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## Metal cutting tools





**PILANA TOOLS**

# History & Present time

## HISTORY

The tool production in Hulin began in 1934. The firm was founded by Mr. Studeník who named the new company "First Moravian factory" for saws and tools". At first the company started producing hand saws, circular saw blades and was gradually enriching the production programme with cutters for wood cutting and other tools for wood working. In the 1960th the production assortment enriched with TCT circular saw blades, gang saw blades, planner knives, machine knives, metal cutting tools and saw bodies. In the years 1948-1992 the firm was a state-owned enterprise. In 1992 the firm was transferred to private ownership.

## PRESENT TIME

PILANA TOOLS with its 650 workers is in the process of dynamic development and is one of the biggest producers of tools in Europe. The tools are made of the best-quality steel in accordance with DIN and ISO standards. The quality is closely watched at each production stage. For the highest precision the most up-to-date equipment is used: Laser, CNC grinding machines, CNC milling machines, automatic furnaces and other automatic and semiautomatic machinery.

The constant attention is paid to the production improvement and automation. These measures, together with long-lasting experience and low costs, enable to offer high quality products at competitive prices. PILANA TOOLS regularly exports 80% of its products to over 70 countries world-wide.

PILANA TOOLS consists of property-joined companies.

### PILANA TOOLS a.s.

provides energy supplies and other services.

### Companies

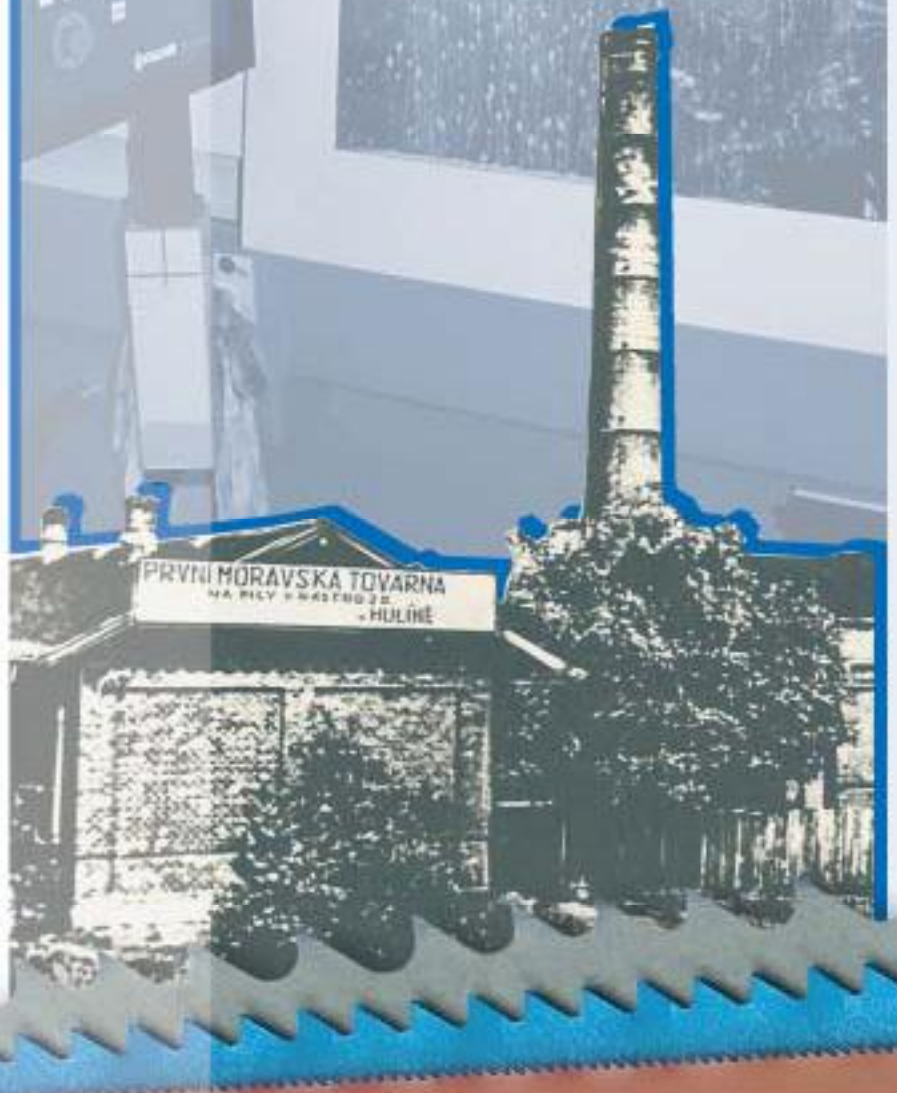
PILANA TOOLS Metal spol. s.r.o.

PILANA TOOLS Wood Saws spol. s.r.o.

PILANA TOOLS Knives spol. s.r.o.

PILANA TOOLS Saw Bodies spol. s.r.o.

provide tool manufacturing and tool development.



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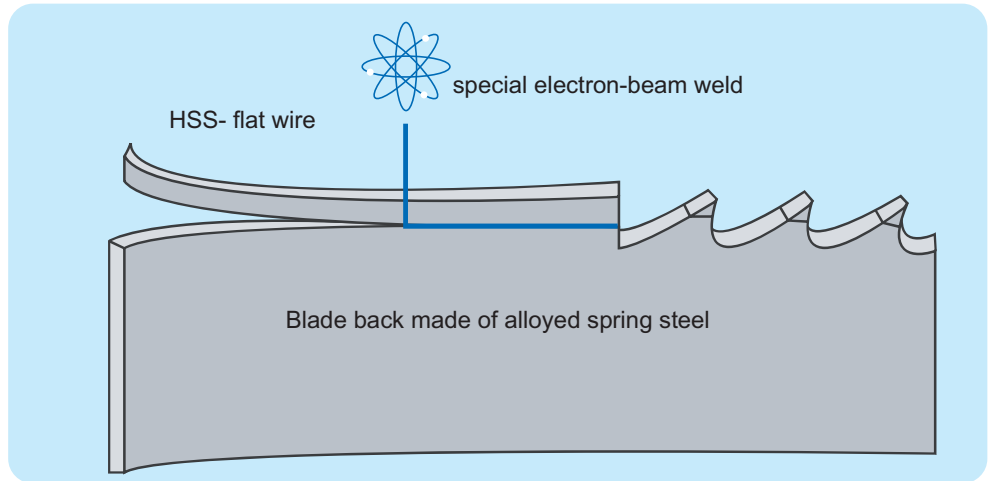
# Bimetal - Material

## M42

DIN type 1.3247  
hardness approx.  
67-69 HRC

## M51

DIN type 1.3207  
hardness 69 HRC  
with high tungsten and  
cobalt content



### Flexible:

Body of band saw blade is manufactured from special alloyed spring steel. It is highly flexible with hardness of about 50 HRC. It is an ideal basis for long life-time and excellent cutting performance.

### Tough and Resistable

Tooth tips made from HSS steel in M42 or M51 material version.

### The best bonding

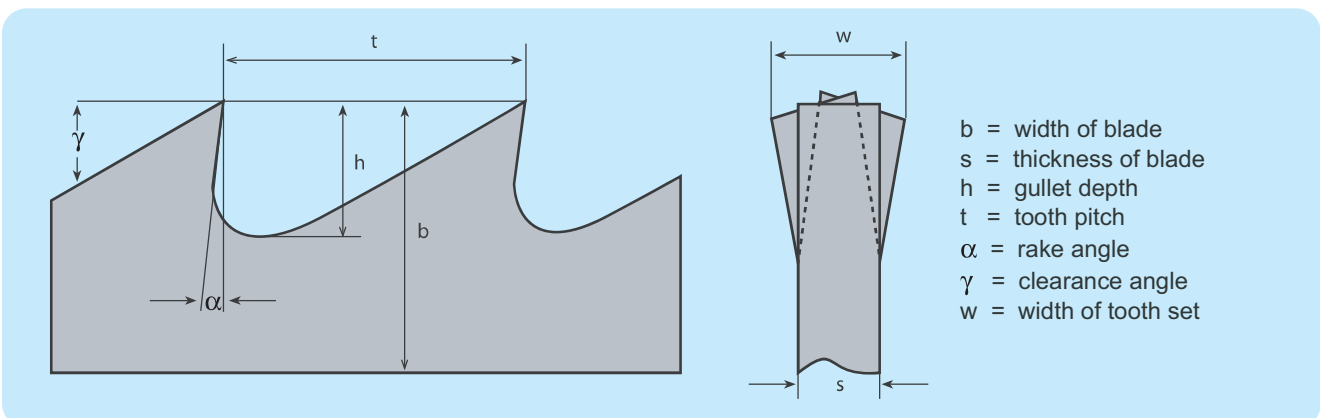
Both materials are undetachably welded together.

### All advantages

The high quality Bi-Metal blade shows both, flexibility of the supporting body and enormous wear resistance of hardened HSS steel. On finished blade each tooth top from HSS steel is designed for heavy load and enormous performance.

## Geometry of the band saw blade

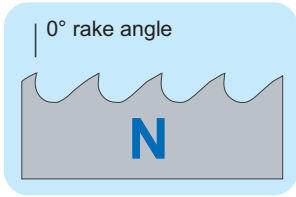
### [ Terminology ]



# Tooth forms

Only well-chosen tooth shape can effectively cut with low-vibration. Four basic types are available.

Standard tooth

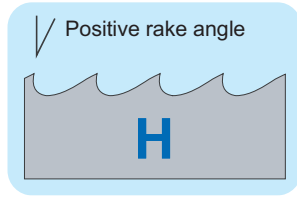


**Specialisation:**  
short chipping materials  
thin-sided materials

**Specification:**  
0° rake angle  
4+18 teeth/inch

**Product range:**  
100, 420

Hook tooth

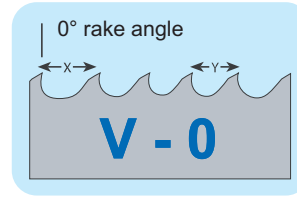


**Specialisation:**  
long chipping materials  
tough materials  
big diameters

**Specification:**  
Positive rake angle  
1,25 + 6 teeth/inch

**Product range:**  
100, 421, 426, 427

Variable tooth

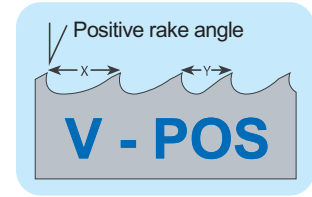


**Specialisation:**  
low vibration cutting  
structurals

**Specification:**  
0° rake angle  
variable tooth pitch  
of 3/4 to 10/14

**Product range:**  
430

Variable tooth with positive hook angle

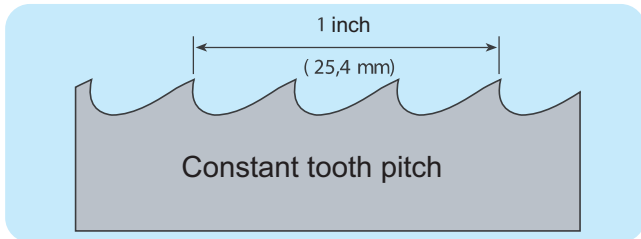


**Specialisation:**  
low vibration cutting  
solid material

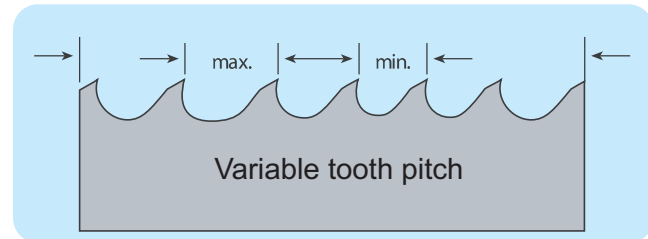
**Specification:**  
Positive rake angle  
variable tooth pitch  
of 0,75/1,25 to 4/6

**Product range:**  
431, 434, 435, 436, 437,  
438, 531, 537, 544

# Tooth pitch



The tooth distance is equally spaced.  
The number of teeth per inch (25,4mm) denotes the tooth of the saw blade.



The tooth distances vary within a group of teeth.  
The smallest and the largest tooth pitch denotes the variable tooth of saw blade.

# Tooth set

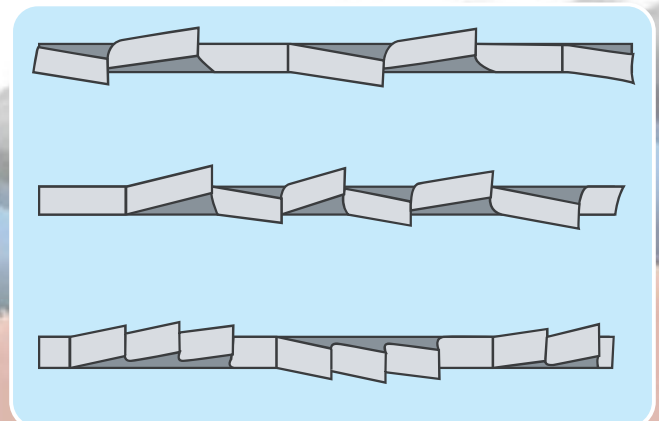
Apart from the tooth form and tooth pitch it is essential to choose the right tooth setting for the performance of the saw blade. The correct clearance of band saw blade is achieved by specific setting for each cutting application. This is to avoid blade pinching, very important in problematic cutting jobs.

The type and width of setting are decisive factors for cutting.

**Standard-Raker-Set (S, SW)**  
maximum 10 teeth per inch  
tooth shape N, H

**Variable-Group-Set (G, GW)**  
0,75/1,25 about 10/14 teeth per inch  
K tooth shape

**Wavy set (W)**  
maximum 14 teeth per inch  
N tooth shape



# Correct tooth pitch » optimum performance

For optimum cutting performance of Bi-Metal band saw blade it is essential to choose the right toothing for individual application. Choose either Standard tooth form with constant tooth pitch or Variable tooth form with unevenly spaced teeth. Combined toothing is recommended for cutting of problematic material with vibration reduction.

## Recommended toothing for cutting solid material

### Constant tooth pitch

Cross section mm	Teeth per inch	
	TPI	Tooth shape
380 - 800	1,25	H
200 - 400	2	H
120 - 200	3	H
80 - 120	4	H/N
50 - 80	6	N
30 - 50	8	N
20 - 30	10	N
10 - 20	14	N
0	18	N

N= Standard tooth shape  
H= Hook tooth shape

### Variable tooth pitch

Cross section mm	Teeth per inch	
	TPI	Tooth shape
550	0,75/1,25	V - POS
300 - 600	1/2	V - POS
120 - 350	2/3	V - POS
80 - 140	3/4	V - POS
60 - 110	4/6	V - POS
40 - 70	5/8	V - 0
30 - 60	6/10	V - 0
20 - 40	8/12	V - 0
25	10/14	V - 0

V-POS= variable tooth shape with positive hook angle  
V-0= variable tooth shape with 0° hook angle

## Recommendation to cut steel tubes and structurals

While cutting steel tubes and profile the choice of the correct toothing plays an decisive role. Variable toothing has been proven to be the most appropriate toothing type. Important factors are the wall thickness or outer parameters of the tubes or structurals.

### Thin wall structurals ( rake angle 0° )

Wall thickness (S) in mm	Outer diameter in mm						
	20	40	60	80	100	120	150
2	14	14	14	14	14	14	10/14
3	14	14	14	14	10/14	10/14	8/12
4	14	14	10/14	10/14	8/12	8/12	6/10
5	14	10/14	10/14	8/12	8/12	6/10	6/10
6	14	10/14	8/12	8/12	6/10	6/10	5/8
8	14	8/12	6/10	6/10	5/8	5/8	5/8
10	-	6/10	6/10	5/8	5/8	5/8	-

Wall thickness (S) in mm	Outer diameter of structurals (in mm)							
	Outer diameter of structurals (in mm)				Heavy wall structurals (pos. Rake angle)			
	80	100	120	150	200	300	500	750
10	-	-	-	4/6	4/6	4/6	3/4	3/4
15	4/6	4/6	4/6	4/6	3/4	3/4	2/3	2/3
20	4/6	3/4	3/4	3/4	3/4	2/3	2/3	2/3
30	3/4	3/4	3/4	3/4	2/3	2/3	2/3	1/2
50	-	3/4	3/4	2/3	2/3	2/3	1/2	1/2
80	-	-	-	-	2/3	1/2	1/2	1/2
100	-	-	-	-	-	1/2	0,75/1,25	0,75/1,25

PILANA band saw blades are always delivered as welded endless coils suitable for machines or machine rolls.

6 - 13 mm - 76 m | 20 - 34 mm - 100 m | 41 mm - 80 m | 54-67 mm - 90 m | 80 mm - 80 m

# Technical recommendations

## [ for band saw blades ]

Material Groups	Material Specification DIN	Material No.	Cutting Speed $V_c$ (m/min)		Cooling Fluids	
			CS1/CS2-Plus	Bi-Metal	Cutting oil	Emulsion
Structural steels	St 37 – 2	1.0037	30-50	80-100		x
	St 50 – 2	1.0050	30-45	60-85		x
	St 60 – 2	1.0060	30-40	50-70		x
Case-Fardening steels	C 10	1.0301	40-60	80-100	x	
	14 NiCr 14	1.5752	25-30	40-55	x	
	21 NiCrMo 2	1.6523	30-40	50-60	x	
	16 MnCr 5	1.7131	25-30	40-60	x	
Free-Machining steels	9 S 20	1.0711	40-60	80-120		x
	45 S 20	1.0727	40-60	80-120		x
Heat treatable steels	C 45	1.0503	35-50	60-70		x
	40 Mn 4	1.1157	30-40	60-70		x
	36 NiCr 6	1.5710	30-40	60-70		x
	34 CrNiMo 6	1.6582	25-35	50-65		x
	42 CrMo 4	1.7225	25-35	50-65		x
Ball bearing steels	100 Cr 6	1.3505	20-30	35-50		x
	100 CrMn 6	1.3520	20-30	35-50		x
Spring steels	65 Si 7	1.5028	25-35	45-60		x
	50 CrV 4	1.8159	25-35	45-60		x
Unalloyed tool steels	C 125 W	1.1663	20-30	40-60		x
	C 75 W	1.1750	20-30	40-60		x
Cold-Work tools steels	125 Cr 1	1.2002	20-30	40-50	x	x
	X 210 Cr 12	1.2080	15-25	30-40	x	x
	X 155 CrVMo 12 1	1.2379	15-25	30-40	dry	
	X 42 Cr 13	1.2083	20-25	35-45	x	x
	X 165 CrV 12	1.2201	15-25	30-45	x	x
	100 CrMo 5	1.2303	15-30	30-50	x	x
	X 32 CrMoV 3 3	1.2365	25-35	45-60	x	x
	45 WCrV 7	1.2542	20-30	40-50	x	x
	56 NiCrMoV 7	1.2714	20-30	40-50	x	x
High speed steels	S 6-5-2-5 (E Mo5 Co5)	1.3243	20-30	35-45		x
	S 2-10-1-8 (M 42)	1.3247	20-30	35-45		x
	S 6-5-2 (DMo5)	1.3343	20-30	35-45		x
Valve steels	X 45 CrSi 9 3	1.4718	-	30-45	x	x
	X 45 CrNiW 18 9	1.4873	-	30-40	x	x
High temperature steels	X 20 CrMoV 12 1	1.4922	-	10-30	x	x
	X 5 NiCrTi 26 15	1.4980	-	10-30	x	x
Heat resistant steels	X 10 CrSi 6	1.4712	-	15-25	x	x
	X 10 CrAl 18	1.4742	-	15-25	x	x
	X 15 CrNiSi 25 20	1.4841	-	15-25	x	x
Stainless steels	X 5 CrNi 18 10	1.4301	-	30-40	x	x
	X 6 CrNiMoTi 17 122	1.4571	-	30-40	x	x
Steel castings	GS-38	1.0420	20-30	40-60		x
	GS-60	1.0558	20-30	40-60		x
Cast irons	GG-15	0.6015	25-30	30-60	dry	
	GG-30	0.6030	25-30	30-60	dry	
	GGG-50	0.7050	25-30	30-60	dry	
	GTW-40-05	0.8040	25-30	30-60	dry	
	GTS-65-02	0.8165	25-30	30-60	dry	
Copper	KE-Cu	2.0050	100-250	100-400	x	x
	Elektrolyt-Kupfer		100-250	100-400	x	x
Brass (Copper-Zinc Alloys)	CuZn 10	2.0230	100-300	100-400		x
	CuZn 31 Si 1	2.0490	100-250	100-400		x
Aluminium Bronze (Copper Aluminium Alloys)	CuAl 8	2.0920	20-30	35-50		x
Bronze (Copper-Tin Alloys)	CuAl 10 Fe 3 Mn 2	2.0936	20-30	35-50		x
	CuSn 6	2.1020	80-100	80-150		x
Red Brass (Copper Cast Alloys)	CuSn 6 Zn 6	2.1080	80-100	80-150		x
	G-CuSn 10 Zn	2.1086.01	30-40	50-100		x
Nickle Base Alloys	G-CuSn 5 ZnPb	2.1096.01	30-40	50-100		x
	NiCr 20 TiAl	2.4631	-	10-25	x	x
Aluminium and Alloys	NiCr 22 FeMo	2.4972	-	10-25	x	x
	Al 99.5	3.0255.07	80-300	80-800		x
Titanium Alloys	AlMgSiPb	3.0615.71	80-300	80-800		x
	G-AlSi 5 Mg	3.2341.01	80-300	80-800		x
	Ti 99.5	3.7024.1	-	10-20	x	x
Thermoplastic Plastics	TiAl 6 V 4	3.7165	-	10-20	x	x
	PVC		100-400	100-400	dry	
Plastics with fibre inlays	Teflon, Hostalen		100-400	100-400	dry	
	Resitex		50-200	50-300	dry	
	Novotex		50-200	50-300	dry	



## [ band saw blades ]

### Troubleshooting



		Breakage of band saw	Curved cut
Machine	<b>Band saw guidance and radius arm</b> Control and set up the guidance of the band saw regularly. Control its guiding wear and if needed, replace it. Set up the guidance arm as close to the work piece as possible.	Blade guidance is too far from cutting piece or wrong set up. Blade guidance is worn-out. Radius arm is loose.	Blade guidance is too far from cutting piece or wrong set up. Blade guidance is worn-out. Radius arm is loose.
	<b>Drive discs</b> Drive discs of the band saw must be kept in good condition and properly balanced.	Worn-out drive disc. Discs are too small- try thinner band saws.	
	<b>Chip brushes</b> Control the right setting of the chip brushes and change the brushes regularly.		
	<b>Blade tension</b> It is necessary to tension the blade accordingly for straight cutting. Measure the tension with tensionmeter.	Blade tension is too strong.	Blade tension is too small.
	<b>Cooling/cutting fluid</b> Cooling fluid is important for oiling and cooling of the machine. Check the concentration of fluid with refractometer. Use only good quality cooling fluids. It should run into the cut under low pressure in sufficient flow.		
Cutting data	<b>Blade speed</b> It is necessary to choose the right blade speed. Check the blade speed with speedometer.		Blade speed is too slow.
	<b>Feed speed</b> Feed speed must be chosen carefully so that band saw teeth cut efficiently.	Feed speed is too high.	Feed speed is too fast.
Band saw blade	<b>Tooth pitch</b> Choosing the right tooth pitch is as important as choosing the right feed speed and blade speed.	Tooth pitch is too small- too many teeth.	Tooth pitch is too small- too many teeth.
	<b>Tooth shape</b> Each tooth shape has its ideal usage.		
	<b>Running-in</b> It is necessary to run in the blade to achieve maximum lifetime of band saw. Never cut in old cutting line.		
	<b>Lifetime of band saw</b> All band saw blades will eventually get used. Watch for worn-out signs.		Saw blade is worn-out.
Work piece	<b>Surface</b> Grade of work piece surface substantially influences lifetime of blade. If the surface is bad, lower the blade speed.		
	<b>Fastening of work piece</b> Make sure your work piece is well fastened. It is important especially when bundle cutting. Do not cut bent or damaged pieces.		



1. It is necessary to pay the same attention to band saw blades as to other tools. Please check especially:
  - cracks
  - band saw back jamming
  - twisting and dulling of band saw
2. Keep the band saw in good technical condition. Please check especially:
  - if the fixing clamp and straightening mechanism are functional
  - if the hydraulic pressure, cooling fluid are sufficient and circular wheel are parallel
  - if not so, it is absolutely needed to change or set up the mechanism.
3. Put the band saw on clean, chip-free circular wheels. Insert band saw between circular wheels, straighten band saw properly and adjust rotating brush for chip removal from tooth spaces.
4. Tighten cutting material in the clamp so that as many teeth as possible are cutting (min. 4, maximum 30).
5. While bundle cutting, each piece must be well fixed.
6. Find out the material hardness before you start cutting- cut out hard spot, scale or flame burn off.
7. Before casting cutting remove sand from the surface with bastard file or steel brush. Sand can make band saw go dull very fast.
8. Before starting to cut it is necessary to keep minimal clearance between top tooth line and cutting material- 10mm and set up minimal feed pressure of saw arm.
9. Increase feed pressure of saw arm after starting the machine gradually. Do not use neither high pressure not low pressure.
10. While cutting make sure the cooling fluid flow into cutting spot is continuous.
11. Straighten the band saw after cutting 2 or 3 pieces.
12. Check the single cutting time after a certain time period. If this time is in disproportion, replace the band saw with new one.
13. Never start cutting with new band saw in old cut line. It is necessary to turn the material and start cutting again.

Tooth breaking	Rough surface	Fast teeth worn out	Vibration	Band saw spinning on driving wheels
			Band saw guidance is too far from cutting piece or wrong set up. Band saw guidance is used.	
				Driving wheel is worn out
Chip removing brush does not work, tooth spaces are full		Chip removing brush does not work		
			Lead arm is loose.	Band saw straightness is too small
		Insufficient flow of cooling fluid. Wrong concentration of cooling fluid		
	Band saw speed is too low	Speed of band saw is too high	Band saw straightness is too small	
Feed speed is too high	Feed speed is too high	Feed speed is too high or too low	Natural vibration- increase or decrease band saw speed slightly	Feed speed is too high
Tooth pitch is too high. tooth spaces are full	Tooth pitch is too small	Wrong tooth shape		
Teeth are too weak		Band saw was not run in properly	Feed speed is too high or too low	
	Band saw was not fixed properly	Surface defects. iron scales, rust, sand	Use the right tooth shape	
	Band saw is worn out			Band saw is worn out
			Band saw was not run in properly	

# M 42 - 420

## MASSIVE Expert

All purpose blade for cutting all dimension of solid steel



### Usage

- » common steel qualities up to 1400 N/mm<sup>2</sup> tensile strength
- » non ferrous metals
- » cross sections up to approx. 100 mm (4")
- » contour cutting operations

### Charasterictits

- » tooth tips made of HSS M42 / material no. 1.3247
- » standard teeth with 0° resp. slightly positive rake angle combined with a standard-raker or wavy set is distinguished to cut short chipping materials and light wall thickness
- » for smooth and burr-free cuts

Dimensions		Teeth per inch					
mm	inch	4	6	8	10	14	18
6 x 0,90	1/4 x 0,035				N	N	
10 x 0,90	3/8 x 0,035				N	N	
13 x 0,65	1/2 x 0,025				N	N	N
13 x 0,90	1/2 x 0,035				N	N	
20 x 0,90	3/4 x 0,035	N	N	N	N	N	
27 x 0,90	1 1/16 x 0,035	N	N	N	N	N	
34 x 1,10	1 3/8 x 0,042	N	N				
41 x 1,30	1 5/8 x 0,050	N	N				

**N = standard**

# M 42 - 421

## MASSIVE Expert Plus

ideal for cutting larger solid bars



### Usage

- » common steel qualities up to 1400 N/mm<sup>2</sup> tensile strength
- » non ferrous metals
- » cross sections over 100 mm (4")

### Characteristics

- » tooth tips made of HSS M42 / material no. 1.3247
- » hook teeth with a positive rake angle combined with a raker-set, for easy tooth penetration and chip formation on larger cross sections
- » cuts long chipping and tough materials without a problem
- » cuts smooth and accurate

Dimensions		Teeth per inch				
mm	inch	1,25	2	3	4	6
6 x 0,90	1/4 x 0,035					H
10 x 0,90	3/8 x 0,035				H	H
13 x 0,65	1/2 x 0,025					H
13 x 0,90	1/2 x 0,035			H	H	H
20 x 0,90	3/4 x 0,035			H	H	
27 x 0,90	1 1/16 x 0,035		H	H	H	H
34 x 1,10	1 3/8 x 0,042	H	H	H		
41 x 1,30	1 5/8 x 0,050	H	H	H		
54 x 1,30	2 1/8 x 0,050	H	H	H		
54 x 1,60	2 1/8 x 0,063	H	H	H		
67 x 1,60	2 5/8 x 0,063	H	H	H		
80 x 1,60	3 1/8 x 0,063	H	H	H		

H = hook teeth

# M 42 - 427

## MASSIVE Master

excellent in cutting special alloys and materials  
difficult to machine

[ borazon-ground teeth ]



### Usage

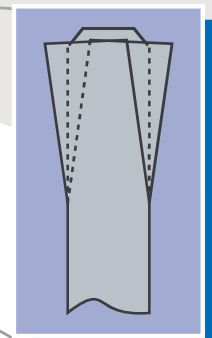
- » stainless steels
- » heat resistant steels
- » Titanium Alloys
- » Nickel based Alloys

### Characteristics

- » precision borazon-ground tooth tips made of HSS M 42 / material no. 1.3247
- » hook teeth with ground triple chip geometry, positive rake angle and standard-raker-set for perfectly divided chips
- » bevelled roughing teeth provide excellent guidance of saw blade
- » sharpest cutting edges grant fast cutting rates and great cutting accuracy

Dimensions		Teeth per inch		
mm	inch	1,25	2	3
27 x 0,90	1 1/16 x 0,035			H
34 x 1,10	1 3/8 x 0,042		H	H
41 x 1,30	1 5/8 x 0,050	H	H	H
54 x 1,30	2 1/8 x 0,050	H	H	H
54 x 1,60	2 1/8 x 0,063	H	H	H
67 x 1,60	2 5/8 x 0,063	H		

**H = hook teeth**

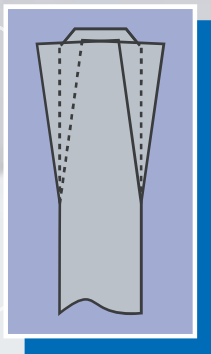


# M 42 - 437

## MASSIVE Master Plus

ideal performance in cutting special alloys and materials difficult to machine

[ borazon-ground variable teeth ]



### Usage

- » stainless steels
- » heat resistant steels
- » Titanium alloys
- » Nickel-based alloys

### Characteristics

- » precision borazon-ground tooth tips made of HSS M42 / material no. 1.3247
- » variable teeth with ground multi-chip geometry, positive rake angle and group-set
- » perfectly divided chips and excellent band guidance
- » sharpest cutting edges grant reduced cutting forces and great cutting accuracy

Dimensions		Teeth per inch			
mm	inch	0,75/1,25	1/2	2/3	3/4
27 x 0,90	1 1/16 x 0,035			V-POS	V-POS
34 x 1,10	1 3/8 x 0,042			V-POS	V-POS
41 x 1,30	1 5/8 x 0,050		V-POS	V-POS	V-POS
54 x 1,30	2 1/8 x 0,050			V-POS	V-POS
54 x 1,60	2 1/8 x 0,063		V-POS	V-POS	V-POS
67 x 1,60	2 5/8 x 0,063	V-POS	V-POS	V-POS	

**V-POS = variable teeth with positive rake**

# M 42 - 434

## MASSIVE Prominent

excellent in cutting tough alloys and difficult materials



### Usage

- » long chipping steels
- » stainless steels
- » Titanium base alloys
- » special Bronze
- » Copper alloys
- » Nickel base alloys
- » exotic, difficult to cut alloys
- » solid materials of medium sections

### Characteristics

- » tooth tops from material HSS M42, DIN 1.3247
- » variable tooth with 0° rake angle with a special group-set cuts even lightest sections with less vibrations
- » short chipping materials are cut without a problem
- » band saw for long life and low cost cutting

Dimensions		Teeth per inch	
mm	inch	2/3	3/4
34 x 1,10	1 3/8 x 0,042	V-POS+	V-POS+
41 x 1,30	1 5/8 x 0,050	V-POS+	V-POS+
54 x 1,30	2 1/8 x 0,050	V-POS+	
54 x 1,60	2 1/8 x 0,063	V-POS+	V-POS+

**V-POS+ = variable teeth with extremely positive rake angle**

# M 42 - 438

## MASSIVE Prominent Plus

ideal for cutting tough materials and alloys

[ borazon-ground teeth ]



### Usage

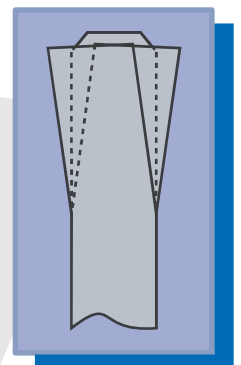
- » long chipping steels
- » stainless steels
- » Titanium alloys
- » special Bronzes
- » Copper alloys
- » Nickel based Alloys
- » exotic, difficult to cut alloys

### Characteristics

- » precision borazon-ground tooth tips made of HSS M 42 / material no. 1.3247
- » variable teeth with extremely positive rake angle in connection with the ground tooth geometry and a variable group-set generate a superior chip distribution
- » chamfered raker teeth grant excellent band guidance with lowest vibration
- » cleanest cutting edges and highest performance are the result

Dimensions		Teeth per inch	
mm	inch	2/3	3/4
34 x 1,10	1 3/8 x 0,042	V-POS+	V-POS+
41 x 1,30	1 5/8 x 0,050	V-POS+	V-POS+
54 x 1,30	2 1/8 x 0,050	V-POS+	
54 x 1,60	2 1/8 x 0,063	V-POS+	V-POS+

**V-POS+ = variable teeth with extremely positive rake angle**



# M 42 - 430

## PROFILE Expert

basic - professional for thin and medium wall thickness



### Usage

- » common steel qualities up to 1400 N/mm<sup>2</sup> tensile strength
- » profiles of non-ferrous metals
- » single and bundle cuts
- » tubes and structurals with light or medium walls
- » sheet metal on vertical band saw machines

### Characteristics

- » tooth tops from material HSS M42, DIN 1.3247
- » variable tooth with 0° rake angle with a special group-set cuts even lightest sections with less vibrations
- » short chipping materials are cut without a problem
- » long life and low cost cutting

Dimensions		Teeth per inch					
mm	inch	3/4	4/6	5/8	6/10	8/12	10/14
6 x 0,90	1/4 x 0,035						V-0
10 x 0,90	3/8 x 0,035						V-0
13 x 0,65	1/2 x 0,025				V-0	V-0	V-0
13 x 0,90	1/2 x 0,035				V-0	V-0	V-0
20 x 0,90	3/4 x 0,035		V-0	V-0	V-0	V-0	V-0
27 x 0,90	1 1/16 x 0,035	V-0	V-0	V-0	V-0	V-0	V-0
34 x 1,10	1 3/8 x 0,042	V-0	V-0	V-0	V-0	V-0	V-0
41 x 1,30	1 5/8 x 0,050	V-0	V-0	V-0	V-0		
54 x 1,30	2 1/8 x 0,050	V-0	V-0				
54 x 1,60	2 1/8 x 0,063	V-0	V-0				

**V-O = variable teeth**



# M 42 - 431

## PROFILE Expert Plus

strong in cutting medium and large sections



### Usage

- » common steel qualities up to 1400 N/mm<sup>2</sup>
- » non-ferrous metals
- » single and bundle cuts
- » solid material of medium to large dimensions
- » heavy wall tubes

### Characteristics

- » tooth tops from material HSS M42, DIN 1.3247
- » variable teeth with a positive rake angle with a special group-set cut solid materials as well as heavy wall structurals and tubing at fast cutting rates, with a smooth surface

Dimensions		Teeth per inch				
		0,75/1,25	1/2	2/3	3/4	4/6
mm	inch					
20 x 0,90	3/4 x 0,035					V-POS
27 x 0,90	1 1/16 x 0,035			V-POS	V-POS	V-POS
34 x 1,10	1 3/8 x 0,042			V-POS	V-POS	V-POS
41 x 1,30	1 5/8 x 0,050		V-POS	V-POS	V-POS	V-POS
54 x 1,30	2 1/8 x 0,050		V-POS	V-POS	V-POS	V-POS
54 x 1,60	2 1/8 x 0,063		V-POS	V-POS	V-POS	V-POS
67 x 1,60	2 5/8 x 0,063	V-POS	V-POS	V-POS	V-POS	
80 x 1,60	3 1/8 x 0,063	V-POS	V-POS	V-POS	/	

**V-POS = variable teeth with positive rake angle**

# M 42 - 435

# PROFILE Master

excellent performance for heavy industry

[ extra wide tooth setting ]

## Usage

- » H-beams and similar shapes of medium and large dimensions
- » angles and similar shapes



## Characteristics

- » tooth tops from material HSS M42, DIN 1.3247
- » variable teeth with slightly positive rake angle and extra heavy group-set shows excellent performance on H-beams and similar shapes
- » avoids blade pinching in beams with inside tension, or in poorly supported profiles
- » for 90° and mitter cutting

Dimensions		Teeth per inch		
mm	inch	2/3	3/4	4/6
34 x 1,10	1 3/8 x 0,042	V-POS	V-POS	V-POS
41 x 1,30	1 5/8 x 0,050	V-POS	V-POS	V-POS
54 x 1,30	2 1/8 x 0,050	V-POS	V-POS	
54 x 1,60	2 1/8 x 0,063	V-POS	V-POS	V-POS
67 x 1,60	2 5/8 x 0,063	V-POS	V-POS	V-POS

**V-POS = variable teeth with positive rake angle**

# M 42 - 426

# ALU Expert

smoothly cuts light metals

[extra wide tooth setting]



## Usage

- » pure Aluminium and Aluminium alloys
- » all dimensions

## Characteristics

- » tooth tops from material HSS M42, DIN 1.3247
- » hook teeth with an extra heavy set perform at all dimensions
- » smooth cuts and tool life that convinces

Dimensions		Teeth per inch				
mm	inch	1,25	2	3	4	6
10 x 0,90	3/8 x 0,035				H	H
13 x 0,65	1/2 x 0,025					H
13 x 0,90	1/2 x 0,035			H		
20 x 0,90	3/4 x 0,035			H		
27 x 0,90	1 1/16 x 0,035		H	H	H	
34 x 1,10	1 3/8 x 0,042	H	H			
41 x 1,30	1 5/8 x 0,050	H	H			

**H = hook teeth**

# M 42 - 436

## ALU Master

cutting Aluminium without pinching

[ wide setting ]

### Usage

- » pure Aluminium and Aluminium alloys
- » materials that tend to pinching
- » larger sections and heavy wall structurals



### Characteristics

- » tooth tops from material HSS M42, DIN 1.3247
- » this heavy tooth set with positive rake angle avoids blade pinching and cuts larger workpieces with low vibration
- » provides increased productivity and low cost per cut

Dimensions		Teeth per inch	
mm	inch	2/3	3/4
27 x 0,90	1 1/16 x 0,035	V-POS	V-POS
34 x 1,10	1 3/8 x 0,042	V-POS	V-POS
41 x 1,30	1 5/8 x 0,050	V-POS	V-POS

**V-POS = variable teeth with vpositive rake angle**

# M 51 - 531

## PROFILE M 51

extra durable teeth for cutting tough steel types and alloyed metals of medium dimensions



### Usage

- » steels up to 1700 N/mm<sup>2</sup> tensile strength
- » authentic stainless steels
- » nickle-based alloys
- » Titanium and special bronzes
- » solid material of medium dimensions
- » heavy wall tubing

### Characteristics

- » tooth tops from material HSS M51, DIN 1.3207
- » positive variable tooth with special strong tooth forms
- » high heat and wear resistance of HSS M51 tooth tips increases band life on all hard and problematic steels

Dimensions		Teeth per inch			
mm	inch	1/2	2/3	3/4	4/6
27 x 0,90	1 1/16 x 0,035			V-POS+	V-POS+
34 x 1,10	1 3/8 x 0,042		V-POS+	V-POS+	
41 x 1,30	1 5/8 x 0,050		V-POS+	V-POS+	
54 x 1,60	2 1/8 x 0,063	V-POS+	V-POS+		

**V-POS+ = variable teeth with extremely positive rake angle**

# M 51 - 537

## MASSIVE M 51

extremely resistant sharpened teeth for toughest steel types and alloys of medium dimensions

[ borazon ground teeth ]

### Usage

- » steels up to 1700 N/mm<sup>2</sup> tensile strength
- » authentic stainless steels
- » nickle-based alloys
- » solid material of medium dimensions

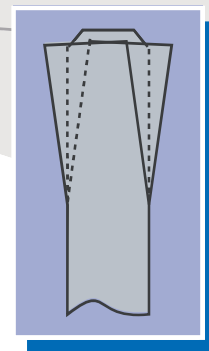


### Characteristics

- » precision borazon ground tooth tips made of HSS M51, DIN 1.3207
- » variable tooth with extremely positive rake angle in connection with the ground tooth geometry and a variable group-set generate a superior chip distribution
- » chamfered raker teeth grant excellent band guidance at lowest vibration
- » Tooth tip hardness of approx. HRC 69 increases the life time for better cost-effectiveness

Dimensions		Teeth per inch		
mm	inch	1/2	2/3	3/4
34 x 1,10	1 3/8 x 0,042		V-POS+	V-POS+
41 x 1,30	1 5/8 x 0,050		V-POS+	V-POS+
54 x 1,60	2 1/8 x 0,063	V-POS+	V-POS+	

V-POS+ = variable teeth with extremely positive rake



# M 51 - 544

## MASSIVE PLUS M 51

Superior cutting performance for steels and special bronzes of medium and large dimensions

[ teeth made by pressure grinding ]



### Usage

- » steels up to 1700 N/mm<sup>2</sup> tensile strength
- » stainless steels
- » long chipping materials
- » large cross sections cutting

### Characteristics

- » tooth tops from material HSS M51, DIN 1.3207
- » newly designed tooth form with highest performance of quality surface, fully whet ground at a pressure chamber
- » variable teeth with positive rake angle and standard setting
- » designed for large and powerful machine types
- » low vibration, great lifetime, high efficiency

Dimension		Teeth per inch			
		0,75/1,25	1 / 1,5	1,4 / 2	2 / 3
mm	inch				
41 x 1,30	1 5/8 x 0,050			V - POS	V - POS
54 x 1,60	2 1/8 x 0,063		V - POS	V - POS	V - POS
67 x 1,60	2 5/8 x 0,063	V - POS	V - POS	V - POS	V - POS

**V-POS = variable teeth with positive rake angle**

# Band Saw Blades - Carbon Steel

**CS - 100 for piece production  
and less demanding applications**

## Usage

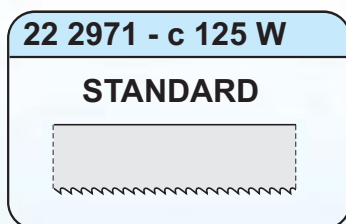
- » common steel types with tensile strength 700N/mm<sup>2</sup>
- » single or bulk cutting
- » non-ferrous metals
- » solid material of small diameter, tubes and profiles

## Characteristics

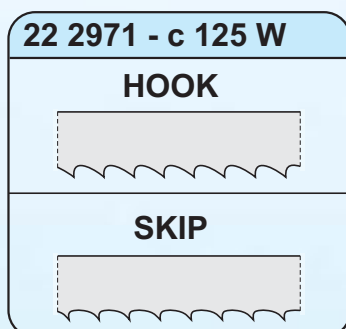
- » band saw body and teeth from Carbon steel
- » tooth tips high- frequency hardened and tempered to hardness 64-65 HRC
- » tooth shape Standard, Hook and Skip

## Packing

- » Saw blades can be delivered in a box of 30m or welded to the required length



Band Saw blades from Carbon Steel STANDARD									
Dimensions	Teeth per inch								Weight (kg)
4 x 0,65			8	10	12	14	18	22	0,02
6 x 0,65		6	8	10	12	14	18	22	0,03
8 x 0,65		6	8	10	12	14	18	22	0,04
10 x 0,65		6	8	10	12	14	18	22	0,05
13 x 0,65	4	6	8	10	12	14	18	22	0,06
16 x 0,80	4	6	8	10	12	14	18	22	0,10
20 x 0,80	4	6	8	10	12	14	18		0,14
25 x 0,90	4	6	8	10	12	14	18		0,20



Band Saw blades from Carbon Steel HOOK and SKIP					
Dimensions	Teeth per inch				Weight (kg)
	HOOK		SKIP		
6 x 0,65	4	6		4	0,03
8 x 0,65	4	6		4	0,04
10 x 0,65	4	6		4	0,05
13 x 0,65	4	6		4	0,06
16 x 0,80	4	6		4	0,10
20 x 0,80	4	6		4	0,14
25 x 0,90	4	6		4	0,20



22 2961

# Power Hacksaw Blades

## Sabre Saw Blades

22 2965

### Usage

- » cutting structural steels, tool steels and high speed steels
- » cast irons cutting
- » non-ferrous metals cutting
- » solid materials, profiles, tubes, metals

### Characteristics

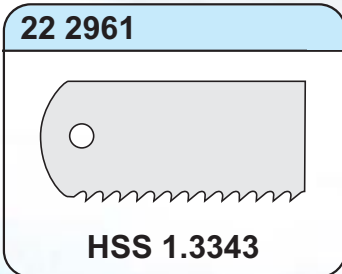
- » hack saws produced of high efficient Swedish high speed steel, hardened and tempered to enable perfect performance
- » material: HSS=Dmo5 = DIN 1.3343 = ČSN 19830
- » teeth alternatively set
- » designed for power frame saws and KASTO tools

### Usage

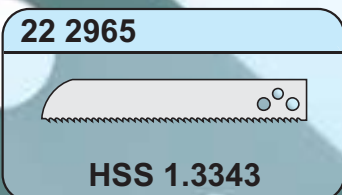
- » pneumatic and electrical machines as FEIN, Spitzhas, Premag, Rockwell etc.
- » pull cutting upwards or downwards
- » soft steels, steel profiles
- » plastics
- » chipboard

### Characteristics

- » hack saws produced of high efficient Swedish high speed steel, hardened and tempered to enable perfect performance
- » material: HSS=Dmo5 = DIN 1.3343 = ČSN 19830
- » teeth alternatively set, for small tooth pitches wavy set



Power Hacksaw Blades						
Dimensions (mm)	Teeth per inch				Weight (kg)	
300 x 25 x 1,25			10	14	0,09	
300 x 25 x 1,60	6	8	10	14	0,10	
350 x 25 x 1,25			10	14	0,10	
350 x 32 x 1,60	6	8	10	14	0,136	
400 x 25 x 1,25		8	10	14	0,11	
400 x 32 x 1,60	4	6	8	10	0,16	
400 x 40 x 2,00	4	6	8	10	0,25	
450 x 32 x 1,60	4	6	8	10	0,17	
450 x 40 x 2,00	4	6	8	10	0,28	
500 x 40 x 2,00	4	6	8	10	0,30	
550 x 50 x 2,50	4	6	8		0,54	
600 x 50 x 2,00	4	6	8	10	0,47	
600 x 50 x 2,50	4	6	8		0,59	
650 x 50 x 2,50	4	6	8		0,63	
700 x 50 x 2,50	4	6	8		0,67	



Sabre Saw Blades					
Dimensions (mm)	Teeth per inch				Weight (kg)
180 x 27 x 1,60	8	10	14	16	0,06
200 x 27 x 1,60	8	10	14	16	0,07
300 x 27 x 1,60	8	10	14	16	0,10
400 x 27 x 1,60	8	10	14	16	0,13
500 x 27 x 1,60	8	10	14	16	0,16
500 x 27 x 2,00	8	10	14	16	0,20

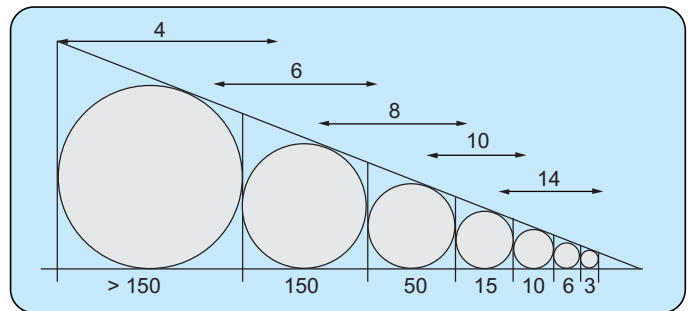
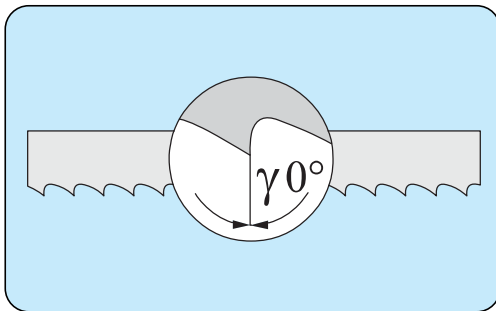
# General recommendations



## For usage of metal cutting power hacksaw blades

### How to choose the right type of hacksaw blades

Choosing of the hacksaw blade with the correct tooth number per inch depends on dimensions and type of the cutting material.



- 14 teeth/25 mm - cutting of thin materials of all types as tubes, pipes, profiles etc.
- 10 teeth/25 mm - cutting of all material types with small and medium dimensions
- 6 teeth/25 mm - cutting of all material types of greater thickness
- 4teeth/25 mm - cutting of soft material types of greater thickness

RECOMMENDED TEETH PER 25MM (TPI) FOR EACH MATERIAL TYPE			
Material	Material diameter		
	10 - 30	30 - 100	100 - 250
	Teeth per inch (25mm)		
Free machining steel Building irons Structural steel	14 - 8	8 - 6	6 - 4
Heat-treated steel Nitridated steel	14 - 8	8 - 6	6 - 4
Unalloyed tool steel Alloyed tool steel	10 - 8	6 - 4	4
Spring steel	14 - 8	8 - 6	6 - 4
High temperature steel Stainless steel	8 - 6	6 - 4	6 - 4
Malleable cast iron to 200HB Gray iron over 200HB	8 - 6	6 - 4	4
Cast iron	10 - 8	8 - 6	6 - 4
Dural Bronze Aluminium Brass	6 - 4	6 - 4	6 - 4

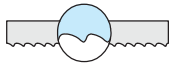
Small tooth number is suitable for thicker material cutting and greater tooth number is better for thin profile cutting.

# How to use power hack saw blades properly

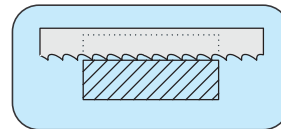
1. It is important to pay the same attention to power hack saw blades as to any other tools.
2. Keep the machine in good technical condition. It is especially needed to check if:
  - a) the lifting arm and its function are in order,
  - b) oil pump of the lifting arm is clean and without air bubbles.
3. Tighten the hack saw blade in the machine in correct position and straighten it properly.
4. Tighten the cutting material firmly into the clamps so that as many teeth as possible cut ( at least 4, maximum 30).
5. While bundle cutting (more pieces at once) make sure each piece is firmly tightened.
6. While cutting metal castings make sure you remove foundry sand from the surface with bastard file or steel brush. Sand can cause the hack saw to run dull very fast.
7. While starting the machine, lower the saw frame carefully and change the pressure or lower the feed speed for several first cuts (only when new blade is used).
8. Do not use too high or too low pressure.
9. Always use cooling fluids while cutting.
10. After cutting two or three pieces check the tension of the blade.
11. After a certain cutting period check the time needed for a single cut. In case this time is irregularly long, replace the blade immediately with new one.
12. Never start cutting with new blade in old cut-line. Setting of previously used blade was already smaller and cut-line is too narrow for a new blade. It is necessary to release, turn the cutting material and start cutting again.

## Defects and their causes

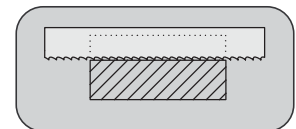
### 1. Fast blunting



- » if wrong teeth number is chosen
- » if saw blade is not tightened accurately
- » if cutting speed is too high- especially while cutting hard metals
- » if pressure is too high - teeth go blunt fast
- » insufficient pressure - teeth grate but do not cut in
- » insufficient cooling
- » if defects in mechanism for reverse cutting occur



yes

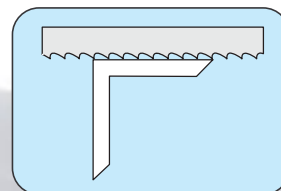


no

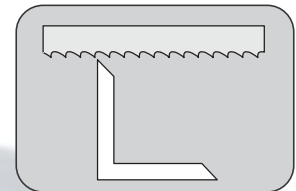
### 2. Teeth breaking



- » tooth pitch is too small (teeth number per 25mm) while cutting thin elements
- » if cutting sharp edges or thin-walled elements when not even 4 teeth are in cut at once.
- » if material is not tightened well



yes

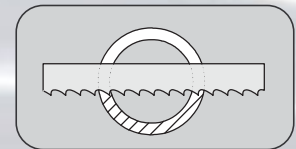
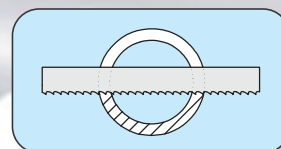


no

### 3. Breaking of saw blade



- » unqualified straightening of saw blade in machine frame
- » improperly chosen hack saw blade for high feed
- » careless lowering of machine frame
- » cutting material is not tightened properly
- » driving new hack saw into cutting line previously made by used hack saw blade.
- » jammed material while finishing the cut
- » defective bearings in machine or defective stroke



### 4. Curved cutting



- » wrong fixing of blade in the machine
- » blade is insufficiently tightened
- » material is insufficiently tightened
- » too high pressure and wrong chosen blade
- » hard spots inside the material
- » faulty machine - worn bearings, frame is not fixed

By choosing the right hack saw blade in correct dimensions for cutting particular material type you will reach the most economical cutting performance. Do not forget to follow the above instructions while using hack saw blades.

# Hand hacksaw blades

## HSS, Cr

22 2950 - HSS

22 2951 - HSS

22 2950 - Cr

22 2951 - Cr

### Usage

- » HSS - high cutting performance suitable for all steel types
- » Cr - best for common use

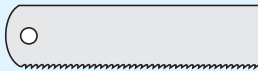
### Characteristics

- » HSS - high speed steel
- » Cr - alloyed steel

### Packing

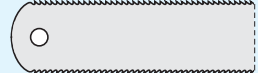
- » in cardboard box

#### HSS 22 2950



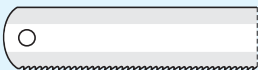
dimensions	teeth per inch	weight (kg)
300 x 13 x 0,65	18	0,02
300 x 13 x 0,65	24	0,02
300 x 13 x 0,65	32	0,02

#### HSS 22 2951



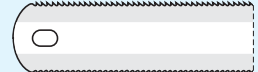
dimensions	teeth per inch	weight (kg)
300 x 25 x 0,65	18	0,04
300 x 25 x 0,65	24	0,04
300 x 25 x 0,65	32	0,04

#### Cr 22 2950



dimensions	teeth per inch	weight (kg)
300 x 13 x 0,65	18	0,02
300 x 13 x 0,65	24	0,02
300 x 13 x 0,65	32	0,02

#### Cr 22 2951

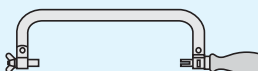


dimensions	teeth per inch	weight (kg)
300 x 20 x 0,65	18	0,03
300 x 20 x 0,65	24	0,03
300 x 20 x 0,65	32	0,03
300 x 25 x 0,65	18	0,04
300 x 25 x 0,65	24	0,04
300 x 25 x 0,65	32	0,04

22 2956

# Hacksaw frame for metal cutting

#### 22 2956



Hacksaw frame			
Lenght (mm)		Packing- pcs/box	weight (kg)
300		5	0,70

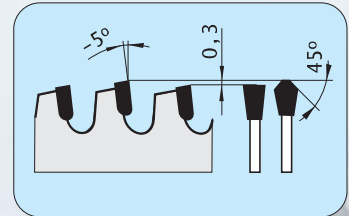
# Tungsten Carbide-tipped Saw Blades

for non-ferrous  
metals and plastics cutting

[ machines with manual feed motion ]

## Usage

- » cutting of non-ferrous extrusions and profiles
- » suitable for "down cutting" or mitre saws
- » manual feed motion machines
- » we recommend type 13 for massive materials
- » type 11 is best for cutting thin-walled profiles



**LOW NOISE**

» » Diameter 200 - 450mm

## Characteristics

- » interchanging flat and trapezoidal tooth with negative rake angle 5°
- » tungsten carbide tips type K10
- » expansion slots are filled with copper rivets to enable low-noise cutting and to improve heat exhaust from cutting spot
- » saw blades between 200-400mm diameter are always produced in low-noise version
- » smooth and precise cutting applications

### 22 5387 - 13 TFZ N

diameter (mm)	kerf (mm)	body thickness (mm)	bore diameter (mm)	teeth number
250	3,2	2,5	30	60
300	3,2	2,5	30	72
350	3,6	2,8	30	84
400	3,6	2,8	30	96
420	4,0	3,2	30	96
450	4,0	3,2	30	108
500	4,0	3,2	30	120

### 22 5387 - 11 TFZ N

diameter (mm)	kerf (mm)	body thickness (mm)	bore diameter (mm)	teeth number
160	2,8	2,2	20	48
190	2,8	2,2	30	56
200	3,2	2,5	30	60
250	3,2	2,5	30	80
300	3,2	2,5	30	96
350	3,6	2,8	30	108
400	3,6	2,8	30	120

# Tungsten carbide-tipped saw blades

for non-ferrous metals and plastics cutting

[ machines with mechanical feed motion ]

22 5387 - 13 TFZ P

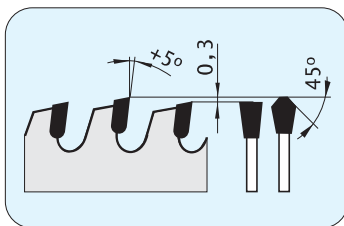
22 5387 - 11 TFZ P

## Usage

- » cutting applications include thin-walled aluminum extrusions and profiles, plastics and synthetical resin boards (Pertinax)
- » mechanical feed motion
- » we recommend type 13 for massive materials
- » type 11 is best for cutting thin-walled profiles

## Characteristics

- » interchanging flat and trapezoidal tooth with positive rake angle 5°
- » tungsten carbide tips type K10
- » expansion slots are filled with copper rivets to enable low-noise cutting and to improve heat exhaust from cutting spot
- » saw blades between 200-400mm diameter are always produced in low-noise version
- » smooth and precise cutting applications



**LOW NOISE**

» » Diameter 200 - 450mm

### 22 5387 - 13 TFZ P

diameter (mm)	kerf (mm)	body thickness (mm)	bore diameter (mm)	teeth number
200	3,2	2,5	30	48
250	3,2	2,5	30	60
300	3,2	2,5	30	72
350	3,6	2,8	30	84
400	3,6	2,8	30	96
450	4,0	3,2	30	108
500	4,0	3,2	30	120

### 22 5387 - 11 TFZ P

diameter (mm)	kerf (mm)	body thickness (mm)	bore diameter (mm)	teeth number
250	3,2	2,5	30	80
300	3,2	2,5	30	96
350	3,6	2,8	30	108

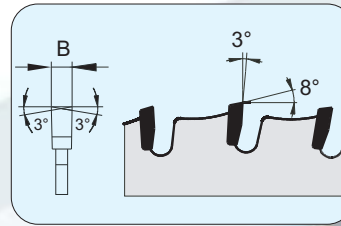
# Tungsten carbide-tipped saw blades

22 5388 WZ

## DRY CUT blades

### Usage

- » cutting thin metal materials
- » non-ferrous metals cutting
- » PVC
- » acrylic glass
- » sandwich panels and acrylics



### Characteristics

- » alternating teeth with positive hook angle 3°
- » tungsten tips suitable for cutting above mentioned material types
- » special toothback angle which serves as chip size limiter and simultaneously prevents breaking of TCT tips
- » guarantees good quality cut

### 22 5388 WZ

diameter (mm)	kerf (mm)	body thickness (mm)	bore diameter (mm)	teeth number
150	2,2	1,6	16 (20)	30
160	2,2	1,6	16 (20)	30
170	2,2	1,6	16 (20)	32
180	2,2	1,6	20 (30)	36
190	2,4	1,8	20 (30)	38
200	2,4	1,8	20 (30)	40
210	2,4	1,8	30	40
230	2,4	1,8	30	44
235	2,4	1,8	30	44
250	2,4	2	30	48
300	2,4	2	30	60
300	2,4	2	30	80
305	2,4	2	25,4	60
305	2,4	2	25,4	80
350	2,6	2,2	30	80
355	2,6	2,2	25,4	80

## Service

Besides production of new TCT saw blades PILANA also provides full service of used TCT saw blades. Service and reconditioning are performed with technology, components and quality identically as new blades are made.