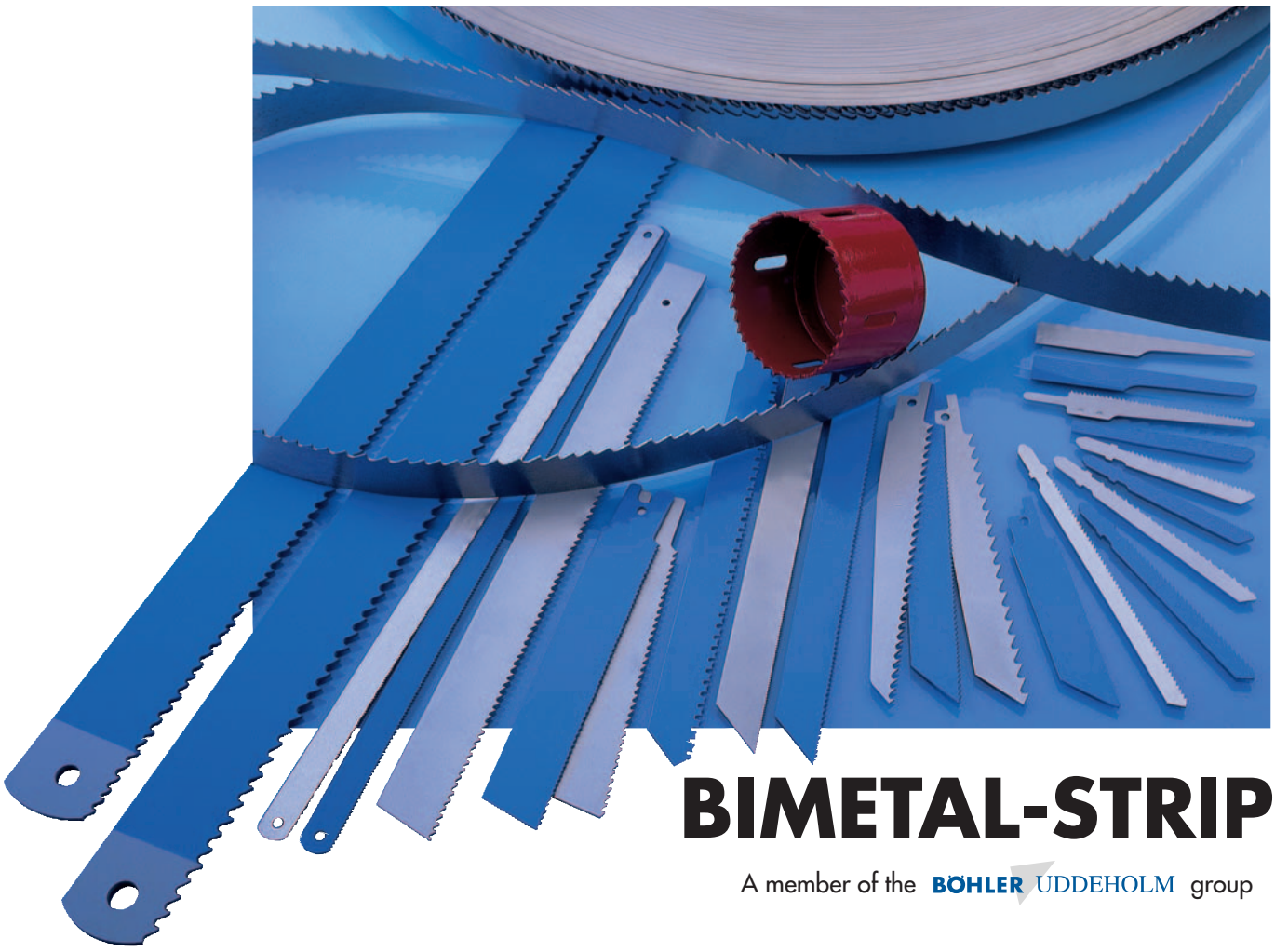
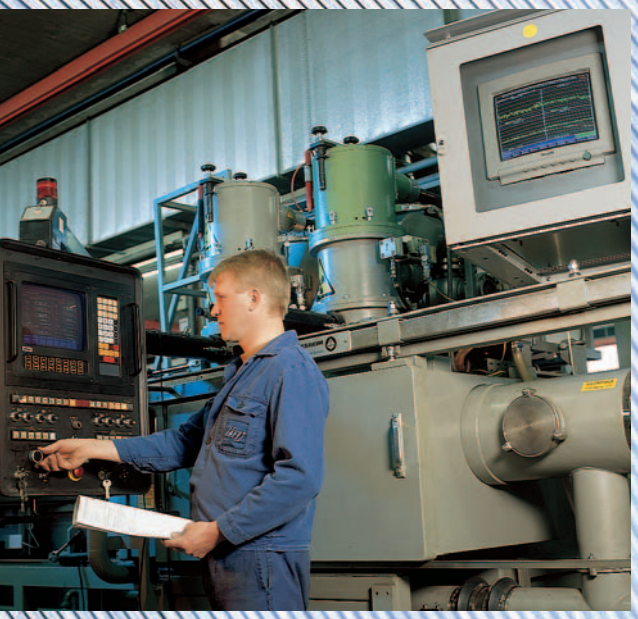
by BÖHLER



BIMETAL-STRIP

A member of the BÖHLER UDDEHOLM group



Double jet welding equipment to join the High Speed Steel and backing material.

Dressing tool to smooth the weld seam.



Automatic setting of dressing tool.

THE WORLD'S LARGEST SUPPLIER OF BIMETAL STRIP FOR THE SAW INDUSTRY

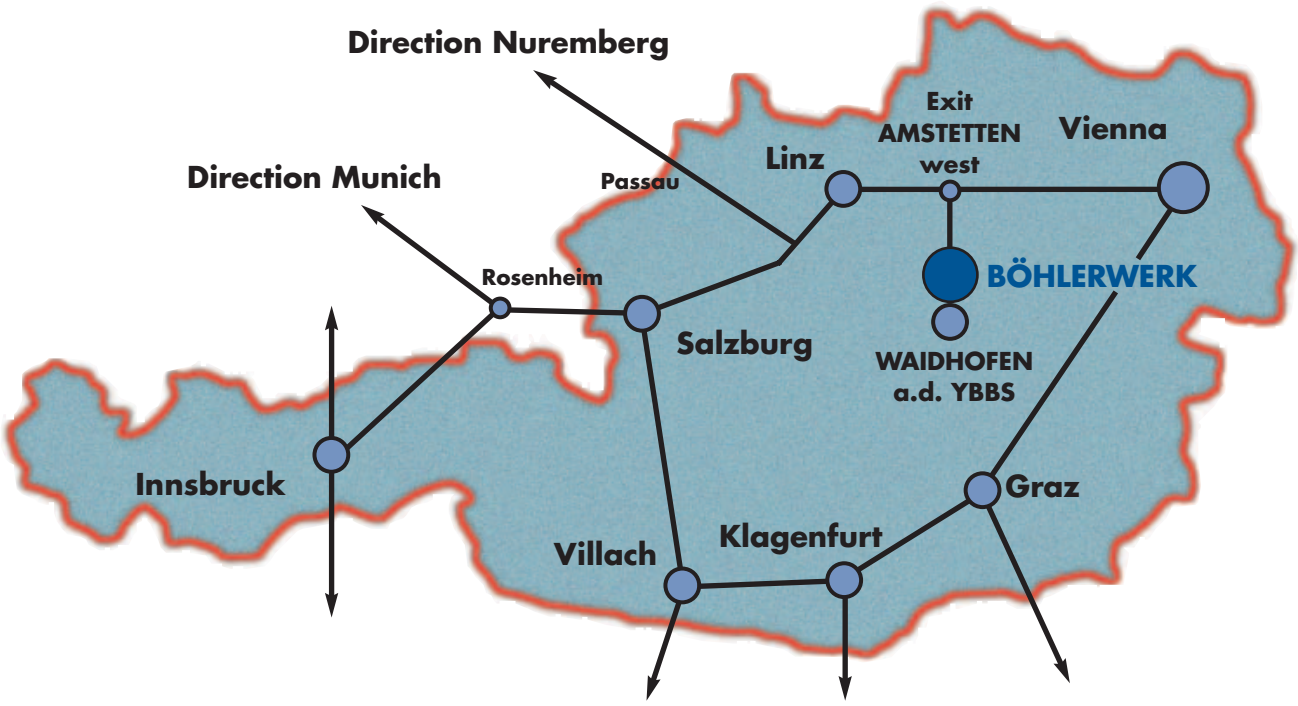
Bimetal strip was first used in the manufacture of high quality tools in the early 1970's. The specialists of BOHLER YBBSTAL BAND realised at once the significance of the new compound materials.

New developments in metallurgy are tested thoroughly for their suitability for this application, as well as new production technology.

As an independent subsidiary of the world's largest tool steel business, the world wide `know how´ of the BOHLER UDDEHOLM AG is also available to customers of BOHLER YBBSTAL BAND.

A variety of high quality special steels produce first class raw materials for the manufacture of saws.

The continuing further development of these activities has led to Bimetal strip from Ybbstal being delivered to all parts of the world and BOHLER YBBSTAL BAND GmbH & Co KG becoming the world's largest supplier of Bimetal strip for the saw industry.



SAWS FROM BOHLER BIMETAL STRIP STEEL
The outstanding solution

Bimetal strip is the starting point for the manufacture of superior high performance saws. Two different steel grades - high speed steel on the cutting side and hot strength spring steel on the reverse side are welded along the length without the use of additional materials.

BOHLER YBBSTAL BAND as market leaders are committed to provide first class bimetal strip for their customers in the saw industry.

Through close attention to specialised customer requirements and problem solving the customer's every need is catered for.

Bohler itself is an independent supplier as it does not manufacture saws.

High quality manufacturing to the internationally recognised quality standard of ISO 9001 has seen the Company achieve a level above the standard of its competitors. The market for Bimetal strip has grown consistently over the years and more and more customers decide to rely on the high standards set by BOHLER Bimetal strip steel.

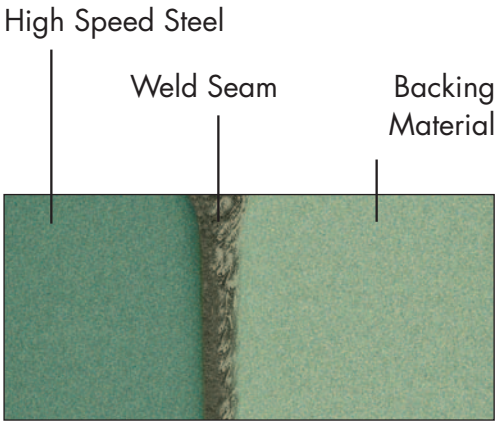


BOHLER bimetal strip is subject to stringent quality control.

BOHLER STANDS FOR QUALITY

Through working closely together with universities and research institutes it has been possible to develop an automatic control mechanism which guarantees continual and consistent high quality.

- A first class preservation of the welding seam due to the installation of an automatic, high precision guide, which ensures an accurate welding of the high speed steel and the supporting material during the welding process.
- A faultless weld due to an automatic identification process and removal of all welding abnormalities.
- Easy to mill due to low hardness of the weld seam.
- A long shelf life as a result of using the best edge and surface materials as well as high quality backing strip.
- In addition our Bimetal strip possesses minimal distortion and excellent durability.
- And finally, the ink jet print marking on the high speed steel edge is environmentally friendly.



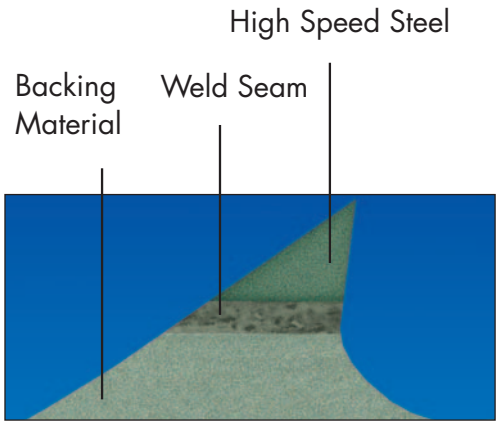


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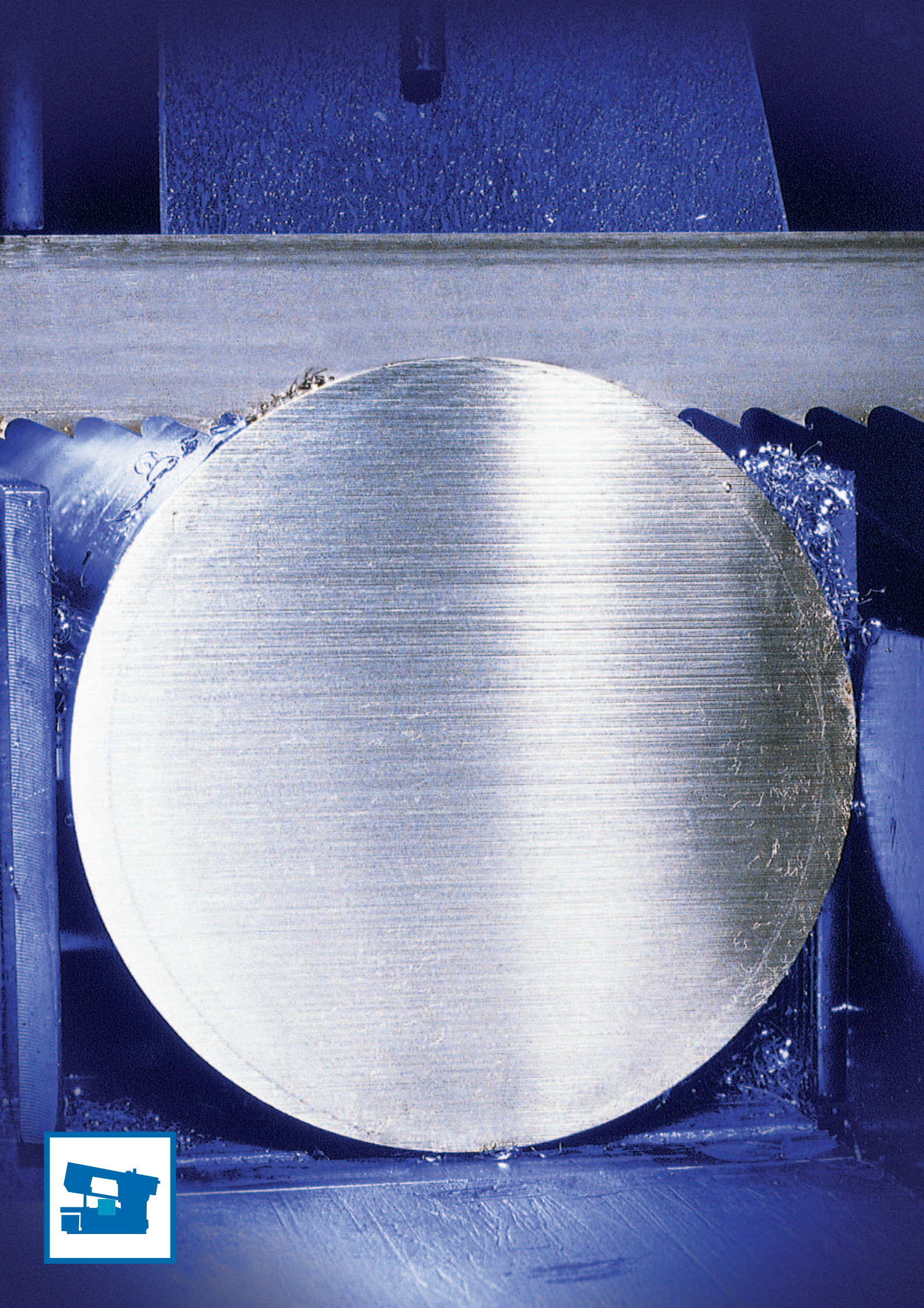
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Bimetal Strip for BANDSAWS

High Speed Steel

Bohler Grade	S504			S500		S700	
DIN	~HS1-5-1-8			HS2-10-1-8		HS10-4-3-10	
WSTNR.	[1.3299]			1.3247		1.3207	
AISI	MATRIX II			M42		~M51	
Typical Analysis %	C	0.73		C	1.09	C	1.26
	Cr	4.10		Cr	3.90	Cr	4.00
	Mo	5.00		Mo	9.40	Mo	3.60
	V	1.00		V	1.20	V	3.20
	W	1.00		W	1.50	W	9.30
	Co	8.00		Co	8.00	Co	10.00

Backing Material

Bohler Grade	B313		B552		
DIN	32CrMoV12		- - -		
WSTNR.	[1.2390]		[1.2791]		
AISI	- - -		D 6 A		
Typical Analysis %	C	0.34	C	0.45	
	Cr	2.90	Cr	1.00	
	Mo	0.90	Mo	1.00	
	V	0.20	V	0.10	
	Ni	0.70	Ni	0.50	

Condition as Supplied: annealed

Hardness:

High Speed Steel	240 - 320 HV_3
Weld Seam	max. 400 HV_3 (excluding S700)
Backing Material	180 - 250 HV_3

Surface: metalic bright, free from rolling defects, laps, deep scratches, pits etc…

Edge finish: High Speed Steel edge rectangular with corner radius max. 0.10 mm.
Back edge machined rectangularly with corner radius of 0.10 - 0.20 mm

Tolerances:

Width:	W 41.50 mm	± 0.050 mm
	W > 41.50 mm	± 0.070 mm
Thickness:	T 0.63 mm	± 0.020 mm
	T 1.00 mm	± 0.025 mm
	T 1.50 mm	± 0.030 mm
	T 2.50 mm	± 0.035 mm
Flatness:	max. 1 µm/mm strip width	
Parallelism:	max. deviation 0.020 mm at width of 34.50 mm	
	max. deviation 0.030 mm at width of > 34.50 mm	
Straightness:	max. deviation 1.25 mm in 1000 mm	
Twist:	max. 5° per metre	

Identification: High Speed Steel edge marked by Ink Jet with details of order



Bimetal Strip for JIG SAW and RECIPROCATING SAW BLADES

High Speed Steel

Bohler Grade	S601		S504		S500
DIN	HS6-5-2		~HS1-5-1-8		HS2-10-1-8
WSTNR.	1.3343		[1.3299]		1.3247
AISI	M2		MATRIX II		M42
Typical Analysis %	C	0.85	C	0.73	C 1.09
	Cr	4.20	Cr	4.10	Cr 3.90
	Mo	5.10	Mo	5.00	Mo 9.40
	V	2.00	V	1.00	V 1.20
	W	6.40	W	1.00	W 1.50
	Co	- - -	Co	8.00	Co 8.00

Backing Material

Bohler Grade	B313	B552	
DIN	32CrMoV12	- - -	
WSTNR.	[1.2390]	[1.2791]	
AISI	- - -	D 6 A	
Typical Analysis %	C	0.34	C 0.45
	Cr	2.90	Cr 1.00
	Mo	0.90	Mo 1.00
	V	0.20	V 0.10
	Ni	0.70	Ni 0.50

Condition as Supplied: annealed

Hardness:

High Speed Steel	240 - 320 HV_3
Weld Seam	max. 410 HV_3
Backing Material	180 - 250 HV_3

Surface: metalic bright, free from rolling defects, laps, deep scratches, pits etc...

Edge finish: High Speed Steel edge rectangular with corner radius max. 0.10 mm
Back edge machined rectangularly with corner radius of 0.10 - 0.20 mm (alternatively rounded)

Tolerances:

Width:	+ 0.000 / - 0.150 mm	
Thickness:	T 1.00 mm	± 0.025 mm
	T 1.50 mm	± 0.030 mm
	T 2.50 mm	± 0.035 mm
Flatness:	max. 1 µm/mm strip width	
Parallelism:	max. deviation 0.02 mm	
Straightness:	max. deviation 1.25 mm in 1000 mm	
Twist:	max. 5° per metre	

Identification: High Speed Steel edge marked by Ink Jet with details of order



Bimetal Strip for HACKSAW BLADES

High Speed Steel

Bohler Grade	S601		S504	
DIN	HS6-5-2		~HS1-5-1-8	
WSTNR.	1.3343		[1.3299]	
AISI	M2		MATRIX II	
Typical Analysis %	C	0.85	C	0.73
	Cr	4.20	Cr	4.10
	Mo	5.10	Mo	5.00
	V	2.00	V	1.00
	W	6.40	W	1.00
	Co	- - -	Co	8.00

Backing Material

Bohler Grade	F550		B552	
DIN	50CrV4		- - -	
WSTNR.	1.8159		[1.2791]	
AISI	6150		D 6 A	
Typical Analysis %	C	0.50	C	0.45
	Cr	1.00	Cr	1.00
	Mo	- - -	Mo	1.00
	V	0.12	V	0.10
	Ni	- - -	Ni	0.50

Condition as Supplied: annealed

Hardness:

High Speed Steel	240 - 300 HV_3
Weld Seam	max. 430 HV_3
Backing Material	150 - 220 HV_3

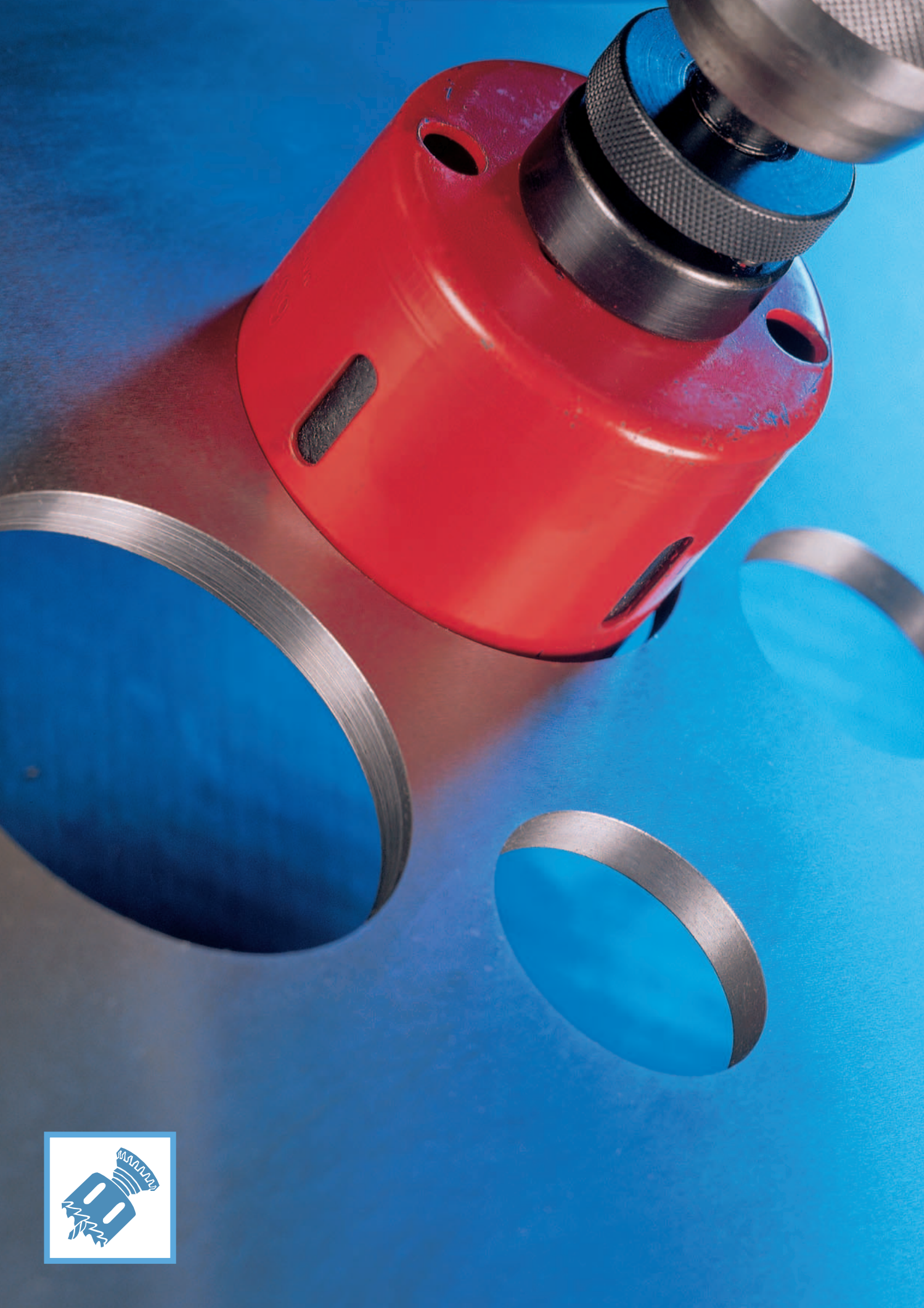
Surface: metalic bright, free from rolling defects, laps, deep scratches, pits etc…

Edge finish: High Speed Steel edge rectangular with corner radius max 0.10 mm. Back edge machined rectangularly with corners rounded.

Tolerances:

Width:	± 0.050 mm
Thickness:	± 0.020 mm
Flatness:	max. 1 µm/mm strip width
Parallelism:	max. deviation 0.02 mm
Straightness:	max. deviation 1.25 mm in 1000 mm
Twist:	max. 5° per metre

Identification: High Speed Steel edge marked by Ink Jet with details of order



Bimetal Strip for HOLE SAWS and POWER SAW BLADES

High Speed Steel

Bohler Grade	S607		S504	
DIN	HS6-5-3		~HS1-5-1-8	
WSTNR.	1.3344		[1.3299]	
AISI	M3 Cl. 2		MATRIX II	
Typical Analysis %	C	1.21	C	0.73
	Cr	4.10	Cr	4.10
	Mo	5.00	Mo	5.00
	V	2.90	V	1.00
	W	6.40	W	1.00
	Co	- - -	Co	8.00

Backing Material

Bohler Grade	W326		B552	
DIN	48CrMoV6-7		- - -	
WSTNR.	1.2323		[1.2791]	
AISI	- - -		D 6 A	
Typical Analysis %	C	0.45	C	0.45
	Cr	1.40	Cr	1.00
	Mo	0.70	Mo	1.00
	V	0.30	V	0.10
	Ni	- - -	Ni	0.50

Condition as Supplied: annealed

Hardness:

High Speed Steel	240 - 320 HV_3
Weld Seam	max. 430 HV_3
Backing Material	180 - 250 HV_3

Surface: metalic bright, free from rolling defects, laps, deep scratches, pits etc...

Edge finish: High Speed Steel edge rectangular with corner radius max 0.10 mm.
Back edge machined rectangularly with corner radius of 0.10 mm - 0.30 mm

Tolerances:

Width:	± 0.100 mm	
Thickness:	T 1.50 mm	± 0.030 mm
	T > 1.50 mm	± 0.035 mm
Flatness:	max. 2 µm/mm strip width	
Parallelism:	max. deviation 0.035 mm	
Straightness:	max. deviation 1.50 mm in 1000 mm	
Twist:	max. 5° per metre	

Identification: High Speed Steel edge marked by Ink Jet with details of order

GENERAL INFORMATION

The heat treatment parameters for the bimetal strip shall principally be chosen with regard to the high speed steel grade involved. The heat treatment method depends on the choice of the heat treatment unit.

Salt bath:
for individual heat treatment of hand and power saw blades, etc.

Continuous heat treatment:
for band saw blades, but also for hand- and hole saw blades.

Protective gas or vacuum chamber furnaces:
for individual heat treatment.

The information on the hardness and tempering properties of the high speed steels given on the following pages is intended to offer you some guidance in adjusting the heat treatment cycles to the respective requirements. On account of its production parameters, high speed steel exhibits a very homogeneous and fine-grained structure, offering the prerequisites for obtaining optimum efficiency. This presupposes that austenitizing conditions, temperature and soaking time are properly chosen and observed and that absolute absence of decarburization is ensured. For obtaining high cutting hardness and toughness we recommend at least three tempering cycles.

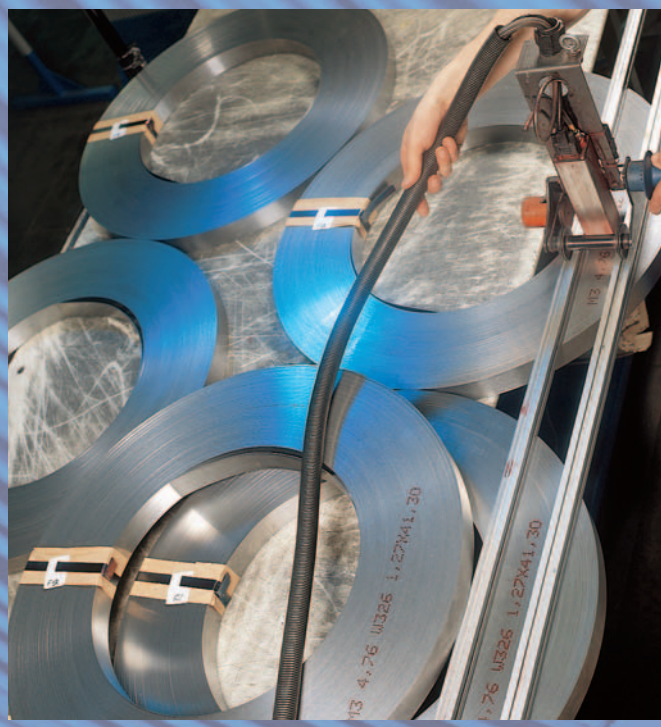
After heat treatment, the backing material exhibits the following average hardness values:

Bohler Grade	Hardness in HV_3
F550	appr. 390
B552	appr. 480
W326	appr. 480
B313	appr. 510

Should you have any particular problems, please do not hesitate to consult our technical service staff.



Metallurgical laboratory test on the structure of a high alloy steel.



Marking on the high speed steel edge by Ink jet printer.

HEAT TREATMENT INSTRUCTIONS

FOR BOHLER HIGH SPEED STEEL GRADES

S601
Tungsten-molybdenum high speed steel with excellent toughness and cutting properties, for a wide variety of applications.

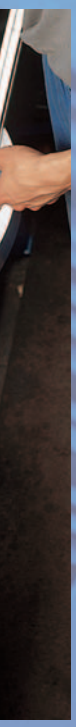
S607
Tungsten-molybdenum-vanadium high speed steel exhibiting excellent wear resistance.

S504
Cobalt-molybdenum high speed steel with high ductility and good cutting capability. Especially for machining of open profiles and tubes.

S500
Cobalt-molybdenum high speed steel exhibiting high hardness, excellent cutting properties, high red hardness and good toughness.

S700
High grade, tungsten-molybdenum high speed steel, all-purpose grade, with optimum cutting properties, wear resistance and red hardness

Bohler Grade	S601 M 2	S607 M 3 Cl. 2	S504 MATRIX II	S500 M 42	S700 M 51
Hardening temperature	1200-1230°C [1]	1200-1230°C [1]	1140-1180°C [3]	1170-1200°C [4]	1200-1230°C [5]
Holding time	40-60" on H.T.	40-60" on H.T.	40-50" on H.T.	40-60" on H.T.	40-60" on H.T.
Achiev. Austenite grain size	18-22 as per Snyder Graff	16-20 as per Snyder Graff	10-16 as per Snyder Graff	15-20 as per Snyder Graff	18-24 as per Snyder Graff
Tempering temperature	540-570°C	550-570°C	540-560°C	530-570°C	550-570°C
Tempering time	2 x 1 hour	2-3 x 1 hour	2-3 x 1 hour	2-3 x 1 hour	2-3 x 1 hour
Achievable hardness	min. 820 HV [2]	min. 860 HV [2]	min. 800HV	min. 900 HV [2]	min. 920 HV



1) for good ductility choose lower hardening temperature, for good red hardness and wear resistance choose higher hardening temperature.

2) Is not valid for low hardening temperature and high tempering temperature.

3) for good ductility lower temperature, for high red hardness choose higher temperature.

4) for good ductility you can reduce the lower temperature. For high red hardness and wear resistance choose higher temperature.

5) for best wear resistance and red hardness the higher temperature can be exceeded.



CERTIFICATE OF REGISTRATION

Quality Management System

Böhler-Ybbstal Band Gmbh & Co KG
Division of Böhler-Uddeholm AG

Rotte Wuhr, Waidhofnerstrasse 3
A-3333 Böhlerwerk
Austria

Operate a Quality Management System which complies with the requirements of **BS EN ISO 9001:2000** *for the activities detailed in the scope of registration.*

Certificate No: **FM 34461**

Signed on behalf of BSI

Originally registered: **9 Jul 1996**

UKAS QUALITY MANAGEMENT 003

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BSI Management Systems

MC44602/ISSUE 1/SA/0102/UK/DP

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A member of the **BÖHLER** UDDEHOLM group

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No substances which are hazardous to health or which damage the ozone layer are used in the manufacture of our products.

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