cutoff, <i>a</i></p> <p>Saw guard position, <i>b</i></p> <p>Sawblade projection, <i>c</i></p> <p>Scoring sawblade projection</p> <p>Machine set-up when performing measurement under no load, <i>d</i></p>	<p><b>Units</b></p>	<p><b>Standard condition(s)</b></p>	<p><b>Condition chosen within permitted range or conditions deviating from standard</b></p>
<p><b>Tool and cutting data</b></p> <p>Type of tool: Standard sawblade with carbide-tipped teeth</p> <p>Tooth profile: Alternate top-level teeth</p> <p>Main sawblade</p> <p>spindle speed</p> <p>sawblade diameter</p> <p>cutting speed</p> <p>number of teeth</p> <p>tooth width</p> <p>actual blade thickness</p> <p>Scoring sawblade</p> <p>spindle speed</p> <p>sawblade diameter</p> <p>cutting speed</p> <p>number of teeth</p> <p>tooth width</p> <p>actual blade thickness</p> <p>Feed rate</p>	<p>mm</p> <p>mm</p> <p>mm</p> <p>mm</p> <p>mm</p> <p>r/min</p> <p>mm</p> <p>m/s</p> <p>mm</p> <p>mm</p> <p>r/min</p> <p>mm</p> <p>m/s</p> <p>mm</p> <p>mm</p> <p>m/min</p>	<p>20</p> <p>20 max.</p> <p>30</p> <p>2</p> <p>1 160</p> <p>3 000 <sup>1)</sup></p> <p>355 (350)</p> <p>.....</p> <p>54 to 60</p> <p>3,2 to 3,6 (± 0,1)</p> <p>2,2 to 2,6 (± 0,1)</p> <p>.....<sup>2)</sup></p> <p>.....<sup>2)</sup></p> <p>.....<sup>2)</sup></p> <p>.....<sup>2)</sup></p> <p>..... ± 0,1 <sup>2)</sup></p> <p>..... ± 0,1 <sup>2)</sup></p> <p>6 ± 2</p>	
<p>1) Spindle speed shall be as close as possible to 3 000 r/min.</p> <p>2) In accordance with manufacturer's recommendations.</p>			

**Data sheet for double-end trim circular sawing machines (nonstroke) (concluded)**

**Testing material**

Material: particle board, three-layer construction  
Moisture content: 6 % to 10 %  
Board thickness: 16 mm  
Board length: 1 200 mm, processed down to a final minimum length of 600 mm  
Board width: 600 mm to 800 mm  
Previous processing: none

**Photo or detailed illustration of the machine tested**

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**Testing laboratory**

Firm/institution: .....  
Address: .....  
Telephone: .....  
Date: ..... Signature: .....  
Test carried out:  
place: .....  
date: .....

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## Annex N (normative)

### Woodworking machines — Operating conditions for single blade stroke circular sawing machines for cross-cutting

#### N. 1 General

This annex contains a series of Standard operating conditions to be applied in connection with measurement of noise from single blade stroke circular sawing machines for cross-cutting. Microphone positions are specified to allow measurement of sound pressure level at the operator's position and for determining the sound power level of a machine of this type.

These Standard conditions shall be complied with as closely as possible. If, in a specific Situation, it is necessary to deviate from Standard conditions, the actual condition applied for the test shall be recorded where a blank space in the column "Condition chosen within permitted range or conditions deviating from Standard" allows for such a Situation.

Mandatory and Standard safety attachments shall be mounted and in use during the tests.

This annex may also serve as a data sheet on which information on operating conditions is recorded.

This present annex shall be used in connection with measurement of noise from the following machine.

#### Machine classification number (see ISO 7984)

Single blade stroke circular sawing machine for cross-cutting	12.131.1
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This annex may also be applied for measurement of noise from special kinds of machines having a similar construction and function.

#### N.2 Noise measurements

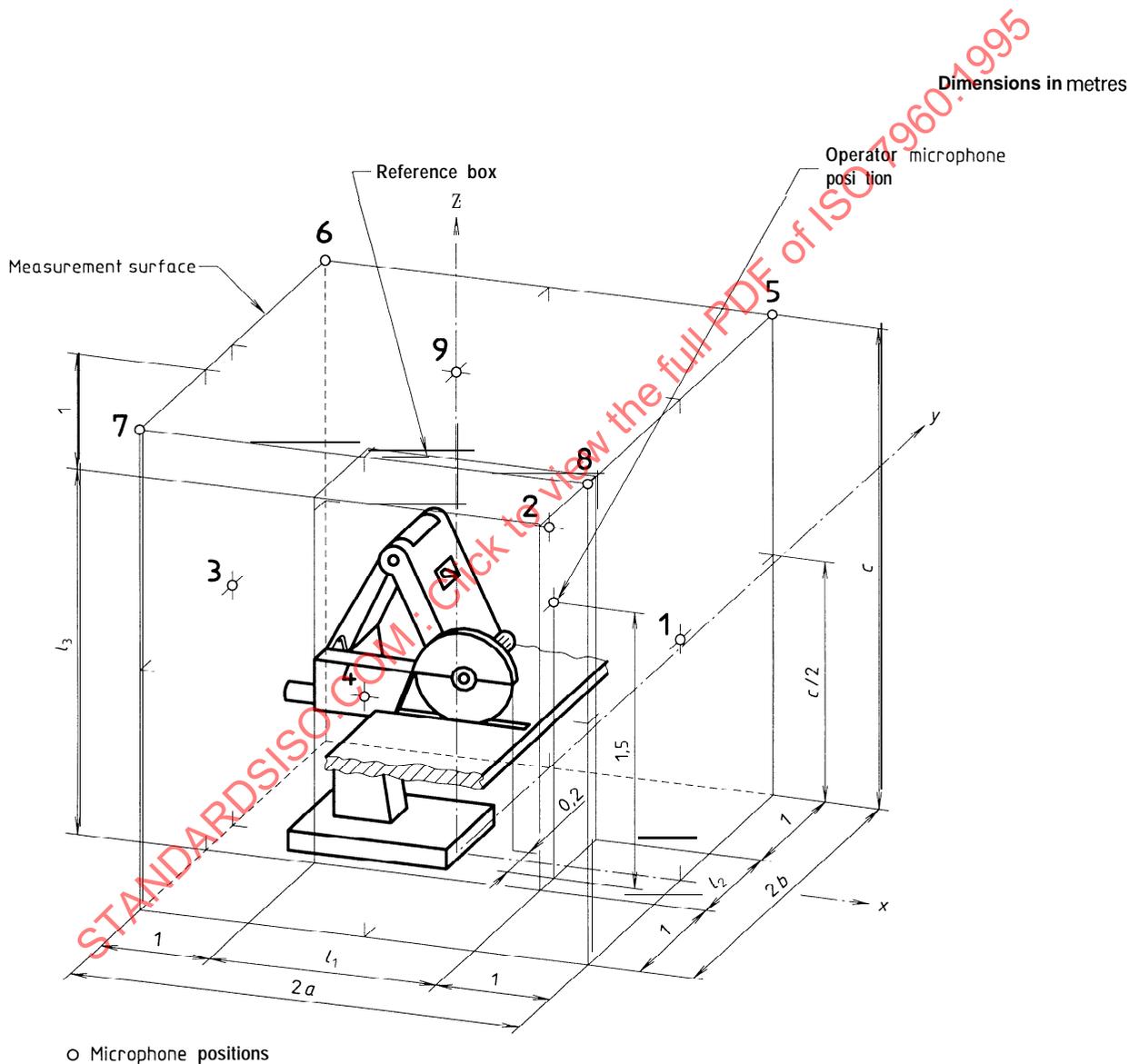
The machine shall be tested under the following conditions.

- a) Testing under no load with operating arrangement and tool and cutting data as specified in this annex.
- b) Testing under load as specified in this annex. The measurement result is the average of a series of at least three operations- For each Operation the equivalent continuous sound pressure level is measured over a full working cycle from when the tool/workpiece starts moving until the tool/workpiece has returned to the start Position. The time period for each working cycle shall be reported.
- c) Operator microphone position for test purpose:
  - 1,5 m above floor level;
  - in the plane of the front face of the reference box;
  - 0,2 m to the left of sawblade.

d) The reference box

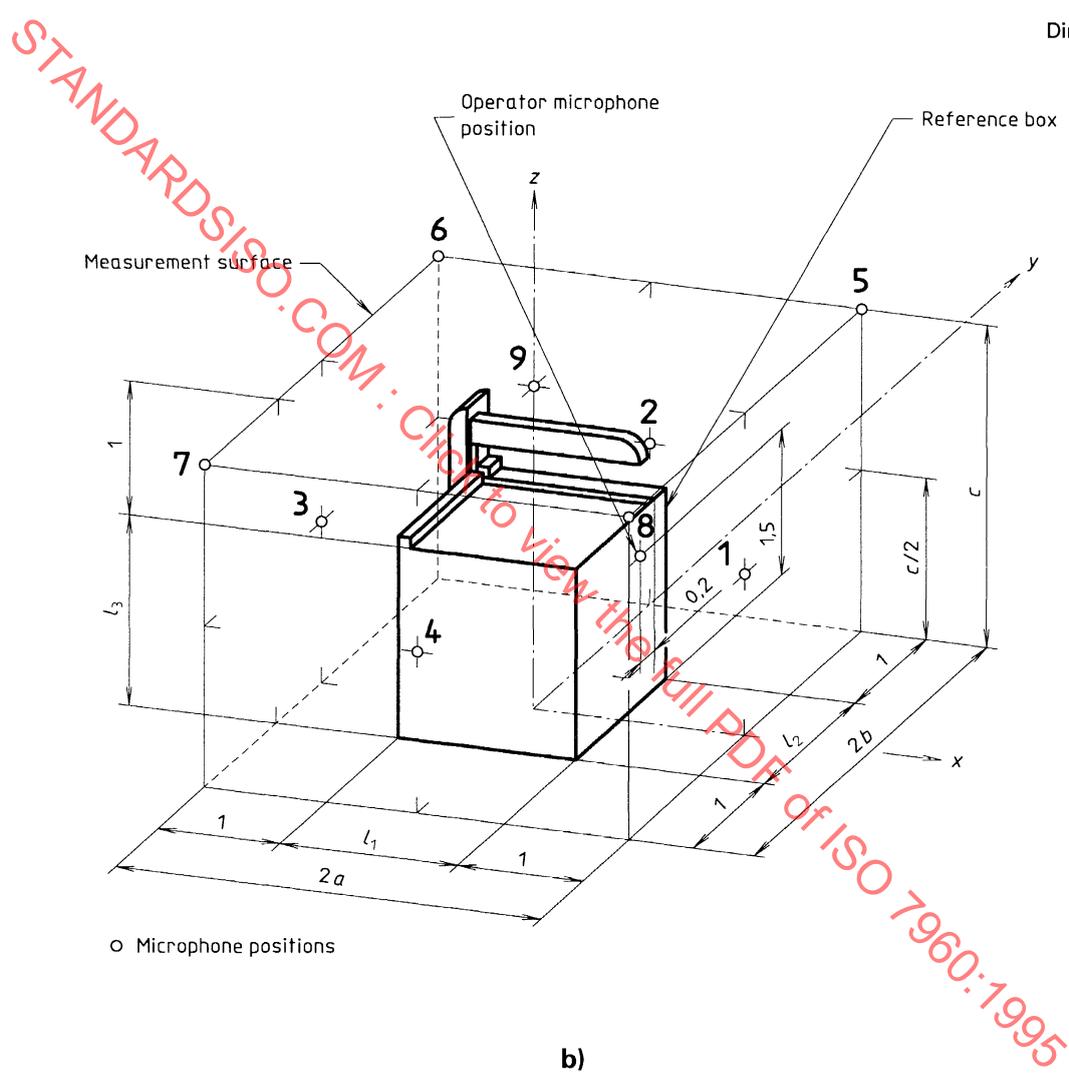
- 1) encloses the machine in all outward and upward positions but excludes the table and protruding parts of foundation [see figure N.1 a)];
- 2) encloses the table. The height of the reference box equals the height of the table above floor level [see figure N.1 b)];
- 3) encloses the table and the hood (in upper Position) [see figure N.1 c)].

NOTE 16 In practice, such a measurement can only be carried out by using integrating sound level meters.



a)

Dimensions in metres



○ Microphone positions

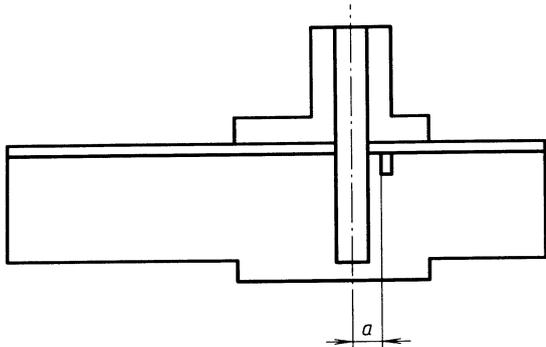
b)



**N.3 Data sheet for single blade stroke circular sawing machines for cross-cutting**

<b>Machine data</b>	
Make: .....	
Model: .....	
Year of manufacture: .....	Serial No.: .....
Machine function: .....	
Overall dimensions of machine <sup>1)</sup> :	
length .....	width ..... mm height ..... mm
Max. blade diameter .....	mm Clamp flange diameter ..... mm
Nominal rotational speed:	
motor: .....	r/min
sawblade max. ....	r/min
min. ....	r/min
<b>Machine installation</b>	
Machine installed according to manufacturer's instructions	Remarks/description: .....
yes <input type="checkbox"/>	no <input type="checkbox"/>
Machine installed with dust extraction according to manufacturer's specifications	.....
yes <input type="checkbox"/>	no <input type="checkbox"/>
Machine mounted on vibration isolators	.....
yes <input type="checkbox"/>	no <input type="checkbox"/>
Machine fitted in separate noise enclosure	.....
yes <input type="checkbox"/>	no <input type="checkbox"/>
Machine equipped with integral noise enclosure	.....
yes <input type="checkbox"/>	no <input type="checkbox"/>
Machine equipped with noise-reducing hood	.....
yes <input type="checkbox"/>	no <input type="checkbox"/>
Other noise control measure	.....
yes <input type="checkbox"/>	no <input type="checkbox"/>
<p>1) Those elements which protrude from the machine and which are not likely to contribute to the noise emission (for example hand-wheels, levers) may be disregarded.</p>	

Data sheet for single blade stroke circular sawing machines for cross-cutting (continued)

<p><b>Testing operation</b></p> <p>Cross-cutting of softwood</p> <p><b>Operating arrangement</b></p>  <p>Position of fixed stop, <i>a</i></p>	<p><b>Units</b></p> <p>mm</p>	<p><b>Standard condition(s)</b></p> <p>20</p>	<p><b>Condition chosen within permitted range or conditions deviating from standard</b></p>																																				
<p><b>Tool and cutting data</b></p> <p>Type of tool: Standard sawblade with carbide-tipped teeth</p> <p>Sawblade data (largest recommended sawblade diameter should be chosen):</p> <table border="1" data-bbox="159 1254 782 1624"> <thead> <tr> <th>Sawblade diameter mm</th> <th>Number of teeth</th> <th>Tooth width mm</th> <th>Blade thickness mm</th> </tr> </thead> <tbody> <tr> <td>200</td> <td>48 to 64</td> <td>2,5 to 3,2</td> <td>1,6 to 2,2</td> </tr> <tr> <td>250</td> <td>56 to 84</td> <td>2,5 to 3,2</td> <td>1,6 to 2,2</td> </tr> <tr> <td>315 (300)</td> <td>56 to 84</td> <td>3,0 to 3,2</td> <td>2,0 to 2,2</td> </tr> <tr> <td>355 (350)</td> <td>54 to 60</td> <td>3,2 to 3,6</td> <td>2,2 to 2,6</td> </tr> <tr> <td>400</td> <td>36 to 64</td> <td>3,2 to 3,6</td> <td>2,2 to 2,6</td> </tr> <tr> <td>450</td> <td>40 to 64</td> <td>3,6 to 4,0</td> <td>2,5 to 2,8</td> </tr> <tr> <td>500</td> <td>48 to 72</td> <td>4,0 to 4,5</td> <td>2,8 to 3,2</td> </tr> <tr> <td>630 (600)</td> <td>48 to 72</td> <td>5,6</td> <td>3,6</td> </tr> </tbody> </table> <p>630 to 1 000 According to manufacturer's specification</p> <p>Spindle speed</p> <p>Sawblade diameter</p> <p>Cutting speed</p> <p>Number of teeth</p> <p>Tooth width</p> <p>Actual blade thickness</p> <p>Feed rate</p>	Sawblade diameter mm	Number of teeth	Tooth width mm	Blade thickness mm	200	48 to 64	2,5 to 3,2	1,6 to 2,2	250	56 to 84	2,5 to 3,2	1,6 to 2,2	315 (300)	56 to 84	3,0 to 3,2	2,0 to 2,2	355 (350)	54 to 60	3,2 to 3,6	2,2 to 2,6	400	36 to 64	3,2 to 3,6	2,2 to 2,6	450	40 to 64	3,6 to 4,0	2,5 to 2,8	500	48 to 72	4,0 to 4,5	2,8 to 3,2	630 (600)	48 to 72	5,6	3,6	<p>r/min<sup>1)</sup></p> <p>mm</p> <p>m/s</p> <p>mm</p> <p>mm</p> <p>mm</p> <p>m/min</p>	<p>.....</p> <p>.....</p> <p>..... ± 0,1</p> <p>..... ± 0,1</p> <p>6 ± 2</p>	
Sawblade diameter mm	Number of teeth	Tooth width mm	Blade thickness mm																																				
200	48 to 64	2,5 to 3,2	1,6 to 2,2																																				
250	56 to 84	2,5 to 3,2	1,6 to 2,2																																				
315 (300)	56 to 84	3,0 to 3,2	2,0 to 2,2																																				
355 (350)	54 to 60	3,2 to 3,6	2,2 to 2,6																																				
400	36 to 64	3,2 to 3,6	2,2 to 2,6																																				
450	40 to 64	3,6 to 4,0	2,5 to 2,8																																				
500	48 to 72	4,0 to 4,5	2,8 to 3,2																																				
630 (600)	48 to 72	5,6	3,6																																				
<p>1) Spindle speed shall be the maximum possible for the actual machine.</p>																																							

**Data sheet for single blade stroke circular sawing machines for cross-cutting (concluded)**

<b>Testing material</b>			
Material:	softwood, medium grade		
Moisture content:	8 % to 14 %		
Material length:	1 000 mm, processed down to a final minimum length of 500 mm		
	<b>≤ 315 mm</b>	<b>Sawblade diameter 355 mm to 450 mm</b>	<b>&gt; 450 mm</b>
Material height:	50 mm	75 mm	100 mm
Material width:	50 mm	150 mm	250 mm
Previous processing:	none		
<b>Photo or detailed illustration of the machine tested</b>			
<p style="color: red; font-size: 2em; transform: rotate(-45deg); opacity: 0.5;">STANDARDSISO.COM : Click to view the full PDF of ISO 7960:1995</p>			
<b>Testing laboratory</b>			
Firm/institution: .....			
Address: .....			
Telephone: .....			
Date: .....		Signature: .....	
Test carried out:			
place: .....			
date: .....			

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## Annex P (normative)

### Woodworking machines — Operating conditions for vertical and horizontal panel sizing sawing machines

#### P. 1 General

This annex contains a series of Standard operating conditions to be applied in connection with measurement of noise from vertical and horizontal panel sizing machines. Microphone positions are specified to allow measurement of sound pressure level at the operator's position and for determining the sound power level of a machine of this type.

These Standard conditions shall be complied with as closely as possible. If, in a specific Situation, it is necessary to deviate from Standard conditions, the actual condition applied for the test shall be recorded where a blank space in the column "Condition chosen within permitted range or conditions deviating from Standard" allows for such a Situation.

Mandatory and Standard safety attachments shall be mounted and in use during the tests.

This annex may also serve as a data sheet on which information on operating conditions is recorded.

This present annex shall be used in connection with measurement of noise from the following machine.

	<b>Machine classification number</b> (see ISO 7984)
Vertical and horizontal panel sizing sawing machine	12.131.261

This annex may also be applied for measurement of noise from special kinds of machines having a similar construction and function.

#### P.2 Noise measurements

The machine shall be tested under the following conditions.

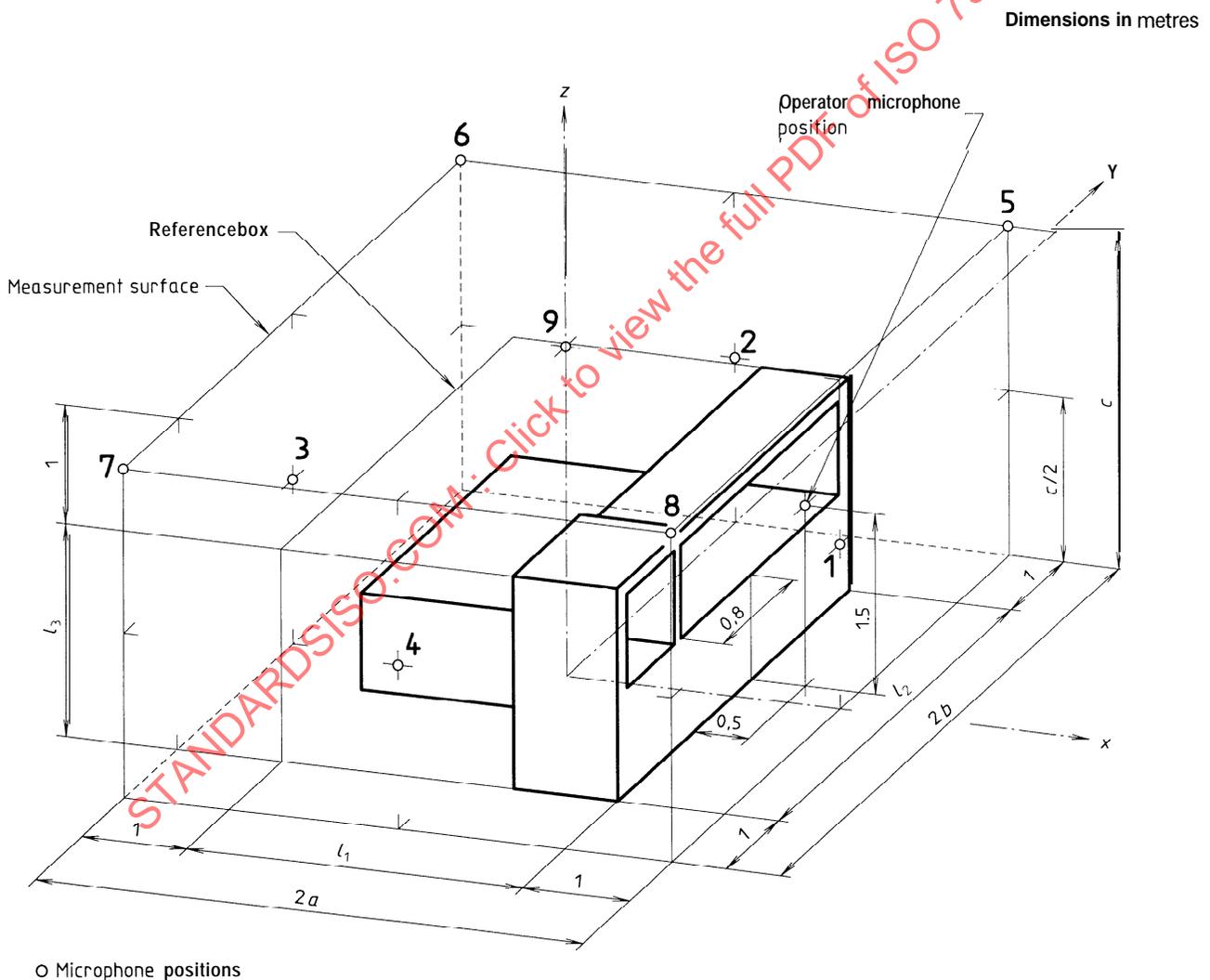
- a) Testing under no load with operating arrangement and tool and cutting data as specified in this annex.
- b) Testing under load as specified in this annex. The measurement result is the average of a series of at least three operations. During the first part of the work cycle, when the test material is fed into the tool, a higher level of noise may be emitted which depends on the infeed rate. On manually fed machines the infeed rate is difficult to control and therefore this part of the operating cycle shall not be included in the measurement.
- c) Operator microphone position for test purpose for horizontal panel sizing sawing (see figure P.1):
  - 1,5 m above floor level;
  - 0,5 m forward of the front face of the reference box;
  - 0,8 m to the right of the sawblade outlet.

NOTE 17 The reference box excludes protruding park in front of the machine.

- d) Operator microphone position for test purpose for vertical panel sizing sawing machines (see figure P. 2) :
- 1,5 m above floor level;
  - 0,5 m forward of the saw unit in idle Position;
  - in the vertical plane of the sawblade.

NOTE 18 Figure P.2 shows a machine placed against a wall. If the machine is detached, the microphone positions should be extended to include positions 3, 6 and 7 shown in figure P.1. Likewise, microphone positions 5', 8' and 9' should be used instead of 5, 8 and 9, if space so allows.

NOTE 19 The use of integrating sound level meters is recommended but is not mandatory.



**Figure P.1 — Measurement surface and microphone array for determination of sound power level for horizontal panel sizing sawing machines (see ISO 3740 series for explanation of Symbols)**

Dimensions in metres

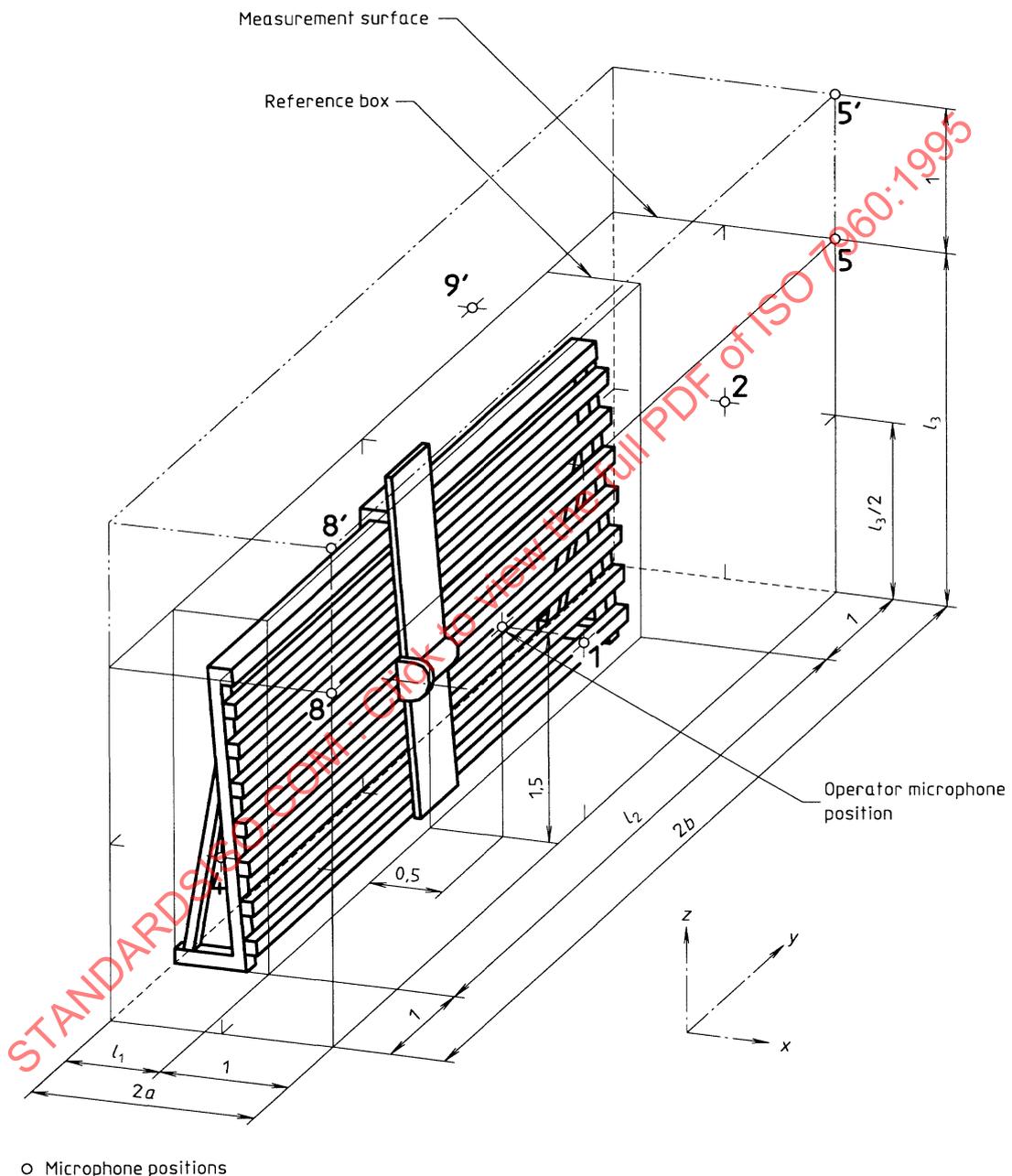
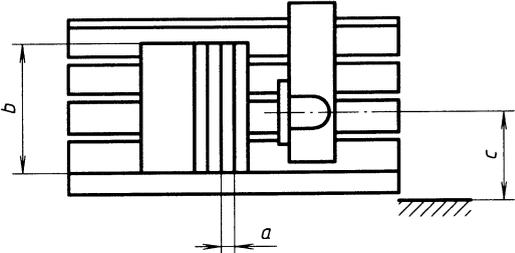
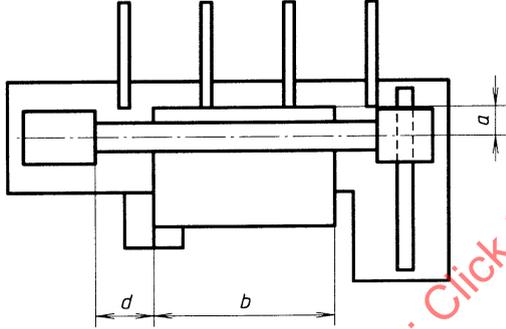


Figure P.2 — Measurement surface and microphone array for determination of sound power level for vertical panel sizing sawing machines (see ISO 3740 series for explanation of symbols)

**P.3 Data sheet for vertical and horizontal panel sizing sawing machines**

<b>Machine data</b>	
Make: .....	
Model: .....	
Year of manufacture: .....	Serial No.: .....
Overall dimensions of machine <sup>1)</sup> :	
length .....	width ..... mm height ..... mm
Max. blade diameter .....	mm Clamp flange diameter ..... mm
<input type="checkbox"/> With scoring sawblade	<input type="checkbox"/> Without scoring sawblade
<input type="checkbox"/> Vertical machine	<input type="checkbox"/> Horizontal machine
<input type="checkbox"/> Manual saw unit movement	<input type="checkbox"/> Automated saw unit movement
Nominal rotational speed:	
motor: .....	r/min
sawblade max. ....	r/min
min. ....	r/min
scoring sawblade: .....	r/min
<b>Machine installation</b>	
Machine installed according to manufacturer's instructions	Remarks/description:
yes <input type="checkbox"/> no <input checked="" type="checkbox"/>	.....
Machine installed with dust extraction according to manufacturer's specifications	.....
yes <input type="checkbox"/> no <input type="checkbox"/>	.....
Machine mounted on vibration isolators	.....
yes <input type="checkbox"/> no <input type="checkbox"/>	.....
Machine equipped with noise-reducing hood	.....
yes <input type="checkbox"/> no <input type="checkbox"/>	.....
Other noise control measures	.....
yes <input type="checkbox"/> no <input type="checkbox"/>	.....
1) Those elements which protrude from the machine and which are not likely to contribute to the noise emission (for example hand-wheels, levers) may be disregarded.	

**Data sheet for vertical and horizontal panel sizing sawing machines (continued)**

Testing operation	Units	Standard condition(s)	Condition chosen within permitted range or conditions deviating from standard
<p>Cutting particle board</p> <p><b>Operating arrangement</b></p> <p><b>Vertical machine</b></p>  <p>The board shall be placed centrally on the machine Saw unit position at idle running, <i>c</i></p> <p><b>Horizontal machine</b></p>  <p>Distance between panel and sawblade outlet, <i>d</i> Width of cutoff, <i>a</i> Cutting length, <i>b</i></p>	<p>mm</p> <p>mm</p> <p>mm</p>	<p>1 200</p> <p>200</p> <p>50</p> <p>1 200</p>	
<p><b>Tool and cutting data</b></p> <p>Type of tool: Standard sawblade with carbide-tipped teeth Tooth profile: Alternate top level teeth</p> <p>Feed rate</p> <p>a) vertical machines b) horizontal machines</p> <p><b>Main sawblade</b></p> <p>spindle speed sawblade diameter cutting speed number of teeth tooth width actual blade thickness</p> <p><b>Scoring sawblade</b></p> <p>spindle speed sawblade diameter cutting speed number of teeth tooth width actual blade thickness</p>	<p>m/min</p> <p>m/min</p> <p>r/min</p> <p>mm</p> <p>m/s</p> <p>mm</p> <p>mm</p> <p>r/min</p> <p>mm</p> <p>m/s</p> <p>mm</p> <p>mm</p>	<p><math>8 \pm 2</math> <sup>1)</sup></p> <p><math>15 \pm 2</math> <sup>1)</sup></p> <p>..... 2)</p> <p>..... 2)</p> <p>..... 2)</p> <p>..... 2)</p> <p>..... <math>\pm 0,1</math> 2)</p> <p>..... <math>\pm 0,1</math> 2)</p> <p>..... 2)</p> <p>..... 2)</p> <p>..... 2)</p> <p>..... 2)</p> <p>..... <math>\pm 0,1</math> 2)</p> <p>..... <math>\pm 0,1</math> 2)</p>	
<p>1) Speed shall be as close as possible to the standard condition. 2) In accordance with manufacturer's recommendations.</p>			

**Data sheet for vertical and horizontal panel sizing sawing machines (concluded)**

<b>Testing material</b>	
Material:	particle board, three-layer construction
Moisture content:	6 % to 10 %
Board thickness:	16 mm
Board length:	1 200 mm
Board width:	1 000 mm, processed down to a final minimum width of 300 mm
Previous processing:	none
<b>Photo or detailed illustration of the machine tested</b>	
<p>STANDARDSISO.COM : Click to view the full PDF of ISO 7960:1995</p>	
<b>Testing laboratory</b>	
Firm/institution:	.....
Address:	.....
Telephone:	.....
Date:	Signature: .....
Test carried out:	
place:	.....
date:	.....

## Annex Q (normative)

### Woodworking machines — Operating conditions for multiblade circular sawing machines for ripping

#### Q. 1 General

This annex contains a series of Standard operating conditions to be applied in connection with measurement of noise from multiblade circular sawing machines. Microphone positions are specified to allow measurement of sound pressure level at the operator's position and for determining the sound power level of a machine of this type.

These Standard conditions shall be complied with as closely as possible. If, in a specific Situation, it is necessary to deviate from Standard conditions, the actual condition applied for the test shall be recorded where a blank space in the column "Condition chosen within permitted range or conditions deviating from Standard" allows for such a Situation.

Mandatory and Standard safety attachments shall be mounted and in use during the tests.

This annex may also serve as a data sheet on which information on operating conditions is recorded.

This present annex shall be used in connection with measurement of noise from the following machine.

	<b>Machine classification number (see ISO 7984)</b>
Multiblade circular sawing machine	12.132.34

This annex may also be applied for measurement of noise from special kinds of machine having a similar construction and function.

#### Q.2 Noise measurements

The machine shall be tested under the following conditions.

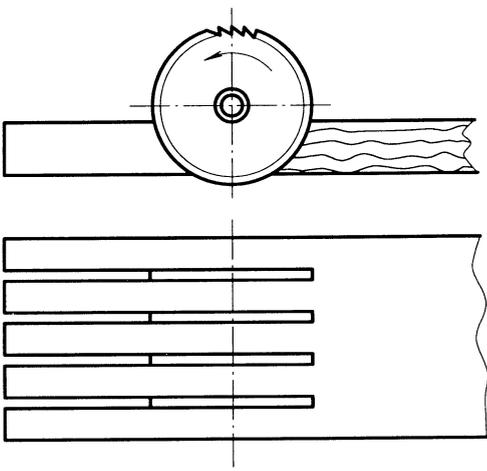
- a) Testing under no load with operating arrangement and tool and cutting data as specified in this annex.
- b) Testing under load as specified in this annex. A continuous supply of test pieces should be fed with minimal distance between successive test pieces so that measurements are made during simultaneous Operation of all working units.
- c) Operator microphone position for test purpose (see figure Q.1):
  - 1,5 m above floor level;
  - in the plane of the front face of the measurement surface;
  - 0,2 m to the left of fence position (viewed from infeed direction).

NOTE 20 The use of integrating sound level meters is recommended but is not mandatory.





Data sheet for multiblade circular sawing machines for ripping (continued)

<p><b>Testing operation</b></p> <p>Ripping of softwood</p> <p><b>Operating arrangement</b></p>  <p>Number of sawblades Width of strips, <i>a</i></p>	<p><b>Units</b></p> <p>mm</p>	<p><b>Standard condition(s)</b></p> <p>4 26 to 28</p>	<p><b>Condition chosen within permitted range or conditions deviating from standard</b></p>																				
<p><b>Tool and cutting data</b></p> <p>Type of tool: Standard sawblade with carbide-tipped teeth</p> <p>Sawblade data (largest recommended sawblade diameter should be chosen):</p> <table border="1" data-bbox="103 1377 726 1612"> <thead> <tr> <th>Sawblade diameter mm</th> <th>Number of teeth</th> <th>Tooth width mm</th> <th>Blade thickness mm</th> </tr> </thead> <tbody> <tr> <td>250</td> <td>18 to 24</td> <td>2,5 to 3,2</td> <td>1,6 to 2,2</td> </tr> <tr> <td>315 (300)</td> <td>20 to 28</td> <td>3,0 to 3,2</td> <td>2,0 to 2,2</td> </tr> <tr> <td>355 (350)</td> <td>24 to 32</td> <td>3,2 to 3,6</td> <td>2,2 to 2,6</td> </tr> <tr> <td>400</td> <td>28 to 36</td> <td>3,2 to 3,6</td> <td>2,2 to 2,6</td> </tr> </tbody> </table> <p>Spindle speed<sup>1)</sup> Sawblade diameter Cutting speed Number of teeth Tooth width Actual blade thickness Feed rate</p>	Sawblade diameter mm	Number of teeth	Tooth width mm	Blade thickness mm	250	18 to 24	2,5 to 3,2	1,6 to 2,2	315 (300)	20 to 28	3,0 to 3,2	2,0 to 2,2	355 (350)	24 to 32	3,2 to 3,6	2,2 to 2,6	400	28 to 36	3,2 to 3,6	2,2 to 2,6	<p>r/min mm m/s mm mm m/min</p>	<p>..... ..... ..... ..... ..... ± 0,1 ..... ± 0,1 15 ± 2</p>	
Sawblade diameter mm	Number of teeth	Tooth width mm	Blade thickness mm																				
250	18 to 24	2,5 to 3,2	1,6 to 2,2																				
315 (300)	20 to 28	3,0 to 3,2	2,0 to 2,2																				
355 (350)	24 to 32	3,2 to 3,6	2,2 to 2,6																				
400	28 to 36	3,2 to 3,6	2,2 to 2,6																				
<p>1) Spindle speed shall be the maximum possible for the operation.</p>																							

**Data sheet for multiblade circular sawing machines for ripping (concluded)**

<b>Testing material</b>	
Material:	softwood, medium grade
Moisture content:	8 % to 14 %
Material length:	2 000 mm
Material height:	40 mm
Material width:	150 mm
Previous processing:	none
<b>Photo or detailed illustration of the machine tested</b>	
<p>STANDARDSISO.COM : Click to view the full PDF of ISO 7960:1995</p>	
<b>Testing laboratory</b>	
Firm/institution:	.....
Address:	.....
Telephone:	.....
Date:	.....
Signature:	.....
Test carried out:	
place:	.....
date:	.....