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^3 to 750 kg/m^3, 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^3 and 600 kg/m^3.

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.

	Machine classification number (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

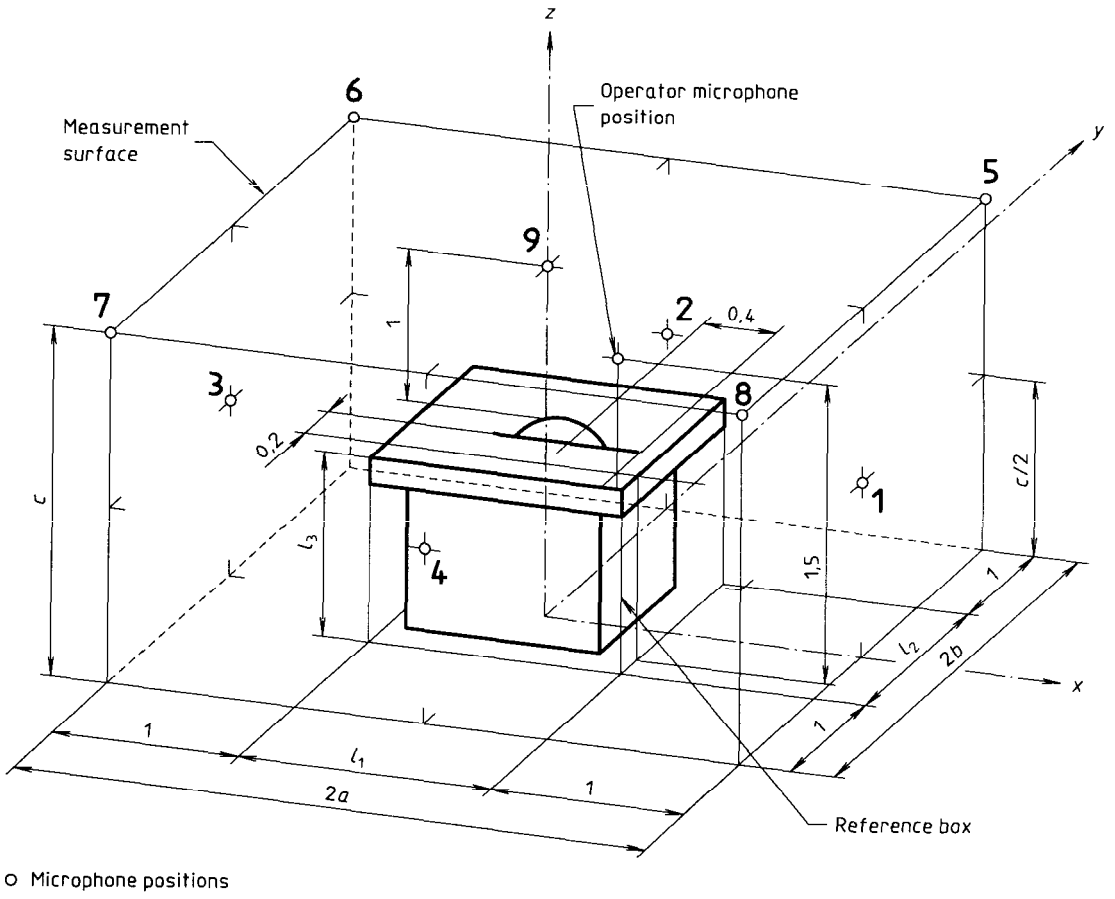


Figure A.1 — Measurement surface and microphone array for determination of sound power level for single-blade circular saw benches (see ISO 3740 series for explanation of symbols)

A.3 Data sheet for single-blade circular saw benches

Machine data

Make: .....

Model: .....

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

Overall dimensions of machine[1]:

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

Maximum blade diameter ..... mm Clamp flange diameter ..... mm

Nominal rotational speed:

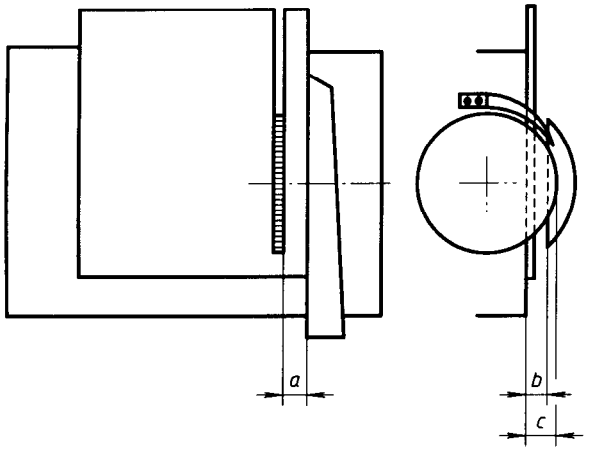
motor ..... r/min blade ..... r/min

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 equipped with noise-reducing hood 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 handwheels, levers) may be disregarded.

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

Testing operation	Units	Standard condition(s)	Condition chosen within permitted range or conditions deviating from standard
Cutting strips of particle board			
Operating arrangement			
			
Parallel fence position, a	mm	50	
Saw guard position, h	mm	20	
Sawblade projection, c	mm	30	
Tool and cutting data			
Type of tool: standard sawblade with carbide-tipped teeth			
Tooth profile: double alternate helix (staggered)			
Spindle speed	r/min	4 000 [1)]	
Feed rate	m/min	6 ± 2	
Blade diameter ⩽ 315 mm			
sawblade diameter	mm	250	
cutting speed	m/s	.....	
number of teeth		48 to 60	
tooth width	mm	3,2 ± 0,1	
actual blade thickness	mm	2,2 ± 0,1	
Blade diameter > 315 mm			
sawblade diameter	mm	355 (350)	
cutting speed	m/s	.....	
number of teeth		54 to 60	
tooth width	mm	3,2 to 3,6 (± 0,1)	
actual blade thickness	mm	2,2 to 2,6 (± 0,1)	

1) Spindle speed shall be as close as possible to 4 000 r/min.

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

Testing laboratory

Firm/institution: .....

Address: .....

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.

	Machine classification number (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

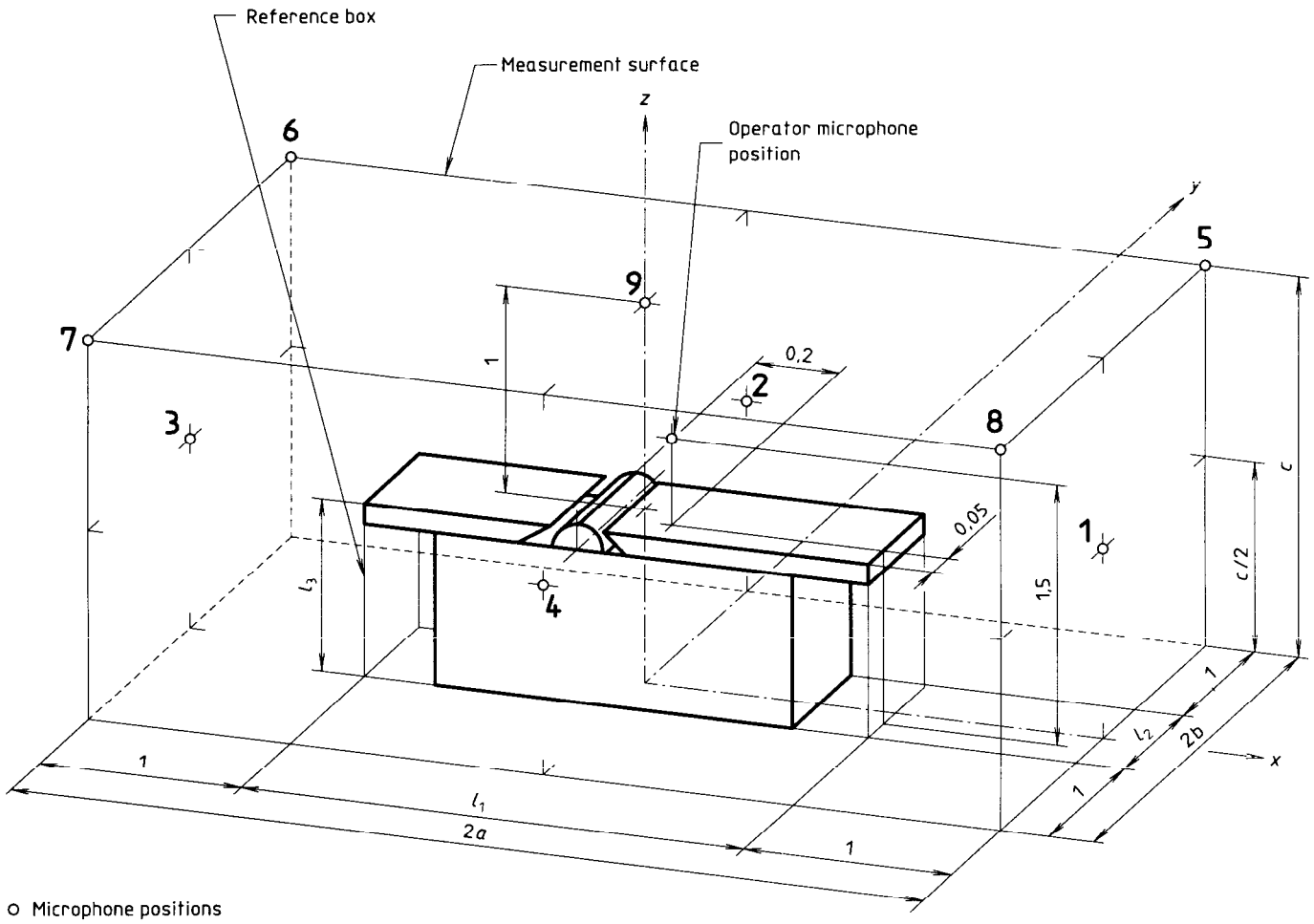


Figure B.1 — Measurement surface and microphone array for determination of sound power level for planing machines (see ISO 3740 series for explanation of symbols)

B.3 Data sheet for planing machines

Machine data

Make: .....

Model: .....

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

Overall dimensions of machine[1]:

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

Cutter length ..... mm Cutting diameter ..... mm

Number of cutting knives: .....

Nominal rotational speed:

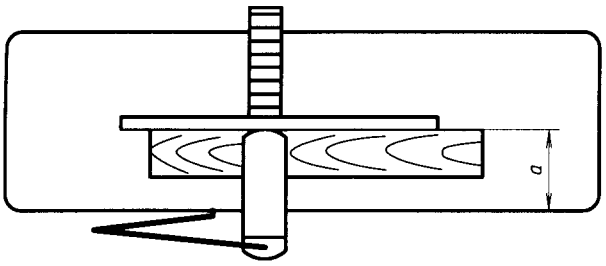
motor ..... r/min cutter ..... r/min

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 equipped with slotted table lips yes ☐ no ☐	.....
Machine equipped with helical 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 handwheels, levers) may be disregarded.

Data sheet for planing machines *(continued)*

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

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

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 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.

	Machine classification number (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:

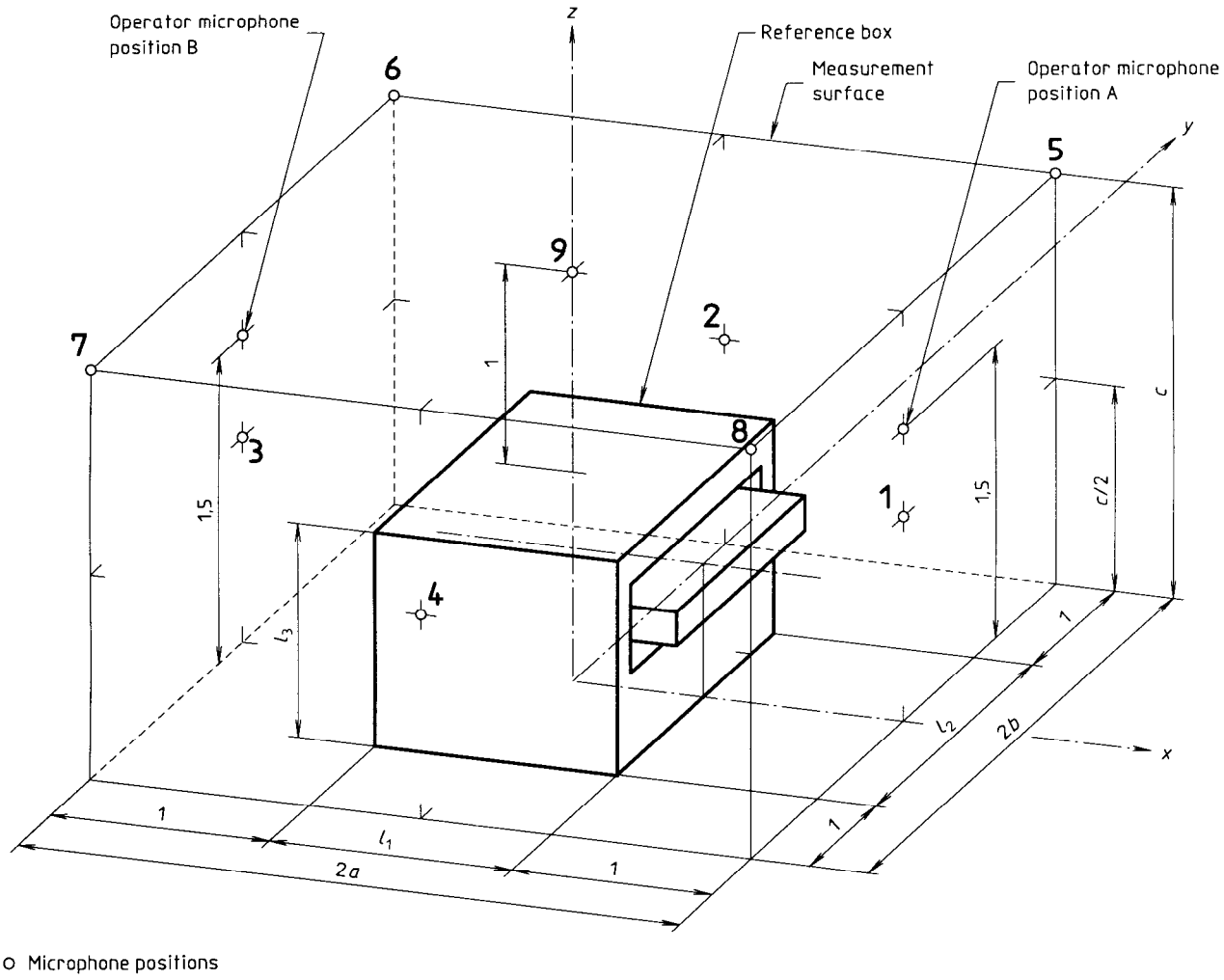
— 1,5 m above floor level;

— 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.

Dimensions in metres



o Microphone positions

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

Machine data

Make: .....

Model: .....

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

Overall dimensions of machine[1]:

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

Cutter length ..... mm Cutting diameter ..... mm

Number of cutting knives: .....

Nominal rotational speed:

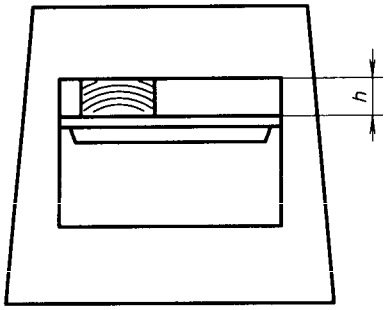
motor ..... r/min cutter ..... r/min

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 equipped with infeed and outfeed noise-reducing arrangements yes ☐ no ☐	.....
Machine equipped with helical cutter-block yes ☐ no ☐	.....
Machine fitted with noise enclosure 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 handwheels, levers) may be disregarded.

Data sheet for thickness planing machines *(continued)*

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

Data sheet for thickness 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:	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

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.

Dimensions in metres

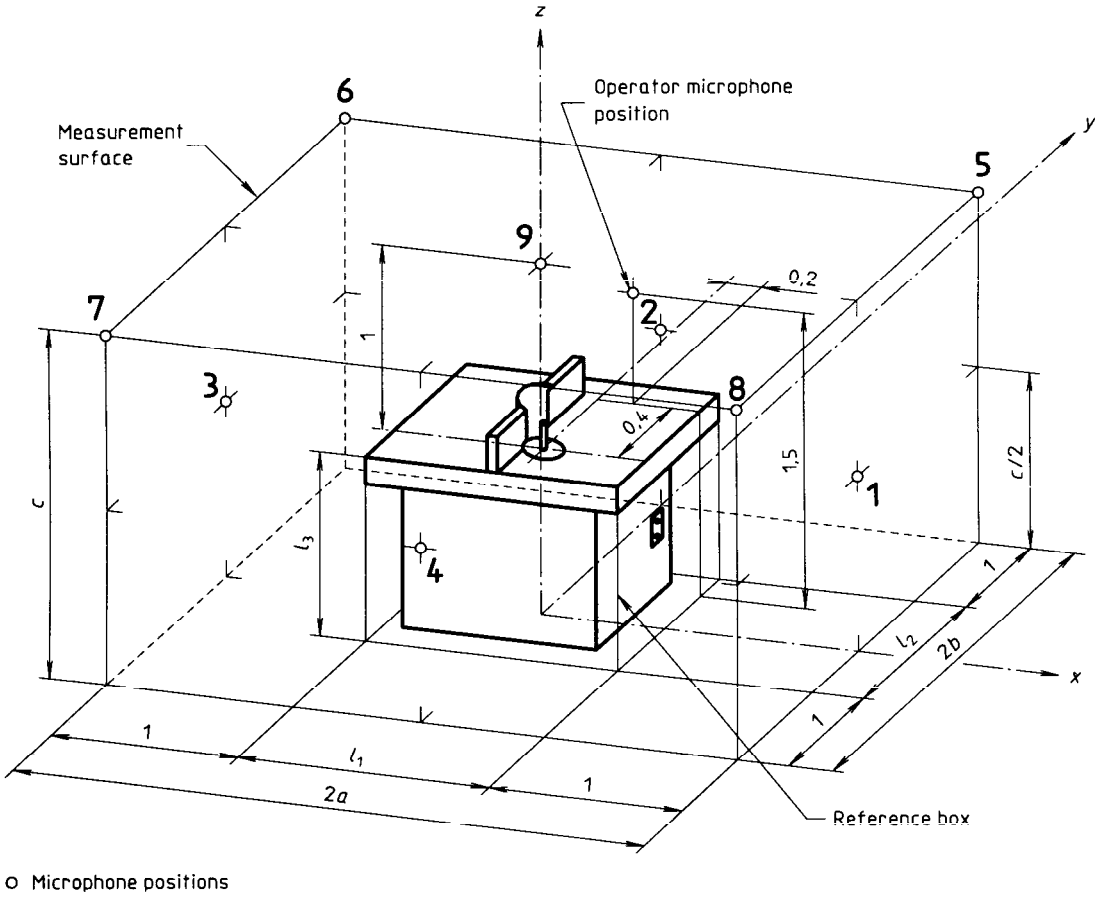


Figure D.1 — Measurement surface and microphone array for determination of sound power level for single-spindle moulding machines (see ISO 3740 series for explanation of symbols)

D.3 Data sheet for single-spindle moulding machines

Machine data

Make: .....

Model: .....

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

Overall dimensions of machine[1]:

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

Drive of spindle: .....

Nominal rotational speed:

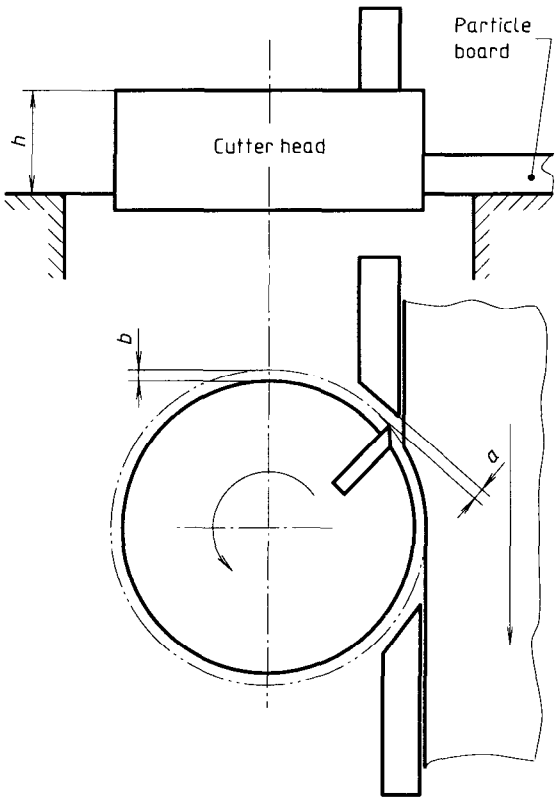
motor ..... r/min spindle ..... r/min

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 equipped with cutter guard designed as a noise-reducing hood 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 single-spindle moulding machines *(continued)*

Testing operation	Units	Standard condition(s)	Condition chosen within permitted range or conditions deviating from standard
Moulding in particle board edges			
Operating arrangement			
			
Distance, *a*	mm	1 ± 0,1	
Projection of cutting knives, *b*	mm	1,1 max.	
Upper tool edge above table, *h*	mm	45	
Tool and cutting data			
Type of tool: Circular cutter with straight knives			
Spindle speed	r/min	6 000 [1)]	
Cutting circle diameter	mm	125	
Cutting speed	m/s	40	
Number of knives		2	
Tool width	mm	50	
Cutting width	mm	16	
Cutting depth	mm	10	
Feed rate	m/min	6 ± 2	
Cutting principle: cutter rotation opposing feed			

1) Spindle speed shall be as close as possible to 6 000 r/min.

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

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.

	Machine classification number (see ISO 7984)
Double-end profiling machine	82.4

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;

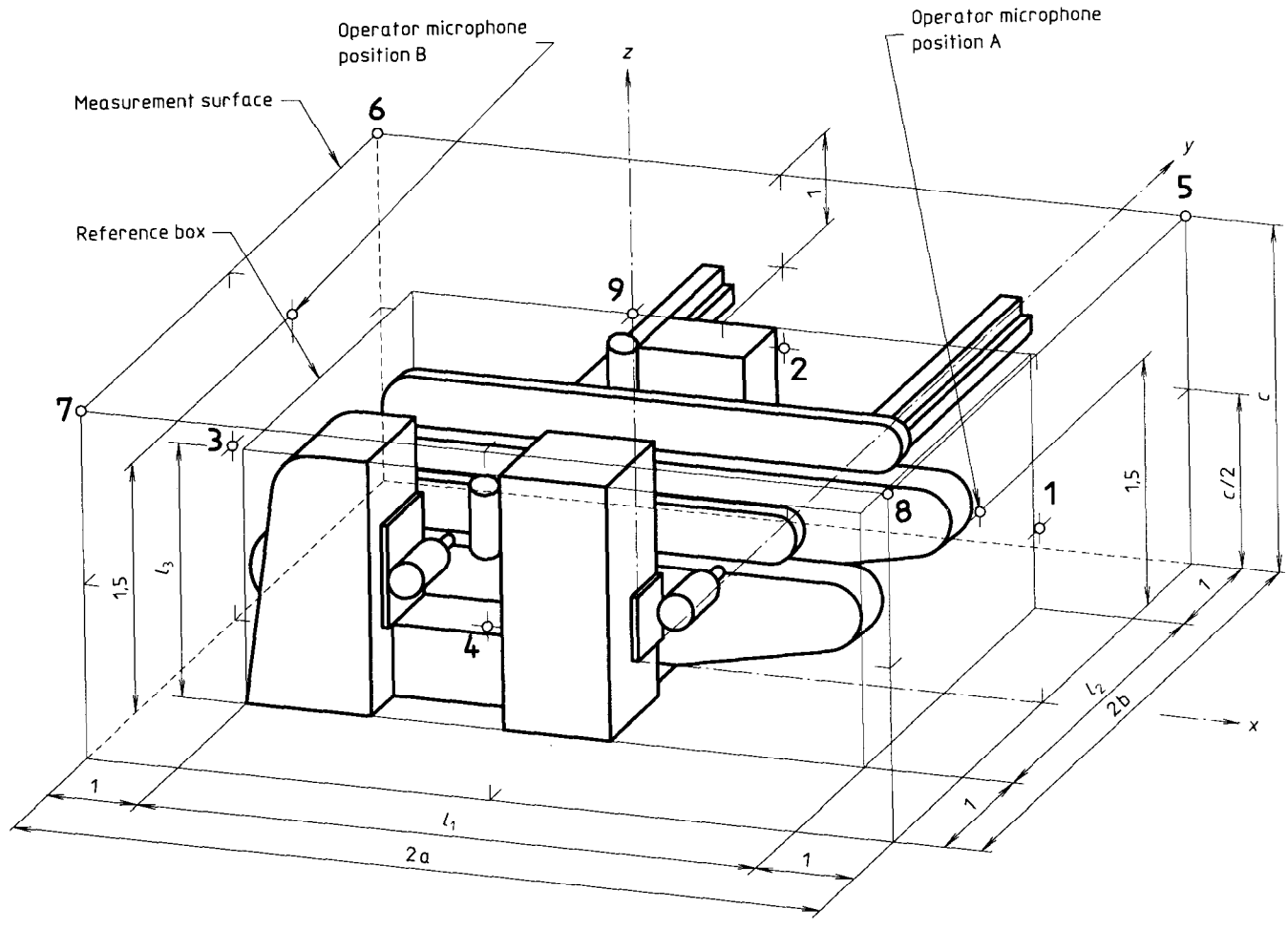
— in the plane of the rear face of the measurement surface;

— 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.

Dimensions in metres



o 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[1]:

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

Spindle No.[1]	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 handwheels, levers) may be disregarded.

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

Testing operations

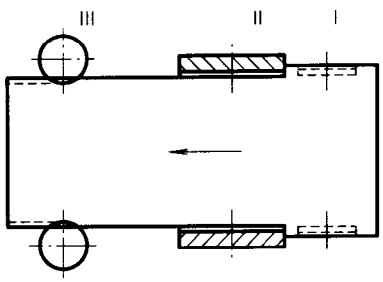
Sizing and grooving in particle board edges.

One of the following procedures is used:

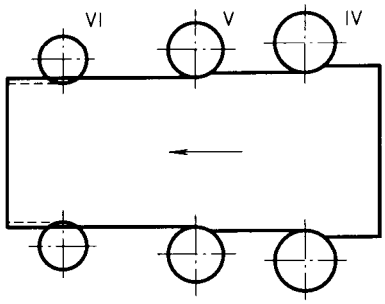
Procedure S using:
Scoring sawblade (I)
Hogging cutter (II)
Grooving saw (III)

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

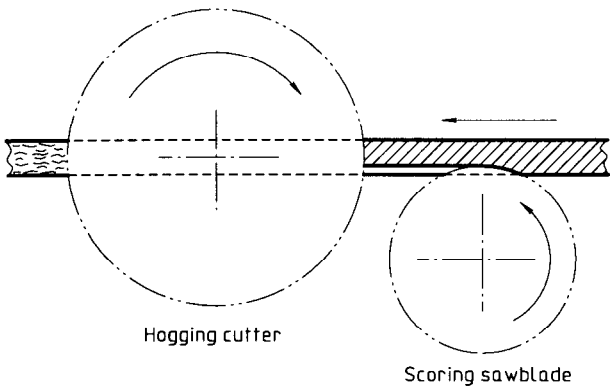


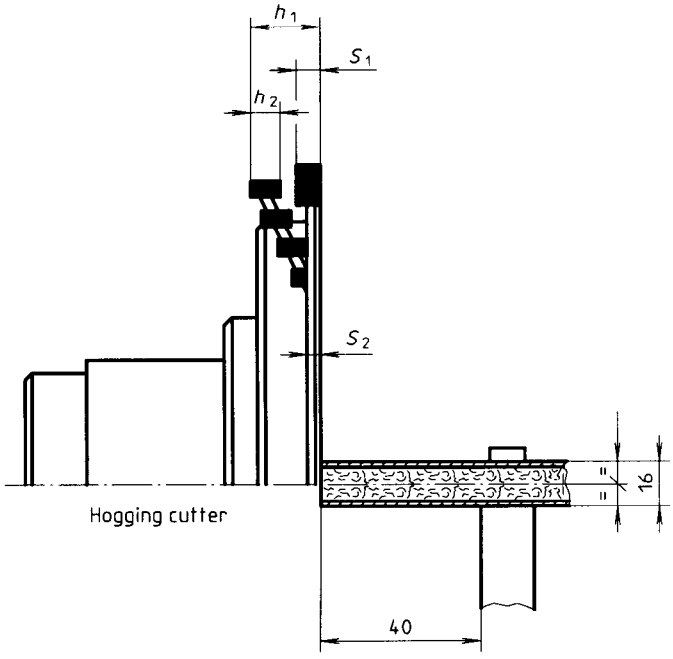
Procedure M

Operating arrangement

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

Dimension in millimetres

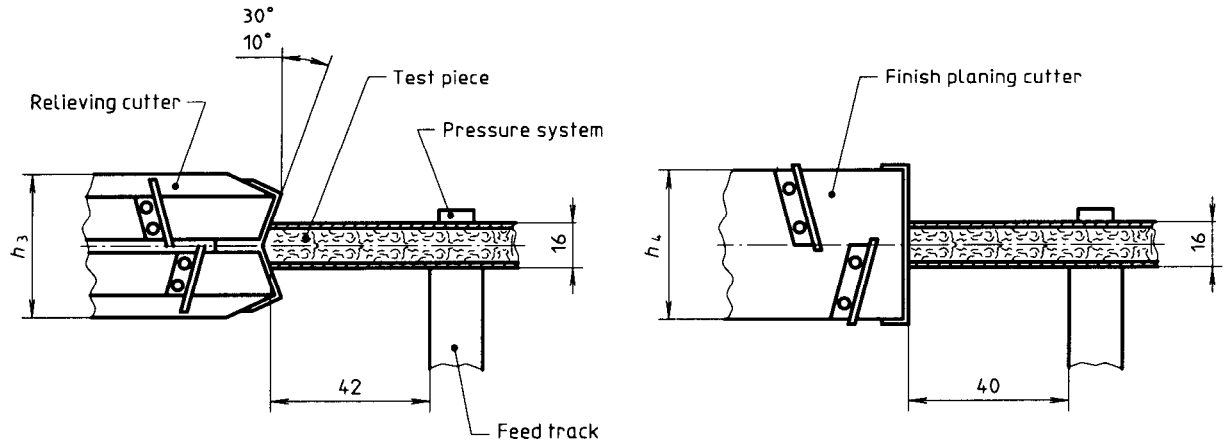




Data sheet for double-end profiling machines *(continued)*

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
Procedure S				
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 [1] or 6 000 [1]		
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 [1]	
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 [1]	
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 [2]		
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
Procedure M			
Edge planing			
a) Spindle IV (vertical)			
Relieving (spindle rotation opposing feed)			
Relieving cutter with carbide knives			
spindle speed	r/min	3 000 [1] or 6 000 [1]	
cutting circle diameter	mm	200	
cutting speed	m/s	.....	
number of cutting knives		2 × 4	
cutter width, h_3	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 [1] or 6 000 [1]	
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) Spindle VI (vertical)			
Grooving (spindle rotation opposing feed)			
Grooving saw with carbide-tipped teeth			
spindle speed	r/min	3 000 [1] or 6 000 [1]	
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 [2]	
e) Distance, feed track-tool	mm	40	

1) If available, 6 000 r/min shall be used.
2) If this feed rate is unobtainable, the nearest available shall be used.

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

Testing material

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

Photo or detailed illustration of the machine tested

Testing laboratory

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).

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 F.1 refers to a machine set-up for a 600 mm board width.

NOTE 9 The use of integrating sound level meters is recommended but is not mandatory.

Dimensions in metres

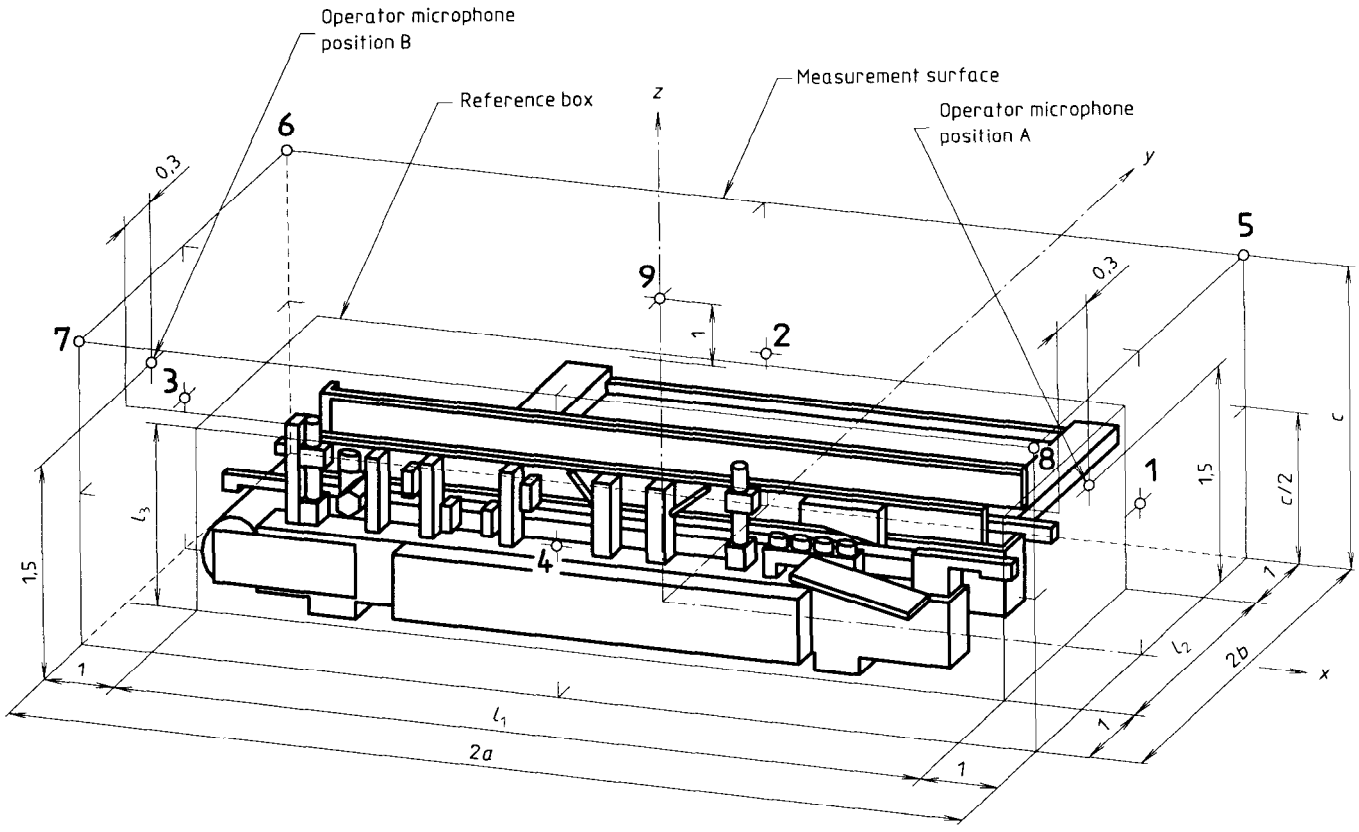


Figure F.1 — Measurement surface and microphone array for determination of sound power level for edge-banding machines (see ISO 3740 series for explanation of symbols)

F.3 Data sheet for edge-banding machines

Machine data

Make: .....

Model: .....

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

Overall dimensions of machine[1]:

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

Spindle No.[1]	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 handwheels, 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

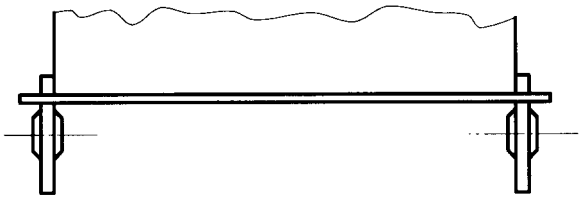
Process C: chamfering

Process D: grooving

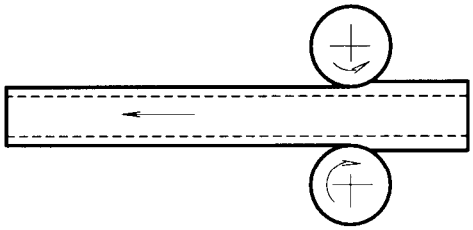
Processing operations shall be symmetrical for double-sided machines.

Operating arrangements

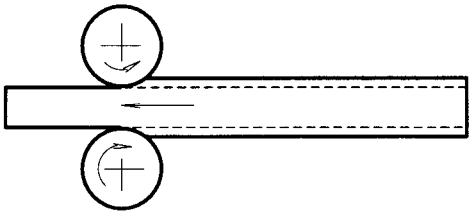
Process A: End trimming



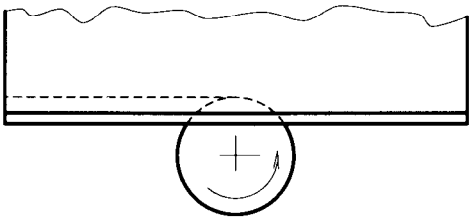
Process B: Edge trimming



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
Procedure P ☐ **Procedure H** ☐			
a) End trimming saw			
Type of saw: Specify according to make of machine			
spindle drive	r/min	.....	
sawblade diameter	mm	.....	
cutting speed	m/s	.....	
number of teeth		.....	
tooth profile			
tooth width	mm	.....	
actual blade thickness	mm	.....	
b) Edge trimming cutter			
Type of tool:.....			
spindle speed	r/min	.....	
cutting circle diameter	mm	70	
cutting speed	m/s	.....	
number of teeth/knives		4	
cutter width	mm	12 min.	
cutting depth	mm	.....	
cutting principle: spindle rotation opposing feed			
c) Chamfering cutter			
Type of tool:.....			
spindle speed	r/min	.....	
cutting circle diameter	mm	70	
cutting speed	m/s	.....	
number of teeth/knives		4	
cutting width	mm	12 min.	
cutting depth	mm	.....	
cutting principle: spindle rotation opposing feed			
d) Grooving saw			
Type of tool:.....			
spindle speed	r/min	.....	
cutting circle diameter	mm	.....	
cutting speed	m/s	50 min.	
number of teeth		.....	
tooth width	mm	4	
cutting depth	mm	5	
cutting principle: spindle rotation in direction of feed			
e) Feed rate	m/min	15 min.	

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

Testing material

	Procedure P	Procedure H
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

Photo or detailed illustration of the machine tested

Testing laboratory

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

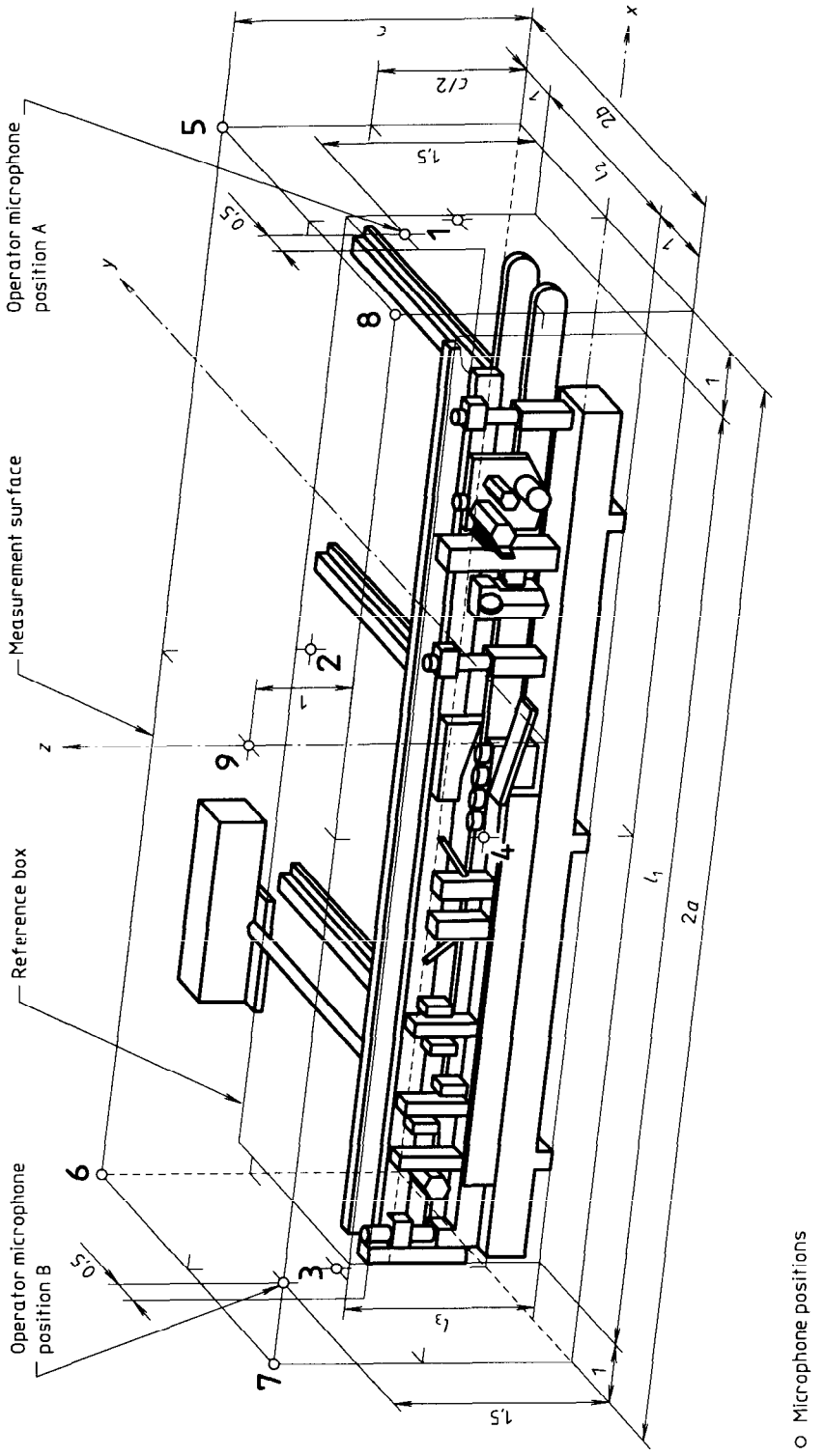


Figure G.1 — Measurement surface and microphone array for determination of sound power level for double-end sizing and edge-banding machines (see ISO 3740 series for expianation of symbols)

G.3 Data sheet for double-end sizing and edge-banding machines

Machine data

Make: .....

Model: .....

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

Overall dimensions of machine[1]:

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

Spindle No.[1]	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				
11				
12				

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 handwheels, levers) may be disregarded.

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

Testing operations

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

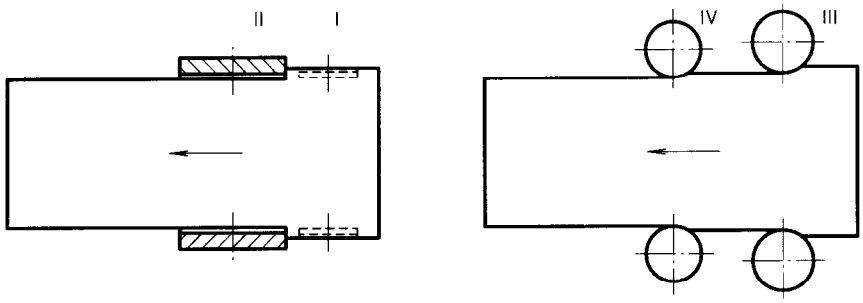
a) Sizing, using one of the following procedures:

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

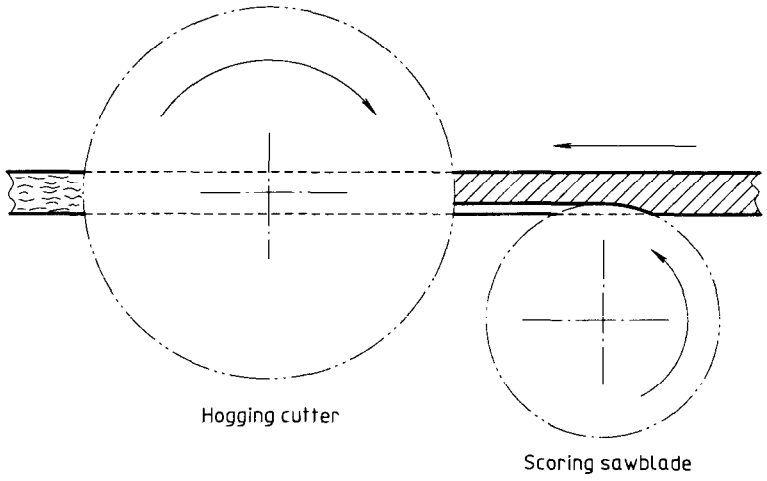
Processing operations shall be symmetrical.

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

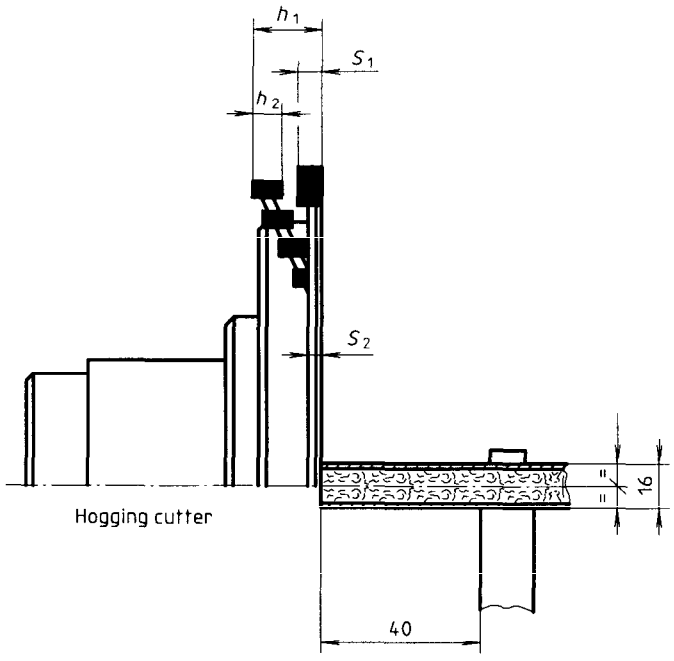
Operating arrangements

a) **Procedure S**

Sizing operation with scoring sawblade and hogging cutter



Dimensions in millimetres



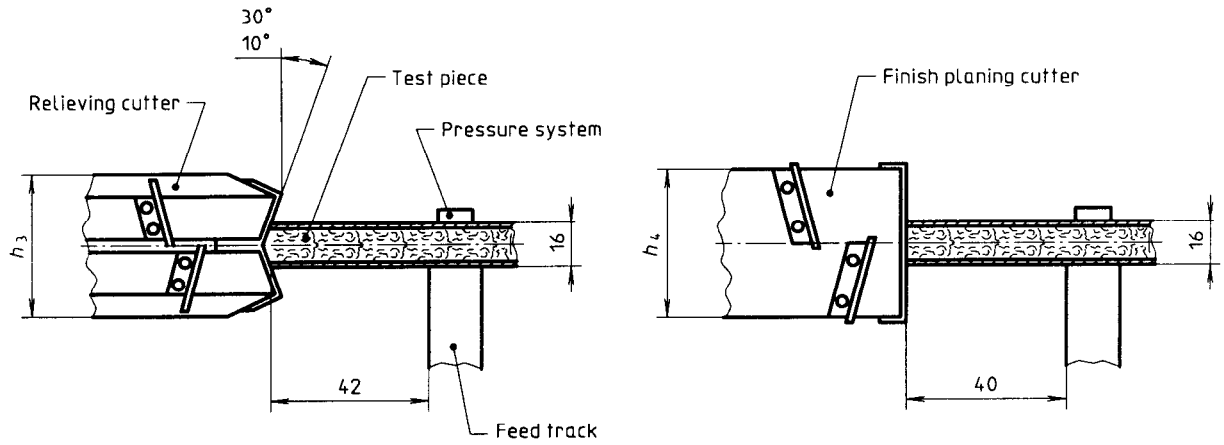
Hogging cutter, axis situated at centreline of test piece

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

b) Procedure M

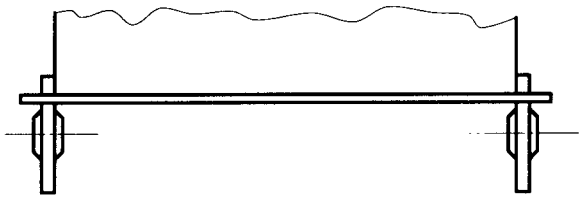
Sizing operation with relieving cutter and finish planing cutter

Dimensions in millimetres

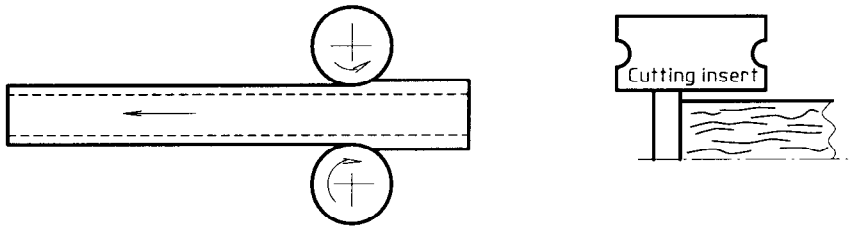


Operating arrangements for final processing, if possible

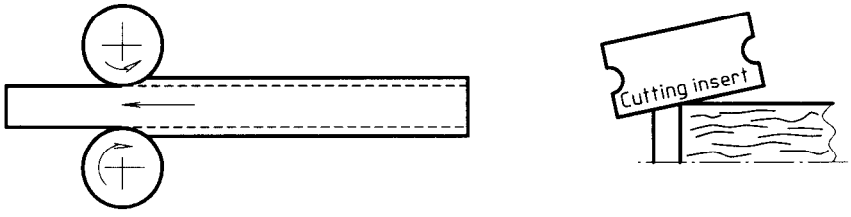
Process A: End trimming



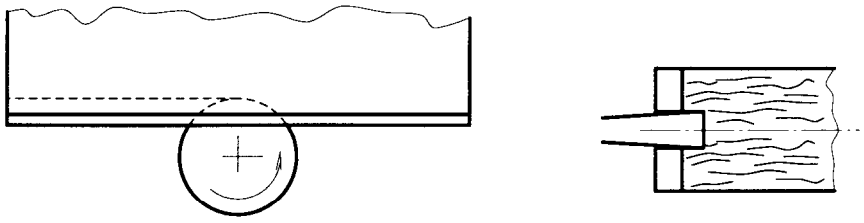
Process B: Edge trimming



Process C: Chamfering



Process D: Grooving



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
Procedure S 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 [1] or 6 000 [1]		
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 [1]	
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 [2]		
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**
Procedure M 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 [1]	
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 [1]	
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 [2]	
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**
Procedure P ☐ **Procedure H** ☐			
a) End trimming saw Type of saw: Specify according to make of machine			
spindle drive	r/min	.....	
sawblade diameter	mm	.....	
cutting speed	m/s	.....	
number of teeth		.....	
tooth profile			
tooth width	mm	.....	
actual blade thickness	mm	.....	
b) Edge trimming cutter Type of tool:.....			
spindle speed	r/min	.....	
cutting circle diameter	mm	70	
cutting speed	m/s	.....	
number of teeth/knives		4	
cutter width	mm	12 min.	
cutting depth	mm	.....	
cutting principle: spindle rotation opposing feed			
c) Chamfering cutter Type of tool:.....			
spindle speed	r/min	.....	
cutting circle diameter	mm	70	
cutting speed	m/s	.....	
number of teeth/knives		4	
cutting width	mm	12 min.	
cutting depth	mm	.....	
cutting principle: spindle rotation opposing feed			
d) Grooving saw Type of tool:.....			
spindle speed	r/min	.....	
cutting circle diameter	mm	.....	
cutting speed	m/s	50 min.	
number of teeth		.....	
tooth width	mm	4	
cutting depth	mm	5	
cutting principle: spindle rotation in direction of feed			
e) Feed rate	m/min	15 min.	

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

Testing material

	Procedure P	Procedure H
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

Photo or detailed illustration of the machine tested

Testing laboratory

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.

	Machine classification number (see ISO 7984)	
	12.22	12.32
Two-side and multi-side planing and moulding machines	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 interchangable.

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.

Dimensions in metres

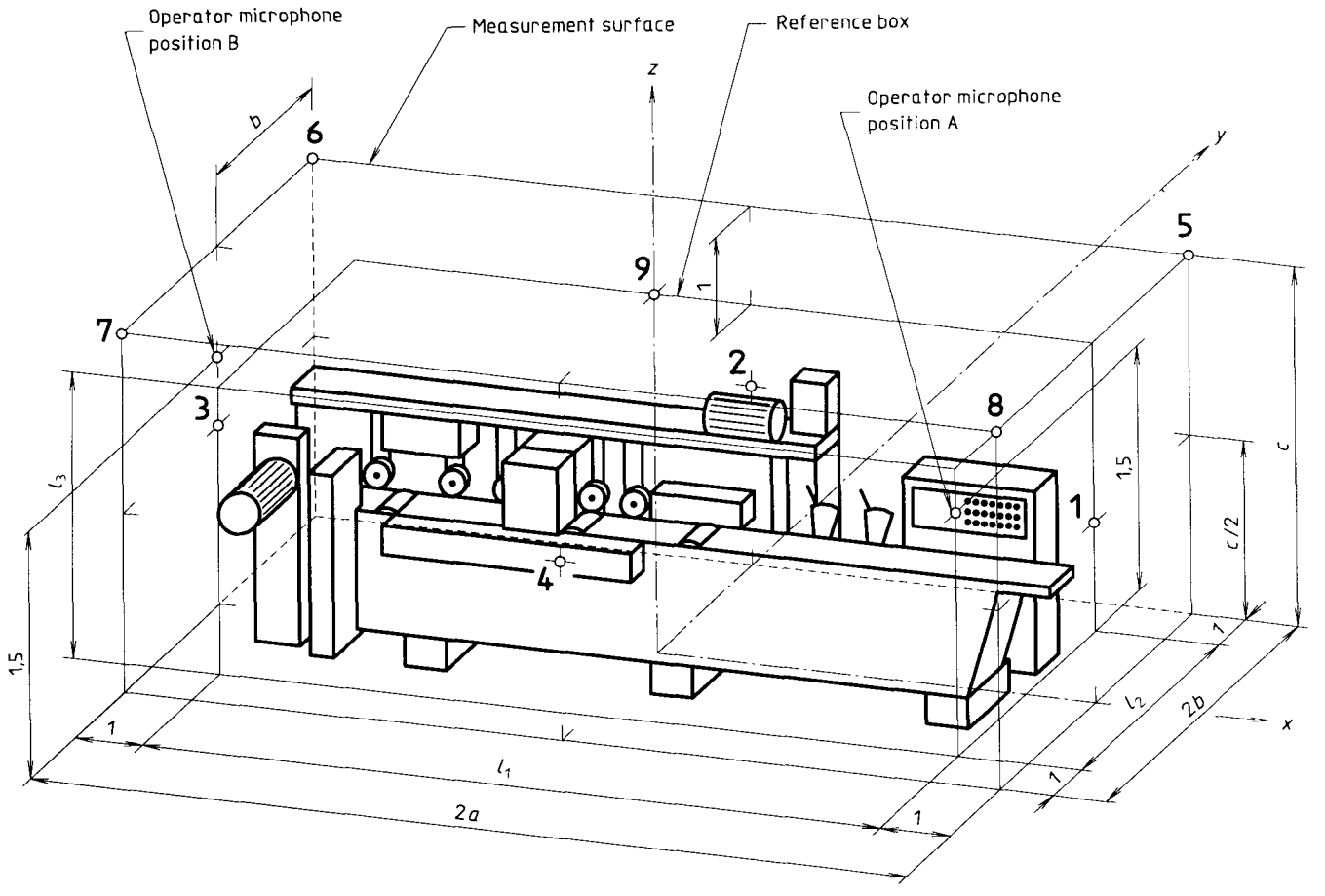


Figure H.1 — Measurement surface and microphone array for determination of sound power level for two-side and multi-side planing machines and moulding machines (see ISO 3740 series for explanation of symbols)

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[1]:

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

Spindle No.[1]	Spindle function	Maximum tool diameter mm	Nominal rotational speed Motor r/min	Nominal rotational speed 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)*

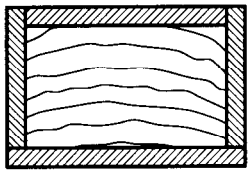
Testing operations

Planing of softwood on maximum number of sides.

Operating arrangements

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

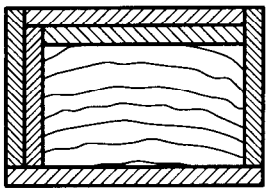
Moulding machines with a feed rate of ≤ 60 m/min, and planing machines (all sizes).



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 [1]	
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 [1]	
number of cutters in action		4 max.	
cutting circle diameter	mm	125 [2]	
cutting speed	m/s	39	
number of knives		4	
Moulding machines, class normal duty			
feed rate	m/min	15 [1]	
number of cutters in action		4 max.	
cutting circle diameter	mm	125 [2]	
cutting speed	m/s	39	
number of knives		4	
Moulding machines, class heavy duty			
feed rate	m/min	60 [1]	
number of cutters in action	m/min	6 max.	
cutting circle diameter	mm	160	
cutting speed	m/s	50	
number of knives		6	

1) Spindle speed and feed rate shall be as close as possible to indicated values.
2) If the spindle diameter is over 40 mm, then a cutting circle diameter greater than 125 mm may be chosen.

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

Testing material

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

Photo or detailed illustration of the machine tested

Testing laboratory

Firm/institution: .....

Address: .....

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.

	Machine classification number (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.

Dimensions in metres

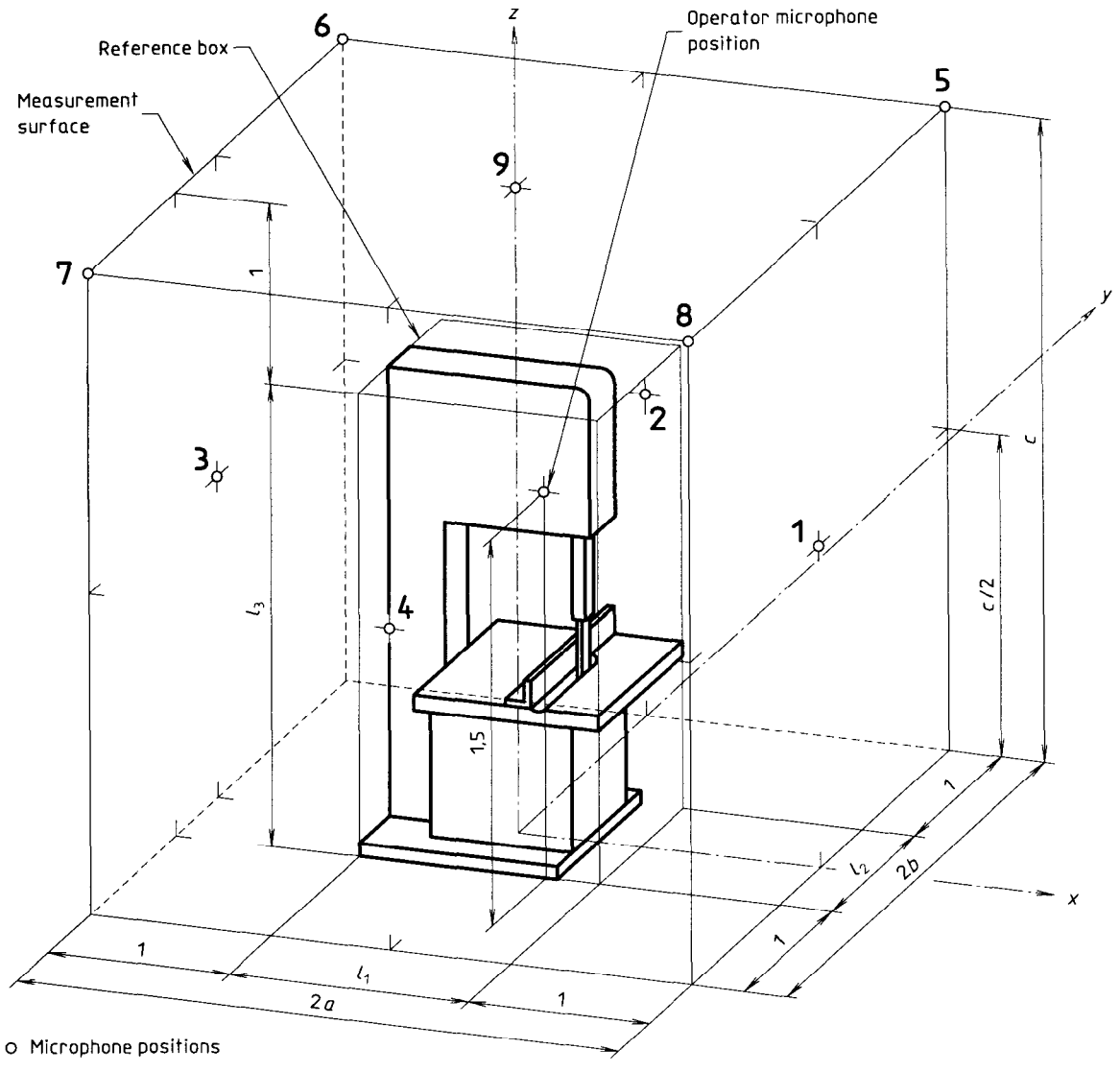


Figure J.1 — Measurement surface and microphone array for determination of sound power level for band sawing machines (see ISO 3740 series for explanation of symbols)

Dimensions in metres

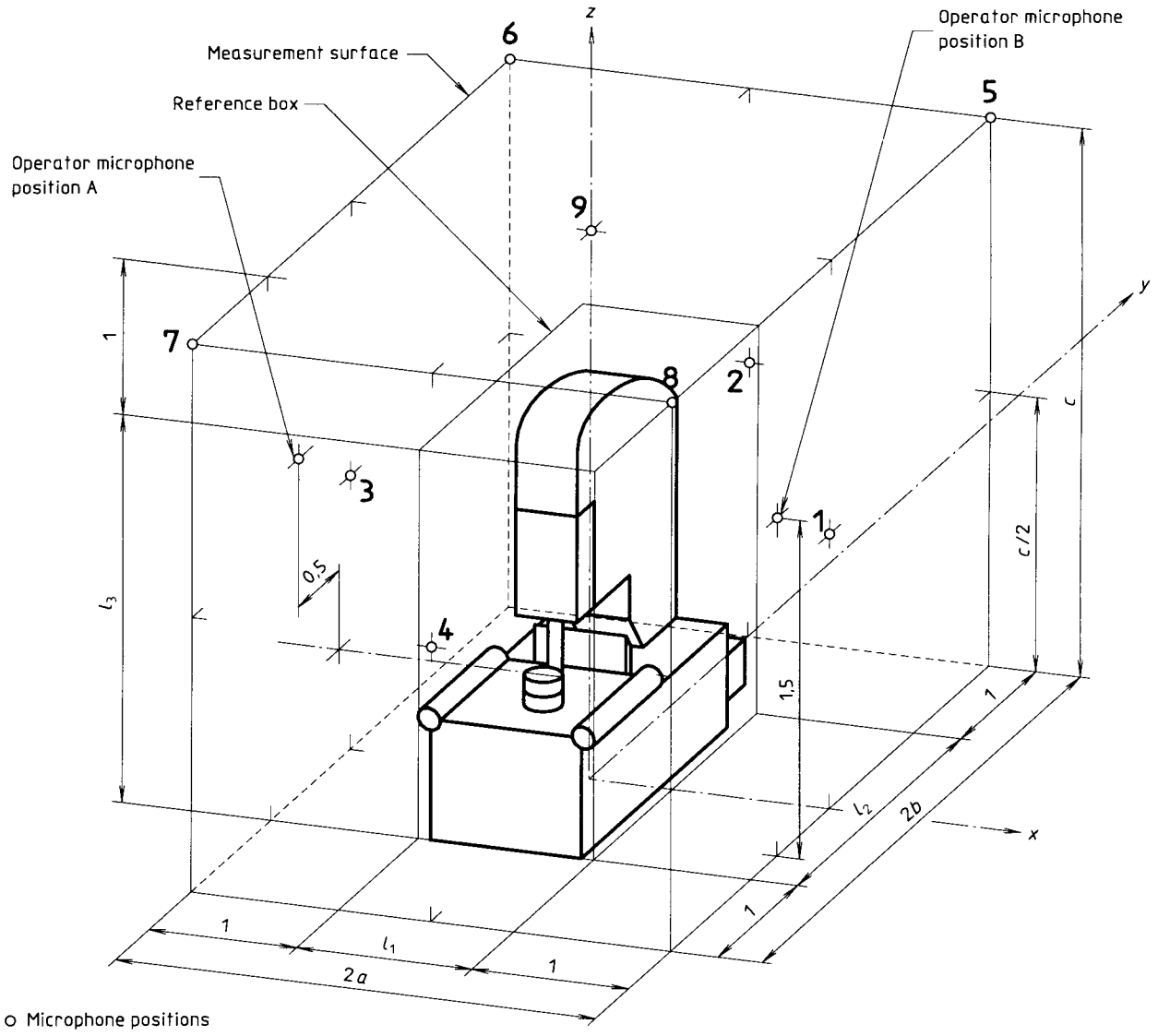


Figure J.2 — Measurement surface and microphone array for determination of sound power level for band resawing machines (see ISO 3740 series for explanation of symbols)

J.3 Data sheet for band sawing machines

Machine data

Make: .....

Model: .....

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

Overall dimensions of machine[1]:

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

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

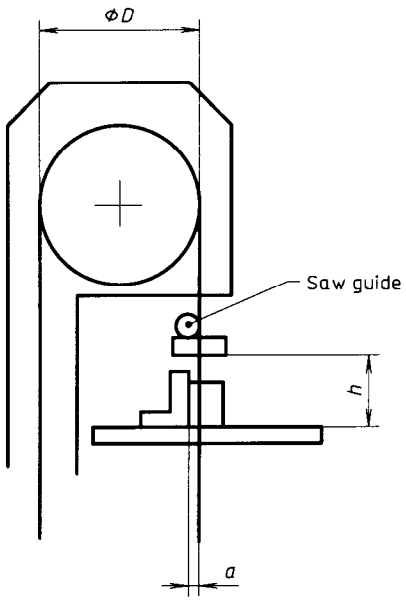
yes ☐ no ☐ .....

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 handwheels, 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
Cutting of softwood **Operating arrangement**  				
Fence position, *a*:	Table band saw Band resawing machine	mm mm	10 25	
Height to saw guide, *h*:			min. possible	

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			
☐ Pulley diameter, $D \leqslant 500$	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 ± 2	
☐ Pulley diameter, $500 < D \leqslant 900$	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	$\leqslant 0{,}001\ D$	
feed rate	m/min	6 ± 2	
☐ 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	$\leqslant 0{,}001\ D$	
feed rate	m/min	6 ± 2	
b) Band resawing machines			
☐ 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	$\leqslant 0{,}001\ D$	
feed rate			
manual feed	m/min	6 ± 2	
mechanical feed	m/min	15	

Data sheet for band sawing machines *(concluded)*

Testing material

Material:	softwood, medium grade	
Moisture content:	8 % to 14 %	
	Table band saw	**Band resawing machine**
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	

Photo or detailed illustration of the machine tested

Testing laboratory

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'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-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

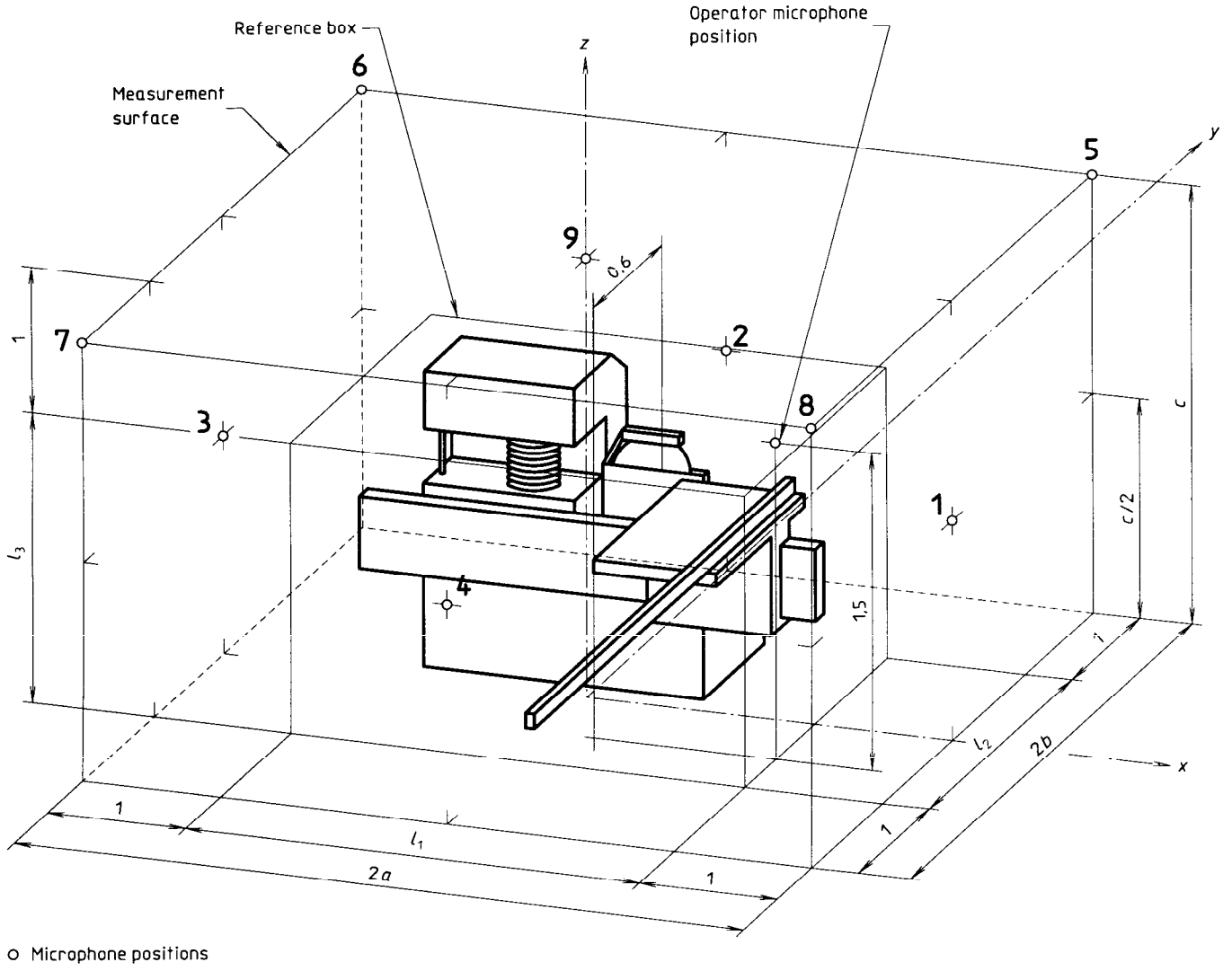


Figure K.1 — Measurement surface and microphone array for determination of sound power level for single-end tenoning machines (see ISO 3740 series for explanation of symbols)

K.3 Data sheet for single-end tenoning machines

Machine data

Make: .....

Model: .....

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

Overall dimensions of machine[1]:

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

Spindle No.[1]	Spindle function	Maximum tool diameter mm	Nominal rotational speed Motor r/min	Nominal rotational speed Spindle r/min
1				
2				
3				
4				
5				
6				

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

☐ Manual movement ☐ Automatic movement

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 ☐ .....

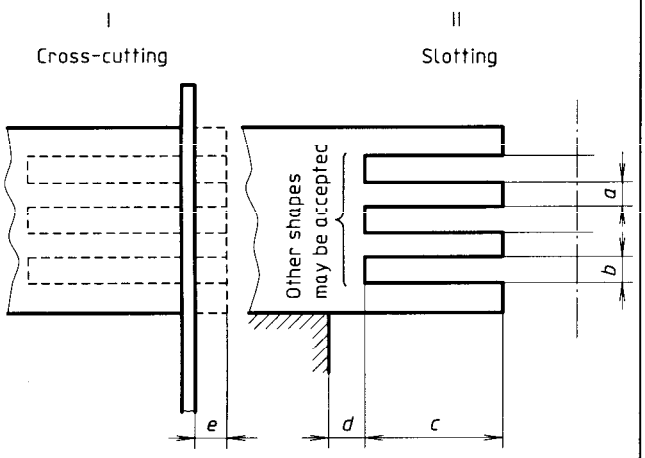
Machine equipped with noise-reducing hoods
yes ☐ no ☐ .....

Other noise control measures
yes ☐ no ☐ .....

Antisplitting device
yes ☐ no ☐ .....

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

Data sheet for single-end tenoning machines *(continued)*

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

1) Spindle speed shall be as close as possible to 3 000 r/min.

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

Testing material

Material:	softwood, medium grade
Moisture content:	8 % to 14 %
Material length:	1 000 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

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.

	Machine classification number (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

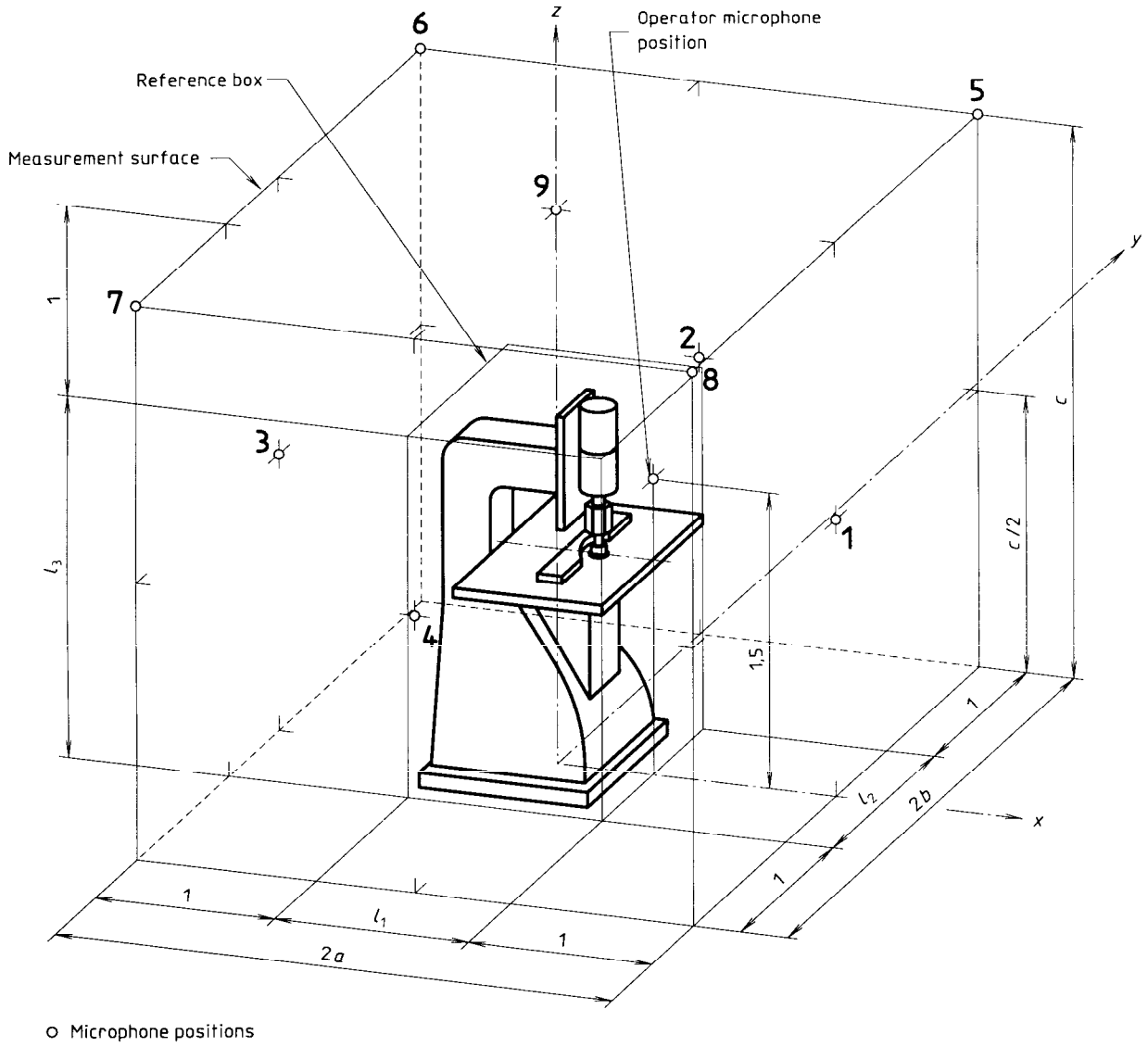


Figure L.1 — Measurement surface and microphone array for determination of sound power level for routing machines (see ISO 3740 series for explanation of symbols)

L.3 Data sheet for routing machines

Machine data

Make: .....

Model: .....

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

Overall dimensions of machine[1]:

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

Nominal rotational speed:

motor max.: ..... r/min spindle: ..... r/min

min.: ..... r/min

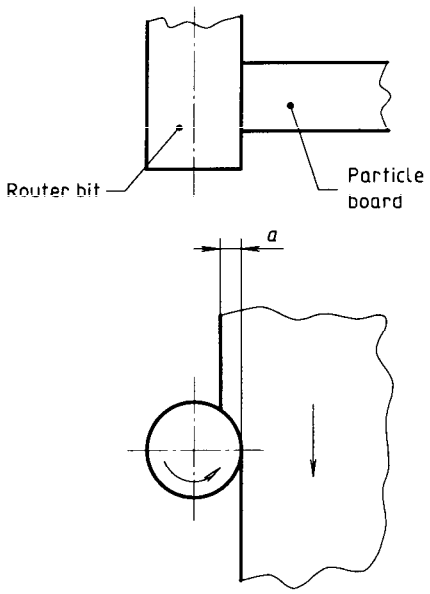
☐ Attached frequency converter ☐ Separate frequency converter ☐ Belt drive

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 handwheels, levers) may be disregarded.

Data sheet for routing machines *(continued)*

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

1) Spindle speed shall be as close as possible to 18 000 r/min.

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

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

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's 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.

Dimensions in metres

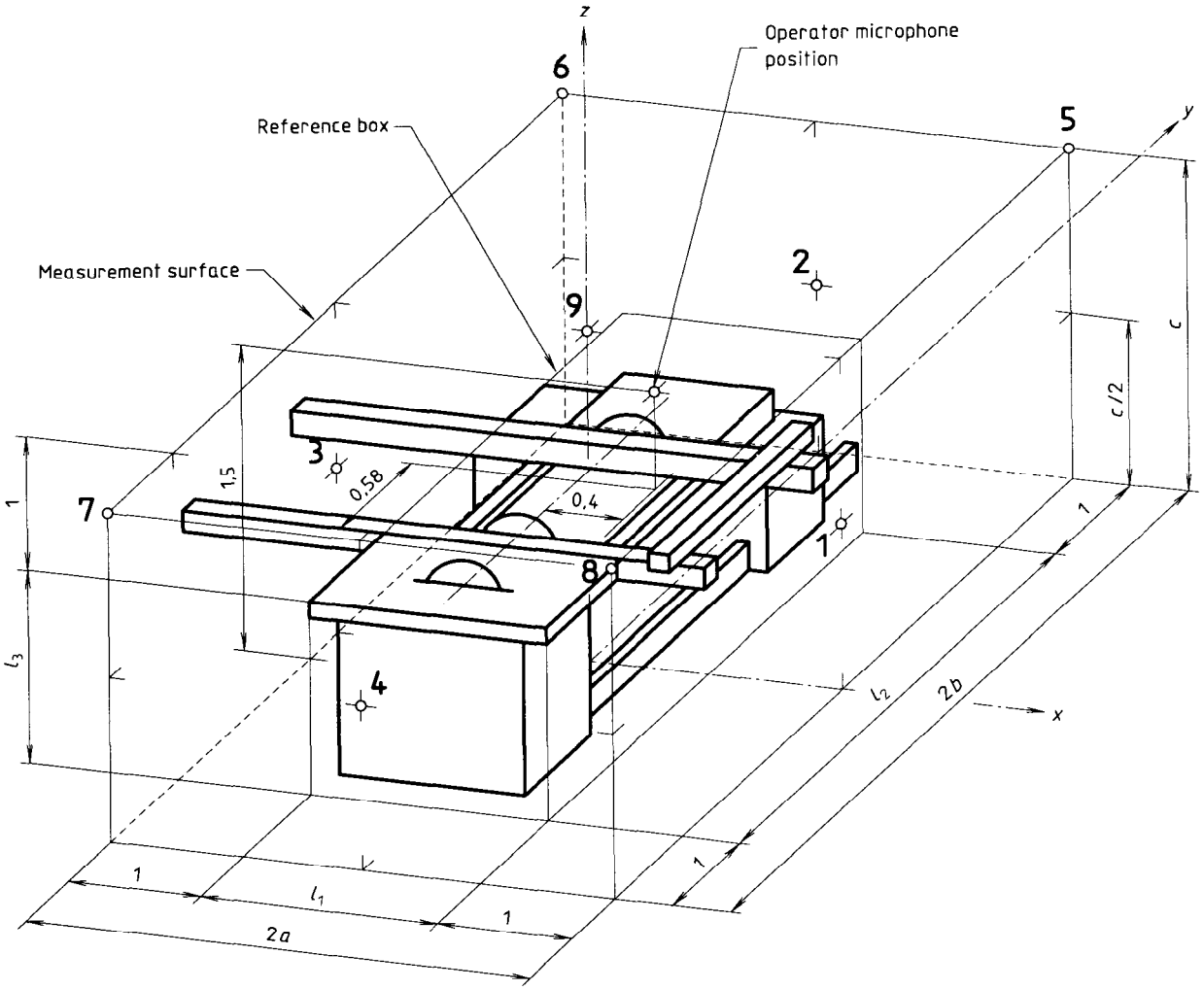


Figure M.1 — Measurement surface and microphone array for determination of sound power level for double-end trim circular sawing machines (see ISO 3740 series for explanation of symbols)

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

Machine data

Make: .....

Model: .....

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

Overall dimensions of machine[1]:

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

Max. blade diameter ..... Clamp flange diameter ..... mm

☐ With scoring sawblade ☐ Without scoring sawblade

Nominal rotational speed:

motor: ..... r/min

sawblade max. ..... r/min

min. ..... r/min

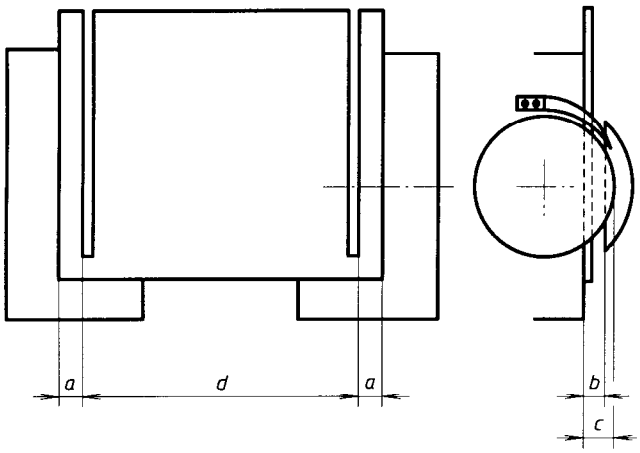
scoring sawblade: ..... r/min

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 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 handwheels, levers) may be disregarded.

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

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

1) Spindle speed shall be as close as possible to 3 000 r/min.
2) In accordance with manufacturer's recommendations.

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

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

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

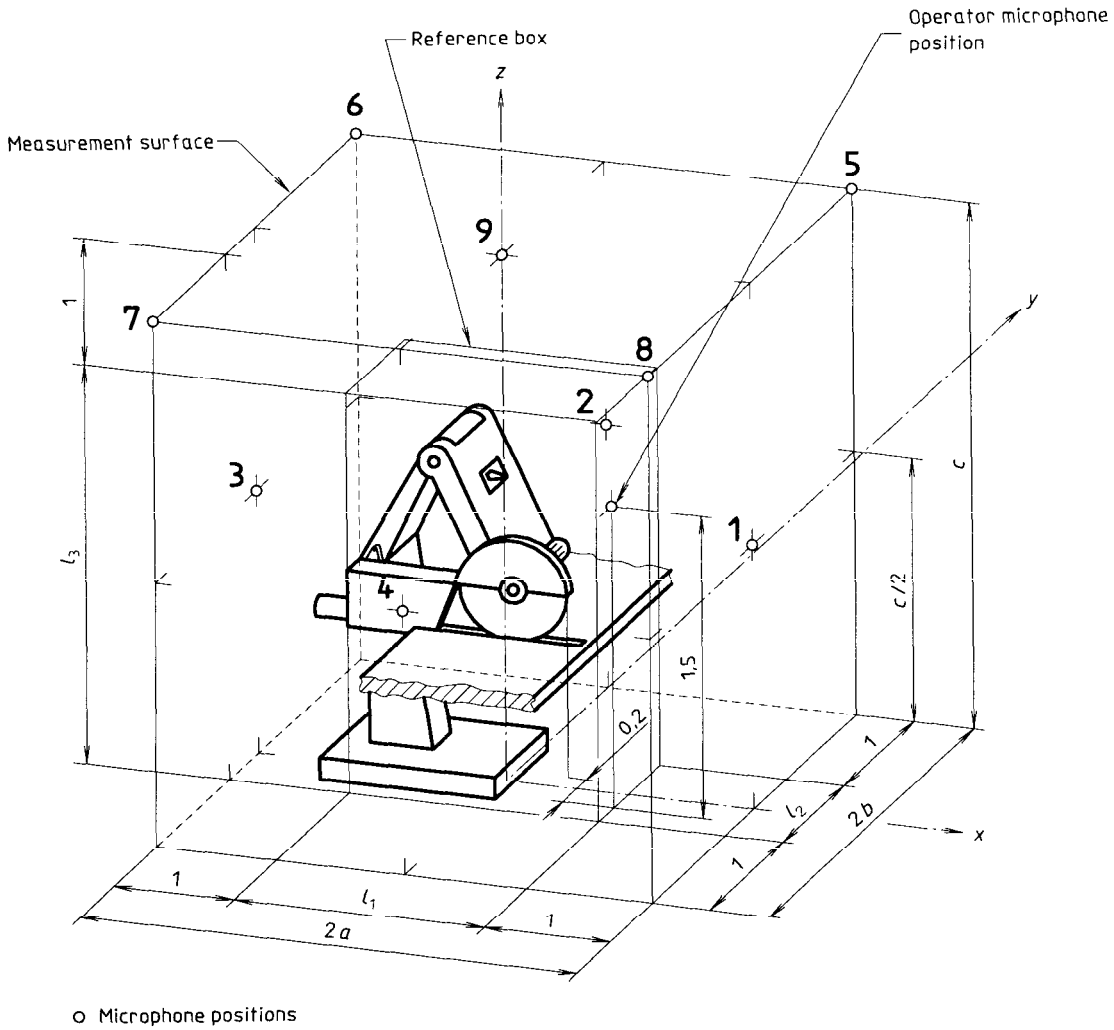
1) encloses the machine in all outward and upward positions but excludes the table and protruding parts of foundation [see figure N.1 a)];

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.

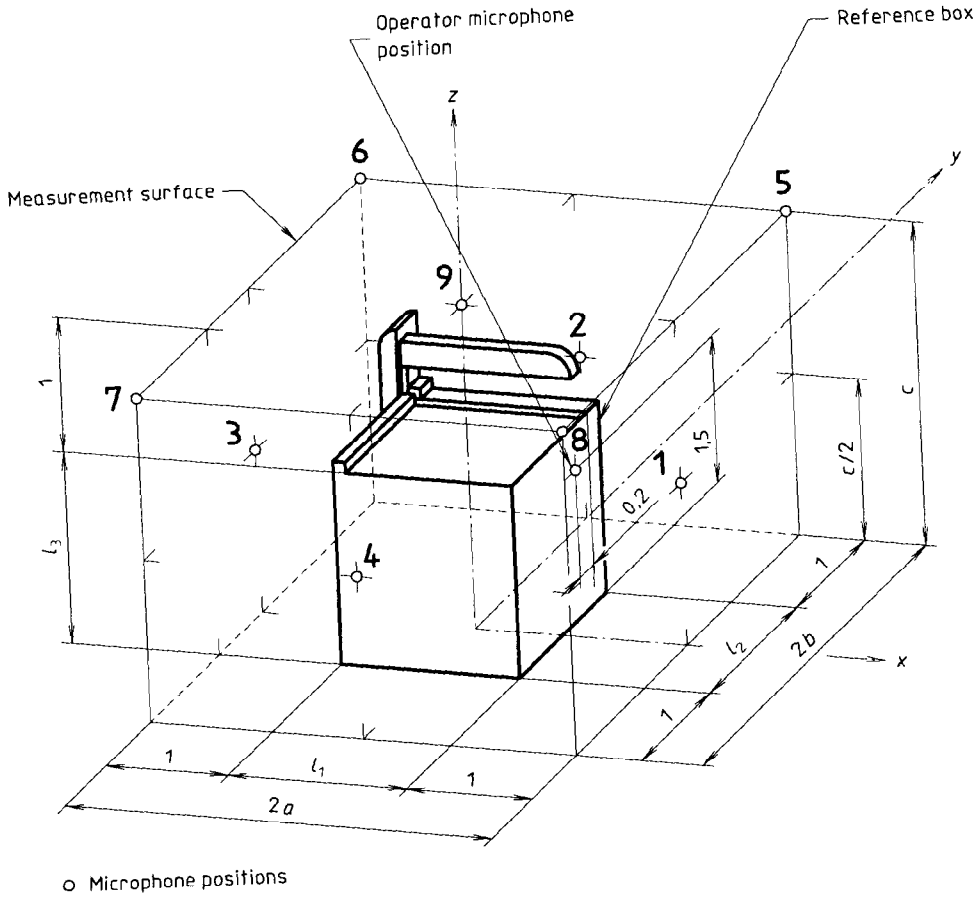
Dimensions in metres



o Microphone positions

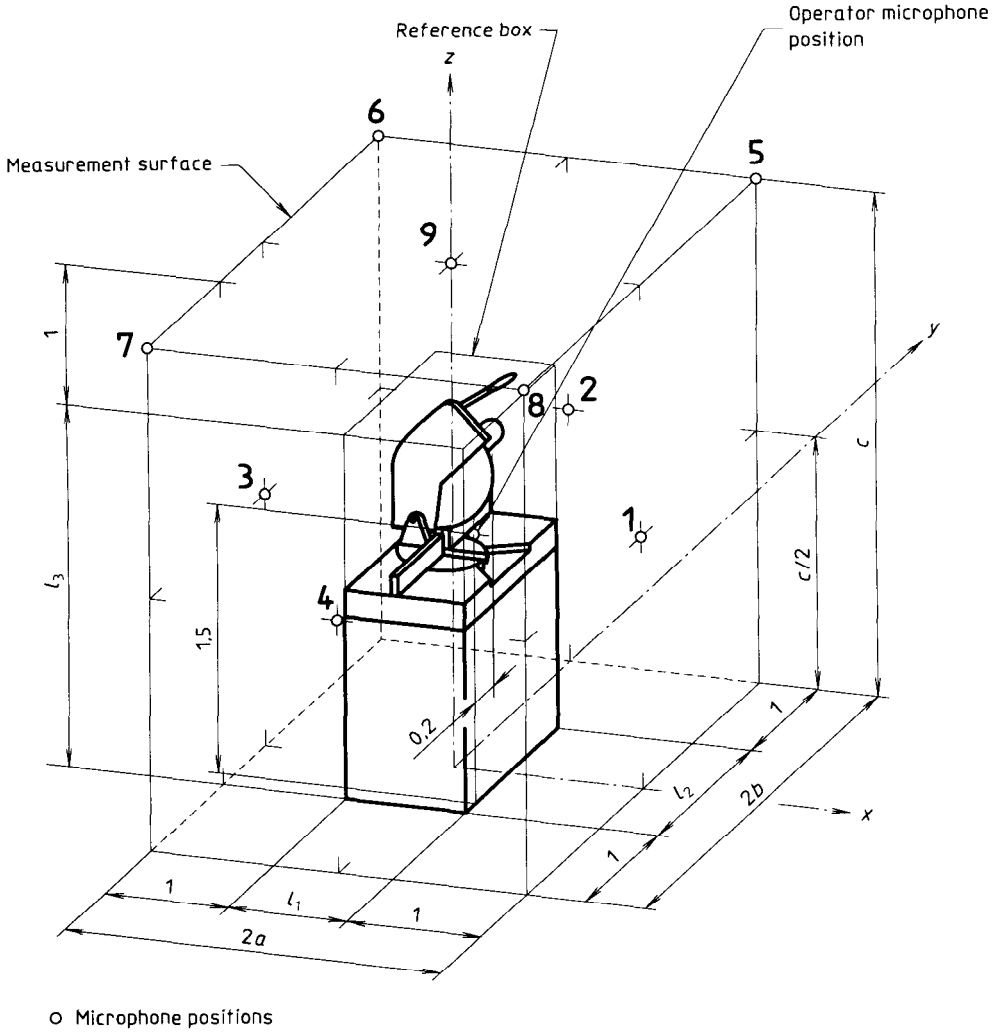
a)

Dimensions in metres



b)

Dimensions in metres



c)

Figure N.1 — Measurement surface and microphone array for determination of sound power level for single blade stroke circular sawing machines for cross-cutting
(see ISO 3740 series for explanation of symbols)

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

Machine data

Make: .....

Model: .....

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

Machine function: .....

Overall dimensions of machine[1]:

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

Max. blade diameter ..... mm Clamp flange diameter ..... mm

Nominal rotational speed:

motor: ..... r/min

sawblade max. ..... r/min

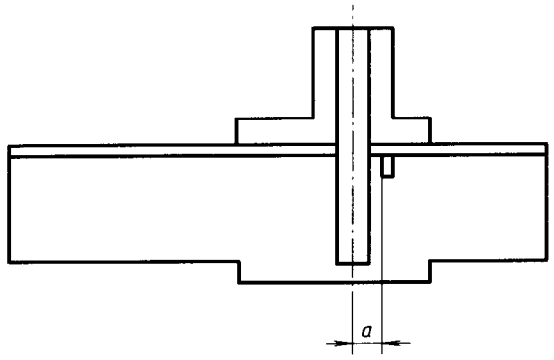
min. ..... r/min

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 hood yes ☐ no ☐	.....
Other noise control measure yes ☐ no ☐	.....

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

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

Testing operation	Units	Standard condition(s)	Condition chosen within permitted range or conditions deviating from standard
Cross-cutting of softwood			
Operating arrangement			
			
Position of fixed stop, *a*	mm	20	

Tool and cutting data

Type of tool: Standard sawblade with carbide-tipped teeth

Sawblade data (largest recommended sawblade diameter should be chosen):

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
630 to 1 000	According to manufacturer's specification		

Spindle speed	r/min[1)]		
Sawblade diameter	mm	.....	
Cutting speed	m/s	.....	
Number of teeth			
Tooth width	mm	..... ± 0,1	
Actual blade thickness	mm	..... ± 0,1	
Feed rate	m/min	6 ± 2	

1) Spindle speed shall be the maximum possible for the actual machine.

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

Testing material

Material:	softwood, medium grade		
Moisture content:	8 % to 14 %		
Material length:	1 000 mm, processed down to a final minimum length of 500 mm		
	Sawblade diameter		
	$\leqslant$ 315 mm	**355 mm to 450 mm**	**$>$ 450 mm**
Material height:	50 mm	75 mm	100 mm
Material width:	50 mm	150 mm	250 mm
Previous processing:	none		

Photo or detailed illustration of the machine tested

Testing laboratory

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.

	Machine classification number (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 parts 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.

Dimensions in metres

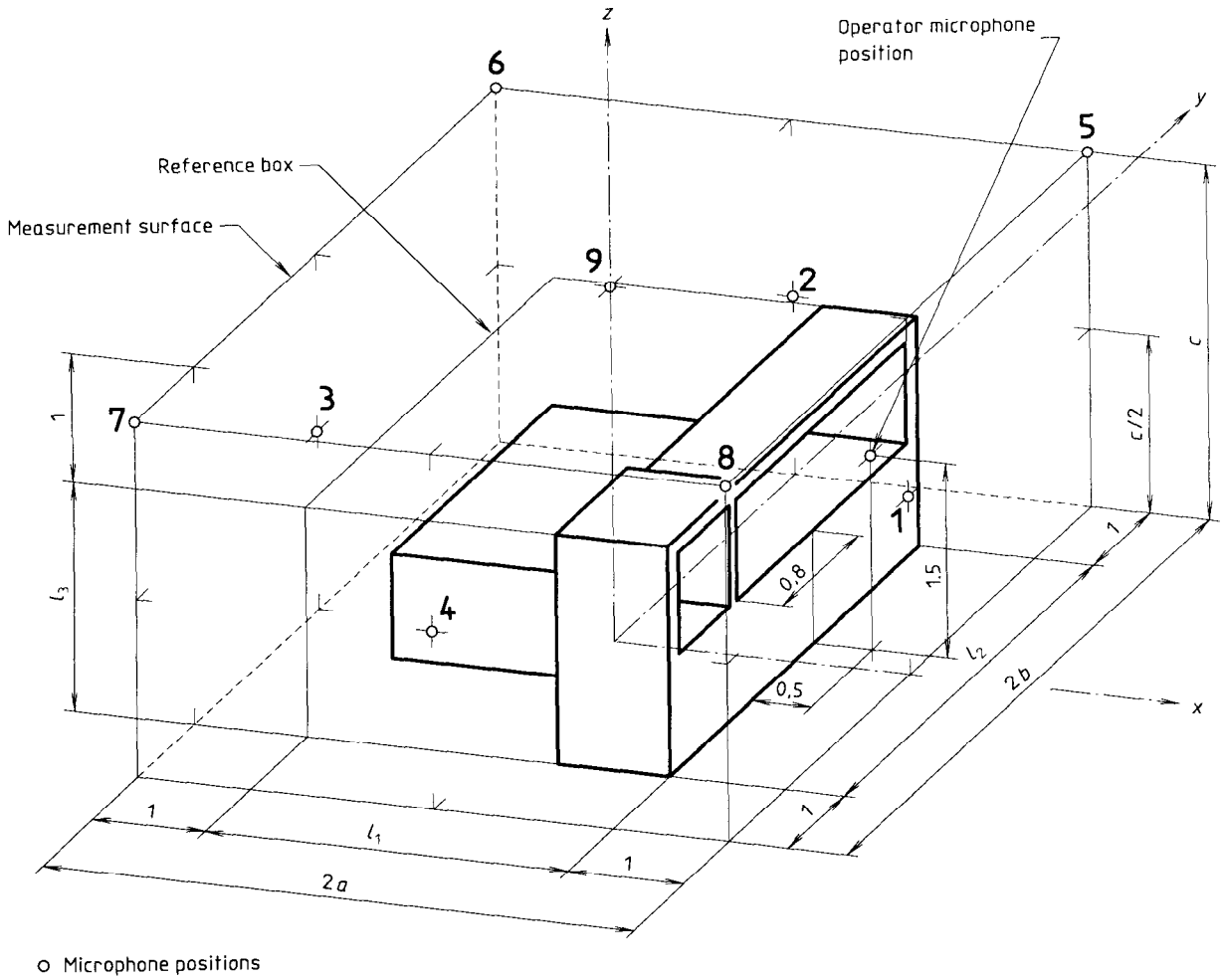


Figure P.1 — Measurement surface and microphone array for determination of sound power level for horizontal panel sizing sawing machines (see ISO 3740 series for explanation of symbols)

Dimensions in metres

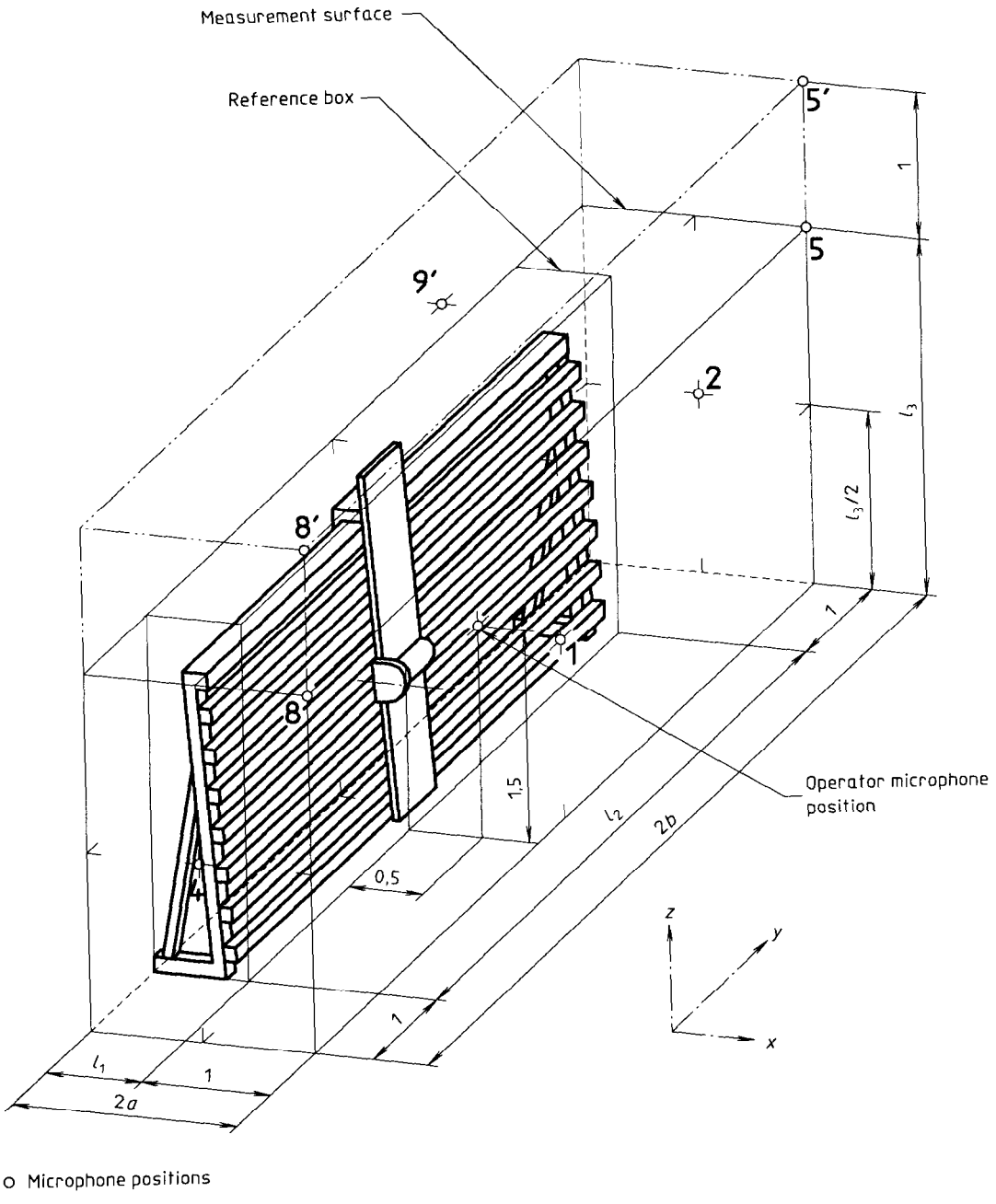


Figure P.2 — Measurement surface and microphone array for determination of sound power level for vertical panel sizing sawing machines (see ISO 3740 series for explanation of symbols)

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

Machine data

Make: .....

Model: .....

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

Overall dimensions of machine[1]:

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

Max. blade diameter ..... mm Clamp flange diameter ..... mm

☐ With scoring sawblade ☐ Without scoring sawblade

☐ Vertical machine ☐ Horizontal machine

☐ Manual saw unit movement ☐ Automated saw unit movement

Nominal rotational speed:

motor: ..... r/min

sawblade max. ..... r/min

min. ..... r/min

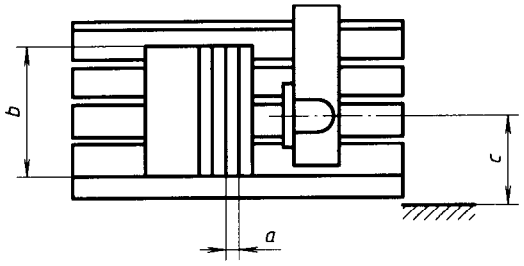
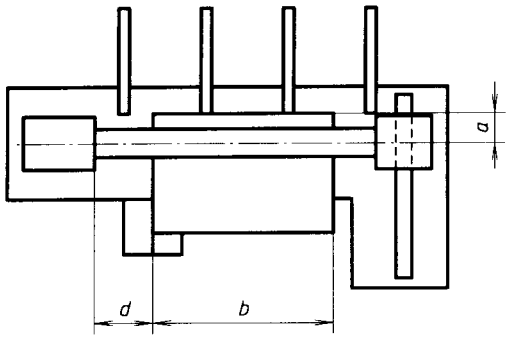
scoring sawblade: ..... r/min

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 equipped with noise-reducing hood 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 handwheels, 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
Cutting particle board			
Operating arrangement			
Vertical machine			
			
The board shall be placed centrally on the machine			
Saw unit position at idle running, *c*	mm	1 200	
Horizontal machine			
			
Distance between panel and sawblade outlet, *d*	mm	200	
Width of cutoff, *a*	mm	50	
Cutting length, *b*	mm	1 200	
Tool and cutting data			
Type of tool: Standard sawblade with carbide-tipped teeth			
Tooth profile: Alternate top level teeth			
Feed rate			
a) vertical machines	m/min	8 ± 2 [1]	
b) horizontal machines	m/min	15 ± 2 [1]	
Main sawblade			
spindle speed	r/min	..... [2]	
sawblade diameter	mm	..... [2]	
cutting speed	m/s	..... [2]	
number of teeth		..... [2]	
tooth width	mm	..... ± 0,1 [2]	
actual blade thickness	mm	..... ± 0,1 [2]	
Scoring sawblade			
spindle speed	r/min	..... [2]	
sawblade diameter	mm	..... [2]	
cutting speed	m/s	..... [2]	
number of teeth		..... [2]	
tooth width	mm	..... ± 0,1 [2]	
actual blade thickness	mm	..... ± 0,1 [2]	

1) Speed shall be as close as possible to the standard condition.
2) In accordance with manufacturer's recommendations.

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

Testing material

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

Photo or detailed illustration of the machine tested

Testing laboratory

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.

	Machine classification number (see ISO 7984)
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.

Dimensions in metres

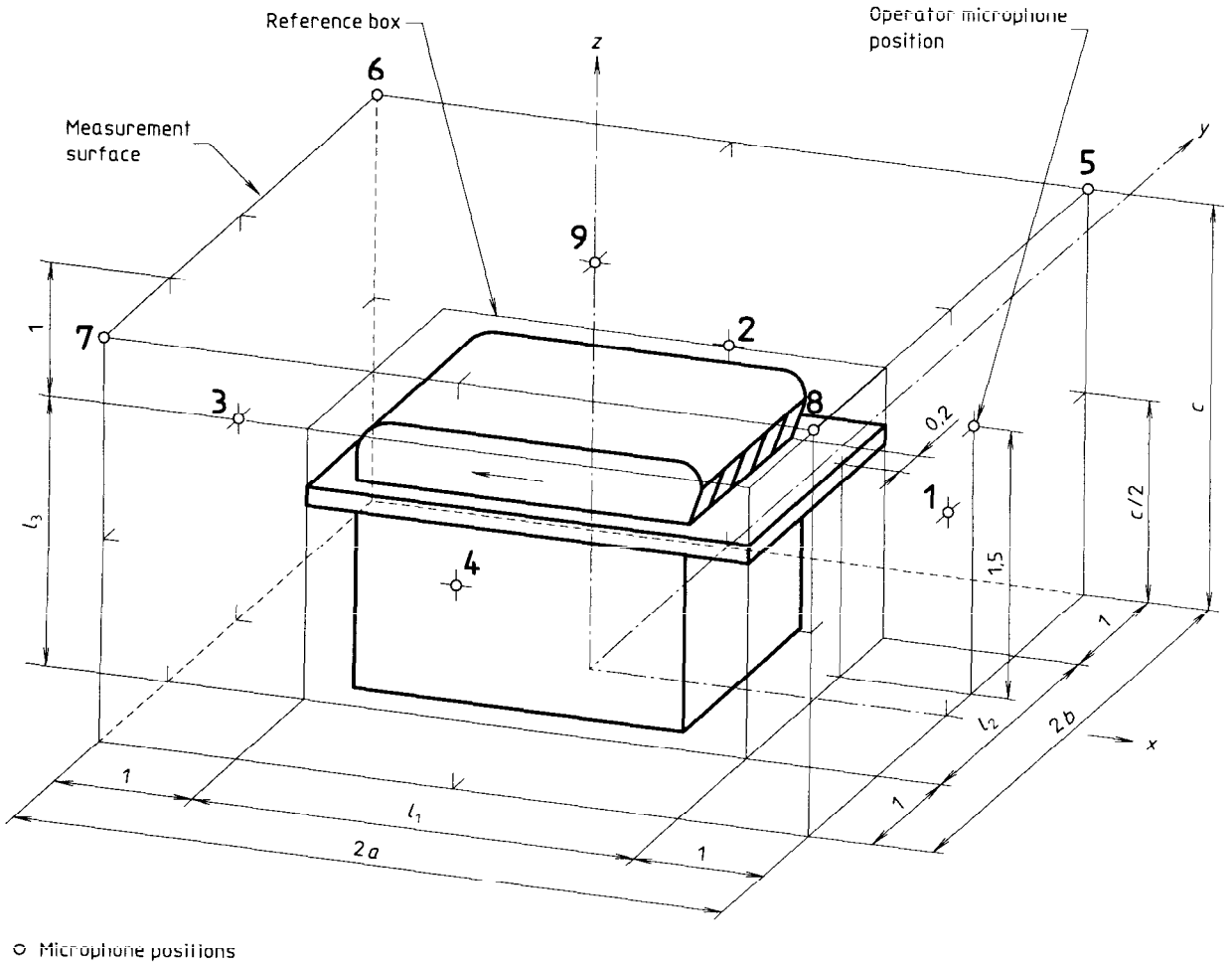


Figure Q.1 — Measurement surface and microphone array for determination of sound power level for multiblade circular sawing machines (for ripping) (see ISO 3740 series for explanation of symbols)

Q.3 Data sheet for multiblade circular sawing machines for ripping

Machine data

Make: .....

Model: .....

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

Overall dimensions of machine[1]:

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

Max. blade diameter ..... mm Clamp flange diameter ..... mm

Nominal rotational speed:

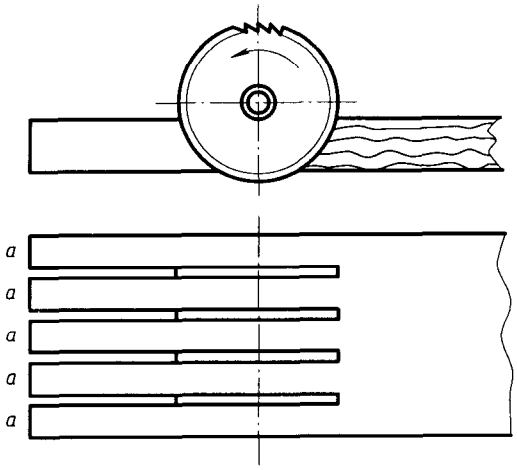
motor: ..... r/min sawblade: ..... r/min

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 infeed and outfeed noise-reducing arrangements 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 handwheels, levers) may be disregarded.

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

Testing operation	Units	Standard condition(s)	Condition chosen within permitted range or conditions deviating from standard
Ripping of softwood			
Operating arrangement			
			
Number of sawblades		4	
Width of strips, *a*	mm	26 to 28	
Tool and cutting data			
Type of tool: Standard sawblade with carbide-tipped teeth			
Sawblade data (largest recommended sawblade diameter should be chosen):			

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

Spindle speed[1)]	r/min	.....	
Sawblade diameter	mm	.....	
Cutting speed	m/s	.....	
Number of teeth		.....	
Tooth width	mm	..... ± 0,1	
Actual blade thickness	mm	..... ± 0,1	
Feed rate	m/min	15 ± 2	

1) Spindle speed shall be the maximum possible for the operation.

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

Testing material

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

Photo or detailed illustration of the machine tested

Testing laboratory

Firm/institution: .....

Address: .....

Telephone: .....

Date: ..... Signature: .....

Test carried out:

place: .....

date: .....

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Annex R
(normative)

Woodworking machines — Operating conditions for sanding machines

R.1 General

This annex contains a series of standard operating conditions to be applied in connection with measurement of noise from sanding 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.

	Machine classification number (see ISO 7984)
Narrow belt sanding machines with fixed table	12.721.1
Narrow belt sanding machines with sliding table or frame	12.721.2
Automatic narrow belt sanding machines	12.721.3
Wide belt sanding machines	12.722
Sanding machines with cylindrical tool	12.74
Sanding machines with different tools	12.75

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

R.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. Measurements are made during simultaneous operation of all working units. For machines with conveyor belt drive a continuous supply of test pieces should be fed with minimum distance between successive test pieces. For machines with sliding table or frame only one test piece is necessary.

c) Operator microphone positions for test purpose (sanding machine without travelling pad) (see figure R.1)

   Position A:

   — 1,5 m above floor level;

   — 0,5 m forward of vertical plane of front edge of table;

   — in middle of table.

Position B:

— 1,5 m above floor level;

— 0,5 m rearward of vertical plane of rear edge of table;

— in middle of table.

d) Operator microphone position for test purpose (sanding machine with travelling pad) (see figure R.2)

— 1,5 m above floor level;

— 1,0 m forward of travelling pad.

Position for travelling pad:

— 0,6 m from the fence.

NOTE 21 The use of integrating sound level meters is recommended but is not mandatory.

Dimensions in metres

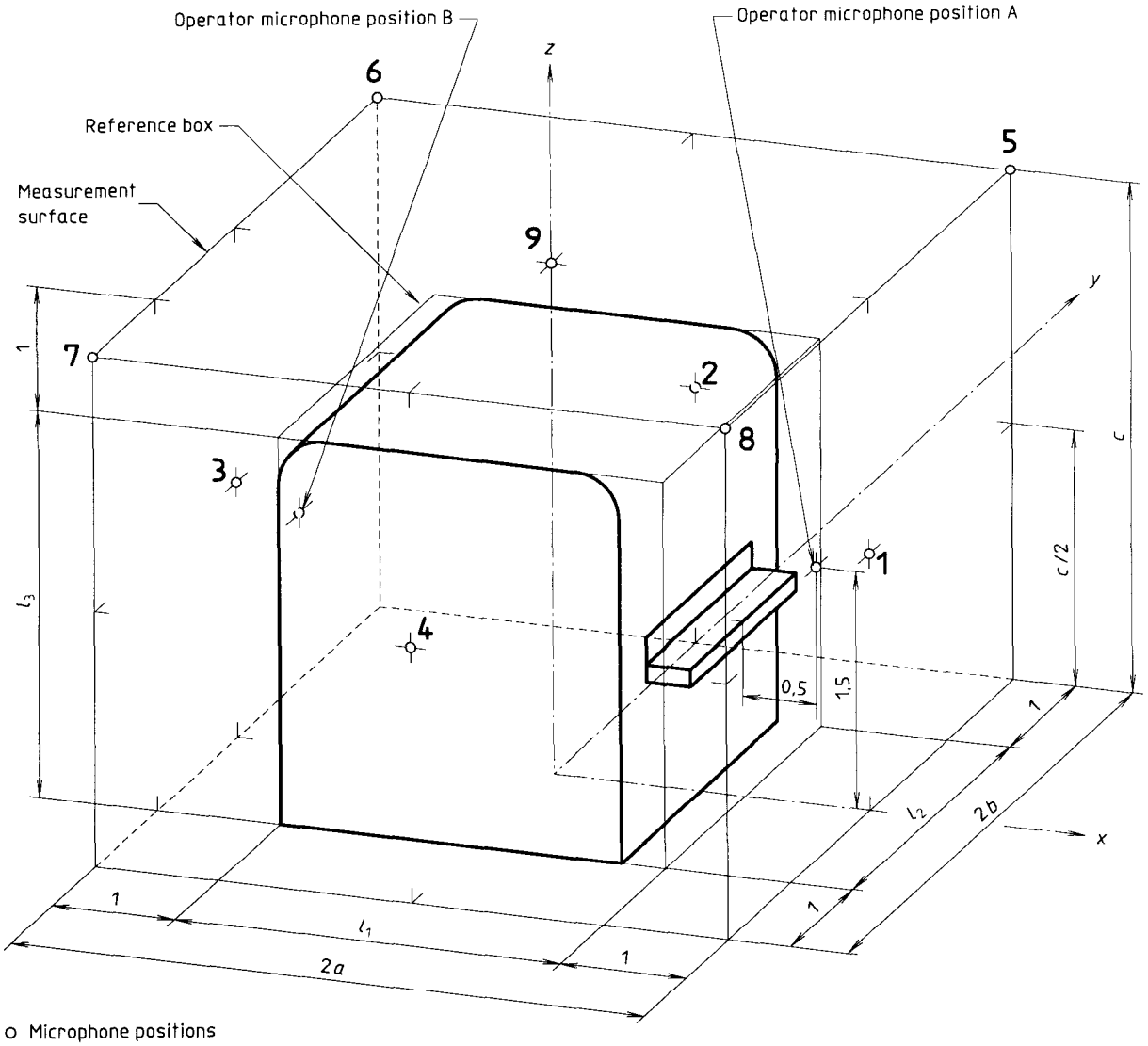


Figure R.1 — Measurement surface and microphone array for determination of sound power level for sanding machines without travelling pad (see ISO 3740 series for explanation of symbols)

Dimensions in metres

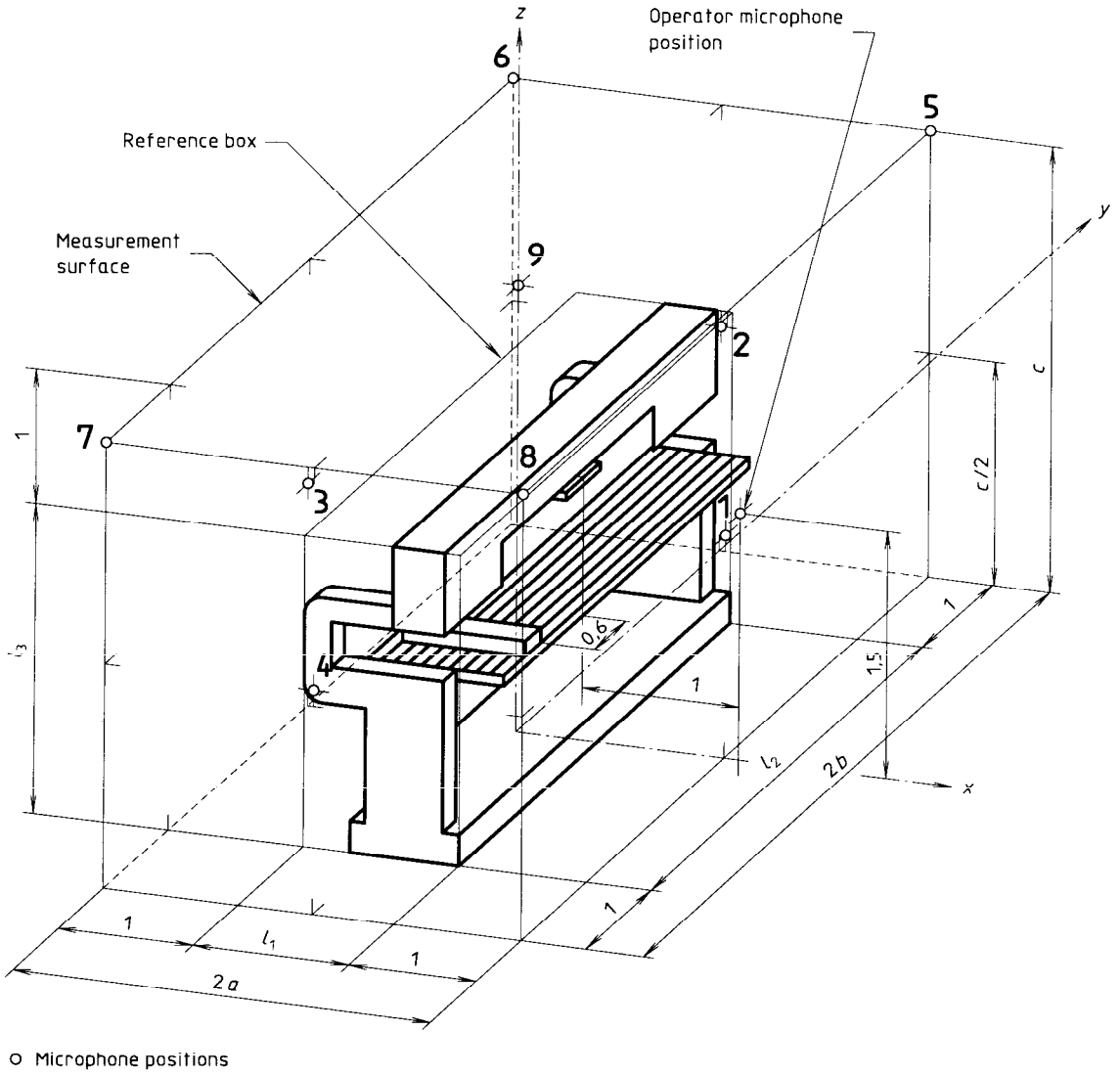


Figure R.2 — Measurement surface and microphone array for determination of sound power level for sanding machines with travelling pad (see ISO 3740 series for explanation of symbols)

R.3 Data sheet for sanding machines

Machine data

Make: .....

Model: .....

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

Overall dimensions of machine[1]:

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

Width of sanding belt: ..... mm Maximum speed of sanding belt: ..... m/s

Description of function:	No. of units	Max. speed of sanding belt m/s	Motor power kW
Wide belt with cylinder			
Wide belt with pad			
Cross belt			
Brushing device			
Cleaning device, compressed air			
Vacuum device on conveyor belt			

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 with built-in dust extraction
yes ☐ no ☐ .....

Machine mounted on vibration isolators
yes ☐ no ☐ .....

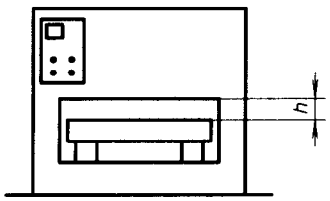
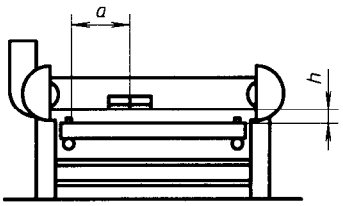
Machine fitted in separate noise enclosure
yes ☐ no ☐ .....

Machine equipped with integral noise enclosure
yes ☐ no ☐ .....

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 handwheels, levers) may be disregarded.

Data sheet for sanding machines *(continued)*

Testing operation	Units	Standard condition(s)	Condition chosen within permitted range or conditions deviating from standard
Sanding of particle board			
Operating arrangement			
First and second wide belt units operating. Other belt units: idle running with belt.			
Built-in dust extraction, and all auxiliary units (e.g. cleaning and vacuum devices) necessary for the operation, shall be working.			
Machine with conveyor belt drive			
			
Passage height at idling, h	mm	16	
Machine with sliding table			
			
Passage height at idling, h	mm	16	
Distance from fence to travelling pad, a	mm	600	
Tool and cutting data			
New sanding belts or sanding paper shall be used.			
☐ Machine with conveyor belt drive			
speed of sanding belt	m/s	max. recommended	
feed rate	m/min	10 ± 2	
grit size for first wide belt unit		80 to 120	
grit size for second wide belt unit		120 to 160	
grit size for other belt units		In accordance with normal belt functions	
total sanding depth	mm	0,1 to 0,3	
pressure oscillation		In accordance with manufacturer's recommendation	
☐ Machine with sliding table or frame			
speed of sanding belt	m/s	max. recommended	
feed rate (movement of table)	m/min	4 ± 1	
grit size		80 to 120	
sanding depth	mm	0,1 to 0,3	
pressure		Corresponding to the sanding depth	

Data sheet for sanding machines *(concluded)*

Testing material

Material:	particle board, three-layer construction
Moisture content:	6 % to 10 %
Board thickness:	16 mm
Board length:	1 200 mm
Board width:	600 mm
Previous processing:	none

Photo or detailed illustration of the machine tested

Testing laboratory

Firm/institution: .....

Address: .....

Telephone: .....

Date: ..... Signature: .....

Test carried out:

place: .....

date: .....

Annex S
(normative)

Woodworking machines — Operating conditions for double edging circular sawing machines for rough cutting

S.1 General

This annex contains a series of standard operating conditions to be applied in connection with measurement of noise from double edging circular sawing machines (for rough 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)
Double edging circular sawing machine for rough cutting	12.132.33

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

S.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 minimum distance between successive test places so that measurements are made during simultaneous operation of all working units.

c) Operator microphone position for test purpose (see figure S.1):
   - 1,5 m above the surface on which the operator stands;
   - in the plane of the front face of the measurement surface;
   - 0,5 m to the left of centreline of infeed aperture (viewed from infeed direction).

NOTE 22 The use of integrating sound level meters is recommended but is not mandatory.

Dimensions in metres

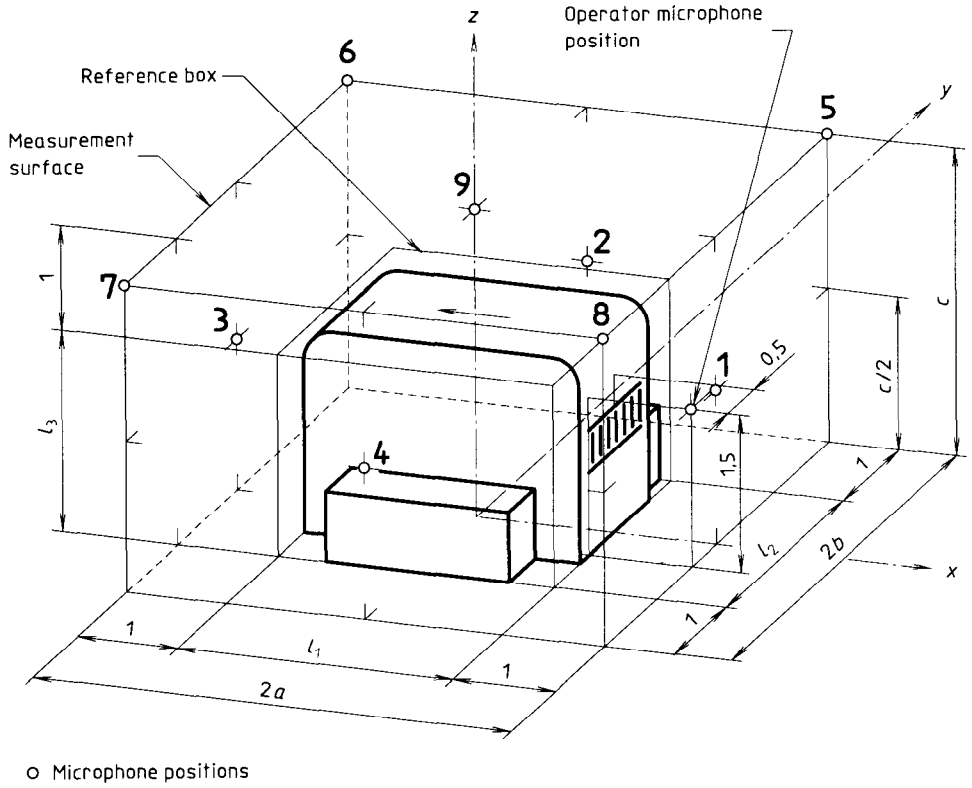


Figure S.1 — Measurement surface and microphone array for determination of sound power level for double edging circular sawing machines (see ISO 3740 series for explanation of symbols)

S.3 Data sheet for double edging circular sawing machines for rough cutting

Machine data

Make: .....

Model: .....

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

Overall dimensions of machine[1]:

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

Max. blade diameter ..... mm Clamp flange diameter ..... mm

Nominal rotational speed:

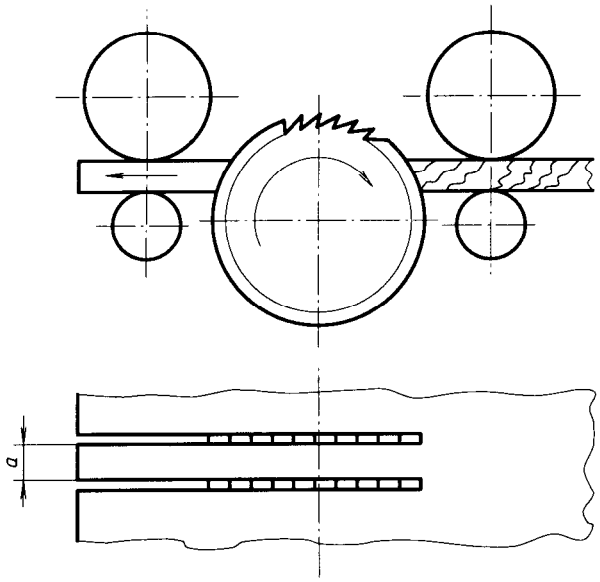
motor: ..... r/min sawblades: ..... r/min

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 infeed and outfeed noise-reducing arrangements 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 handwheels, levers) may be disregarded.

Data sheet for double edging circular sawing machines for rough cutting *(continued)*

Testing operation	Units	Standard condition(s)	Condition chosen within permitted range or conditions deviating from standard
Edging of softwood			
Operating arrangement			
			
Saw spindle can be arranged above or below workpiece.			
Number of sawblades		2	
Width of strip, a	mm	75	
Tool and cutting data			
Type of tool: Standard sawblade with carbide-tipped teeth			
Sawblade data (largest recommended sawblade diameter should be chosen):			
Sawblade diameter mm / **Number of teeth** / **Tooth width** mm / **Blade thickness** mm			
355 (350) / 16 to 36 / 3,6 to 5,0 / 2,4 to 3,0			
400 / 18 to 36 / 3,8 to 5,0 / 2,4 to 3,0			
450 / 24 to 36 / 4,2 to 5,2 / 2,6 to 3,2			
500 / 24 to 36 / 4,8 to 5,5 / 3,0 to 3,5			
630 (600) / 30 to 36 / 5,0 to 5,5 / 3,0 to 3,5			
630 to 1 000 / According to manufacturer's specification			
Spindle speed[1)]	r/min	.....	
Sawblade diameter	mm	.....	
Cutting speed	m/s	.....	
Number of teeth		.....	
Tooth width	mm	..... ± 0,1	
Actual blade thickness	mm	..... ± 0,1	
Feed rate	m/min	40 ± 2	

1) Spindle speed shall be the maximum possible for the operation.

Data sheet for double edging circular sawing machines for rough cutting *(concluded)*

Testing material

Material:	softwood (green timber), medium grade
Moisture content:	> 20 %
Material length:	3 000 mm
Material width:	≈ 200 mm
Material height:	50 mm

NOTE — If the machine is designed for normal use with a feed rate of more than 40 m/min and tested with this feed rate, the material height may be 24 mm to 26 mm.

Previous processing: none

Photo or detailed illustration of the machine tested

Testing laboratory

Firm/institution: .....

Address: .....

Telephone: .....

Date: ..... Signature: .....

Test carried out:

place: .....

date: .....

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Annex T
(normative)

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

T.1 General

This annex contains a series of standard operating conditions to be applied in connection with measurement of noise from double 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 machines.

	Machine classification number (see ISO 7984)
Double and multi-blade stroke circular sawing machines	12.132.1 (double blade only)

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

T.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 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 T.1):
   - 1,5 m above floor level;
   - in vertical plane of front edge of table;
   - 1 m to the right of the left-hand sawblade.

Tests taken at the operator's position shall be as shown for idling conditions.

The reference box shall enclose the table and the hood (in upper position).

NOTE 23 In practice, such a measurement can only be carried out by using integrating sound level meters.

Dimensions in metres

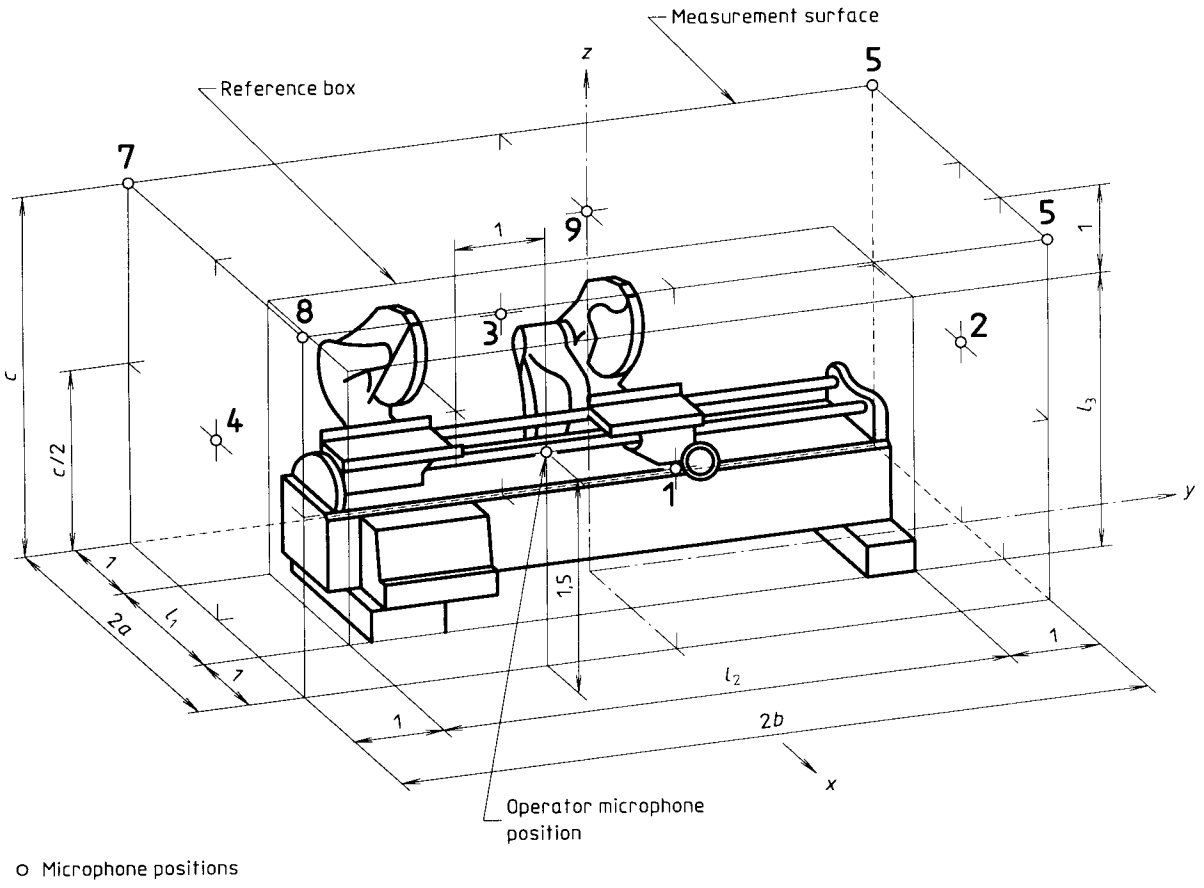


Figure T.1 — Measurement surface and microphone array for determination of sound power level for double blade stroke circular sawing machines for cross-cutting (see ISO 3740 series for explanation of symbols)

T.3 Data sheet for double blade stroke circular sawing machines for cross-cutting

Machine data

Make: .....

Model: .....

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

Machine function: .....

Overall dimensions of machine[1]:

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

Max. blade diameter ..... mm Clamp flange diameter ..... mm

Nominal rotational speed:

motor: ..... r/min

sawblade max.: ..... r/min

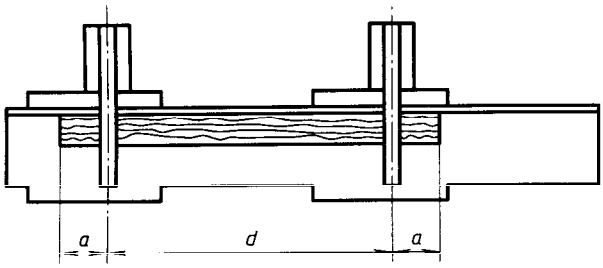
min.: ..... r/min

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 hood 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 handwheels, levers) may be disregarded.

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

Testing operation	Units	Standard condition(s)	Condition chosen within permitted range or conditions deviating from standard
Cross-cutting of softwood			
Operating arrangement			
			
Position of fixed stops, a	mm	20	
Machine set-up when performing measurement under no load, d	mm	1 960	
Tool and cutting data			
Type of tool: Two equal standard sawblades with carbide-tipped teeth			

Sawblade data (largest recommended sawblade diameter should be chosen):

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
630 to 1 000	According to manufacturer's specification		

Spindle speed[1)]	r/min	.....	
Sawblade diameter	mm	.....	
Cutting speed	m/s	.....	
Number of teeth		.....	
Tooth width	mm	..... ± 0,1	
Actual blade thickness	mm	..... ± 0,1	
Feed rate	m/min	6 ± 2	

1) Spindle speed shall be the maximum possible for the actual machine.

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

Testing material

Material:	softwood, medium grade		
Moisture content:	8 % to 14 %		
Material length:	2 000 mm, processed down to a final minimum length of 1 500 mm		
	Sawblade diameter		
	⩽ 315 mm	**355 mm to 450 mm**	**> 450 mm**
Material height:	50 mm	75 mm	100 mm
Material width:	50 mm	150 mm	250 mm
Previous processing:	none		

Photo or detailed illustration of the machine tested

Testing laboratory

Firm/institution: .....

Address: .....

Telephone: .....

Date: ..... Signature: .....

Test carried out:

place: .....

date: .....

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Annex U
(normative)

Woodworking machines — Operating conditions for double-end tenoning machines for tenoning only

U.1 General

This annex contains a series of standard operating conditions to be applied in connection with measurement of noise from double-end tenoning 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.

	Machine classification number (see ISO 7984)
Double-end tenoning machines (for tenoning only) producing a tenon on both ends of the workpiece during an automatic cycle; different arrangements can be used	82.2

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

U.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 machine shall be fed with a continuous supply of workpieces and the measurement period is considered finished when three pieces are completed. This measurement period shall be reported.

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

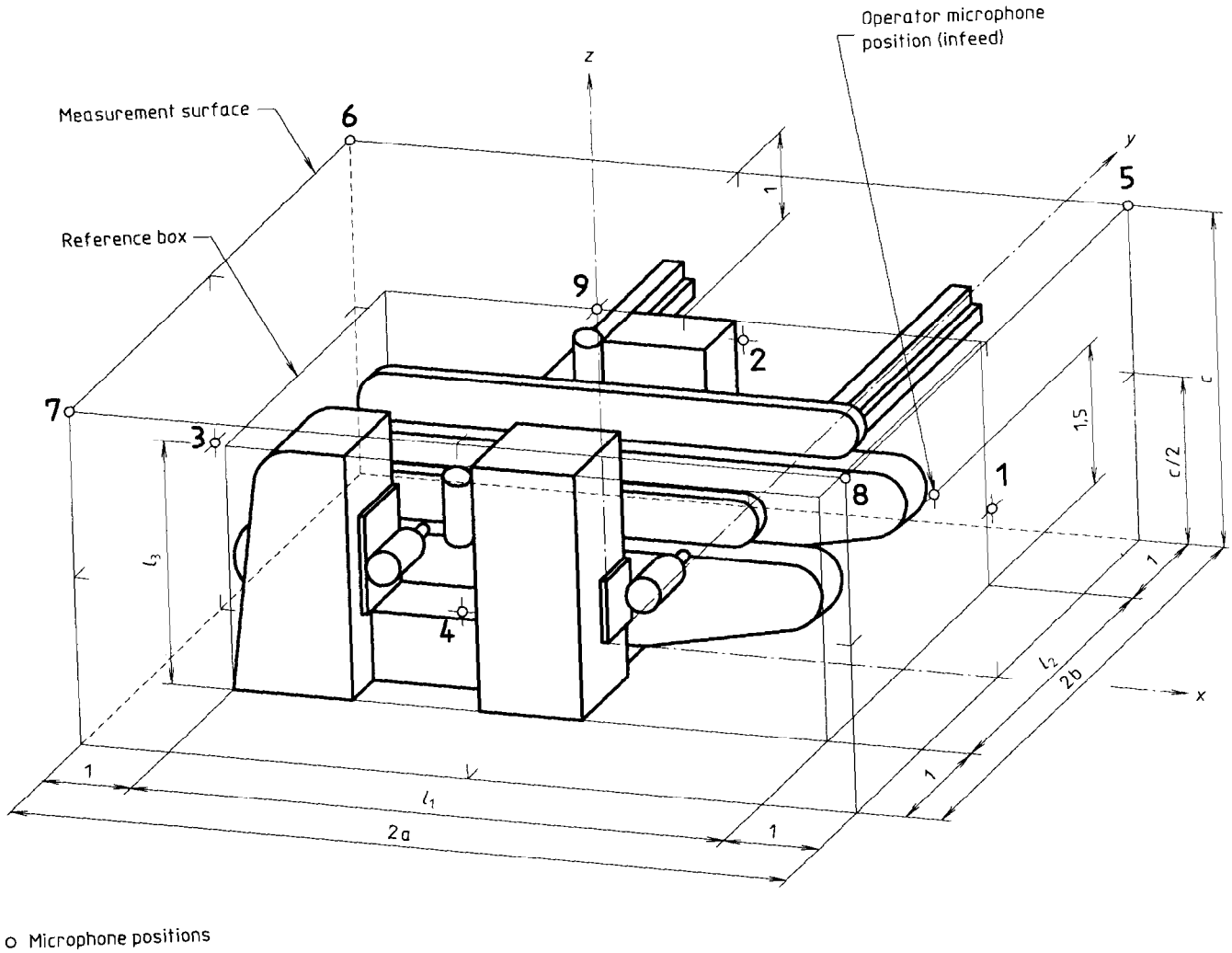
- 1,5 m above floor level;
- in line with middle of infeed or outfeed referred to a constant material length of 2 000 mm;
- in the plane of front or rear face of the reference box.

NOTE 24 If middle of infeed or outfeed cannot be defined, point 1 or 3 of the measurement surface should be used.

d) The reference box shall enclose all elements of the machine which are significant radiators of sound energy. The reference box shown in figure U.1 refers to a machine set-up for a 2 000 mm material length.

NOTE 25 In practice, such a measurement can only be carried out by using integrating sound level meters.

Dimensions in metres



o Microphone positions

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

U.3 Data sheet for double-end tenoning machines for tenoning only

Machine data

Make: .....

Model: .....

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

Overall dimensions of machine[1]:

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

Spindle No.[1]	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 ☐ .....

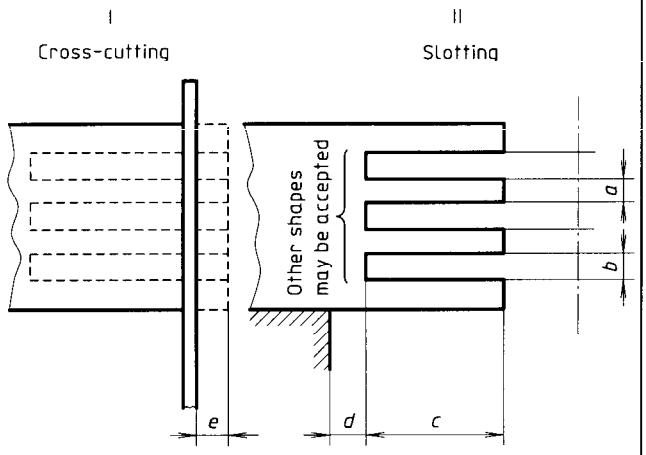
Machine equipped with integral noise enclosure
yes ☐ no ☐ .....

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 handwheels, levers) may be disregarded.

Data sheet for double-end tenoning machines for tenoning only *(continued)*

Testing operation	Units	Standard condition(s)	Condition chosen within permitted range or conditions deviating from standard
Tenoning and slotting of softwood at both ends of test piece.			
Operating arrangement			
Tools shall be fitted only to those spindles which are used in the test procedure			
The machine shall be equipped with a backstop device for the workpiece			
			
Tenoning thickness, *a*	mm	8	
Slot width, *b*	mm	8	
Tenon depth, *c*	mm	60 to 65	
Distance to support, *d*	mm	min. possible	
Surplus for cross-cutting, *e*	mm	2 to 20	
Tool and cutting data			
a) Spindle I			
Cross-cutting sawblade (standard sawblade with carbide-tipped teeth)			
spindle speed	r/min	3 000 [1]	
sawblade diameter	mm	355 (350)	
cutting speed	m/s	.....	
number of teeth		48 to 64	
tooth profile: alternate top-level			
tooth width	mm	3,2 to 3,6	
actual blade thickness	mm	2,2 to 2,6	
b) Spindle II			
Slotting cutters (rotation opposing feed)			
number each side		3	
spindle speed	r/min	3 000 [1]	
cutting circle diameter	mm	300	
cutting speed	m/s	.....	
number of cutting knives		2 to 3	
blade projection	mm	.....	
c) Feed rate during tenoning	m/min	6 ± 2	

1) Spindle speed shall be as close as possible to 3 000 r/min.

Data sheet for double-end tenoning machines for tenong only *(concluded)*

Testing material

Material:	softwood, medium grade
Moisture content:	8 % to 14 %
Material length:	1 000 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

Testing laboratory

Firm/institution: .....

Address: .....

Telephone: .....

Date: ..... Signature: .....

Test carried out:

place: .....

date: .....

Annex V
(informative)

Bibliography

[1] ISO 3740:1980, *Acoustics — Determination of sound power levels of noise sources — Guidelines for the use of basic standards and for the preparation of noise test codes.*

[2] ISO 3741:1988, *Acoustics — Determination of sound power levels of noise sources — Precision methods for broad-band sources in reverberation rooms.*

[3] ISO 3742:1988, *Acoustics — Determination of sound power levels of noise sources — Precision methods for discrete-frequency and narrow-band sources in reverberation rooms.*

[4] ISO 3743:1988, *Acoustics — Determination of sound power levels of noise sources — Engineering methods for special reverberation test rooms.*

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

[6] ISO 3745:1977, *Acoustics — Determination of sound power levels of noise sources — Precision methods for anechoic and semi-anechoic rooms.*

[7] ISO 3746:—[1)], *Acoustics — Determination of sound power levels of noise sources — Survey method employing and enveloping measurement surface over a reflecting plane.*

[8] ISO 3747:1987, *Acoustics — Determination of sound power levels of noise sources — Survey method using a reference sound source.*

[9] ISO 4871:—[2)], *Acoustics — Declaration and verification of noise emission values of machinery and equipment.*

[10] ISO 11200:—[3)], *Acoustics — Noise emitted by machinery and equipment — Guidelines for the use of basic standards for the determination of emission sound pressure levels at the work station and at other specified positions.*

[11] ISO 11201:—[3)], *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at the work station and at other specified positions — Engineering method in an essentially free field over a reflecting plane.*

[12] ISO 11202—[3)], *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at the work station and at other specified positions — Survey method in situ.*

[13] ISO 11203—[3)], *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at the work station and at other specified positions.*

[14] ISO 11204—[3)], *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at the work station and at other specified positions — Method requiring environmental corrections.*

1) To be published. (Revision of ISO 3746:1979)
2) To be published. (Revision of ISO 4871:1984)
3) To be published.

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Descriptors: acoustics, machine tools, woodworking machinery, noise (sound), engine noise, airborne sound, tests, acoustic tests, determination, sound pressure, sound power, testing conditions, acoustic measurements.

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