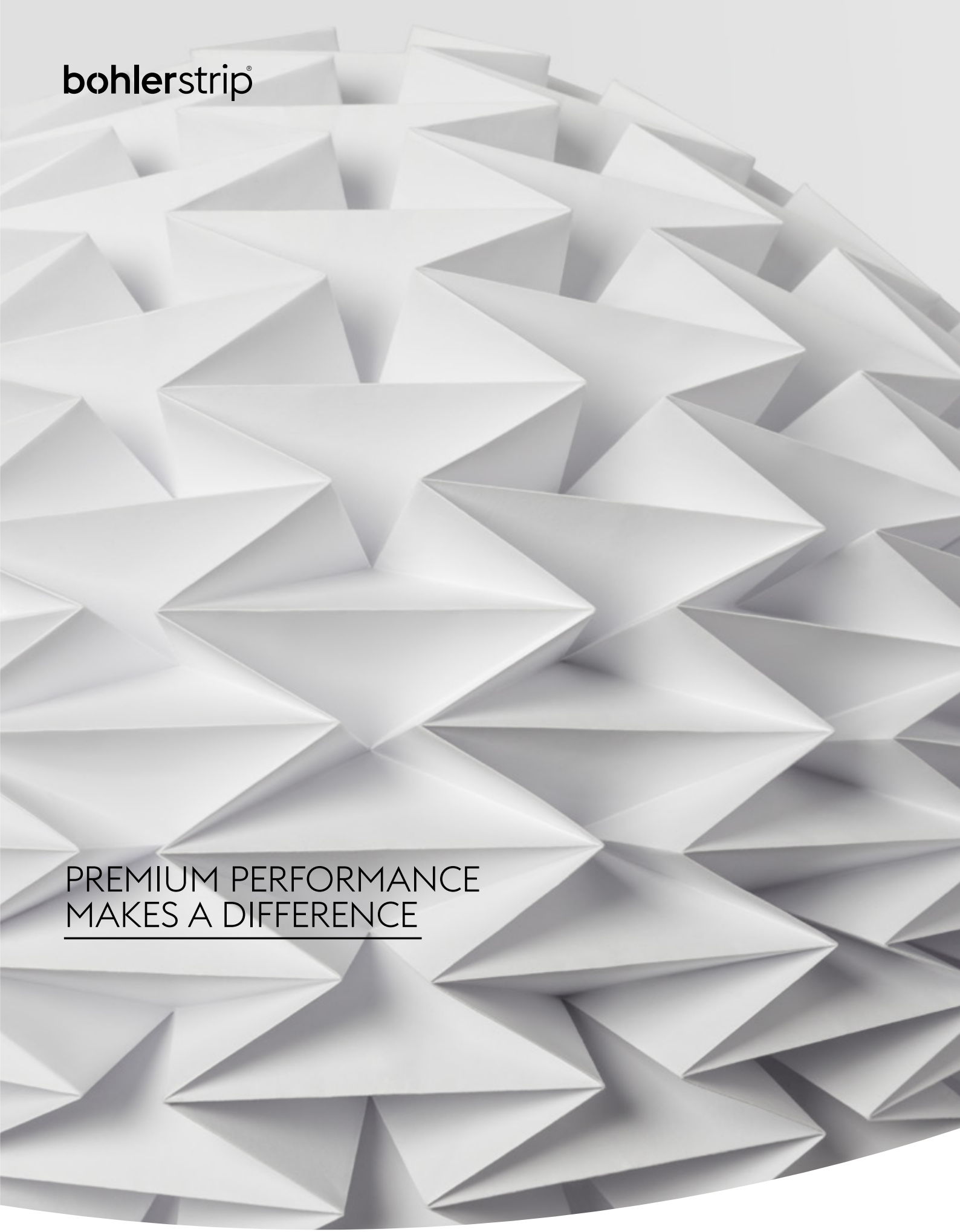
bohlerstrip®

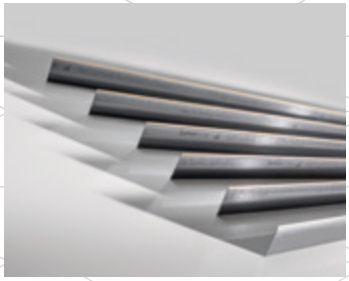


PREMIUM PERFORMANCE MAKES A DIFFERENCE

voestalpine Precision Strip GmbH
www.voestalpine.com/precision-strip

voestalpine
ONE STEP AHEAD.

OUR PURSUIT OF PERFECTION MAKES THE DIFFERENCE.



Only the best is good enough! Things that were state-of-the-art yesterday have maybe become the standard today. This is why we at bohlerstrip permanently strive to push the limits. In close cooperation with our customers, we develop new, innovative solutions and take them real. We never pause in our pursuit of new developments but always move the decisive step forward. The profound metallurgical know-how of our R & D staff and the close cooperation with our customers create our products' crucial technological lead that sets bohlerstrip apart from other manufacturers.

Perfection is another word for premium. We turn perfection into steel rules that make each box a masterpiece. Being a premium partner of the die-making and die-cutting industries, we know that almost nothing is impossible. At the same time, we also know that what really counts in the end is to find the perfect balance between high-end, innovative packaging designs and their economic viability. To help our customers achieve this balance with every new challenging die-cutting job, we are passionately committed to thinking "out of the box".

What is the definition of premium performance? A tradition of developing and implementing new approaches. Whether these be new folding box designs, impressive solutions for laminated packagings, or die-cut parts in the electronics industry: whatever your ideas for tomorrow might be – we like thinking with you about your future projects. In this way, we repeatedly come up with technological milestones that lead to innovative changes in the converting industry. Take for example our X-Press, which has formed part of the bohlerstrip rule portfolio for some years. It reduces make-ready cost by up to 80% compared to dies equipped with conventional rules, helping our customers to far outperform their competitors.

PREMIUM FROM IRON ORE
TO THE FINAL PRODUCT.

It is the performance that makes the difference.
Unlike other steel rule manufacturers, we control all parameters in the production process – from the metallurgical composition of our raw material, the selection of material from the highest-quality sections of the steel coil, to the perfect edge finish of the final product. Over the years, we have amassed a profound competence in rule manufacturing, enabling us to offer you complete premium solutions for your markets. We manufacture excellent products with properties that are ready to meet your challenges – today and tomorrow – on state-of-the-art machinery.

Premium is more than just packaging.
It is the passionate search for unique solutions for your benefit. The ideas for new packaging and die-cutting solutions also stem from our passion to understand and develop our customers' ideas – even if they seem unusual at first. What drives us forward is the challenge to re-define the limits of what is possible. The result of this effort is a real technological lead and innovative solutions that open up new perspectives for the future.

What makes our employees true performers?
Our common mindset to provide premium service and solutions to our customers.
Our employees are not just anybody – they are individuals with a distinct character and a particular love of premium challenges. This makes them most important for the company's development. And that is why we are always glad to invest in their ongoing professional skills. Because in the end, it is the individual's enthusiasm that is the driving force for developing new products and exploring new directions. All this connects us – and you benefit from that.

ALL OF OUR KNOW-HOW FOCUSED IN ONE PLACE.

This is premium performance to the point.
Our complete steel rule product portfolio is 100% made in Austria, in one of Europe's most modern strip steel competence centers. With products that are made from excellent prime materials and finished as premium cutting, creasing, and special rules. You benefit from our decades of experience and know-how in cold-rolling, hardening and tempering, edge machining and tip hardening.

Premium in a new dimension.
In our high-tech mills in Austria, we keep pushing the limits of modern steel rule production, for your benefit now and in the future. For example, our state-of-the art annealing furnaces, which ensure that our steel gets an absolutely uniform and stress-free metallurgical structure, or our exclusive edge-finishing and our in-house designed HF-hardening machinery. The result of all of this are steel rules that set worldwide benchmarks for rule lifetime and die-cutting quality.

PREMIUM AT THE MILL.
AND BEYOND.

Owned by voestalpine AG, we are part of a global group of technology companies in the steel sector. Our strength is our international orientation and our unique combination of material and processing know-how. Another asset is our in-house team of metallurgy and engineering specialists. Our market presence is secured through a sales and technical support network in more than 80 countries worldwide.

What is at the core of the premium performance of our steel rules?
The unique combination of manufacturing techniques to produce steel rules.

Superior material uniformity, dimensional accuracy, surface appearance and a metallurgical structure that perfectly matches its application. We achieve our steel qualities and product performance through precisely-tuned material processing steps. The specific bohlerstrip know-how is based on our ability to successfully combine various production techniques:

Cold-rolling
Annealing, hardening and tempering
Edge machining and finishing
Profiling
Laser welding

FLATBED DIE-CUTTING

Why are our flatbed steel rules so premium?
They are in shape for a fast world.

Industrial and consumer goods need appropriate packaging. Packaging – folded solid board in particular – offers product protection for safe transportation and has to increasingly serve promotional purposes. High-precision platen die-cutters are used to guarantee the best results at high speeds with perfect cutting results. State-of-the-art technology such as automatic bending machines, plywood lasers and water jet rubber cutting equipment is used in die-making. Precision steel rules are a must for perfect die-cutting results and need to be selected carefully depending on the specific requirements of each individual job.

BOHLERSTRIP CUTTING RULES

To meet the requirements of each die-cutting job in the best possible way, bohlerstrip offers two basic categories of cutting rules: through-hardened and edge-hardened rules.

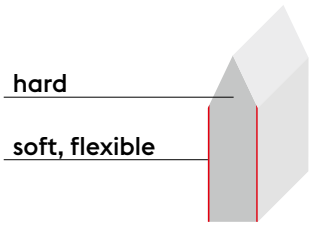
THROUGH-HARDENED CUTTING RULES

Through-hardened rules have the same hardness in body and edge. Our specific tempering and decarburisation process achieves a particular rule structure with a soft but deep decarburisation zone, resulting in excellent bending properties.
In general, bohlerstrip cutting edges and bevels have a shaved (S) finish for the highest accuracy.

TOP

This bohlerstrip standard cutting rule offers good bendability and a well-balanced body-edge hardness for short runs whenever costs are the key factor, e.g. solid box-board, corrugated board, labels, postcards, ...

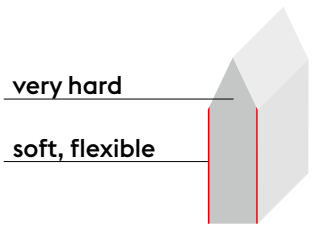
Hardness	Body	~ 450 HV (45 HRC)
	Edge	~ 450 HV (45 HRC)
Bendability	(2 pt rule)	α = 80°, R ~ 0.3 mm
Thickness	(pt)	1.5 / 2 / 3 / 4
Height	(depending on thickness)	12.00 – 100.00 mm
Bevel finish		S
Packaging		magenta



H 75

Is a very hard cutting rule with a reduced bendability but very high stability in die-cutting operation. Service life is good when die-cutting difficult materials, e.g. gaskets, rubber, cork, felts, beer mats, grinding discs, ...

Hardness	Body	~ 525 HV (51 HRC)
	Edge	~ 525 HV (51 HRC)
Bendability	(2 pt rule)	α = 85°, R ~ 1.7 mm
Thickness	(pt)	2 / 3 / 4
Height	(depending on thickness)	23.30 – 50.80 mm
Bevel finish		S
Packaging		red

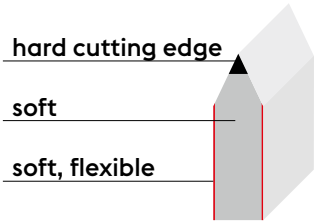


EDGE-HARDENED CUTTING RULES

Edge-hardened rules offer a high-frequency (HF) hardened tip which results in an extended service life and reduced tip wear. These rules are available in a shaved (S), standard ground (G), polished (P) and fine ground (GX) bevel execution.

UNIVERSAL

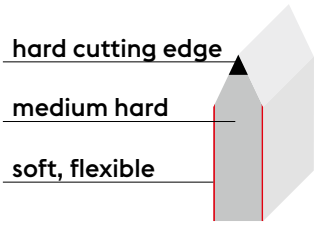
bohlerstrip UNIVERSAL cutting rules combine the excellent bending properties of a soft body with an edge-hardened tip for an extended service life suitable for universal applications, e.g. folding carton / cardboard, corrugated board, labels, postcards, ...



Hardness	Body	~ 340 HV (35 HRC)
	Edge	~ 660 HV (58 HRC)
Bendability	(2 pt – shaved)	α = 60°, R ~ 0.3 mm
Thickness	(pt)	1.3 / 1.5 / 2 / 2.6 / 3 / 4
Height	(depending on thickness)	8.00 – 60.00 mm
Bevel finish		S, G, P, GX
Packaging		orange

UNIVERSAL 40

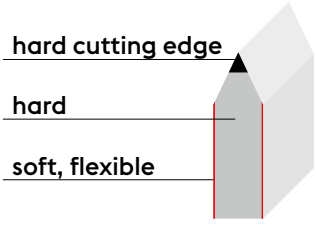
bohlerstrip UNIVERSAL 40 cutting rules withstand higher cutting forces in die-cutting better due to increased body hardness, e.g. folding carton / cardboard, corrugated board, labels, postcards, ...



Hardness	Body	~ 390 HV (40 HRC)
	Edge	~ 660 HV (58 HRC)
Bendability	(2 pt – shaved)	α = 70°, R ~ 0.3 mm
Thickness	(pt)	1.5 / 2 / 3 / 4
Height	(depending on thickness)	22.00 – 50.80 mm
Bevel finish		S, G, P
Packaging		orange

UNIVERSAL 60

bohlerstrip UNIVERSAL 60 cutting rules offer the body hardness of our TOP cutting rule with an HF-hardened cutting edge. This results in improved rule stability, reduced wear on the tip and bevel as well as an extended service life, e.g. solid board, plastics materials, thin gaskets, foils, puzzles, thermorforming industry, ...

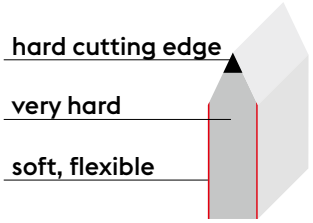


Hardness	Body	~ 450 HV (45 HRC)
	Edge	~ 660 HV (58 HRC)
Bendability	(2 pt – shaved)	α = 80°, R ~ 0.3 mm
Thickness	(pt)	1.5 / 2 / 3 / 4
Height	(depending on thickness)	8.00 – 100.00 mm
Bevel finish		S, G, P, GX
Packaging		yellow

UNIVERSAL 75

bohlerstrip UNIVERSAL 75 cutting rules offer premium stability and wear resistance but limited bendability. This is required when die-cutting heavy materials such as gaskets, thick substrates, various plastics materials, as well as abrasive materials.

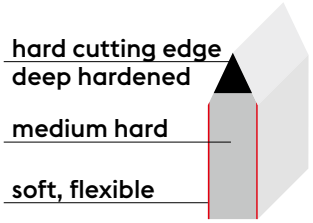
Hardness	Body	~ 525 HV (51 HRC)
	Edge	~ 700 HV (60 HRC)
Bendability	(2 pt rule)	α = 90°, R ~ 1.7 mm
Thickness	(pt)	2 / 3 / 4
Height	(depending on thickness)	23.30 – 50.80 mm
Bevel finish		S, G, P, GX
Packaging		green



EXTRA

This cutting rule was designed to die-cut thick, rigid and abrasive materials such as gaskets, plastics, composites, solid board books, wood, etc. bohlerstrip EXTRA cutting rules offer extra high edge hardness for a long tool life along with deep hardening for maximum stability in the die-cutting process while maintaining good bendability.

Hardness	Body	~ 390 HV (40 HRC)
	Edge	~ 720 HV (61 HRC)
Bendability	(2 pt rule)	α = 85°, R ~ 0.6 mm
Thickness	(pt)	2 / 3 / 4
Height	(depending on thickness)	23.80 – 100.00 mm
Bevel finish		S, GX
Packaging		green



Hardness values and bending properties

All bohlerstrip cutting rules exhibit the best decarburisation characteristics due to our special process. The amount of decarburisation strongly correlates with bending properties. Narrow angle bending without cracking is the result of a well-controlled decarburisation process.

Brand	Hardness		Bevel finish	Guaranteed Bending Properties				
	Body	Edge		Bending Angle	Bending Radius R [mm]			
TOP	~ 450 HV (45 HRC)		S	α = 80°	0.3	0.3	0.6	1.1
H 75	~ 525 HV (51 HRC)		S	α = 85°	–	1.7	3.5	6.5
UNIVERSAL	~ 340 HV	~ 660 HV	S	α = 60°	0.3	0.3	0.4	0.7
	(35 HRC)	(58 HRC)	G	α = 85°	0.3	0.4	0.6	1.1
UNIVERSAL 40	~ 390 HV	~ 660 HV	S	α = 70°	0.3	0.3	0.4	0.7
	(40 HRC)	(58 HRC)	G	α = 90°	0.3	0.4	0.6	1.1
UNIVERSAL 60	~ 450 HV	~ 660 HV	S	α = 80°	0.3	0.3	0.6	1.1
	(45 HRC)	(58 HRC)	G	α = 85°	0.5	0.5	0.6	1.1
UNIVERSAL 75	~ 525 HV	~ 700 HV	S	α = 90°	–	1.7	3.5	6.5
	(51 HRC)	(60 HRC)	G	α = 90°	–	1.7	3.5	6.5
EXTRA	~ 390 HV	~ 720 HV	S	α = 85°	–	0.6	0.9	–
	(40 HRC)	(61 HRC)						
		S = shaved			1.5 pt	2 pt	3 pt	4 pt
		G = standard ground			0.53 mm	0.71 mm	1.05 mm	1.42 mm

Autoflex® Cutting rules for superior bending results

Uniform bending results are crucial for automated rule processing. Even though our standard rules are suitable for this, stricter tolerances are required – especially regarding straightness – in high-end jobs. To cope with this demand, bohlerstrip offers the Autoflex range of products with the tightest of tolerances. This is paramount for professional auto rule processing.

(K-Back)

K-Back compensation back edge

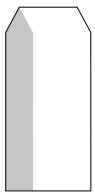
Steel rules with a flat rule back generate tolerance problems when bending narrow angles due to bulging effects on the rule bottom. bohlerstrip K-Back (compensation back) minimises this effect and offers:

» Reduced back deformation when bending narrow angles, even without broaching.
» Easy rule insertion into plywood.
» Self-levelling effect as the rule back flattens out under pressure.

BEVEL PROFILES

To cope with the various requirements in diemaking, bohlerstrip offers a complete range of bevels.

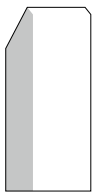
CF



CF – Center Face, Single Bevel

Center Face (symmetric) bevel has become the norm for cutting standard packaging materials. Standard edge angle: 53° (others on request)

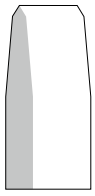
SF



SF – Side Face, Single Bevel

SF (non-symmetric) bevels are best suited for cutting thick materials where a straight/vertical cut is required. The SF bevel is not available in a “G” execution.

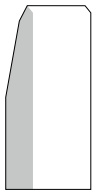
CFDB



CFDB – Center Face, Double Bevel

This type of cutting bevel reduces the cutting force when cutting hard/thick materials such as glass fibre-reinforced laminates, leather, cork, rubber, jigsaw puzzles, corrugated board, plastics, plywood. The CFDB bevel is recommended for multi-layer cutting, when the thickness of the material exceeds the length of the first cutting bevel.

SFDB

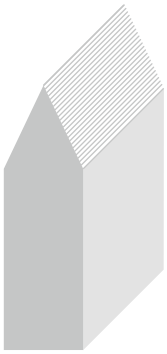


SFDB – Side Face, Double Bevel

An SFDB profile offers the same benefits as a CFDB bevel when cutting thicker materials. The substrate is left with a square 90° cut edge and all the distortion from penetration is left on the material waste. The SFDB bevel is not available in a “G” execution.

BEVEL FINISH

To cater for the full range of applications, bohlerstrip offers a large variety of bevel finishes.



Shaved Cutting Bevel (S)

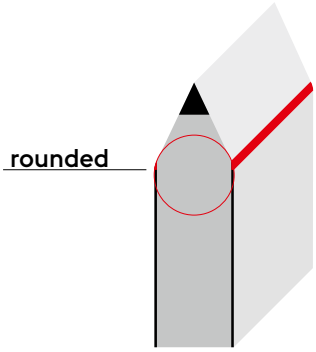
The standard bevel finish for bohlerstrip cutting rules is a precision shaved quality surface bevel. These rules benefit from premium bendability and height consistency.

Polished Cutting Bevel (P)

Polished cutting rules combine the benefits of shaved and ground execution in one rule.

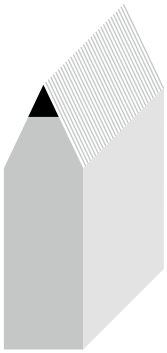
» Reduced dusting
» Less friction when penetrating the cut material, thus reducing cutting force
» Rounded transition zone between bevel and body reduces material surface cracking

This execution is also available with a polished double bevel (PL) in CFDB or SFDB.



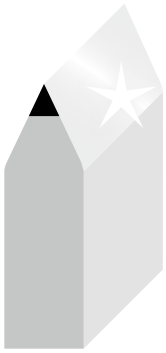
Standard Ground Cutting Bevel (G)

A standard ground cutting edge has proven the best choice for the cost-efficient cutting of plastics, rubber, laminates and coated materials. We recommend our HF hardened cutting rules in a “G” finish as UNIVERSAL 40, UNIVERSAL 60 and UNIVERSAL 75. The ground cutting edge achieves easy material penetration at a reduced cutting pressure. For thermoforming jobs, we recommend UNIVERSAL 60 “G”.



Fine Ground Bevel (GX)

Cutting rules with an emphasis on an advanced, fine-ground cutting bevel, designed for laminated/coated cardboard and materials for the thermoforming industry. This next-generation grinding technology opens the door for all kinds of new die-cutting applications where standard cutting rules achieve suboptimum results.

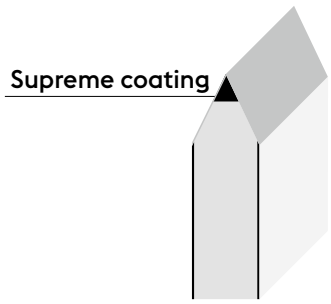


Super-Fine Ground Bevel (X)

These cutting rules are processed on a unique grinding machine using razor blade technology, thus ensuring a super-sharp cutting edge with a super-fine ground bevel finish. Such properties are mandatory for the professional die-cutting of delicate materials including plastics materials, films, foils, semiconductor material, laminated and metallized folding cartons.

COATED CUTTING RULES

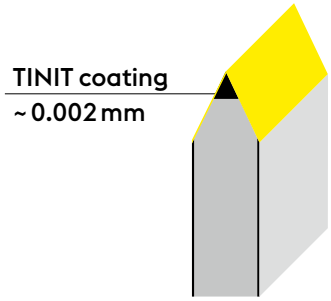
Coated cutting rules provide various benefits such as reduced dusting, extended service life, less wear on the cutting edge and bevel.



Supreme Dust Killer SUPREME

Supreme coating was initially developed for die-cutting labels to prevent glue sticking to the rule bevel. Many of our customers experience reduced dusting when using Supreme coated cutting rules due to the lower edge/bevel friction.

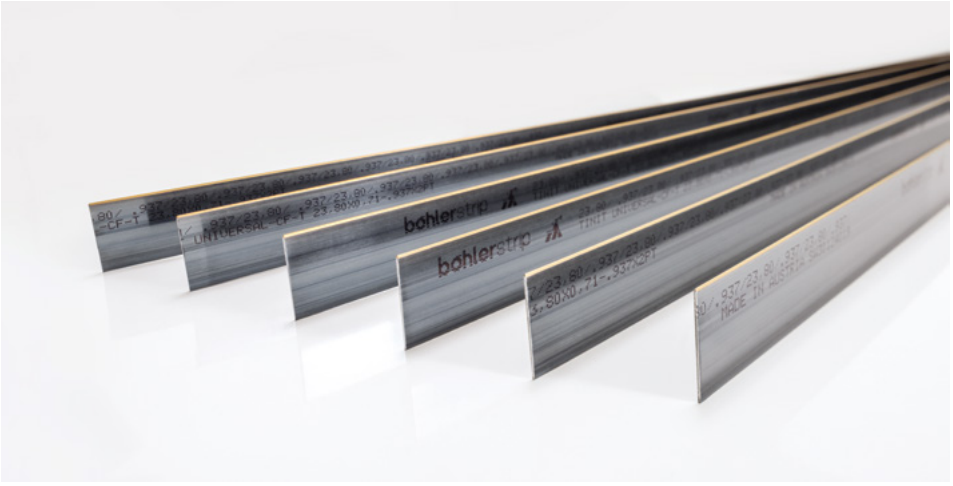
Product information:
The cutting bevel of the Supreme rules are coated with a thin anti-friction-film that fills the micropores and marks on the cutting bevel and thereby supports a smooth bevel surface.
Supreme coated rules are offered in Universal, Universal 40, Universal 60, and Universal 75 grades.



Tinit (TiN) LONG LIFE

TiN coated cutting rules are coated with a thin (approx. 0.002 mm) layer of TiN on the cutting bevel only. The TiN coating hardness of ~ 2,400 HV stands out in comparison with the standard UNIVERSAL edge hardness of ~ 660 HV (4 times harder). Bendability, body structure, cutting profile and dimensions remain unchanged and match those of standard UNIVERSAL rules.

TINIT rule benefits:
» Significantly increased knife lifetime
» Anti-sticking effect due to smooth bevel surface
» Same bendability as uncoated cutting rules
» Reduced dusting due to smoother bevel surface
» Increased wear resistance when cutting abrasive materials

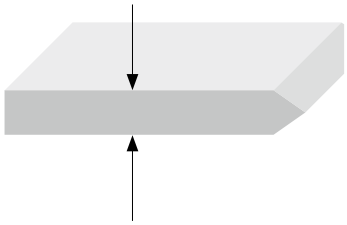


DIMENSIONS AND TOLERANCES

Rule thickness is a major parameter during bending on automated rule processors. Tight tolerances guarantee trouble-free operation with consistent bending results.

Thickness Range:
0.45 – 2.13 mm (1.3 pt – 6 pt)

Rule Thickness s			Thickness Tolerance	
[pt]	[mm]	[inch]	[mm]	[inch]
1.3	0.45	0.018″	± 0.015	± 0.0006″
1.4	0.50	0.020″	± 0.015	± 0.0006″
1.5	0.53	0.021″	± 0.015	± 0.0006″
2	0.71	0.028″	± 0.015	± 0.0006″
3	1.05	0.041″	± 0.020	± 0.0008″
4	1.42	0.056″	± 0.020	± 0.0008″
6	2.13	0.084″	± 0.025	± 0.0010″



Height Range:
8.00 – 100.00 mm (0.315″ – 3.937″)

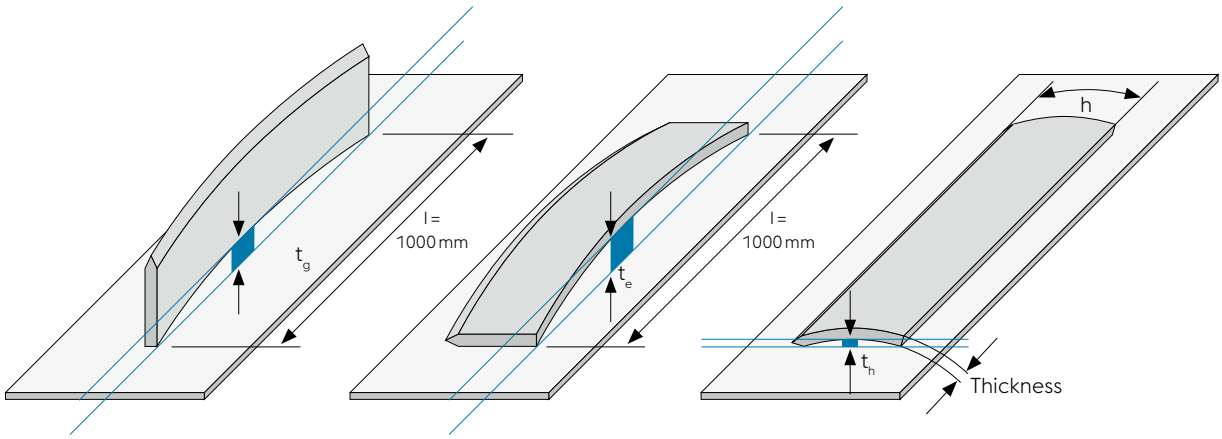
Rule Height h		Height Tolerance	
[mm]	[inch]	[mm]	[inch]
8.00 – 25.40	0.315″ – 1.000″	± 0.020	± 0.0008″
> 25.40 – 50.80	> 1.000″ – 2.000″	± 0.025	± 0.0010″
> 50.80 – 76.20	> 2.000″ – 3.000″	± 0.030	± 0.0012″
> 76.20 – 100.00	> 3.000″ – 3.937″	± 0.035	± 0.0014″

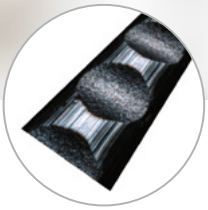
Form Tolerances
For precision die-cutting, it is vital to use steel rules with minimum tolerances. bohlerstrip steel rules offer the tightest tolerances, helping customers to achieve premium results.

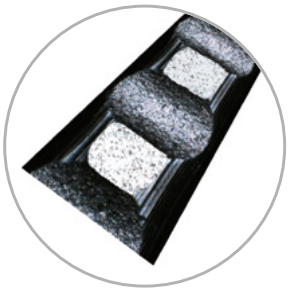
Straightness
tg: = max. 0.5 mm / 1000 mm
Autoflex: max. 0.25 mm / 1000 mm
(for cut lengths only)

Coilset
te: = max. 5 mm / 1000 mm
(for cut lengths only)

Flatness
th: = max. 1 µm / mm rule height h
(1 µm = 0.001 mm)







Patented micro-serrated rule back under electron microscope, before and after press load.

X-PRESS. OPTIMIZED PRODUCTION RUNS AND MAKE-READY

X-Press

The innovation lies within the patented back-design of the cutting rule, which paves the way for the predefined compensation area for the cutting rule to self-level under pressure. The cutting tip is therefore under less strain and remains sharper for a longer period of time. In day-to-day operation, this means a substantially longer tooling life. X-PRESS is ideal for **large volume jobs.**

Benefits

» Minimized make-ready time
» Excellent cut quality
» Extended knife lifetime
» Re-orders without patching
» Standard rule processing on auto-bending equipment

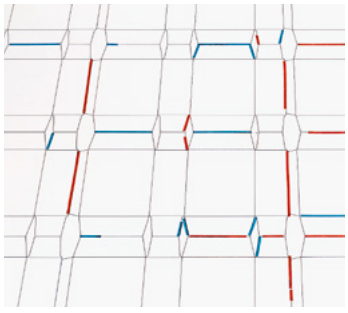
Features

» Self-levelling cutting rule with micro-serrated rule back
» Same processing as standard UNIVERSAL rules
» Improved knife service life
» Excellent bendability

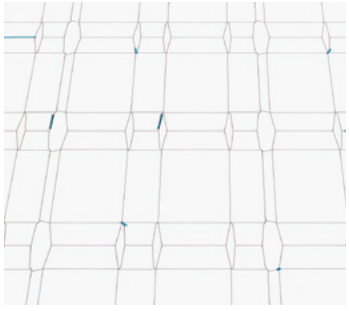
Application

» Solid board
» Corrugated board

Patching with standard cutting rule



Patching with X-Press cutting rule



Specification X-Press

Hardness	Body	~ 340 HV (35 HRC)*
	Cutting tip	~ 660 HV (58 HRC)*
Thickness	2 pt, 3 pt	
	0.71 mm / 1.05 mm	
Height	23.60 mm / 23.80 mm	
Bevel profile	CF / CFDB	
Bevel finish	Shaved S; Polished P; Supreme M	
Bevel angle	53° / 42°	
Cutting back	Micro-serrated X-Press-Back (patented)	
Form of delivery	Length à 1.000 mm ; coils à 100 m (2 pt), à 60 m (3 pt)	

*) same as with bohlerstrip Universal cutting rule

X-PRESS PURE.
EFFORTLESS MAKE-READY

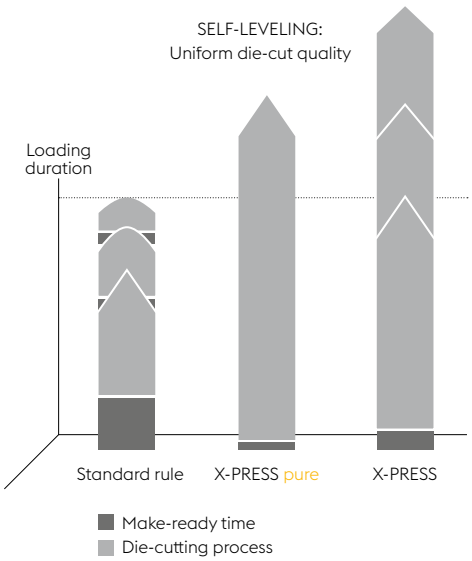
Converter benefits:
» Increased productivity
» Optimum machine utilization
» Best die-cutting results
» Easy handling

X-Press pure
The slimlined back execution of the cutting rule combined with the patented micro-serration is considerably more sensitive. In practical terms, this means that under ideal circumstances, make-ready is possible without patching. X-PRESS PURE provides the best results with medium to small size production runs of corrugated and solid board.

Benefits
» Make-ready without patching possible
» Excellent and consistent cutting quality
» Easy change-over between die-cutters
» Ideal for one-off dies

Features
» Self-levelling cutting rule with micro-serrated and V-shaped rule back
» Similar processing as standard UNIVERSAL rules
» Excellent bendability

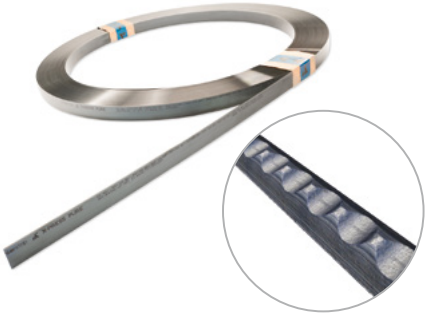
Application
» Solid board
» Corrugated board



The sensitive rule back is prone to deformation during insertion into ply wood. We suggest the use of a plastic board underneath.

Specification X-Press pure

Hardness	Body	~ 340 HV (35 HRC)*
	Cutting tip	~ 660 HV (58 HRC)*
Thickness	2 pt, 3 pt	
	0.71 mm / 1.05 mm	
Height	23.60 – 50.00 mm	
Bevel profile	CF / CFDB	
Bevel finish	Shaved S; polished P; supreme M	
Bevel angle	53° / 42°	
Cutting back	Micro-serrated and V-shaped X-Press rule back	
Form of delivery	Length à 1.000 mm; coils à 100 m (2 pt), à 60 m (3 pt)	



Special X-Press rules (perforating rules, wave rules...) see page 26
*) same as with bohlerstrip Universal cutting rule

PLAST-X.
THE IDEAL CUTTING RULE FOR PLASTICS CUTTING

Plast-X

Plast-X is a well-established bohlerstrip innovation to cut PET, PE, PVC, PP, PS, semiconductor elements, blister packs and thermoplastic materials. We apply technology from razor blade manufacturing to drastically improve the die-cutting performance. Plast-X is available in three versions. While PXS focuses on the best bendability, PXH offers the best tool life due to increased body and edge hardness. PX represents the ideal compromise between PXS and PXH.

Benefits

» Reduced friction
» Reduced cutting force
» Clean cut faces

Features

» High edge hardness
» Super-fine bevel-surface finish
» Extremely sharp cutting edge
» K-Back as standard

Application

» PET, PE, PP, PVC, foils, blister
» Laminated substrates
» Coated or varnished cardboards
» Metallized boards

Specification Plast-X

	PXS (soft)	PX (standard)	PXH (hard)
Hardness			
Body	~ 340 HV (35 HRC)	~ 390 HV (40 HRC)	~ 450 HV (45 HRC)
Edge	~ 660 HV (58 HRC)	~ 700 HV (60 HRC)	~ 700 HV (60 HRC)
Thickness	1.3 pt / 1.5 pt / 2 pt	1.3 pt / 1.5 pt	2 pt / 3 pt / 4 pt
	0.45 mm / 0.53 mm / 0.71 mm	0.45 mm / 0.53 mm	0.71 mm / 1.05 mm / 1.42 mm
Height	23.60 – 50.00 mm	23.30 – 50.00 mm	23.60 – 50.00 mm
Bevel profile	CF / CFDB	CF / SF / CFDB / SFDB	CF / CFDB
Bevel finish		bright, super-fine ground	
		razor blade technology	
Bevel angle	30° / 42° / 53°	30° / 42° / 53°	30° / 42° / 53°
Specials	TiN coated for extra long life on request		

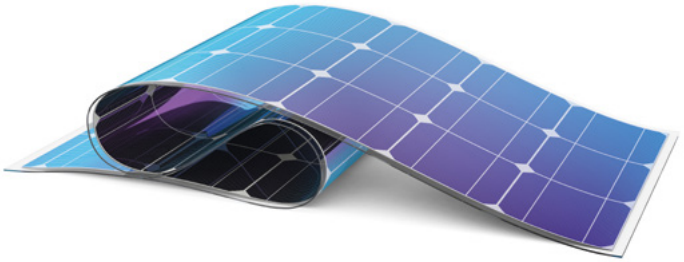
PLAST-X HARD 800. UNIQUE DUAL EDGE AND DEEP HARDENED.

Plast-X Hard 800
Made to make your die-cutting tools perform longer!

Benefits

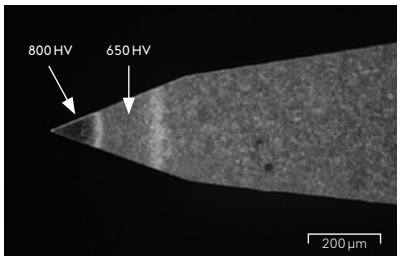
» Super hard rule tip	→ durability
» Very hard secondary zone	→ durability
» Deep hardened	→ durability
» Super-fine ground bevel	→ clean cut/no dust
» Hard body	→ stability in die-cutting
» Shorter 2nd bevel	→ stability in die-cutting

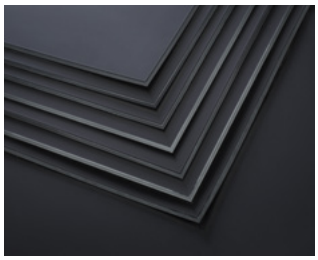
Features
» Dual edge and deep hardened
» Super-fine ground finish
» High stability



Application

» Plastic materials	PVC, PP, PET, PA, PE, films, foils, electronics, IML
» Rigid materials	gaskets

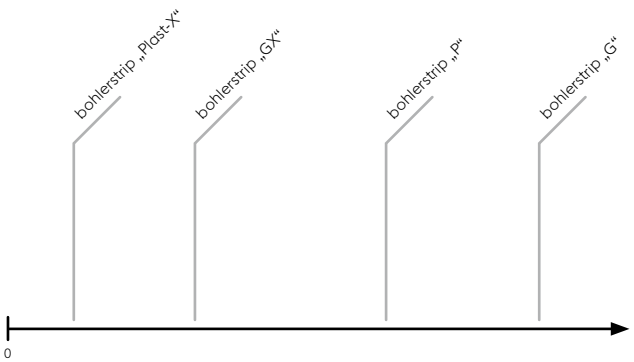




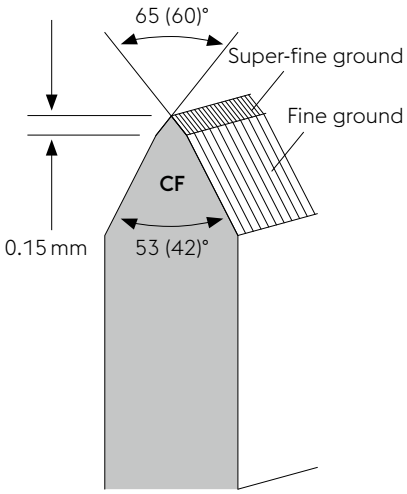
Specification

	Plast-X 800	Plast-X Hard 800
Hardness		
Body	~ 390 HV (40 HRC)	~ 450 HV (45 HRC)
Tip area	~ 800 HV (64 HRC)	~ 800 HV (64 HRC)
Second zone	~ 650 HV (58 HRC)	~ 650 HV (58 HRC)
Thickness	2 pt / 3 pt	2 pt / 3 pt
	0.71 mm / 1.05 mm	0.71 mm / 1.05 mm
Height	23.60 mm / 23.80 mm	23.60 mm / 23.80 mm
Bevel profile	CF / CFDBT	CF / CFDBT
Bevel finish	super-fine ground (X)	super-fine ground (X)
Bevel angle	30° / 42°	30° / 42°
Surface color	standard	silver

BEVEL SURFACE ROUGHNESS COMPARISON



STABILO-CUT SX
SMOOTH CUTTING IN ROUGH DIE-CUTTING ENVIRONMENTS



Stabilo-Cut SX
The specific bevel and rule tip design improves stability in the die-cutting operation and reduces dust and angel hair when die-cutting delicate materials. Also very suitable for thermoforming jobs.

Benefits
» Wide angle rule tip improves rule stability
» Dust reduction
» Clean cut

Features
» Robust bevel design (65°– 53° / 60°– 42°)
» Sharp rule tip
» Super-fine ground / fine ground single bevel

Application
» For use in rough die-cutting environments

Specification

	STABILO-CUT SX
Quality	UNIVERSAL / UNIVERSAL 60
Hardness body/edge	~ 340 HV / ~ 450 HV // ~ 660 HV
	(~ 35 HRC) / (~ 45 HRC) // (~ 58 HRC)
Thickness	2 pt / 3 pt / 4 pt, 0.71 / 1.05 / 1.42 mm
Height	23.60 / 23.80 / 30.00 – 50.00 mm
Bevel profile	CF / CFDB
Bevel finish	SX – super-fine ground
Bevel angle	~ 65° / 53° // ~ 60° / 42°
Forms of delivery	in lengths of 1.000 mm
	2 pt in 100 M coils
	3 pt in 25–60 M coils
	4 pt in 25 M coils
Specials	wide angle tip, fine ground bevel finish

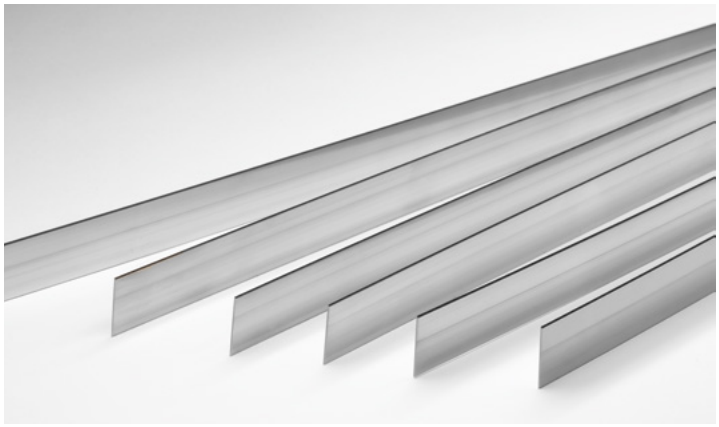
STAINLESS-CUT GX
HIGH RESISTANCE FOR SENSITIVE INDUSTRIES

Stainless-CUT
New generation cutting rules suitable for all applications where the highest hygienic standards apply, in particular in the food, healthcare and pharmaceutical industries.

Benefits
» Clean cut = no dust
» Corrosion resistant

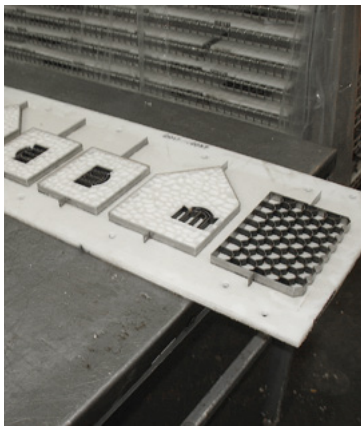
Features
» Silver color rule surface
» Sharp cutting edge
» Fine ground bevel

Application
» For use in food, healthcare and chemical industries



Specification

	Stainless-CUT
Quality	bohlerstrip stainless
Hardness body/edge	~ 440 HV (~ 45 HRC)
Thickness	2 pt / 3 pt, 0.71 / 1.05 mm
Height	23.80 mm
Bevel profile	CF
Bevel finish	GX – fine ground
Bevel angle	53°
Forms of delivery	in lengths of 1.000 mm
	2 pt in 50 M coils
	3 pt in 25 M coils
Specials	fine ground bevel finish
	no ink-jet printing



BOHLERSTRIP CREASING RULES

High-precision creasing rules are needed to emboss box folding lines. Folding box designs and the precision of final products are becoming more demanding, calling for the use of high-quality creasing rules with tight tolerances.
Creasing rule tolerances have to be adjusted to the tolerances of cutting rules. This is of paramount importance for the best creasing results. bohlerstrip creasing rules offer:

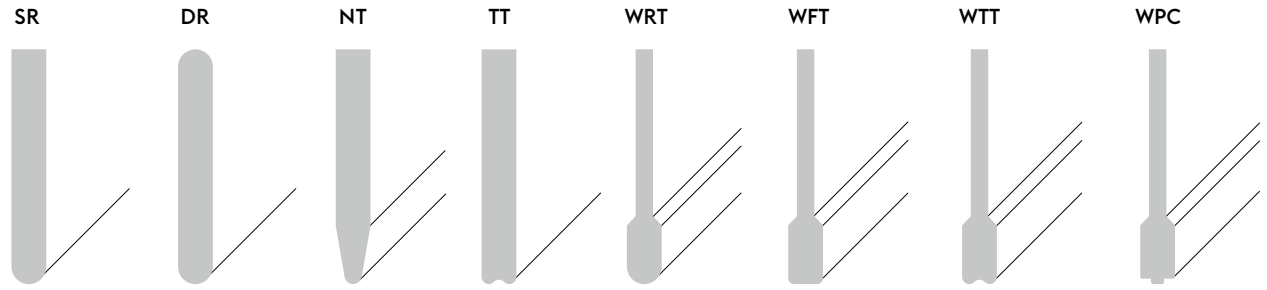
» Very smooth crease head surfaces
» Perfectly radiused profile
» Smooth transition from radiused profile to the side faces
» Minimum eccentricity
» Minimum height and thickness tolerances

Manufacturing Range
bohlerstrip creasing rules are produced by two manufacturing methods, depending on the rule thickness:

HT – Hardened and Tempered:
This process guarantees stability on creasing rules with a thickness ≤ 3 pt.

HR – Hard Rolled:
This type of creasing rule is recommended for rules ≥ 4 pt.

Brand	Hardness	1.5 pt	2 pt	3 pt	4 pt	6 pt
		0.53 mm	0.71 mm	1.05 mm	1.42 mm	2.13 mm
bohlerstrip HT	~ 380 HV (39 HRC)	✓	✓	✓	–	–
bohlerstrip HR	min. 265 HV (850 N / mm²)	–	–	–	✓	✓
Packaging	blue					



Single Round		Double Round		Narrow Top		Twin-Track		Wide Top		Wide Top Specials	
SR		DR		NT		TT		WRT / WFT		WTT / WPC	
[pt]	[mm]	[pt]	[mm]	[pt]	[mm]	[pt]	[mm]	[pt]	[mm]	[pt]	[mm]
1.5	0.53	1.5	0.53	2 / 0.35	0.71 / 0.15	2 / 3	0.71 / 1.05				
2	0.71	2	0.71	2 / 0.70	0.71 / 0.25	2	0.71	2 / 4	0.71 / 1.42		
3	1.05	3	1.05	2 / 1	0.71 / 0.36	3	1.05	3 / 6	1.05 / 2.13	3 / 8	1.05 / 2.84
4	1.42			2 / 1.3	0.71 / 0.45	4	1.42	4 / 6	1.42 / 2.13		
6	2.13			2 / 1.4	0.71 / 0.50			4 / 8	1.42 / 2.84	4 / 8	1.42 / 2.84
				2 / 1.5	0.71 / 0.53						

NEW MARKING ON BOTH SIDES

Front side
Standard ink-jet marking, very near to crease top:
» bohlerstrip logo
» Hammer man
» Profile
» Height in mm/inch
» Thickness in mm/pt
» Batch number
» “Made in Austria” print

Rear side – new!
Continuous ink-jet printing, very near to crease top:
» Height in mm/inch in bold letters and large font size

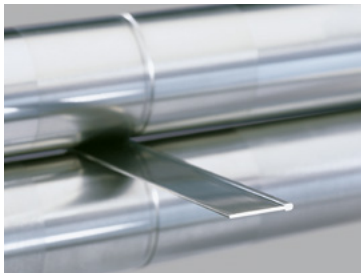
Benefits: easy & simple crease check.
» Height control
» Readability – height information still visible on short length pieces due to continuous print
» Height info fully visible after plywood insertion.

Dimension Range

The choice of creasing rule height depends mainly on the height of the cutting rule and the thickness of the cut material.

Rule Thickness s			Standard Heights h	
[pt]	[mm]	[inch]	[mm]	[inch]
1.5 – 6	0.53 – 2.13	0.021″ – 0.084″	20.30 – 24.40	0.800″ – 0.960″
			Other rule heights on request	

Dimension Tolerances



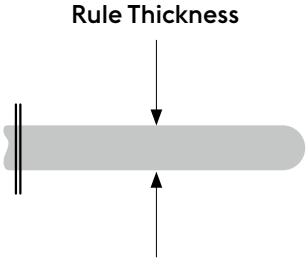
Due to gradual wear on the cutting knives in die-cutting operations, creasing effects become more pronounced. Therefore, the selection of creasing rules with special tolerances is essential, which is why bohlerstrip creasing rules are supplied with negative height tolerance but strictly comply with international standards.

Height Tolerance:

Rule Height h		Height Tolerance	
[mm]	[inch]	[mm]	[inch]
20.30 – 24.40	0.800″ – 0.960″	+0 / – 0.040	+0 / – 0.0016″

Thickness Tolerance:

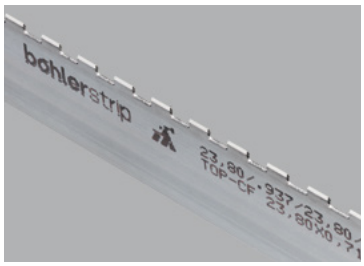
Rule Thickness s			Thickness Tolerance	
[pt]	[mm]	[inch]	[mm]	[inch]
1.5	0.53	0.021″	± 0.015	± 0.0006″
2	0.71	0.028″	± 0.015	± 0.0006″
3	1.05	0.041″	± 0.020	± 0.0008″
4	1.42	0.056″	± 0.020	± 0.0008″
6	2.13	0.084″	± 0.025	± 0.0010″



BOHLERSTRIP SPECIAL RULES

Perforating Rules

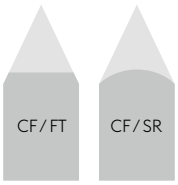
bohlerstrip perforating rules are available in a wide range of thicknesses and tooth/gap combinations. The spacing is usually given in mm. We also manufacture in point and inch spacings on request.



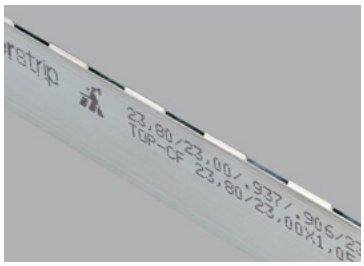
Grade	TOP, UNIVERSAL
Bevel profile	CF, CFDDB
Thickness	2 pt / 3 pt / 4 pt
	0.71 / 1.05 / 1.42 mm
Height	21.30 – 25.40 mm
	0.840″ – 1.000″
Spacing P	tooth / gap *

* Minimum tooth / gap width is defined by rule thickness.

Combination Rules (Cut-Crease)



With cut-crease rules, there is no need to insert individual parts of cutting and creasing rules. bohlerstrip cut-crease rules are produced in standard punched (CF), or in flat- or round machined executions for high-quality jobs (CF / FT and CF / SR).



Grade	TOP, UNIVERSAL
Bevel profile	CF, CF / FT, CF / SR
Thickness	2 pt / 3 pt / 4 pt
	0.71 / 1.05 / 1.42 mm
Height	HS = cutting part height
	HR = creasing part height
Spacing P	cut / crease
	Please contact us for available combinations

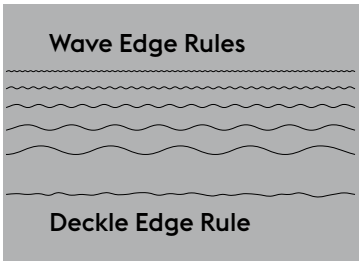
Glue Flap Rule

Glue flap rules are wave edge perforating rules, which are manufactured in the same heights as scoring rules. They are used to roughen the glue flaps on cardboard boxes so as to obtain a firm grip surface for the adhesive.

Grade	TOP, UNIVERSAL
Bevel profile	CF
Thickness	2 pt
	0.71 mm
Height	23.32 / 23.50 / 23.60 mm
	0.918″ / 0.925″ / 0.929″
Spacing P	0.71 / 0.71 mm
(Tooth/gap)	2 pt / 2 pt
Wave Spacing W	5.0 mm

Wave Edge and Deckle Edge Rules

The main application for wave edge rules is in the production of safety cutting edges on solid and corrugated board boxes, to avoid injuries during box handling. Deckle edge rules are used to cut post cards, greeting and business cards.



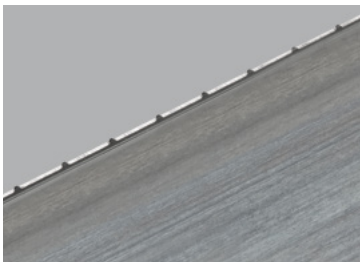
Grade	TOP, UNIVERSAL
Bevel profile	CF, CFDB
Thickness	2 pt / 3 pt
	0.71 / 1.05 mm
Height	21.30 – 25.40 mm
	0.840″ – 1.000″
Wave Spacing W	2.0 mm – super fine, 3.5 mm – very fine
	5.0 mm – fine, 7.0 mm – medium, 10.0 mm – large
Autobender qualified executions (A)	in CFDB with
	wave spacing W = 1.7 mm, 2.0 mm, 3.5 mm

Stripping Rules

For ejecting waste material after the die-cutting process, bohlerstrip premium stripping rules secure optimum diecutter speeds.

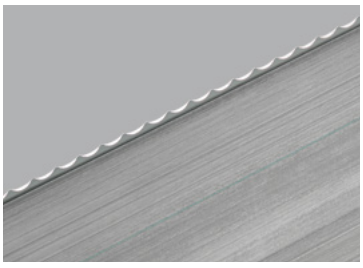
Flat (no teeth)

Grade	TOP 36
Bevel profile	FT (Flat Top)
Thickness	3 pt
	1.05 mm
Height	30 / 40 / 45 / 50 / 55 mm
	1.181″ / 1.575″ / 1.772″ / 1.969″ / 2.165″
Optional Wave Spacing W	3.5 / 5.0 / 7.0 / 10.0 mm



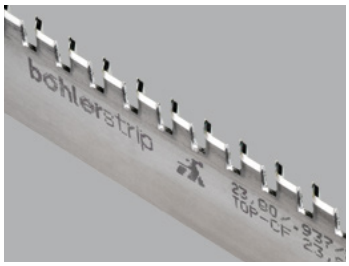
Stripping Rule with teeth

Grade	TOP	TOP 36
Bevel profile	**CFW 42°**	**CF**
Thickness	3 pt	3 pt
	1.05 mm	1.05 mm
Height	50 – 55 mm	50 – 55 mm
Toothshape	pyramidical	rectangular
	1.969″–2.165″	1.969″–2.165″
Spacing configuration	0.10 / 3.18 mm	0.5 / 1.5 – 0.5 / 5 – 0.5 / 10 mm
Optional Wave Spacing W	–	7.0 mm

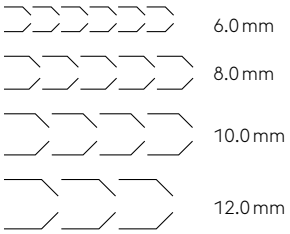


Zipper Edge Rules

Zipper rules provide a tear-open solution especially for shelf ready packagings.

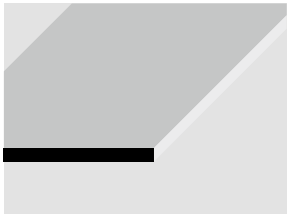


Grade	TOP 36
Bevel profile	CF
Thickness	2 pt / 3 pt
	0.71 / 1.05 mm
Height	21.30 – 25.40 mm
	0.840″ – 1.000″
Tooth Spacing A	6.0 / 8.0 / 10.0 / 12.0 mm
Specification	straight – angled part: 3 / 5 – 2 / 5
Packaging	in pairs



Spacer Rules

Spacer rules fill gaps between steel rules and wider laser cuts within the die board or backfill unwanted laser cuts within an existing die. The rules have a square cross sectional profile. bohlerstrip spacer rules are available in all common wood sizes used in the die making industry.



Grade	HT / HR
Bevel profile	cut edges
Thickness	½ pt – 6 pt
	0.36 – 2.13 mm
Height	15, 17, 18, 20 mm
	5 / 8″, 3 / 4″

X-Press Special Rules

	X-Press Perforation	X-Press Safety Edge
Grade	Universal	Universal
Bevel profile	CF	CFDB
Thickness	2 pt / 3 pt	2 pt / 3 pt
	0.71 / 1.05 mm	0.71 / 1.05 mm
Height	23.60 / 23.80 mm	23.80 mm
Tooth / Gap	2.00 / 1.00, 2.00 / 2.00, 3.00 / 1.00 mm	
	3.00 / 3.00, 4.00 / 1.00, 4.00 / 4.00, 10.00 / 10.00 mm	
Wave spacing		1.50 /A, 3.00 /A, 5.00 /N
		A = Auto-bender qualified

PACKING UNITS (for rules in cut lengths)

All Rule Types: (except wave edge, glue flap, zipper and waved stripping rules)

Rule Thickness			Packing Units (in pieces) for Rule Heights of:					
[pt]	[mm]	[inch]	8 – 15 mm	> 15 – 27 mm	> 27 – 40 mm		> 40 – 100 mm	
					A	B	A	B
1.3	0.45	0.018″	100	150	100			
1.4	0.50	0.020″	100	140	100			
1.5	0.53	0.021″	100	140	100			
2	0.71	0.028″	75	100	35	70	35	
3	1.05	0.041″	50	60	25	50	25	24
4	1.42	0.056″	40	50	17	34	17	16
6	2.13	0.084″		30	12	24	12	

A = 1 m and 1.5 m lengths
B = 762 mm (30 inch) lengths

Wave Edge and Glue Flap Rules:

Rule Thickness			for Wave Spacings W of:		
[pt]	[mm]	[inch]	2 mm	3.5 mm	5 / 7 / 10 mm
2	0.71	0.028″	80	80	70
3	1.05	0.041″	60	60	60

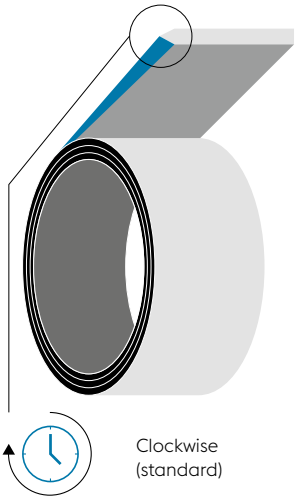
Zipper Edge Rules: (packed in pairs)

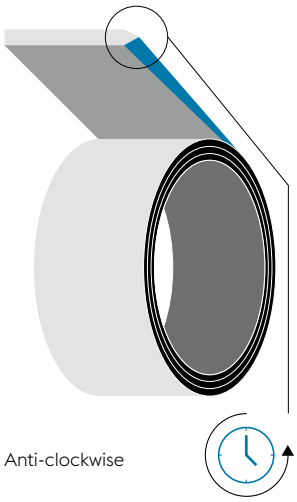
Rule Thickness			for Tooth Spacings A of:	
[pt]	[mm]	[inch]	6 mm	8 / 10 / 12 mm
2	0.71	0.028″	60 (30 pairs)	40 (20 pairs)
3	1.05	0.041″	40 (20 pairs)	30 (15 pairs)

Waved Stripping Rules:

Rule Thickness			for Rule Heights of:	
[pt]	[mm]	[inch]	30 / 40 mm	45 / 50 mm
3	1.05	0.041″	40	20

FORMS OF DELIVERY





Cut Lengths:
bohlerstrip steel rules are produced in standard lengths of 1,000 mm and 762 mm (30 inches). High cutting rules (30–100 mm) come in lengths of 1,500 mm (59 inches).

Coils:
Material delivered in coils is packed in dispenser boxes or, if steel strapped (radial), in corresponding coil packaging.

Standard coil boxes:
For automatic bending machines, various types of coils are offered. The inner diameter and winding direction have to be specified based on the machine type. The standard inner diameters are 356 mm and 400 mm. Further diameters on request.

Dispenser boxes:
Dispenser boxes allow the rule to be easily pulled out of the box for just the rule length required, thus minimizing rule waste. These boxes additionally protect the rule and are a safe way of storage. Attention: coils packed in dispenser boxes cannot be wrapped in anti-corrosion paper!

Coiling directions and strip marking:
» R: Standard: view on cutting bevel “6” outside printing clockwise

» RU: Reverse: view on cutting bevel “ ò” inside printing anti-clockwise

RI und RA on request.

Rule Thickness		Standard Coil Lengths	
[pt]	[mm]	[m]	[ft]
1.3	0.45	100	328
1.5	0.53	100	328
2	0.71	100	328
3	1.05	60	197
4	1.42	50	164

for heights ≥15 – 27 mm


bohlerstrip
by voestalpine
STANZLINIEN
STEEL RULES
FILETS À DÉCOUPER
FILEJE PARA TROQUELES
抜切刃鋼
トムソン刃
MADE IN AUSTRIA, EUROPE
bohlerstrip
PLAST-X
UNIVERSAL 40

PRECISION CUTTING RULES

Brand	Hardness: Body	Hardness: Edge	Hardness: Bending R [mm]	Sizes: Height [mm] [1, 2]	Sizes: Thickness [pt]	Bevels: Edge Angle [3, 4]	Bevels: Shaved	Bevels: Standard ground	Bevels: Polished	Bevels: GX	Coatings: TINIT shaved "Long-life"	Coatings: Supreme ground "Dust Killer" [5, 6]	Additional Features: Back "K-Back"	Additional Features: Autoflex	Application and Features
TOP	~ 450 HV (45 HRC)	~ 450 HV (45 HRC)	+	22.00 – 100.00	1.5 / 2 / 3 / 4	42° / 53°	CF / CFDB								for short / medium runs
							SF / SFDB								
H 75	~ 525 HV (51 HRC)	~ 525 HV (51 HRC)	+	22.00 – 100.00	2 / 3 / 4	42° / 53°	CF / CFDB								for short / medium runs, rigid materials
							SF / SFDB								
UNIVERSAL	~ 340 HV (35 HRC)	~ 660 HV (58 HRC)	+++	21.30 – 50.80	1.3 / 1.5 / 2 / 3 / 4	42° / 53°	CF / CFDB	CF / CFDB	CF / CFDB	✓	✓	✓	optional	optional	for narrow radius bending
							SF / SFDB		SF / SFDB						
UNIVERSAL 40	~ 390 HV (40 HRC)	~ 660 HV (58 HRC)	++	22.00 – 50.80	1.5 / 2 / 3 / 4	42° / 53°	CF / CFDB		CF / CFDB				optional	optional	robust body
							SF / SFDB		SF / SFDB						
UNIVERSAL 60	~ 450 HV (45 HRC)	~ 660 HV (58 HRC)	+	22.00 – 100.00	1.5	42° / 53°	CF / CFDB	CF / CFDB	CF / CFDB	✓	✓	✓	optional	optional	solid body, wider radius bending
					2 / 3 / 4		SF / SFDB		SFDB	✓					
UNIVERSAL 75	~ 525 HV (51 HRC)	~ 700 HV (60 HRC)	+	22.00 – 100.00	2 / 3 / 4	42° / 53°	CF / CFDB	CF / CFDB		✓				optional	solid body, tip for hard materials
							SF / SFDB								
EXTRA	~ 390 HV (40 HRC)	~ 720 HV (61 HRC)	++	22.00 – 50.80	2 / 3 / 4	42° / 53°	CF / CFDB			✓				optional	robust body, tip for hard materials
							SF / SFDB			✓					

[1] Other dimensions on request
[2] Availability depends on order quantity
[3] Other dimensions on request
[4] Availability depends on order quantity
[5] SF / SFDB on request
[6] Optional polished version

SUPER-FINE GROUND X-CUTTING RULES

Brand	Hardness: Body	Hardness: Edge	Hardness: Bendability	Sizes: Height [mm]	Sizes: Thickness [pt] [1, 2]	Bevels: Edge Angle	Bevels: Shaved [3, 4]	Bevels: Super-fine ground	Bevels: Polished	Bevels: GX	Coatings: TINIT shaved "Long-life"	Coatings: Supreme ground "Dust Killer"	Features: Back "K-Back"	Features: Autoflex	Application and Features
Plast-X Soft	~ 340 HV (35 HRC)	~ 660 HV (58 HRC)	+++	23.60 / 50.00	1.3 / 1.5 / 2	30° / 42° / 53°		CF / CFDB					standard	standard	plastic films, PVC foils, LCD films
Plast-X	~ 390 HV (40 HRC)	~ 700 HV (60 HRC)	++	23.60 / 50.00	2 / 3	42° / 53°		CF / CFDB			CF / CFDB		standard	standard	plastic films, PVC foils, blister packs
								SF/SFDB							thickness < 0.5 mm
Plast-X 800	~ 390 HV (40 HRC)	~ 650 HV (58 HRC)	++	23.60 / 23.80	2	30° / 42°		CF / CFDBT					standard	standard	metallized / laminated boards, electronics,
		~ 800 HV (64 HRC)													plastic materials < 0.5 mm thick
Plast-X Hard	~ 450 HV (45 HRC)	~ 700 HV (60 HRC)	+	23.60 / 50.00	2 / 3	42° / 53°		CF / CFDB					standard	standard	plastic films, plastic boxes, UV laminated folding
								SF							boxboard, thickness > 0.5 mm
Plast-X Hard 800	~ 450 HV (45 HRC)	~ 650 HV (58 HRC)	+	23.60 / 23.80	2	30° / 42°		CF / CFDBT					standard	standard	plastics materials, PE, PS, PA, PP, PET, PVC, films, foils,
		~ 800 HV (64 HRC)													electronics, rigid materials, gaskets

[1] Other dimensions on request
[2] Availability depends on order quantity
[3] Other dimensions on request
[4] Availability depends on order quantity

CONVERSION TABLE

Hardness Conversion

Vickers Hardness		Rockwell Hardness		Shore Hardness	
(HV)	(HV)	(HRC)	(HRC)	~ (HS)	~ (HS)
800	490	64.0	48.4	88	65
780	480	63.3	47.7	87	–
760	470	62.5	46.9	86	63
740	460	61.8	46.1	–	–
720	450	61.0	45.3	83	–
700	440	60.1	44.5	–	59
690	430	59.7	43.6	–	–
680	420	59.2	42.7	80	
670	410	58.8	41.8	–	56
660	400	58.3	40.8	79	54
650	390	57.8	39.8	–	–
640	380	57.3	38.8	77	–
630	370	56.8	37.7	–	51
620	360	56.3	36.6	75	50
610	350	55.7	35.5	–	48
600	340	55.2	34.4	–	47
590	330	54.7	33.3	73	46
580	320	54.1	32.2	–	45
570	310	53.6	31.0	71	43
560	300	53.0	29.8	–	–
550	290	52.3	28.5	70	41
540	280	51.7	27.1	–	40
530	270	51.1	25.6	68	38
520	260	50.5	24.0	–	37
510	250	49.8	22.2	66	35
500	240	49.1	20.3	–	34

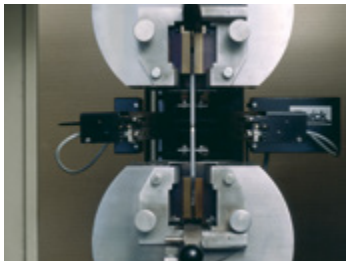
QUALITY ASSURANCE

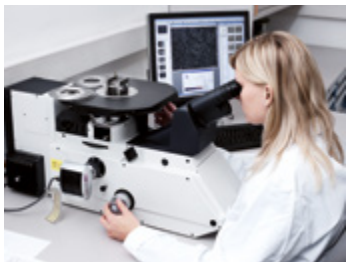
**THERE ARE MANY WAYS TO DEFINE QUALITY
BUT ONLY ONE STANDARD THAT REALLY MATTERS:
YOUR SATISFACTION!**


CERTIFICATE

TÜV AUSTRIA

voestalpine





Our Target – Quality Competence

With almost 150 years of experience in converting steel into components for high-grade final products, we honor the concept of a good partnership. For us, the first step towards an optimum solution is to understand our customers' demands.
Quality is an essential part of our corporate culture, and this is reflected in all areas of our business activities. Close relationships with customers, reliability and quick decision-making are essential elements of our organisation. Many of our innovations and solutions are permanently enhanced for our customers' benefit.
voestalpine Precision Strip has the most up-to-date laboratory and testing knowlege. We are of course certified according to EN ISO 9001 and EN ISO 14001 (environmental approval).

THE COMPANY

Experience in steel manufacturing – from iron ore to serrated steel rule – the entire production chain is within our group.

Continuous innovation and investment to keep one step ahead – we are world market leader in high-quality flatbed and rotary steel rules.

Short lead times and fast reaction to customer requirements – our additional small unit facilities in Austria, Spain and USA ensure the best service.

Product developments and new solutions for market demands – our in-house R&D center with profound knowledge in steel processing and application guarantees our success.

Customer care and direct contact with the factory – our global distribution network and experienced outside sales staff take care of your specific needs.

Strip Steel Technology since 1872.

BOHLERSTRIP FACTS

WORDS ARE NICE. FACTS ARE BETTER.

The Precision Strip Group
Production locations in Austria, Sweden and United States.
Production in Europe's most modern cold rolling mill
in Kematen an der Ybbs, Austria, since 2011.
Stockholding distribution offices in Austria, Sweden,
China, United States, Spain and Mexico.
Worldwide more than 1,100 employees.
Since 2007, member of voestalpine AG, Austria.
Renaming in April 2015
from Boehler-Uddeholm Precision Strip GmbH to
voestalpine Precision Strip GmbH

Core business
- Bimetal strip for the metal saw industry
- Special precison strip for different applications, e.g. for knives, springs, special saws, electronic parts, razor blades, scalpels and flapper valves
- Steel rules for the packaging industry
- Rule die steel for the leather and textile industry
- Wood band saw and circular saw steel
- Stone saw steel for marble cutting
- Coating and creping blades for the pulp and paper industry

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