

Planing and profiling

Leitz Lexicon Edition 7

Version 2



Explanation of abbreviations

A	= dimension A	LH	= left hand rotation
a_e	= cutting thickness (radial)	M	= metric thread
a_p	= cutting depth (axial)	MBM	= minimum order quantity
ABM	= dimension	MC	= multi-purpose steel, coated
APL	= panel raising length	MD	= thickness of knife
APT	= panel raising depth	min^{-1}	= revolutions per minute (RPM)
AL	= working length	MK	= morse taper
AM	= number of knives	m min^{-1}	= metres per minute
AS	= anti sound (low noise design)	m s^{-1}	= metres per second
b	= overhang	n	= RPM
B	= width	n_{max}	= maximum permissible RPM
BDD	= thickness of shoulder	NAL	= position of hub
BEM	= note	ND	= thickness of hub
BEZ	= description	NH	= zero height
BH	= tipping height	NL	= cutting length
BO	= bore diameter	NLA	= pinhole dimensions
CNC	= Computerized Numerical Control	NT	= grooving depth
d	= diameter	P	= profile
D	= cutting circle diameter	POS	= cutter position
D0	= zero diameter	PT	= profile depth
DA	= outside Diameter	PG	= profile group
DB	= diameter of shoulder	QAL	= cutting material quality
DFC	= Dust Flow Control (optimised chip clearance)	R	= radius
DGL	= number of links	RD	= right hand twist
DIK	= thickness	RH	= right hand rotation
DKN	= double keyway	RP	= radius of cutter
DP	= polycrystalline diamond	S	= shank dimension
DRI	= rotation	SB	= cutting width
FAB	= width of rebate	SET	= set
FAT	= depth of rebate	SLB	= slotting width
FAW	= bevel angle	SLL	= slotting length
FLD	= flange diameter	SLT	= slotting depth
f_z	= tooth feed	SP	= tool steel
$f_{z \text{ eff}}$	= effective tooth feed	ST	= Cobalt-basis cast alloys, e.g. Stellite®
GEW	= thread	STO	= shank tolerance
GL	= total length	SW	= cutting angle
GS	= Plunging edge	TD	= diameter of tool body
H	= height	TDI	= thickness of tool
HC	= tungsten carbide, coated	TG	= pitch
HD	= wood thickness (thickness of workpiece)	TK	= reference diameter
HL	= high-alloyed tool steel	UT	= cutting edges with irregular pitch
HS	= high-speed steel (HSS)	V	= number of spurs
HW	= tungsten carbide (TCT)	v_c	= cutting speed
ID	= ident number	v_f	= feed speed
IV	= insulation glazing	VE	= packing unit
KBZ	= abbreviation	VSB	= adjustment range
KLH	= clamping height	WSS	= workpiece material
KM	= edge breaker	Z	= number of teeth
KN	= single keyway	ZA	= number of fingers
KNL	= combination pinhole consists of 2/7/42 2/9/46,35 2/10/60	ZF	= tooth shape (cutting edge shape)
L	= length	ZL	= finger length
I	= clamping length		
LD	= left hand twist		
LEN	= Leitz standard profiles		

Notes to the Lexicon concerning the diagrams and tables

The statements made in the diagrams and tables relate to specific conditions and represent parameters from tests subjected to defined conditions. Variations when using tools in individual case due to special application conditions may be possible. Our support team will provide you with detailed information.



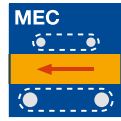
3. Planing and profiling

	3.1 Surface planing – thickening	2
	Enquiry/order form special tools – surface planing – thickening	4
	3.2 Planing	6
	3.2.1 Cutterheads for pre-planing	6
	3.2.2 Cutterheads for pre and finish planing	13
	3.2.3 Cutterheads for finish planing	17
	3.2.4 Combination tools for planing and profiling	30
	3.3 Profiling	33
	3.3.1 Tools for tongue and groove joints	33
	3.3.2 Radius profile cutterheads	37
	3.3.3 Cutterheads for multi-purpose profiling	40
		
	3.4 Finger jointing	50
	Enquiry - Checklist for minifinger tools	53
	3.4.1 Minifinger joint cutters	54
	3.4.2 High performance minifinger cutters	61
	3.4.3 Minifinger joint cutterheads	69
	3.4.4 Minifinger disc cutters	78
	3.4.5 Scoring sawblades and hoggers	80
		
	3.5 Grooving, jointing, rebating	84
	3.5.1 Rebating cutterheads for multi-purpose processing	84
	3.6 Window production	85
	Troubleshooting	87
	Signs of wear	88
	Enquiry/order form special tools – planing and profiling	91
	Alphabetical product index	93
	ID index	94

3. Planing and profiling

3.1 Surface planing – thickening

Application



Surface-cutting, thickening and width planing of workpieces of any length on surface planing machines and planing machines. The workpieces are first planed to get a reference surface. In the second operation they are planed to thickness (dimension) and possibly jointed to get a right angle as second reference surface.

Workpiece material

Softwood and hardwood, dry and wet, chip and fibreboards (e.g. chipboard, MDF), insulating materials, plastics.

Machines

Surface planing and thickening machines.

Mounting of long planerheads

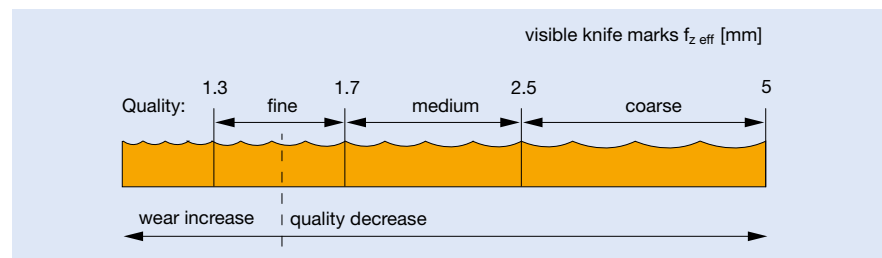
Long planerheads have integrated ball bearings and drive pulleys.

Recommended cutting materials

	HS	Marathon (MC)	HW
Softwood dry	◆	◆	◆
Softwood wet	◇	◆	
Hardwood dry	◇	◆	◆
Hardwood wet	◇	◆	
Plywood		◇	◆
Chipboard			◆
MDF			◇
WPC (Wood-Plastic-Composite)	◇	◆	◆

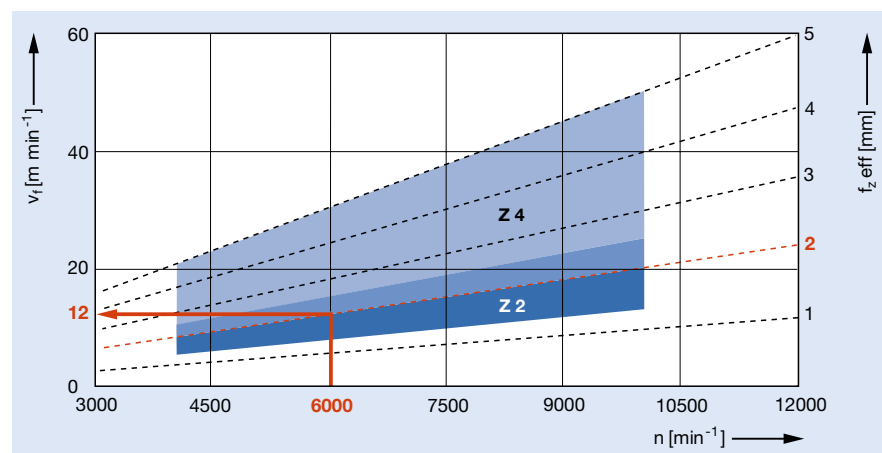
◆ suitable ◇ partly suitable

Feed speed



The feed speed is determined by the required surface quality. Relation between the surface quality and length of knife marks $f_{z,eff}$.

Diagram to determine the feed speed v_f depending on RPM n and knife marks $f_{z,eff}$ for different number of teeth Z^*



* Even on tools with several wings, only the marks of one knife show on the workpiece surface (one-knife finish).
Z 2 and Z 4 tools produce the same surface quality under identical machining conditions. (see technical information and charts in section User Manual).

3. Planing and profiling

3.1 Surface planing – thickening

Long planerheads, construction type



Technical information

Centrofix Plus - long planerhead made of steel. Turnblade system with formfitting centrifugal clamping. Turnblades with integrated chipbreaker for clean finish also in difficult wood types. Fast, precise knife changes with no adjustment.

Cutting material

HW, HS, MC.

Application

For planing softwood, hardwood, insulating materials, plastics.



Technical information

VariPlan - long planerhead made of steel. Resharpenable and constant diameter turnblade system. Self-positioning and centrifugal force supporting knife clamping for easy handling.

Cutting material

HW, HS.

Application

For planing of softwood, hardwood, insulating material, plastics.



Technical information

HeliPlan/HeliCut - long planerhead made of steel. Turnblades can be turned four times. Low noise and energy efficient through spiral and segmented knife arrangement.

Cutting material

HW.

Application

For planing of softwood and hardwood, insulating material, plastics.

Enquiry/order form special tools – surface planing – thickening

Customer details: Customer number:

Enquiry
 Order

Delivery date: (not binding) CW

Company: _____

Street: _____

Date: _____

Post code/place: _____

Enquiry/order no.: _____

Country: _____

Tool ID: (if known) _____

Phone/fax: _____

No. of pieces: _____

Contact person: _____

Signature: _____

Workpiece material:

Type:

Solid wood: _____ Type: _____
 Wood derived material: _____ Type: _____
 Others _____ Type: _____

Moisture content: _____ %
 Density: _____ g/cm³
 Additional information: _____

Machine:

Manufacturer: _____

Type: _____

Model: _____

Spindle sequence (in feeding direction) e.g. 1 bottom, 2 right hand, 3 left hand, 4 top, 5 multi-purpose.

Motor:	Power:	RPM:	Spindle dimensions:	Add. information:
1	_____ kW (HP)	_____ min ⁻¹	_____ mm	_____
2	_____ kW (HP)	_____ min ⁻¹	_____ mm	_____
3	_____ kW (HP)	_____ min ⁻¹	_____ mm	_____
4	_____ kW (HP)	_____ min ⁻¹	_____ mm	_____
5	_____ kW (HP)	_____ min ⁻¹	_____ mm	_____

Tool:

Tool type (see selection): _____

Dimension:

Diameter: _____ mm
 Cutting width: _____ mm
 Bore: _____ mm
 No. of teeth: _____

Cutting material:

HL (HLS)
 HS (HSS)
 HW (HM)
 ST

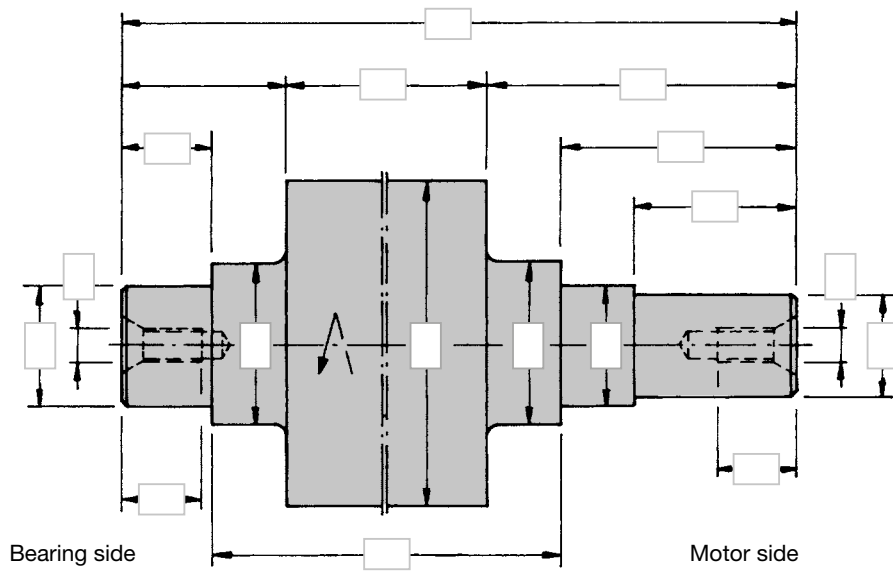
Direction of rotation:

left hand
 right hand

Please state existing data on tool, machine and workpiece material.

Dimensions for long planerheads

(Enter dimensions on drawing or graph)



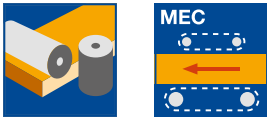
Sketch for application, special motor spindle etc., side of table to workpiece and fence.

A large rectangular area filled with a fine grid, intended for the user to sketch the application of the planerhead, including the motor spindle, side of the table, workpiece, and fence.

3. Planing and profiling

3.2 Planing 3.2.1 Cutterheads for pre-planing

Working process



Planing is the first step after cutting the workpiece to size. It prepares workpiece surfaces and machines a datum surface for accurate workpiece processing. Pre-planing is recommended prior to profiling on four-sided moulders and multi spindle moulding machines. Pre-planing and reference heads can be combined on the same spindle to guide the timber through the machine.

Workpiece materials

Softwood and hardwood, dry or wet
Chipboard and wood fibre materials (MDF etc.).

Machines

Four-sided moulders and multi spindle moulding machines.

Tool clamping

Mounted directly on the machine spindle, retained by spindle nut.

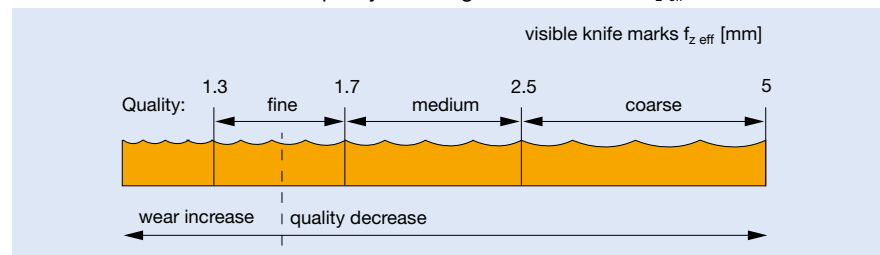
Recommended cutting material

	HS	Marathon (MC)	HW
Softwood dry	◆	◆	◆
Softwood wet	◇	◆	◆
Hardwood dry	◇	◆	◆
Hardwood wet	◇	◆	◆
Plywood		◇	◆
Chipboard			◆
MDF			◇
WPC (Wood-Plastic-Composite)	◇	◆	◆

◆ suitable ◇ partly suitable

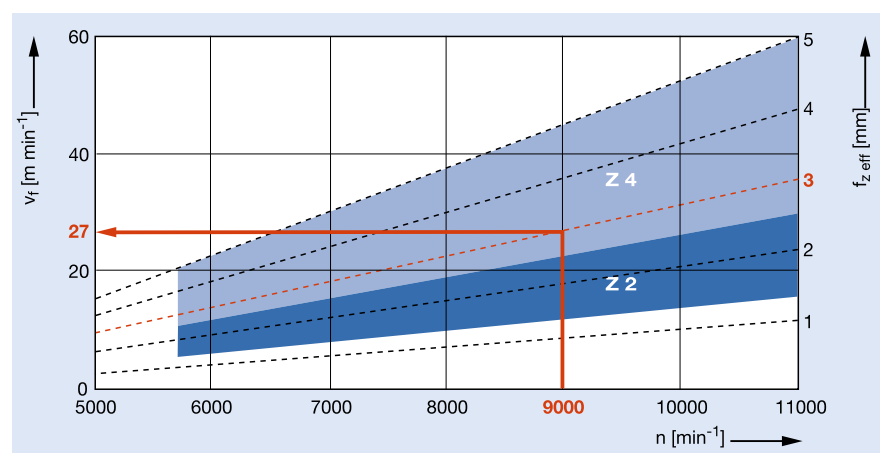
Feed speed

The feed speed is determined by the required surface quality.
Relation between the surface quality and length of knife marks $f_{z\text{ eff}}$.



The feed speed is determined according to the quality requirements which can be measured by the produced cuttermarks.
The diagram shows the relation between surface quality and length of knife marks $f_{z\text{ eff}}$.

Planerhead Z 2 and Z 4



Even on tools with several wings, only the marks of one knife show on the workpiece surface (one-knife finish).
Z 2 and Z 4 tools produce the same surface quality under identical machining conditions (see technical information and charts in section User Manual).

Planerhead HeliPlan

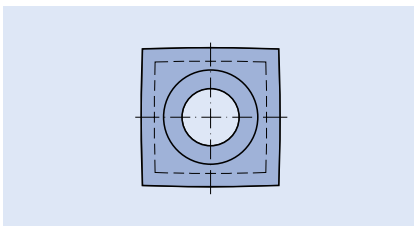


Application	Planing, pre-planing.
Machines	Four-sided moulders and profiling machines or machines with HSK 85 WS interface.
Workpiece material	Softwood and hardwood.
No. of teeth/tool life	2/2 staggered, each HW turnblade knife has 4 lives.
Cutting material	HW.
Chip removal	Softwood: up to 15.0 mm. Hardwood: up to 10.0 mm.
Tool design	Aluminium or steel tool body with spiral, staggered single cutting edges, mounted on the tool body periphery.
Technical features	HW turnblade knives with 4 curved cutting edges.

1) Tool body of steel or aluminium
2) Knives
3) Clamping screw

Special advantages	<ul style="list-style-type: none"> - Minimum breakout. - Noise reduction (up to 10 dB(A)). - The staggered cut reduces both the cutting force and feed pressure. - Turnblade knives have four cutting edges (four lives).
---------------------------	---

Note	<ul style="list-style-type: none"> - Barely visible marks in the overlap area; minimal waviness. - As HeliPlan has a staggered cut of individual cutting edges, the tool has limited suitability for producing finished surfaces. Finish planing or profiling may be necessary depending on the quality requirement. - Tool body surface hardening advisable for abrasive workpiece materials. - Use in combination with reference cutterhead WW 410 2 (see page 11) on the first bottom spindle of moulding machines.
-------------	--



HW turnblade knife with 4 cutting edges.



Planerhead HeliPlan with 4 edge HW turnblade knives

Application:

Pre-planing, surfacing and jointing all types of wood with large chip removal. Also suitable for finish planing if quality demands are less important or in combination with subsequent sanding.

Machine:

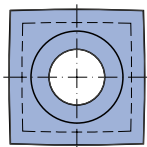
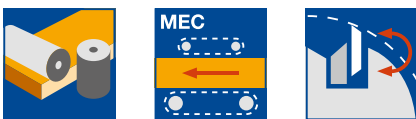
Four-sided moulders.

Workpiece material:

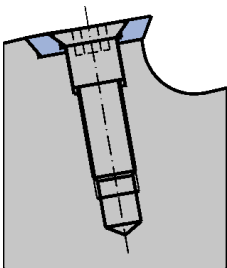
Softwood and hardwood.

Technical information:

Pre-planing cutterhead with 4 edge HW turnblade knives. Low noise and energy efficient due to spiral, segmented edge arrangement. Smooth finish by radiused cutting edges. Aluminium tool body. Optional with steel reference cutterhead for machines with fence.



HW turnblade knife



Knives mounted on periphery

Aluminium tool body, with bore

WW 220 2 01

D	SB	ND	BO	Z	AM	n_{max}	ID
mm	mm	mm	mm		PCS	min^{-1}	
125	130	136	40	2/2	22	12000	030423 ●
125	166	172	40	2/2	28	12000	030467 ●
125	210	216	40	2/2	36	12000	030452
125	236	242	40	2/2	40	12000	030466 ●
125	256	262	40	2/2	44	12000	030470 ●
140	166	172	50	2/2	28	12000	030468
140	236	242	50	2/2	40	12000	030469

Design with HW cutting edges.

Further dimensions and inch dimensions available on request.

Suitable reference cutterheads on page 11.

Spare knives:

BEZ	ABM	QAL	VE	ID
	mm		PCS	
Turnblade knife	15x15x2.5	HW	10	009535 ●
Turnblade knife	15x15x2.5	TDC		602901 ●

Spare parts:

BEZ	ABM	ID
	mm	
Countersink screw, Torx® 20	M5x14.2-8.8	007394 ●
Torx® key	Torx® 20	006091 ●



Planerhead HeliPlan with 4 edge HW turnblade knives

Application:

Pre-planing, surfacing and jointing all types of wood with large chip removal. Also suitable for finish planing if quality demands are less important or in combination with subsequent sanding.

Machine:

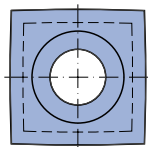
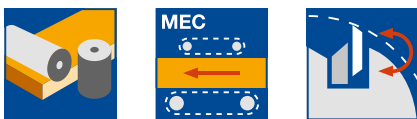
Four-sided moulders with HSK 85 WS interfaces.

Workpiece material:

Softwood and hardwood.

Technical information:

Pre-planing cutterhead with 4 edge HW turnblade knives. Low noise and energy efficient due to spiral, segmented edge arrangement. Smooth finish through radiused cutting edges. Aluminium tool body. Tool and HSK are shrink-fit together. Optional steel reference cutterhead for machines with fence.



Aluminium tool body, with HSK 85 WS

WL 210 2 02

D	SB	A	Z	AM	n_{max}	ID	ID
mm	mm	mm		PCS	min^{-1}	bottom	top
125	130	26	2/2	22	12000	132000 □	132001 □
125	166	26	2/2	28	12000	132022 □	132023 □
125	210	26	2/2	36	12000	132008	132009
125	236	26	2/2	40	12000	132024 □	132025 □
125	270	26	2/2	46	8000	132012	132013
125	310	26	2/2	54	8000	132014 ●	132015 ●

Aluminium tool body, HSK 85 WS with reference cutterhead

WL 403 2 02

D	SB	A	Z	V	AM	n_{max}	DRI	ID
mm	mm	mm			PCS	min^{-1}		
125	236	26	2/2	2	40	12000	bottom	132066 □
125	310	26	2/2	2	54	8000	bottom	132065 □

Design with HW cutting edges.

Further dimensions and inch dimensions available on request.

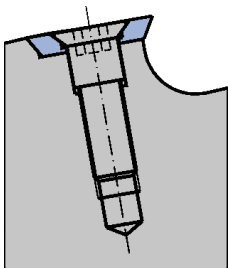
Spare knives:

BEZ	ABM	QAL	VE	ID
	mm		PCS	
Turnblade knife	15x15x2.5	HW	10	009535 ●
Turnblade knife	15x15x2.5	TDC		602901 ●

Spare parts:

BEZ	ABM	ID
	mm	
Countersink screw, Torx® 20	M5x14.2-8.8	007394 ●
Torx® key	Torx® 20	006091 ●

HW turnblade knife



Knives mounted on periphery



Hydro Planerhead HeliPlan

Application:

Pre-planing, surface cutting of all types of wood with large chip removal. Finish cutting of glueable surfaces and workpieces with secondary quality demands.

Machine:

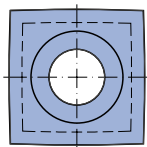
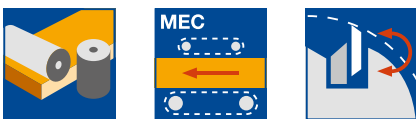
Four-sided moulders and profiling machines.

Workpiece material:

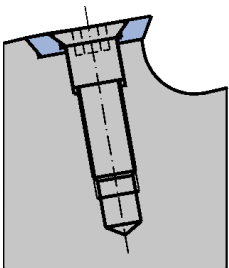
Softwood and hardwood.

Technical information:

Pre-planing cutterhead with 4-time HW turnblades. Low noise and energy efficient through spiral, segmented edge arrangement. Plane surfaces through radiused cutting edges. Tool bodies of lightweight aluminium with integrated hydro clamping system. Activated by a grease gun.



HW turnblade knife



Knives mounted on periphery

Aluminium tool body

HW 230-2

D mm	SB mm	BO mm	Z	n_{max} min ⁻¹	ID
160	150	50	4/4	11000	132200
160	180	50	4/4	11000	132201
160	200	50	4/4	11000	132202
160	230	50	4/4	11000	132203
160	310	50	4/4	11000	132204
200	150	50	6/6	8000	132205
200	180	50	6/6	8000	132206
200	200	50	6/6	8000	132207
200	230	50	6/6	8000	132208
200	310	50	6/6	8000	132209
250	150	50	8/8	6900	132210
250	180	50	8/8	6900	132211
250	200	50	8/8	6900	132212
250	230	50	8/8	6900	132213
250	310	50	8/8	6900	132214

Design in steel/lightweight aluminium on request. This version combines the advantages of a light weight tool and a wear resistant knife seating and gullet area.

Spare knives:

BEZ	ABM mm	QAL	VE PCS	ID
Turnblade knife	15x15x2.5	HW	10	009535 ●
Turnblade knife	15x15x2.5	TDC		602901 ●

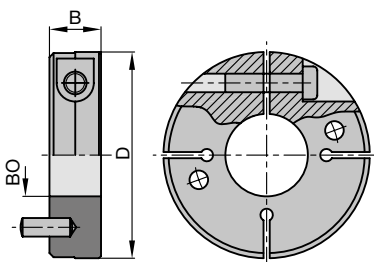
Spare parts:

BEZ	ABM mm	ID
Countersink screw, Torx® 20	M5x14.2-8.8	007394 ●
Torx® key	Torx® 20	006091 ●

Clamping collars without thread

TD 870 0

D mm	B mm	BO mm	ID
100	25	40	030700 ●
100	25	50	030702 ●



Clamping collar without thread



Reference cutterhead

Application:

For cutting a side reference rebate when surface planing on the first bottom spindle in combination with a planer cutterhead.

Machine:

Four-sided moulders with fence.

Workpiece material:

Softwood and hardwood.

Technical information:

Steel tool body with HW turnblade knives, can be combined with pre-planing and finish planing cutterheads on the first bottom spindle.

D 145 for planerheads D 125.

D 160 for planerheads D 140.



For wedge-type system, build-up system, CentroStar

WW 410 2

D	SB	BO	Z	V	QAL	n _{max} min ⁻¹	ID
mm	mm	mm					
145	15	40	2	2	HW	12000	132077 ●
160	15	50	2	2	HW	11000	132078 ●

For HeliPlan, VariPlan Plus

WW 410 2

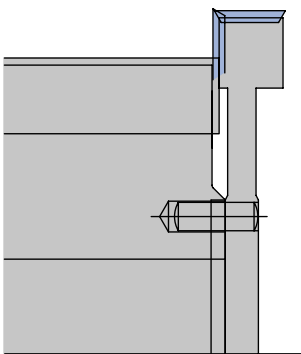
D	SB	BO	Z	V	QAL	n _{max} min ⁻¹	ID
mm	mm	mm					
145	15	40	2	2	HW	12000	132075 ●
160	15	50	2	2	HW	11000	132076 ●

Spare knives:

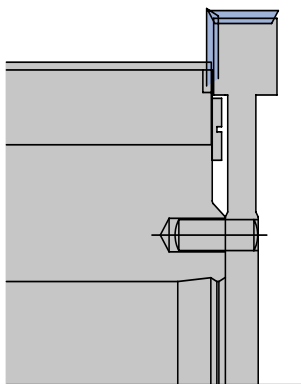
BEZ	ABM mm	QAL	VE PCS	ID
Turnblade knife	15x15x2.5	HW	10	009535 ●

Spare parts:

BEZ	ABM mm	ID
Spacer	70x3x40,DTK58	028617 ●
Countersink screw, Torx® 20	M5x14.2-8.8	007394 ●
Pin	6x20	008617 ●



Combination with wedge-type system, build up system and CentroStar. For planerheads without boss, mounted with spacers.



Combination with HeliPlan and VariPlan Plus cutterhead. Mounting without spacer.

3. Planing and profiling

3.2 Planing 3.2.1 Cutterheads for pre-planing



Cutterhead for groove bed guide

Application:

For guide grooves on the first bottom spindle for precise feeding of short parts or curved workpieces.

Machine:

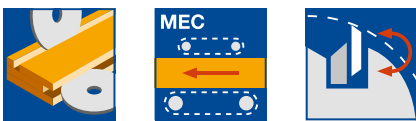
Four-sided moulders with groove beds.

Workpiece material:

Softwood and hardwood, along grain.

Technical information:

Build up turnblade knife tool system, diameter and cutting width constant. The closed, round design of the tool body reduces the noise level.



HW turnblade design

WW 101 2, WW 102 2

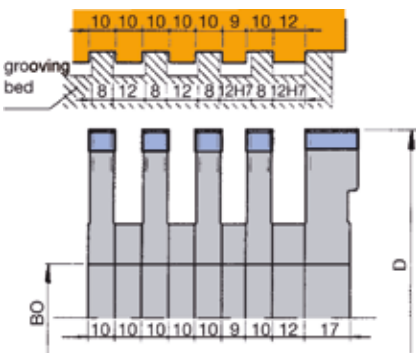
D	SB	BO	BO _{max}	Z	V	n _{max}	ID
mm	mm	mm	mm			min ⁻¹	
125	20	40	50	2	2	12000	020389 ●
125	10	40	50	2	2	12000	020390 ●
140	20	40	50	2	2	10900	020386 ●
140	10	40	50	2	2	10900	020388 ●

Spare knives:

BEZ	ABM	QAL	VE	ID
	mm		PCS	
Turnblade knife	19.7x8x1.5	HW-30F	10	005071 ●
Turnblade knife	9.7x8x1.5	HW-30F	10	005197 ●
Turnblade spur VS1	14x14x2	HW-F	10	005099 ●

Spare parts:

BEZ	ABM	ID
	mm	
Spacer	60x0.1x40	027941 ●
Spacer	60x0.3x40	027942 ●
Spacer	60x9x40	028449 ●
Spacer	60x10x40	027951 ●
Clamping wedge	18x18.75x8.27	009671 ●
Clamping wedge	9x18.75x8.27	009764 ●
Clamping screw w. disc, Torx® 25	M6x18.5	007442 ●
Allen screw with shank, Torx® 15	M5x20	007380 ●
Countersink screw, Torx® 20	M6x0.5x4.9	006243 ●
Torx® key	Torx® 15	117507 ●
Torx® key	Torx® 20	117503 ●
Setting gauge for knives	0.3/0.8	005374 ●

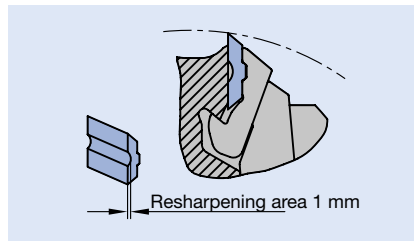
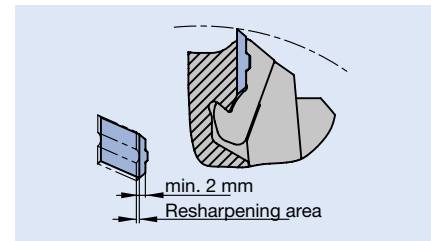
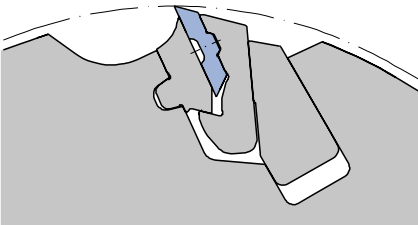


Number of tools for different widths

SB mm	working width mm				
	80	100	120	140	170
SB 20	1	1	1	1	1
SB 10	3	4	5	6	8

Planing cutterhead VariPlan Plus



Application	Pre and finish planing of all types of wood.
Machines	Four-sided and multi spindle moulders, also with HSK 85 WS interface.
Workpiece material	Softwood and hardwood, plastics (limited suitable).
Number of knives	Z 2 to Z 12 depending on the feed speed and the tool diameter.
Resharpener area	 
Cutting material	HS for softwood. HW for hardwood, mixed use of softwood and hardwood or laminated wood with glued joint.
Chip removal	Pre-planing: Softwood up to 10 mm, hardwood up to 8 mm. Finish planing up to 1.0 mm.
Tool design	Resharpener and constant diameter tool system with turnblade planer knives. Aluminium body, wear resistant steel chip breaker. Centrifugal force assisted, self-centering knife clamping system.
Technical characteristics	 <p>Operational safety through full form knife clamping. Fast knife change through self-positioning knife clamping. Knife clamping in the dust-protected area.</p> <p>One sharpening operation, therefore 2 extra tool lives by turnblade knife. VariPlan Plus basic body for 3 knife variants: Microfinish, RipTec and Integral turnblade knives.</p> <p>VariPlan Plus Planerheads for machines with HSK 85 WS interface are mounted on HSK 85 WS arbor. Combination with pre surfacing/rebating cutterhead possible.</p>

Aluminium tool body with steel chip breaker.



Planerhead VariPlan Plus

Application:

Multi-purpose planing tool:
For pre-planing with RipTec turnblades.
For finish planing with microfinish turnblades.

Machine:

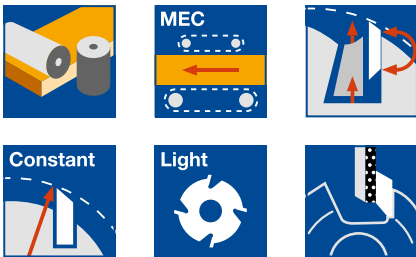
Four-sided moulders and multi spindle planing machines.

Workpiece material:

Softwood and hardwood, thermoplastics (partly suitable).

Technical information:

Resharpenable and constant diameter planerhead system.
Self-positioning and centrifugal force supported knife clamping. Lightweight aluminium tool body. Resharpener the knives on the cutting face means one sharpening operation gives two additional lives.



Lightweight aluminium tool body

WW 240 2 05

D	SB	ND	BO	n_{max}	Z	ID	ID
mm	mm	mm	mm	min^{-1}		HS	HW-MF
125	130	136	40	12000	2	134250 □	134200 ●
125	150	156	40	12000	2	134251	134201
125	166	172	40	12000	2	134252 □	134202 ●
125	180	186	40	12000	2	134253	134203
125	210	216	40	12000	2	134254	134204
125	236	242	40	12000	2	134255 □	134205 ●
125	256	262	40	12000	2	134258	134208
125	270	276	40	10500	2	134256	134206
125	130	136	40	12000	4	134450 □	134400 ●
125	150	156	40	12000	4	134451	134401
125	166	172	40	12000	4	134452 □	134402 ●
125	180	186	40	12000	4	134453	134403
125	210	216	40	12000	4	134454	134404
125	236	242	40	12000	4	134455 □	134405 ●
125	256	262	40	12000	4	134458	134408 ●
125	270	276	40	10500	4	134456	134406

Further dimensions and inch dimensions on request.
Spare knives (HS/HW-MF/HW-RipTec) see section Knives and Spare Parts.

Spare knives:

SB	H	DIK	SET	ID	ID
mm	mm	mm	PCS	HS	HW-MF
130	16	3.7	2	610506 ●	617106 ●
150	16	3.7	2	610509 ●	617109 ●
166	16	3.7	2	610571 □	617171 ●
180	16	3.7	2	610512 ●	617112 ●
210	16	3.7	2	610515 ●	617115 ●
236	16	3.7	2	610569 □	617169 ●
256	16	3.7	2	610572 □	617172 ●
270	16	3.7	2		617165 ●



Planerhead VariPlan Plus

Application:

Multi-purpose planing tool:
For pre-planing with RipTec turnblades.
For finish planing with microfinish turnblades.

Machine:

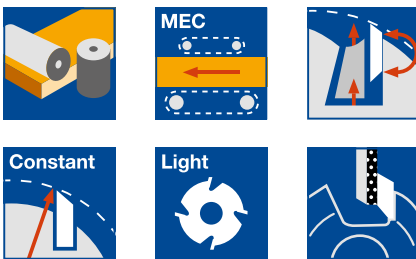
Four-sided moulders and multi spindle moulders with HSK 85 WS interfaces.

Workpiece material:

Softwood and hardwood, thermoplastics (partly suitable).

Technical information:

Resharpenable and constant diameter planerhead system. Self-positioning and centrifugal force supported knife clamping. Lightweight aluminium tool body. Resharpener the knives on the cutting face means one sharpening operation gives two additional lives. Tool body and HSK arbor are shrunk fit together.



Lightweight aluminium tool body on HSK 85 WS

WP 240 2 05

D mm	SB mm	A mm	n_{max} min ⁻¹	Z	QAL	ID LH / bottom	ID RH / top
125	130	26	12000	2	HW-MF	134500 □	134501 □
125	150	26	12000	2	HW-MF	134502	134503
125	166	26	12000	2	HW-MF	134504 □	134505 □
125	180	26	12000	2	HW-MF	134506	134507
125	210	26	12000	2	HW-MF	134508	134509
125	236	26	12000	2	HW-MF	134510 □	134511 □
125	270	26	8000	2	HW-MF	134512	134513
125	310	26	8000	2	HW-MF	134514	134515
125	130	26	12000	4	HW-MF	134600 □	134601 □
125	150	26	12000	4	HW-MF	134602	134603
125	166	26	12000	4	HW-MF	134604 □	134605 □
125	180	26	12000	4	HW-MF	134606	134607
125	210	26	12000	4	HW-MF	134608	134609
125	236	26	12000	4	HW-MF	134610 □	134611 □
125	270	26	8000	4	HW-MF	134612	134613
125	310	26	8000	4	HW-MF	134614	134615

Further dimensions and inch dimensions on request.

Spare knives (HS/HW-MF/HW-RipTec) see section Knives and Spare Parts.

Spare knives:

SB mm	H mm	DIK mm	SET PCS	ID HS	ID HW-MF
130	16	3.7	2	610506 ●	617106 ●
150	16	3.7	2	610509 ●	617109 ●
166	16	3.7	2	610571 □	617171 ●
180	16	3.7	2	610512 ●	617112 ●
210	16	3.7	2	610515 ●	617115 ●
236	16	3.7	2	610569 □	617169 ●
270	16	3.7	2		617165 ●
310	16	3.7	2	610522 ●	617122 ●



Planerhead VariPlan Plus

Application:

Multi-purpose planing tool:
For pre-planing with RipTec turnblades.
For finish planing with microfinish turnblades.

Machine:

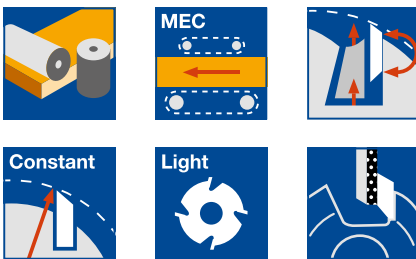
Four-sided moulders and multi spindle moulders with HSK 85 WS interfaces.

Workpiece material:

Softwood and hardwood, thermoplastics (partly suitable).

Technical information:

Resharpenable and constant diameter planerhead system. Self-positioning and centrifugal force supported knife clamping. Lightweight aluminium tool body. Resharpener the knives on the cutting face means one sharpening operation gives two additional lives. Tool body and HSK arbor are shrunk fit together.



Lightweight aluminium tool body on HSK 85 WS with reference cutterhead Z2 / V2

WP 240 2 08

D	SB	A	n _{max}	Z	QAL	DRI	ID
mm	mm	mm	min ⁻¹				
125	236	26	12000	2	HW-MF	LH / bottom	134581 □
125	236	26	12000	4	HW-MF	LH / bottom	134681 □

Further dimensions and inch dimensions on request.

Spare knives (HS/HW-MF/HW-RipTec) see section Knives and Spare Parts.

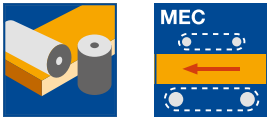
Spare knives:

SB	H	DIK	SET	ID	ID
mm	mm	mm	PCS	HS	HW-MF
130	16	3.7	2	610506 ●	617106 ●
150	16	3.7	2	610509 ●	617109 ●
166	16	3.7	2	610571 □	617171 ●
180	16	3.7	2	610512 ●	617112 ●
210	16	3.7	2	610515 ●	617115 ●
236	16	3.7	2	610569 □	617169 ●
270	16	3.7	2		617165 ●
310	16	3.7	2	610522 ●	617122 ●

3. Planing and profiling

3.2 Planing 3.2.3 Cutterheads for finish planing

Application



Finish planing is the last production step on four-sided moulders. The recommended finish planing cutting depth is 0.5-0.8 mm. For good results, a tear-out free pre-planed surface is required.

Workpiece material

Softwood and hardwood.
Chipboard and fibre materials (MDF etc.).

Machines

Four-sided moulders with or without jointing.

Tool clamping

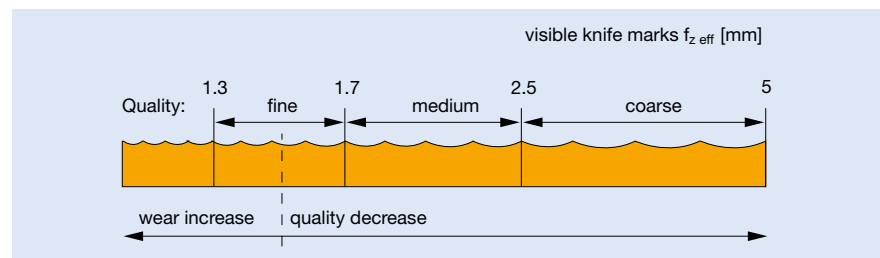
Direct on the machine spindle with spindle clamping nut, with hydro clamping element or with HSK interface.

Recommended cutting

	HS	Marathon (MC)	HW
Softwood dry	◆	◆	◇
Softwood wet		◆	◆
Plywood		◇	◆
Chipboard			◆
MDF			◆
WPC (Wood-Plastic-Composite)	◇	◆	◆

◆ suitable ◇ partly suitable

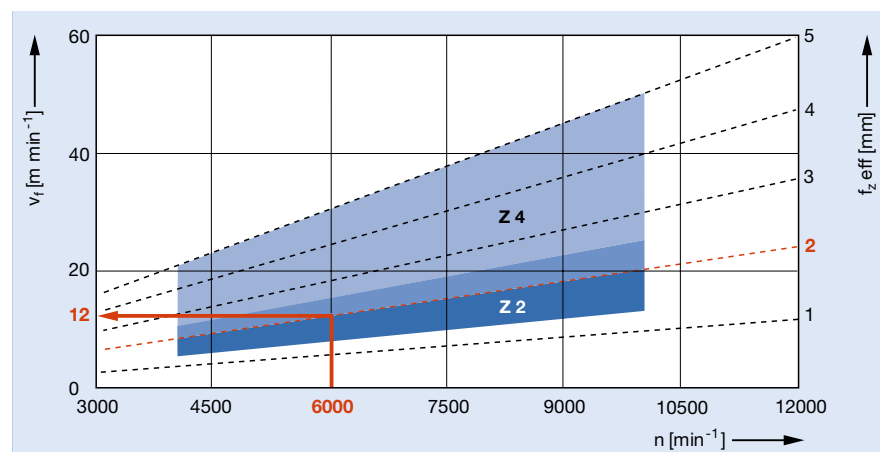
Feed speed



The selection of the feed speed is determined by the required surface quality. See diagram for the relationship between surface quality and length of knife marks $f_{z\text{ eff}}$.

Diagram to determine feed speed v_f depending on RPM n and length of knife marks $f_{z\text{ eff}}$ for different number of wings.

Diagram:
Planing cutterhead
Z 2 and Z 4

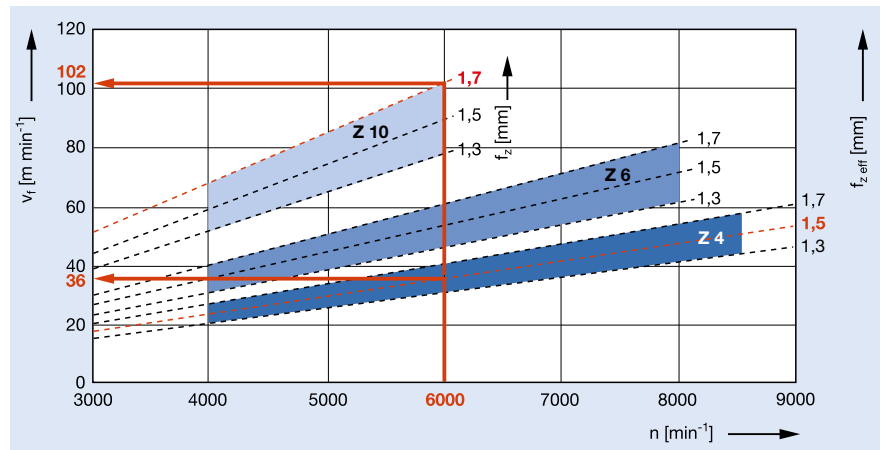


Even on tools with several wings, only the marks of one knife show on the workpiece surface (one-knife finish).

Z 2 and Z 4 tools produce the same surface quality under identical machining conditions (see technical information and charts in section User Manual).

Length of cutter marks for jointed hydro planing cutterheads

Diagram:
 Hydro planerhead
 Z 4
 Z 6
 Z 10



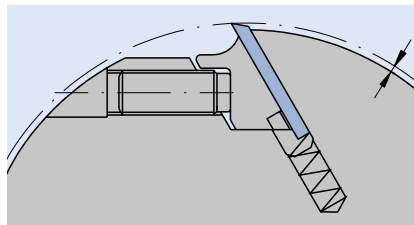
The marks of all knives show on the workpiece in regular pitches on jointed hydro tools. More wings means high feed speeds maintaining the same surface quality (see technical information and charts in section User Manual).

Wedge type system



Application	Planing, pre-planing and finish planing.
Machines	Four-sided moulders.
Workpiece material	Softwood and hardwood.
Features of knives	Knife thickness: 3 mm, knife height: 30 mm. Resharpener area: 10 mm.
Cutting material	HS, HW and Marathon (MC).
Chip removal	Softwood: up to 15.0 mm. Hardwood: up to 10.0 mm.
Tool design	Aluminium alloy cutterhead with resharpenable planer knives (SB x 30 x 3 mm). Used on four-sided moulders for pre-planing and finish planing.
Technical information	Cutterhead with compression spring for knife positioning with setting gauge.

Note



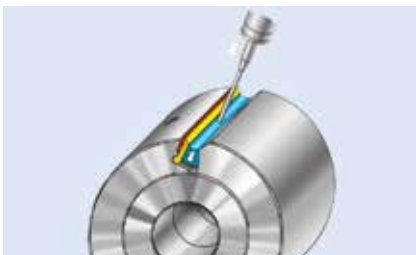
Correct knife projection:
maximum 2 mm.

- Knives resharpened in the cutterhead for improved run out accuracy and better planing quality.
- After resharpening, check the minimum knife clamping height marked on the tool body.
- Always tighten the screws from the middle to the outside; setting torque 17 Nm
- Check the knife projection (see picture above). Position the planing knife with key and setting gauge.
- Mounting the reference head requires two additional holes D 7 mm on a pitch circle diameter of 58 mm and a spacer 3 mm (ID **028617**).

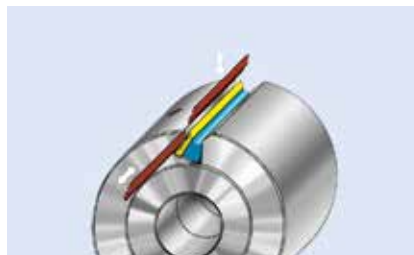
CentroStar planerhead



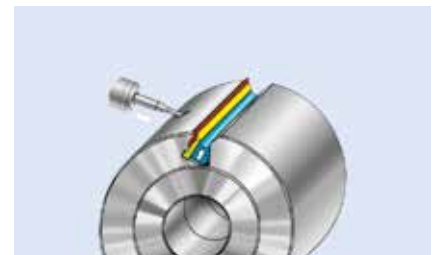
Application	Joining, pre-planing and finish planing with low chip removal.
Machines	Four-sided moulders.
Workpiece material	Softwood and hardwood.
Number of wings	Z 2 to Z 4; Reversible knife with 2 lives per knife.
Cutting material	HS, HW and Marathon (MC).
Chip removal	Softwood: up to 7.0 mm. Hardwood: up to 5.0 mm.
Tool design	Aluminium cutterhead with turnblade knives, constant diameter and form fitting centrifugal clamping system.
Technical information	<ul style="list-style-type: none"> - Centrifugal clamping system. - Turnblade knives with chip breaker for clean surfaces in difficult zones. - Lightweight aluminium tool body. - Hardened steel replaceable wear parts.
Note	<ul style="list-style-type: none"> - CentroStar quick clamping system with snap mechanism (no clamping screws) for quick and easy knife replacement. - Lower noise level compared to existing cutterheads from optimised gullet and closed tool body. - Can be used with Reference cutterhead WW 410 2 on four-sided moulding machines.



Loosen knife clamping.



Radial and axial knife change possible.



Activate knife clamping. Secured by form fitting centrifugal clamping system.

Serrated back planerhead with HSK 85 WS interface



Application	Pre and finish planing.
Machines	Planing machines with HSK 85 WS interface.
Workpiece material	Softwood and hardwood, dry and wet.
Number of wings	Z 2, Z 4, Z 6
Cutting material	Marathon (MC), tungsten carbide HW.
Chip removal	Softwood: up to 12 mm. Hardwood: up to 10 mm.
Feed type	Mechanical feed.
Tool design	<p>Monobloc steel tool body. High concentricity and balance quality. Seating for 60° serrated back planer knives H = 40 mm x 5.0 mm thickness with standard tooth pitch 1.6 mm.</p>
Resharpener area	9 mm.
Advantages	Pre and finish planing with Marathon planer knives resharpened to one cutting circle. For finish planing with $n = 12000 \text{ min}^{-1}$ and a feed rate $> 18 \text{ m min}^{-1}$, the planer knives require jointing on the machine. After jointing, all knives will have the same cutting circle.
Note	<p>Cutting angle 20° for softwood. Cutting angle 12° for hardwood and wood fibre materials. Jointing with $n = 10000 \text{ min}^{-1}$.</p>

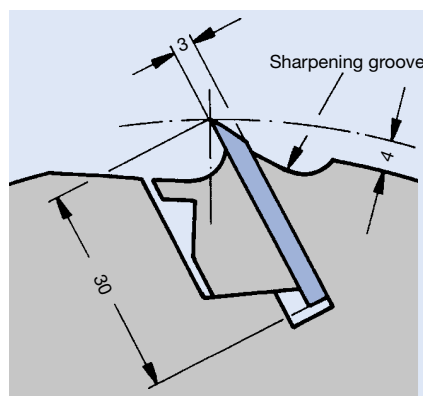
Hydro planerhead



Application	Surfacing, pre-planing and finish planing for feeds from 24 to 120 m min ⁻¹ .
Machines	Multi spindle moulders, with jointing if required.
Workpiece material	Softwood and hardwood.
Number of wings	Z 4 to Z 12 depending on the diameter.
Cutting material	HS, HW and Marathon (MC 33).
Chip removal	Pre-planing: up to 5.0 mm. Finish planing: up to 0.8 mm.
Tool design	Steel cutterhead with hydraulic clamping, open hydro clamping system with resharpenable planer knives resharpened in the cutterhead for concentricity < 0.005 mm.
Technical features	Jointed knives for excellent surfaces at high feed speeds. Maximum joint bevel width: for softwood 0.5 mm, for hardwood 0.7 mm. High running accuracy and low vibration from hydro clamping. High feed speeds depend on the number of wings and RPM (see page 24, Diagram to determine feed speed).

Note

- Hydro clamp only on spindle.
- Clamp to spindle with clamping collar.
- For knives 30 x 3 mm (35 x 3 from diam. 203 on) HS, HW and MC.



Sharpening groove on the body behind knife for easy knife resharpening in the cutterhead on sharpening machines.

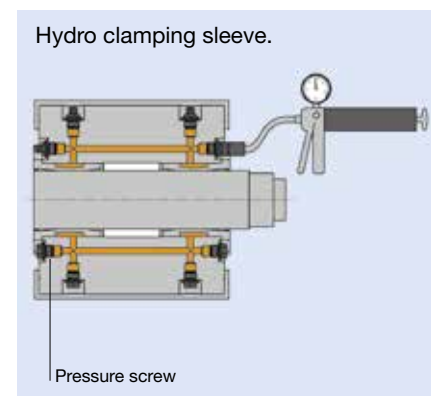


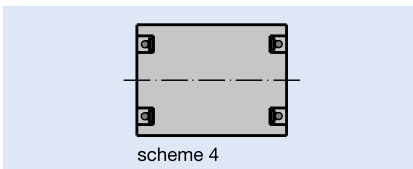
Illustration of hydro clamping system.

TurboPlan Plus hydro planerhead



Application	Pre-planing and precision finish planing feed from between 160 to 360 m min ⁻¹ .
Machines	High performance moulders with precision spindles and counter bearing.
Workpiece material	Softwood and hardwood.
Diameter/ Number of wings	D 200 to D 360. Z 4 to Z 32.
Cutting material	Marathon (MC 33).
Chip removal	Pre-planing: 5.0 mm. Finish planing: 0.8 mm.
Resharpener area	10.0 mm.
Tool design	Hydro planerhead with steel body. Open hydro clamping system. Integrated balancing segments, attached to body. Form fitting knife clamping: Resharpenable knives with serrated back in Leitz Marathon design. Central knife clamping by open hydro system.
Technical features	For Leitz serrated back Marathon knives HS 30 x 5.0 mm. High concentricity and low vibration from hydro clamping system. Knives resharpened in automatic resharpening machines have a concentricity < 0.005 mm.
Tool clamping	Hydro clamping system.
Knife clamping	Form fitting design, hydro clamping.

Note



Jointed knives give an excellent finish at high feed speeds. Do not pressurise the hydro clamping system without mounting the tool on the spindle.
Working pressure 350-450 bar – check daily. Spindle safety – use locking collars to reduce the risk of the tool spinning and cold welding on the spindle.
For Leitz serrated back knives Marathon (MC) 30 x 5 mm.

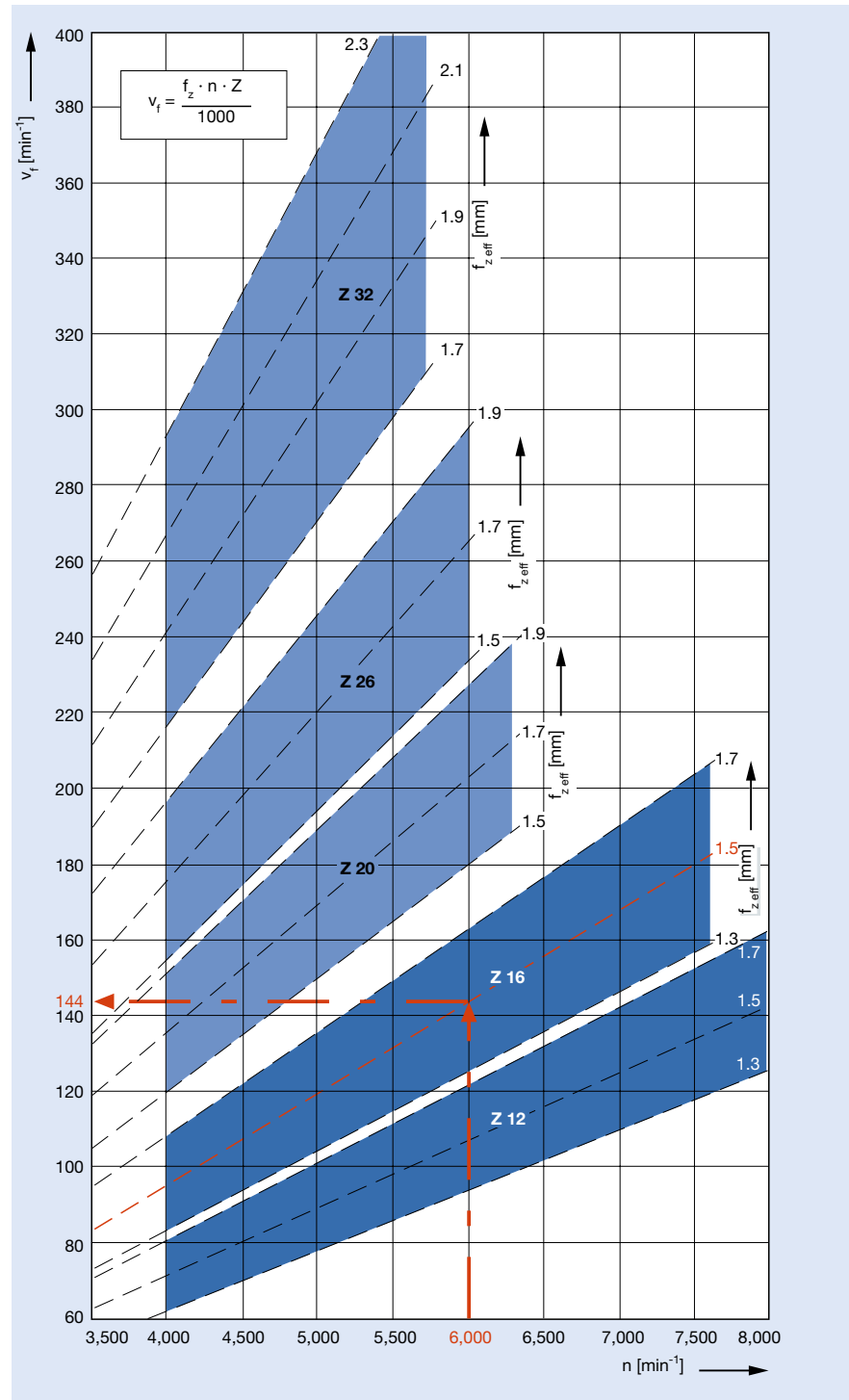
Hydro planerheads – TurboPlan Plus

Diagram to determine feed speed v_f of jointed hydro planerheads depending on RPM n and knife marks $f_{z,eff}$ different number of wings Z^*

The feed speed is determined by the required surface quality (length of knife marks $f_{z,eff}$) and depends on the RPM and the number of wings in the cutterhead. The relation can be found in the diagram below.

Diagram:
Hydro planerhead
RotaPlan and TurboPlan

- Z 12
- Z 16
- Z 20
- Z 26
- Z 32



With jointed hydro tools the marks of all knives are shown on the workpiece in regular pitches. More wings mean higher feed speeds maintaining the same surface quality.



Planerhead wedge-type system

Application:

Multi-purpose suitable for pre-planing with large chip removal and for finish planing.

Machine:

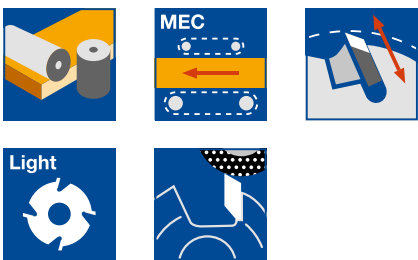
Four-sided moulders and profile machines.

Workpiece material:

Softwood and hardwood.

Technical information:

Cutterhead with resharpenable planer knives SB x 30 x 3.0 mm. Pressure springs position the knives by a setting gauge on the defined cutting edge circle. Cutting material quality HS, Marathon (MC33) and HW available.



Aluminium tool body, coated

WM 200 2 07

D	SB	BO	n _{max}	Z	ID	ID
mm	mm	mm	min ⁻¹		HS	HW
125	100	40	10500	4	140408 ●	140458 □
125	130	40	10500	4	140409 ●	140459 □
125	150	40	10500	4	140410 ●	140460
125	170	40	10500	4	140411 ●	140461 □
125	180	40	10500	4	140412 ●	140462
125	210	40	10500	4	140413 ●	140463
125	230	40	10500	4	140414 ●	140464
125	240	40	10500	4	140415 ●	140465 □

Suitable reference cutterhead on page 11.

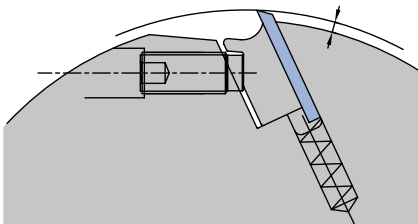
Spare knives:

Part-no.	SB	H	DIK	ID	ID	ID	ID
	mm	mm	mm	HS Classic	HS Premium	HW	MC33
1	100	30	3	605002 ●	027103 ●	027279 ●	606702 ●
1	130	30	3	605005 ●	027106 ●	027282 ●	606705 ●
1	150	30	3	605006 ●	027107 ●	027283 ●	606706 ●
1	170	30	3	605007 ●	027108 ●	027284 ●	606707 ●
1	180	30	3	605008 ●	027109 ●	027285 ●	606708 ●
1	210	30	3	605010 ●	027110 ●	027286 ●	606710 ●
1	230	30	3	605011 ●	027111 ●	027287 ●	606711 ●
1	240	30	3	605012 ●	027134 ●	027323 ●	606712 ●

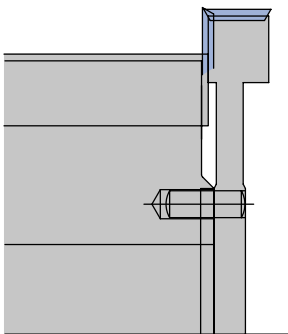
Spare knives in further dimensions and qualities see section Knives and Spare Parts.

Spare parts:

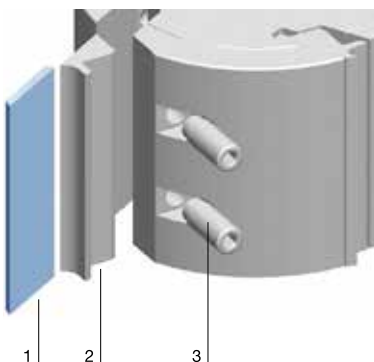
Part-no.	BEZ	ABM	for SB	ID
		mm	mm	
2	Clamping wedge		100	620900 ●
2	Clamping wedge		130	620901 ●
2	Clamping wedge		150	620902 ●
2	Clamping wedge		170	620903 ●
2	Clamping wedge		180	620904 ●
2	Clamping wedge		210	620905 ●
2	Clamping wedge		230	620906 ●
2	Clamping wedge		240	620907 ●
3	Allen screw	M10x1x25		007395 ●
	Allen key	SW 5		117509 ●
	Pressure spring	27x6x0.75		008076 ●
	Setting gauge	D125/140		005361 ●



Correct protrusion: max. 2 mm



Combined with reference cutterhead





Planerhead CentroStar

Application:

Especially suitable for finish planing. Can also be used for pre-planing with chip removal up to 6 mm.

Machine:

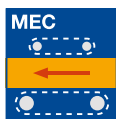
Four-sided moulders.

Workpiece material:

Softwood and hardwood.

Technical information:

Form fit knife clamping system supported by centrifugal force. Axial or radial knife removal. HS or HW turnblade planer knife SB x 12 x 2.7 mm. Integrated chip breaker to prevent pre-splitting. Aluminium tool body.



Aluminium tool body

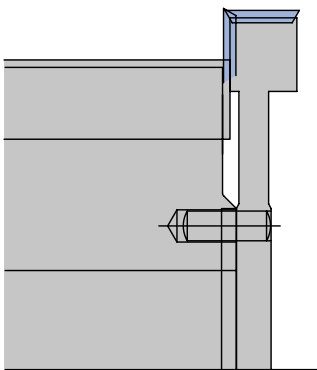
WW 240 2 20

D	SB	ND	BO	BO _{max}	Z	n _{max}	ID	ID
mm	mm	mm	mm	mm		min ⁻¹	HS	HW
125	100	106	40	50	4	12000	130442 ●	130443 □
125	130	136	40	50	4	12000	130446 ●	130447 □
125	166	172	40	50	4	12000	130492 ●	130493 □
125	180	186	40	50	4	12000	130454 ●	130455 □
125	210	216	40	50	4	12000	130458 ●	130459 □
125	236	242	40	50	4	12000	130494 ●	130495 □
125	256	262	40	50	4	12000	130496 ●	130497 □

Further dimensions and inch dimensions available on request.

Suitable reference cutterheads on page 11.

Spare parts service only by the manufacturer.



Combined with reference cutterhead

Spare knives:

SB	H	DIK	QAL	SET	ID
mm	mm	mm		PCS	
100	12	2.7	HS	4	610203 ●
130	12	2.7	HS	4	610205 ●
166	12	2.7	HS	4	610286 ●
180	12	2.7	HS	4	610211 ●
210	12	2.7	HS	4	610213 ●
236	12	2.7	HS	4	610287 ●
256	12	2.7	HS	4	610288 ●
100	12	2.7	HW-F	2	610606 ●
130	12	2.7	HW-F	2	610612 ●
166	12	2.7	HW-F	2	610680 ●
180	12	2.7	HW-F	2	610621 ●
210	12	2.7	HW-F	2	610627 ●
236	12	2.7	HW-F	2	610679 ●
256	12	2.7	HW-F	2	610681 ●



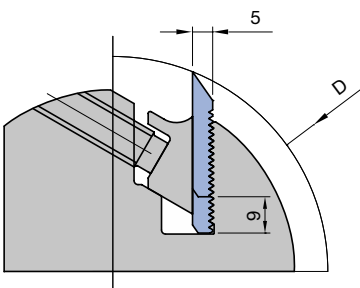
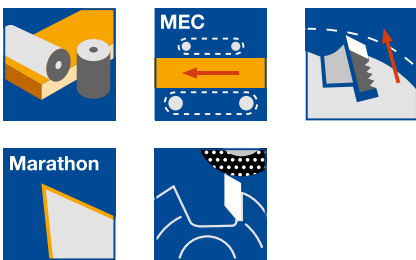
Planerhead with HSK 85 WS and serrated back HS Marathon planer knives

Application:
Finish planing.

Machine:
Four-sided moulders with HSK 85 WS interface.

Workpiece material:
Cutting angle 20° for softwood and hardwood in general.
Cutting angle 12° for materials likely to splinter such as oak, Douglas fir, merbau and wood fibre materials, e.g. MDF.

Technical information:
Finish planing cutterhead in mono block design DTK 90 mm with serrated back planer knives SB x 40 x 5 mm ground to cutting circle. Jointable by specific jointing stone. Steel tool body. High balance quality by assembly with parts of the same weight.



Cutting angle 20°

WP 210 2 01

D	SB	A	QAL	Z	n _{max}	ID	ID
mm	mm	mm			min ⁻¹	LH / bottom	RH / top
106	130	26	MC33	2	12000	140322 ●	140323 ●
106	170	26	MC33	2	12000	140324 ●	140325 ●
106	240	26	MC33	2	12000	140326 ●	140327 ●
106	80	26	MC33	4	12000	140330 ●	140331 ●
106	130	26	MC33	4	12000	140332 ●	140333 ●
106	170	26	MC33	4	12000	140334 ●	140335 ●
106	240	26	MC33	4	12000	140336 ●	140337 ●
128	80	26	MC33	6	10000	140346 ●	140347 ●
128	130	26	MC33	6	10000	140348 ●	140349 ●
128	170	26	MC33	6	10000	140350 ●	140351 ●
128	240	26	MC33	6	8000	140352 ●	140353 ●

Cutting angle 12°

WP 210 2 01

D	SB	A	QAL	Z	n _{max}	ID	ID
mm	mm	mm			min ⁻¹	LH / bottom	RH / top
106	130	26	MC33	2	12000	140302 ●	140303 ●
106	170	26	MC33	2	12000	140304 ●	140305 ●
106	240	26	MC33	2	12000	140306 ●	140307 ●
106	130	26	MC33	4	12000	140312 ●	140313 ●
106	170	26	MC33	4	12000	140314 ●	140315 ●
128	80	26	MC33	6	10000	140340 ●	140341 ●
128	130	26	MC33	6	10000	140342 ●	140343 ●
128	170	26	MC33	6	10000	140344 ●	140345 ●

Spare knives:

SB	H	DIK	QAL	VE	ID
mm	mm	mm		PCS	
80	40	5	MC33	2	697302 ●
130	40	5	MC33	2	697304 ●
170	40	5	MC33	2	697306 ●
240	40	5	MC33	2	697311 ●

Spare parts:

BEZ	ABM	for SB	ID
	mm	mm	
Clamping wedge	78x25.3x10.8	80	620702 ●
Clamping wedge	128x25.3x10.8	130	620705 ●
Clamping wedge	168x25.3x10.8	170	620707 □
Clamping wedge	238x25.3x10.8	240	620710 □
Allen screw	M10x1x20		007396 ●
Allen key	SW 5		117509 ●



Hydro planerhead

Application:

Pre and finish planing with high feed speeds.

Machine:

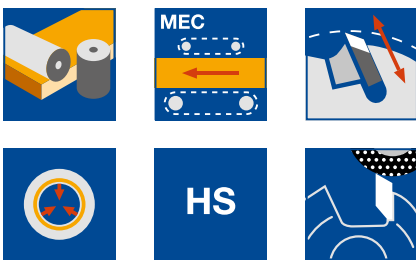
Four-sided moulders and profile machines with jointing equipment.

Workpiece material:

Softwood and hardwood.

Technical information:

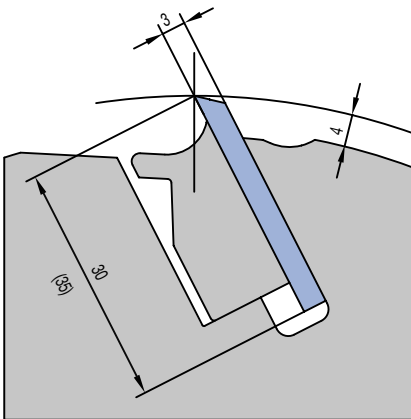
Steel tool body with corrosion resistant surface protection. Integrated hydro clamping system with exchangeable clamping sleeves. Activated by a grease gun. Inclusive resharpenable HS planer knives (SB x 30 x 3 mm). From diameter 203 mm, knives with 35 mm height also can be used. Hydro planerheads can only be used in combination with a clamping collar.



Steel tool body

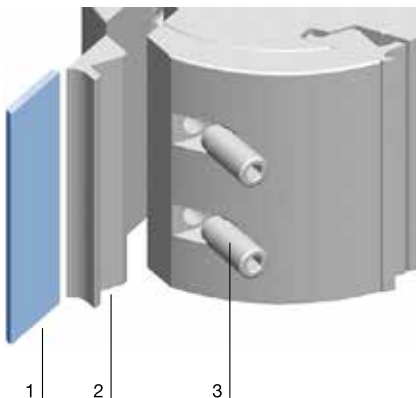
HM 200 2 07

D	SB	BO	Z	QAL	n_{max}	ID
mm	mm	mm			min ⁻¹	
163	130	50	4	HS	8100	142050
163	160	50	4	HS	8100	142051
163	230	50	4	HS	8100	142052
163	60	50	6	HS	8100	142053 ●
163	100	50	6	HS	8100	142054 ●
163	130	50	6	HS	8100	142055 ●
163	160	50	6	HS	8100	142056 ●
163	230	50	6	HS	8100	142057 ●
163	60	50	8	HS	8100	142058
163	100	50	8	HS	8100	142059
163	130	50	8	HS	8100	142060
163	160	50	8	HS	8100	142061
163	180	50	8	HS	8100	142062
163	230	50	8	HS	8100	142063
203	100	50	12	HS	6600	142064
203	130	50	12	HS	6600	142065
203	160	50	12	HS	6600	142066
203	180	50	12	HS	6600	142067
203	230	50	12	HS	6600	142068



Lightweight aluminium version on request.

Mounted knife



Spare knives:

Part-no.	SB	H	DIK	ID	ID	ID	ID
	mm	mm	mm	HS Classic	HS Premium	HW	MC33
1	60	30	3	605000	027101 ●	027277 ●	606700 ●
1	100	30	3	605002 ●	027103 ●	027279 ●	606702 ●
1	130	30	3	605005 ●	027106 ●	027282 ●	606705 ●
1	160	30	3	605045 ●	027163 ●		606745 ●
1	180	30	3	605008 ●	027109 ●	027285 ●	606708 ●
1	230	30	3	605011 ●	027111 ●	027287 ●	606711 ●

Spare parts:

Part-no.	BEZ	ABM	for SB	ID
		mm	mm	
2	Clamping wedge		60	620950 ●
2	Clamping wedge		100	620951 ●
2	Clamping wedge		130	620952 ●
2	Clamping wedge		160	620953 ●
2	Clamping wedge		180	620954 ●
2	Clamping wedge		230	620955 ●
3	Allen screw	M10x1x25		007395 ●
3	Allen screw	M10x1x20		007396 ●
3	Allen screw	M10x1x16		007397 ●
	Grease nipple	M10x1		007935 ●
	Relief plug	M10x1		007983 ●
	Allen key	SW 5		117509 ●
	Grease gun			008239 ●



Hydro planerhead TurboPlan PLUS

Application:
Pre and finish planing with high feed speeds.

Machine:
High performance planing machines with precision spindles and counter bearing as well as a jointing unit.

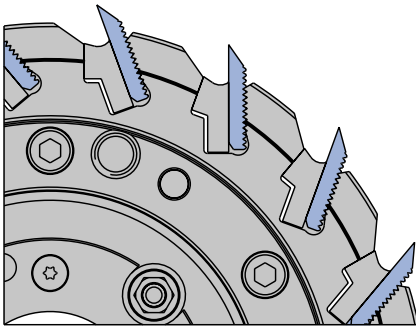
Workpiece material:
Softwood and hardwood.

Technical information:
Tool body in weight optimized design with two independent hydro systems for the tool and knife clamping. Activated by a grease gun. Marathon coated planer knives with back serration (SB x 30 x 5 mm). Hydro planerheads can only be used in combination with a clamping collar.



Weight optimised design
HM 200 2 08

D	SB	BO	Z	n_{max}	ID
mm	mm	mm		min^{-1}	
200	150	50	14	8000	142230
200	230	50	14	8000	142231
200	330	50	14	8000	142232
225	150	50	18	7200	142233
225	230	50	18	7200	142234
225	330	50	18	7200	142235
260	150	50	22	6200	142236
260	230	50	22	6200	142237
260	330	50	22	6200	142238



TurboPlan PLUS knife clamping

Spare knives:

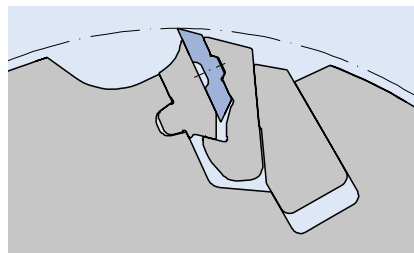
SB	H	DIK	QAL	ID
mm	mm	mm		
150	30	5	MC33	697359 □
230	30	5	MC33	697360 □
330	30	5	MC33	697363 □

Spare parts:

BEZ	ABM	BEM	ID
	mm		
Knife setting device	for TurboPlan		142290
Setting gauge for Hydro planerhead	Knife protrusion		142291
	3.8 mm		
Grease gun			008239 ●
Grease cartridge	for Hydro sleeve		007934 ●
Jointing stone (round)	12x32	Colour: grey	008237 ●
Jointing stone (angular)	20x15x60	Colour: brown	008238 ●

Planerhead VariPlan Plus/ProFix F



Application	Four-sided moulders for planing, grooving or profiling in one process step. The combination of planing knives and profiling knives allows the planerhead to be used as a multi-purpose planing and profiling tool.
Machines	Four-sided moulders.
Workpiece material	Softwood and hardwood.
Cutting material	Planing knives HS / HW. Profile knives HW.
Number of wings	Z 2+2 seatings for radius, bevel, grooving or profile knives.
Resharpening area	Planer knife 1.0 mm, profile knife 4.5 mm
Chip removal	Softwood: up to 10.0 mm. Hardwood: up to 7.0 mm.
Tool design	Lightweight aluminium cutterhead with resharpenable turnblade planing knives. Clamping system with constant profile and constant diameter (see introduction VariPlan Plus and ProFix cutterhead).
Technical features	 <p>Axially adjustable profile knives can be adjusted to the corresponding wood width/height. Profile depths up to 25 mm and working widths up to 120 mm possible.</p> <p>Cutterhead with lightweight aluminium tool body and steel chip breaker.</p>

Accessories	Bevel, grooving, fluting knives; two left and two right knives per set.										
	<table border="0"> <tr> <td>bevel: 22 mm x 45°</td> <td>rounding: R = 3 – 22,5 mm</td> <td>flute: R = 3 – 25 mm</td> <td>flute: R = 3 – 22,5 mm</td> <td>Nut: 8 x 10 mm, 12 – 25 mm</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	bevel: 22 mm x 45°	rounding: R = 3 – 22,5 mm	flute: R = 3 – 25 mm	flute: R = 3 – 22,5 mm	Nut: 8 x 10 mm, 12 – 25 mm					
bevel: 22 mm x 45°	rounding: R = 3 – 22,5 mm	flute: R = 3 – 25 mm	flute: R = 3 – 22,5 mm	Nut: 8 x 10 mm, 12 – 25 mm							

Note	<ul style="list-style-type: none"> – Quick change of VariPlan Plus knives in radial direction. – Quick change and adjustment of ProFix profile knives in axial direction. – Special profile knives on request.
-------------	---

3. Planing and profiling

3.2 Planing

3.2.4 Combination tools for planing and profiling



Planerhead VariPlan Plus/ProFix F system PF 25

Application:

For planing and profiling (chamfering) e.g. grooving, bevelling, rounding or profiling in common.

Machine:

Four-sided moulders.

Workpiece material:

Softwood and hardwood.

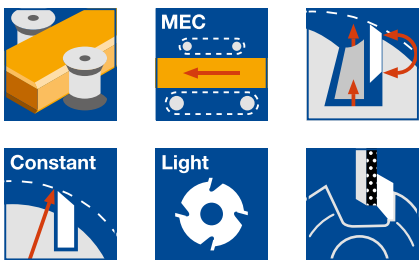
Technical information:

Resharpenable cutterhead system with constant diameter and constant profile.

VariPlan Plus planerhead with knife seatings for ProFix F profile knives (PF 25) and

HW microfinish turnblade knives. Profile knives: PT_{max} 25 mm, SB_{max} 100 mm.

Lightweight aluminium tool body.

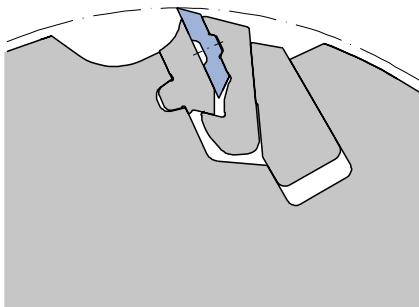


Bore 40 mm

WW 240 2 07

D	SB	ND	BO	QAL	n_{max}	Z	ID
mm	mm	mm	mm		min^{-1}		
125	130	136	40	HW	10200	2+2	131060 ●
125	166	172	40	HW	10200	2+2	131058 ●
125	236	242	40	HW	10200	2+2	131059 ●

Further knife types, dimensions and inch dimensions on request. Servicing with spare parts only by the manufacturer. VariPlan Plus spare knives in section Knives and Spare Parts.



Spare knives:

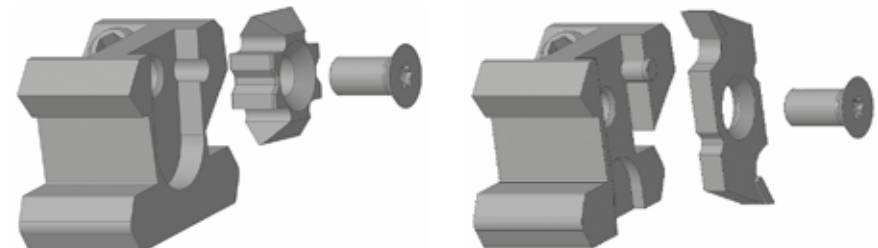
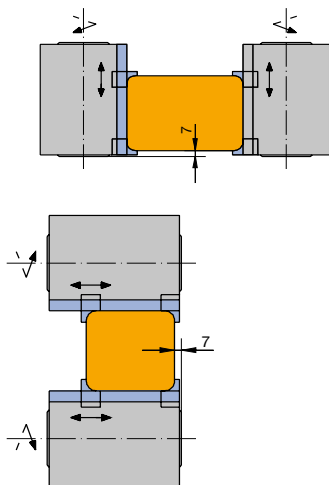
BEZ	SB	ABM	QAL	ID	ID
	mm	mm		LH	RH
ProFix F knife PF 25 R=3	25	R=3	HW	011041 ●	011042 ●
ProFix F knife PF 25 R=5	25	R=5	HW	011043 ●	011044 ●
ProFix F knife PF 25 R=10	25	R=10	HW	011047 ●	011048 ●
ProFix F knife PF 25 Bevel 45°	25	Bevel 45°	HW	011051 ●	011052 ●

Further profile knives on request.

Spare parts:

BEZ	ABM	ID	ID
	mm	LH	RH
Knife holder for edge knives	D=125, SW=20°	011301 ●	011300 ●
Knife holder for grooving knives	D=125, SW=20°, NT=6	011303 ●	011302 ●
Allen key	SW 4		005445 ●
Allen key	SW 5		005452 ●

Lightweight aluminium tool body with steel chip breaker



Knife holder to adapt edge knives.

Knife holder to adapt grooving knives.

Use on vertical or horizontal spindles

$HD = SB - 40 \text{ mm}$



Planerhead VariPlan Plus/ProFix F system PF 25

Application:

For planing and profiling (chamfering) e.g. grooving, bevelling, rounding or profiling in common.

Machine:

Four-sided moulders with HSK 85 WS interface.

Workpiece material:

Softwood and hardwood.

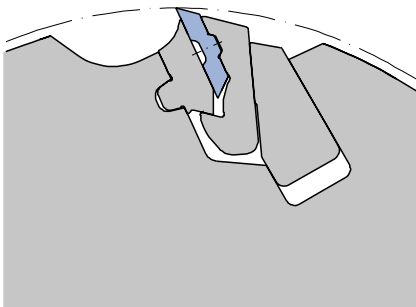
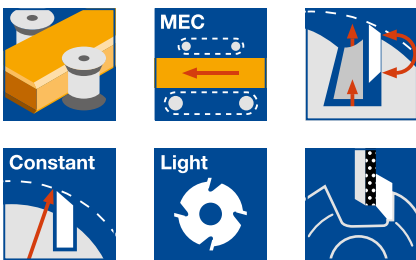
Technical information:

Resharpenable cutterhead system with constant diameter and constant profile.

VariPlan Plus planerhead with knife seatings for ProFix F profile knives (PF 25) and

HW microfinish turnblade knives. Profile knives: PT_{max} 25 mm, SB_{max} 100 mm.

Lightweight aluminium tool body.



Lightweight aluminium tool body with steel chip breaker

HSK 85 WS

WP 240 2 01

D	SB	A	Z	n_{max}	DRI	BEM	ID
mm	mm	mm		min^{-1}			
125	130	26	2+2	10200	LH	left/on bottom	131120 □
125	130	26	2+2	10200	RH	right/on top	131121 □
125	166	26	2+2	10200	LH	left/on bottom	131116 □
125	166	26	2+2	10200	RH	right/on top	131117 □
125	236	26	2+2	10200	LH	on bottom	131118 □
125	236	26	2+2	10200	RH	on top	131119 □

Further knife types, dimensions and inch dimensions on request. Servicing with spare parts only by the manufacturer. VariPlan Plus spare knives in section Knives and Spare Parts.

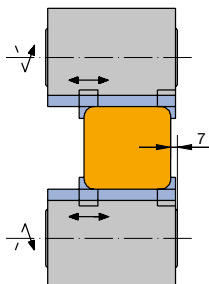
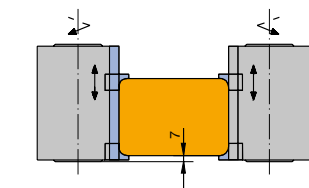
Spare knives:

BEZ	SB	ABM	QAL	ID	ID
	mm	mm		LH	RH
ProFix F knife PF 25 R=3	25	R=3	HW	011041 ●	011042 ●
ProFix F knife PF 25 R=5	25	R=5	HW	011043 ●	011044 ●
ProFix F knife PF 25 R=10	25	R=10	HW	011047 ●	011048 ●
ProFix F knife PF 25 Bevel 45°	25	Bevel 45°	HW	011051 ●	011052 ●

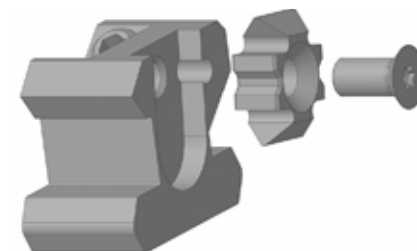
Further profile knives on request.

Spare parts:

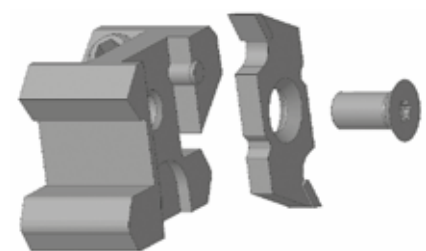
BEZ	ABM	ID	ID
	mm	LH	RH
Knife holder for edge knives	D=125, SW=20°	011301 ●	011300 ●
Knife holder for grooving knives	D=125, SW=20°, NT=6	011303 ●	011302 ●
Allen key	SW 4		005445 ●
Allen key	SW 5		005452 ●



Use on vertical or horizontal spindles
 $HD = SB - 40$ mm



Knife holder to adapt edge knives.



Knife holder to adapt grooving knives.

3. Planing and profiling

3.3 Profiling

3.3.1 Tools for tongue and groove joints

Profile variations	Tongue and groove profiles are used on wall, ceiling and floor panels. The profiles are standardised and different in each country. The tools for machining solid wood panels presented on the following product pages are the most common designs in Europe. The majority of tools for wall and ceiling panel machining are produced to customer specifications.
Workpiece materials	Softwood and medium hardwood.
Machines	Four-sided moulders with feed speeds up to 80 m min ⁻¹ . Machines with high precision spindles and jointing units for feed speeds up to 300 m min ⁻¹ .
Application	Machining against feed, panel face down. Groove right, tongue left. Groove machined either as a part of the groove profile or separately on a horizontal spindle.
Tool design	<p>HL solid cutter: HL solid cutters are form ground with a large resharpening area. Suitable for softwood such as spruce or fir. The main application is high speed moulders for producing standardised tongue and groove boards in high quantities and with high quality requirements.</p> <p>HW/HS-tipped tools: HW/HS-tipped tools have a smaller resharpening area of approx. 5 mm depending on the tipping thickness. HW/HS-tipped tools are suitable for softwood and hardwood. They are mainly used on small volume moulding machines with frequent profile changes.</p>

Design of grooving and tongue cutter sets

Tongue and groove cuttersets are of 2 part, adjustable.



Tongue cutter:
Always wing on wing.



Grooving cutter:
two designs –
wing on wing or
wing on gullet

Wing-on-wing design:

With the wing-on-wing design, the two parts of the cutter set are positioned with the cutting edges on top of each other and the gullets in line so the two parts can be resharpened simultaneously.

Advantage: Resharpening simpler and greater resharpening area.

Disadvantage: Only every other groove wing is cutting the groove flank.

For a Z 6 groove cutter, only three groove wings are cutting each side of the groove.

Tear-outs can occur at high feed speeds.

3. Planing and profiling

3.3 Profiling

3.3.1 Tools for tongue and groove joints



Wing-on-gullet design:

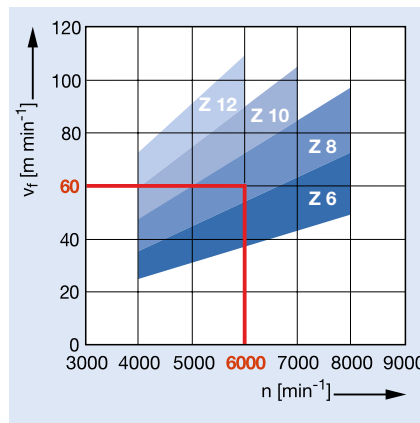
Unless indicated otherwise, Leitz delivers wing-on-gullet design as a standard.

With this design, the two cutter parts are adjusted so that the wings of one part lie in the gullets of the other part.

Advantage: All the wings are constantly working on the groove side.

This design is preferable for high feed speeds.

Relation between feed rate, RPM and number of wings



For tools without hydro clamping, only the marks of one knife show on the surface (one-knife finish).

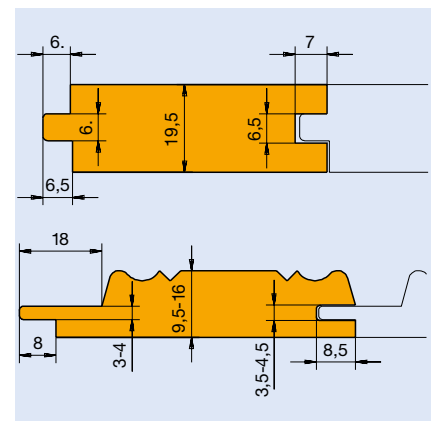
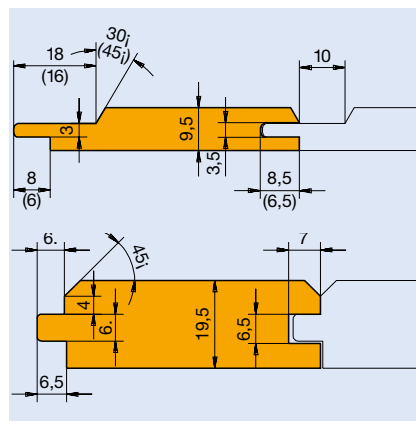
When calculating the maximum feed speed, only one cutting edge can be taken into account.

If the tool is clamped with a hydro clamping system and the profiling is resharpened to a concentricity of at least 0.01 mm, all cutting edges are equally involved in the cutting process and can be taken into account when calculating the maximum feed speed.

f_z 0.8 - 1.5 mm

Profile samples for groove and tongue panels

German standard profiles

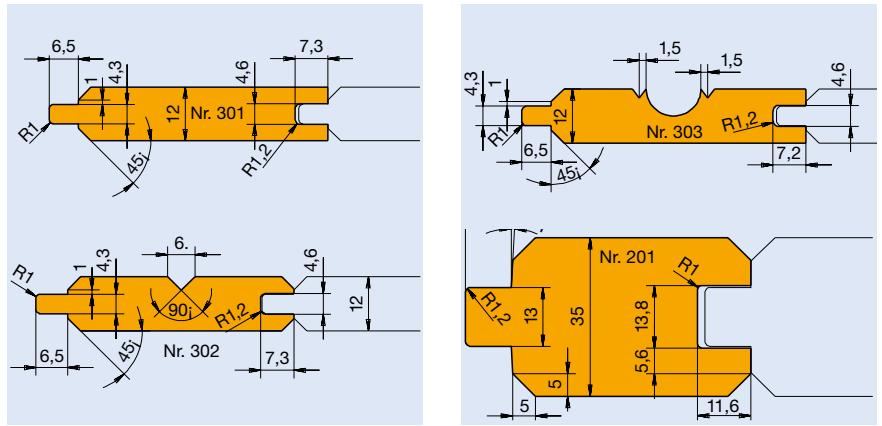


3. Planing and profiling

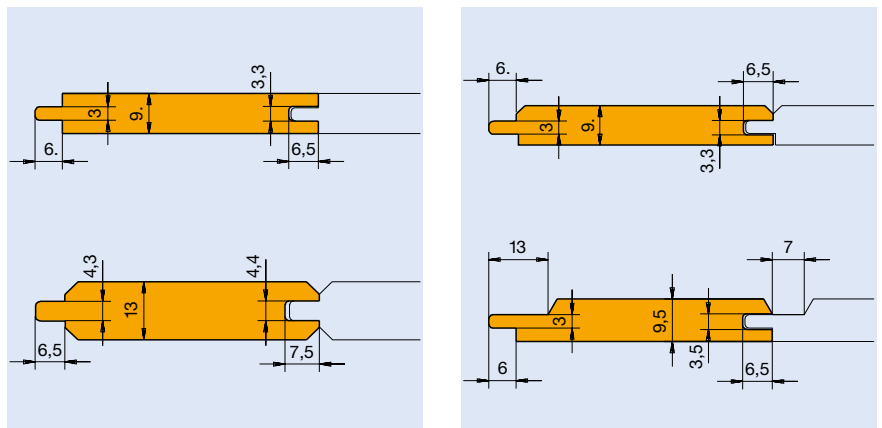
3.3 Profiling

3.3.1 Tools for tongue and groove joints

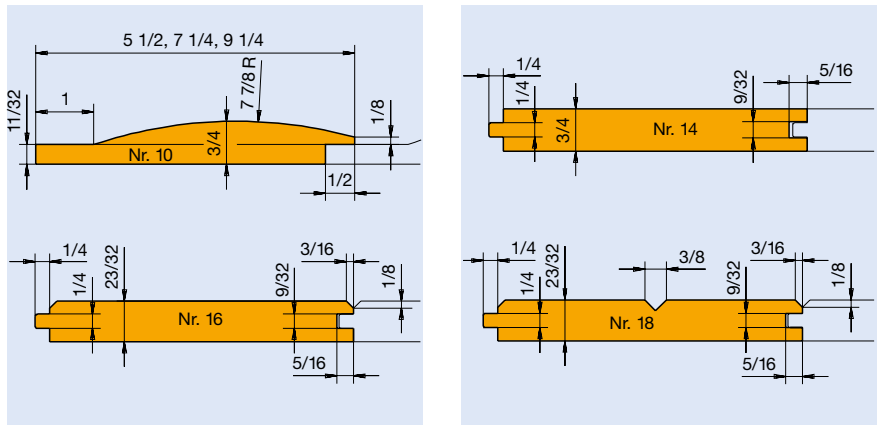
Australian standard profiles



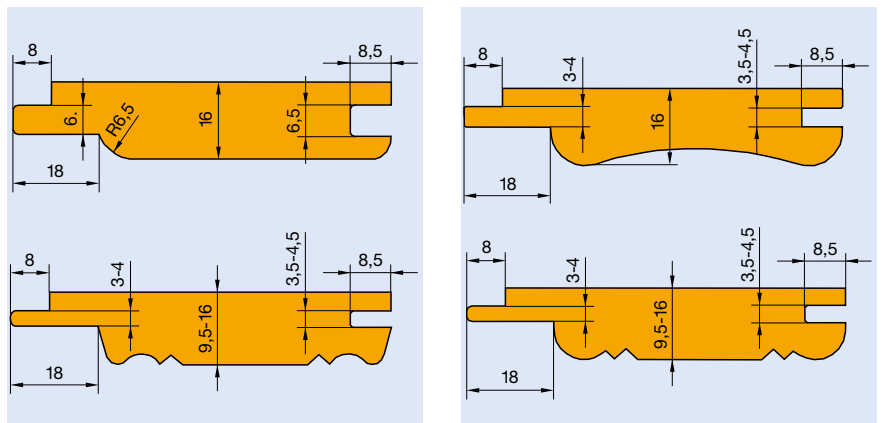
Scandinavian standard profiles



Canadian standard profiles



European country-house profiles





Tongue and groove cutter, HL solid / HS tipped

Application:

For tongue and groove profiles on wall and ceiling panels.

Machine:

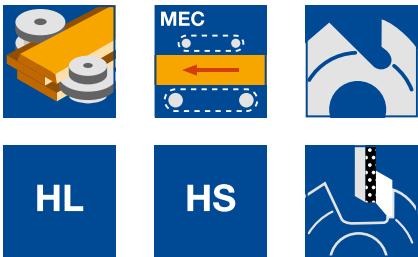
Four-sided moulders.

Workpiece material:

Softwood, along grain.

Technical information:

Tongue and groove cutter set with spacers for adjustment to different wood thicknesses and tongue and groove widths. BO 60 for use on hydro sleeve for high feed speeds and machining qualities. HL profile cutter with form ground clearance and large resharping area; HS tipped design with straight clearance.



Straight with closed joint (P3), as viewed from finished face

AF 200 2

P	D	BO	HD	Z	NT	FL	n_{max}	QAL	ID
	mm	mm	mm		mm	mm	min^{-1}		
3	180	60	15 - 27	6	8.5	8	9000	HL	021876
3	160	40	15 - 27	6	8.5	8	9000	HS	022016

Bevel profile with closed joint (P5), as viewed from finished face

AF 210 2

P	D	BO	HD	Z	NT	FL	n_{max}	QAL	ID
	mm	mm	mm		mm	mm	min^{-1}		
5	160	40	12.5 - 16	6	7	6	9000	HS	021913

Bevel profile (P1, P4)

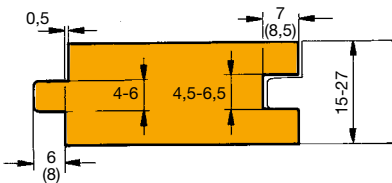
AF 240 2

P	D	BO	HD	NT	FL	Z	n_{max}	QAL	ID
	mm	mm	mm	mm	mm		min^{-1}		
1	180	60	12 - 27	7	6	6	9000	HL	021964
4	180	60	12 - 27	8	8.5	6	9000	HL	021969

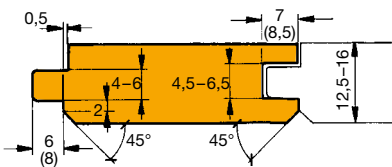
Radius profile R5 (P6)

AF 221 2

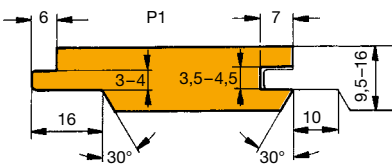
P	D	BO	HD	NT	FL	Z	n_{max}	QAL	ID
	mm	mm	mm	mm	mm		min^{-1}		
6	180	60	14 - 19	10	10.5	6	9000	HL	021883



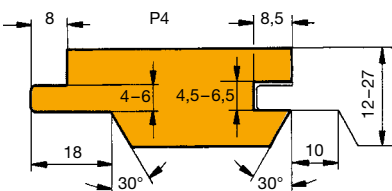
Profile 3: AF 200 2



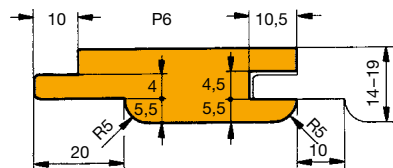
Profile 5: AF 210 2



Profile 1: AF 240 2



Profile 4: AF 240 2



Profile 6: AF 221 2



Profile cutterhead set ProfilCut Q - bevelling / rounding

Application:

Multi-purpose tool set for bevelling, rounding and jointing the workpiece edges at the same time.

Machine:

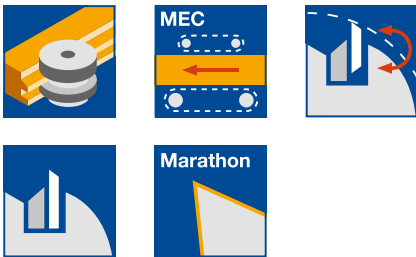
Spindle moulders, copy shaping and moulders, double-end tenoner.

Workpiece material:

Softwood and hardwood.

Technical information:

With a combination of jointing and bevelling/rounding cutterheads, different profiles and wood thicknesses can be machined. Profile knives with different radii/bevels can be mounted in one cutterhead.

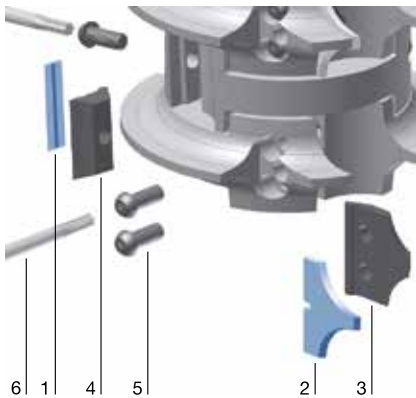


Mechanical feed

SE 541 2 53

Tool Type	D ₀ mm	AW PCS	n _{max} min ⁻¹	Z	ID
Jointing-rounding	125	2	8000	2	126063 □
Rounding-jointing-rounding	125	3	8000	2	126064 □
Rounding-rounding	125	2	8000	2	126065 □

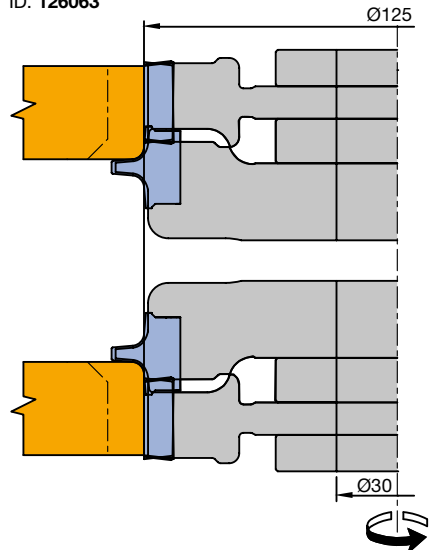
Further radii are available at short notice.



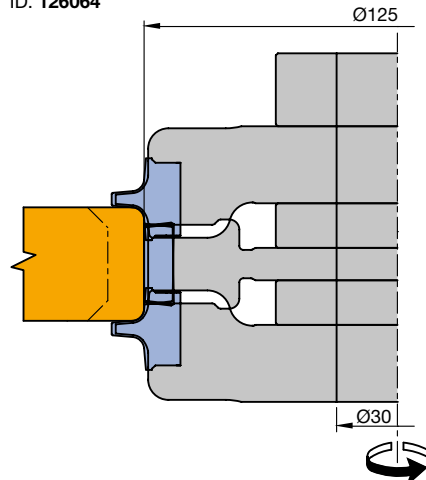
Spare parts:

Part-no.	BEZ	ABM mm	Tool no.	ID
3	Clamping wedge	18x22x8.27	1/2	629231
3	Clamping wedge	33x28x8.27	3/4	629232
3	Clamping wedge	38x29.71x8.27	5	629233
3	Clamping wedge	38x29.71x8.27	6	629234
3	Clamping wedge	48x31.73x8.27	7	629235
3	Clamping wedge	48x31.73x8.27	8	629236
4	Clamping wedge	18x18.75x8.27	20	009671 ●
4	Clamping wedge	33x18.75x8.27	35	009674 ●
4	Clamping wedge	48x18.75x8.27	50	009677 ●
5	Clamping screw w. disc, M6x18.5			007442 ●
	Torx® 25			
6	Torx® key		Torx® 25	117504 ●

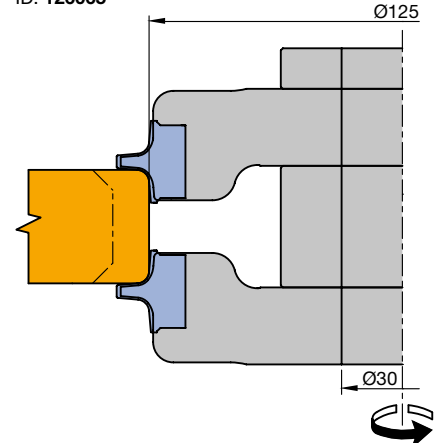
ID. 126063



ID. 126064



ID. 126065

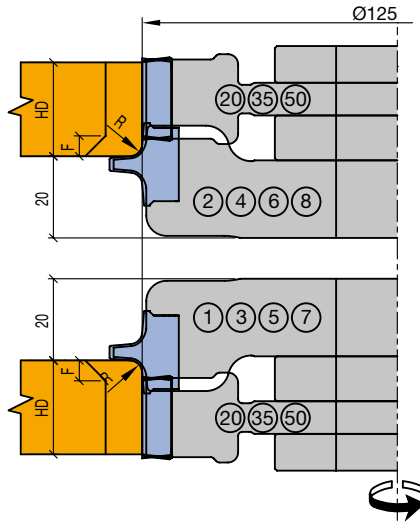


3. Planing and profiling

3.3 Profiling 3.3.2 Radius profile cutterheads

ID. 126063

Order example:
 -Combination ID 126063
 -Profile description top down RL
 jointingSB35/R5 or R5/jointingSB35
 -Bore diameter 30



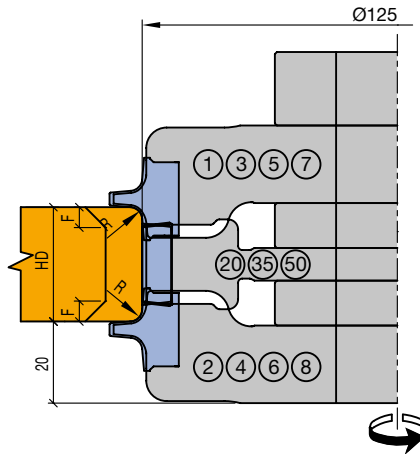
Wood thickness (HD):

Jointing tool	20	35	50
max. HD	18+R (F)	33+R (F)	48+R (F)

F (bevel) max. = 5 or 9x45°

ID. 126064

Order example:
 -Combination ID 126064
 -Profile description top down RL
 R5/jointingSB35/R5
 -Bore diameter 30

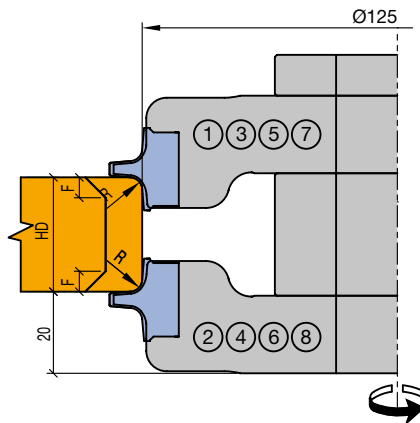


Radii tools	Jointing tool			Minimum wood thickness
	20	35	50	
No.1+2	6	12	24	
No.1+4	13	19	31	
No.1+6	18	24	36	
No.1+8	28	34	46	
No.3+2	13	19	31	
No.3+4	20	26	38	
No.3+6	25	31	43	
No.3+8	35	41	53	
No.5+2	18	24	36	
No.5+4	25	31	43	
No.5+6	30	36	48	
No.5+8	40	46	58	
No.7+2	28	34	46	
No.7+4	35	41	53	
No.7+6	40	46	58	
No.7+8	50	56	68	
max. HD	18+R+R (F+F)	33+R+R (F+F)	48+R+R (F+F)	

F (bevel) max. = 3, 5, 7x45° or 8x40°
 Wood thicknesses are calculated with max. bevel

ID. 126065

Order example:
 -Combination ID 126065
 -Profile description top down RL
 R5/R5
 -Bore diameter 30



Radii tools	Minimum wood thickness
No.1+2	-2
No.1+4	5
No.1+6	10
No.1+8	20
No.3+2	5
No.3+4	12
No.3+6	17
No.3+8	27
No.5+2	10
No.5+4	17
No.5+6	22
No.5+8	32
No.7+2	20
No.7+4	27
No.7+6	32
No.7+8	42

3. Planing and profiling

3.3 Profiling 3.3.2 Radius profile cutterheads

Spare part: clamping wedge 629231

WZ 125306	R4
ME 619247	
WZ 125307	R5
ME 619248	
WZ 125308	R6
ME 619249	
WZ 125309	R7
ME 619250	
WZ 125304	R2
ME 619245	
WZ 125305	R3
ME 619246	
WZ 125310	R8
ME 619251	
WZ 125311	F5x45°
ME 619253	

Spare part: clamping wedge 629232

WZ 125321	R11
ME 619255	
WZ 125322	R12
ME 619256	
WZ 125323	R13
ME 619257	
WZ 125324	R14
ME 619258	
WZ 125325	R15
ME 619259	
WZ 125326	F9x45°
ME 619260	
WZ 125320	R10
ME 619254	

Spare part: clamping wedge 629233

WZ 125334	R16
ME 619263	
WZ 125335	R17
ME 619264	
WZ 125336	R18
ME 619265	
WZ 125337	R19
ME 619266	
WZ 125338	R20
ME 619267	
WZ 125339	F9x40°
ME 619269	

Spare part: clamping wedge 629231

WZ 125314	R4
ME 619247	
WZ 125315	R5
ME 619248	
WZ 125316	R6
ME 619249	
WZ 125317	R7
ME 619250	
WZ 125312	R2
ME 619245	
WZ 125313	R3
ME 619246	
WZ 125318	R8
ME 619251	
WZ 125319	F5x45°
ME 619253	

Spare part: clamping wedge 629232

WZ 125328	R11
ME 619255	
WZ 125329	R12
ME 619256	
WZ 125330	R13
ME 619257	
WZ 125331	R14
ME 619258	
WZ 125332	R15
ME 619259	
WZ 125327	R10
ME 619254	
WZ 125333	F9x45°
ME 619260	

Spare part: clamping wedge 629234

WZ 125340	R16
ME 619271	
WZ 125341	R17
ME 619272	
WZ 125342	R18
ME 619273	
WZ 125343	R19
ME 619274	
WZ 125344	R20
ME 619275	
WZ 125345	F9x40°
ME 619277	

Spare part: clamping wedge 629235

WZ 125346	R25
ME 619279	
WZ 125347	R26
ME 619280	
WZ 125348	R27
ME 619281	
WZ 125349	R28
ME 619282	
WZ 125350	R29
ME 619283	
WZ 125351	R30
ME 619284	

WZ 23015
ME 5071
VE 10 pcs.)
Wedge 9671

WZ 23016
ME 5073
VE 10 pcs.)
Wedge 9674

WZ 23017
ME 5075
VE 10 pcs.)
Wedge 9677

Spare part: clamping wedge 629236

WZ 125352	R25
ME 619285	
WZ 125353	R26
ME 619286	
WZ 125354	R27
ME 619287	
WZ 125355	R28
ME 619288	
WZ 125356	R29
ME 619289	
WZ 125357	R30
ME 619290	

Spacer set (one set per cutterhead necessary)

60x20x30

3. Planing and profiling

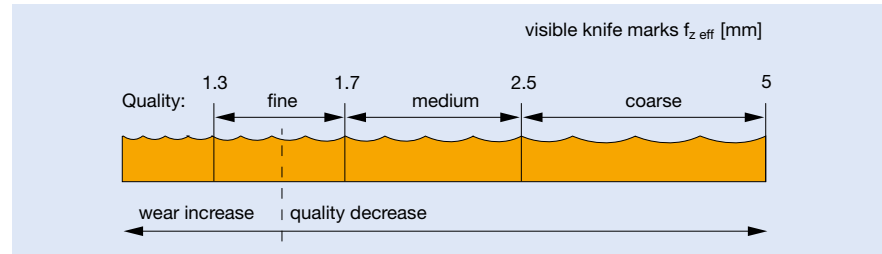
3.3 Profiling

3.3.3 Cutterheads for multi-purpose profiling

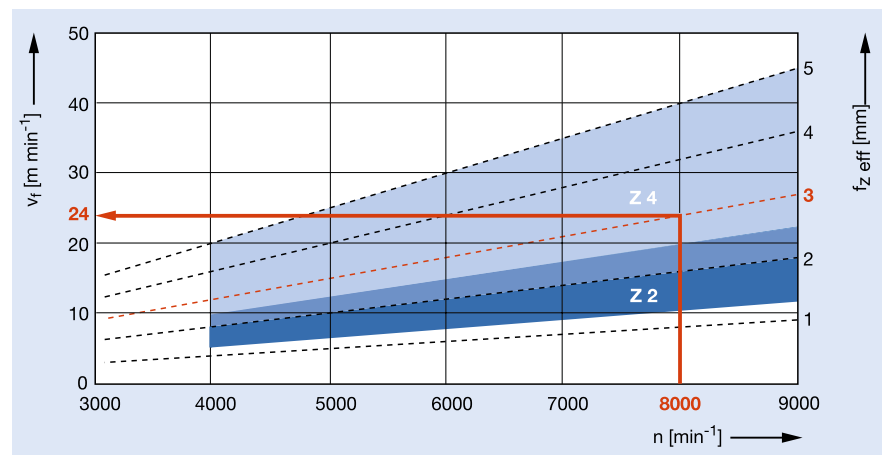
Process steps

The cutterheads presented in the following section are suitable for a variety of profiles in the craft and industrial sectors. Due to the different application possibilities, the use of the tool and wood types to be machined are detailed on the respective product pages.

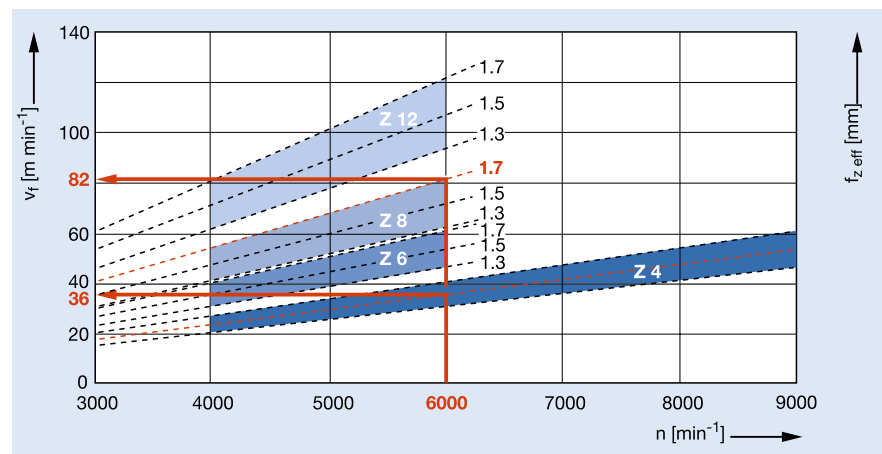
Relation between surface quality and length of knife marks $f_{z\text{ eff}}$



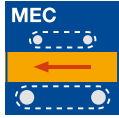
Cutterhead without hydro clamping: Feed speeds depending on RPM, length of knife marks and number of wings



Cutterhead with hydro clamping: Feed speeds depending on RPM, length of knife marks and number of wings



Profile cutterheads for serrated back blank knives



Application	Multi-purpose profiling, machining along grain.
Machines	Four-sided moulders and profiling machines.
Workpiece materials	Softwood and hardwood.
Number of teeth	Z 2, Z 4.
Cutting material	Marathon (MC), HW.
Resharpener area	10.8 mm (9 + 1.8 mm) Marathon (MC) and HW blank knife with backing plate.
Feed	Four-sided profiling.
Tool design	Steel tool body. High concentricity and balance. Knife seat for serrated back knives in HS and MC 33, thickness 8 mm, and HW and HW PowerKnifeSystem (MicroSystem blank knives), total thickness 10 mm (HW blank knife and backing plate). Standard pitch 1.6 mm.
Advantages	Optimal cutting speed with $n = 12,000 \text{ min}^{-1}$ and thus improved finish quality. For optimal finish quantity we recommend to grind in the profile blanks in the cutterhead and joint them additionally on the machine.
Note	Cutting angle 20° for softwood. Cutting angle 12° for hardwood and wood fibre materials. PowerKnifeSystem (HW MicroSystem) blank knives with a knife height of 70 mm can only be used for cutting widths up to 150 mm. For jointing: resharpened concentricity of $< 0.005 \text{ mm}$.



Profile cutterhead ProFix F

Application:

Flexible profiling of different profiles, suitable for panel production.

Machine:

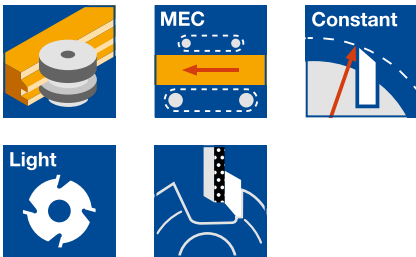
Four-sided moulder and profiling machine.

Workpiece material:

Softwood and hardwood, with grain.

Technical information:

Resharpenable, diameter and profile constant tooling system. Easy profile adjustment through knife change. No tool measurement required. To adapt ProFix F knives with 4.5 mm resharpening area and a profile depth of 25 mm max. Lightweight aluminium tool body. Division of maximum cutting width to several knives possible.



Bore 40 mm

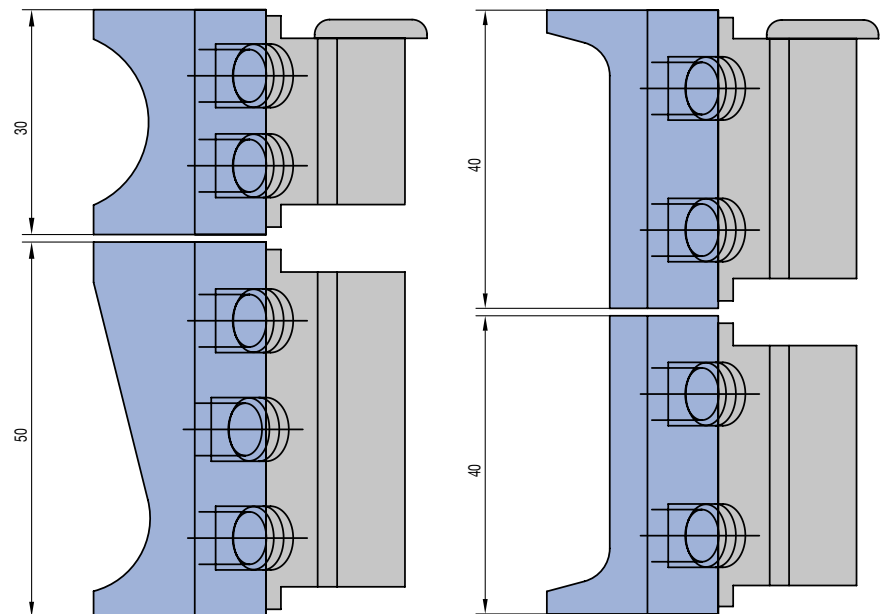
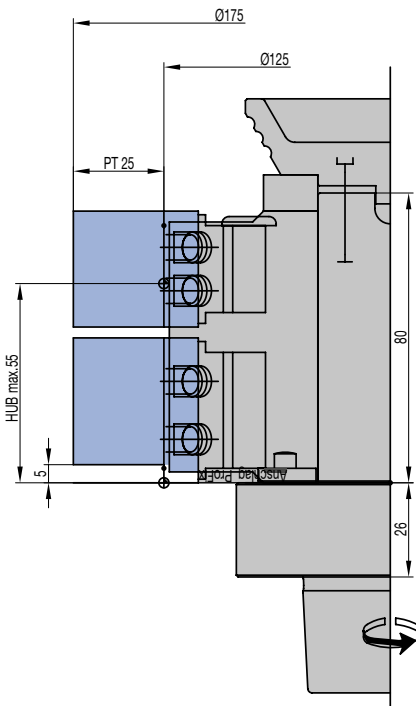
HY 500 2 25

D ₀ mm	PT mm	SB mm	n _{max} min ⁻¹	Z	ID
125	25	20 - 70	10000	2	014044 ●
125	25	20 - 90	10000	2	014043 ●

HSK 85 WS

HY 500 2 25

D ₀ mm	PT mm	SB mm	n _{max} min ⁻¹	BEM	Z	ID
125	25	20 - 70	10000	right/top	2	014046 □
125	25	20 - 70	10000	left/bottom	2	014048 □
125	25	20 - 90	10000	right/top	2	014045 □
125	25	20 - 90	10000	left/bottom	2	014047 □





Profile cutterhead VariForm

Application:

For cutting profiles. Different profiles with maximum 20 mm profile depth can be mounted.

Machine:

Moulders, double-end tenoners, edgebanding machines etc.

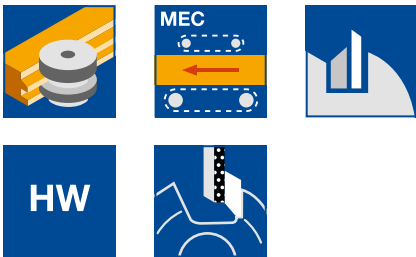
Workpiece material:

Softwood and hardwood (HW-30F), panel materials or glued wood (HW-10F).

Technical information:

Multi-purpose cutterhead for MEC feed with tungsten carbide special profile knives and backing plates.

Resharpenable 3 to 4 times.



Partly profiled tool body, MEC feed, Z 2 - Z 4 U profile

TT 531 2

D	TD	SB	BO	BO _{max}	PT _{max}	Z	n _{max}	ID
mm	mm	mm	mm	mm	mm		min ⁻¹	
165	140	40	30	40	20	2	10000	135212 ●
165	140	60	30	40	20	2	10000	134214 ●
180	165	40	30	50	20	4	9000	135206 ●
180	165	60	30	50	20	4	9000	135208 ●

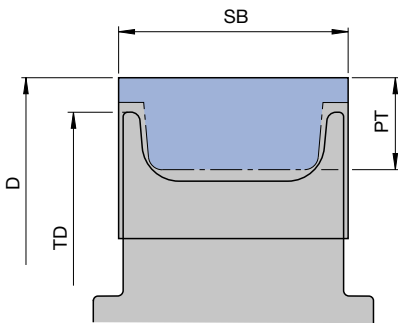
Supplied with clamping wedges, but without backing plates and knives.

Spare knives:

Part-no.	H	SB	ID	ID
	mm	mm	HW-10F	HW-30F
1	45	40	636226 ●	636239 ●
1	45	60	636287 ●	636275 ●

Spare parts:

Part-no.	BEZ	ABM	for SB	ID
		mm	mm	
2	Backing plate VariForm	for knives 40x45x2.1		645004 ●
2	Backing plate VariForm	for knives 60x45x2.1		645006 ●
3	Clamping wedge	36x13.21x26	40/45	009756 ●
3	Clamping wedge	56x13.21x26	60	009757 ●
4	Allen screw with ISK 5	M10x12		006044 ●
	Allen key	SW 5, L100		117506 ●

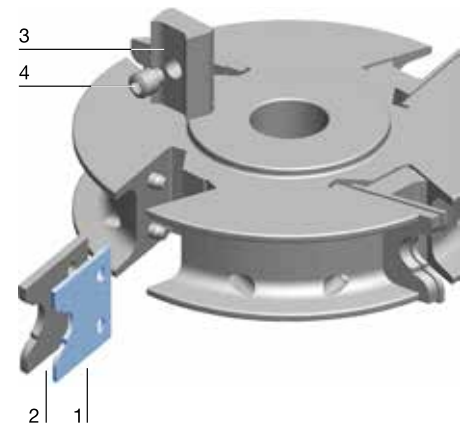


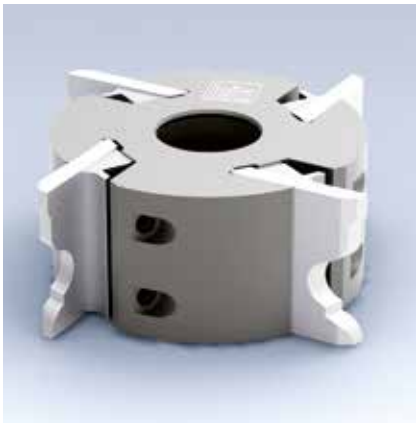
Tool body, U profile

Table of the 0-diameter (D₀) for adjusting the machine spindles

D	TD	D ₀
mm	mm	mm
150	135	110
165	140	125
180	165	140

Tool system description VariForm see section Profile Tool Systems.





Profile cutterheads for serrated back blank knives

Application:

For multi-purpose profiles in hard and/or materials likely to splinter.

Machine:

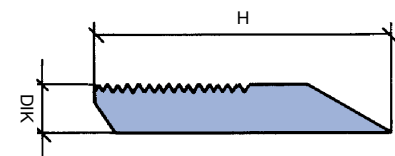
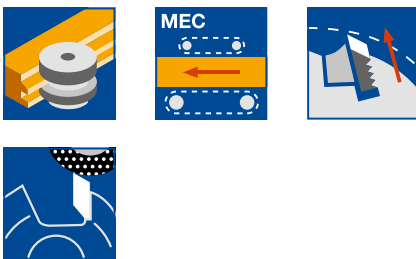
Four-sided moulders.

Workpiece material:

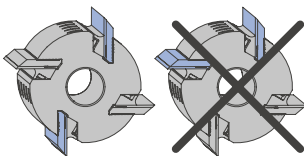
Cutting angle 20° for softwood and hardwood in general.

Technical information:

Profile cutterhead with 60° serration, 1.6 mm pitch. Steel tool body. Blank knives with knife thickness 8 - 10 mm and knife heights of 40 - 70 mm can be used depending on required profile depth. Cutting materials: Marathon (MC) and HW.



Serrated back blank knives with high precision serration, serration angle 60°, pitch 1.6 mm.



Attention:

For safety reasons, always mount knives and backing plates (VE) of the same weight opposite to each other.

H	QAL	PT
mm		mm
50	MC	15
60	MC	20
70	MC	30
50	HW	10
60	HW	18
55		15
70		27

Table to determine maximum profile depth.

The profile depth figures are to be regarded as standard values. The maximum profile depth depends on the tool diameter and cutting angle.

Cutting angle 20°

WM 501 2 05

TD	SB	BO	BO _{max}	n _{max}	Z	ID
mm	mm	mm	mm	min ⁻¹		
122	80	40	40	10300	2	135805 ●
122	40	40	40	10300	4	135802 ●
122	60	35	40	10300	4	135806 ●
122	60	40	40	10300	4	135808 ●
122	80	40	40	10300	4	135809 ●
122	100	35	40	10300	4	135810 ●
122	100	40	40	10300	4	135812 ●
122	130	40	40	10300	4	135814 ●
122	150	40	40	10300	4	135817 ●
122	170	40	40	10300	4	135816 ●
122	180	40	40	10300	4	135819 ●
122	230	40	40	10300	4	135821 ●
122	240	40	40	10300	4	135822 ●
137	60	40	50	9400	4	135823 ●
137	60	50	50	9400	4	135825 ●
137	80	50	50	9400	4	135826 ●
137	100	40	50	9400	4	135827 ●
137	100	50	50	9400	4	135829 ●
137	130	40	50	9400	4	135830 ●
137	130	50	50	9400	4	135831 ●
137	150	50	50	9400	4	135833 ●
137	180	50	50	9400	4	135836 ●
137	230	50	50	9400	4	135838 ●

Workpiece material:

Cutting angle 12° for materials likely to splinter such as oak, Douglas fir, merbau and wood fibre materials, e.g. MDF.

Cutting angle 12°

WM 501 2 05

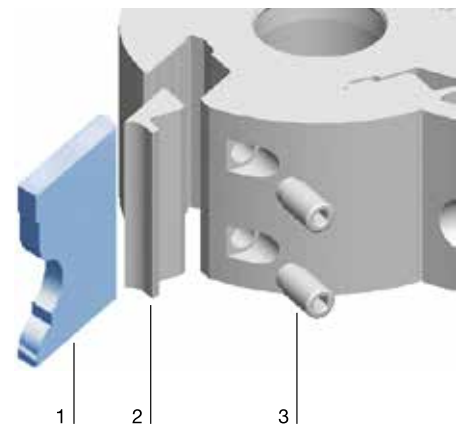
TD	SB	ND	BO	Z	ID
mm	mm	mm	mm		
122	40	40	40	4	135840
122	60	60	40	4	135841
122	80	80	40	4	135842
122	130	130	40	4	135843

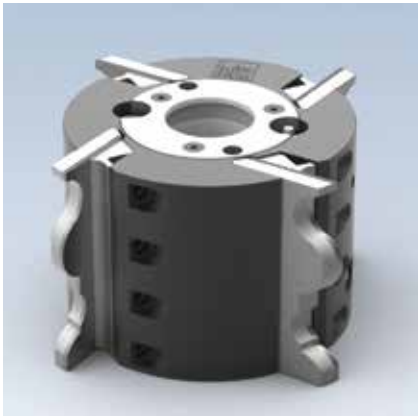
Cutterhead without knives. For blank knives in different dimensions and qualities, see section Knives and Spare Parts.

Lightweight aluminium design on request.

Spare parts:

Part-no.	BEZ	ABM mm	for SB mm	ID
2	Clamping wedge	38x25.3x10.8	40	620700 ●
2	Clamping wedge	58x25.3x10.8	60	620701 ●
2	Clamping wedge	78x25.3x10.8	80	620702 ●
2	Clamping wedge	98x25.3x10.8	100	620703 ●
2	Clamping wedge	128x25.3x10.8	130	620705 ●
2	Clamping wedge	148x25.3x10.8	150	620706 ●
2	Clamping wedge	168x25.3x10.8	170	620707 □
2	Clamping wedge	178x25.3x10.8	180	620708 □
2	Clamping wedge	228x25.43x11	230	620709 □
2	Clamping wedge	238x25.3x10.8	240	620710 □
3	Allen screw	M10x1x20		007396 ●
	Filler piece	40x30x8	40	005305 ●
	Filler piece	60x30x8	60	005306 ●
	Filler piece	80x30x8	80	005307 ●
	Filler piece	100x30x8	100	005308 ●
	Filler piece	130x30x8	130	005310 ●
	Filler piece	150x30x8	150	005311 ●
	Filler piece	170x30x8	170	620770 ●
	Filler piece	180x30x8	180	005312 ●
	Filler piece	230x30x8	230	005313 ●
	Filler piece	240x30x8	240	620771 ●
	Allen key	SW 5		117509 ●





Hydro profile cutterhead for serrated back blank knives

Application:

Cutting of multi-purpose profiles with high feed speeds.

Machine:

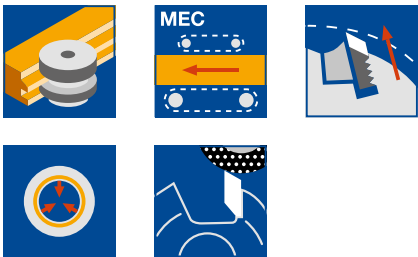
Four-sided moulders and profile machines.

Workpiece material:

Softwood and hardwood.

Technical information:

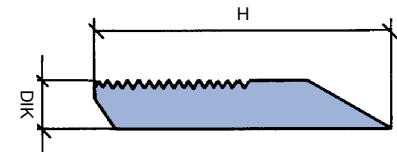
Profile cutterhead with 60°-serration, 1.6 mm pitch. Steel tool body with corrosion resistant surface protection. For blank knives with 8 - 10 mm knife thickness and 5 mm (see table) and 40 - 70 mm knife height, depending on the required profile depth. Integrated hydro clamping system with exchangeable clamping sleeves. Activated by a grease gun. Hydro profile cutterheads can only be used in combination with a clamping collar.



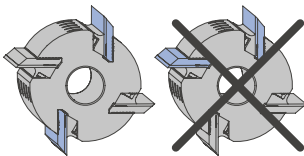
Steel tool body

HM 501 2 05

TD	SB	BO	for knife thickness	Z	n _{max}	ID
mm	mm	mm	mm		min ⁻¹	
135	100	40	8 - 10	4	9400	137035
135	150	40	8 - 10	4	9400	137036
145	60	50	8 - 10	6	9100	137037
145	100	50	8 - 10	6	9100	137038
150	60	50	8 - 10	4	8800	137039 ●
150	100	50	8 - 10	4	8800	137040 ●
150	150	50	8 - 10	4	8800	137041 ●
150	230	50	8 - 10	4	8800	137042 ●
150	60	50	8 - 10	6	8800	137043 ●
150	100	50	8 - 10	6	8800	137044 ●
150	150	50	8 - 10	6	8800	137045 ●
150	230	50	8 - 10	6	8800	137046 ●
165	60	50	8 - 10	8	8200	137047
165	100	50	8 - 10	8	8200	137048
170	60	50	8 - 10	8	8100	137049 ●
170	100	50	8 - 10	8	8100	137050
170	150	50	8 - 10	8	8100	137051 ●
190	60	50	5	12	7400	137052
190	60	50	5	14	7400	137053



Serrated back blank knives with high precision serration, serration angle 60°, pitch 1.6 mm.



Cutterhead without knives. Blanks in various dimensions and qualities see section Knives and Spare Parts.

Attention:

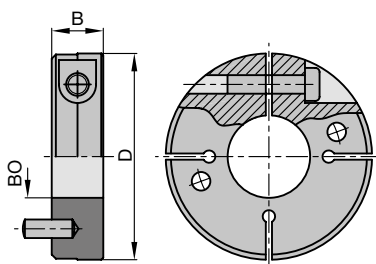
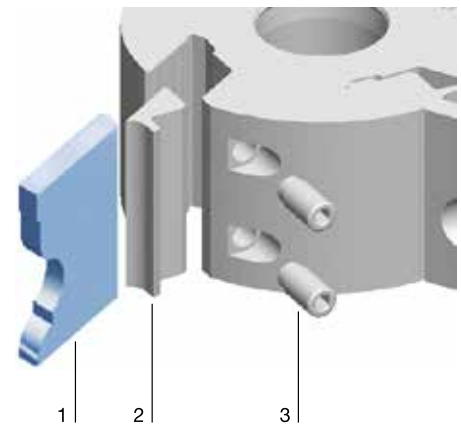
For safety reasons, always mount knives + backing plates (VE) of the same weight opposite to each other.

H	QAL	PT
mm		mm
50	MC	15
60	MC	20
70	MC	30
50	HW	10
60	HW	18
55		15
70		27

Table to determine maximum profile depth. The profile depth figures are to be regarded as standard values. The maximum profile depth depends on the tool diameter and cutting angle.

Spare parts:

Part-no.	BEZ	ABM mm	for SB mm	ID
2	Clamping wedge	38x25.3x10.8	40	620700 ●
2	Clamping wedge	58x25.3x10.8	60	620701 ●
2	Clamping wedge	78x25.3x10.8	80	620702 ●
2	Clamping wedge	98x25.3x10.8	100	620703 ●
2	Clamping wedge	128x25.3x10.8	130	620705 ●
2	Clamping wedge	148x25.3x10.8	150	620706 ●
2	Clamping wedge	168x25.3x10.8	170	620707 □
2	Clamping wedge	178x25.3x10.8	180	620708 □
2	Clamping wedge	228x25.43x11	230	620709 □
2	Clamping wedge	238x25.3x10.8	240	620710 □
3	Allen screw	M10x1x20		007396 ●
	Filler piece	40x30x8	40	005305 ●
	Filler piece	60x30x8	60	005306 ●
	Filler piece	80x30x8	80	005307 ●
	Filler piece	100x30x8	100	005308 ●
	Filler piece	130x30x8	130	005310 ●
	Filler piece	150x30x8	150	005311 ●
	Filler piece	170x30x8	170	620770 ●
	Filler piece	180x30x8	180	005312 ●
	Filler piece	230x30x8	230	005313 ●
	Filler piece	240x30x8	240	620771 ●
	Allen key	SW 5		117509 ●



Clamping collar without thread

Clamping collars without thread

TD 870 0

D	B	BO	ID
mm	mm	mm	
100	25	40	030700 ●
100	25	50	030702 ●



Profile cutterhead with HSK 85 WS for serrated back blank knives

Application:

For multi-purpose profiles in hard and/or materials likely to splinter.

Machine:

Four-sided moulders with HSK 85 WS interface.

Workpiece material:

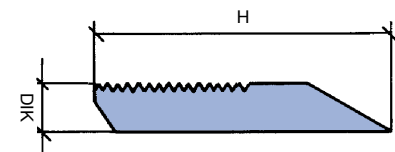
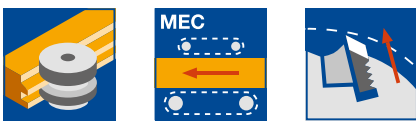
Cutting angle 20° for softwood and hardwood in general.

Cutting angle 12° for materials likely to splinter e.g. oak, Douglas fir, merbau and wood fibre materials, e.g. MDF.

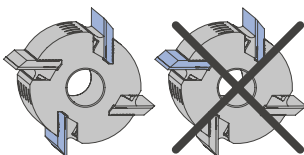
Technical information:

Profile cutterhead with back serration, 1.6 mm pitch, with integrated HSK.

Blanks with knife thickness 8 - 10 mm and knife heights of 40 - 70 mm can be used depending on the required profile depth. Cutting materials: Marathon (MC) and HW. Steel tool body. High balance quality by assembly with parts of the same weight.



Serrated back blank knives with high precision serration, serration angle 60°, pitch 1.6 mm.



Attention:

For safety reasons, always mount knives + backing plates (VE) of the same weight opposite to each other.

Cutting angle 20°

WP 510 2 02

TD mm	SB mm	A mm	Z	n_{max} min ⁻¹	ID LH / bottom	ID RH / top
90	40	26	2	12000	136200	136201
90	60	26	2	12000	136202 ●	136203 ●
90	80	26	2	12000	136204 ●	136205 ●
90	100	26	2	12000	136206 ●	136207 ●
90	130	26	2	12000	136208 ●	136209 ●
90	150	26	2	12000	136210	136211
* 90	170	26	2	12000	136212 ●	136213 ●
* 90	210	26	2	12000	136216	136217
* 90	240	26	2	12000	136218 ●	136219 ●
90	270	26	2	8000	136220	136221
90	40	26	4	12000	136224 ●	136225 ●
90	60	26	4	12000	136226 ●	136227 ●
90	80	26	4	12000	136228 ●	136229 ●
90	100	26	4	12000	136230 ●	136231 ●
90	130	26	4	12000	136232 ●	136233 ●
90	150	26	4	12000	136234	136235
* 90	170	26	4	12000	136236 ●	136237 ●
* 90	210	26	4	12000	136240	136241
* 90	240	26	4	12000	136242 ●	136243 ●
* 90	270	26	4	8000	136244	136245
115	80	26	6	10000	136198 ●	136199 ●
115	130	26	6	10000	136400 ●	136401 ●
115	170	26	6	10000	136402 ●	136403 ●
115	240	26	6	8000	136404 ●	136405 ●

* = Not for PKS blank knives H = 70 mm with $n = 12,000 \text{ min}^{-1}$

Cutterhead without knives. For blank knives in different dimensions and qualities, see section Knives and Spare Parts.

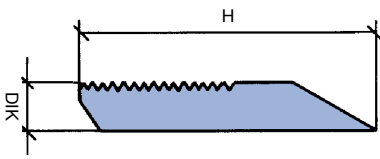
H mm	QAL	PT mm
50	MC	15
60	MC	20
70	MC	30
50	HW	10
60	HW	18
55		15
70		27

Table to determine maximum profile depth. The profile depth figures are to be regarded as standard values. The maximum profile depth depends on the tool diameter and cutting angle.

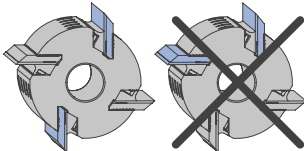
3. Planing and profiling

3.3 Profiling

3.3.3 Cutterheads for multi-purpose profiling



Serrated back blank knives with high precision serration, serration angle 60°, pitch 1.6 mm.



Attention:

For safety reasons, always mount knives + backing plates (VE) of the same weight opposite to each other.

Cutting angle 12°

WP 510 2 02

TD mm	SB mm	A mm	Z	n _{max} min ⁻¹	ID LH / bottom	ID RH / top
90	40	26	2	12000	136248 ●	136249 ●
90	60	26	2	12000	136250 ●	136251 ●
90	80	26	2	12000	136252	136253
90	100	26	2	12000	136254 ●	136255 ●
90	130	26	2	12000	136256 ●	136257 ●
90	150	26	2	12000	136258	136259
* 90	170	26	2	12000	136260	136261
* 90	210	26	2	12000	136264	136265
* 90	240	26	2	12000	136266	136267
90	40	26	4	12000	136270 ●	136271 ●
90	60	26	4	12000	136272 ●	136273 ●
90	80	26	4	12000	136274 ●	136275 ●
90	100	26	4	12000	136276 ●	136277 ●
90	130	26	4	12000	136278	136279
90	150	26	4	12000	136280	136281
* 90	170	26	4	12000	136282	136283
115	80	26	6	10000	136192	136193
115	130	26	6	10000	136194	136195
115	170	26	6	10000	136196	136197

* = Not for PKS blank knives H = 70 mm with n = 12,000 min⁻¹

Cutterhead without knives. For blank knives in different dimensions and qualities, see section Knives and Spare Parts.

H mm	QAL	PT mm
50	MC	15
60	MC	20
70	MC	30
50	HW	10
60	HW	18
55		15
70		27

Table to determine maximum profile depth. The profile depth figures are to be regarded as standard values. The maximum profile depth depends on the tool diameter and cutting angle.

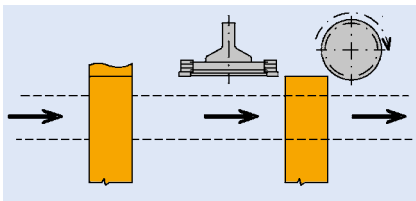
Spare parts:

BEZ	for knife thickness mm	for SB mm	ID
Clamping wedge	8/10	40	620816 ●
Clamping wedge	8/10	60	620817 ●
Clamping wedge	8/10	80	620818 ●
Clamping wedge	8/10	100	620819 ●
Clamping wedge	8/10	130	620820 ●
Clamping wedge	8/10	150	620821 ●
Clamping wedge	8/10	170	620822 ●
Clamping wedge	8/10	190	620823 ●
Clamping wedge	8/10	210	620824 ●
Clamping wedge	8/10	240	620825 ●
Clamping wedge	8/10	270	620826 ●
Clamping wedge	8/10	310	620827 ●
Allen screw			007396 ●
Filler piece		40	005305 ●
Filler piece		60	005306 ●
Filler piece		80	005307 ●
Filler piece		100	005308 ●
Filler piece		130	005310 ●
Filler piece		150	005311 ●
Filler piece		170	620770 ●
Filler piece		190	620772 ●
Filler piece		210	620773 ●
Filler piece		240	620771 ●
Filler piece		270	620774 ●
Filler piece		310	620775 ●
Dust protection cover			008244 ●
Allen key			117509 ●

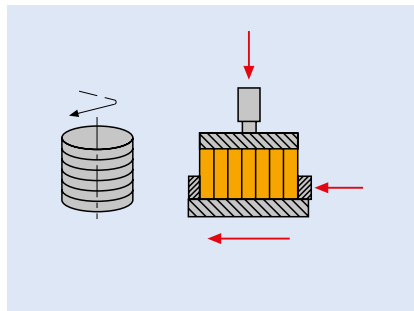
3. Planing and profiling

3.4 Finger jointing

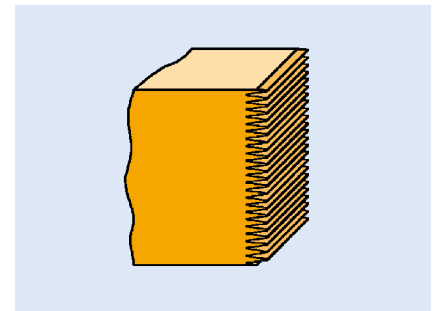
Process step	Cutting high-strength finger joint profiles for longitudinal jointing of workpieces. The finger profiles meet the requirements of the testing institutes.
Machines	Single and double side finger jointing machines with and without cut-off saw or scoring saws, double-end tenoners, compact finger joint lines, cross profile and standard machines.
Tools	For finger joint machines without cut-off saw: Use minifinger tools with the following finger lengths: 10/10, 15/15 or 20/20 mm. For finger joint machines with cut-off saw: Use minifinger tools with the following finger lengths: 10/11, 15/16.5 or 20/22 mm.



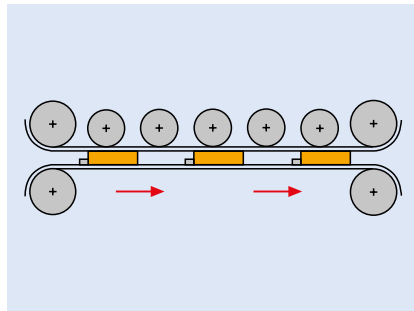
Minifinger jointing machine with cut-off.



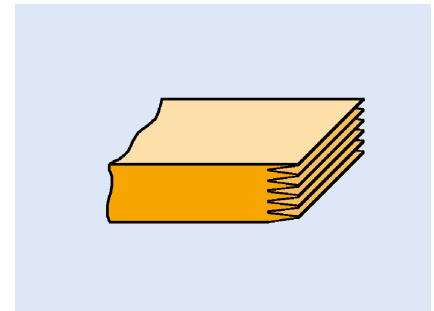
Vertical finger jointing machine/stack machine.



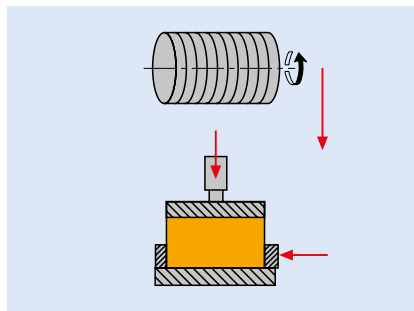
Vertical finger jointing.



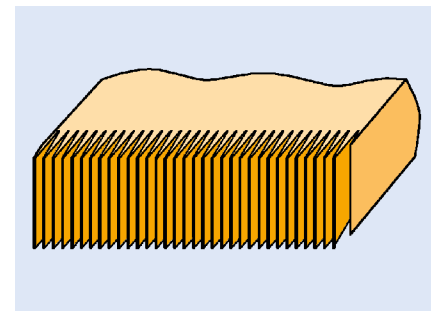
Horizontal finger jointing line.



Horizontal finger jointing.



Compact finger jointing line.



Compact finger jointing.
Vertical finger jointing with horizontal spindle.

Feed rate	Depending on the spindle RPM, no. of wings, workpiece material and condition of the minifinger tooling cutting edges.
------------------	---

Workpiece materials	Coniferous wood and hardwood, softwood and hardwood, Exotic wood, glulam (limited).
----------------------------	---

Recommended cutting material

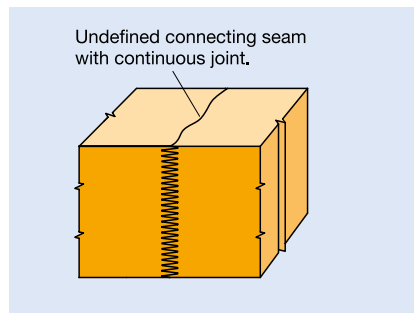
	HS	Marathon (MC)	HW
Coniferous wood soft	◆	◆	◇
Coniferous wood hard		◆	◆
Deciduous wood soft		◆	◆
Deciduous wood hard		◇	◆
Exotic wood		◇	◆
Glulam			◇

◆ suitable ◇ partly suitable

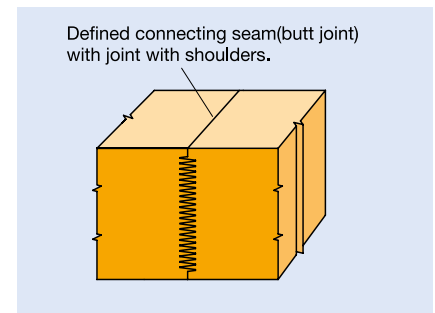
Joint types

Shoulder variations

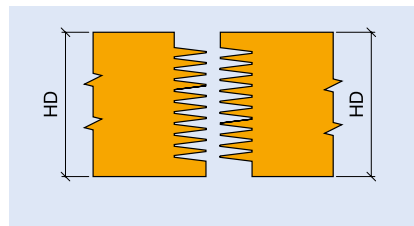
Strips with continuous joint present an irregular glue line on the side of the profile. To give a straight line (seam), the fingers are profiled with shoulder cutters. The number of fingers is determined by the wood thickness and the shoulder width.



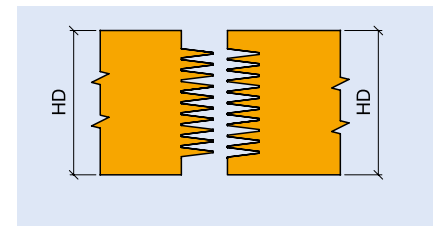
Continuous joint.



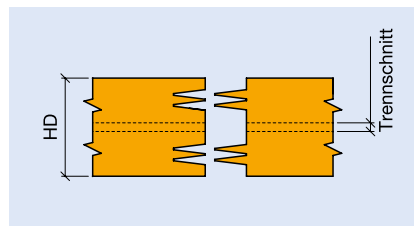
Joint with shoulders.



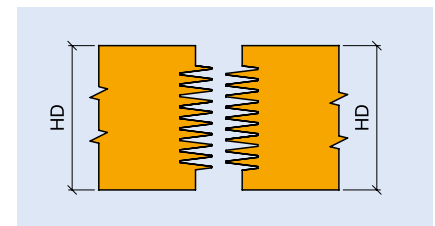
Profile 2: Staggered shoulders.



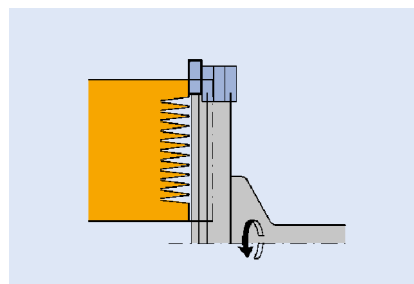
Profile 3: Level shoulders.



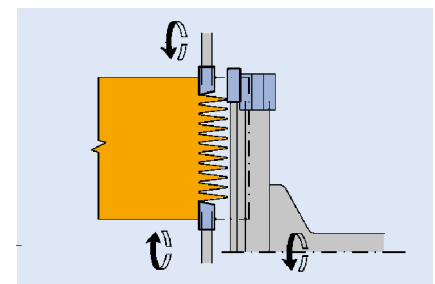
Profile 4: Shoulders for splitting.



Profile 5: Shoulder centralised.



Hogger for trimming minifingers.



Hogger and scoring saw for trimming minifingers and scoring the butt joint.

The requirements for finger joints are defined in the standards DIN 68140 and EN 385 and EN 387.

Load group I (load-bearing components):

Multi-purpose finger joints for laminated panels BSH.

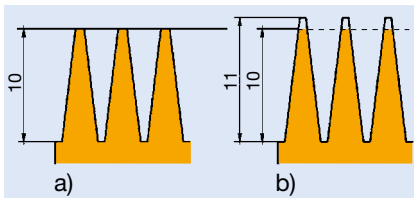
The components should be calculated according to DIN 1052. $v \leq 0.18$.

Load group II:

Multi-purpose finger joints for construction timber (KVH).

Finger joints with shoulders also fall into this group. $v \leq 0.25$.

Finger profiles



Minifinger profile

a – without cut-off, b – with cut-off

Finger length l mm	Finger pitch t mm	Width of finger tip b mm	Weakening degree v	Relative tip play s mm
10	3,8	0,60	0,16	0,30 – 0,50
15	3,8	0,42	0,11	0,45 – 0,75
20	5,0	0,50	0,10	0,60 – 1,00
20	6,2	1,00	0,16	0,60 – 1,00
30	6,2	0,60	0,10	0,90 – 1,50
50	12,0	2,00	0,17	1,50 – 2,50

Finger length 4 mm

Finger pitch 1.6 mm

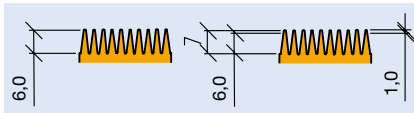
Production of mouldings, glued panels in furniture, mitre joints for windows/doors, picture frames.

Finger length 6/7 mm

Finger pitch 2.8 mm

Wood finishing and residual wood for precise construction parts e.g. special window blanks, frieze strips, glued wood panels in furniture.

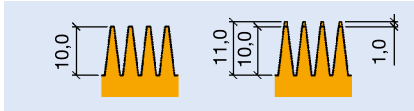
Reduced finger length to save wood. Tightly sealed finger profile feasible through the length determination of the fingers.



Finger length 10 mm

Finger pitch 3.8 mm

Wood finishing and wood residue recycling, lamellas for window blanks and glued panels in furniture. Finger length 10 mm to DIN 68140 (EN 385 and EN 387) for finger joints in coniferous wood for load bearing components. Finger joints present a visible tip play (S) after pressing.

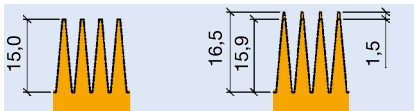


Finger length 15 mm

Finger pitch 3.8 mm

Wood finishing for BSH (laminated wood) and KVH (construction timber).

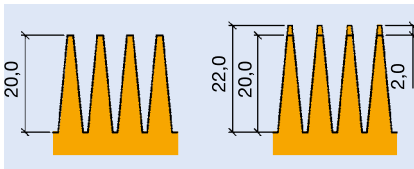
Finger joints in coniferous wood for high strength, load bearing components to DIN 68140 (EN 385 and EN 387), e.g. lamellas for laminated wood. These finger joints present a visible tip play (S) after pressing.



Finger length 20 mm

Finger pitch 6.2 mm

Wood finishing for laminated wood, mainly for construction timber, duo, trio and cross beams to DIN 68140, (EN 385 and EN 387) for finger joints in coniferous wood for high strength, load bearing components, e.g. lamellas for laminated wood. These finger joint present a visible tip play (S) after pressing. Because of the greater pitch the finger seam is more visible and stability lower.

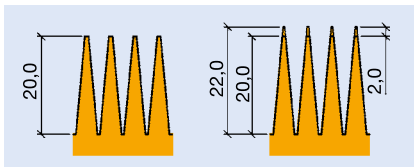


Finger length 20 mm

Finger pitch 5.0 mm

Wood finishing for laminated wood and KVH construction timber to DIN 68140 (EN 385 and 387) for finger joints in coniferous wood for high strength, load bearing components, e.g. lamellas for laminated wood, KVH, formwork beams. These finger joints show a visible gap after pressing.

Finger profile with higher stability than the fingers with 6.2 mm pitch. Advantage compared to ZL 15 mm: Because of greater pitch, the wood finger is more stable and easier to join together.



Enquiry - Checklist for minifinger tools

Customer details: Customer number

Enquiry
 Order

Delivery date: (not binding) KW

Company: _____

Street: _____

Date: _____

Post code/place: _____

Enquiry/order no.: _____

Country: _____

Tool Id: (if known) _____

Phone/fax: _____

No. of pieces: _____

Contact person: _____

Signature: _____

Application:

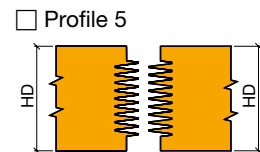
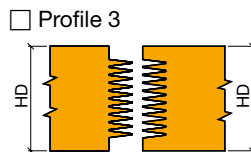
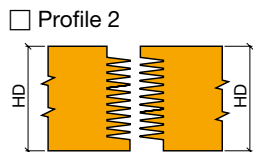
- Vertical finger jointing
- Horizontal finger jointing
- Load bearing components
- Not load bearing components

Workpiece material:

Profile: _____
 Wood thickness (mm): _____
 Finger length (mm): _____
 Finger pitch: _____

- With basic clearance
- Tightly fitting profile (only for not load bearing components)
- Continuous joint

With shoulder cutters



Machine:

Producer: _____
 Type: _____

- One sided machine
- Horizontal spindle
- Continuous machine
- Machine cutting in stacks
- Table width (mm): _____
- Feed speed
- Double sided machine
- Vertical spindle
- _____ parts/min
- _____ tables/min
- _____ mm
- _____ m/min

Tool:

	Cutter spindle	Cut-off device <input type="checkbox"/>	Scorer on top <input type="checkbox"/>	Scorer on bottom <input type="checkbox"/>
RPM (min ⁻¹):	_____	_____	_____	_____
Power (KW):	_____	_____	_____	_____
Tool diam.(mm):	_____	_____	_____	_____
Spindle diam.:	_____	_____	_____	_____
Spindle length (mm):	_____	_____	_____	_____
Hydro clamping:	<input type="checkbox"/>			
Mounted on sleeve:	<input type="checkbox"/>			
Flange diameter:	_____	_____	_____	_____
Number of teeth:	_____	_____	_____	_____

Adhesive:

Producer: _____
 Type: _____

- Water-bases adhesive
- PU with fibre
- PU pure

3. Planing and profiling

3.4 Finger jointing 3.4.1 Minifinger joint cutters

WF 620 2/WF 620 2 06
Minifinger joint cutter



Minifinger joint cutters with straight cut, straight back relief, staggered profile teeth, secured against twisting by design of tool body. Solid and robust cutter design with individually embedded tips.

Table for allowed RPM $n = \text{min}^{-1}$ in relation to finger length ZL and diameter D. Zero-diameter D_0 in relation to finger length for adjustment of the machine spindles.

ZL mm	D mm	D_0 mm	$n_{\text{max.}}$ min^{-1}
10	160	140	9,000
6	160	148	9,000
15	170	140	8,500
20	180	140	8,000
10	250	230	6,200
15	260	230	6,000
20	260	220	6,000

Application

For self-locking longitudinal joints for all kinds "in load bearing" components and window blanks with continuous finger joint.

Cutting material

HS, Marathon (MC) and HW.

Resharpener area

12 mm.

Feed rate

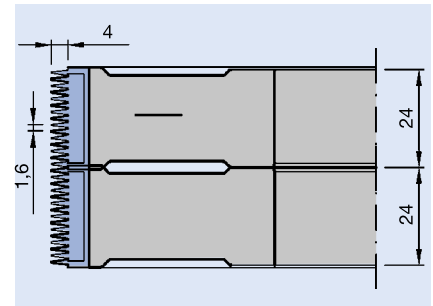
Depending on RPM up to 24 m min^{-1} .

Minifinger joint cutter pitch 1.6 mm

Standard cutting width
Minifinger joint cutter WF 620 2
Finger length = 4 mm
D = 160 mm
Finger pitch 1.6 mm

Table to determine the number of cutters for a given wood thickness and cutting width.

SB	25.0 mm
Hub	24.0 mm
No. of fingers	Wing row ZA 15
Wood thickness	No. of cutters
23	1
47	2
71	3
95	4
119	5



3. Planing and profiling

3.4 Finger jointing 3.4.1 Minifinger joint cutters

Minifinger joint cutter

WF 620 2/WF 620 06

Standard minifinger joint cutter

Finger length 10 mm and 15 mm

D = 160/250 mm 170/260 mm

Finger pitch = 3.8 mm

Minifinger joint cutter

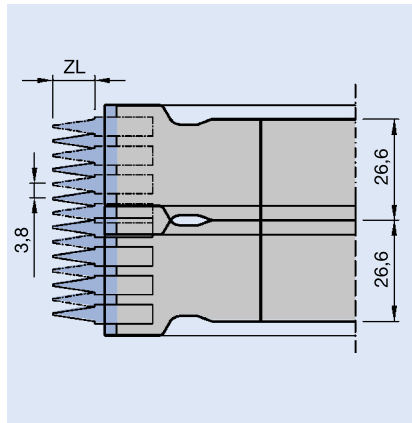
WF 620 2/WF 620 06

Standard minifinger joint cutter

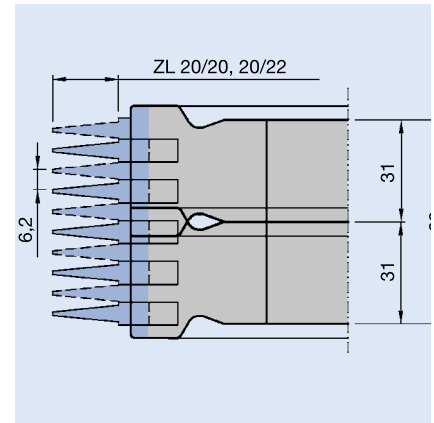
Finger length 20 mm

D = 180/260 mm

Finger pitch = 6.2 mm



Minifinger joint cutter pitch 3.8 mm, finger length 10 or 15 mm.



Minifinger joint cutter pitch 6.2 mm.

Minifinger joint cutter with pitch of 3.8 mm

SB	28.6 mm
Hub	26.6 mm
ZA	Tooth row ZA 7
Wood thickness	Number of cutters
24	1
51	2
77	3
104	4
131	5
157	6
184	7
210	8
237	9
264	10
290	11
317	12

Minifinger joint cutter with pitch of 6.2 mm

SB	33.0 mm
Hub	31.0 mm
ZA	Tooth row ZA 5
Wood thickness	Number of cutters
28	1
59	2
90	3
121	4
152	5
183	6
214	7
245	8
278	9
397	10
338	11



Minifinger joint cutter, HS

Application:

For self-locking longitudinal joints. See section introduction for additional information.

Machine:

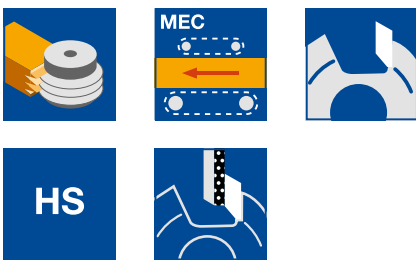
Finger joint machines with/without cut-off saw, continuous machines.

Workpiece material:

Softwood, across grain; limited suitability for hardwood.

Technical information:

Reduced risk of breakage from individually brazed finger cutting edges. Design with enlarged tip gap suitable for PU adhesives and for finger joint machines without cut-off saw and horizontal working spindle. Cutting material HS. Resharpener area 12 mm.



ZL 4 mm, TG 1.6 mm

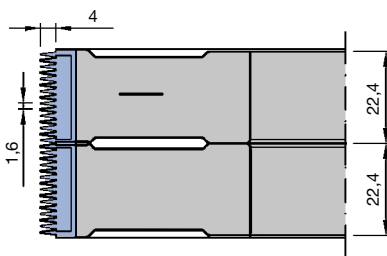
WF 620 2

D	SB	ND	BO	Z	ZA	QAL	ZL	ID
mm	mm	mm	mm		PCS		mm	
160	25	22.4	50	2/2	15	HS	4	021543 ●

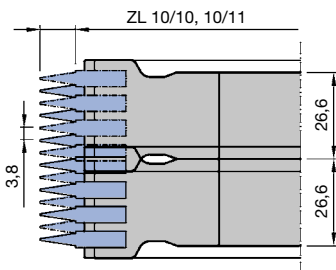
ZL 10 mm, TG 3.8 mm

WF 620 2

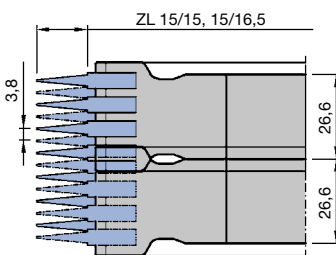
D	SB	ND	BO	Z	ZA	QAL	ID	ID
mm	mm	mm	mm		PCS		ZL	ZL
							10/10	10/11
160	28.6	26.6	50	2/2	7	HS	021685 ●	021689 ●
160	28.6	26.6	50	3/3	7	HS	120313 □	021692 ●
250	28.6	26.6	50	3/3	7	HS	021688 □	021693 ●
250	28.6	26.6	50	4/4	7	HS	120316 □	120318 □



Minifinger joint cutter ZL 4 mm, TG 1.6 mm



Minifinger joint cutter ZL 10 mm, TG 3.8 mm



Minifinger joint cutter ZL 15 mm, TG 3.8 mm

ZL 15 mm, TG 3.8 mm

WF 620 2

D	SB	ND	BO	Z	ZA	QAL	ID	ID
mm	mm	mm	mm		PCS		ZL	ZL
							15/15	15/16.5
170	28.6	26.6	50	2/2	7	HS	021694 ●	021696 ●
260	28.6	26.6	50	3/3	7	HS	021695 □	021697 ●
260	28.6	26.6	80	4/4	7	HS	120420	120422

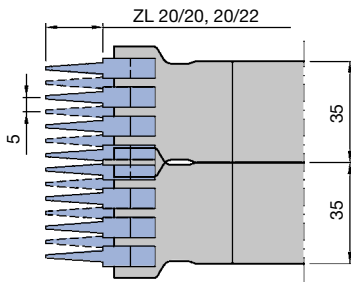
ZL 15 mm, TG 3.8 mm, for application with PU glue

WF 620 2

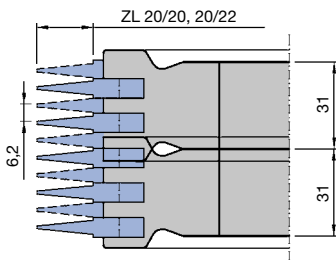
D	SB	ND	BO	Z	ZA	QAL	ID	ID
mm	mm	mm	mm		PCS		ZL	ZL
							15/15	15/16.5
170	28.6	26.6	50	2/2	7	HS	120412 ●	120414 □
260	28.6	26.6	50	3/3	7	HS	120413 □	120415 □
260	28.6	26.6	80	4/4	7	HS	120421	120423

3. Planing and profiling

3.4 Finger jointing 3.4.1 Minifinger joint cutters



Minifinger joint cutter ZL 20 mm,
TG 5.0 mm



Minifinger joint cutter ZL 20 mm,
TG 6.2 mm

ZL 20 mm, TG 5.0 mm

WF 620 2

D	SB	ND	BO	Z	ZA	QAL	ID	ID
mm	mm	mm	mm		PCS		ZL	ZL
180	37	35	50	2/2	7	HS	20/20	20/22
							021729 ●	021730 □

ZL 20 mm, TG 6.2 mm

WF 620 2

D	SB	ND	BO	Z	ZA	QAL	ID	ID
mm	mm	mm	mm		PCS		ZL	ZL
180	33	31	50	2/2	5	HS	20/20	20/22
260	33	31	50	3/3	5	HS	021668 ●	021669 ●
260	33	31	80	4/4	5	HS	021674 □	021670 □
							120525	120527

ZL 20 mm, TG 6.2 mm, for application with PU glue

WF 620 2

D	SB	ND	BO	Z	ZA	QAL	ID	ID
mm	mm	mm	mm		PCS		ZL	ZL
180	33	31	50	2/2	5	HS	20/20	20/22
260	33	31	50	3/3	5	HS	120515 ●	120516 ●
260	33	31	80	4/4	5	HS	120510 □	120511 □
							120524	120526

3. Planing and profiling

3.4 Finger jointing 3.4.1 Minifinger joint cutters



Minifinger joint cutter, Marathon

Application:

For self-locking longitudinal joints. See section introduction for additional information.

Machine:

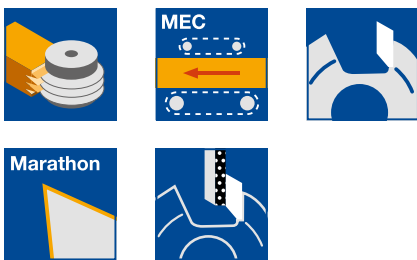
Finger joint machines with/without cut-off saw, continuous machines.

Workpiece material:

Softwood, across grain; also suitable for hardwood.

Technical information:

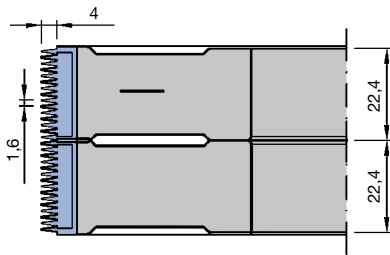
Reduced risk of breakage from individually brazed finger cutting edges. Design with enlarged tip gap suitable for PU adhesives and for finger joint machines without cut-off saws and horizontal working spindle. Marathon coating allows up to 4 times longer tool life compared to HS version. Resharpener area 12 mm (or 6 mm for ID **123005** and 8 mm for ID **123102**).



ZL 4/5 mm, TG 1.6 mm

WF 620 2 06

D	SB	ND	BO	Z	ZA	QAL	ZL	ID
mm	mm	mm	mm		PCS		mm	
160	25	22.4	50	2/2	15	MC	4/5	123003
250	25	22.4	50	3/3	15	MC	4/5	123004
250	25	22.4	50	6/6	15	MC	4/5	123005 ●

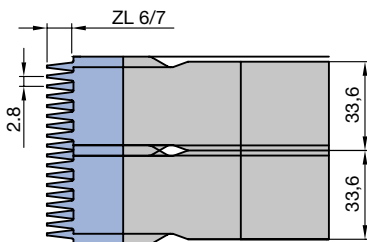


Minifinger joint cutter ZL 4 mm, TG 1.6 mm

ZL 6/7 mm, TG 2.8 mm

WF 620 2 06

D	SB	ND	BO	Z	ZA	QAL	ZL	ID
mm	mm	mm	mm		PCS		mm	
160	34	33.6	50	3/3	12	MC	6/7	123100 ●
250	34	33.6	50	4/4	12	MC	6/7	123101 ●
250	34	33.6	50	6/6	12	MC	6/7	123102 ●

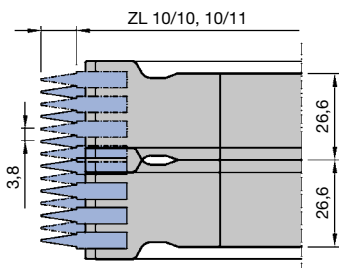


Minifinger joint cutter ZL 6/7 mm, TG 2.8 mm

ZL 10 mm, TG 3.8 mm

WF 620 2 06

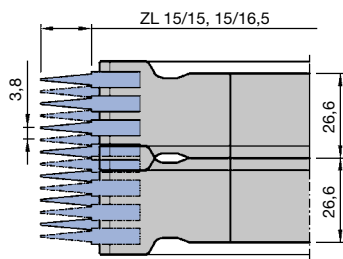
D	SB	ND	BO	Z	ZA	QAL	ID	ID
mm	mm	mm	mm		PCS		ZL	ZL
							10/10	10/11
160	28.6	26.6	50	2/2	7	MC	120608 ●	120612 ●
160	28.6	26.6	50	3/3	7	MC	120616 □	120617 □
250	28.6	26.6	50	3/3	7	MC	120609 □	120613 ●
250	28.6	26.6	50	4/4	7	MC	120620 □	120622 □



Minifinger joint cutter ZL 10 mm, TG 3.8 mm

3. Planing and profiling

3.4 Finger jointing 3.4.1 Minifinger joint cutters



Minifinger joint cutter ZL 15 mm,
TG 3.8 mm

ZL 15 mm, TG 3.8 mm

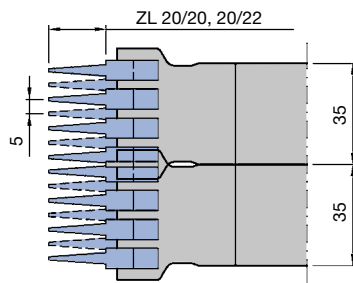
WF 620 2 06

D mm	SB mm	ND mm	BO mm	Z	ZA PCS	QAL	ID ZL	ID ZL
170	28.6	26.6	50	2/2	7	MC	15/15	15/16.5
260	28.6	26.6	50	3/3	7	MC	120710	120713 ● 120714 ●
260	28.6	26.6	80	4/4	7	MC	120721	120723

ZL 15 mm, TG 3.8 mm, for application with PU glue

WF 620 2 06

D mm	SB mm	ND mm	BO mm	Z	ZA PCS	QAL	ID ZL	ID ZL
170	28.6	26.6	50	2/2	7	MC	15/15	15/16.5
260	28.6	26.6	50	3/3	7	MC	120711 ●	120715 □
260	28.6	26.6	80	4/4	7	MC	120712 □	120716 □
260	28.6	26.6	80	4/4	7	MC	120722	120724



Minifinger joint cutter ZL 20 mm,
TG 5.0 mm

ZL 20 mm, TG 5.0 mm

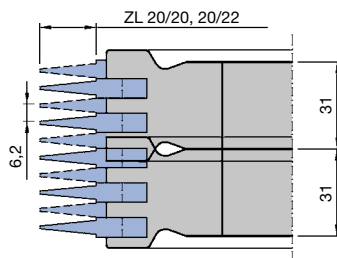
WF 620 2 06

D mm	SB mm	ND mm	BO mm	Z	ZA PCS	QAL	ID ZL	ID ZL
180	37	35	50	2/2	7	MC	20/20	20/22
260	37	35	50	3/3	7	MC	120818 □	120820 □
260	37	35	80	4/4	7	MC	120819 □	120821 □

ZL 20 mm, TG 6.2 mm

WF 620 2 06

D mm	SB mm	ND mm	BO mm	Z	ZA PCS	QAL	ID ZL	ID ZL
180	33	31	50	2/2	5	MC	20/20	20/22
260	33	31	50	3/3	5	MC	120810 ●	120814 □
260	33	31	80	4/4	5	MC	120811 □	120815 □
260	33	31	80	4/4	5	MC	120834	120836



Minifinger joint cutter ZL 20 mm,
TG 6.2 mm

ZL 20 mm, TG 6.2 mm, for application with PU glue

WF 620 2 06

D mm	SB mm	ND mm	BO mm	Z	ZA PCS	QAL	ID ZL	ID ZL
180	33	31	50	2/2	5	MC	20/20	20/22
260	33	31	50	3/3	5	MC	120812 ●	120816 □
260	33	31	80	4/4	5	MC	120813 □	120817 □
260	33	31	80	4/4	5	MC	120835	120837



Minifinger joint cutter, HW

Application:

For self-locking longitudinal joints. See section introduction for additional information.

Machine:

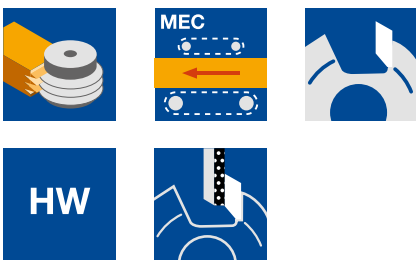
Finger joint machines with/without cut-off saws, continuous machines.

Workpiece material:

Hardwood, across grain.

Technical information:

Reduced risk of breakage from individually brazed finger cutting edges. Cutting material HW. Resharpener area 12 mm.



ZL 10 mm, TG 3.8 mm

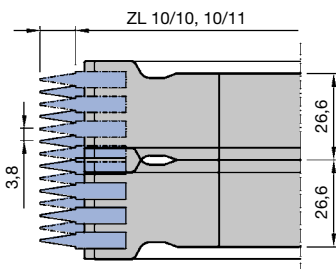
WF 620 2

D mm	SB mm	BO mm	Z	ZA PCS	QAL	n _{max} min ⁻¹	ID ZL	ID ZL
160	28.6	50	2/2	7	HW	8000	10/10	10/11
160	28.6	50	3/3	7	HW	8000	021600 ●	021601 ●
250	28.6	50	3/3	7	HW	6000	021604 □	021603 ●
							021605 □	021602 ●

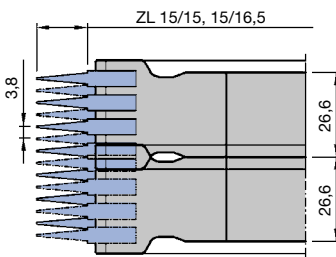
ZL 15 mm, TG 3.8 mm

WF 620 2

D mm	SB mm	BO mm	Z	ZA PCS	QAL	n _{max} min ⁻¹	ID ZL	ID ZL
170	28.6	50	2/2	7	HW	8000	15/15	15/16.5
260	28.6	50	3/3	7	HW	6000	021644 ●	021645 ●
							021652	021648



Minifinger joint cutter ZL 10 mm, TG 3.8 mm



Minifinger joint cutter ZL 15 mm, TG 3.8 mm

Table to determine the number of cutters for a given wood thickness.

Finger length 10 and 15 mm;

D = 160/250 mm and 170/260 mm

Finger pitch = 3.8 mm

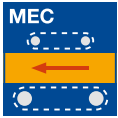
SB	28.6 mm
Hub	26.6 mm
ZA	Tooth row ZA 7
Wood thickness	Quantity cutter
24	1
51	2
77	3
104	4
131	5
157	6
184	7
210	8
237	9
264	10
290	11
317	12

3. Planing and profiling

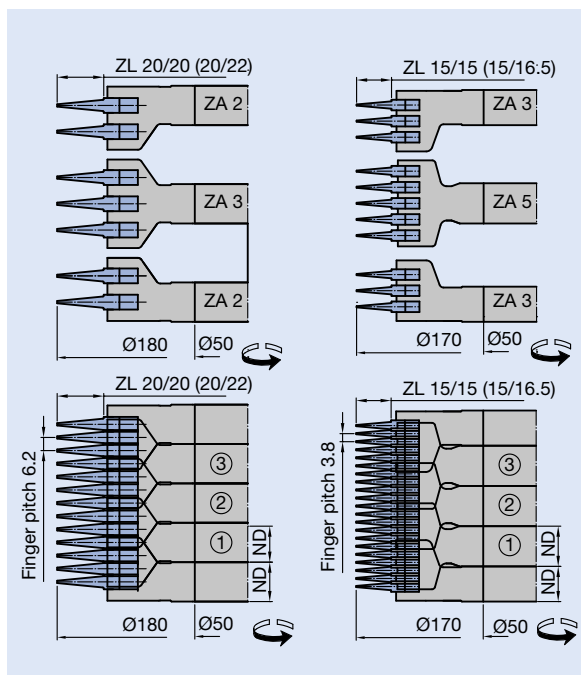
3.4 Finger jointing

3.4.2 High performance minifinger cutters

High performance minifinger joint cutters, real Z 4



Application	For self-locking finger joints for supporting and load bearing components on high performance finger joint machines.
Machines	High performance finger joint machines with/without cut-off saw.
Workpiece material	Solid woods across grain.
Number of wings	Real Z 4.
Cutting material	HS and Marathon (MC).
Tool design	Solid steel tool body design with individually brazed finger knives. Higher number of wings for higher feed speeds and improved joint cut quality.
Feed	MEC.
Resharpener area	12 mm.
Particular benefit	A tool set, comprising of basic, top and bottom cutters for the required working width/height. The spiral knife arrangement reduces the power consumption and noise.



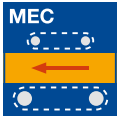
Minifinger joint cutter combinations with the finger lengths 10, 15 and 20 mm.

3. Planing and profiling

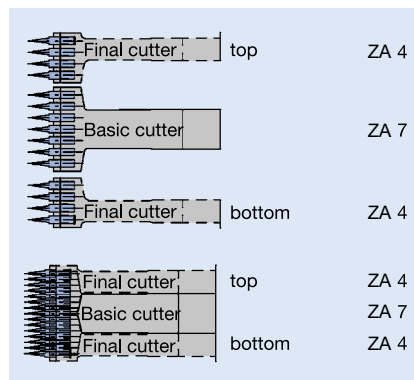
3.4 Finger jointing

3.4.2 High performance minifinger cutters

High performance minifinger joint cutters, real Z 6



Application	For self-locking finger joints for supporting and load bearing components for high performance finger joint machines.
Machines	High performance finger joint machines with/without cut-off saw.
Workpiece material	Solid woods across grain.
Number of wings	Real Z 6, for ZL 10 mm D = 250.
Cutting material	HS and Marathon (MC).
Tool design	Solid steel tool body with individually brazed finger knives. High number of wings for higher feed speeds and improved joint cut quality.
RPM	$n_{\max} = 6,000 \text{ min}^{-1}$.
Feed	MEC.
Resharpener area	12 mm.
Particular benefit	A tool set, comprising basic, top and bottom cutters for the required working width/height. The spiral knife arrangement reduces the power consumption and noise.



Combination for high performance minifinger joint cutter set Z 6.

Table to determining the number of minifinger joint cutters with finger pitch of 3.8 mm.

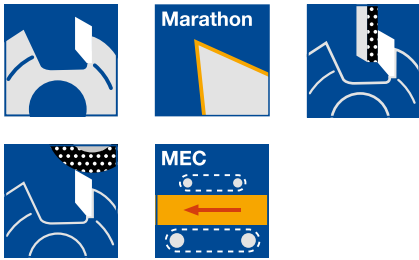
Finger length 10 and 15 mm Real Z6		TG 3.8 mm		
		Basic cutter	Final cutter top	Final cutter bottom
Tooth row	ZA	7	4	4
Hub thickness	ND	26.6 mm	19 mm	19 mm
Wood thickness	Clamping height	Number of cutters	Number of cutters	Number of cutters
HD	KLH			
27	38	0	1	1
53	64.6	1	1	1
80	91.2	2	1	1
106	117.8	3	1	1
133	144.4	4	1	1
160	171	5	1	1
186	197.6	6	1	1
213	224.2	7	1	1
239	250.8	8	1	1
266	277.4	9	1	1
293	304	10	1	1

3. Planing and profiling

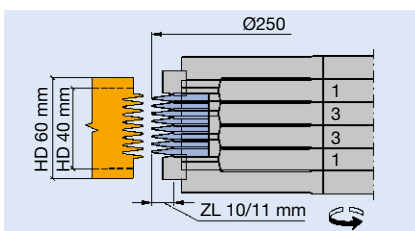
3.4 Finger jointing

3.4.2 High performance minifinger cutters

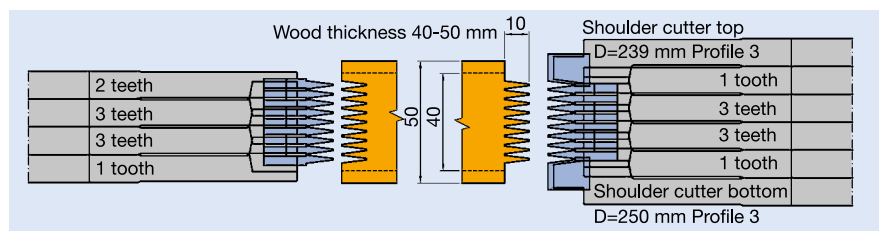
High performance minifinger joint cutters, real Z 6



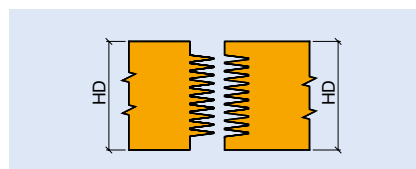
Application	For self-locking finger joints for load bearing components with shoulder cuts for high performance finger joint machines.
Machines	High performance finger joint machines with cut-off saw.
Workpiece material	Solid woods across grain.
Number of wings	Real Z 6 for D = 260 mm.
Cutting material	HS and Marathon (MC).
Tool design	Solid steel tool body with individually brazed finger cutters. High number of wings for higher feed speeds and improved joint cut quality.
RPM	$n_{\max} = 6,000 \text{ min}^{-1}$.
Feed	MEC.
Resharpener area	12 mm.
Particular benefit	A tool set, comprising of basic, top and bottom shoulder cutters and shoulder cut for the required working width/height. The spiral arranged wings reduces the power consumption and noise.



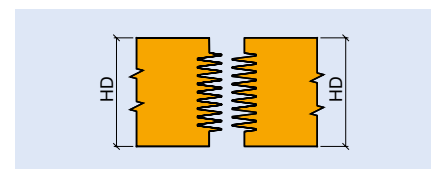
Minifinger joint cutter set real Z 6. Shoulder cutters central, profile 5.



Minifinger joint cutter set real Z 6, shoulder cutters in gap.



Profile 3

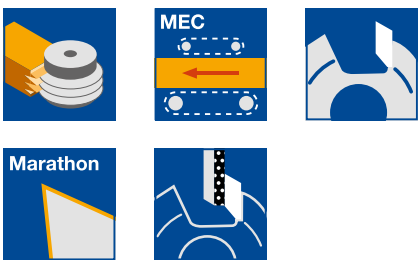


Profile 5

3. Planing and profiling

3.4 Finger jointing

3.4.2 High performance minifinger cutters



Minifinger joint cutter, Marathon, real Z 4

Application:

For self-locking longitudinal joints. See section introduction for additional information.

Machine:

High performance finger joint machines with/without cut-off saws.

Workpiece material:

Softwood, across grain; also suitable for hardwood.

Technical information:

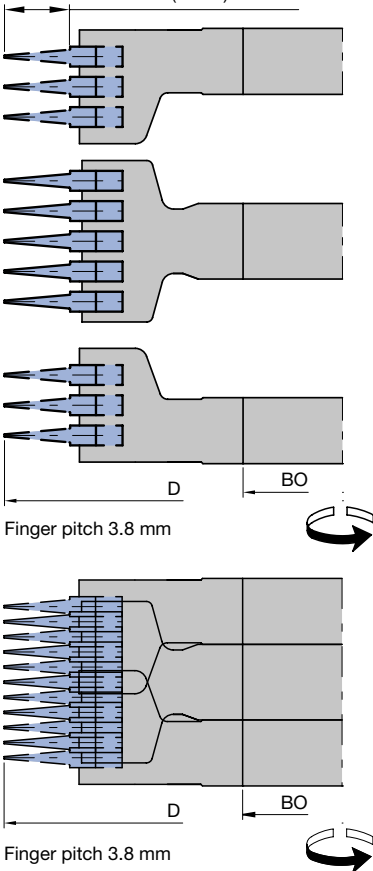
High number of teeth tool design, top and bottom final cutters required. Assembly of tool set: see section introduction. Version with enlarged tip gap suitable for PU adhesives and for finger joint machines without cut-off saws for horizontal spindle. Marathon coating allows up to 4 times longer tool life compared to HS version. Resharpener area 12 mm.

ZL 15 mm, TG 3.8 mm

WF 620 2 06, WF 623 2 06

Tool Type	D mm	SB mm	ND mm	BO mm	Z	ZA PCS	QAL	ID ZL 15/15	ID ZL 15/16.5
Top final cutter	170	20.2	16.6	50	4	3	MC	121700 □	121704 □
Basic cutter	170	35.4	19.0	50	4	5	MC	120705 □	120707 □
Bottom final cutter	170	20.2	16.6	50	4	3	MC	121701 □	121705 □

ZL 15/15 (15/16,5)
ZL 10/10 (10/11)



ZL 15 mm, TG 3.8 mm, for application with PU glue

WF 620 2 06, WF 623 2 06

Tool Type	D mm	SB mm	ND mm	BO mm	Z	ZA PCS	QAL	ID ZL 15/15	ID ZL 15/16.5
Top final cutter	170	20.2	16.6	50	4	3	MC	121702 ●	121706 □
Basic cutter	170	35.4	19.0	50	4	5	MC	120706 ●	120708 □
Bottom final cutter	170	20.2	16.6	50	4	3	MC	121703 ●	121707 □
Top final cutter	200	20.2	16.6	60	4	3	MC	121708	121710
Basic cutter	200	35.4	19	60	4	5	MC	120725	120726
Bottom final cutter	200	20.2	16.6	60	4	3	MC	121709	121711

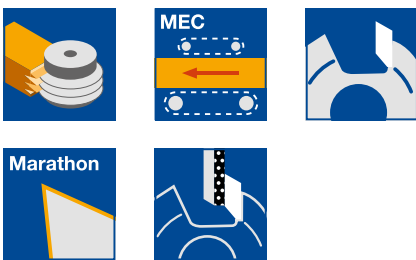
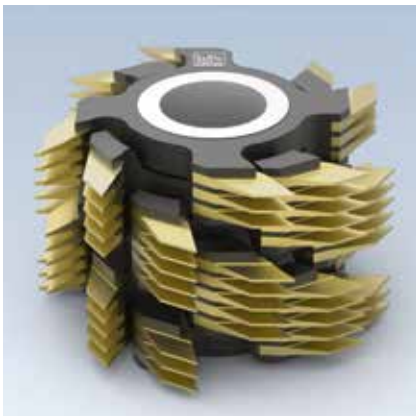
Finger length 10 and 15 mm

TG: 3,8 mm

Real Z4

		Basic cutter	Final cutter top	Final cutter bottom
ZA		5	3	3
ND		19	16,6	16,6
HD	KLH	Cutter quantity	Cutter quantity	Cutter quantity
19	33,2	0	1	1
38	52,2	1	1	1
57	71,2	2	1	1
76	90,2	3	1	1
95	109,2	4	1	1
114	128,2	5	1	1
133	147,2	6	1	1
152	166,2	7	1	1
171	185,2	8	1	1
190	204,2	9	1	1
209	223,2	10	1	1
228	242,2	11	1	1
247	261,2	12	1	1
266	280,2	13	1	1
285	299,2	14	1	1
304	318,2	15	1	1
323	337,2	16	1	1

HD = wood thickness
KLH = clamping height



Minifinger joint cutter, Marathon, real Z 4

Application:

For self-locking longitudinal joints. See section introduction for additional information.

Machine:

High performance finger joint machines with/without cut-off saws.

Workpiece material:

Softwood, across grain; also suitable for hardwood.

Technical information:

High number of teeth tool design, top and bottom final cutters required. Assembly of tool set: see section introduction. Version with enlarged tip gap suitable for PU adhesives and for finger joint machines without cut-off saws for horizontal spindle. Marathon coating allows up to 4 times longer tool life compared to HS version. Resharpener area 12 mm.

ZL 20 mm, TG 6.2 mm

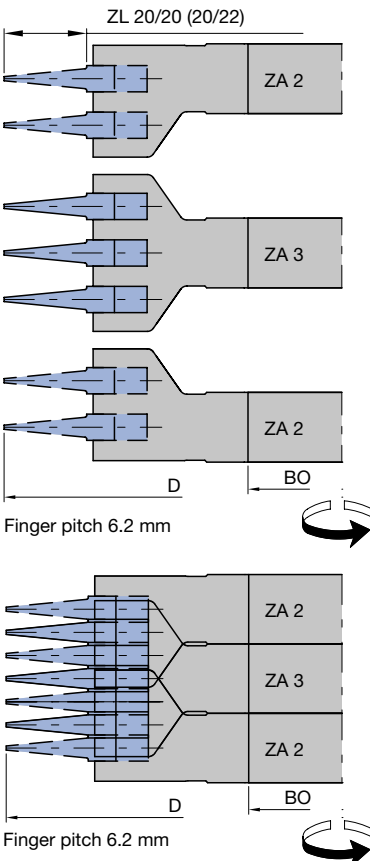
WF 623 2 06

Tool Type	D mm	SB mm	ND mm	BO mm	Z	ZA PCS	QAL	ID ZL 20/20	ID ZL 20/22
Top final cutter	180	18.6	18.6	50	4	2	MC	121808	121810
Basic cutter	180	31	18.6	50	4	3	MC	120838	120840
Bottom final cutter	180	18.6	18.6	50	4	2	MC	121812	121814

ZL 20 mm, TG 6.2 mm, for application with PU glue

WF 623 2 06

Tool Type	D mm	SB mm	ND mm	BO mm	Z	ZA PCS	QAL	ID ZL 20/20	ID ZL 20/22
Top final cutter	180	18.6	18.6	50	4	2	MC	121809	121811
Basic cutter	180	31	18.6	50	4	3	MC	120839	120841
Bottom final cutter	180	18.6	18.6	50	4	2	MC	121813	121815



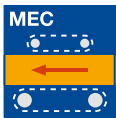
Finger length 20 mm

TG: 6,2 mm

Real Z3

		Basic cutter	Final cutter top	Final cutter bottom
ZA		3	2	2
ND		18,6	18,6	18,6
HD	KLH	Cutter quantity	Cutter quantity	Cutter quantity
19	37,2	0	1	1
37	55,8	1	1	1
56	74,4	2	1	1
74	93	3	1	1
93	111,6	4	1	1
112	130,2	5	1	1
130	148,8	6	1	1
149	167,4	7	1	1
167	186	8	1	1
186	204,6	9	1	1
205	223,2	10	1	1
223	241,8	11	1	1
242	260,4	12	1	1
260	279	13	1	1
279	297,6	14	1	1
298	316,2	15	1	1
316	334,8	16	1	1

HD = wood thickness
KLH = clamping height



Minifinger joint cutter, Marathon, real Z 6

Application:

For self-locking longitudinal joints. See section introduction for additional information.

Machine:

High performance finger joint machines with/without cut-off saws.

Workpiece material:

Softwood, across grain; also suitable for hardwood.

Technical information:

High number of teeth tool design, top and bottom final cutters required. Assembly of tool set: see section introduction. Version with enlarged tip gap suitable for PU adhesives and for finger joint machines without cut-off saws for horizontal spindle. Marathon coating allows up to 4 times longer tool life compared to HS version. Resharpener area 12 mm.

ZL 10 mm, TG 3.8 mm

WF 620 2 06, WF 623 2 06

Tool Type	D	SB	ND	BO	Z	ZA	QAL	ZL	ID
	mm	mm	mm	mm		PCS		mm	
Top final cutter	250	26.6	19	50	6	4	MC	10/11	121012 ●
Basic cutter	250	49.4	26.6	50	6	7	MC	10/11	120601 ●
Bottom final cutter	250	26.6	19	50	6	4	MC	10/11	121013 ●

Finger length 10 mm and 15 mm

TG: 3,8 mm

Real Z6

		Basic cutter	Final cutter top	Final cutter bottom
ZA		7	4	4
ND		26,6	19	19
HD	KLH	Cutter quantity	Cutter quantity	Cutter quantity
27	38	0	1	1
53	64,6	1	1	1
80	91,2	2	1	1
106	117,8	3	1	1
133	144,4	4	1	1
160	171	5	1	1
186	197,6	6	1	1
213	224,2	7	1	1
239	250,8	8	1	1
266	277,4	9	1	1
293	304	10	1	1

HD = wood thickness

KLH = clamping height



Minifinger joint cutter and shoulder cutter, Marathon, real Z 6

Application:

For self-locking longitudinal joints with straight visible joint for horizontal joints, e.g. solid wood panels or finger jointed profile strips. See section introduction for additional information.

Machine:

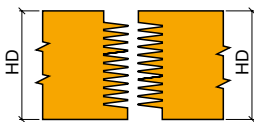
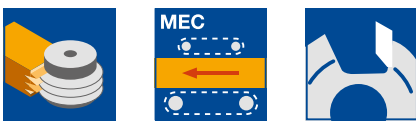
High performance finger joint machines with cut-off saw.

Workpiece material:

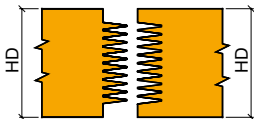
Softwood, across grain; also suitable for hardwood.

Technical information:

High number of teeth tool design. Tool set consists of basic cutter, extension cutter and shoulder cutters for different positions of the visible joint. Cutting width adjusted to wood thickness. Mounted on clamping sleeve. Marathon coating allows up to 4 times longer tool life compared to HS version. Resharpener area 12 mm.



Profile 2



Profile 3

Basic- / extension cutter ZL 10/11 mm, TG 3.8 mm

WF 620 2 06, WF 623 2 06

Tool Type	D mm	SB mm	ND mm	BO mm	Z	ZA PCS	QAL	DRI	ID
Basic cutter	250	20.2	11.2	60	6	3	MC	RH	120624 □
Extension cutter	250	5.0	11.2	60	6	1	MC	LH	121608 □
Extension cutter	250	5.0	11.2	60	6	1	MC	RH	121609 □
Extension cutter	250	12.6	11.2	60	6	2	MC	LH	121610 □
Extension cutter	250	12.6	11.2	60	6	2	MC	RH	121611 □

Shoulder cutter profile 2 and 3 for ZL 10/11 mm, TG 3.8 mm

WF 621 2 06

D mm	SB mm	BO mm	Z	QAL	ID LH	ID RH
249.7	12	60	6	MC	122400 □	122401 □

Clamping sleeve with threaded nut for LH/RH rotation

TB 270 0

D mm	BO mm	NL mm	GL mm	ID
60	50	85	105	029474 ●
60	50	120	140	029475 ●
60	50	150	170	029476 ●
60	50	180	200	029477 ●
60	50	210	230	029478 ●
60	50	240	260	029479 ●

Spacer

TR 100 0

D mm	B mm	BO mm	ID
90	3.8	60	028447 ●
90	11.4	60	028448 ●

3. Planing and profiling

3.4 Finger jointing 3.4.3 Minifinger joint cutterheads

WM 620 2/WM 620 2 06
Minifinger joint cutterhead

Minifinger joint cutterhead with resharpenable profile knives.
Knives individually replaceable.
Secure against twisting by pins.
Cutting material with Leitz Marathon coating increases the tool life by 3-5 times compared with conventional HS, depending on the conditions of use.
Finger length 10 can also be supplied in HW.



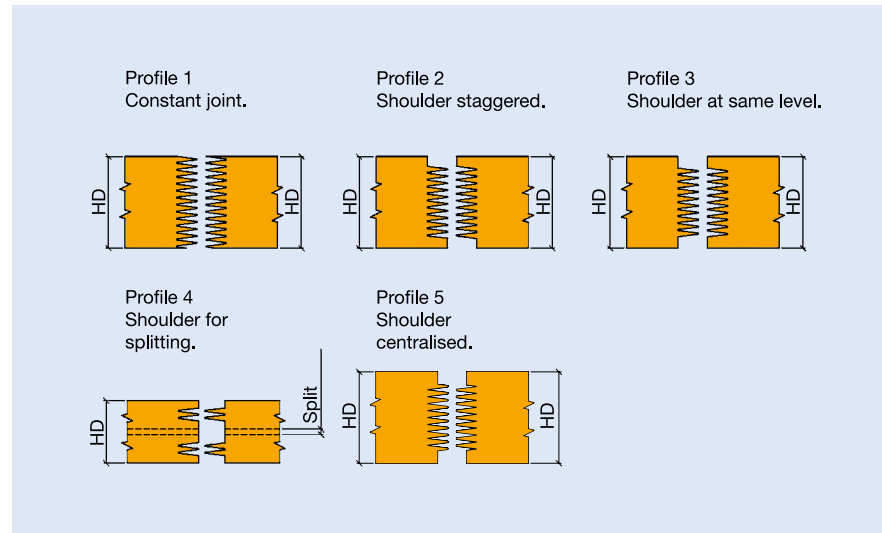
Application	For self-locking finger joints for supporting components, solid wooden panels, strips, window blanks.
Cutting material	HS, Marathon (MC), HW.
Resharpenable area	Marathon (MC) = 10 mm, HW = 6 mm.
Feed rate	RPM dependent up to 24 m min ⁻¹ .

3. Planing and profiling

3.4 Finger jointing 3.4.3 Minifinger joint cutterheads

WM 620 2 01 Minifinger cutterhead

Minifinger cutterhead with resharpenable minifinger turnblade knives. Wood thickness max. 60 mm adjustable with or without shoulders. The resharpenable turnblade knives and the replaceable finger knives guarantee high flexibility and economic efficiency. Knives are resharpened on standard multi-purpose sharpening machines with cooling.



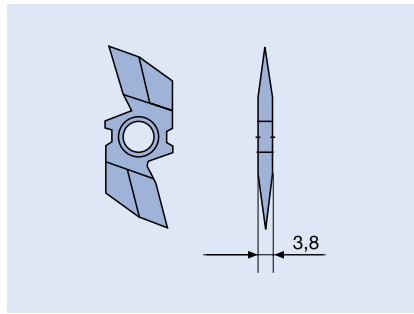
Application	For self-locking longitudinal joints for panel and moulding production with or without shoulders.
Machines	Double-end tenoners, double sided finger jointing lines with cut-off saw, single sided finger jointing lines with cut-off saw.
Cutting material	HW.
Resharpener area	2 x 6 mm.
Number of teeth/finger length	Z 6 or 3 + 3 at D = 250 mm , 10/11 mm finger length. Z 4 or 2 + 2 at D = 160 mm, 10/11 mm finger length.
Feed rate	Up to 36 m min ⁻¹ , depending on spindle RPM and cutting edge arrangement.

3. Planing and profiling

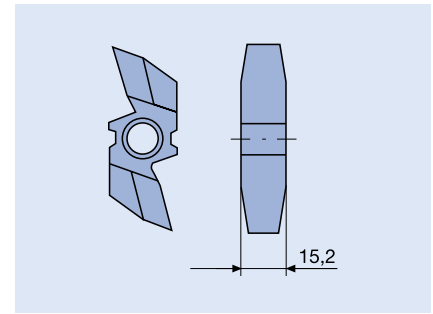
3.4 Finger jointing 3.4.3 Minifinger joint cutterheads

Note

For wood up to 60 mm thick: joints with/without shoulders. Positioning the shoulder knives in 3.8 mm steps enables adjustment to different wood thicknesses.



Minifinger knife, 2 edges.



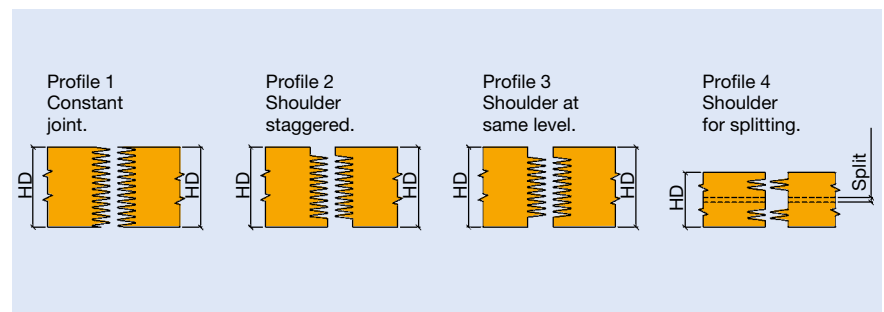
Shoulder knife, 2 edges.

Table to determination of required number of spare knives:

HD from-to mm	ZB mm	ZA	Half shoulder (HS) mm	HD from-to mm	ZB mm	ZA	Half shoulder (S) mm
16 – 22	9.4	3	3.3 – 6.3	17 – 23	10.7	3	
19 – 25	13.2	4	2.9 – 5.9	21 – 27	14.5	4	3.2 – 6.2
23 – 29	17	5	3.0 – 6.0	25 – 31	18.3	5	3.3 – 6.3
27 – 33	20.8	6	3.1 – 6.1	29 – 35	22.1	6	3.4 – 6.4
31 – 37	24.6	7	3.2 – 6.2	33 – 39	25.9	7	3.5 – 6.5
35 – 41	28.4	8	3.3 – 6.3	36 – 42	29.7	8	3.1 – 6.1
38 – 44	32.2	9	2.9 – 5.9	40 – 46	33.5	9	3.2 – 6.2
42 – 48	36	10	3.0 – 6.0	44 – 50	37.3	10	3.3 – 6.3
46 – 52	39.8	11	3.1 – 6.1	48 – 54	41.1	11	3.4 – 6.4
50 – 56	43.6	12	3.2 – 6.2	52 – 58	44.9	12	3.5 – 6.5

**Minifinger cutterhead
Turbo Hawk**

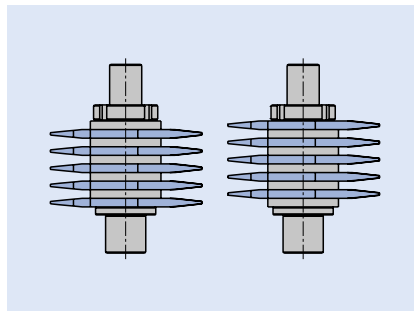
Resharpenable cutterhead system with individually replaceable HS circular knives. Production of different profiles with the same tool body. Flexible cutting edge arrangement with or without shoulders. Wood thickness to maximum 50 mm.



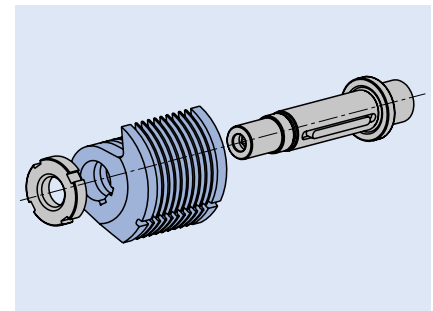
3. Planing and profiling

3.4 Finger jointing 3.4.3 Minifinger joint cutterheads

Application	For cutting self-locking longitudinal joints for exactly measured components, e.g. all kinds of finger joint profile mouldings, solid wood panels.
Machines	High performance finger jointing lines with cut-off saw.
Cutting material	HS, Marathon (MC).
Resharpener area	100 mm.
Number of teeth/finger length	Z 5/5 at finger length 10 mm. Z 10 at finger length 6.35 mm (1/4"), 9.52 mm (3/8").
RPM	4,800 min ⁻¹ at wood thickness up to 40 mm 4,000 min ⁻¹ at wood thickness up to 41 - 55 mm
Feed rate	Up to 48 m min ⁻¹ depending on spindle RPM and cutting edge arrangement.
Advantages	Constant diameter, adjustable on the machine by gauge. Knife set can be changed as one unit on the clamping arbor resulting in short set up times when changing wood thickness. Constant balance due to clamping of the knives by a keyway on the arbor.
Note	With the Z 10 design, the knives are mounted without spacers. This design can only be used on machines with a raker. On other machines the knives must be mounted with spacers (Z 5/5 design).



Arbor as change unit.
Knives mounted with spacer.
Z 5/5 design.



Knife mounting on the arbor.
Anti-twist keyway for the knives.

3. Planing and profiling

3.4 Finger jointing 3.4.3 Minifinger joint cutterheads



Minifinger joint cutterhead with replaceable knives

Application:

For self-locking longitudinal joints. See section introduction for additional information.

Machine:

Finger joint machines with and without cut-off saw, continuous machines.

Workpiece material:

Softwood and hardwood.

Technical information:

Steel tool body with block knives. Individually replaceable knives if damaged. Always resharpen sets of tools to the same diameter. Marathon coating allows up to 4 times longer tool life compared to HS version. Resharpener area 10 mm for MC or 6 mm for HW.



ZL 10/10 and 10/11 mm, MC

WM 620 2 06

D mm	SB mm	BO mm	ND mm	Z	TG	ZA PCS	n_{max} min ⁻¹	ID ZL	ID ZL
160	31.4	50	30.4	2/2	3.8	8	8000	10/10	10/11
250	31.4	50	30.4	3/3	3.8	8	4500	135901	135902

ZL 10/10 and 10/11 mm, HW

WM 620 2

D mm	SB mm	BO mm	ND mm	Z	TG	ZA PCS	n_{max} min ⁻¹	ID ZL	ID ZL
160	31.4	50	30.4	2/2	3.8	8	8000	10/10	10/11
250	31.4	50	30.4	3/3	3.8	8	4500	022730	022731
								022732	022733

ZL 15/15 and 15/16.5 mm, MC

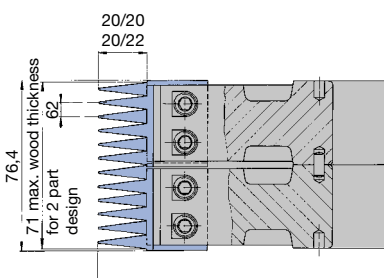
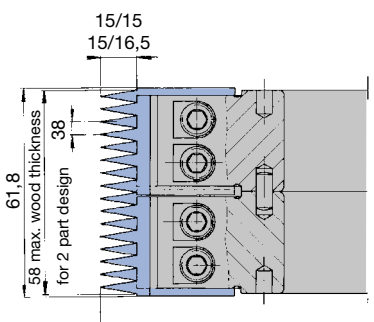
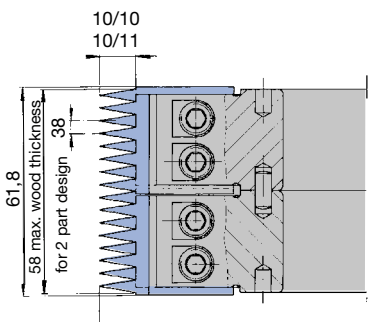
WM 620 2 06

D mm	SB mm	BO mm	ND mm	Z	TG	ZA PCS	n_{max} min ⁻¹	ID ZL	ID ZL
170	31.4	50	30.4	2/2	3.8	8	8000	15/15	15/16.5
260	31.4	50	30.4	3/3	3.8	8	4500	135904	135906
								135905	135907

ZL 20/20 and 20/22 mm, MC

WM 620 2 06

D mm	SB mm	BO mm	ND mm	Z	TG	ZA PCS	n_{max} min ⁻¹	ID ZL	ID ZL
180	39.2	50	37.2	2/2	6.2	6	8000	20/20	20/22
260	39.2	50	37.2	3/3	6.2	6	4500	135908	135910
								135909	135911



Spare knives:

QAL	Cut-off saws	Tip gap	Profile knife	ZL mm	TG	ZA PCS	ID SET 2	ID SET 3
MC	without	standard	right	10/10	3.8	4	611452	611552
MC	without	standard	left	10/10	3.8	4	611453	611553
MC	without	standard	right	15/15	3.8	4	611454	611554
MC	without	standard	left	15/15	3.8	4	611455	611555
MC	without	standard	right	20/20	6.2	3	611456	611556
MC	without	standard	left	20/20	6.2	3	611457	611557
MC	with	standard	right	10/11	3.8	4	611450	611550
MC	with	standard	left	10/11	3.8	4	611458	611558
MC	with	standard	right	15/16.5	3.8	4	611459	611559
MC	with	standard	left	15/16.5	3.8	4	611460	611560
MC	with	standard	right	20/22	6.2	3	611461	611561
MC	with	standard	left	20/22	6.2	3	611451	611551
MC	without	large	right	10/10	3.8	4	611474	611574
MC	without	large	left	10/10	3.8	4	611475	611575
MC	without	large	right	15/15	3.8	4	611476	611576
MC	without	large	left	15/15	3.8	4	611477	611577
MC	without	large	right	20/20	6.2	3	611478	611578
MC	without	large	left	20/20	6.2	3	611479	611579
HW	without	standard	right	10/10	3.8	4	611300	611350
HW	without	standard	left	10/10	3.8	4	611302	611352
HW	with	standard	right	10/11	3.8	4	611304	611354
HW	with	standard	left	10/11	3.8	4	611306	611356

Table to determine the quantity of cutterheads for given wood thickness.

Table to determine the quantity of cutterheads for given wood thickness.

Cutterhead - block knife with pitch 3.8 mm

Finger length	Quantity of cutterheads
10 and 10/11 mm	
15 and 15/16.5 mm	
SB	31.4 mm
Hub	30.4 mm
ZA	Tooth row 8
Wood thickness	Quantity of cutterheads
28	1
58	2
89	3
119	4
150	5
180	6
210	7
241	8
271	9
302	10
332	11
362	12

Cutterhead - block knife with pitch 6.2 mm

Finger length	Quantity of cutterheads
20/20 mm	
22/22 mm	
SB	39.2 mm
Hub	37.2 mm
ZA	Tooth row 6
Wood thickness	Quantity of cutterheads
34	1
71	2
108	3
145	4
183	5
220	6
257	7
294	8
331	9
368	10



Minifinger cutterhead with HW turnblade knives

Application:

For self-locking longitudinal joints for non-supporting components, e.g. panels and strips.

Machine:

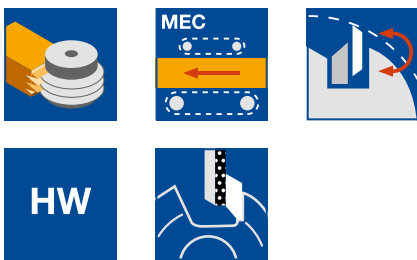
Finger joint machines and continuous machines with cut-off saw.

Workpiece material:

Softwood and hardwood, across grain.

Technical information:

Steel tool body with HW turnblade knives. Particularly suitable for hardwood, e.g. for horizontal joints with and without shoulders. Variable design for defined wood thicknesses from 15 to 60 mm. The rest of the knife seating must be filled with spacers and a safety washer (spare part no. 4). Individual cutting edges can be replaced if a cutting edge breaks. Resharpening area 2 x 6 mm.



Profile 1, ZL 10/11 mm, TG 3.8 mm

WM 620 2 01

D	SB	BO	Z	HD	n _{max}	ID	ID
mm	mm	mm		mm	min ⁻¹	LH	RH
160	60	50	2/2	60	8000	135001	135000
250	60	50	3/3	60	5000	135005	135004

Attention: When assembling, always finish by fitting spacers with the securing device (spare part no. 4).

Tools for profile 2 - 5 on request.

Spare knives:

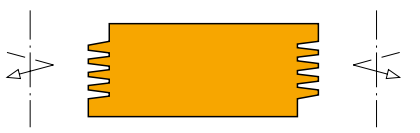
Part-no.	BEZ	P	ZL	SB	TG	QAL	ID
			mm	mm			
1	Minifinger knife		10/11	3.8	3.8	HW	618002 ●
2	Shoulder knife	2. 3. 4	10/11	11.4	3.8	HW	618005 ●
2	Shoulder knife	5	10/11	11.4	3.8	HW	618006 ●

Spare parts:

Part-no.	BEZ	ABM	ID
		mm	
3	Spacer for ZL 10/11	13x3.8x6.1	008199 ●
3	Spacer	15x17x5	008230 ●
4	Spacer with safety device	24.9x21x3.8	008200 ●
4	Spacer with safety device	24.9x20x6.2	008201 ●
5	Countersink screw, Torx® 20	M6x40	006090 ●
5	Countersink screw, Torx® 20	M6x50	007856 ●
5	Countersink screw, Torx® 20	M6x65	007882 ●
5	Countersink screw, Torx® 20	M6x70	007880 ●
	Torx® key	Torx® 20	006091 ●



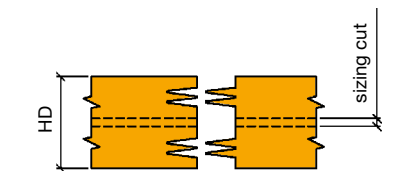
Profile 1 with continuous finger jointing



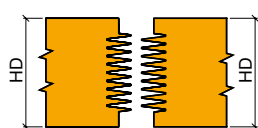
Profile 2 with staggered shoulder cutters



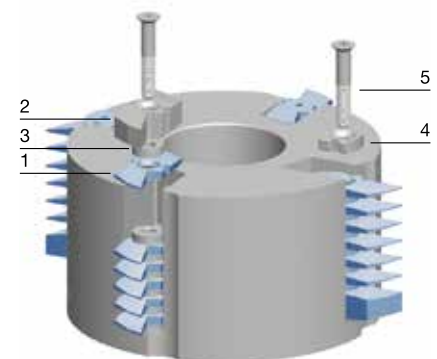
Profile 3 with shoulder cutters on the same level



Profile 4 with shoulder cutters for splitting



Profile 5 with half shoulder





Hydro minifinger cutterhead TurboHawk with curved knives

Application:

For self-locking longitudinal joints for non supporting components, e.g. panels and strips.

Machine:

High performance finger joint machines and continuous machines with cut-off saw.

Workpiece material:

Softwood; limited suitability for hardwood.

Technical information:

Resharpenable, constant diameter and constant profile tool system with hydro clamping. No machine adjustment required. Particularly suitable for horizontal joints with and without shoulders. Variable for defined wood thicknesses from 15 to 50 mm. The remaining knife seatings must be filled with spacers and a locking nut. Minifinger curved knives with extremely large resharpening area.



With curved knives ZL 6.35 mm (1/4"), TG 3.53 mm

HM 620 2 05

P	D mm	BO mm	HD _{max} mm	Z	QAL	n _{max} min ⁻¹	ID LH	ID RH
1	266.67	50	50	5/5	HS	4000	135524	135525
2	266.67	50	50	5/5	HS	4000	135532	135533
3	266.67	50	50	5/5	HS	4000	135540	135541



Profile 1 with continuous finger jointing



Profile 2 with staggered shoulder cutters



Profile 3 with shoulder cutters on the same level

With curved knives ZL 9.52 mm (3/8"), TG 4.3 mm

HM 620 2 05

P	D mm	BO mm	HD _{max} mm	Z	QAL	n _{max} min ⁻¹	ID LH	ID RH
1	266.67	50	50	5/5	HS	4000	135548	135549
2	266.67	50	50	5/5	HS	4000	135556	135557
3	266.67	50	50	5/5	HS	4000	135564	135565

With curved knives ZL 10/11 mm, TG 3.8 mm

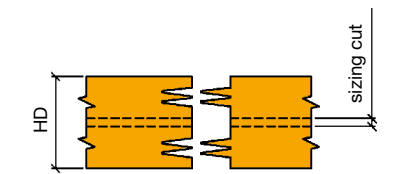
HM 620 2 05

P	D mm	BO mm	HD _{max} mm	Z	QAL	n _{max} min ⁻¹	ID LH	ID RH
1	266.67	50	50	5/5	HS	4000	135500	135501
2	266.67	50	50	5/5	HS	4000	135508	135509
3	266.67	50	50	5/5	HS	4000	135516	135517

Please note the spindle arrangement. Arrangement for other wood thicknesses on request.

Spare knives:

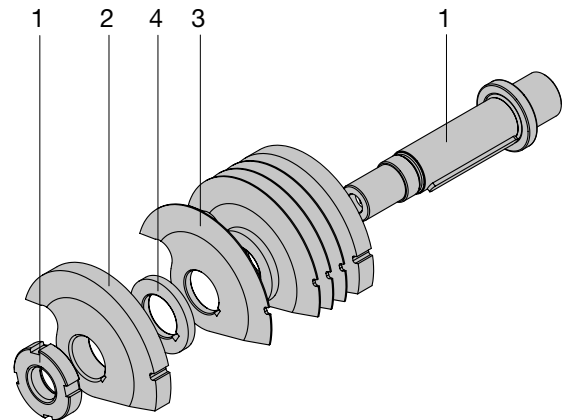
Part-no.	BEZ	ABM mm	ZL mm	ID HS	ID MC
3	Minifinger knife	38.1x3.53x19.05	6.35	618202	618221
2	Shoulder knife	38.1x8.74x19.05	6.35	618252	618270
3	Minifinger knife	38.1x4.3x19.05	9.52	618208	618222
2	Shoulder knife	38.1x9.51x19.05	9.52	618258	618271
3	Minifinger knife	38.1x3.8x19.05	10/11	618200	618220
2	Shoulder knife	38.1x11.4x19.05	10/11	618250	618269



Profile 4 with shoulder cutters for splitting

Spare parts:

Part- no.	BEZ	ABM mm	TG	ID
	Setting gauge	D266.67x80		005377 ●
1	Clamping arbor	HD 50 mm KL 55 mm		008226 ●
1	Clamping arbor	HD 38 mm KL 43 mm		008227 ●
1	Clamping arbor	HD 32 mm KL 34.5 mm		008228 ●
1	Clamping arbor	HD 25 mm KL 29 mm		008229 ●
	Sickle spanner	34/36 DIN 1810 A		117510 ●
	Screw driver	SW 6, L50		117508 ●
4	Filler piece for rounding knives	33x3.53x19.05,KN1.8x4.2	3.53	008224 ●
4	Filler piece for rounding knives	33x4.3x19.05,KN1.8x4.2	4.3	008225 ●
4	Filler piece for rounding knives	33x3.8x19.05,KN1.8x4.2	3.8	008223 ●



3. Planing and profiling

3.4 Finger jointing 3.4.4 Minifinger disc cutters

WF 624 2
Disc cutter, minifinger profile with and without shoulders

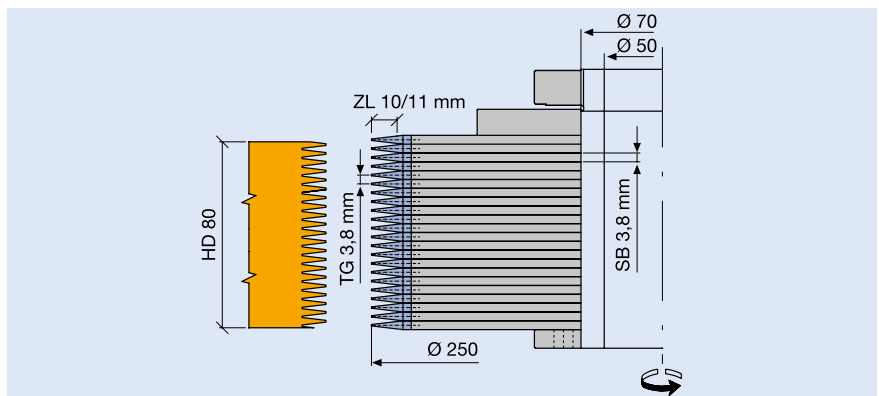
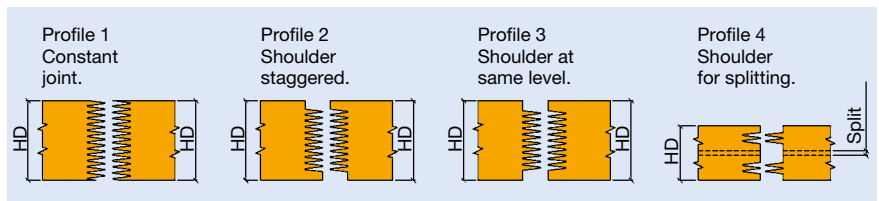
Minifinger disc cutter tipped with HW or DP cutting edges. Variable arrangement for defined wood thicknesses, with or without shoulder cutter, mounted on screwed sleeve as tool set.



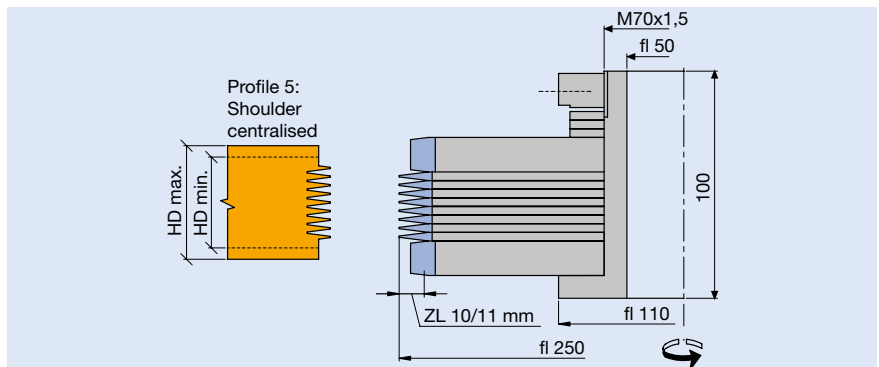
Application For self-locking longitudinal joints for precise measured components, e.g. finger joint solid wood panels, all kinds of mouldings, floors, parquet, stair and furniture parts, especially narrow mouldings.
Finger jointing lines with cut-off saw for high feed speeds.

Cutting material HW, DP.

Resharpener area HW = 3.5 mm, DP = 3-5 times resharpenable.



22 HW disc cutter for 80 mm wood thickness.



Minifinger shoulder cutter set with 8 finger.

Note: DP minifinger disc cutters only suitable for knotless wood and wood derived materials that are planed at right angles. Exact clamping for vibration-free cutting is required.

3. Planing and profiling

3.4 Finger jointing 3.4.4 Minifinger disc cutters



Minifinger disc cutter, HW, with and without shoulder cutter

Application:

For self-locking longitudinal joints for non-supporting components, e.g. panels and strips.

Machine:

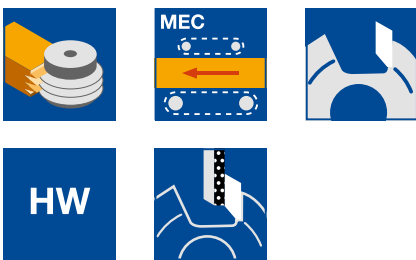
Finger joint machines with cut-off saws.

Workpiece material:

Hardwood and abrasive tropical wood.

Technical information:

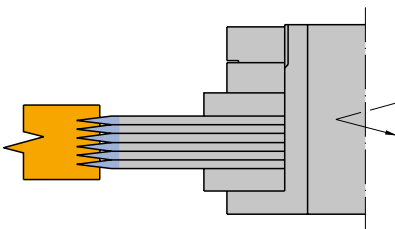
HW tipped cutters. Tool body thickness corresponds to finger pitch. Particularly suitable for horizontal joints with and without shoulders. Variable design for defined wood thicknesses from 15 to 80 mm. Suitable for small wood thicknesses. Resharpener area 3.5 mm. Design in DP on request.



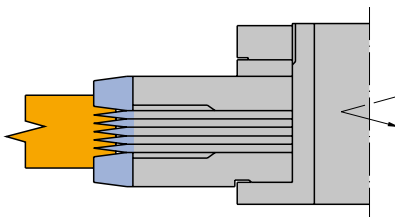
HW, ZL 10/11 mm, TG 3.8 mm

WF 620 2, WF 621 2

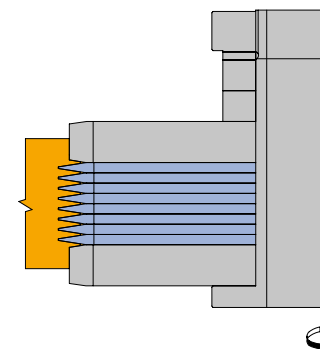
Tool Type	D mm	SB mm	BO mm	Z	n_{max} min ⁻¹	ID
Minifinger joint cutter	160	3.8	70	2	9000	022200 ●
Minifinger joint cutter	160	3.8	70	4	9000	021511 ●
Minifinger joint cutter	250	3.8	70	6	6000	021513 ●
Shoulder cutter	159.8	15.2	70	4	9000	021762 ●
Shoulder cutter P3	249.7	15.2	70	6	6000	021764 ●
Shoulder cutter P5	239.7	15.2	70	6	6000	022153 ●



Minifinger joint cutterset without shoulder cutters



Minifinger joint cutterset with shoulder cutters P3



Minifinger joint cutterset with shoulder cutters P5

HW, ZL 10/11.5 mm, TG 4.0 mm

WF 620 2, WF 621 2

Tool Type	D mm	SB mm	BO mm	Z	n_{max} min ⁻¹	ID
Minifinger joint cutter	160	4	70	2	9000	021509 ●
Shoulder cutter	159.9	16	70	2	9000	022204 ●

Clamping element with threaded nut

TB 270 0

D mm	BO mm	NL mm	GL mm	DRI	ID
70	50	116	146	LH, RH	029695 ●
70	50	80	110	LH, RH	029473 ●

Spare parts:

BEZ	ABM mm	ID
Sickle spanner adjustable	D90/155; L290; DIN1816; tenon 6	005462 ●

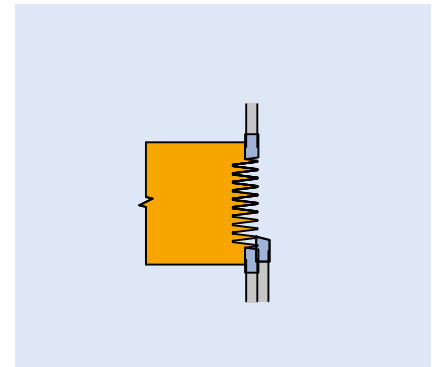
Spacers

TR 100 0

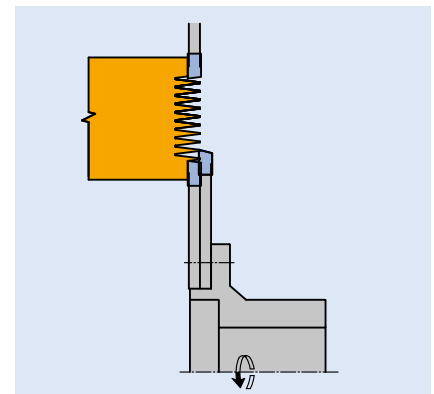
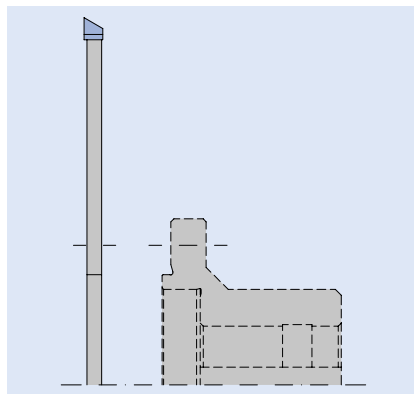
D mm	B mm	BO mm	TG	ID
100	3.8	70	3.8	028437 ●
100	11.4	70	3.8	028450 ●
100	15.2	70	3.8	028439 ●
175	11.4	70	3.8	028678 ●

3. Planing and profiling

3.4 Finger jointing 3.4.5 Scoring sawblades and hoggers

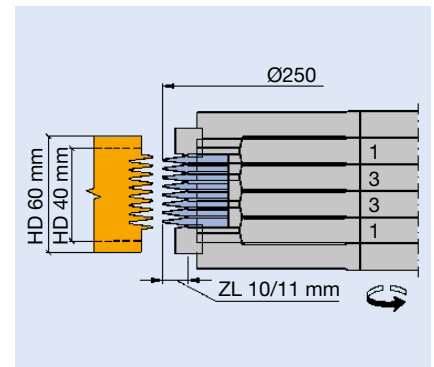
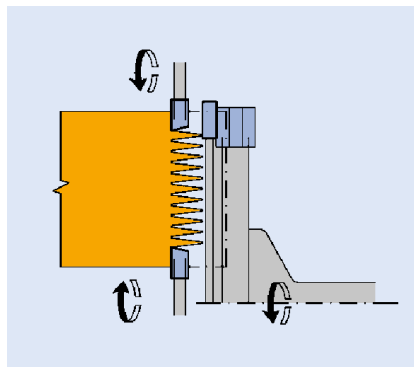


Process step	Scoring across grain with feed.
Workpiece materials	Softwood and hardwood, wood derived material.
Cutting material	HW.
Machines	Finger jointing lines with scoring and cut-off saw.
Application	Scoring minifingers with shoulders.
Tool design Scoring saw	HW scoring sawblade, possibly double scoring sawblade mounted on flanged sleeve with bevel one side tooth shape.



Double scorer scoring shoulders with minifinger joint cutters.

Advantage	Bevel one side teeth used with feed, for cleaner, tear-out free shoulders.
------------------	--

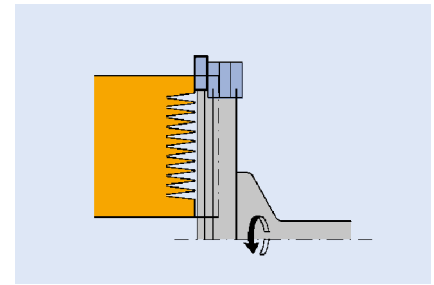


Hogger and scorer for trimming the minifinger joints and scoring the shoulder joint.

3. Planing and profiling

3.4 Finger jointing

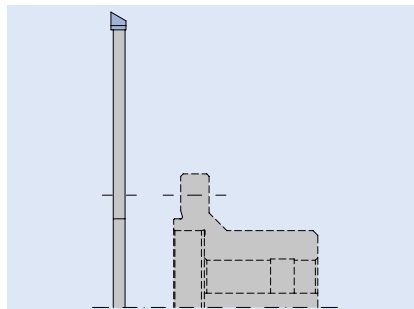
3.4.5 Scoring sawblades and hoggers



Hogger for trimming minifingers.

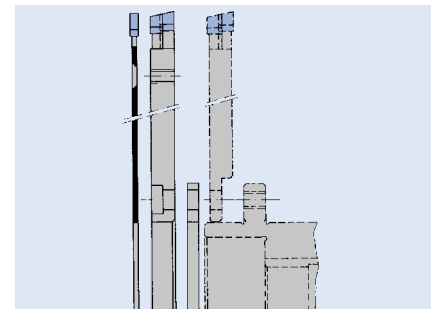
Process step	Hogging across grain.
Workpiece materials	Softwood and hardwood, wood derived material.
Cutting material	HW.
Machines	Finger jointing lines with cut-off saw.
Application	Trimming mini fingers.
Cutting width	Saw hogger: 6.35 mm and 8 mm. Hogger: 12 mm. Segment hogger: 10 – 25 mm.

Tool design



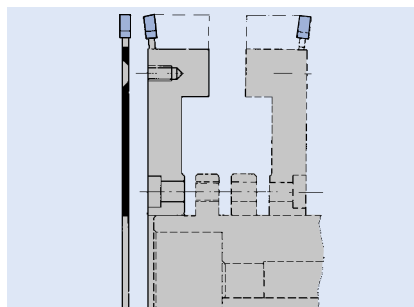
Saw hogger

HW circular sawblade mounted directly on flanged sleeve, bevel one side teeth.



Saw hogger

HW circular sawblade with hogger discs mounted on flanged sleeve (see section Panel Processing).



Segment hogger

HW circular sawblade with segmental tool body mounted on flanged sleeve (see section Panel Processing).

Advantage

One side bevel HW teeth for clean, tear-out free end grain.



Scorer for shoulder minifinger joints

Application:

For scoring in front of the trimming hogger or for machining the face edge of shoulder joints.

Machine:

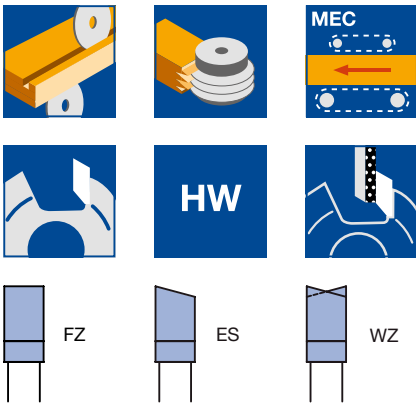
Finger joint machines with trimming and scoring aggregates.

Workpiece material:

Softwood, hardwood and wood derived materials.

Technical information:

Particularly suitable for scoring the shoulders on finger joint machines. Tear-free shoulders guaranteed.



Scoring sawblade for Grecon PowerJoint

WK 100 2

D	SB	BO	Z	ZF	QAL	n_{max}	ID	ID
mm	mm	mm				min^{-1}	LH	RH
100	4.4	20	18	FZ	HW	8000	061995 ●	061995 ●

Single scoring saw mounted on flanged sleeve

SK 999 2, SK 999 2

D	SB	BO	Z	ZF	QAL	n_{max}	ID	ID
mm	mm	mm				min^{-1}	LH	RH
200	6.5	40 DKN	48	WZ	HW	7200	061986 □	061987 □
200	4.75	40 DKN	64	ES	HW	7200	062632 □	062633 □

Double scoring saw mounted on flanged sleeve

SK 999 2

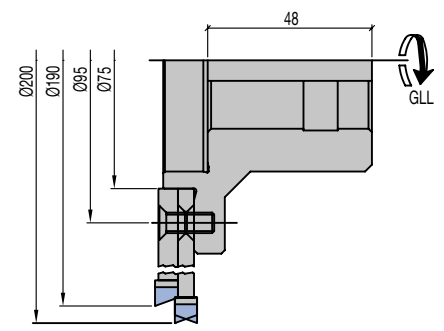
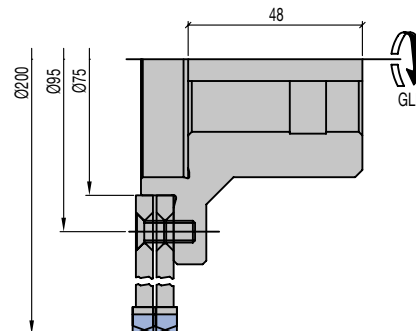
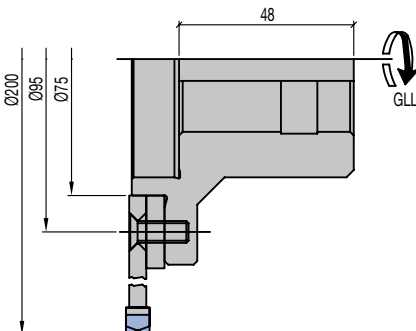
D	SB	BO	Z	ZF	QAL	n_{max}	ID	ID
mm	mm	mm				min^{-1}	LH	RH
200	12.2	40 DKN	48	WZ/WZ	HW	7200	061988 □	061989 □
200	12.3	40 DKN	48	ES/WZ	HW	7200	061990 □	061991 □
190								

Spare sawblades:

D	SB	BO	Z	ZF	NLA	QAL	n_{max}	ID	ID
mm	mm	mm			mm		min^{-1}	LH	RH
200	6.5	75	48	WZ	6NL TK95	HW	7200	061992 ●	061992 ●
190	6.7	75	48	ES	6NL TK95	HW	7200	061993 ●	061994 ●
200	4.75	75	64	ES	6NL TK95	HW	7200	062630 ●	062631 ●

Spare parts:

BEZ	ABM	L	BO	ID
	mm	mm	mm	
Flanged sleeve	113/75x61x40 DKN	61	40 DKN	061680 ●
Flanged disc	D115/BO75/TK95		75	028676 ●
Spacer	180x1x75		75	028677 ●
Countersink screw, Torx® 20	M6x16			006086 ●





Sawblade hogger for trimming minifingers

Application:

Defined trimming of the workpiece before cutting the fingers for adjusting the finger fitting.

Machine:

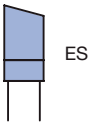
Finger joint machine with trimming aggregate, double-end profiler, tenoner.

Workpiece material:

Softwood, hardwood and wood derived materials.

Technical information:

HW circular saw blade with high number of teeth. Bevelled on one side for perfect cutting quality and reduced tear-outs.



Sawblade hogger mounted on flanged sleeve

SK 999 2

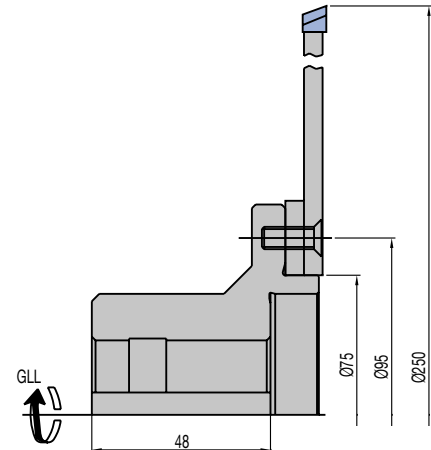
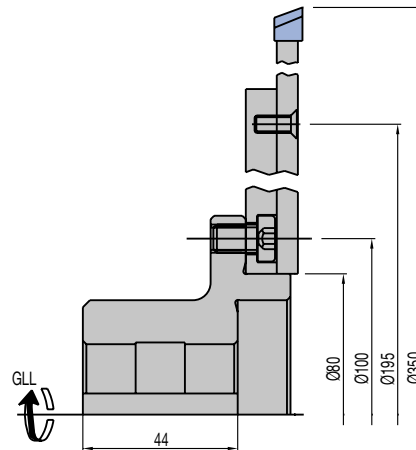
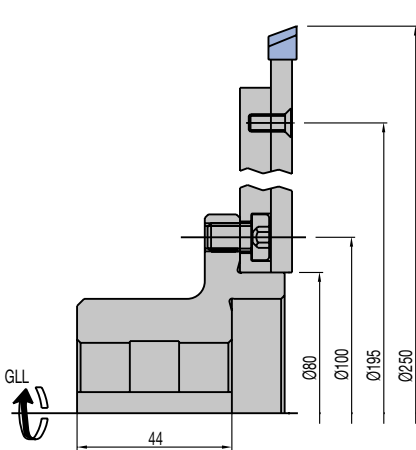
D	SB	BO	Z	ZF	QAL	ID	ID
mm	mm	mm				LH	RH
250	6.35	40 DKN	80	ES	HW	062618 □	062619 □
250	8	40 DKN	60	ES	HW	062620 □	062621 □
350	8	40 DKN	72	ES	HW	062622 □	062623 □

Spare sawblades:

D	SB	BO	Z	ZF	QAL	ID	ID
mm	mm	mm				LH	RH
250	6.35	75	80	ES	HW	062624 ●	062625 ●
250	8	80	60	ES	HW	062626 ●	062627 ●
350	8	80	72	ES	HW	062628 ●	062629 ●

Spare parts:

BEZ	ABM	L	BO	ID
	mm	mm	mm	
Flanged sleeve	113/80x59x40 DKN	59	40 DKN	061679 ●
Flanged sleeve	113/75x61x40 DKN	61	40 DKN	061680 ●
Flanged disc	D215/BO80/TK195		80	028675 ●
Flanged disc	D115/BO75/TK95		75	028676 ●
Countersink screw, Torx® 20	M6x16			006086 ●
Countersink screw, Torx® 20	M5x12			006247 ●
Cylindrical screw with ISK	M8x12			005943 ●





Rebating cutterhead for joinery machines - HeliCut 15

Application:

For cutting grooves, rebate grooves, V-grooves as well as for jointing longitudinal and crosscut wood with large hogging depths in the wood construction.

Machine:

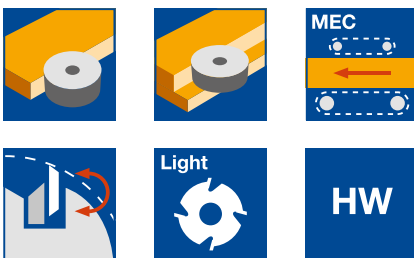
CNC-controlled joinery machines, as well as special machines for general wood construction with machine-specific adaptors.

Workpiece material:

Solid wood, preferably softwood for wood construction, hardwood (oak, ash etc.).

Technical information:

Carrier body constructed from high strength lightweight aluminium alloy. With 4-times turnable, spiral-shaped assembled HW turnblades. Application of the same knives as peripheral knives and spurs. The cutting bevels of the HW knives are numbered. No clamping wedges, direct tangential knife clamping. Easy handling of knife change without further mounting aid.



Aluminium tool body

WW 430 2 05

D	SB	BO	Z	V	ID
mm	mm	mm			
250	60	30	4x6	2 x 4+4	132538
250	80	30	4x8	2 x 4+4	132539
250	100	30	4x10	2 x 4+4	132540
300	20	30	4x2	2 x 4+4	132541
300	40	30	4x4	2 x 4+4	132542
300	60	30	4x6	2 x 4+4	132543
300	80	30	4x8	2 x 4+4	132544
300	100	30	4x10	2 x 4+4	132545
350	20	30	4x2	2 x 4+4	132546
350	40	30	4x4	2 x 4+4	132547
350	60	30	4x6	2 x 4+4	132548
350	80	30	4x8	2 x 4+4	132549
350	100	30	4x10	2 x 4+4	132550
400	20	30	4x2	2 x 4+4	132551
400	40	30	4x4	2 x 4+4	132552
400	60	30	4x6	2 x 4+4	132553
400	80	30	4x8	2 x 4+4	132554
400	100	30	4x10	2 x 4+4	132555



More dimensions on request.

Spare knives:

BEZ	ABM	QAL	BEM	VE	ID
	mm			PCS	
Turnblade knife	15x15x2.5	HW	HeliCut 15	10	009549 ●
Turnblade knife	15x15x2.5	HW-MF	HeliCut 15	10	009543 ●
Turnblade knife	15x15x2.5	TDC	HeliCut 15		602900 ●

Spare parts:

BEZ	ABM	ID
	mm	
Countersink screw, Torx® 20	M5x18	114030 ●
Torx® key	Torx® 20	006091 ●

International window systems



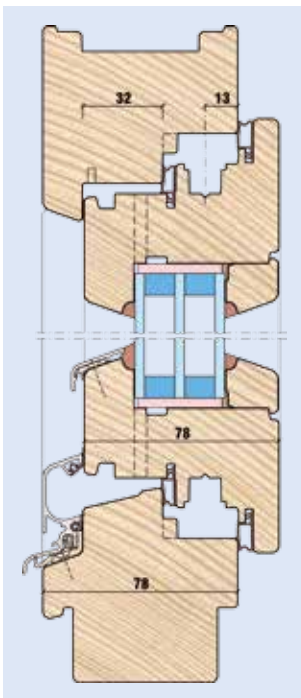
The window section is not just a matter of construction specification. More important are the national specifications to which a window must correspond for particular applications. EN 14351-1 defines these mandatory specifications. CE-marking clearly shows that a window meets all the required criteria of the intended application, defining the window construction. Leitz knows the business, and advises and supports customers on the correct design and the best tool.

To support customers with CE certification, Leitz continental standard systems are listed on www.CE-fix.de ("Making CE marking easy for windows and external doors") from VBH - the world's largest trading company supplying hardware for windows and doors.

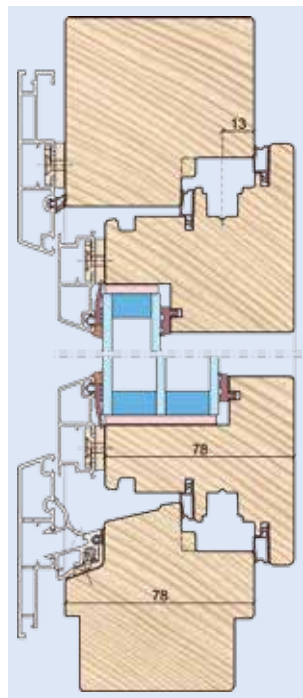
In addition to window systems from Leitz, the patented RipTec technology for corner joints by Leitz, and the PlugTec corner joint, designed by Leitz and certified by the ift-Rosenheim Institute as per FE08-1, are also part of this platform. All construction details in Leitz continental window systems have been designed as required by CE certification. Leitz's national standard domestic window programs have successfully passed the system test at an authorized testing institute, such as ift-Rosenheim.



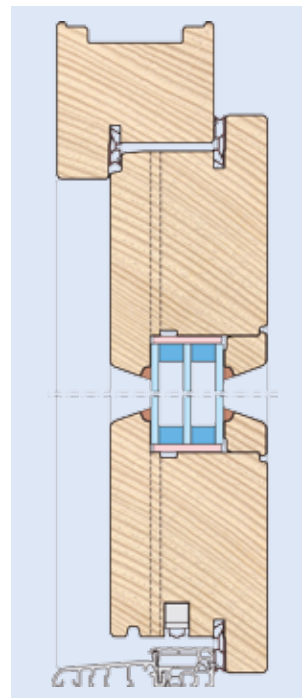
Leitz has specifically designed standard systems based on the requirements of certified window systems in order to meet country-specific requirements. These modular system solutions are characterized by high flexibility in production and design, and future-proof technical features including heat technology, noise protection and safety.



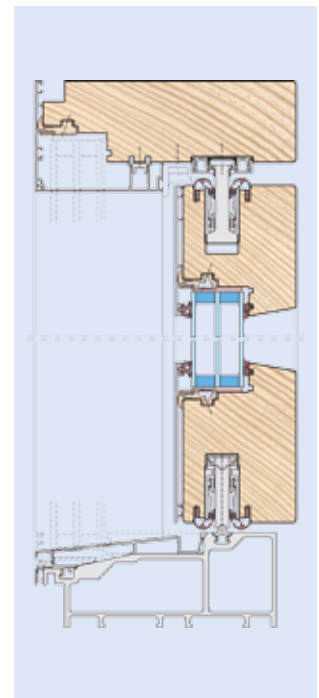
IV78 ClimaTrend
13 mm gear axle
32 mm distance of wind-rain block



IV78 ClimaTrend
13 mm gear axle



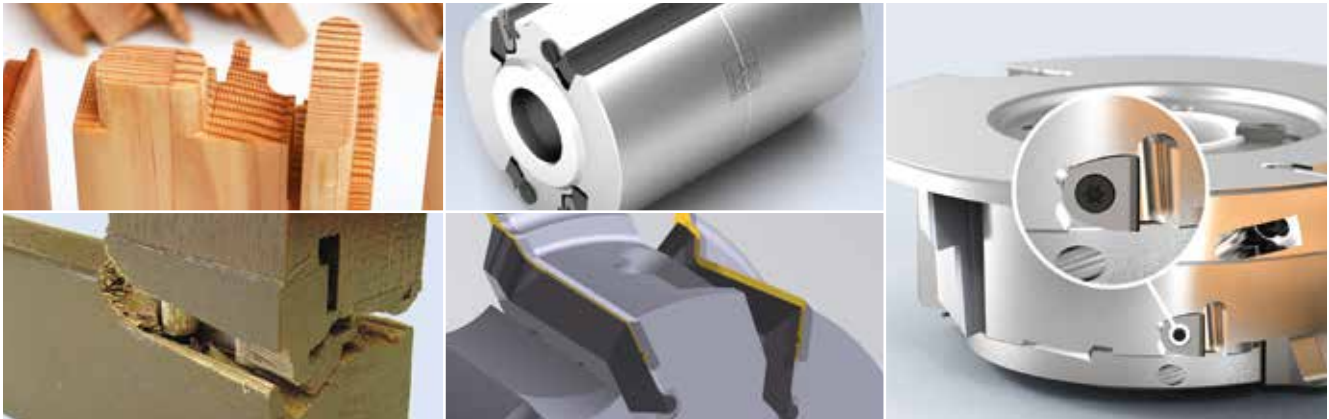
Front door, single rebate
Sash and frame sealing.
Rotary sash sealing stop and front door threshold for barrier-free installation.



Wood/Alu sliding door
with fixed glazing in the frame
Ground-deep glazing with stepless exit.

Tool systems and processing technology

Especially for cutting technologies designed for the production of wooden windows, such as RipTec or Integral and Hybrid technology as well as toolsets of machine-specific features, allow optimal utilization of machine capacity with excellent machine quality at the same time. The Leitz tool systems are described extensively in section Profile Tool Systems.



Leitz RipTec: Nearly tear-free finish and maximum stability of the joint with increased feed speed

Leitz PlugTec: The innovative corner joint for the most demanding applications

Leitz Integral: Precutting and finish processing with one single tool for increased performance time of the finish edge

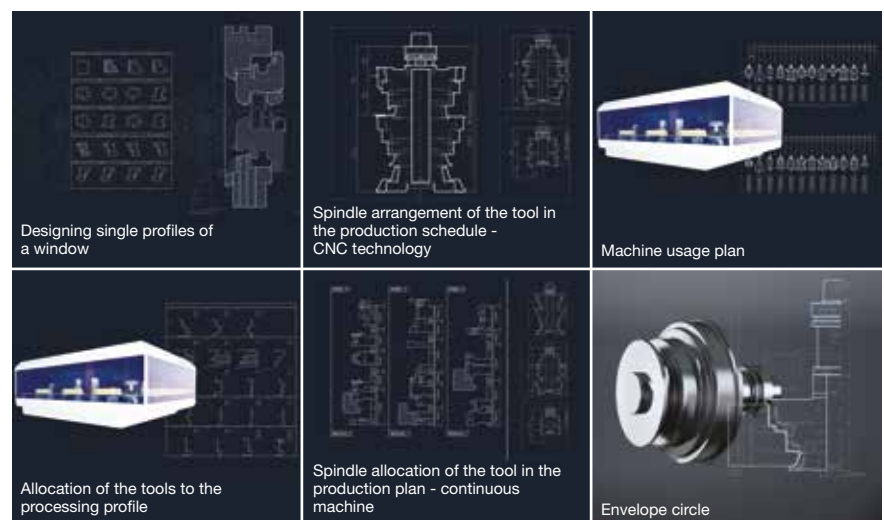
Leitz Hybrid: Combination of HW-tool systems with diamond edges for reduced edge wear

Engineering services



For a head start in an increasingly competitive international marketplace, right from the planning stage, you can count on Leitz. As your expert partner, we offer customized and efficient solutions for the production of modern window and door systems. After determining the requirements, Leitz work in cooperation with machine and software producers to ensure customers receive the most efficient service package. If maximum flexibility is required during production, then the toolsets are split. However, if productivity is the first priority then complete toolsets are the correct solution.

Leitz identify trends in the market, is in constant contact with notable international testing institutes, producers of hinges and seals, and understands what is important in window construction. Our window experts provide support in every way to carry out your objectives.



Designing single profiles of a window

Spindle arrangement of the tool in the production schedule - CNC technology

Machine usage plan

Allocation of the tools to the processing profile

Spindle allocation of the tool in the production plan - continuous machine

Envelope circle

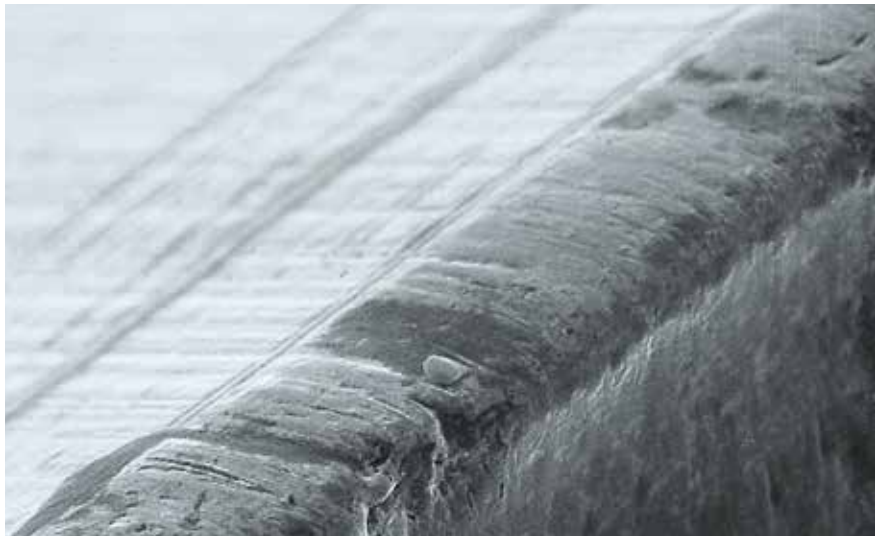
Problem	Possible cause	Action
Surface defect Cutting quality	- RPM too low	Increase RPM and thus cutting speed increase tool diameter
	- Incorrect geometry	Measure, change tool
	- Spindle and tool tolerances too high	Check motor bearing and tolerances
	- Tool balance	Check and re-balance
	- Cutting speed too high (no chip formation), relation feed to number of teeth not adequate	Increase feed speed, Reduce number of teeth and RPM
	- Number of teeth too low, feed to high	Match number of teeth and feed speed
Wavy, rough surface	- Workpiece feed not consistent	Check feed speed and/or transport equipment
	- Infeed rollers with insufficient pressure or worn	Increase pressure of in feed rollers and recut serrations
	- Workpiece too thin or too short	Observe the machine manufacturer guidelines
	- Chip removal too high	Use for several working steps or pre relieve
	- Resin built up on tool, tool is blunt	Remove resin or sharpen
Surface defect Burn marks	- Cutting speed too high	Reduce cutting speed
	- Relation feed speed to number of teeth not adequate	Match number of teeth and feed speed
	- Tool continues to rotate in standing workpiece	Provide for continuous feed
Surface defect Tear-outs	- Wood moisture too low	Check drying control
	- Wood with many branches (loose branches)	Optimisation with crosscut saws and longitudinal joints
Surface defect Chip marks	- Angle geometry not matched to workpiece material	Check and adjust and/or new tool
	- Gap between knife and clamping element	Clean and carefully mount clamping element and knives
	- Gullet too small	Check and increase
	- Extraction hood and extraction not suitable	Contact machine manufacturer to clarify
	- Extraction performance insufficient in tool area	Guideline: 30 m s ⁻¹ air supply speed
Profile defect Workpiece – Angle error – uneven	- Tool set profiles not the same, e. g. sets with feed/against feed	Check and match tool sets
	- Stacked spindle positioned in feed direction or not at right angle to table	Check angle with clock gauge on vertically running spindle in two planes
	- Support table and fence worn out	Reprocess and/or replace support table and fence
	- Angle tolerance between support table and fence too big or fence and process edge not correctly adjusted	Check and adjust angles, align plane from fence to process edge including tool
Motor power Feed speed	- High resin build up on tool, tool blunt	Remove resin from tool and sharpen more frequently
	- Tool gullet too small	Check and increase
	- Cutting angle too small	Adjust or new tool
	- Cutting across grain too deep	Use several working steps or pre cut

Wear of HS cutting edges

When planing solid wood (softwood or hardwood) the HS cutting edges are subject to mechanical and chemical wear.

This leads to blunting of the cutting edges and will consequently affect the quality of the wood surface.

Significant blunting requires considerably more work when resharpening the knives and reduces the number of possible resharpens.



Wear of HS cutting edges.

Pitting wear at the face HS

Chemical wear can be very high because of the consistency of the wood, e.g. machining wet wood can lead to pitting of the face.

The pitting weakens the cutting edge and results in chipping/breakage.

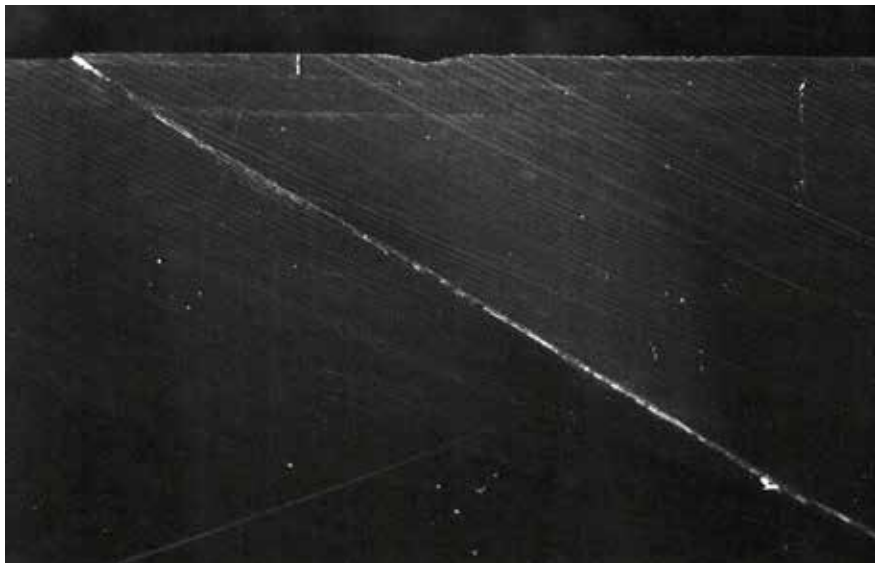


Pitting wear.

Destruction of HW cutting edges

Too large knife projection or tipping material overhang will result in breakages when machining very hard wood. Too large projection of carbide tipped planer knives, plus a low cutting angle can overstress the knife when machining very hard timber. This can result in hairline cracks or knife breakages.

The maximum knife projection, angle geometry and minimum clamping length given in the handling instructions must be adhered to.



Destruction of HW cutting edges.

Cutting edge fractures

Dull cutting edges, unbalancing or weak feed pressure can create vibrations in the machine, especially when machining very hard materials.

An uneven cutting force can result in chipping to the cutting edge. When tools are in constant use, it is important the tools are sharpened frequently and not allowed to become too blunt. A higher cutting angle may help.

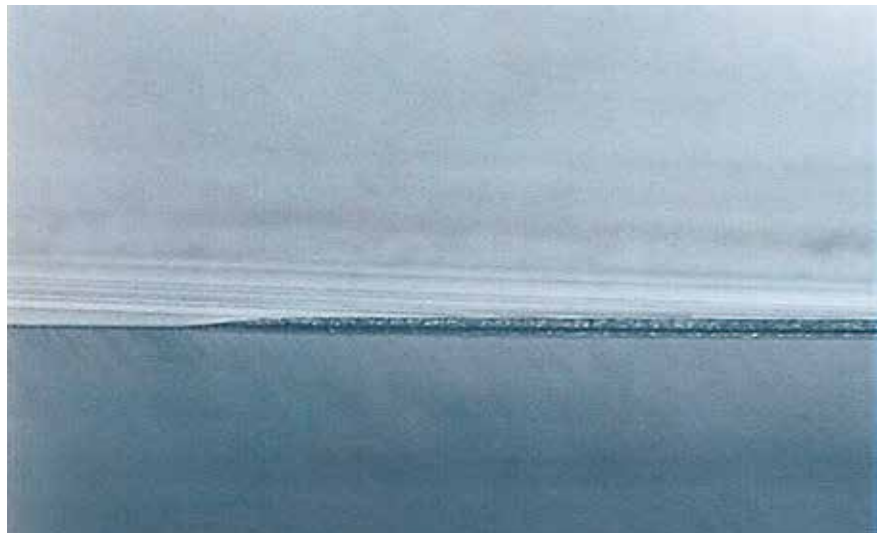


Cutting edge fractures.

Wear to HW cutting edges

The photograph shows the wear of a uniformly blunt cutting edge.

The cutting edge can be resharpened without a significant material loss. This increases the overall performance time of the tool.

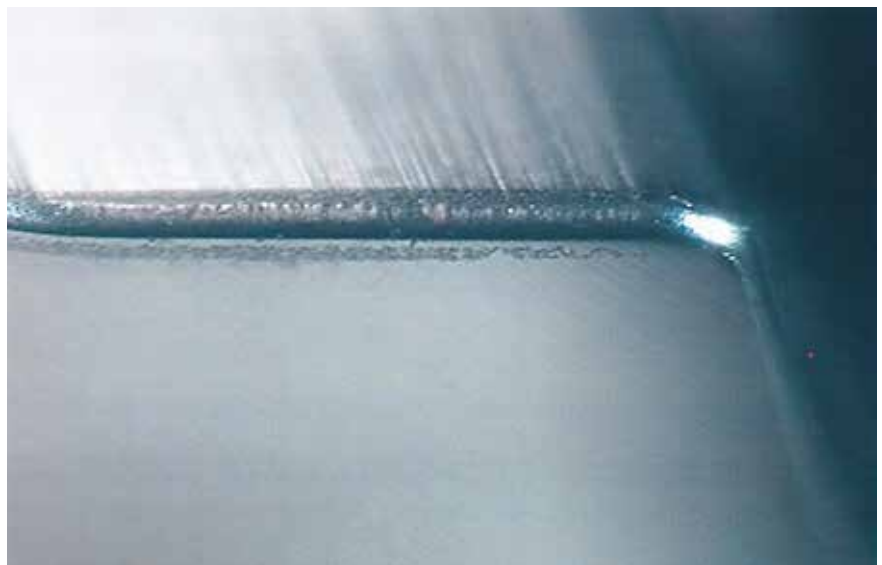


Wear of HW cutting edges.

Too much wear to cutting edges

When the cutting edges are very blunt, the cutting force becomes too high, the surface quality deteriorates, resulting in additional resharpening and loss of tool life.

If the cutting edge is not resharpened correctly, the performance time is reduced, resulting in cutting edge fractures.



Too much wear on cutting edges.

Cutting edge abrasion

For largely homogenised materials, mechanical wear will lead to continuous rounding of the cutting edges.

The quality of the surface determined the level of abrasion and should normally be, as a guideline, between 0.2 to 0.3 mm maximum.

Tipped tools require resharpener to ensure the efficiency of the tools.

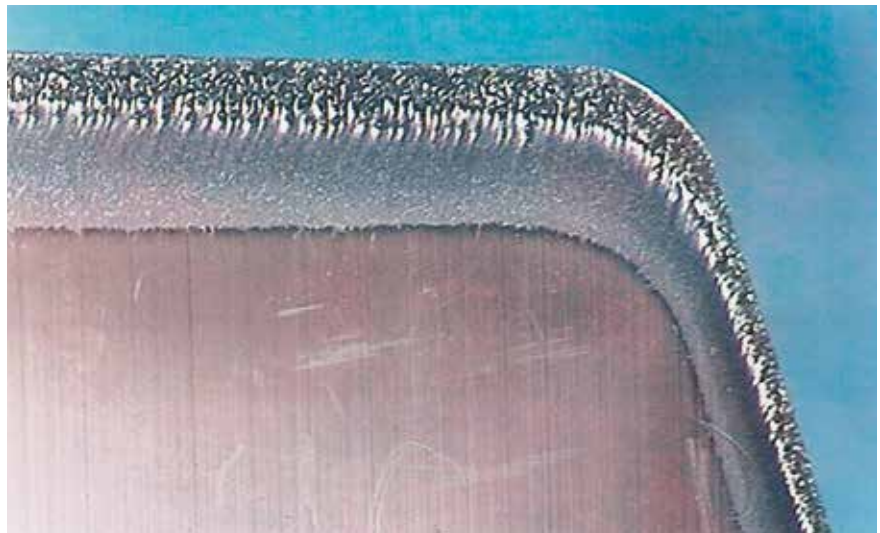


Common rounding of cutting edges after use for spruce

Cutting edge abrasion by chemical impact

When processing workpiece materials with a high content of tannic acids (e.g. oak), the cutting edge abrasion is mainly caused by mechanical plus chemical wear.

Cobalt, a binding agent in tungsten carbide, is washed out by chemical reaction leading to early depletion of the cutting edge.



Chemical impact – Cutting edge abrasion – Application oak

Cutting edge damage caused by improper repair

For cutterheads/sets with HW cutting elements, the knives must be turned or replaced after reaching the end of their performance time.

Resharpener parallel to face will reduce the essential clamping forces, creating gaps between knives and clamping wedges, impair the surface quality, and is not permitted for safety reasons.

Ensure careful cleaning and mounting when changing the knives of tools with turnblade/throw away knives.



Cutting edge abrasion caused by improper repair

Enquiry/order form special tools – planing and profiling

Customer details: Customer number:

Enquiry
 Order

Delivery date: (not binding) CW

Company: _____

Street: _____

Date: _____

Post code/place: _____

Enquiry/order no.: _____

Country: _____

Tool ID: (if known) _____

Phone/fax: _____

No. of pieces: _____

Contact person: _____

Signature: _____

Workpiece material:

- Solid wood Type: _____
- Wood material Type: _____
- Coating Type: _____
- Other Type: _____
- Finish hogging

Moisture: _____ %

Density: _____ g/cm³

Further information: _____

Machine:

(e.g. spindle moulders, four-sided moulders edging machines, window making machines etc.)

Manufacturer: _____

Type/construction year: _____

Model: _____

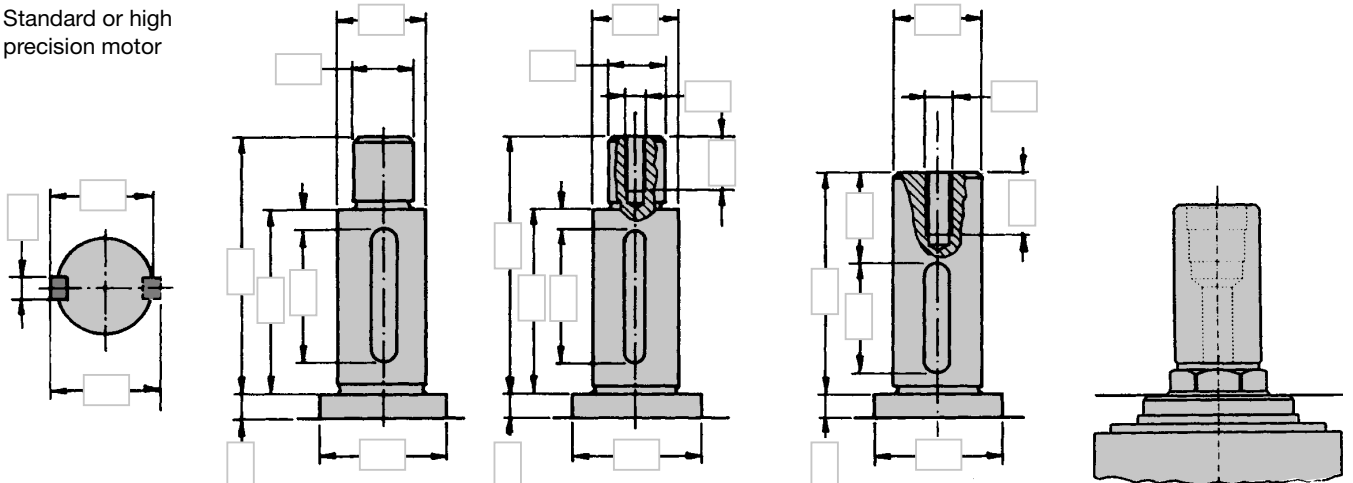
Specification of spindle sequence in feed direction

- e. g.: 1 bottom, 2 right, 3 left, 4 top, 5 multi-purpose
- or: 1 scraping, 2 hogging, 3 cutting, 4 finish cutting, 5 post cutting
- or: 1 sawing, 2 slot/tenon, 3 cutting with feed, 4 cutting against feed

Motor no.:	Power:	RPM:	Spindle dimension:	Additional information:
1	_____ kW	_____ min ⁻¹	_____ mm	_____
2	_____ kW	_____ min ⁻¹	_____ mm	_____
3	_____ kW	_____ min ⁻¹	_____ mm	_____
4	_____ kW	_____ min ⁻¹	_____ mm	_____
5	_____ kW	_____ min ⁻¹	_____ mm	_____

Direction of rotation (LH/RH) or cutting direction (with feed/against feed) must be specified for each spindle.

Standard or high precision motor



Enquiry/order form special tools – planing and profiling

Tool:

Tool type (e.g. one part/tipped tools/assembled tool, see product information)

Dimension:

Diameter: _____ mm

Cutting width: _____ mm

Bore: _____ mm

Number of teeth: _____

Cutting material:

HL

HS

ST

HW

DP

Cutting point:

no cutting point

sleeve with interlock

sleeve without interlock

quick clamping sleeve

hydro sleeve

Direction of rotation:

right hand rotation

left hand rotation

Cutting direction:

with feed

against feed

Kind of feed:

manual (MAN)

mechanical (MEC)

Feed speed: _____ min⁻¹

Cutting width (SB): _____ mm

Cutting depth: _____ mm

Remark:

zero diameter: _____ mm

max. diam.: _____ mm

zero height: _____ mm

clamping length: _____ mm

Application:

Solid wood

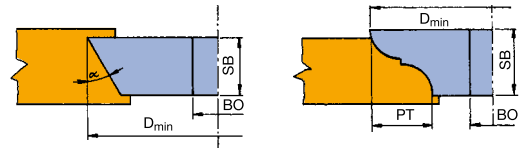
Wood materials top layer

longitudinal

Medium layer

crosscut front

Top and medium layer



Technical information:

Tipped tools (bevel trimming cutters/profile routers):

Design: bending test, Z2, mech. feed, Z3, Z4, round shape
Tooth shape: with/without spur

Table for min. tool diameter.

Applicable for bevel trimming cutter

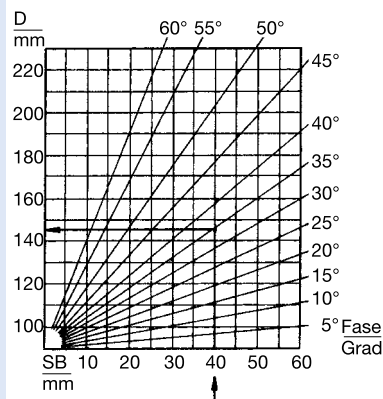
BO – 30 mm:

For bore 40 mm:

D + 10 mm

For bore 50 mm:

D + 20 mm



Formula for min. tool diameter:

Applicable for profile routers BO – 30 mm:

For bore 40 mm: D + 10 mm

For bore 50 mm: D + 20 mm

Formula: $D_{min} = 100 + 2 \times PT$ (mm)

Note:

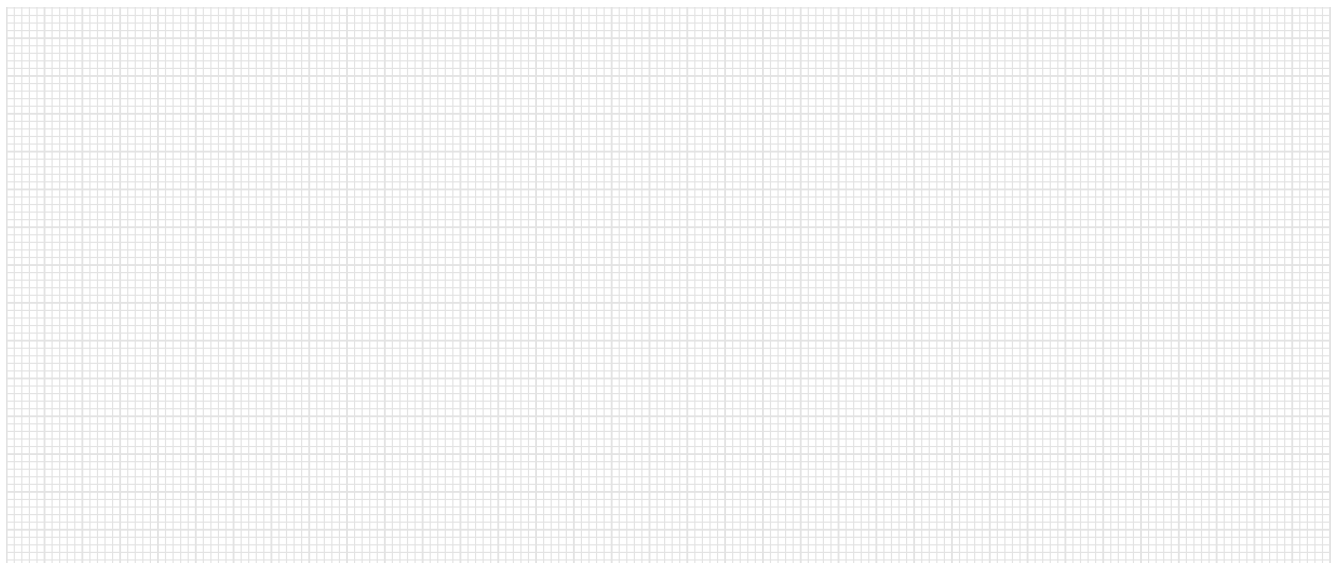
Bevels of more than 45° and large profile depths require large diameters. The maximum permitted RPM must be considered when calculated the cutting diameter and must not be exceeded. Profile sketches must clearly indicate whether the material (wood) or cutter is shown. Please specify motor side, direction of rotation, dimensions and any other conditions on the material sample or the drawings.

Assembled tools with turnblade/throw away knives:

Formula: $D_{min} = 90 + 2 \times PT$ (mm) – Applicable for BO – 30 mm

Sketch for application plan, profile drawing, special motor spindle etc.

Please specify workpiece support and fence side and/or workpiece face side top/bottom.



Alphabetical product index

B	
Basic / extension cutter ZL 10/11 mm, TG 3.8 mm	68

C	
Clamping collars without thread	10, 47
Clamping element with threaded nut	79
Clamping sleeve with threaded nut for LH/RH rotation	68
Combination tools for planing and profiling	30-32
Cutterhead for groove bed guide	12
Cutterheads for finish planing	17-29
Cutterheads for multi-purpose profiling	40-49
Cutterheads for pre and finish planing	13-16
Cutterheads for pre-planing	6-12

D	
Double scoring saw mounted on flanged sleeve	82

F	
Finger jointing	50-52, 54-83

G	
Grooving, jointing, rebating (kerving)	84

H	
High performance minifinger cutters	61-68
Hydro minifinger cutterhead TurboHawk with curved knives	76
Hydro planerhead	22, 28
Hydro Planerhead HeliPlan	10
Hydro planerhead TurboPlan PLUS	29
Hydro profile cutterhead for serrated back blank knives	46-47

M	
Minifinger cutterhead with HW turnblade knives	75
Minifinger disc cutter, HW, with and without shoulder cutter	79
Minifinger disc cutters	78-79
Minifinger joint cutter and shoulder cutter, Marathon, real Z 6	68
Minifinger joint cutter, HS	56-57
Minifinger joint cutter, HW	60
Minifinger joint cutter, Marathon	58-59
Minifinger joint cutter, Marathon, real Z 4	65-66
Minifinger joint cutter, Marathon, real Z 6	67
Minifinger joint cutterhead with replaceable knives	73
Minifinger joint cutterheads	69-77
Minifinger joint cutters	54-60

P	
Planerhead CentroStar	26
Planerhead HeliPlan with 4 edge HW turnblade knives	8-9
Planerhead VariPlan Plus	14-16
Planerhead VariPlan Plus/ProFix F system PF 25	31-32
Planerhead wedge-type system	25
Planerhead with HSK 85 WS and serrated back HS Marathon planer knives	27
Planing	6-32
Planing and profiling	1-92
Profile cutterhead ProFix F	42
Profile cutterhead set ProfilCut Q - bevelling / rounding	37
Profile cutterhead VariForm	43
Profile cutterhead with HSK 85 WS for serrated back blank knives	48-49

Profile cutterheads for serrated back blank knives	41, 44
Profiling	33-49

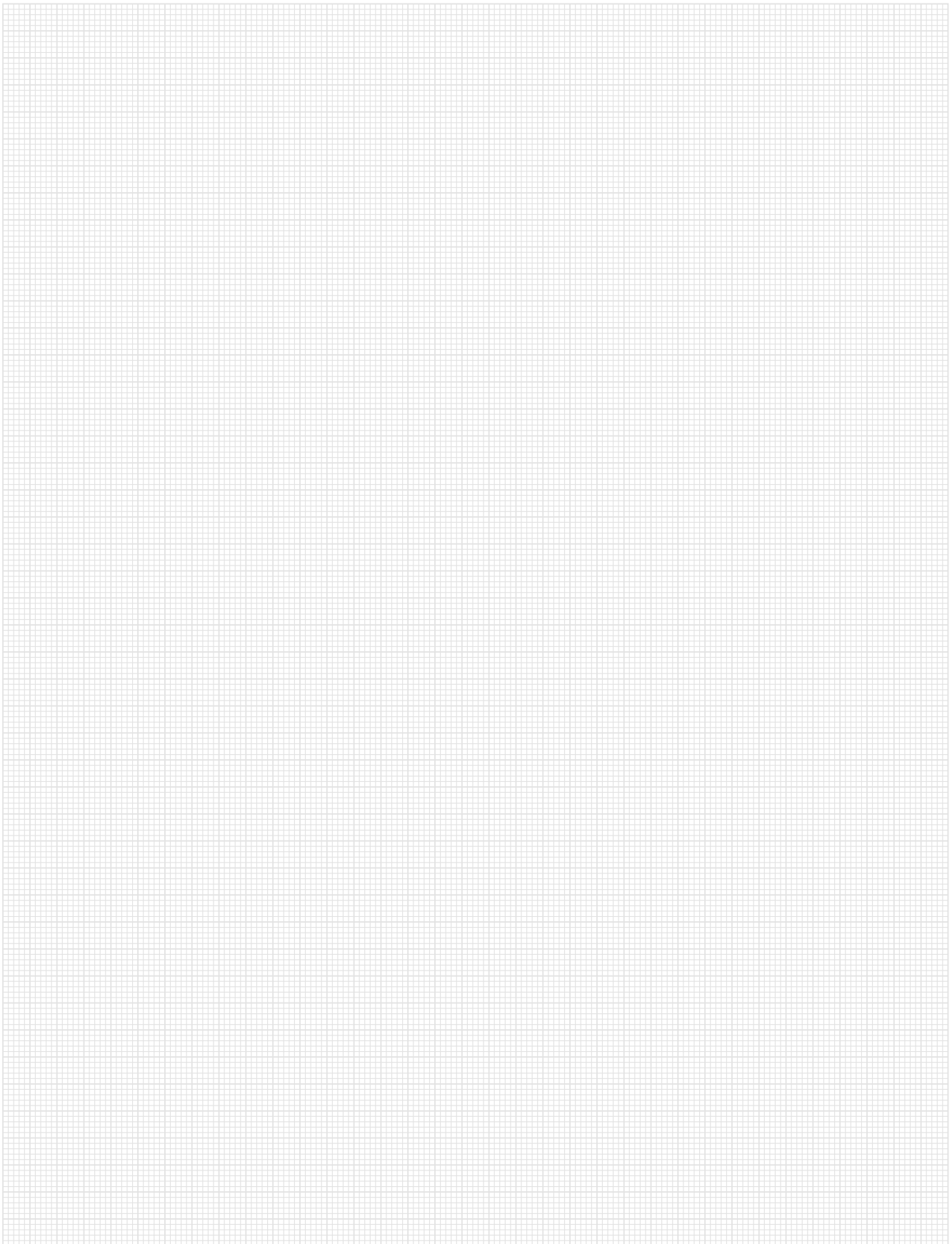
R	
Radius profile cutterheads	37-39
Rebating cutterhead for joinery machines - HeliCut 15	84
Rebating cutterheads for multi-purpose processing	84
Reference cutterhead	11

S	
Sawblade hogger for trimming minifingers	83
Sawblade hogger mounted on flanged sleeve	83
Scorer for shoulder minifinger joints	82
Scoring sawblade for Grecon PowerJoint	82
Scoring sawblades and hoggers	80-83
Shoulder cutter profile 2 and 3 for ZL 10/11 mm, TG 3.8 mm	68
Single scoring saw mounted on flanged sleeve	82
Spacer	11, 68
Spacers	79

T	
Tongue and groove cutter, HL solid / HS tipped	36
Tools for tongue and groove joints	33-36

ID	Page	ID	Page	ID	Page	ID	Page	ID	Page	ID	Page
014043 ●	42	029474 ●	68	120706 ●	65	121814	66	132207	10	134502	15
014044 ●	42	029475	68	120707 □	65	121815	66	132208	10	134503	15
014045 □	42	029476 ●	68	120708 □	65	122400 □	68	132209	10	134504 □	15
014046 □	42	029477	68	120709 ●	59	122401 □	68	132210	10	134505 □	15
014047 □	42	029478	68	120710 □	59	123003	58	132211	10	134506	15
014048 □	42	029479	68	120711 ●	59	123004	58	132212	10	134507	15
020386 ●	12	029695 ●	79	120712 □	59	123005 ●	58	132213	10	134508	15
020388 ●	12	030423 ●	8	120713 ●	59	123100 ●	58	132214	10	134509	15
020389 ●	12	030452	8	120714 ●	59	123101 ●	58	132538	84	134510 □	15
020390 ●	12	030466 ●	8	120715 □	59	123102 ●	58	132539	84	134511 □	15
021509 ●	79	030467 ●	8	120716 □	59	126063 □	37	132540	84	134512	15
021511 ●	79	030468	8	120721	59	126064 □	37	132541	84	134513	15
021513 ●	79	030469	8	120722	59	126065 □	37	132542	84	134514	15
021543 ●	56	030470 ●	8	120723	59	130442 ●	26	132543	84	134515	15
021600 ●	60	030700 ●	10, 47	120724	59	130443 □	26	132544	84	134581 □	16
021601 ●	60	030702 ●	10, 47	120725	65	130446 ●	26	132545	84	134600 □	15
021602 ●	60	061986 □	82	120726	65	130447 □	26	132546	84	134601 □	15
021603 ●	60	061987 □	82	120810 ●	59	130454	26	132547	84	134602	15
021604 □	60	061988 □	82	120811 □	59	130455	26	132548	84	134603	15
021605 □	60	061989 □	82	120812 ●	59	130458	26	132549	84	134604 □	15
021644 ●	60	061990 □	82	120813 □	59	130459	26	132550	84	134605 □	15
021645 ●	60	061991 □	82	120814 □	59	130492 ●	26	132551	84	134606	15
021648	60	061995 ●	82	120815 □	59	130493 □	26	132552	84	134607	15
021652	60	062618 □	83	120816 □	59	130494 ●	26	132553	84	134608	15
021668 ●	57	062619 □	83	120817 □	59	130495 □	26	132554	84	134609	15
021669 ●	57	062620 □	83	120818 □	59	130496	26	132555	84	134610 □	15
021670 □	57	062621 □	83	120819 □	59	130497	26	134200 ●	14	134611 □	15
021674 □	57	062622 □	83	120820 □	59	131058 ●	31	134201	14	134612	15
021685 ●	56	062623 □	83	120821 □	59	131059 ●	31	134202 ●	14	134613	15
021688 □	56	062632 □	82	120834	59	131060 ●	31	134203	14	134614	15
021689 ●	56	062633 □	82	120835	59	131116 □	32	134204	14	134615	15
021692 ●	56	120313 □	56	120836	59	131117 □	32	134205 ●	14	134681 □	16
021693 ●	56	120316 □	56	120837	59	131118 □	32	134206	14	135000 □	75
021694 ●	56	120318 □	56	120838	66	131119 □	32	134208	14	135001 □	75
021695 □	56	120412 ●	56	120839	66	131120 □	32	134214 ●	43	135004 □	75
021696 ●	56	120413 □	56	120840	66	131121 □	32	134250 □	14	135005 □	75
021697 ●	56	120414 □	56	120841	66	132000 □	9	134251	14	135206 ●	43
021729 ●	57	120415 □	56	121012 ●	67	132001 □	9	134252 □	14	135208 ●	43
021730 □	57	120420	56	121013 ●	67	132008	9	134253	14	135212 ●	43
021762 ●	79	120421	56	121608 □	68	132009	9	134254	14	135500	76
021764 ●	79	120422	56	121609 □	68	132012	9	134255 □	14	135501	76
021876	36	120423	56	121610 □	68	132013	9	134256	14	135508	76
021883	36	120510 □	57	121611 □	68	132014 ●	9	134258	14	135509	76
021913	36	120511 □	57	121700 □	65	132015 ●	9	134400 ●	14	135516	76
021964	36	120515 ●	57	121701 □	65	132022 □	9	134401	14	135517	76
021969	36	120516 ●	57	121702 ●	65	132023 □	9	134402 ●	14	135524	76
022016	36	120524	57	121703 ●	65	132024 □	9	134403	14	135525	76
022153 ●	79	120525	57	121704 □	65	132025 □	9	134404	14	135532	76
022200 ●	79	120526	57	121705 □	65	132065 □	9	134405 ●	14	135533	76
022204 ●	79	120527	57	121706 □	65	132066 □	9	134406	14	135540	76
022730	73	120601 ●	67	121707 □	65	132075 ●	11	134408 ●	14	135541	76
022731	73	120608 ●	58	121708 □	65	132076 ●	11	134450 □	14	135548	76
022732	73	120609 □	58	121709	65	132077 ●	11	134451	14	135549	76
022733	73	120612 ●	58	121710	65	132078 ●	11	134452 □	14	135556	76
028437 ●	79	120613 ●	58	121711	65	132200	10	134453	14	135557	76
028439 ●	79	120616 □	58	121808	66	132201	10	134454	14	135564	76
028447 ●	68	120617 □	58	121809	66	132202	10	134455 □	14	135565	76
028448 ●	68	120620 □	58	121810	66	132203	10	134456	14	135802 ●	44
028450 ●	79	120622 □	58	121811	66	132204	10	134458	14	135805 ●	44
028678 ●	79	120624 □	68	121812	66	132205	10	134500 □	15	135806 ●	44
029473 ●	79	120705 □	65	121813	66	132206	10	134501 □	15	135808 ●	44

ID	Page	ID	Page	ID	Page	ID	Page
135809 ●	44	136220	48	137036	46	140413	25
135810	44	136221	48	137037	46	140414	25
135812 ●	44	136224 ●	48	137038	46	140415 ●	25
135814 ●	44	136225 ●	48	137039 ●	46	140458 □	25
135816 ●	44	136226 ●	48	137040 ●	46	140459 □	25
135817 ●	44	136227 ●	48	137041 ●	46	140460	25
135819 ●	44	136228 ●	48	137042 ●	46	140461 □	25
135821 ●	44	136229 ●	48	137043 ●	46	140462	25
135822	44	136230 ●	48	137044 ●	46	140463	25
135823	44	136231 ●	48	137045 ●	46	140464	25
135825 ●	44	136232 ●	48	137046	46	140465 □	25
135826 ●	44	136233 ●	48	137047	46	142050	28
135827	44	136234	48	137048	46	142051	28
135829 ●	44	136235	48	137049 ●	46	142052	28
135830	44	136236 ●	48	137050	46	142053 ●	28
135831 ●	44	136237 ●	48	137051 ●	46	142054 ●	28
135833 ●	44	136240	48	137052	46	142055 ●	28
135836	44	136241	48	137053	46	142056 ●	28
135838 ●	44	136242 ●	48	140302 ●	27	142057 ●	28
135840	44	136243 ●	48	140303 ●	27	142058	28
135841	44	136244	48	140304	27	142059	28
135842	44	136245	48	140305	27	142060	28
135843	44	136248 ●	49	140306	27	142061	28
135900	73	136249 ●	49	140307	27	142062	28
135901	73	136250 ●	49	140312	27	142063	28
135902	73	136251 ●	49	140313	27	142064	28
135903	73	136252	49	140314	27	142065	28
135904	73	136253	49	140315	27	142066	28
135905	73	136254 ●	49	140322 ●	27	142067	28
135906	73	136255 ●	49	140323 ●	27	142068	28
135907	73	136256 ●	49	140324 ●	27	142230	29
135908	73	136257 ●	49	140325 ●	27	142231	29
135909	73	136258	49	140326 ●	27	142232	29
135910	73	136259	49	140327 ●	27	142233	29
135911	73	136260	49	140330 ●	27	142234	29
136192	49	136261	49	140331 ●	27	142235	29
136193	49	136264	49	140332 ●	27	142236	29
136194	49	136265	49	140333 ●	27	142237	29
136195	49	136266	49	140334 ●	27	142238	29
136196	49	136267	49	140335 ●	27		
136197	49	136270 ●	49	140336 ●	27		
136198 ●	48	136271 ●	49	140337 ●	27		
136199 ●	48	136272 ●	49	140340	27		
136200	48	136273 ●	49	140341	27		
136201	48	136274 ●	49	140342	27		
136202 ●	48	136275 ●	49	140343	27		
136203 ●	48	136276 ●	49	140344	27		
136204 ●	48	136277 ●	49	140345	27		
136205 ●	48	136278	49	140346 ●	27		
136206 ●	48	136279	49	140347 ●	27		
136207 ●	48	136280	49	140348 ●	27		
136208 ●	48	136281	49	140349 ●	27		
136209 ●	48	136282	49	140350 ●	27		
136210	48	136283	49	140351 ●	27		
136211	48	136400 ●	48	140352 ●	27		
136212 ●	48	136401 ●	48	140353 ●	27		
136213 ●	48	136402 ●	48	140408 ●	25		
136216	48	136403 ●	48	140409 ●	25		
136217	48	136404 ●	48	140410	25		
136218 ●	48	136405 ●	48	140411 ●	25		
136219 ●	48	137035	46	140412	25		



Key to pictograms

	Scoring, top and bottom		Manual feed		Resharpenable cutting face
	Hogging		Solid metal tool		Resharpenable clearance face
	Grooving, horizontal and vertical		Tipped tool		Low noise
	Jointing		Light alloy body		High-alloyed tool steel
	Rebating		Interchangeable knives		High-speed steel
	Profiling		Mechanical knife clamping, reversible		Tungsten carbide
	Profiling joints		Centrifugal knife clamping, reversible		Carbide metal coating
	Profiling tongue and groove		Mechanical knife clamping, adjustable - serrated		
	Planing		Mechanical knife clamping adjustable - plane echan.		
	Planing, profiling		Mechanical knife clamping, re-sharpenable and constant diameter		
	Mechanical feed		Hydro clamping		

