

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

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee MTE/1, Machine tools, upon which the following bodies were represented:

- Advanced Manufacturing Technology Research Institute
- British Engineers' Cutting Tools Association
- Cranfield University
- Gauge and Tools Makers' Association
- Health and Safety Executive
- Machine Tool Technologies Association
- Ministry of Defence
- Coopted members

The following body was also represented in the drafting of the standard, through a panel:

- University of Southampton

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National foreword

This British Standard has been prepared by Technical Committee MTE/1. It is identical with ISO 7960:1995, *Airborne noise emitted by machine tools — Operating conditions for woodworking machines* prepared by the International Organization for Standardization (ISO).

Cross-reference

International Standard	Corresponding British Standard
ISO 7984:1988	BS 4361 <i>Woodworking machines</i> Part 0:1990 <i>Classification of woodworking machines and auxiliary machines used for woodworking</i>

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to vi, pages 1 to 114, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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/m³ to 750 kg/m³, 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/m³ and 600 kg/m³.

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.

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

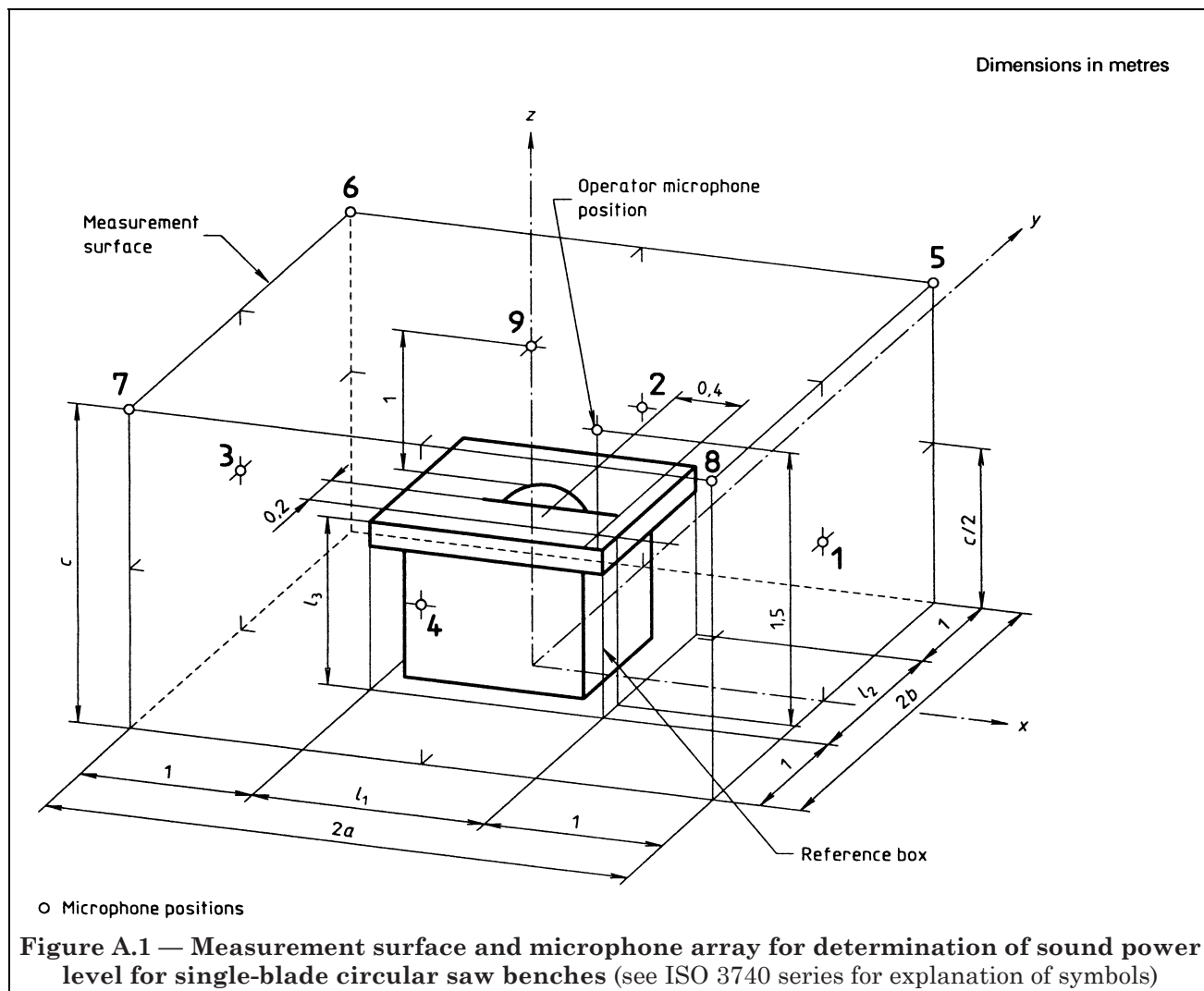
This annex may also be applied for measurement of noise from special-purpose machines having a similar construction and function.

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.

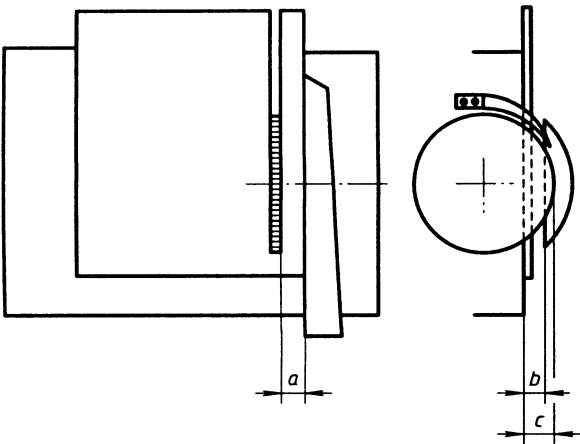
NOTE 4 The use of integrating sound level meters is recommended but is not mandatory.



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

Machine data	
Make:	
Model:	
Year of manufacture:	Serial No.:
Overall dimensions of machine ^a :	
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 ☐
^a Those elements which protrude from the machine and which are not likely to contribute to the noise emission (for example hand-wheels, levers) may be disregarded.	

Data sheet for single-blade circular saw benches

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 Saw guard position, b Sawblade projection, c	mm mm mm	50 20 30	
Tool and cutting data Type of tool: standard sawblade with carbide-tipped teeth Tooth profile: double alternate helix (staggered) Spindle speed Feed rate Blade diameter ≤ 315 mm sawblade diameter cutting speed number of teeth tooth width actual blade thickness Blade diameter > 315 mm sawblade diameter cutting speed number of teeth tooth width actual blade thickness	r/min m/min mm m/s mm mm mm m/s mm mm	4 000 ^a 6 ± 2 250 48 to 60 $3,2 \pm 0,1$ $2,2 \pm 0,1$ 355 (350) 54 to 60 $3,2$ to $3,6 (\pm 0,1)$ $2,2$ to $2,6 (\pm 0,1)$	

^a Spindle speed shall be as close as possible to 4 000 r/min.

Data sheet for single-blade circular saw benches**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:

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)

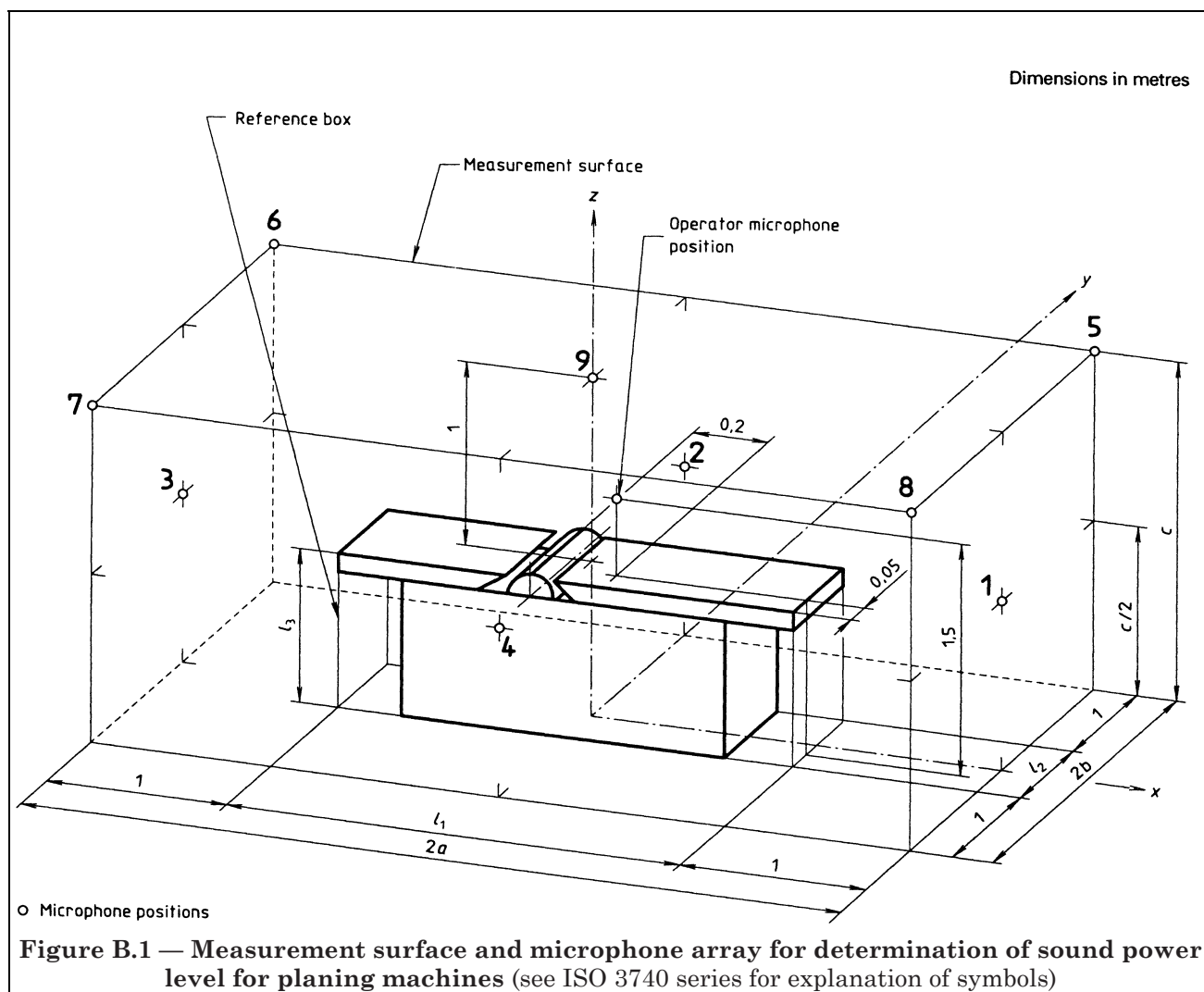
This annex may also be applied for measurement of noise from special-purpose machines having a similar construction and function.

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.

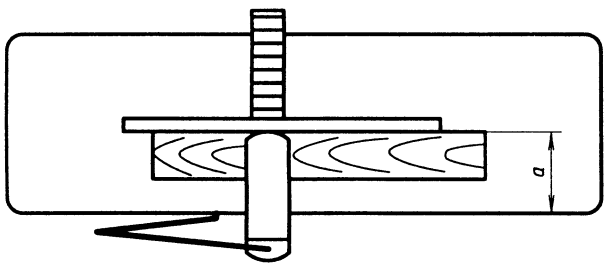


B.3 Data sheet for planing machines

Machine data			
Make:			
Model:			
Year of manufacture:		Serial No.:	
Overall dimensions of machine ^a :			
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 ☐	.....	
.....			

^a 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 planing machines

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

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)

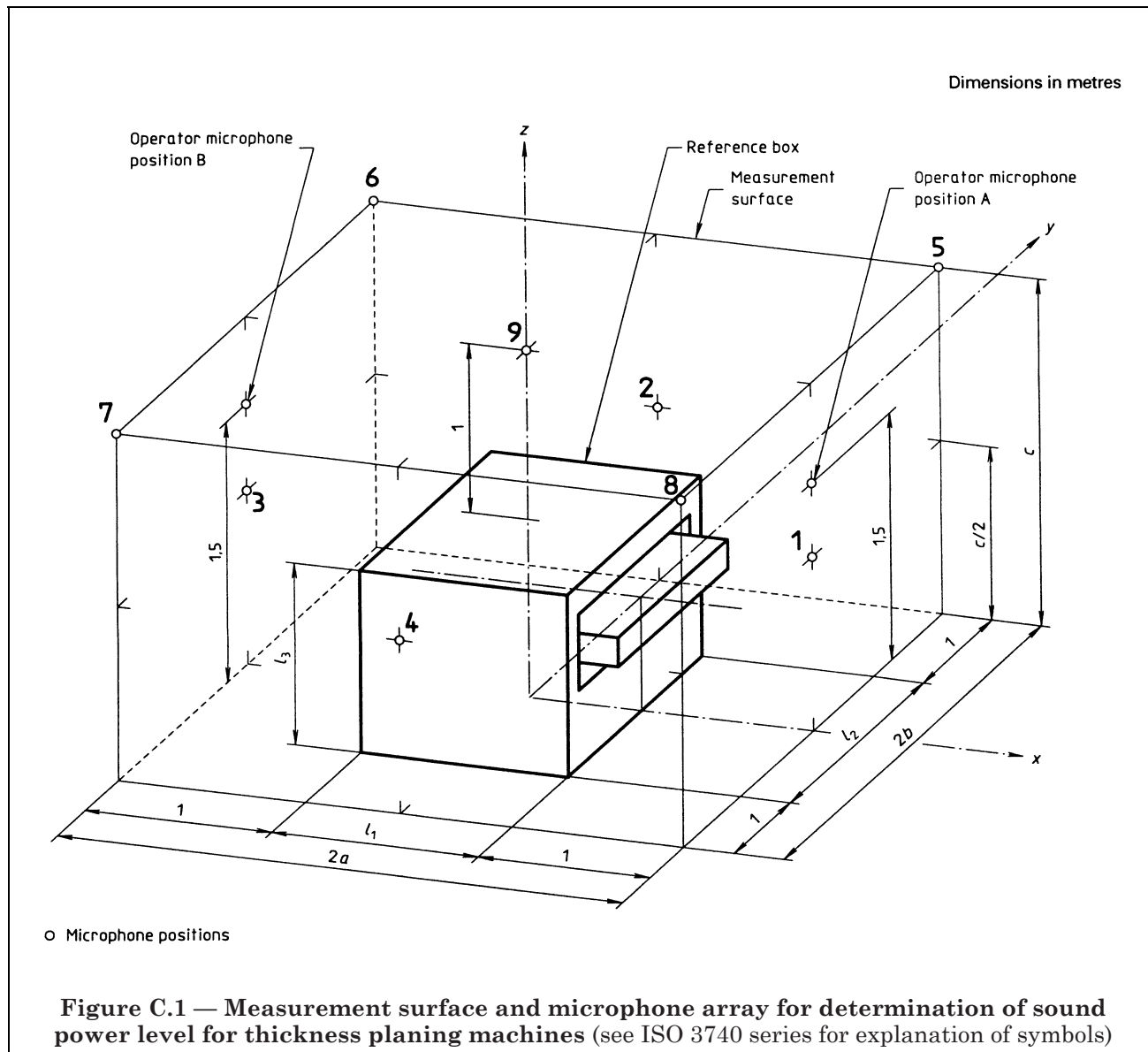
Position A:

- 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.



C.3 Data sheet for thickness planing machines

Machine data	
Make:	
Model:	
Year of manufacture:	Serial No.:
Overall dimensions of machine ^a :	
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 ☐
^a 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 thickness planing machines**Testing material**

Material: softwood, medium grade
Moisture content: 8 % to 14 %
Material length: 1 000 mm
Material width: 100 mm
Material height: 800 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:

Annex D (normative)

Woodworking machines — Operating conditions for single-spindle moulding machines

D.1 General

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

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

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

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

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

Machine classification number (see ISO 7984)

Single-spindle moulding machine

12.311

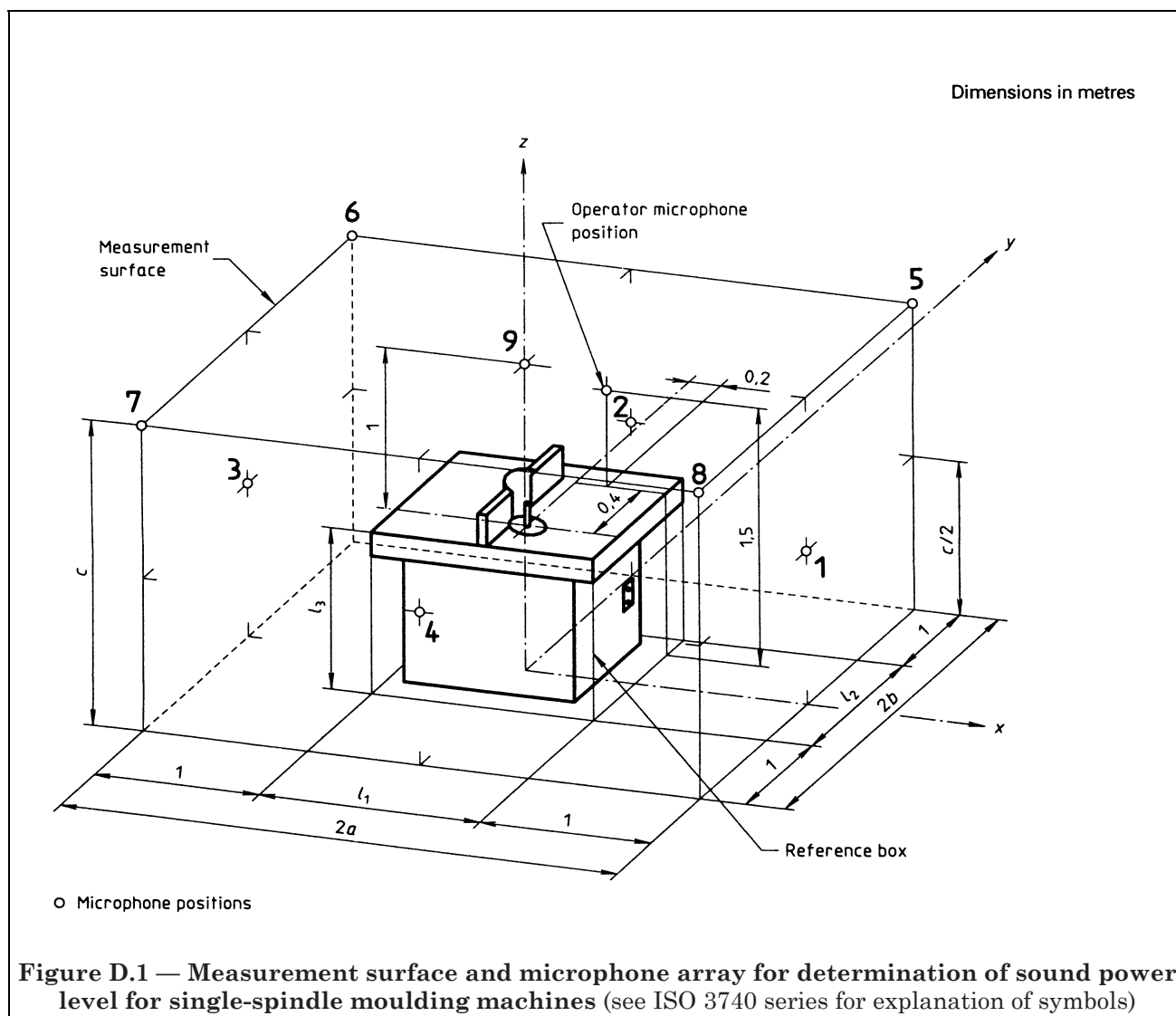
This annex may also be applied for measurement of noise from special-purpose machines having a similar construction and function.

D.2 Noise measurements

The machine shall be tested under the following conditions.

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

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

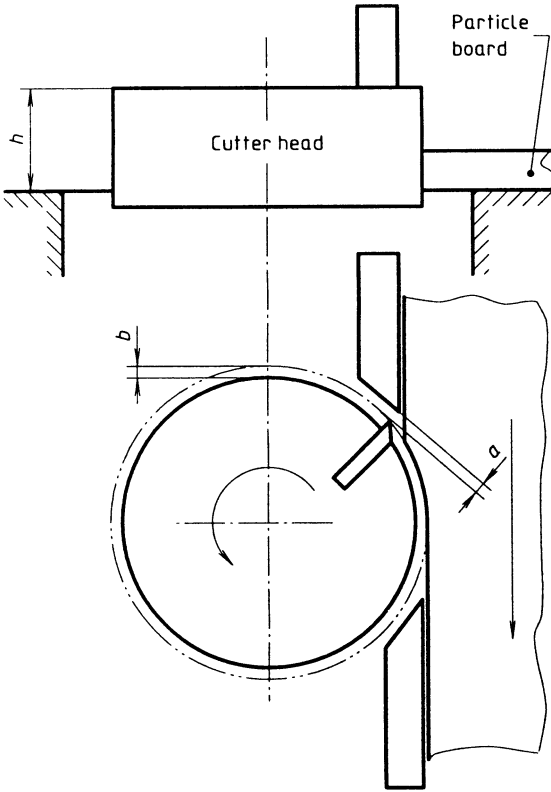


D.3 Data sheet for single-spindle moulding machines

Machine data		
Make:		
Model:		
Year of manufacture:	Serial No.:	
Overall dimensions of machine ^a :		
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 ☐	.....
		
		

^a 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

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

^a Spindle speed shall be as close as possible to 6 000 r/min.

[illegible]

date:

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:

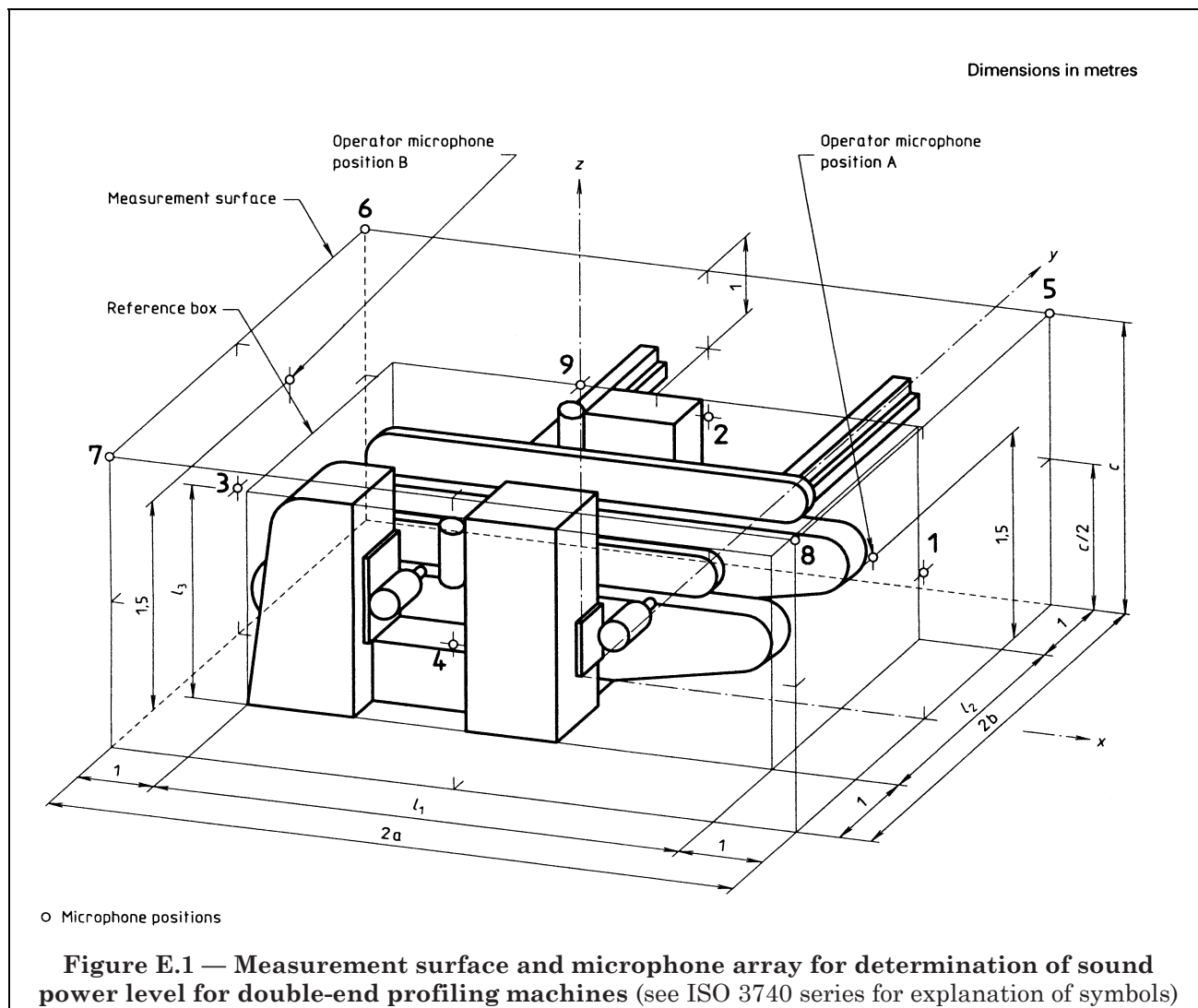
- 1,5 m above floor level;
- in the plane of the front face of the measurement surface;
- in line with the middle of the infeed referred to a constant material width of 600 mm.

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.



E.3 Data sheet for double-end profiling machines

Machine data

Make:

Model:

Year of manufacture: Serial No.:

Overall dimensions of machine^a:

length mm width mm height mm

Spindle No. ^a	Spindle function	Maximum tool diameter mm	Nominal rotational speed	
			Motor r/min	Spindle r/min
1				
2				
3				
4				
5				
6				
7				
8				

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

Data sheet for double-end profiling machines

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)

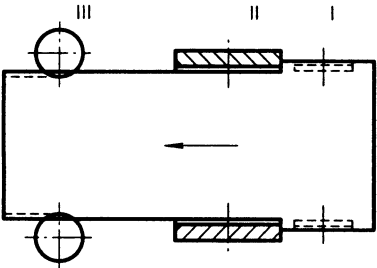
Procedure M using:

Edge moulding, relieving cutter (IV)

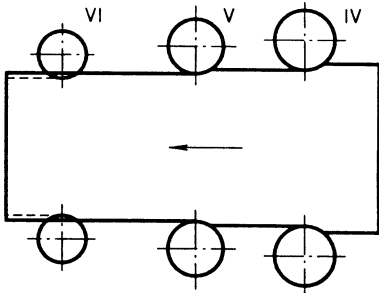
Edge moulding, finish planing cutter (V)

Grooving saw (VI)

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



Procedure S

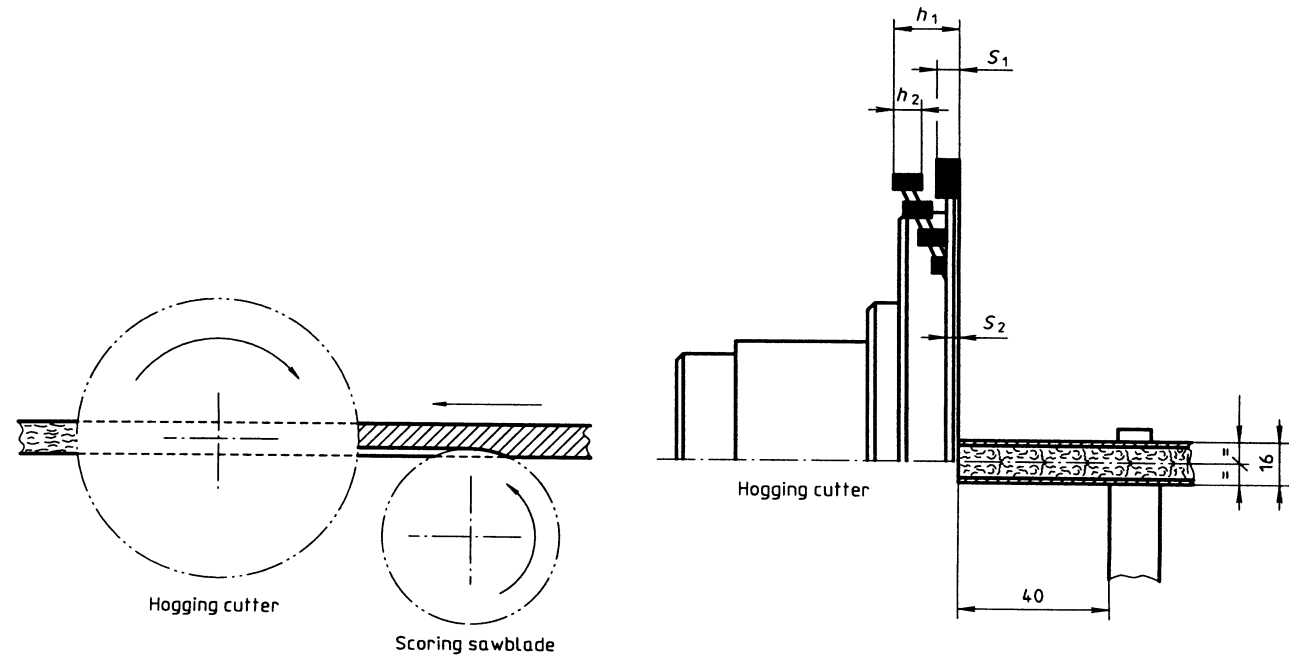


Procedure M

Operating arrangement

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

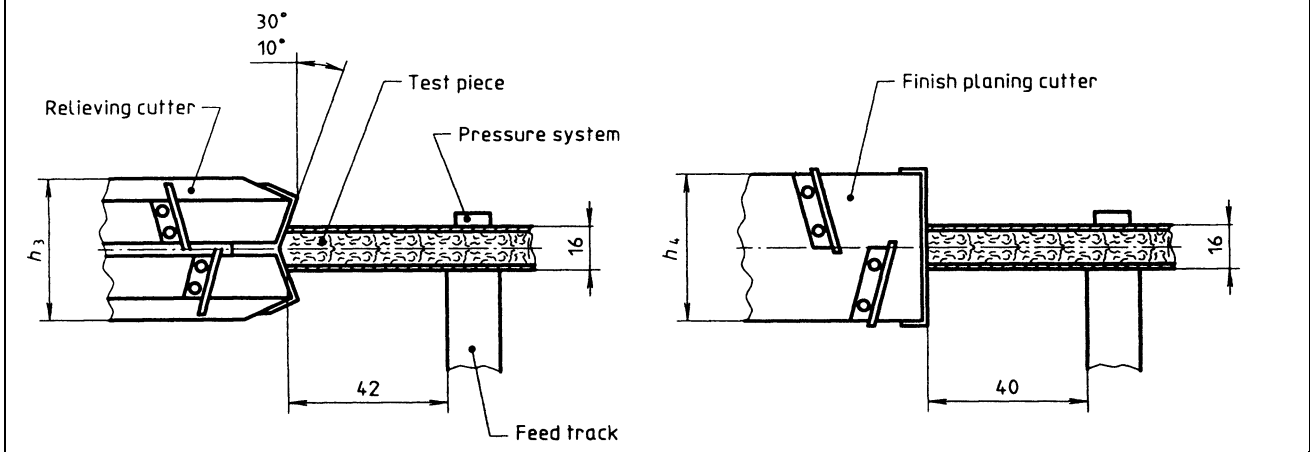
Dimension in millimetres



Data sheet for double-end profiling machines

Procedure M: Sizing operation with relieving cutter and finish planing cutter.

Dimension in millimetres



Data sheet for double-end profiling machines

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 ^a or 6 000 ^a		
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 ^a	
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 ^a	
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 ^b		
e) Distance, feed track-tool	mm	40		

^a If available, 6 000 r/min shall be used.
^b If this feed is unobtainable, the nearest available shall be used.

^a If available, 6 000 r/min shall be used.^b If this feed is unobtainable, the nearest available shall be used.

Data sheet for double-end profiling machines

Tool and cutting data <i>(continued)</i>	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 ^a or 6 000 ^a	
cutting circle diameter	mm	200	
cutting speed	m/s	.....	
number of cutting knives		2 × 4	
cutter width, <i>h</i> 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 ^a or 6 000 ^a	
cutting circle diameter	mm	180	
cutting speed	m/s	.....	
number of cutting knives		2 × 3	
cutter width, <i>h</i> 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 ^a or 6 000 ^a	
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 ^b	
e) Distance, feed track-tool	mm	40	

^a If available, 6 000 r/min shall be used.
^b If this feed rate is unobtainable, the nearest available shall be used.

