

## Finger Jointing Tools / Planing Mills

### Finger Jointing Tools

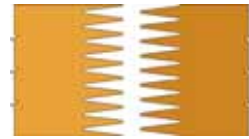
198 Finger Joint Cutters HS, Z 2+2 and Z 3+3	13
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## Cutter type

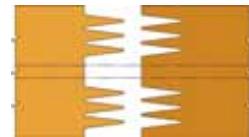
### Finger Joint Cutters

Load bearing wood and lengthening joints (end-to-end) are produced by finger jointing. The customary finger lengths 30-50 mm could be reduced thanks to improved tool technology which resulted in a significant reduction of wood waste (finger length 10/15/20 mm).



### The load bearing capacity of the Finger Joints

The load bearing capacity of the finger joints is in accordance with the measurement proportions specified in the DIN norms (e.g. finger length, angle, finger pitch, etc.)



We classify according to 2 groups of load bearing capacity: I and II. These two groups in turn must comply with particular requirements of finger jointing. The weakening degree, length of finger and angle of flanks are interdependent factors of finger joint cutters. The weakening degree  $v$  is decisive for the load bearing capacity of a finger joint. The bigger  $v$  is the lower is the possible load bearing of a finger joint. The following results are valid for each classification:  
 group of load bearing capacity I  $v \leq 0,18$  for the  
 group of load bearing capacity II  $v \leq 0,25$ .

### Overview

#### Jointing profile

Finger length L	10	15	20
Finger division t	3,8	3,8	6,2
Width finger bast b	0,6	0,54	0,9
Weakening degree v	0,15	0,14	0,14
Group of load bearing capacity	I +II	I +II	I +II

### Compact Cutters

#### e.g. Cutters No. 198/199

HS, HS-Super or HW-tipped, proven performance and extremely robust tooth design and extended edge life.



### Single Cutters

#### e.g. Cutters No. 200


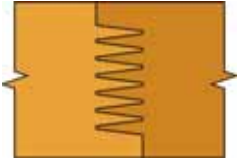

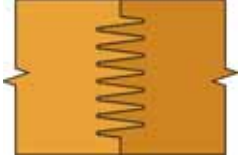
Individual cutting discs with the possibility to add or remove single discs according to the required cutting height. Spiral cutting effect permits higher feed speeds with either 4 or 6 effective cutting twings.



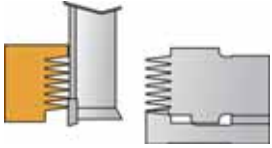
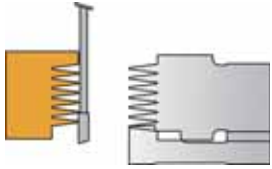
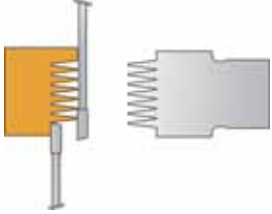
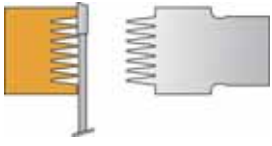
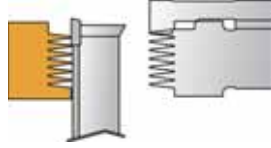
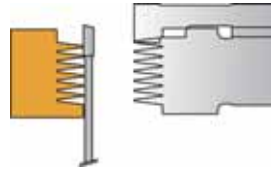
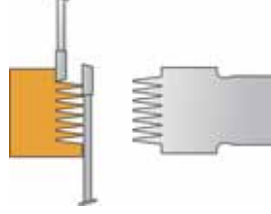
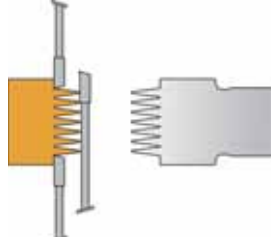
## Type of Finger Joints

### Finger Joint Cutters

Depending on the wood, jointing profiles with or without edge fingers can be produced. Depending on the machine utilized the edge joints can be produced with a cut-off saw or with the dedicated tools.

<p><b>a) Endless galvanizing</b></p>		<p><b>c) Double-sided butt joint</b> edge joints staggered positioned</p>	
<p><b>b) Double-sided</b> edge joints - single sided</p>		<p><b>c) Double-sided butt joint</b> edge joints centric</p>	

### Examples

<p><b>A</b></p> <ul style="list-style-type: none"> <li>- Cut-off from top with hogger</li> <li>- With edge cutting by means of Edge Joint Cutters</li> </ul>		<p><b>B</b></p> <ul style="list-style-type: none"> <li>- Cut-off from top with saw blade</li> <li>- With edge cutting by means of Edge Joint Cutters</li> </ul>		<p><b>C</b></p> <ul style="list-style-type: none"> <li>- Cut-off from top with saw blade</li> <li>- Bevelling with Scoring Saw Blade from bottom</li> </ul>		<p><b>D</b></p> <ul style="list-style-type: none"> <li>- Cut-off from bottom with saw blade</li> </ul>		<p><b>E</b></p> <ul style="list-style-type: none"> <li>- Cut-off from bottom with hogger</li> <li>- With edge cutting by means of Edge Joint Cutters</li> </ul>		<p><b>F</b></p> <ul style="list-style-type: none"> <li>- Cut-off from bottom with saw blade</li> <li>- With edge cutting by means of Edge Joint Cutters</li> </ul>		<p><b>G</b></p> <ul style="list-style-type: none"> <li>- Cut-off from bottom with saw blade</li> <li>- Bevelling with Scoring Saw Blade from top</li> </ul>		<p><b>H</b></p> <ul style="list-style-type: none"> <li>- Cut-off from bottom with saw blade</li> <li>- Bevelling with Scoring Saw Blade from top and bottom</li> </ul>	
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## Application of

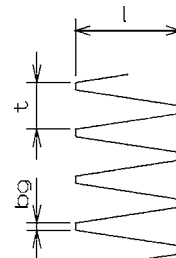
### Finger Joint Cutters

Different tools are used depending on the application:

#### Machines without Cut-Off Saw

The required finger tools are designed for finger joint profiles 10 / 10 mm, 15 / 15 mm, 20 / 20 mm.

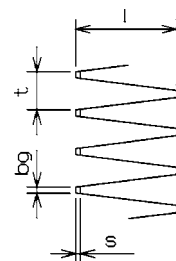
Finger joint with gap "s" can be produced. The gap can vary and depends, e.g., on the following factors: material type, tool and machine.



#### Machines with Cut-Off Saw

The required finger tools are designed for the finger joint profiles 10 / 11mm, 15 / 16,5 mm, 20 / 22 mm.

Thanks to the precise cut-off of the fingers (adjustment) close fitting finger joints without play "s" can be produced.

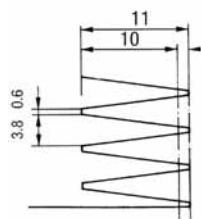


#### Cut-off sized finger jointing profile

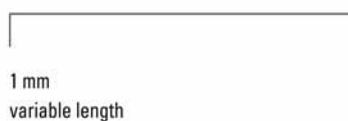
With the cut-off device the actual profile depth on wood with finger joint length 10/11 mm can vary between 10 to 11 mm. With finger joint length 15/16,5 mm the profile depth can vary between 15 and 16,5 mm. With finger joint length 20/22 mm the profile depth can vary between 20 and 22 mm.

The variable profile length allows to change the fitting conditions.

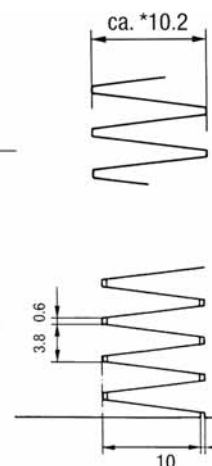
##### Profile example 10/11 mm before cut-off saw



Finger joint cut to \*10.2 mm close fit profile \* = dependent on type of wood



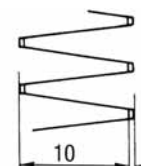
Finger-joint cut to 10 mm = profile 10/10 with gap



##### Profile example 10/10 mm length without cut-off saw



0.32 gap theoretical value





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## 198 Finger Joint Cutters HS, Z 2+2 and Z 3+3

### HS-tipped



#### Design

- Straight face
- Designed to prevent independent rotation
- HS-tipped
- Extended profile of finger 10/11, 15/16,5 and 20/22 for machines with cross-cut device

#### Machine

- On Finger Joint Machines

#### Application

- Finger joints in solid wood
- Soft wood (HS-tipped)
- Glued wood
- Wood construction in conformity with DIN 68140-1, construction of windows, manufacture of floors and strips

#### Overview:

Required No. of Cutters for the given timber width of a given finger length



#### Overview

##### Wood with to finger length:

##### No. of Cutters

4 mm finger	10 or 15 mm finger	20 mm finger, t = 6,2	20 mm finger, t = 5,0	
B = 26	B = 28,6	B = 33	B = 37	
25	24	28	32	1
49	51	59	67	2
73	77	90	102	3
97	104	121	137	4
121	131	152	172	5
145	157	183	207	6
169	184	214	242	7
193	210	245	277	8
217	237	276	312	9
241	264	307	347	10

#### 198 HS-tipped Tool

Ø D mm	B mm	Ø d mm	n <sub>max</sub> min <sup>-1</sup>	Stock mm	t mm	Z	No. of Microf.	L	Order-No.
<b>4 mm finger:</b>									
160	26	50	9000	4/4	1,6	4	16	x	50572490
<b>10 mm finger:</b>									
160	28,6	50	8000	10/10	3,8	2+2	7	x	50572497
250	28,6	50	6000	10/10	3,8	3+3	7	x	50572519
160	28,6	50	8000	10/11	3,8	2+2	7	x	50572501
160	32,4	50	8000	10/11	3,8	2+2	8	x	50572509
160	32,4	50	6000	10/11	3,8	3+3	8	x	50572508
250	13,4	50	6000	10/11	3,8	3+3	3	x	50572548
250	17,2	50	6000	10/11	3,8	3+3	4	x	50572547
250	21	50	6000	10/11	3,8	3+3	5	x	50572546
250	28,6	50	6000	10/11	3,8	3+3	7	x	50572516
<b>15 mm finger:</b>									
170	28,6	50	8000	15/15	3,8	2+2	7	x	50572507
260	28,6	50	6000	15/15	3,8	3+3	7		50572520
170	28,6	50	8000	15/16,5	3,8	2+2	7	x	50572510
170	28,6	50	8000	15/16,5	3,8	3+3	7	x	50572690
260	28,6	50	6000	15/16,5	3,8	3+3	7	x	50572521
<b>20 mm finger with 6,2 mm division:</b>									
180	33	50	8000	20/20	6,2	2+2	5	x	50572512
180	33	50	8000	20/22	6,2	2+2	5	x	50572514
260	33	50	6000	20/22	6,2	3+3	5	x	50572518
<b>20 mm finger with 5,0 mm division:</b>									
180	37	50	8000	20/20	5,0	2+2	7	x	50572572
180	37	50	8000	20/22	5,0	2+2	7		50572571
260	37	50	6000	20/22	5,0	3+3	7	x	50572570





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## 196 Finger Joint Cutters HS real Z=6

HS-tipped



### Design

- HS-tipped
- Real Z=6
- Prevent individual rotation

### Machine

- For use on High-performance finger jointing machines

### Application

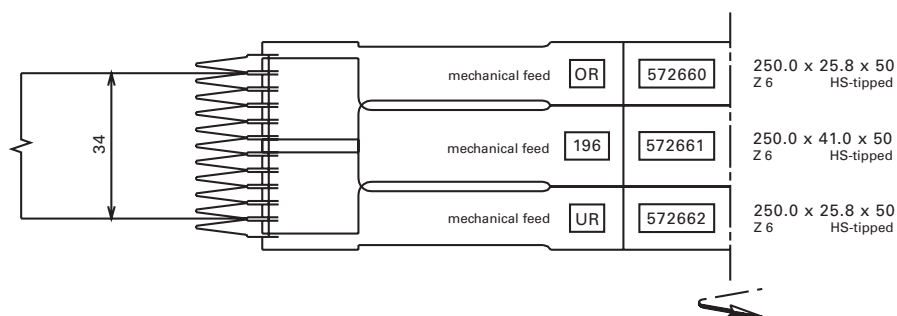
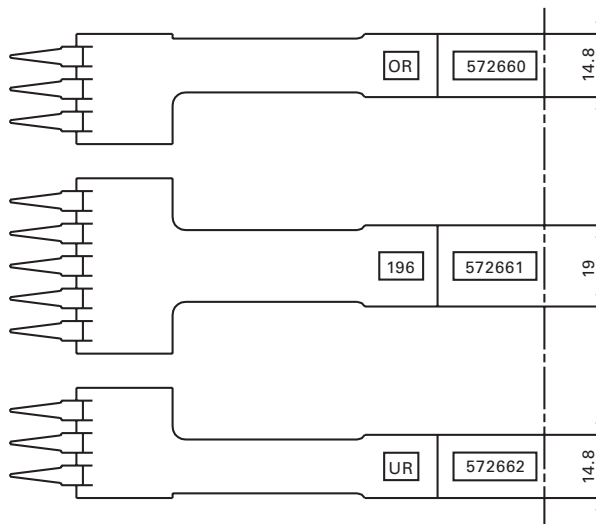
- For high feed rates up to 54 m/min
- For soft wood

### TOOL

Cutter no.	∅ D mm	B mm	∅ d mm	n <sub>max</sub> min <sup>-1</sup>	Stock mm	t mm	Z	No. of Microf.	L	Order-No.
<b>10 mm finger:</b>										
196 OR	250	25,8	50	6000	10/11	3,8	6	3	x	50572660
196	250	41	50	6000	10/11	3,8	6	6	x	50572661
196 UR	250	25,8	50	6000	10/11	3,8	6	3	x	50572662
<b>15 mm finger:</b>										
196 OR	170	25,8	50	8000	15/15	3,8	4	3	x	50572666
196	170	41	50	8000	15/15	3,8	4	6	x	50572667
196 UR	170	25,8	50	8000	15/15	3,8	4	3	x	50572668
<b>15/16,5 mm finger:</b>										
196 OR	170	25,8	50	8000	15/16,5	3,8	4	3	x	50572664
196	170	41	50	8000	15/16,5	3,8	4	6	x	50572670
196 UR	170	25,8	50	8000	15/16,5	3,8	4	3	x	50572671

### Working width Number of Cutter

15 mm	OR + UR
34 mm	OR + 1 + UR
53 mm	OR + 2 + UR
72 mm	OR + 3 + UR
91 mm	OR + 4 + UR
110 mm	OR + 5 + UR
129 mm	OR + 6 + UR
148 mm	OR + 7 + UR
167 mm	OR + 8 + UR
186 mm	OR + 9 + UR
208 mm	OR + 10 + UR





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## 198 Finger Joint Cutters HS-Super, Z 2+2 and Z 3+3

### HS-Super tipped



#### Design

- Straight face
- Designed to prevent independent rotation
- HS-Super for a considerably longer edge life than normal HS
- Extended profile of finger 10/11 mm, 15/16,5 mm and 20/22 mm for machines with cross-cut device.

#### Machine

- On finger jointing machines

#### Application

- Finger joints in solid timber
- Soft wood (HS-tipped)
- Glued timber
- Wood construction in conformity with DIN 68140-1, construction of windows, manufacture of floors and strips

#### Overview:

No. of cutters required for a given timber width:  
a given timber width:



#### Overview

##### Wood with to finger length:

	10 or 15 mm finger	20 mm finger, t = 6,2	20 mm finger, t = 5,0	No. of Cutters
	B = 28,6	B = 33	B = 37	
	24	28	32	1
	51	59	67	2
	77	90	102	3
	104	121	137	4
	131	152	172	5
	157	183	207	6
	184	214	242	7
	210	245	277	8
	237	276	312	9
	264	307	347	10

### 198 HS-Super tipped

#### TOOL

Ø D mm	B mm	Ø d mm	n <sub>max</sub> min <sup>-1</sup>	Stock mm	t mm	Z	No. of Microf.	L	Order-No.
<b>10 mm finger:</b>									
160	28,6	50	8000	10/10	3,8	2+2	7	x	50573497
250	28,6	50	6000	10/10	3,8	3+3	7		50573519
160	28,6	50	8000	10/11	3,8	2+2	7	x	50573501
250	28,6	50	6000	10/11	3,8	3+3	7	x	50573516
<b>15 mm finger:</b>									
170	28,6	50	8000	15/15	3,8	2+2	7	x	50573507
260	28,6	50	6000	15/15	3,8	3+3	7		50573520
170	28,6	50	8000	15/16,5	3,8	2+2	7	x	50573510
260	28,6	50	6000	15/16,5	3,8	3+3	7	x	50573514
<b>20 mm finger with 6,2 mm division:</b>									
180	33	50	8000	20/20	6,2	2+2	5	x	50573512
180	33	50	8000	20/22	6,2	2+2	5		50573514
<b>20 mm finger with 5,0 mm division:</b>									
180	37	50	8000	20/20	5,0	2+2	7		50573572
180	37	50	8000	20/22	5,0	2+2	7		50573571





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## 198 Finger Joint Cutters HW, Z 2+2 and Z 3+3

HW tipped



### Design

- Straight face
- Designed to prevent independent rotation
- HW-tipped
- Extended profile of finger 10/11, 15/16,5 and 20/22 for machines with cross-cut device

### Machine

- On Finger Joint Machines

### Application

- Finger joints in solid wood
- Hard- and exotic wood
- Glued wood
- Wood construction in conformity with DIN 68140-1, construction of windows, manufacture of floors and strips

### Tool

∅ D mm	B mm	∅ d mm	n <sub>max</sub> min <sup>-1</sup>	Stock mm	t mm	Z	No. of Microf.	L	Order-No.
<b>10 mm finger:</b>									
160	28,6	50	8000	10/10	3,8	2+2	7		50640100
250	28,6	50	6000	10/10	3,8	3+3	7		50640105
160	9,6	50	8000	10/11	3,8	2+2	2		50640121
160	13,4	50	8000	10/11	3,8	2+2	3		50640122
250	13,4	50	6000	10/11	3,8	3+3	3		50640111
160	17,2	50	8000	10/11	3,8	2+2	4		50640123
250	17,2	50	6000	10/11	3,8	3+3	4		50640110
160	21	50	8000	10/11	3,8	2+2	5		50640124
250	21	50	6000	10/11	3,8	3+3	5		50640109
160	28,6	50	8000	10/11	3,8	2+2	7	x	50640101
250	28,6	50	6000	10/11	3,8	3+3	7	x	50640106
<b>15 mm finger:</b>									
170	28,6	50	8000	15/15	3,8	2+2	7	x	50640102
260	28,6	50	6000	15/15	3,8	3+3	7		50640107
170	28,6	50	8000	15/16,5	3,8	2+2	7		50640103
260	28,6	50	6000	15/16,5	3,8	3+3	7		50640108



198 160x26x50



198/H 198 160x28,6x50  
(250x28,6x50)



198/H 198 170x28,6x50  
(260x28,6x50)



198 180x33x50  
(260x33x50)





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## 194/H 194 Supplementary Jointing Cuttersets



### Design

- Cutting diameter 250 mm with 6 wings, cutting diameter 160 mm with 4 teeth
- Straight face
- HS- or HW-tipped
- To be used with Finger Joint Cutter 198 / H198 with finger length 10/ 11 mm

### Machine

- On Finger Joint Machines

### Application

- For machines with Cut-Off Saw
- For end-grain jointing with a closed outer joint as required in windows, mouldings or furniture
- HS-tipped for soft wood
- HW-tipped for hard wood

### HS-tipped

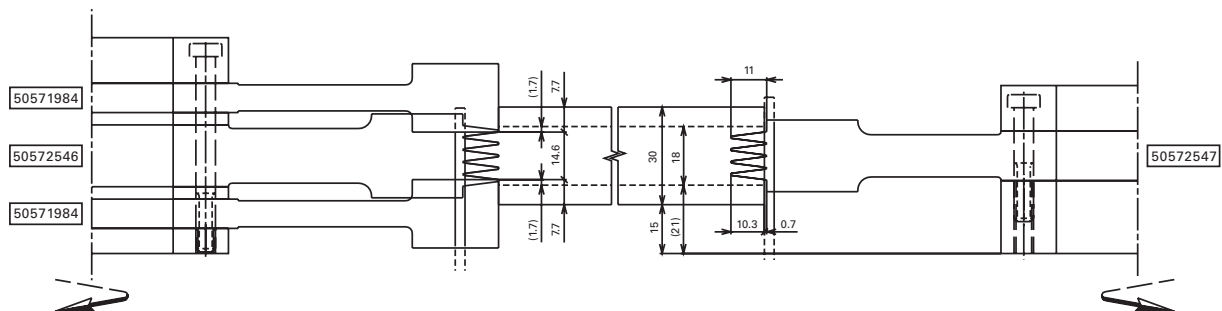
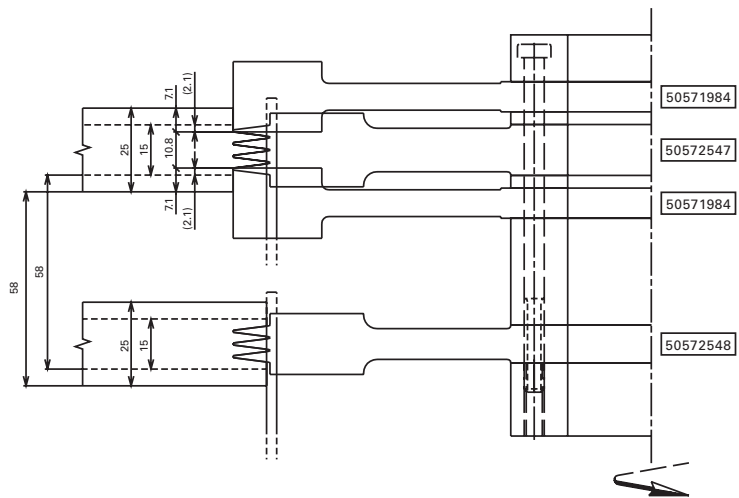
#### Tool

Cutter-No.	Description	∅ D mm	B mm	∅ d mm	n <sub>max</sub> min <sup>-1</sup>	Z	L	Order-No.
194.1.3	HS edge jointing cutterheads 250	250	21	50	6000	6	x	50571984

### HW-tipped

#### Tool

Cutter-No.	Description	∅ D mm	B mm	∅ d mm	n <sub>max</sub> min <sup>-1</sup>	Z	L	Order-No.
194.1	HW edge jointing cutterheads 250	250	21	50	6000	6	x	50671984
194.3	HW edge jointing cutterheads 160	160	21	50	6000	4		50671985





## 199 Finger Joint Cutter sets

HS or HW tipped; closed joint without pinholes



### Design

- Diameter of cutter 160 mm
- HS- or HW-tipped
- Straight face
- Finger jointing profile 10/10 for close fitting
- Edge Joint Cutters 150 mm, for close fitting joint connection

### Machine

- On Finger Joint Machines

### Application

- Cutters 198 with mechanical feed
- Cutters 199 can also be used on Table Shapers. Deflector design reduces the possibility of kickback
- closed joints possible
- The Edge Joint Cutters can be combined with 199.1-199.3 and 198.1-198.3

### HS-TIPPED

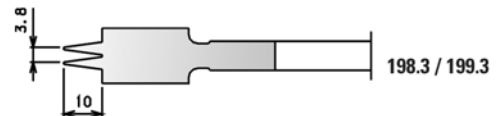
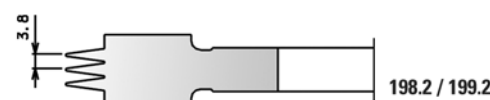
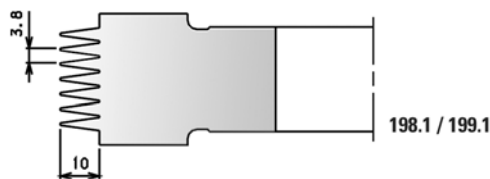
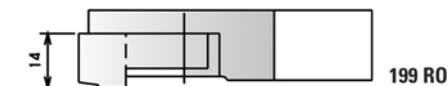
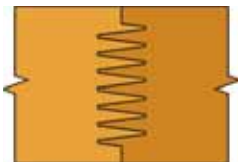
#### Single tools

Cutter-No.	Ø D mm	B mm	Ø d mm	Feed	$n_{min}$ - $n_{max}$ min <sup>-1</sup>	l mm	T mm	Z	No. of Microf.	L	Order-No.
<b>10 mm closed joints without pinholes</b>											
199.1	160	28,6	50	MAN	6000-8000	10/10	3,8	4	7	x	50572530
199.2	160	13,4	50	MAN	6000-8000	10/10	3,8	4	7	x	50572531
199.3	160	9,6	50	MAN	6000-8000	10/10	3,8	4	7	x	50572532
199 RO	150	20	50	MAN	6000-8000			2		x	50572528
199 RU	150	20	50	MAN	6000-8000			2		x	50572529
198.1	160	28,6	50	MEC	8000	10/10	3,8	4	7		50572535
198.2	160	13,4	50	MEC	8000	10/10	3,8	4	7		50572533
198.3	160	9,6	50	MEC	8000	10/10	3,8	4	7		50572534

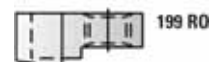
### HW-tipped

#### Single tools

Cutter-No.	Ø D mm	B mm	Ø d mm	Feed	$n_{min}$ - $n_{max}$ min <sup>-1</sup>	l mm	T mm	Z	No. of Microf.	L	Order-No.
<b>10 mm closed joints without pinholes</b>											
199.1	160	28,6	50	MAN	6000-8000	10/10	3,8	4	7	x	50640114
199.2	160	13,4	50	MAN	6000-8000	10/10	3,8	4	7	x	50640115
199.3	160	9,6	50	MAN	6000-8000	10/10	3,8	4	7	x	50640116
199 RO	150	20	50	MAN	6000-8000			2		x	50640210
199 RU	150	20	50	MAN	6000-8000			2		x	50640211
198.1	160	28,6	50	MEC	8000	10/10	3,8	4	7		50640113
198.2	160	13,4	50	MEC	8000	10/10	3,8	4	7		50640117
198.3	160	9,6	50	MEC	8000	10/10	3,8	4	7		50640118



#### Inserts for RO/RU



## 199 Finger Joint Cutter sets

HS or HW tipped; closed joint without pinholes



**Overview:**  
Table showing no. for finger jointing cutters dependent upon wood width or height:  
Finger jointing width = cutter boss height

Table

Finger jointing width ZB No. of Cutters/Type:	198/199.1	198/199.2	198/199.3	required bushing length
7,6	-	-	1	80
11,4	-	1	-	80
15,2	-	-	2	80
19	-	1	1	80
22,8	-	2	-	80
26,6	1	-	-	80
30,4	-	2	1	112
34,2	1	-	1	112
38	1	1	-	112
41,8	1	-	2	112
45,6	1	1	1	112
49,4	1	2	-	112
57	1	2	1	130
64,6	2	1	-	130
68,4	2	-	2	130

• further finger jointing width possible.

### HS-tipped

#### TOOL SET (incl. bushing)

Profile	Ø D mm	Ø d mm	n <sub>min</sub> -n <sub>max</sub> min <sup>-1</sup>	L	Order-No.
A	160	50/30	6000-8000		50572540
A	160	50/40	6000-8000		50572541
B	160	50/30	6000-8000		50572542
B	160	50/40	6000-8000		50572543
C	160	50/30	6000-8000		50572544
C	160	50/40	6000-8000		50572545

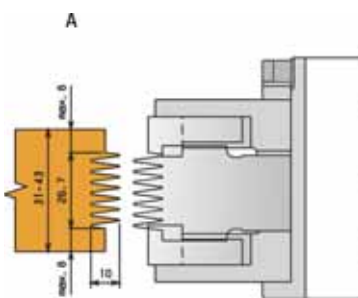
### HW-tipped

#### TOOL SET (incl. bushing)

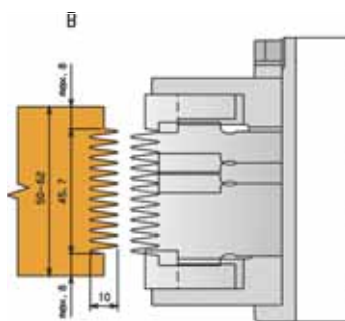
Profile	Ø D mm	Ø d mm	n <sub>min</sub> -n <sub>max</sub> min <sup>-1</sup>	L	Order-No.
A	160	50/30	6000-8000		50640201
A	160	50/40	6000-8000		50640202
B	160	50/30	6000-8000		50640203
B	160	50/40	6000-8000		50640204
C	160	50/30	6000-8000		50640205
C	160	50/40	6000-8000		50640206

### SPARE PARTS

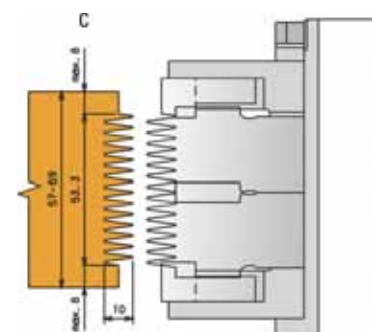
	Description	Dimension	Suitable for	VP	L	Order-No.
199	Jointing knives f. Cutter 199 RO (HW)		50640210	2	x	50640212
199	Insert knives for Butt jointing cutters 199 RO (HS)		50572558	2	x	50572550
199	Insert knives for Butt jointing cutters 199 RU (HW)		50640211	2	x	50640213
199	Insert knives for Butt jointing cutters 199 RU (HS)		50572529	2	x	50572551
	Special screw	M12x1x12		10	x	50930320
	Adjustment Screw	M8x16		10	x	50949533



Finger jointing width 26,7 mm



Finger jointing width 45,7 mm



Finger jointing width 53,3 mm





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## 195 Finger Joint Cutterheads

With replaceable knives



### Design

- Tool body steel
- 4/6 replaceable knives (160 mm) or 6 / 8 knives (250 mm) for very high feed rates
- Straight face
- Designed to prevent independent rotation
- For mechanical feed

### Machine

- On Finger Joint Machines

### Application

- For end grain joints in high stress components
- Wood construction in conformity with DIN 68140-1, construction of windows, manufacture of floors and strips

### New: Stehle knives with longlife coat.

- considerably higher wear resistance and better sliding
- considerably longer edge life compared to conventional material

### Overview

Wood width in mm	No. of Cutters	Wood width in mm	No. of Cutters
27	1	179	6
58	2	210	7
88	3	240	8
118	4	271	9
149	5	297	10

### 195 Finger Joint Cutterheads (Price included knives)

#### Tool

Ø D mm	B mm	Ø d mm	n <sub>max</sub> min <sup>-1</sup>	l	t	Z	No. of Microf.	L	Order-No.
<b>with HSS-Knives</b>									
160	30,4	50	8500	10/11	3,8	2+2	8	x	50570962
160	30,4	50	8500	10/10	3,8	2+2	8		50570961
170	30,4	50	8500	15/15	3,8	2+2	8		50570930
170	30,4	50	8500	15/16,5	3,8	2+2	8		50570931
160	30,4	50	8500	10/11	3,8	3+3	8		50570966
160	30,4	50	8500	10/10	3,8	3+3	8		50570967
170	30,4	50	8500	15/15	3,8	3+3	8		50570932
170	30,4	50	8500	15/16,5	3,8	3+3	8		50570933
250	30,4	50	6000	10/11	3,8	3+3	8		50570960
250	30,4	50	6000	10/10	3,8	3+3	8		50570959
260	30,4	50	6000	15/15	3,8	3+3	8		50570934
260	30,4	50	6000	15/16,5	3,8	3+3	8		50570935
250	30,4	50	6000	10/11	3,8	4+4	8		50570986
250	30,4	50	6000	10/10	3,8	4+4	8		50570987
260	30,4	50	6000	15/15	3,8	4+4	8		50570936
260	30,4	50	6000	15/16,5	3,8	4+4	8		50572937





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## 195 Finger Joint Cutterheads

With replaceable knives

### 195 Finger Joint Cutterheads (Price included knives)

#### TOOL

Ø D mm	B mm	Ø d mm	n <sub>max</sub> min <sup>-1</sup>	l	t	Z	No. of Microf.	L	Order-No.
<b>with Longlife-Knives</b>									
160	30,4	50	8500	10/11	3,8	2+2	8		50571000
160	30,4	50	8500	10/10	3,8	2+2	8		50571001
170	30,4	50	8500	15/15	3,8	2+2	8		50571010
170	30,4	50	8500	15/16,5	3,8	2+2	8		50571011
160	30,4	50	8500	10/11	3,8	3+3	8		50571002
160	30,4	50	8500	10/10	3,8	3+3	8		50571003
170	30,4	50	8500	15/15	3,8	3+3	8		50571012
170	30,4	50	8500	15/16,5	3,8	3+3	8		50571013
250	30,4	50	6000	10/11	3,8	3+3	8		50571004
250	30,4	50	6000	10/10	3,8	3+3	8		50571005
260	30,4	50	6000	15/15	3,8	3+3	8		50571014
260	30,4	50	6000	15/16,5	3,8	3+3	8		50571015
250	30,4	50	6000	10/11	3,8	4+4	8		50571006
250	30,4	50	6000	10/10	3,8	4+4	8		50571007
260	30,4	50	6000	15/15	3,8	4+4	8		50571016
260	30,4	50	6000	15/16,5	3,8	4+4	8		50571017

#### SPARE PARTS

Description	VP	L	Order-No.
HS-Knives 10/10	2	x	50570980
HS-Knives 10/11	2	x	50570981
HS Knives 15/15	2	x	50570982
HS Knives 15/16,5	2	x	50570983
"Longlife" knives 10/10	2	x	50570991
"Longlife" knives 10/11	2	x	50570993
"Longlife" knives 15/15	2	x	50570997
"Longlife" knives 15/16,5	2	x	50570998
Threaded pin	10	x	50947325
Allen wrench DIN 911	10	x	50931919





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## H 200 Finger Joint Cutters

Pitch 3,8 mm



Illustration depicts grinding position

### Design

- Tool body steel
- $\varnothing$  160,  $\varnothing$  200 and  $\varnothing$  250 mm
- Suitable for spiral tooth

### Machine

- On Finger Joint Machines

### Application

- For end grain finger jointing of solid wood, soft- or hard wood
- On special machines with Cut-Off Saw
- Joint with or without glue-gap

HW-tipped

Tool

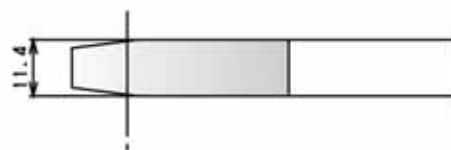
$\varnothing$ D mm	B mm	$\varnothing$ d mm	$n_{max}$ min <sup>-1</sup>	l mm	t mm	Z	No. of Microf.	L	Order-No.
<b>Finger Joint Cutters</b>									
160	3,8	70	8000	10/11	3,8	4	1	x	50640178
250	3,8	70	8000	10/11	3,8	6	1	x	50640173
<b>Edge Jointing Cutter</b>									
160	11,4	70	8000	10/11	3x3,8	4	1		50640185
250	11,4	70	8000	10/11	3x3,8	6	1	x	50640184

### Spare Parts

Description	Dimension	VP	L	Order-No.	€/each
upper Clamping Flange for $\varnothing$ 250	175x15x70	1		50399600	52,90
upper Clamping Flange for $\varnothing$ 160	112x15x70	1		50399601	39,75
lower clamping Flange for $\varnothing$ 250	175x15x70	1		50399606	50,60
upper Clamping Flange for $\varnothing$ 160	115x15x70	1		50399607	38,00
950 V Threaded Bushing	$\varnothing$ 70 right 84 mm Total length	1		50399602	132,10
950 V Threaded Bushing	$\varnothing$ 70 right 100 mm Total length	1		50399603	197,60
950 V Threaded Bushing	$\varnothing$ 70 left 84 mm Total length	1		50399604	132,10
950 V Threaded Bushing	$\varnothing$ 70 left 100 mm Total length	1		50399605	197,60
Nut right	M14	1		50932135	17,00
Nut left	M14	1		50932106	17,00
Ringscrew	M8 DIN 580	1		50945701	6,35
Hydro Nut (up from 100 mm tension height)	M68x1,5x56	1		50860005	
Safety Ring	100x4x70	1		50599403	20,10
Hooked Wrench DIN 1810	80/90	1	x	50931819	23,05
Spacer	100x70x3,8	1		50599400	10,90
Spacer	100x70x7,6	1		50599401	15,00
Spacer	100x70x11,4	1		50599402	18,40



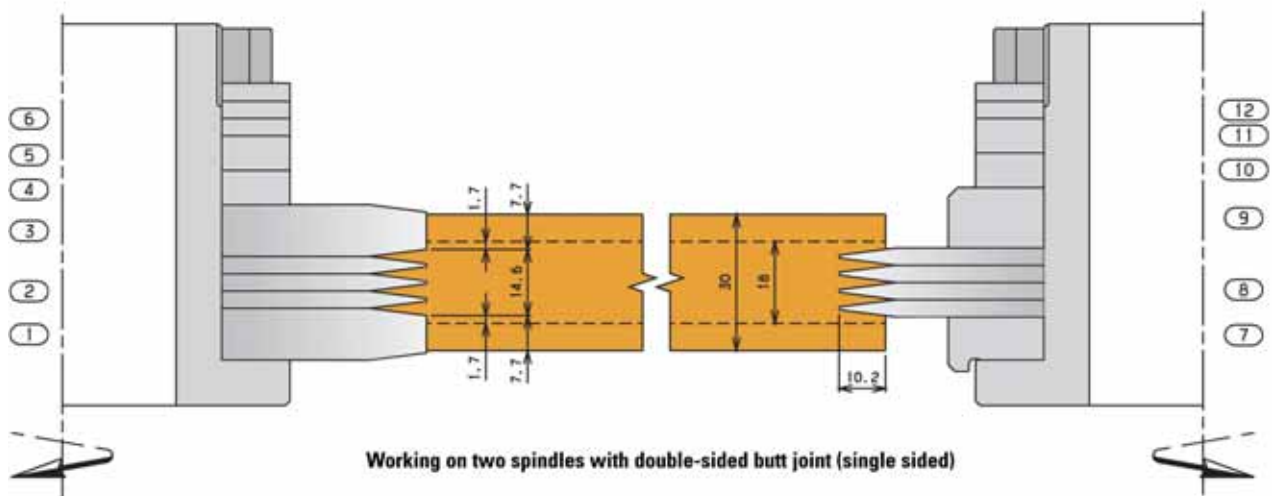
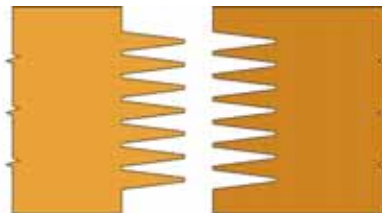
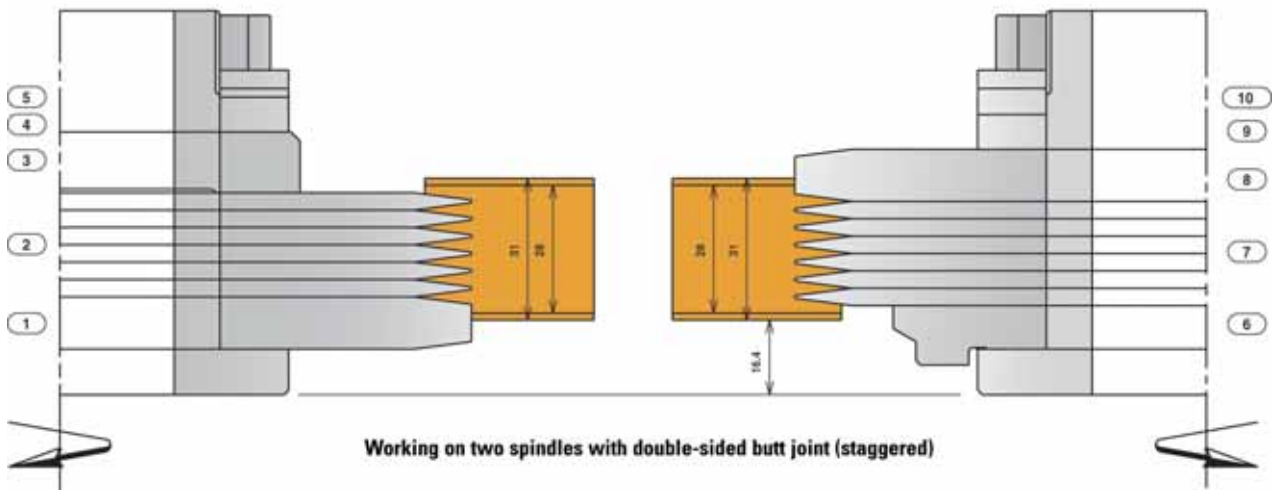
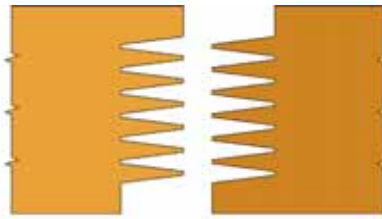
H 200  
160 x 3.8 x 70



H 200  
160 x 11.4 x 70  
= 3 pitches

## H 200 Finger Joint Cutters

Pitch 3,8 mm



## ZSP 1 Hogging System Stehle



Design	Machine	Application
<ul style="list-style-type: none"> <li>• Tool body steel</li> <li>• 4-sided Turnover Knives HW (System-Stehle)</li> <li>• Mounted HW saw blade</li> <li>• Mounting onto motor also by means of clamping sleeve depending on machine</li> </ul>	<ul style="list-style-type: none"> <li>• On Finger Joint Machines and Tenoning Machines</li> </ul>	<ul style="list-style-type: none"> <li>• For both trimming and hogging of solid wood</li> </ul>

### Tool

Ø D mm	Z	Z	Order-No.
<b>Hogger</b>		<b>Rip Saw Blade</b>	
244	16	48 E left	50470400
244	16	48 E right	50470401
300	20	60 E left	50471310
300	20	60 E right	50470310
344	24	72 E left	50470410
344	24	72 E right	50470411

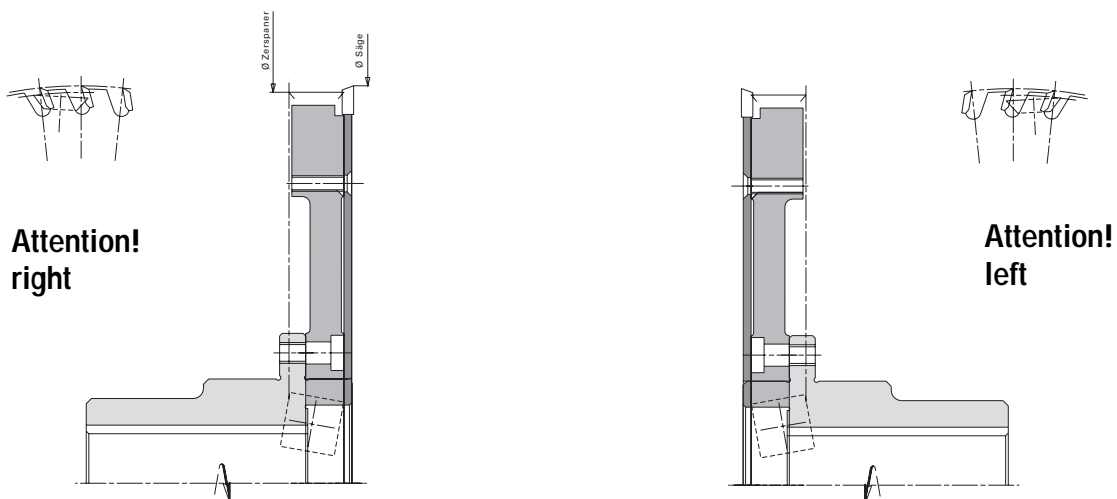
### Spare saw blades

Ø D mm	B mm	Ø d mm	Qty.	L	Order-No.
250	4,4	80	48 E left		50801425
250	4,4	80	48 E right		50801426
305	4,4	80	60 E left		50801042
305	4,4	80	60 E right		50801043
350	4,4	80	72 E left		50801427
350	4,4	80	72 E right		50801428

- The hogging width may be increased for each 20 mm by mounting of additional hogging-disc.
- Please indicate Machine Type, spindle diameter etc. when placing your order

### Spare Parts

Description	Dimension	VP	Order-No.
Knives HWM 221	21x21x5,5	10	50651483
Countersink Screw	M7x16,8 (for Knife HWM 221)	10	50930305
Countersink Screw DIN 7991	M6x16 (for saw blade)	10	50949910
Torx Screw Driver	T30	1	50933102



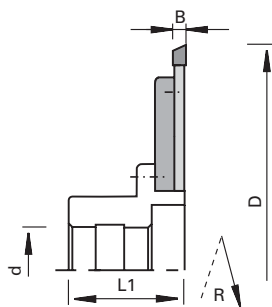
**Attention!**  
right

**Attention!**  
left



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## ZSP 2 Hoggers



### Design

- Special cutting geometry for clean and chip-free cuttings with long edge life
- Precise fit of finger joints
- Low noise

### Machine

- Hogging machines

### Application

- For chip-free cutting and hogging of solid wood

### Scope of delivery:

Hogging saw, flange, screws and screw Driver (unmounted)  
Bushing not included as part of the scope of delivery

### TOOL

Ø D mm	B mm	Ø d mm	L1 mm	b mm	Z	DKN mm	Mach.	L	Order-No. L	Order-No. R
250	8	40	59	44	60	12x3,3	Grecon	x	50881001	50881002
300	8	40	59	44	60	12x3,3	Grecon	x	50881003	50881004
350	10	40	59	44	60+12	12x3,3	Grecon	x	50881005	50881006

### SPARE PARTS

Article	Dimension	L	Order-No. L	Order-No. R
Hogging saw blades	250x8,0/6, 1x80 Z=60	x	50801434	50801435
Hogging saw blades	300x8,0/6, 1x80 Z=60	x	50801436	50801437
Hogging saw blades	350x10,0x80 Z=60+12	x	50801438	50801439
Flange	210x8,4x80	x		50881007
Countersink Screw	M8x20	x		056378
Torx sink Screw	M5x12	x		166709
Torx Screw Driver	T20x100	x		166092
Bushing for Grecon	113x59x40 DKN	x		881008

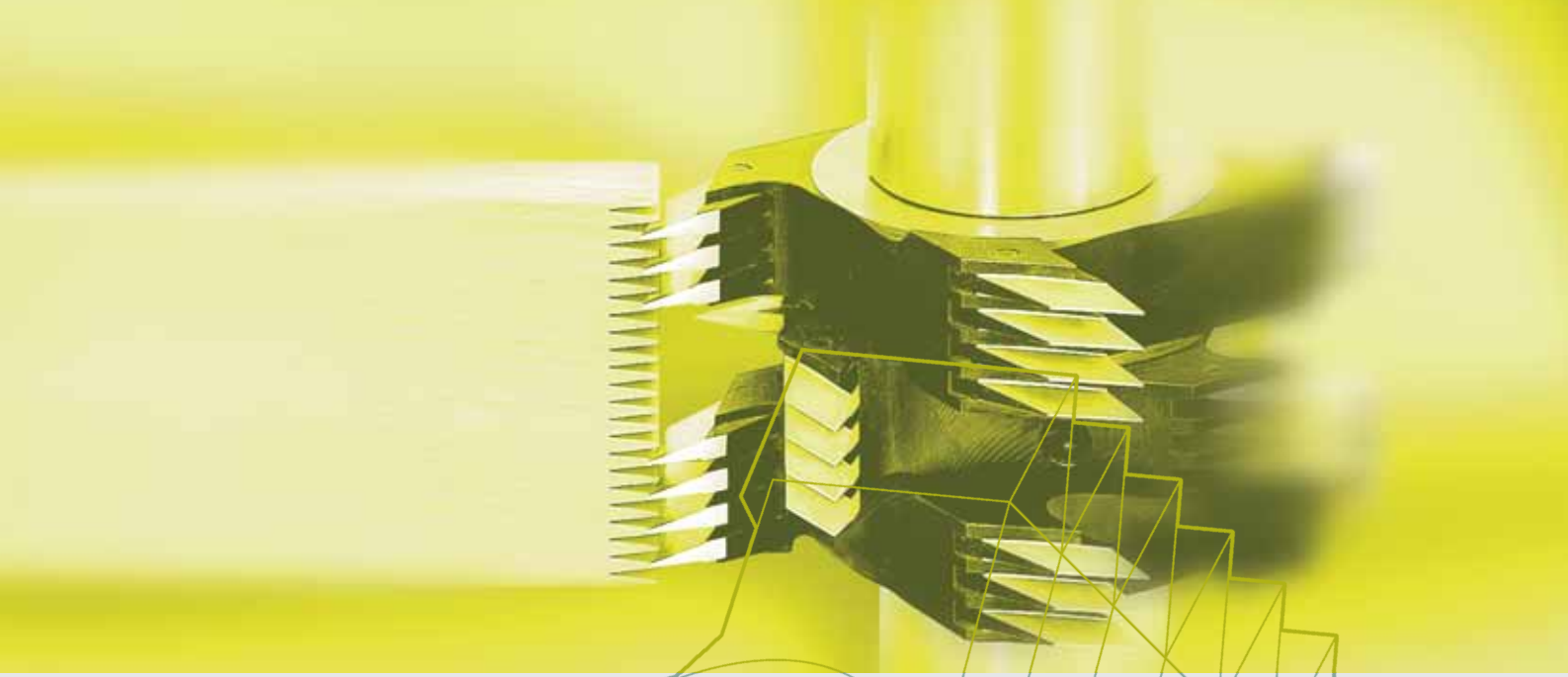
### HW-Ritz saw blade for hogging

Ø D mm	B mm	b mm	d mm	Z	L	Order-No. L	Order-No. R
200	5,1	3,5	75	48	x	50801440	50801441
200	4,7	3,4	75	64	x	50801442	50801443



## Notes





## Finger Jointing Tools / Planing Mills

### Planing Mills

1503 TOK-Groove Bed Cutterhead	28
5570 Spiral-Cutter Head	29
5580 WP Rebating Cutter Head	29
556-1 Planing Cutterheads	30
5545 Chamfer-Bevel Cutterheads	31
556 Z Planing Cutterheads with Side Cutters	32
569 Planing Knives	33
569 Longlife-Planing knives	34
569 HW Planing Knives	35
520-1 Hydro-Planing Cutterheads	36
521-1 Hydro-Profiling Head	37
464 Multi Dowel Cutterheads	38
464 HS knives smooth dowels	39
464 HS knives serrated dowels	40
525 Corrugated Knife Profile Cutterheads	41
525 HS-Blanks with back serration	42
525 HS-Profile knives with back serration	43
4000 Tongue and Groove Cutters	46
4010 Tongue and Groove Cutters WM	48





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## 1503 TOK-Groove Bed Cutterhead



### Design

- Tool body steel
- 2 HW Turnover Knives
- 2 top and 2 bottom TOK-Spurs
- Cutting on periphery and sides

### Machine

- On Moulders with groove-bed device

### Application

- Moulding of guide grooves in solid wood

### TOOL

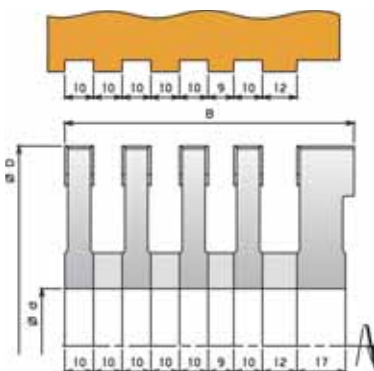
Cutter no.	Ø D mm	B mm	Ø d mm	d <sub>max</sub>	n <sub>max</sub> min <sup>-1</sup>	Z/VS	L	Order-No.
EB 1032	140	20,2	40	50	1000	2+2	x	50661845
EB 1034	140	10	40	50	1000	2+1+1	x	50661846

• Number of tools depending on the cutting width  
 • Tool set with Spacers  
 • Adjusted in sets:

up to 3 pcs. TOK grooving cutter (incl. spacer)	Surcharge
up to 6 pcs. TOK grooving cutter (incl. spacer)	Surcharge
up to 10 pcs. TOK grooving cutter (incl. spacer)	Surcharge

### SETS

Ø D mm	B mm	Ø d mm	d <sub>max</sub>	L	Order-No.
140	80	40	50	1x EB 1032 + 3x EB 1034	50661856
140	100	40	50	1x EB 1032 + 4x EB 1034	50661857
140	120	40	50	1x EB 1032 + 5x EB 1034	50661858
140	140	40	50	1x EB 1032 + 6x EB 1034	50661859
140	160	40	50	1x EB 1032 + 7x EB 1034	50661860
140	180	40	50	1x EB 1032 + 8x EB 1034	50661861



### SPARE PARTS

Description	Dimension	Suitable for	VP	L	Order-No.
Knife KB 008	20x12x1,5	50661845	10	x	50820020
Clamping Wedges DB 075	B=18	50661845	2	x	50930104
Knife KB 005	9,6x12x1,5	50661846	10	x	50820010
Clamping Wedges DB 071	B=8	50661846	2	x	50930145
Threaded pin DIN 915	M6x16	50661845/46	10	x	50947314
Allen wrench	SW 3	50661845/46	1	x	50931904
Spur KB 017	14x14x2,0	50661845/46	10	x	50820014
Spur screw	M5x7	50661845/46	10	x	50930442
Torx Screw Driver	T15	50661845/46	1	x	50933138





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## 5570 Spiral-Knife-Head



### Design

- Tool body aluminium
- Spiral arrangement of HW Turnover Knives

### Machine

- On Moulders

### Application

- For planing, pre-milling and finish cutting
- For solid wood and panel working

### TOOL

Ø D mm	B mm	Ø d mm	n <sub>max</sub> min <sup>-1</sup>	Z	Order-No.
125	100	40	12000	2+2	50665110
125	130	40	12000	2+2	50665101
125	170	40	12000	2+2	50665102
125	230	40	12000	2+2	50665103
125	240	40	12000	2+2	50665104

### SPARE PARTS

Description	Dimension	Order-No.
HW Turnover Knife	15x15x2,5 rounded	50820017
Torx Screw	M5x15,5 T20	182112
Torx Screw Driver	T20x100	166092



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## 5580 WP Rebating Cutter Head



### Design

- Tool body steel

### Machine

- On Moulders

### TOOL

Ø D mm	B mm	Ø d mm	n <sub>max</sub> min <sup>-1</sup>	Z	Order-No.
145	15,2	40	10400	2+2	50665100

### SPARE PARTS

Description	Dimension	Order-No.
HW Spur	14x14x2,0	50820014
HW Turnover Knife	15x12x1,5	50820015
Clamping Wedges	13x11x7	50774698
Threaded pin	M6x12	50947312
Countersink Screw for spur	M5x7	50930442





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## 556-1 Planing Cutterheads

with pressure springs



### Design

- Tool body steel
- Knife position set by means of springs
- With pressure springs

### Machine

- Especially for Moulders

### Application

- For planing
- HS-Knives for solid wood
- HW-Knives for exotic wood, compensated and compressed lumbers

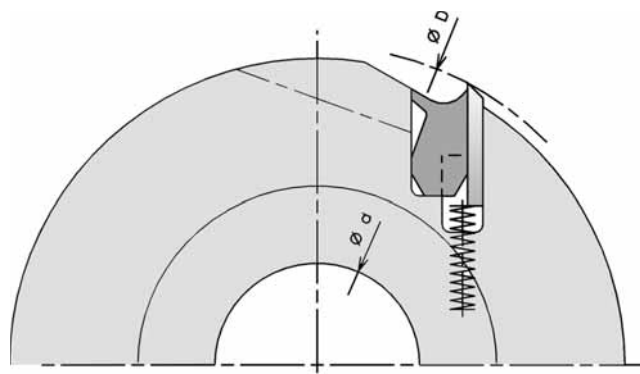
### Tool

Ø D mm	B mm	Ø d mm	n <sub>max</sub> min <sup>-1</sup>	Z	L	Order-No.
125	80	40	9000	4	x	50561046
125	100	40	9000	4	x	50561038
125	130	40	9000	4	x	50561035
125	150	40	9000	4	x	50561036
125	180	40	9000	4	x	50561037
125	230	40	9000	4	x	50561044
125	240	40	9000	4		50561054
140	120	50	9000	4		50561049
140	150	50	9000	4		50561050
140	180	50	9000	4		50561051
140	210	50	9000	4		50561052
140	230	50	9000	4		50561053

- Quoted prices are valid for HS-Knives
- HW-Knives available upon request with surcharge

### Spare Parts

Description	Dimension	Suitable for	VP	L	Order-No.
Clamping Wedge	B=80	50561046	2		50562651
Clamping Wedge DB 4610	B=100	50561038	2		50562659
Clamping Wedge DB 4618	B=120	50561049	2		50562652
Clamping Wedge DB 4616	B=130	50561035	2		50562653
Clamping Wedge DB 4622	B=150	50561036/50	2		50562654
Clamping Wedge DB 4566	B=180	50561037/51	2		50562655
Clamping Wedge DB 4614	B=210	50561052	2		50562656
Clamping Wedge DB 4568	B=230	50561044/53	2		50562657
Threaded Pin DIN 915	M10x25		10	x	50947322
Allen Wrench DIN 911	SW 5		1	x	50931910
Tongue	44 mm		10		50931414
Tongue Bolt			10		50591212





## 5545 Chamfer-Bevel Cutterheads

Additional Head for Planing Heads  $\varnothing$  125 mm and  $\varnothing$  140 mm



Design	Machine	Application
<ul style="list-style-type: none"> <li>• Tool body steel</li> <li>• Fast knife change</li> <li>• With HW Turnover Knife</li> <li>• Suitable for common planing heads with <math>\varnothing</math> 125 mm or <math>\varnothing</math> 140 mm</li> </ul>	<ul style="list-style-type: none"> <li>• On Moulders</li> </ul>	<ul style="list-style-type: none"> <li>• Suitable for panel materials, soft and hard woods, blockboard</li> <li>• Used for chamfering and planing at the same time</li> <li>• Easy and fast changing of knives</li> </ul>

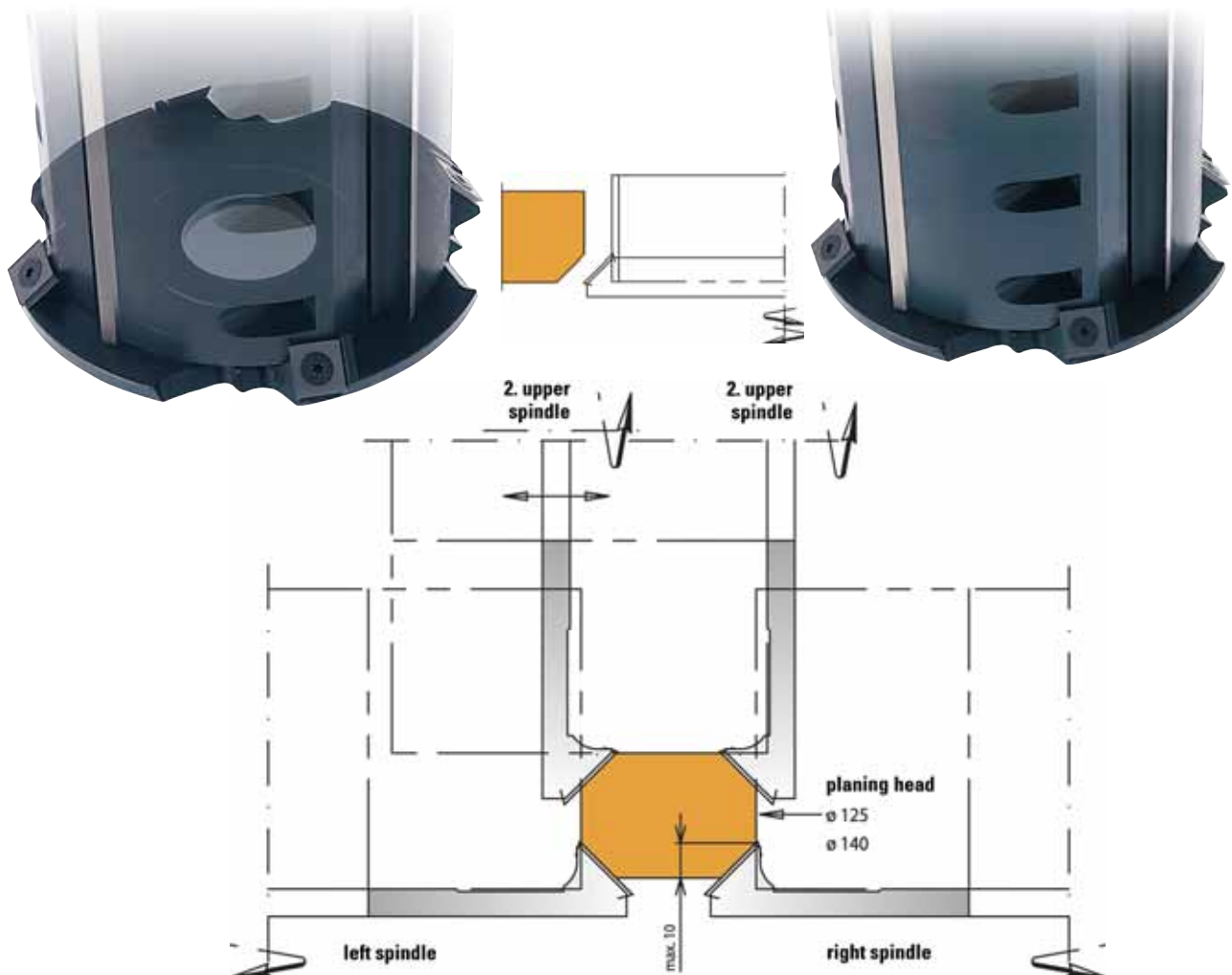
### TOOL

$\varnothing$ D mm	B mm	$\varnothing$ d mm	$\varnothing$ d <sub>max</sub> mm	n <sub>max</sub> min <sup>-1</sup>	right/left	Suitable for	Z	L	Order-No.
145,6	15	40	50	9000	right	$\varnothing$ 125 mm	4	x	50664000
145,6	15	40	50	9000	left	$\varnothing$ 125 mm	4	x	50664001
160,6	15	40	50	9000	right	$\varnothing$ 140 mm	4	x	50664004
160,6	15	40	50	9000	left	$\varnothing$ 140 mm	4	x	50664005

Bore sizes up to max. 50 mm possible

### SPARE PARTS

Description	Dimension	VP	L	Order-No.
Knife KB 035	15x15x2,5	10	x	50820198
Countersink Screw	M6x10	10	x	50591226
Torx Screw Driver	T 20	1	x	50933117





MEC

## 556 Z Planing Cutterheads with Side Cutters



### Design

- Tool body steel
- 3 grooves for axially adjustable Inserts

### Machine

- On Multi Spindle Machines

### Application

- For planing, and chamfering and the same time or grooving
- Solid wood (limber)

### HS-tipped TOOL

Ø D mm	B mm	Ø d mm	n <sub>max</sub> min <sup>-1</sup>	Z	L	Order-No.
140	130	40	6000	3		50369550
140	180	40	6000	3		50369551
143	230	40	6000	3		50369552

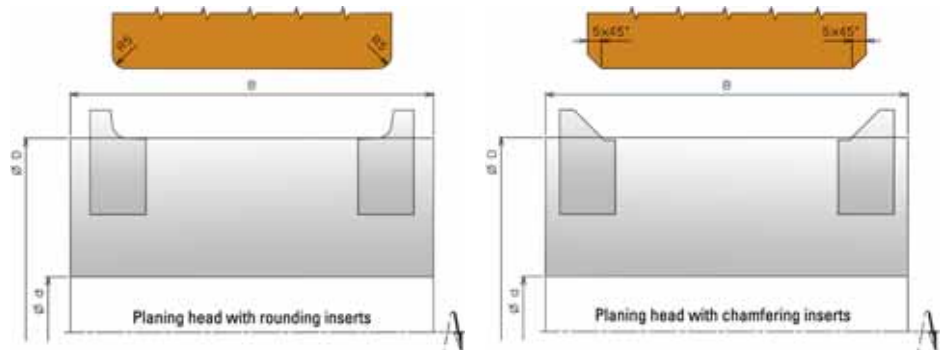
Bevel Knife not included in price for Planing Cutterhead

INSERTS:  
(3 inserts each must be on one cutting circle)



### SPARE PARTS

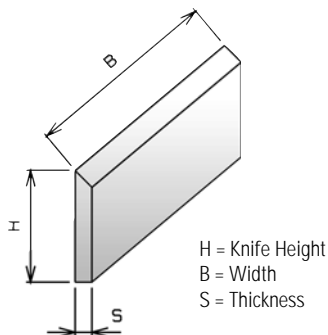
Description	Dimension	Suitable for	VP	L	Order-No.
Bevel Knife no. 63001	No. 63001		3		50369453
Bevel Knife no. 63002	No. 63002		3		50369454
Bevel Knife no. 63007	No. 63006		3		50369455
Bevel Knife no. 63007	No. 63007		3		50369456
Bevel Knife no. 63008	No. 63008 (R5)		3		50369457
Bevel Knife no. 63009	No. 63009 (R5)		3		50369458
Clamping screw DIN 933	M6x12 (for bevel knife)		10		50947705
Open-end wrench	SW 10		1		50932840
Clamping Wedges DB 052	B=130	50369550	3		50369383
Clamping Wedges DB 050	B=180	50369551	3		50369384
Clamping Wedges DB 058	B=230	50369552	3		50369385
Open-end wrench	SW 14		1		50932841
Tongue	44 mm		10		50931414
Tongue bolt			10		50591212



- Max. profile depth 10 mm
- Knives with serrated back
- Cutting inserts resharpenable on profile and adjustable on outside diameter



## 569 Planing Knives



## Design

- Solid HS 18% Tungsten Carbide
- Packing unit 2 pcs.

## Application

- Preferably for soft woods

## Knives

B mm	H mm	S mm	L	Order-No.
1040	25	3	x	50400183
60	30	3	x	50400131
80	30	3	x	50400132
100	30	3	x	50400133
120	30	3	x	50400134
130	30	3	x	50400135
150	30	3	x	50400136
160	30	3	x	50400137
170	30	3	x	50400161
180	30	3	x	50400138
210	30	3	x	50400162
230	30	3	x	50400139
240	30	3	x	50400206
260	30	3	x	50400163
300	30	3	x	50400140
310	30	3	x	50400147
320	30	3	x	50400205
330	30	3	x	50400141
350	30	3	x	50400198
400	30	3	x	50400170
410	30	3	x	50400149
420	30	3	x	50400142
450	30	3	x	50400150
460	30	3	x	50400151
500	30	3	x	50400143
510	30	3	x	50400152
520	30	3	x	50400184
530	30	3	x	50400144
600	30	3	x	50400165
610	30	3	x	50400153
630	30	3	x	50400145
640	30	3	x	50400154
710	30	3	x	50400155
810	30	3	x	50400156
840	30	3	x	50400157
1000	30	3	x	50400185
1040	30	3	x	50400178
1050	30	3	x	50400174
180	35	3	x	50400201
300	35	3	x	50400202
310	35	3	x	50400187
350	35	3	x	50400188
400	35	3	x	50400171
410	35	3	x	50400158
420	35	3	x	50400190
460	35	3	x	50400192
500	35	3	x	50400196
510	35	3	x	50400159
530	35	3	x	50400166
600	35	3	x	50400193



## 569 Planing Knives

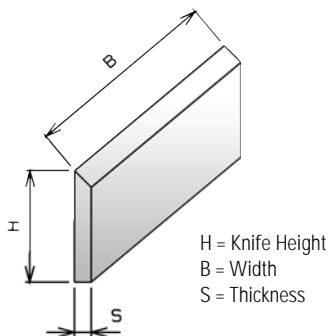
### Knives

B mm	H mm	S mm	L	Order-No.
610	35	3	x	50400160
630	35	3	x	50400194
635	35	3	x	50400195
640	35	3	x	50400167
710	35	3	x	50400179
810	35	3	x	50400164
1000	35	3	x	50400168
1040	35	3	x	50400169
1050	35	3	x	50400175

## 569 Longlife Planing knives (coated)

### KNIVES

B mm	H mm	S mm	L	Order-No.
130	30	3		50400505
150	30	3		50400506
180	30	3		50400508
230	30	3		50400510
310	30	3		50400513
400	30	3		50400521
510	30	3		50400531
410	35	3		50400524
510	35	3		50400532
610	35	3		50400536



#### Design

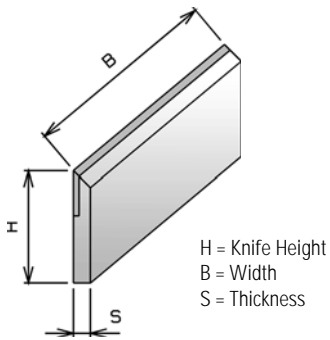
- Carbide grade HS Longlife coating
- 3 up to 5-times edge life compared to conventional material
- Packing units 2 pcs.

#### Application

- Preferably for soft woods



## 569 HW Planing Knives



## Design

- Cutting material HW = TungstenCarbide-tipped
- Packing unit 2 pcs.

## Application

- For all kind of hard wood, exotic wood, compressed wood, plywood, hard paper, plastic and all panel materials

## Knives

B mm	H mm	S mm	L	Order-No.
60	30	3	x	50400021
100	30	3	x	50400023
120	30	3	x	50400024
130	30	3	x	50400025
150	30	3	x	50400026
160	30	3	x	50400036
170	30	3	x	50400027
180	30	3	x	50400028
210	30	3	x	50400029
230	30	3	x	50400030
260	30	3	x	50400031
310	30	3	x	50400032
410	30	3	x	50400033
460	30	3	x	50400078
500	30	3	x	50400079
510	30	3	x	50400034
600	30	3	x	50400080
610	30	3	x	50400035
640	30	3	x	50400083
810	30	3	x	50400063
310	35	3	x	50400073
400	35	3	x	50400077
410	35	3	x	50400074
510	35	3	x	50400075



## 520-1 Hydro-Planing Cutterheads



## Design

- Tool body steel
- Straight knife holders
- Integrated two-part clamping bushing for hydraulic central clamping on the machine spindle

## Machine

- On special low-vibration machines

## Application

- For planing
- Solid wood non-glued: HS knives
- for abrasive solid wood HW-knives
- Used with knife type 569
- Multi-side machines
- High degree of concentricity allows high feed speed

## TOOL

Ø D mm	B mm	Ø d mm	Z	L	Order-No.
143	60	40	4		50562686
143	130	40	4		50562689
143	230	40	4		50562690
163	60	50	4		50562687
163	100	50	4		50562691
163	130	50	4		50562741
163	150	50	4		50562693
163	180	50	4		50562700
163	230	50	4		50562695
163	260	50	4		50562697
163	310	50	4		50562701
163	60	50	6		50562688
163	100	50	6		50562692
163	130	50	6		50562742
163	150	50	6		50562694
163	180	50	6		50562702
163	230	50	6		50562696

Ø D mm	B mm	Ø d mm	Z	L	Order-No.
163	260	50	6		50562698
163	310	50	6		50562703
163	60	50	8		50562738
163	100	50	8		50562740
163	130	50	8		50562739
163	150	50	8		50562743
163	180	50	8		50562750
163	230	50	8		50562744
163	260	50	8		50562745
163	310	50	8		50562751
203	100	50	12		50562752
203	150	50	12		50562753
203	230	50	12		50562754
203	260	50	12		50562755
203	310	50	12		50562756
203	330	50	12		50562757

## SPARE PARTS

Description	Dimension	VP	L	Order-No.
Grease Gun		1		50931618
Nipple for pressure increase		2		80152608
Nipple for pressure decrease		2		80152602
Screw	M12x25	10		50930460
Clamping Wedge	B=60	2		50562961
Clamping Wedge	B=100	2		50562963
Clamping Wedge	B=123 (for 130)	2		50562964
Clamping Wedge	B=150	2		50562965
Clamping Wedge	B=180	2		50562966
Clamping Wedge	B=223 (for 230)	2		50562967
Clamping Wedge	B=253 (for 260)	2		50562968

## 521-1 Hydro-Profiling Head



## Design

- Tool body steel
- Straight knife holders
- Serration at the knife and in the gullet of the tool body
- Integrated two-part clamping bushing for hydraulic central clamping on the machine spindle

## Machine

- On special low-vibration machines

## Application

- Cutting and profiling
- Solid wood non-glued: HS knives
- for abrasive solid wood: HW-knives
- Used with knife type 525
- Multi-side machines
- To guarantee exact clamping of knives, a maximum adjustment towards the periphery of cutter by 4 tooth division = 6,4 mm is allowed
- High degree of concentricity allows high feed speed

## TOOL

Ø D mm	B mm	Ø d mm	Z	n <sub>max</sub> min <sup>-1</sup>	Order-No.
137	60	40	4	9000	50562920
137	100	40	4	9000	50562921
137	130	40	4	9000	50562922
137	150	40	4	9000	50562923
137	180	40	4	9000	50562924
137	230	40	4	9000	50562925
150	60	50	4	6000	50562926
150	100	50	4	6000	50562927
150	130	50	4	6000	50562928
150	150	50	4	6000	50562929
150	180	50	4	6000	50562930
150	230	50	4	6000	50562931
150	260	50	4	6000	50562932
150	310	50	4	6000	50562933
150	60	50	6	6000	50562934

Ø D mm	B mm	Ø d mm	Z	n <sub>max</sub> min <sup>-1</sup>	Order-No.
150	100	50	6	6000	50562935
150	130	50	6	6000	50562936
150	150	50	6	6000	50562937
150	180	50	6	6000	50562938
150	230	50	6	6000	50562939
150	260	50	6	6000	50562940
150	310	50	6	6000	50562941
163	60	50	8	6000	50562942
163	100	50	8	6000	50562943
163	130	50	8	6000	50562944
163	150	50	8	6000	50562945
163	180	50	8	6000	50562946
163	230	50	8	6000	50562947
163	260	50	8	6000	50562948
163	310	50	8	6000	50562949

## SPARE PARTS

Description	Dimension	VP	L	Order-No.
Nipple for pressure increase		2		80152608
Nipple for pressure decrease		2		80152602
Clamping Wedges	M12x25	10		50930461
Clamping Wedges	B=60	2		50562961
Clamping Wedges	B=100	2		50562963
Clamping Wedges	B=123 (for 130)	2		50562964
Clamping Wedges	B=150 B=180	2		50562965
Clamping Wedges	B=180	2		50562966
Clamping Wedges	B=223 (for 230)	2		50562967
Clamping Wedges	B=253 (for 260)	2		50562968





MEC

## 464 Multi Dowel Cutterheads



### Design

- Tool body steel
- 2 or 4 knife holders
- Quick change of HS-knives possible
- Knives are selfcentering when clamping screws are tightened
- Guide-plate for axial adjustment of knives

### Application

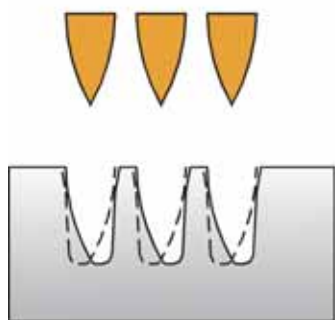
- Production of smooth dowels of 2 to 16 mm
- Production of serrated dowels of 6,1 to 16,1 mm
- Production of profile strips up to 8 mm thick (price upon request)
- Solid wood, soft and hard wood not laminated
- On Multi-Spindle Moulders

### Tool

Ø D mm	B mm	Ø d mm	Ø d <sub>max</sub> mm	n <sub>max</sub> min <sup>-1</sup>	Z	Qty. Knife screws	L	Order-No.
102	50	35	40	6000	2	4		50389261
102	75	35	40	6000	2	6		50389262
102	100	35	40	6000	2	8		50389263
102	50	40	40	6000	2	4		50389264
102	75	40	40	6000	2	6		50389265
102	100	40	40	6000	2	8		50389266
102	125	40	40	6000	2	10		50389267
102	150	40	40	6000	2	12		50389268
102	50	35	40	6000	4	8		50389269
102	75	35	40	6000	4	12		50389270
102	100	35	40	6000	4	16		50389271
102	50	40	40	6000	4	8		50389272
102	75	40	40	6000	4	12		50389273
102	100	40	40	6000	4	16		50389274
102	125	40	40	6000	4	20		50389275
102	150	40	40	6000	4	24		50389276

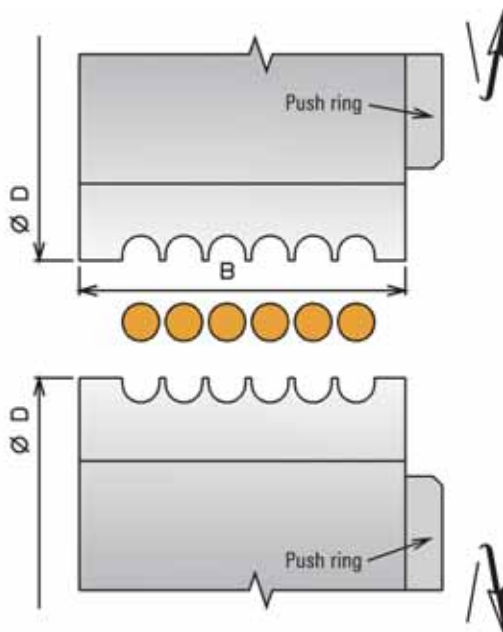
- The price includes the cutterhead and screw without knives.
- Further profiles upon request.

Examples of profiles:



### SPARE PARTS

Description	Dimension	VP	L	Order-No.
Cylindrical Screw DIN 912	M8x30	10	x	50947031
Allen wrench	SW 6	1		50931911
Shim	8,4 mm	10	x	50945505



## 464 HS knives smooth dowels

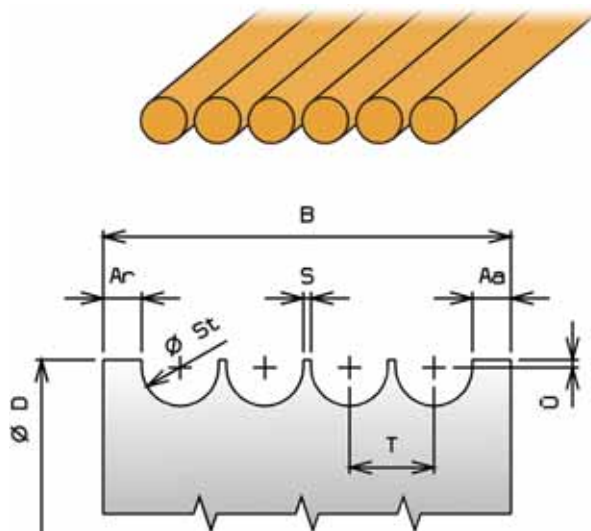
for smooth dowels



### Knives

	St= Dowel $\varnothing$	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
S = bridge		1	1	1	1	1	1	1	1	1	1,5	1,5	1,5	1,5	1,5	1,5
T = distance between two adjacent centres		3	4	5	6	7	8	9	10	11	12,5	13,5	14,5	15,5	16,5	17,5
D= cutter diameter		127	127	127	127	127	127	135	135	135	135	135	135	135	135	135
<b>B= 50</b> No of dowels		12	9	8	7	6	5	4	4	3	3	3	3	2	2	2
Order-No. 50...		38 9200	38 9201	38 9202	38 9203	38 9204	38 9205	38 9206	38 9207	38 9208	38 9209	38 9210	38 9211	38 9212	38 9213	38 9214
<b>B= 75</b> No of dowels			16	13	11	9	8	7	6	6	5	5	4	4	4	4
Order-No. 50...			38 9215	38 9216	38 9217	38 9218	38 9219	38 9220	38 9221	38 9222	38 9223	38 9224	38 9225	38 9226	38 9227	38 9228
<b>B= 100</b> No of dowels				18	15	13	11	10	9	8	7	6	6	6	5	5
Order-No. 50...				38 9229	38 9230	38 9231	38 9232	38 9233	38 9234	38 9235	38 9236	38 9237	38 9238	38 9239	38 9240	38 9241
<b>B= 125</b> No of dowels					16	14	13	11	10	9	8	8	7	7	7	7
Order-No. 50...					38 9242	38 9243	38 9244	38 9245	38 9246	38 9247	38 9248	38 9249	38 9250	38 9251	38 9252	
<b>B= 150</b> No of dowels								14	13	11	10	9	9	8	8	
Order-No. 50...								38 9253	38 9254	38 9255	38 9256	38 9257	38 9258	38 9259	38 9260	

- Manufacture of mouldings up to 8 mm thick (price on demand)
- Surcharge of 50% on gross price for ordering less than 8 knives
- For intermediate sizes surcharge of 25% on next smaller sizes
- When ordering, machine type must be indicated!
- Unit price for 8 identical knives purchased at the same time



## 464 HS knives serrated dowels

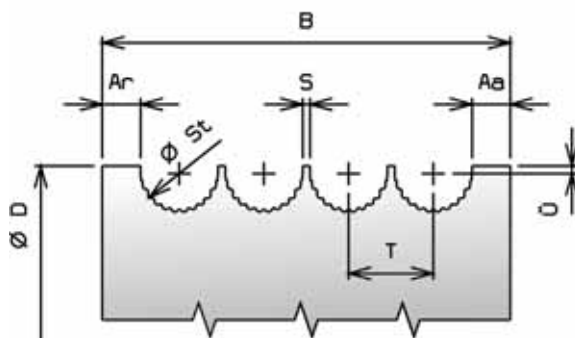
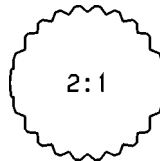
for fine serrations



### KNIVES

St= Dowel Ø	6,1	7,1	8,1	10,1	11,1	12,1	13,1	14,1	15,1	16,1
No of serrations	16	16	20	22	22	22	22	22	22	22
S = bridge	1	1	1	1	1,5	1,5	1,5	1,5	1,5	1,5
T = distance between two adjacent centres	7,1	8,1	9,1	11,1	12,6	13,6	14,6	15,6	16,6	17,6
D = cutter diameter	127	127	135	135	135	135	135	135	135	135
<b>B= 50</b> No of dowels	6	5	4	3	3	3	3	2	2	2
Order-No. 50...	38 9300	38 9301	38 9302	38 9303	38 9304	38 9305	38 9306	38 9307	38 9308	38 9309
<b>B= 75</b> No of dowels	9	8	7	6	5	5	4	4	4	3
Order-No. 50...	38 9310	38 9311	38 9312	38 9313	38 9314	38 9315	38 9316	38 9317	38 9318	38 9319
<b>B= 100</b> No of dowels	12	11	10	8	7	6	6	5	5	5
Order-No. 50...	38 9320	38 9321	38 9322	38 9323	38 9324	38 9325	38 9326	38 9327	38 9328	38 9329
<b>B= 125</b> No of dowels	16	14	13	10	9	8	8	7	7	6
Order-No. 50...	38 9330	38 9331	38 9332	38 9333	38 9334	38 9335	38 9336	38 9337	38 9338	38 9339
<b>B= 150</b> No of dowels				12	11	10	9	9	8	8
Order-No. 50...				38 9340	38 9341	38 9342	38 9343	38 9344	38 9345	38 9346

- Surcharge of 50% on gross price for ordering less than 8 knives
- For intermediate sizes surcharge of 25% on next smaller sizes
- When ordering, machine type must be indicated!
- Unit price for 8 identical knives purchased at the same time

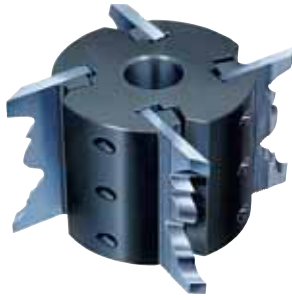






MEC

## 525 Corrugated Knife Profile Cutterheads



### Design

- Tool body steel
- 4 straight knife holders
- Serration at the knife and in the gullet of the tool body
- Special measurements upon request

### Application

- Cutting and profiling
- Unglued solid wood: HS knives
- for abrasive and laminated solid wood
- Multi-side machines
- To guarantee an exact clamping of knives, a maximum adjustment towards the periphery of cutter by 4 tooth division = 6,4 mm is allowed

### TOOL

Ø D mm	B mm	Ø d mm	n <sub>max</sub> min <sup>-1</sup>	Z	L	Order-No.
122	40	40	9000	4	x	50822780
122	60	40	9000	4	x	50822781
122	80	40	9000	4	x	50822782
122	100	40	9000	4	x	50822783
122	130	40	9000	4	x	50822784
122	150	40	9000	4	x	50822785
122	180	40	9000	4	x	50822786
122	230	40	9000	4		50822787
137	60	50	8000	4		50822790
137	80	50	8000	4		50822791
137	100	50	8000	4		50822792
137	130	50	8000	4		50822793
137	150	50	8000	4		50822794
137	180	50	8000	4		50822795
137	230	50	8000	4		50822798

### Price without knives!

- If only two knives are used, the two empty slots must be located opposite to each other and be completed by two counter weight wedges
- Mounting of counter weight wedges also suitable for 2525 profile cutterhead

### SPARE PARTS

Description	Dimension	VP	L	Order-No.
Clamping Wedge screw DIN 915	M10x20	10	x	50947321
Counter piece	B=40	2	x	50822726
Counter piece	B=60	2	x	50822727
Counter piece	B=80	2	x	50822728
Counter piece	B=100	2	x	50822729
Counter piece	B=130	2	x	50822730
Counter piece	B=150	2	x	50822731
Counter piece	B=180	2	x	50822732
Counter piece	B=230	2	x	50822746



## 525 HS-Blanks with back serration



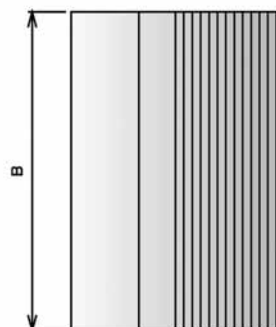
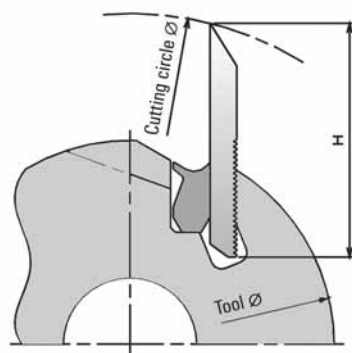
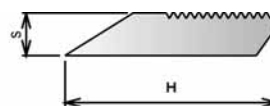
### Design

- Solid HS
- Suitable for STEHLE Safety Profile Cutter-head Type 525
- Tools made to specification with other dimensions in HW, HS or Stellite upon request

### Knives

B mm	H mm	S mm	L	Order-No.
40	40	8	x	50822701
50	40	8	x	50822702
60	40	8	x	50822703
80	40	8	x	50822704
100	40	8	x	50822705
130	40	8	x	50822706
150	40	8	x	50822707
180	40	8	x	50822708
230	40	8	x	50822709
260	40	8	x	50822710
650	40	8	x	50822751
40	50	8	x	50822712
50	50	8	x	50822711
60	50	8	x	50822714
80	50	8	x	50822716
100	50	8	x	50822718
130	50	8	x	50822720
150	50	8	x	50822722
180	50	8	x	50822724
230	50	8	x	50822733
260	50	8	x	50822734
650	50	8	x	50822752

B mm	H mm	S mm	L	Order-No.
40	60	8	x	50822713
60	60	8	x	50822715
80	60	8	x	50822717
100	60	8	x	50822719
130	60	8	x	50822721
150	60	8	x	50822723
180	60	8	x	50822725
230	60	8	x	50822735
260	60	8	x	50822736
650	60	8	x	50822753
40	70	8	x	50822737
60	70	8	x	50822738
80	70	8	x	50822739
100	70	8	x	50822740
130	70	8	x	50822741
150	70	8	x	50822742
180	70	8	x	50822743
230	70	8	x	50822744
260	70	8	x	50822745
650	70	8	x	50822754



## 525 HS-Profile knives with back serration

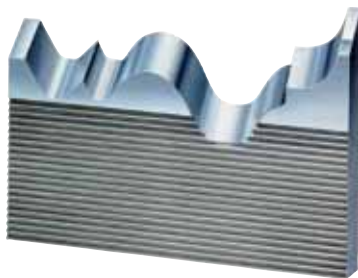


Fig.: Profile Group 2

### Design

- Solid HS
- Suitable for STEHLE Safety Profile Cutter-head Type 525 and 521-1 (for hydro clamping as well)
- Serration 60°, pitch 1/8" according to customer's drawing or sample
- Maximum adjustment of the resharpened knives is allowed by 4 tooth divisions = 6,4 mm

### Knives

#### Profile Group 1

B	H	S	T	L	Order-No.
mm	mm	mm	mm		
40	40	8	8		50822250
60	40	8	8		50822251
80	40	8	8		50822252
100	40	8	8		50822253
130	40	8	8		50822254
150	40	8	8		50822255
180	40	8	8		50822256
230	40	8	8		50822257
40	50	8	15		50822282
60	50	8	15		50822283
80	50	8	15		50822284
100	50	8	15		50822285
130	50	8	15		50822286
150	50	8	15		50822287
180	50	8	15		50822288
230	50	8	15		50822289
40	60	8	22		50822314
60	60	8	22		50822315
80	60	8	22		50822316
100	60	8	22		50822317
130	60	8	22		50822318
150	60	8	22		50822319
180	60	8	22		50822320
230	60	8	22		50822321
40	70	8	30		50822346
60	70	8	30		50822347
80	70	8	30		50822348
100	70	8	30		50822349
130	70	8	30		50822350
150	70	8	30		50822351
180	70	8	30		50822352
230	70	8	30		50822353

#### Profile Group 2

B	H	S	T	L	Order-No.
mm	mm	mm	mm		
40	40	8	8		50822258
60	40	8	8		50822259
80	40	8	8		50822260
100	40	8	8		50822261
130	40	8	8		50822262
150	40	8	8		50822263
180	40	8	8		50822264
230	40	8	8		50822265
40	50	8	15		50822290
60	50	8	15		50822291
80	50	8	15		50822292
100	50	8	15		50822293
130	50	8	15		50822294
150	50	8	15		50822295
180	50	8	15		50822296
230	50	8	15		50822297
40	60	8	22		50822322
60	60	8	22		50822323
80	60	8	22		50822324
100	60	8	22		50822325
130	60	8	22		50822326
150	60	8	22		50822327
180	60	8	22		50822328
230	60	8	22		50822329
40	70	8	30		50822354
60	70	8	30		50822355
80	70	8	30		50822356
100	70	8	30		50822357
130	70	8	30		50822358
150	70	8	30		50822359
180	70	8	30		50822360
230	70	8	30		50822361



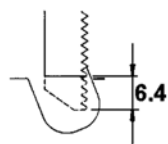
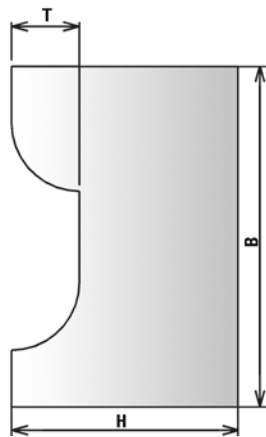
## 525 HS-Profile knives with back serration

Template

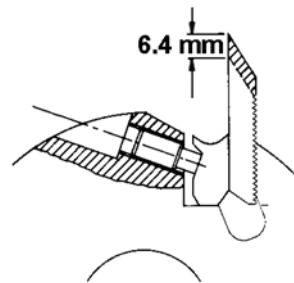
B mm	L	Order-No.
40		50822274
60		50822275
80		50822276
100		50822277
130		50822278
150		50822279
180		50822280
230		50822281

Table

Tool $\varnothing$	H = Knife Height	max. cutting circle $\varnothing$
122	40	140
122	50	160
122	60	180
122	70	200
137	40	155
137	50	175
137	60	195
137	70	215



Adjustable zone max.



Position of knife advanced  
(max. 6.4 mm = 4 serrations)



## General explications

### Tongue and Groove Cutters

**Stock program:**

We supply the design as per example I.

**Made to specification:**

When ordering please state direction of rotation, direction of feed and good side according to examples I, II, III or IV. Without indication we will supply as per example I.

**Example I**

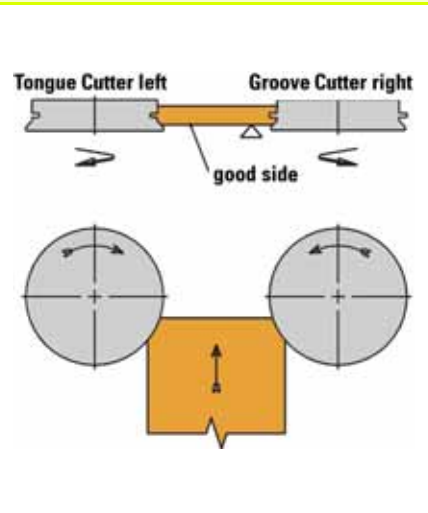


Tongue Cutter  
left = clock-wise

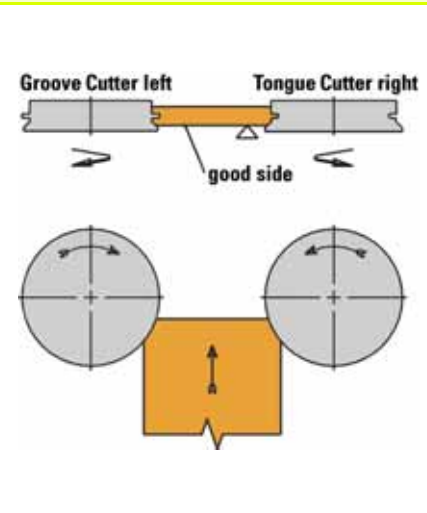
good side

Groove Cutter  
right = anti-clock-wise

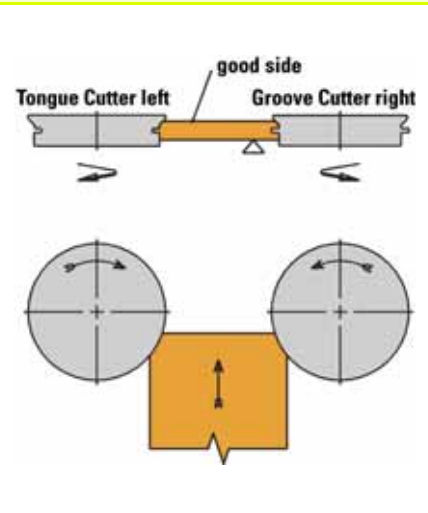
**Example I**



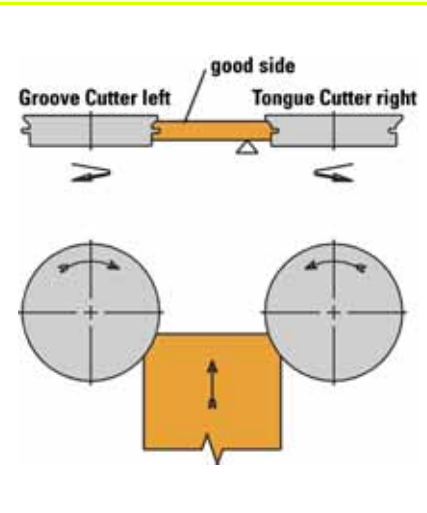
**Example II**



**Example III**



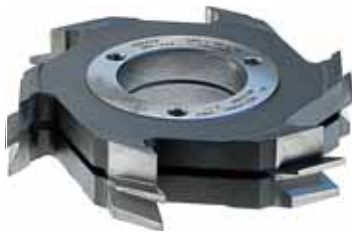
**Example IV**





MEC

## 4000 Tongue and Groove Cutters



### Design

- Tool body steel
- Two pieces
- Adjustable by means of spacer
- Optimal of precision through parallelism of all parts
- 3 fastening pins on 75 mm bolt circle against accidental rotation
- Large regrinding area

### Application

- For tongue and groove board with or without space allowance in material (=open joint) or bevel
- For soft- and hard wood

HS-tipped

TOOL

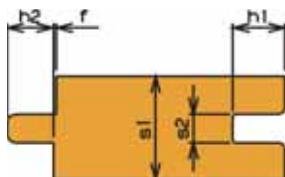
Profile	Ø D mm	B mm	Ø d mm	$n_{max}$ min <sup>-1</sup>	s1 mm	s2 mm	f	Z	L	Order-No.
501/502	180	35	60	8000	12-36	4,5-7,5	0,5	6	x	50532354
505/506	180	35	60	8000	15-27	4,5-7,5	0,5	6		50532358
512/513	180	35	60	8000	12-27	4,5-7,5		6+3		50532361
503/502	180	35	60	8000	12-36	4,5-7,5		6		50532382
529/530	180	35	60	8000	15-27	4,5-7,5	0,5	6		50532384
507/508	180	35	60	8000	15-27	4,5-7,5		6		50532387
525/526	180	35	60	8000	12-27	4,5-7,5		6+3		50532390
541/540	180	35	60	8000	14-19	4,5-7,5		6+3		50532391

### SPARE PARTS

Description	VP	L	Order-No.
1 Set (2 reduction bushings with 2 covers 60/40)	1	x	50005209
1 Set (2 reduction bushings with 2 covers 60/50)	1	x	50005210

- When ordering please indicate state direction of rotation, direction of feed and good side according to examples I, II, III or VI. Without indication we will supply as per example I.
- HW-tipping upon request with surcharge.
- Other measurements are possible after technical clarification.

f = Space allowance

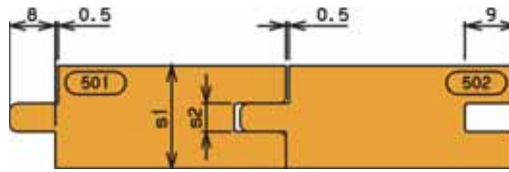


## 4000 Tongue and Groove Cutters

Tongue Cutter

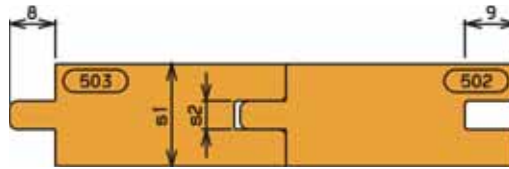
Groove Cutter

Profile 501



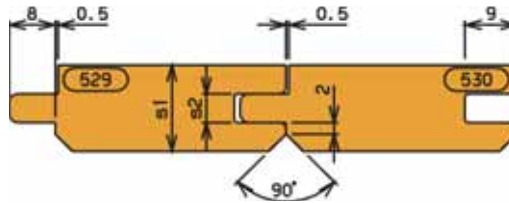
Profile 502

Profile 503



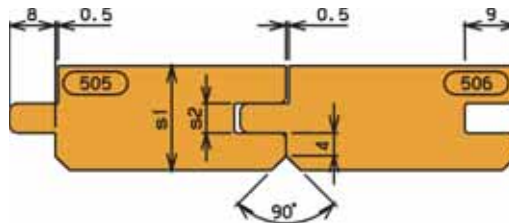
Profile 502

Profile 529



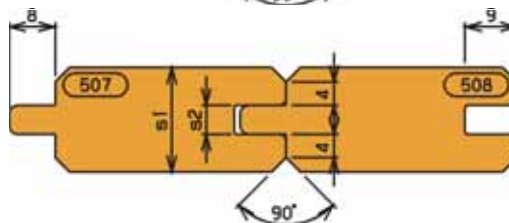
Profile 530

Profile 505



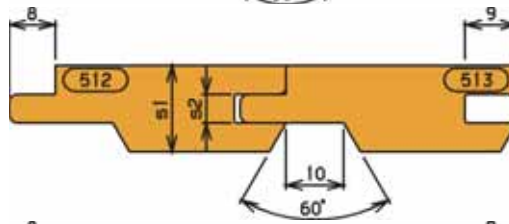
Profile 506

Profile 507



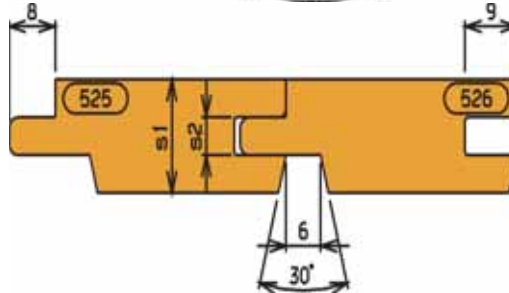
Profile 508

Profile 512



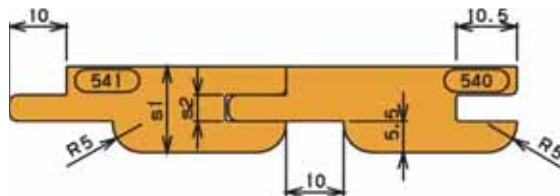
Profile 513

Profile 525



Profile 526

Profile 541



Profile 540





MEC

## 4010 Tongue and Groove Cutters WM

Z4 / Z6



### Design

- Tool body steel
- Two-parts Cutterheads with Turnover Knives
- Adjustable by means of Spacer
- 2 K-Knives for 4-side use 21x21 mm
- Grooving and Rounding Knives
- Z 4 resp. Z 6 on periphery
- 4-edge knives mounted without Clamping Wedges => easily to turn or to be replaced
- Changing of knives does not affect cutting circle
- Re-sharpening is not necessary

### Application

- In planing mills
- For tongue and groove boards with space allowance in material (=open joint) or bevel
- For soft- and hard wood
- For high-abrasive materials we recommend our 4-side HW-Turnover Knife 21x21 mm
- Excellent cutting results
- Easy maintenance
- Mounted on threaded bushing with rings
- For groove cuts wider than 8 mm. Adjustable Grooving Cutters are available.
- Hydro sleeves are available upon request with surcharge

### Tool set

Cutter no.	Profile	Ø D mm	B mm	Ø d mm	n <sub>max</sub> min <sup>-1</sup>	Z/VS/NS	L	Order-No.
<b>Basic set 2K (without bushing)</b>								
SK 043/044	501/502	180	46	60	8000	4/4/4	x	50630400
SK 087/088		140						
SK 106/107	501/502	180	46	60	8000	6/6/6	x	50630407
SK 108/109		156						

### Spare Parts

Description	Dimension	L	Order-No.
Mounted on bush incl. adjust. rings	60/50		50575000
Mounted on bush incl. adjust. rings	60/40		50575001

### Single Heads / complementary Cutterheads

#### Tool set

Cutter no.	Profile	Ø D mm	B mm	Ø d mm	n <sub>max</sub> min <sup>-1</sup>	Z/VS/NS	L	Order-No.
SK 043	502	180	21	60	8000	4/-/2	x	50630415
SK 044	502	180	21	60	8000	4/-/2	x	50630416
SK 086	506	180	21	60	8000	4	x	50630402
SK 087	501	139	21	60	8000	4/2/2	x	50630419
SK 088	501	140	21	60	8000	4/2/2	x	50630421
SK 089	505	166	21	60	8000	4	x	50630401
SK 095	528	181	21	60	8000	6		50630413
SK 104	528	181	21	60	8000	4		50630406
SK 105	527	181	21	60	8000	4/2/2		50630405
SK 106	502	180	21	60	8000	6/-/3	x	50630134
SK 107	502	180	21	60	8000	6/-/3	x	50630133
SK 108	501	156	21	60	8000	6/3/3	x	50630142
SK 109	501	155	21	60	8000	6/3/3	x	50630143
SK 110	506	180	21	60	8000	6	x	50630409
SK 111	505	181	21	60	8000	6		50630408
SK 112	527	200	30	60	8000	6/6		50630414
SK 296	527	198	21	60	8000	6/3/3		50630412
SK 348	507	166	21	60	8000	4		50630420
SK 349	508	180	21	60	8000	4		50630417
SK 350	508	180	21	60	8000	6		50630135
SK 351	507	181	21	60	8000	6		50630136



## 4010 Tongue and Groove Cutters WM

Z4 / Z6

## Single Heads / Complementary Cutterheads

## Tool set

Cutter no.	Profile	∅ D mm	B mm	∅ d mm	$n_{\max}$ min <sup>-1</sup>	Z/VS/NS	L	Order-No.
EA 6580	541	175	14	60	6000	4/2/2		50630410
EA 6582	540	180	18	60	6000	4/-/2		50630411
EA 6584	541	191	14	60	6000	6/3/3		50630403
EA 6586	540	180	18	60	6000	6/3		50630404

## SPARE PARTS

Description	Dimension	Suitable for	VP	L	Order-No.
2K Knife	21x21x5,5		10	x	50651440
Knives HWM 221	21x21x5,5		10	x	50651483
Softline Spur HWM 210		50630405/12	10	x	50651486
Countersink Screw	M7x16,8 (for Knife HWM221, 2K Knife and Softline Spur HWM 210)		10	x	50930305
Knife KE 6298	Profile	50630403/10	10		50686298
Clamping Wedges DB 2995	B=12,5	50630403/10	2		50772995
Knife KB 6300	Profile	50630404/11	10		50686300
Clamping Wedges DB 2994	B=12,5	50630404/11	2		50772994
Clamping screw	M6 L	50630403/04/10/11	10	x	50930373
Torx Screw Driver	T15	50630403/04/10/11	1	x	50933138
NH 189 Grooving Insert	B=4	"Head top"	4	x	50652200
NH 190 Grooving Insert	B=4	"Head bottom"	4	x	50652201
NH 195 Grooving Insert	B=5	"Head top"	4		50652231
NH 196 Grooving Insert	B=5	"Head bottom"	4		50652232
M 5 Edge Rounding Knife	R=1,5		2	x	50655005
Countersunk screw	M7x18 (for Grooving Insert and Edge Rounding Knife)		10	x	50930366
Torx Screw Driver	T30		1	x	50933102
950 V Threaded bushing			1		50594015
950 V Threaded bushing	60/40xGL095 left		1		50594054
950 V Threaded bushing	60/50xGL095 right		1		50594021
950 V Threaded bushing	60/50xGL095 left		1		50594026



## 4010 Tongue and Groove Cutters WM

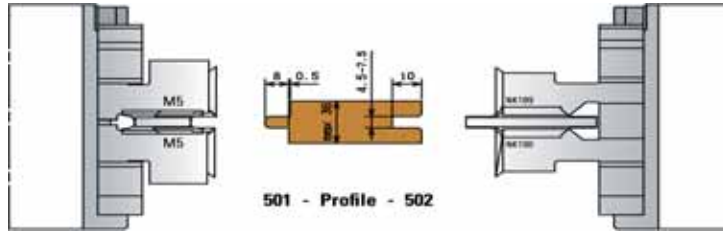
Z4 / Z6

number of teeth

Z 4      Z 6

SK 088    SK 108

SK 087    SK 109



501 - Profile - 502

number of teeth

Z 4      Z 6

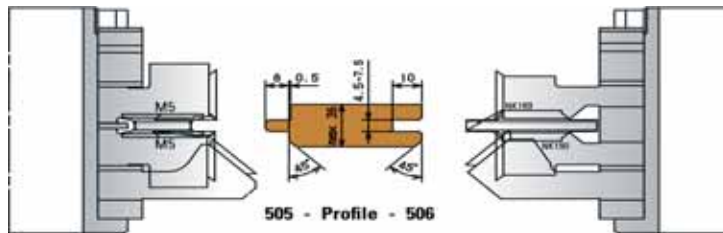
SK 043    SK 106

SK 044    SK 107

SK 088    SK 108

SK 087    SK 109

SK 089    SK 111



505 - Profile - 506

SK 043    SK 106

SK 044    SK 107

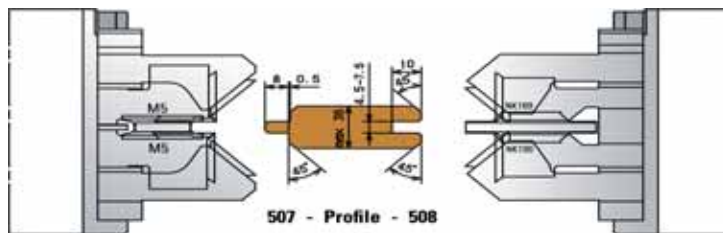
SK 086    SK 110

SK 348    SK 351

SK 088    SK 108

SK 087    SK 109

SK 089    SK 111



507 - Profile - 508

SK 349    SK 350

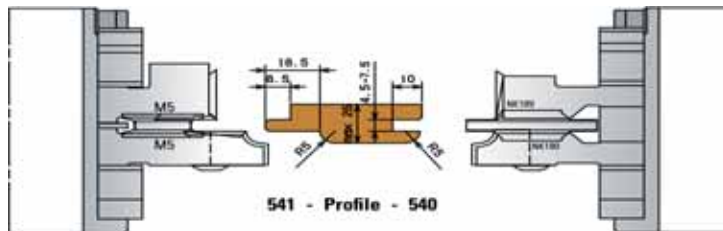
SK 043    SK 106

SK 044    SK 107

SK 086    SK 110

SK 088    SK 108

EA 6580    EA 6584



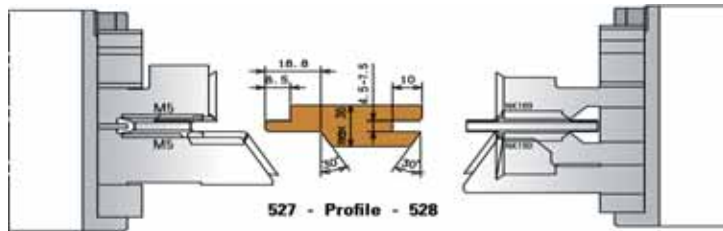
541 - Profile - 540

SK 043    SK 106

EA 6582    EA 6586

SK 088    SK 108

SK 105    SK 296



527 - Profile - 528

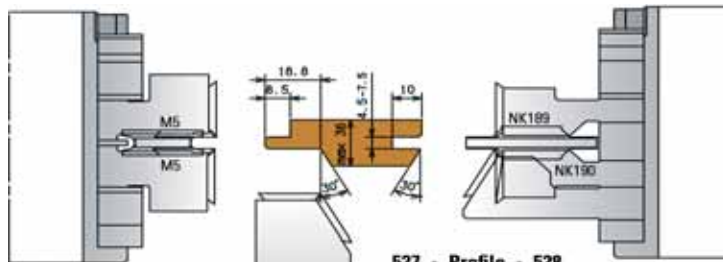
SK 043    SK 106

SK 044    SK 107

SK 104    SK 095

SK 088    SK 108

SK 087    SK 109



527 - Profile - 528

SK 043    SK 106

SK 044    SK 107

SK 104    SK 095

SK 112      Z 6



# Order, Delivery and Payment Terms

## of STEHLE GmbH in 87700 Memmingen

### § 1 Scope, Exclusion of validity of different terms and conditions of business

1. All quotations, deliveries and services of our company are based on these Order, Delivery and Payment terms. They are also applicable without repeated explicit notification for future quotations, deliveries and services to the customer, insofar as this is a corporate body, a special fund under public law or an entrepreneur and, in concluding the contract, is exercising its commercial or independent professional function.
2. Our Terms apply exclusively. The validity of different or supplementary terms and conditions of business of the customer is explicitly ruled out, unless we explicitly agree to their validity in an individual case.

### § 2 Conclusion of contract, Scope of delivery, Assignment prohibition

1. Unless otherwise agreed, our quotations are prepared free of charge. Unless otherwise agreed, the supply contract results from our acceptance of the customer order or the beginning of execution of the order on our part.
2. If we confirm acceptance of the order in writing, our order confirmation is binding for the scope and content of the order relationship. For the purpose of the contract, the information in our quotations is binding, unless otherwise agreed.
3. The documents on which the quotation is based, such as drawings, illustrations, descriptions and weight and dimension specifications, are only considered to be part of the content of the contract if they are explicitly part of the content of our quotation. We reserve the right to make changes, where these changes are not fundamental in nature and do not restrict the purpose of the delivery in accordance with the contract in a manner that is unreasonable for the customer. The documents remain our property and may not be copied, used for any other purpose or made accessible to third parties, and must be returned on demand. The statutory copyright and industrial property rights are also applicable.
4. The customer is not entitled to assign any claims against us or any rights resulting from our business relationship to third parties, or to transfer them to third parties, without our consent. The same shall apply to claims against us or other rights arising indirectly by operation of law.

### § 3 Delivery term

1. The agreed delivery term shall begin upon conclusion of the contract, but not before any documents to be provided by the customer have been received in full and any agreed advance payments have been made. The delivery term shall be considered to have been met if the delivery item has left our warehouse or has been reported to the customer as ready for dispatch before expiry of the term, but cannot be delivered for reasons for which the customer is responsible.
2. The delivery term shall be extended appropriately in cases of force majeure, as well as the occurrence of unforeseen and extraordinary events affecting our company or our suppliers, such as civil disturbance, strike, lockout, fire, confiscation, embargo, legal or official restrictions on energy consumption or incorrect and/or late self-supply, insofar as these events are outside our responsibility, we were not able to avert them despite taking reasonable care in accordance with the circumstances of the individual case, and they affect the prompt performance of the contract. If the delivery term is extended for an inappropriate time due to such circumstances, the customer is entitled, after the expiry of an appropriate extension period to be set by the customer, to withdraw from the contract or, insofar as the customer has an interest in a part delivery, from the unperformed section of the contract. If we have already performed part of the services incumbent upon us, the customer can only withdraw from the whole of the contract if he demonstrably has no interest in the part performance. Other legally or contractually agreed rights of withdrawal shall remain unaffected by this.
3. If we should fall into arrears with the delivery, after the setting and vain expiry of an appropriate extension period the customer is entitled to withdraw from the contract or, insofar as the customer has an interest in a part delivery, the unperformed section of the contract. Further claims by the customer – in particular claims for damages in lieu of performance, and reimbursement of delay damages – are excluded, unless otherwise stipulated in § 10 below. In cases, in which § 10 of these Terms provides for liability due to delayed delivery, the delay damages for each complete week of delay shall be 0.5 %, up to a maximum of 5 % of the value of that part of the total delivery, which cannot be used on time as a consequence of the delay. The parties have the right to provide evidence of higher or lower delay damages.

4. Deliveries before expiry of the delivery term and part deliveries are permissible, insofar as this does unreasonably impair contrary interests of the customer.

### § 4 Prices, Payment, Setoff and Right of Lien

1. The specified prices apply to ex works deliveries from Horb and are net prices exclusive of the applicable sales tax, even if this is not shown separately, and exclusive of the costs for packaging, freight, installation, postage, insurance expenses, customs duties, any banking and payment transaction costs and other incidental costs.
2. Our invoices are due for immediate payment. Unless otherwise agreed, the customer may make payment of the price plus the aforementioned additional costs within 10 days from the invoice date minus 2% discount or within 30 days from the invoice date with no deduction, whereby these payment arrangements do not affect the due date. If the customer is in arrears with a due payment, the aforementioned payment terms shall be cancelled and the invoice amount is due for payment immediately and with no deductions. The preceding payment arrangements do not apply to repair invoices. These are due for payment immediately and with no deductions.
3. The customer shall be in arrears after the expiry of 30 days from receipt of the invoice, unless there are grounds that result in an earlier incidence of arrears (e.g. reminder or a payment period to be determined by the calendar). From the onset of arrears, our claim shall accrue interest at an annual interest rate of 5 percentage points above the base rate. If the customer is a corporate body, a special fund under public law or an entrepreneur and, in concluding the contract, is exercising its commercial or independent professional function, our claim shall accrue interest from the onset of arrears at an annual interest rate of 8 percentage points above the base rate.
4. In case of payment arrears, we are entitled to make further deliveries dependent on the complete settlement of the payment arrears.
5. Unless otherwise agreed, in the case of wage and salary increases or rises in the prices of raw materials or supplies, we reserve the right to adjust the price appropriately, varying from the contractual agreement. This right applies to consumers in the sense of § 13 BGB and only for orders, which are to be executed later than four months after conclusion of the contract and for deliveries and services under contracts for performance of a continuing obligation.
6. Furthermore, we are entitled to refuse our performance if, as a result of a circumstance that has become known to us after conclusion of the contract, we have reason to fear that we will not receive the corresponding consideration from the customer in full and on time, unless the customer affects this consideration or provides adequate security. In particular, this shall apply if, after conclusion of the contract, our credit insurer has refused to insure the purchase price for payment of the delivery item due to the customer's credit rating.
7. If the customer is a merchant in the sense of HGB and the contract is part of his trade, we are entitled to demand maturity interest of 5% without the need for a prior reminder.
8. Setting off with counter claims of the customer that are disputed, not legally established and not ripe for judgement is excluded. If the customer is an entrepreneur and, in concluding the contract, is exercising its commercial or independent professional function, it shall forego the exercising of a right to repudiation or lien, unless we, or our legal representatives or vicarious agents, are burdened with gross breach of contract or the counterclaims of the customer on which the rights of repudiation or lien are founded are based on the contract or are undisputed, legally established or ripe for judgement.
9. We only accept cheques and bills of exchange in fulfilment by prior agreement. Any interest and costs shall be charged to the customer.

### § 5 Termination by customer

1. Should the customer terminate/cancel the order, it shall remain liable to pay the agreed price. However, the price shall be reduced by the amount of the expenditure that we save as a consequence of the cancellation of the contract or the amount that we earn, or maliciously neglect to earn, through alternative use of the freed up capacity.
2. In case of termination/cancellation by the customer before the start of production, our remuneration in accordance with Para. 1 above shall in principle be 10 % of the gross order value including sales tax. However, both we and the customer are entitled to prove a different (higher or lower) level of remuneration in accordance with Para. 1 above. In this case,

the customer shall be liable for the remuneration actually proved in accordance with the above Para. 1.

### § 6 Passing of risk, Dispatch, Packaging

1. Unless otherwise agreed, our deliveries are ex works.
2. In all cases, including for carriage prepaid delivery, the risk – including the risk of confiscation – shall pass to the customer upon handing over of the delivery item to the transport agent. This shall also apply if we carry out the transportation ourselves, or have it carried out, even if we have accepted dispatch or delivery at our own cost. Should dispatch be delayed for reasons that lie in the responsibility of the customer, the risk shall pass to the customer upon notification that the delivery item is ready for dispatch.
3. In the absence of a contrary agreement, we shall determine the type and method of packaging and dispatch.
4. Transport insurance shall only be taken out at the express demand and at the cost to the customer.

### § 7 Retention of title

1. We shall retain the title to the delivery item until payment has been made in full for all claims arising from this contract, including those from cheques and bills of exchange and any claims for recourse from cheque and bill of exchange payments made in fulfilment. For payments by the so-called cheque-bill of exchange method, we retain the title to the delivery item, until the risk of recourse from the bills of exchange provided to us has lapsed. If the customer is a corporate body, a special fund under public law or an entrepreneur and, in concluding the contracts on which the claims below are based, is exercising its commercial or independent professional function, we shall furthermore retain the title to the delivery item until full payment of all claims arising from the business relationship has been affected.
2. The customer shall carry out processing or remodelling of the delivery item for us, without any obligations arising on our part as a result. Should the customer combine, mix, blend or process the delivery item with other goods, we shall receive co-ownership of the resulting goods. The co-ownership share shall be calculated based on the relationship of the invoice value of the delivery item to the value of the newly produced goods. The combination, mixing, blending or processing of the delivery item is permissible in the normal course of business, as long as our aforementioned security interest remains assured.
3. The customer may sell the delivery item and the items resulting from it in accordance with Para. 2 above (hereinafter referred to collectively as conditional goods) in the normal course of business, as long as he ensures the extended retention of title (assignment in accordance with Paragraph 4 below). Other acts of disposal, in particular pledging as collateral, leasing, conferment or mortgaging, are not permitted.
4. The customer hereby assigns to us the claims arising, or yet to arise, from the sale or other use of the conditional goods, and we accept this assignment. Insofar as the conditional goods were in our co-ownership, the assignment shall only cover the proportion of claims corresponding to our co-ownership share.
5. The customer is only authorised to collect the assigned claims in the normal course of business and only revocably. Revocation is only permitted if the customer does not properly fulfill its obligations in accordance with this contract, in particular its payment obligations, is insolvent or encumbered, or has applied for the initiation of insolvency proceedings on its assets. In this case, on our demand the customer shall notify the debtor of the assignment; we are likewise entitled to disclose the extended retention of title to the client of the customer.
6. The customer's right to dispose of the conditional goods and to process, combine, mix and blend them or to collect the assigned claims shall lapse, without the need for explicit revocation, at the onset of insolvency, upon suspension of payments, upon submission of the request for insolvency by the customer or a third party or upon the establishment of encumbrance. In these cases, and in the cases stipulated under Paragraph 5, we are entitled, after the expiry of an appropriate period, to withdraw from the contract and to take possession of the conditional goods. The customer is obliged to surrender the goods. Any realisation proceeds from realisation of the conditional goods taken back will be credited – minus appropriate realisation costs – against the liabilities of the customer.

7. In the case of revocation of the right of collection, the customer is obliged to inform us without delay of the name or company name of the debtor for the assigned claims.
8. If the value of the securities provided to us exceed the total value of the secured claims by more than 20 %, we are obliged at the request of the customer, to release the excess securities at our discretion.
9. The customer must notify us in writing without delay of any imminent or completed access by third parties to the conditional goods or to the assigned claims, handing over the documents necessary for intervention. Within the relationship between us and the customer, intervention costs, including any process costs, shall be charged to the latter.

#### § 8 Warranty

1. We shall bear liability for defects of quality and title of the delivery item, in accordance with the terms below.
2. Complaints resulting from incomplete or incorrect deliveries or complaints due to apparent defects, must be notified to us immediately within eight days after handover of the delivery item, otherwise the delivery item shall be considered to have been approved, unless we or our legal representatives or vicarious agents are burdened with malice. The customer must submit complaints about hidden defects immediately, within eight days of their discovery. If the customer is a merchant and the contract is part of its trade, §§ 377, 378 HGB shall also apply.
3. Our warranty for defects of quality and title is limited to subsequent performance and, in terms of time, to a period of 12 months from handover.
4. If the defect consists of a real right of a third party, as a result of which he can demand surrender of the delivery item, our warranty period shall be 10 years from handover.
5. If the customer is an entrepreneur and, in concluding the contract, is exercising its commercial or independent professional function, a corporate body or a special fund under public law, we shall have the right to choose between free of charge elimination of the defect or replacement delivery.
6. We are entitled to refuse subsequent performance if this is associated with disproportionate costs to us. Instead of subsequent performance, a reduction of the agreed price or cancellation of the contract and – subject to the conditions in § 10 of these Terms – payment of damages in lieu of performance or reimbursement of expenses can then be demanded. Cancellation of the contract and payment in lieu of performance or reimbursement of expenses are ruled out, if only an insignificant defect exists. Furthermore, if we have made defect-free part deliveries, cancellation of the entire contract is only permissible if the interest of the customer in the part deliveries made has demonstrably lapsed.
7. The customer must forward the defective delivery item to us for rectification of defects or replacement delivery at its own risk. Replaced delivery items or parts thereof shall become or remain our property.
8. Further claims by the customer, in particular as a result of personal injury, for damage to goods that are not the subject of this contract or for loss of profit, consequential costs etc. are ruled out, unless otherwise stipulated in § 10 below.
9. Our warranty does not extend to the suitability of the delivery item for intended usage by the customer, which is different from the normal usage, unless this has been agreed in writing.

#### § 9 Withdrawal, Impossibility of performance of contract

1. Apart from in the other cases regulated separately in these Terms, the customer can also withdraw from the contract by written declaration if performance of the contract has become impossible for us before the passing of risk. In the case of partial impossibility, there shall only be a right of withdrawal if the customer demonstrably has no interest in the part delivery or part performance; otherwise, it can demand an appropriate reduction in the price. Furthermore, withdrawal from the contract is only permissible if the breach of duty is significant.
2. If the impossibility is not the responsibility of either party, we shall have a claim for the corresponding proportion of the remuneration for the part performance.

#### § 10 Liability

1. In principle, the customer is not entitled to any other or more extensive contractual or legal liability claims against us, our legal representatives and vicarious agents than those granted in these General Delivery and Payment Terms.
2. Our liability, and the liability of our legal representatives and vicarious agents, is limited in every case to breach of duty and unlawful acts based on intent and gross negligence and the culpable infringement of significant contractual obligations (cardinal obligations).
3. We, our legal representatives and vicarious agents, shall bear full liability for intent and gross negligence; otherwise

our level of liability, and the liability of our legal representatives and vicarious agents, is limited to reimbursement of damages that are typical and foreseeable for the contract. If we have taken out liability insurance to cover the typical contractual risk, the level of our liability, and the liability of our legal representatives or vicarious agents, shall be limited to the benefits of the liability insurance, insofar as the customer is a corporate body, a special fund under public law or an entrepreneur and, in concluding the contract, is exercising its commercial or independent professional function. If there are no benefits under the insurance policy, we must intervene with separate damage payments up to the level of the insured sum.

4. The limitations of liability under Para. 2, 3 und 5 do not apply to liability for damages arising from a risk to life, of injury or to health caused by negligent breach of duty by us or malicious or negligent breach of duty by one of our legal representatives or vicarious agents.
5. Claims for damages by the customer due to negligent breach of duty by us, our legal representatives, vicarious agents and other third parties, whose behavior is to be imputed to us in an individual case, in particular in cases of negligently defective deliveries or negligent delay in delivery, are excluded, insofar as they do not constitute the infringement of significant contractual obligations. Furthermore, compensation for damages in lieu of performance in cases of defective delivery is excluded, if the breach of duty is insignificant.
6. The limitations of liability stipulated in these Terms do not apply to our liability for damages under the terms of the currently valid version of the Law on Liability for Defective Products of 15/12/89, from the acceptance of a guarantee or an exercise risk and in case of malicious concealment of a defect.
7. In cases where our liability arises as a consequence of defects in materials procured from third-party suppliers, the customer is initially instructed to assert our claims assigned to him against the third-party supplier – if necessary judicially. If this action is unsuccessful, we shall be liable in accordance with the preceding paragraphs and those of § 8.

#### § 11 Taking back goods

1. Insofar as we have entered into an obligation towards the customer, with reference to these Order, Delivery and Payment Terms, to take back delivered tools, the customer is entitled to demand the partial or complete taking back of the tools if, and to the extent that, the tools are unused, unmodified and in mint condition, correspond to our current stock programme at the time of the demand for taking back and the customer demands that we take back the tools within one year of their delivery.
2. In the case of taking back tools, the customer shall receive from us, in accordance with Para. 1 above, a credit note for 90 % of the net price calculated for the delivery of the tools taken back. The customer is not entitled to any further claims, in particular for complete or partial repayment of the price paid for the returned tools.
3. Returns of goods for which we are not responsible must be made free of charge. The customer must reimburse us for the resulting costs.

#### § 12 Special tools

All tools not listed in the catalogue are special tools, which must undergo a feasibility study. In case of the commissioning of special tools or hard metal moulds, we are entitled to deviate from the commissioned delivery quantity by +/- 20 %.

#### § 13 Place of performance, Legal venue, Applicable law

1. The place of performance for all claims arising from this business relationship shall be 72160 Horb, insofar as the customer is a merchant under commercial law or a corporate body.
2. The legal venue for all claims arising from this business relationship, including those from bills of exchange and cheques, shall be the court, in whose district we have our headquarters, insofar as the customer is a merchant under commercial law or a corporate body. We are also entitled to institute legal proceedings at the court with jurisdiction over the headquarters of the customer.
3. All contractual and business relationships between us and the customer are subject exclusively to the law of the Federal Republic of Germany, to the exclusion of terms applicable under international agreements, in particular the Hague Convention and the United Nations Agreement on Uniform Law for the International Sale of Goods (CISG).

#### § 14 Limitation of authority of field staff, executives and engineers

We hereby explicitly declare that our staff, with the exception of the Directors and authorised representatives, in particular field staff and commercial agents, executives and

engineers are not entitled to agree amendments to the content of the contract either by telephone or verbally. Amendments to the contract must always be made in writing and, in the absence of agency of estoppel or constructive authority, require the approval of the executive board.

#### § 15 Final clause

Should one or more of the clauses of these Terms, or parts thereof, be or become ineffective, this shall not affect the validity of the remaining clauses. The void clause shall be replaced by a legally permissible clause, which comes as close as possible to the intended economic effect of the ineffective clause.

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