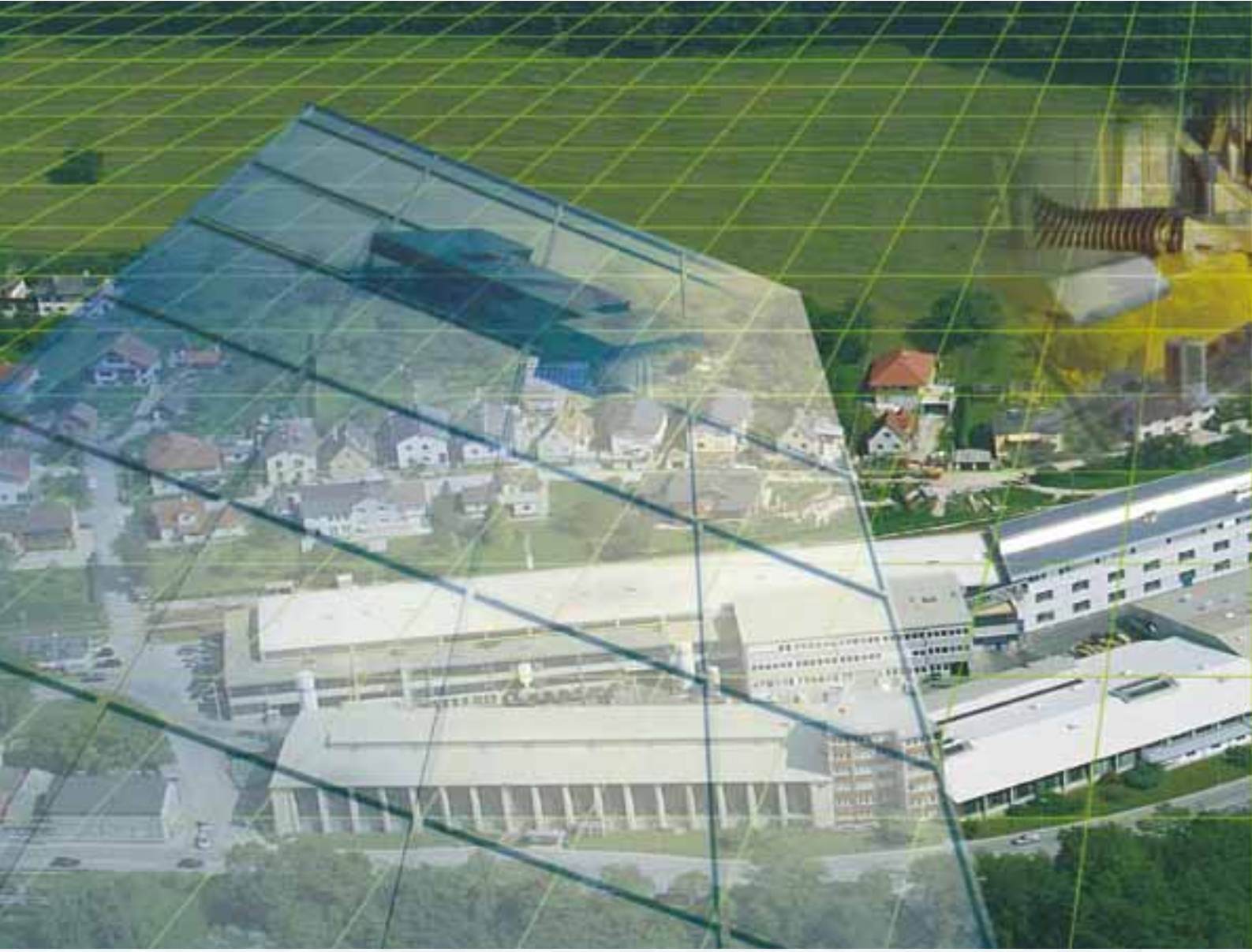


BÖHLER STEEL RULES

THE ULTIMATE CUTTING RULE

BÖHLER UDDEHOLM

precision *strip*



THE COMPANY

World leader

BÖHLER-UDDEHOLM Precision Strip is a 100% subsidiary of the Böhler-Uddeholm Group, which has 10,053 employees worldwide and an annual turnover of more than Euro 1.5 billion. The group is listed on the stock exchange and is internationally known to be one of the most successful producers of special steels.

The Company – a part of the Precision Strip Division – with its head office in Böhlerwerk, Lower Austria, is a world leader in the production of bimetal strips for metal saws, rule die steel for the leather and textile industry as well as high-precision steel rules for the die cutting of packaging materials.

Furthermore cold rolled special strip steel with the highest requirements for material, surface appearance and tolerances is produced.

The group guidelines are behind the philosophy and strategy of BÖHLER-UDDEHOLM Precision Strip. Important statements of our company philosophy include:

- We see ourselves globally as the competent partner in our core business and always strive towards the position of "Best in class".
- The needs and requirements of our customers build the guidelines of our corporate way of thinking.
- We promote Quality and Service. The qualification, motivation and flexibility of our staff form the basis thereof.
- Our obligation is to a clean environment.





SPECIALISTS

Our strengths

Our company has specialised in the processing of medium and high-alloy steels as well as in the special finishing of the following products:

- Cold rolled special strip steel
- Bimetal strip
- Cutting, creasing and rotary rules
- Rule die steel

Close to the final product

Furthermore we also offer strip steel shapes that are close to the final product, thus allowing our clients to economise on further processing.

Customer benefits

We see ourselves as problem solvers as our suggestions are aimed towards as much customer benefits as possible.



FLAT BED CUTTING

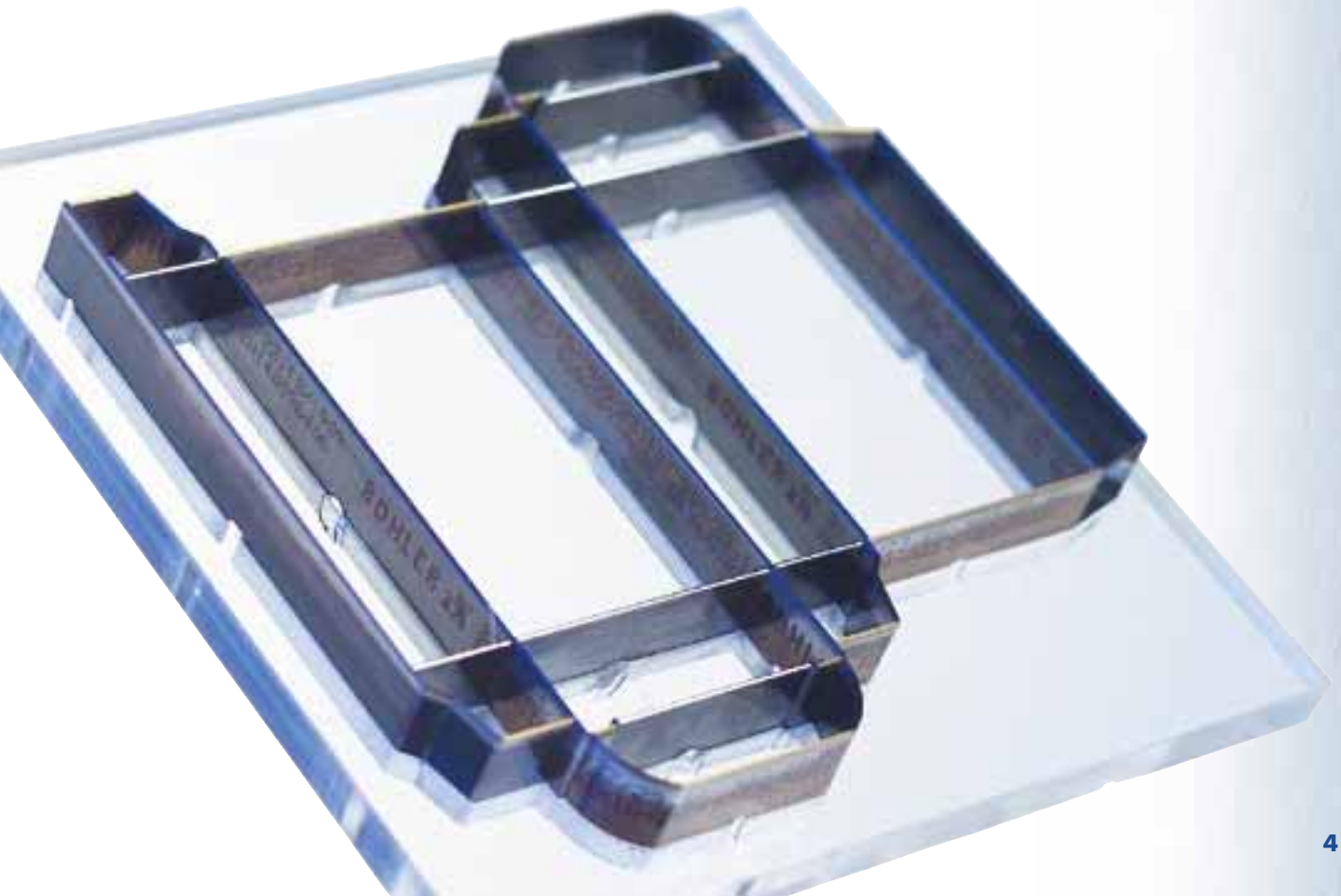
Industrial and consumer goods can only be delivered to end users and commercial enterprises in the adequate packaging.

Packagings, especially folding carton boxes offer protection for the product and also ensure that the goods can be delivered safety. Over the last few decades we have seen a steady increase of the use of packaging as an advertising medium to increase the image of the products as well as the corporation behind them.

To ensure the required quality of the finished product the cartons are processed on precision converting machines. The applied method of flat bed die cutting allows for high speeds and accuracy of the packaging material.

The cutting dies used are produced with the aid of modern technology, like automatic steel rule processor as well as laser and water-jet machinery.

Basic requirements for ideal cutting results is the use of high precision cutting rules that are adjusted and tuned to the required application.



GENERAL INFORMATION

All necessary production steps from the selection of the best suited primary material to the finished cutting rule occur and take place in the production facilities of Böhler-Uddeholm Precision Strip (cold rolling, heat treatment, edge machining, bevel hardening, …).
Exactly balanced operation procedures using state of the art production lines allow us to produce cutting rules with optimal product features and properties.

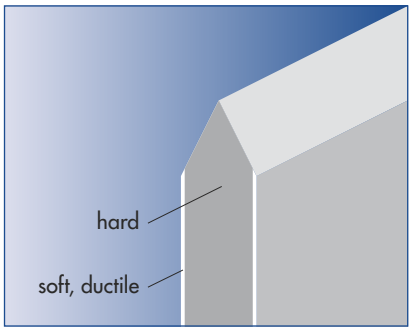


PRODUCTION RANGE

Böhler cutting, scoring and label rules are divided into two main groups, illustrating the optimum properties for the respective applications:

Through-hardened Rules:

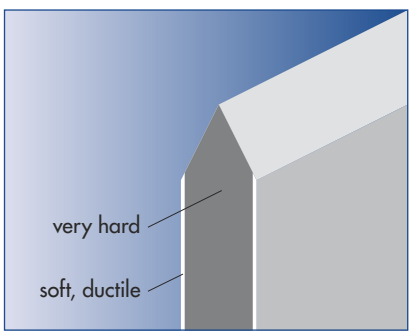
These rules have a uniformly high hardness on the cutting edge and in the body. Special heat treatment gives these rules a particular grain structure and a soft, ductile outer skin, which facilitates the required bendability. The cutting edge is usually shaved (longitudinally worked), with a very high dimensional accuracy.



TOP

This all-purpose rule from BÖHLER offers good bendability and is suitable for slightly abrasive materials.
Used for:
Cardboard, corrugated board, labels, post cards, …

Hardness: body / edge	~ 450 HV (45 HRC)
Bendability: (2 pt rule)	α = 85° R ~ 0,3 mm
Thickness: (pt)	1,1 / 1,5 / 2 / 3 / 4
Heights: (depending on thickness)	7,0 – 100 mm 0.276" – 3.937"
Edge finish:	S
Packaging:	**magenta**



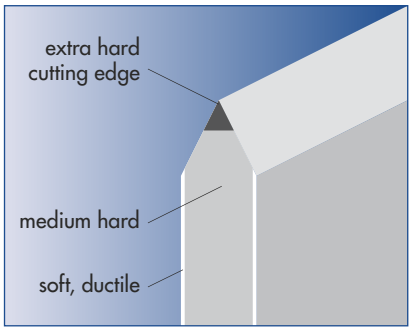
H 75

A very hard rule, which after controlled surface decarburisation can be bent to 90° and offers the highest stability and performance during difficult cutting operations.
Used for:
Gaskets, rubber, plywood, cork, felt, beer mats, …

Hardness: body / edge	~ 525 HV (51 HRC)
Bendability: (2 pt rule)	α = 90° R ~ 1,7 mm
Thickness: (pt)	2 / 3 / 4
Heights: (depending on thickness)	9,55 – 100 mm 0.376" – 3.937"
Edge finish:	S
Packaging:	**red**

Edge-hardened Rules:

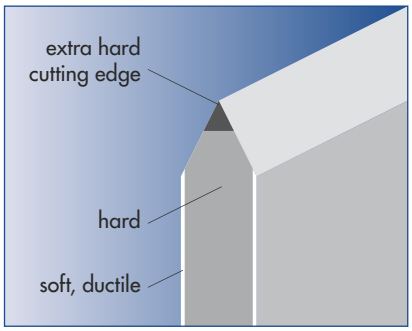
In addition to the properties of the through-hardened rules, these types are subjected to induction hardening of the cutting edge. These rules, therefore, provide an excellent wear resistance and long die life. These rules are available with a drawn, ground and polished cutting edge finish.



UNIVERSAL

The BÖHLER UNIVERSAL rule has the excellent bending properties of soft steel, with the long service life of an extra hard cutting edge and can, therefore, be universally used.
Used for:
Cardboard, corrugated board, labels, post cards, …

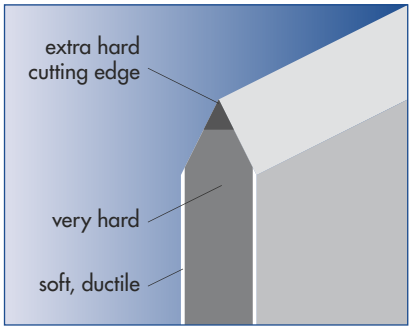
Hardness:	body	~ 340 HV (34 HRC)
	edge	~ 640 HV (57 HRC)
Bendability: (2 pt rule)		α = 75° R ~ 0,3 mm
Thickness: (pt)		1,1 / 1,5 / 2 / 3 / 4
Heights: (depending on thickness)		8,0 – 50,8 mm 0.315" – 2.000"
Edge finish:		S, G, F, P
Packaging:		orange



UNIVERSAL 60

This rule combines the body hardness level of the TOP rule with the advantages of an induction hardened cutting edge. This means high rigidity, outstanding wear resistance and long service life.
Used for:
Plastic, thin gaskets, foils, puzzles, …

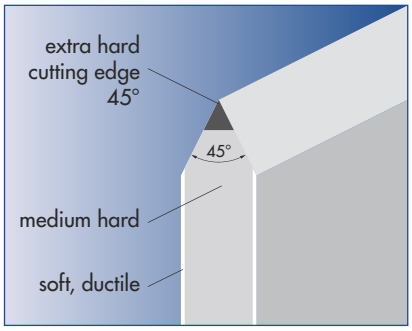
Hardness:	body	~ 450 HV (45 HRC)
	edge	~ 640 HV (57 HRC)
Bendability: (2 pt rule)		α = 85° R ~ 0,3 mm
Thickness: (pt)		1,1 / 1,5 / 2 / 3 / 4
Heights: (depending on thickness)		8,0 – 100,0 mm 0.315" – 3.937"
Edge finish:		S, G, F, P
Packaging:		yellow



UNIVERSAL 75

This rule has excellent stability as well as wear resistance. Therefore, it is very well suited when cutting heavy materials such as non-asbestos gaskets, laminates, metal foils, plastics and other abrasive materials.

Hardness:	body	~ 525 HV (51 HRC)
	edge	~ 670 HV (58 HRC)
Bendability: (2 pt rule)		α = 90° R ~ 1,7 mm
Thickness: (pt)		2 / 3 / 4
Heights: (depending on thickness)		12,00 – 100,0 mm 0.472" – 3.937"
Edge finish:		S, G, F, P
Packaging:		orange

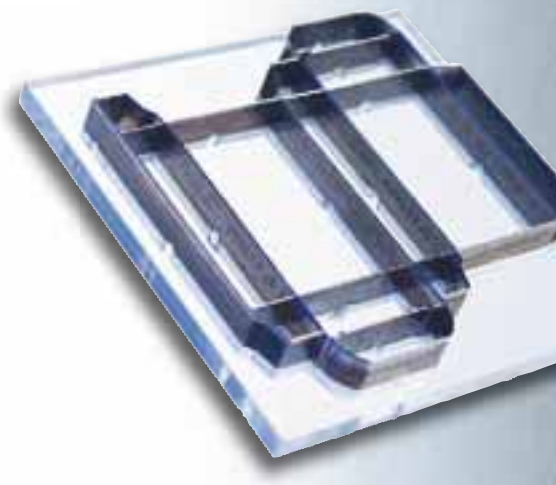


compensation back edge (K-back)



UNIVERSAL SUPER

Due to its slimmer cutting angle of 45° the Universal Super penetrates the substrate easier and requires less cutting pressure during the converting process. In addition the unique compensation back minimizes the unwanted back-edge bulging during the bending operation. Height variations are compensated and the make-ready time is considerably reduced.



HARDNESS VALUES AND BENDING PROPERTIES

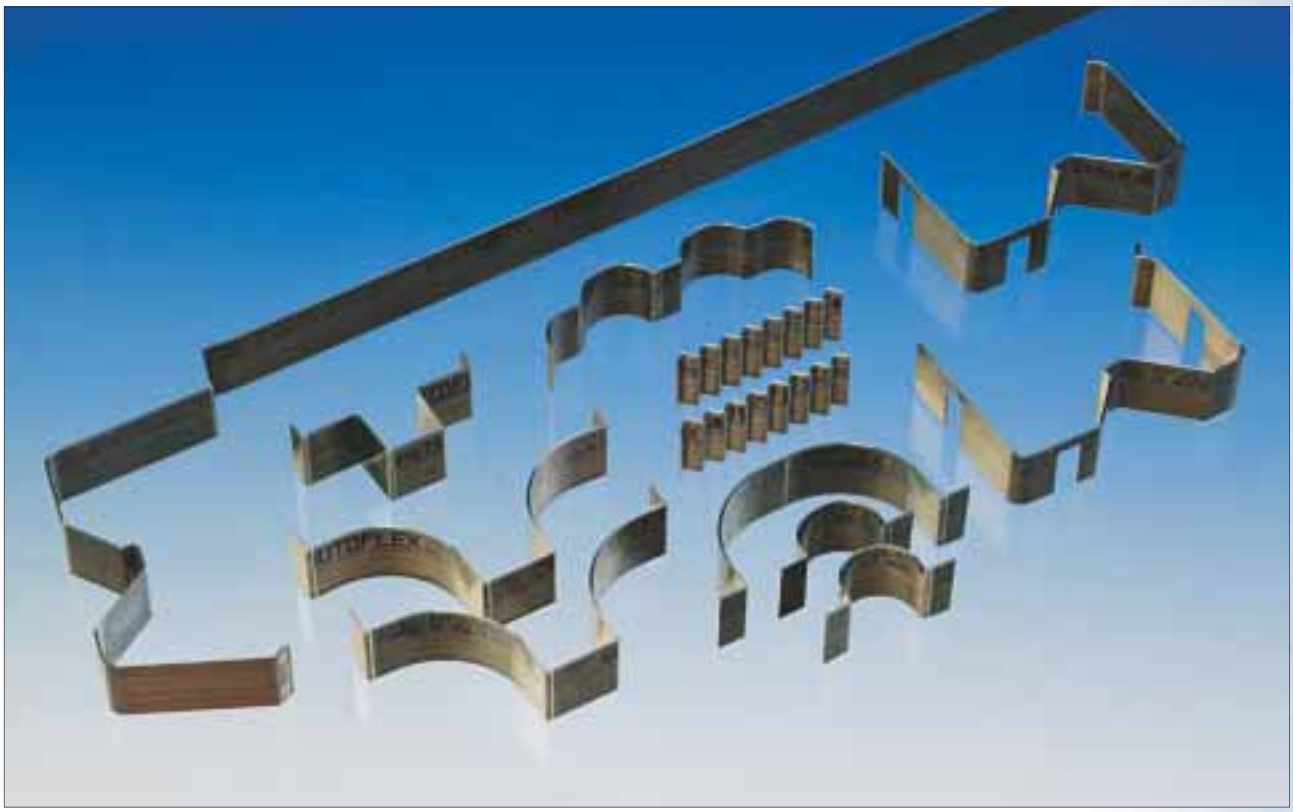
Brand	Hardness		Edge-finish	Guaranteed Bending Properties				
	Body	Edge		Bending Angle	Bending Radius R [mm]			
BÖHLER TOP	~ 450 HV (45 HRC)		S	α = 85°	0,3	0,4	0,6	1,1
BÖHLER H 75	~ 525 HV (51 HRC)		S	α = 90°		1,7	3,5	6,5
BÖHLER UNIVERSAL	~ 340 HV (34 HRC)	~ 640 HV (57 HRC)	S G	α = 75° α = 85°	0,3 0,3	0,3 0,4	0,4 0,9	0,7 1,1
BÖHLER UNIVERSAL 60	~ 450 HV (45 HRC)	~ 640 HV (57 HRC)	S G	α = 85°	0,3 0,5	0,4 0,5	0,6 0,6	1,1 1,1
BÖHLER UNIVERSAL 75	~ 525 HV (51 HRC)	~ 670 HV (58 HRC)	S G	α = 90°		1,7 1,7	3,5 3,5	6,5 6,5
			S = shaved G = ground		1,5 pt 0,53 mm	2 pt 0,71 mm	3 pt 1,05 mm	4 pt 1,42 mm

BÖHLER Auto-flex® CUTTING RULES
for automated bending machines

Based on the high bending consistency of our present TOP and UNIVERSAL cutting rules, we have developed two new rule qualities which offer absolute constant bending properties and therefore ideal for use with automatic benders.

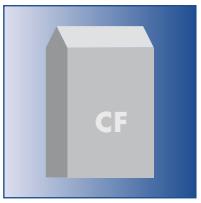
- **TOP Auto-Flex**
- **UNI Auto-Flex**

These characteristics are enabled due to the tightest production tolerances in respect to hardness and thickness.



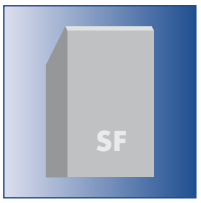
TYPES OF CUTTING EDGES

In order to meet the various cutting applications, all required types of cutting edges are in our production range.



CF – Centre Face (Double Bevel)

The CF-bevel is the most commonly used cutting edge for all standard cardboards.



SF – Side Face (Single Bevel)

This type of cutting edge is particularly suitable for cutting gaskets, displays and close shapes.
The minimum counter bevel facilitates a right angled, straight cut.



CFDB – Centre Face Double Bevel

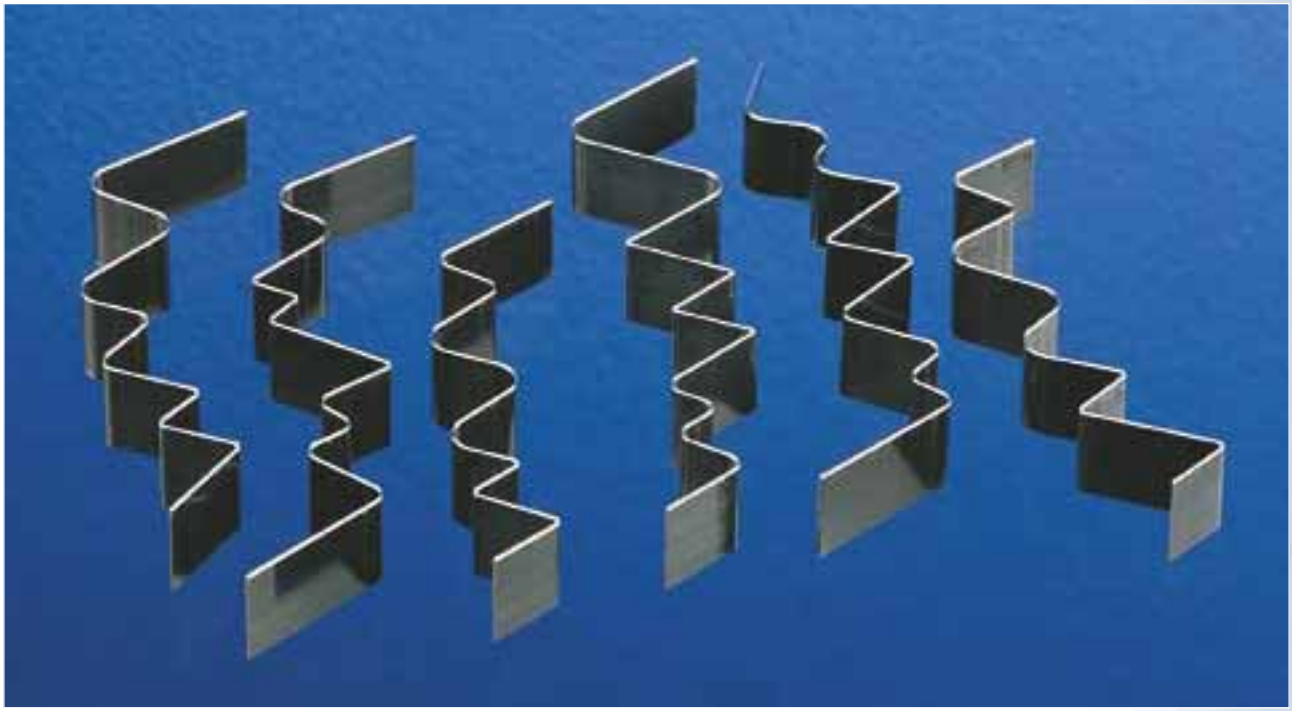
This type of cutting edge reduces the cutting power required when cutting hard and/or thick materials, such as glass fibre reinforced laminates, leather, cork, rubber, jigsaw puzzles, corrugated board, plastics, plywood, etc.



SFDB – Side Face Double Bevel

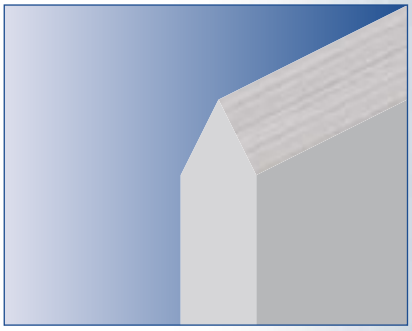
The SFDB profile offers the same advantages as the CFDB when cutting thicker material. SFDB has the added advantage that the material being cut is left with a square 90° cut edge and all the distortion from penetration is left on the material waste.





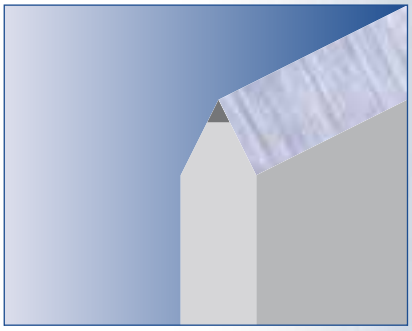
CUTTING EDGE FINISH

Shaved (drawn) cutting edge: (S)



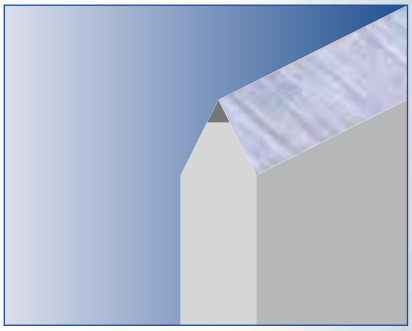
The standard condition of BÖHLER cutting rules is a precision drawn, high surface quality cutting edge.
The cutting rule has a smooth surface with a sharp cutting edge, which minimizes the formation of dust during application and ensures an easy penetration into the material being cut.

Sharpened (ground) cutting edge: (G)



For the efficient cutting of plastics, rubber, laminates and coated materials, a ground cutting edge has proved the best.
We recommend for this application our induction hardened cutting rules (UNI, UNI 60 and UNI 75) in the ground edge finish.
The bendability, compared to rules with a drawn cutting edge, is slightly reduced.

Cross grinding: (F)

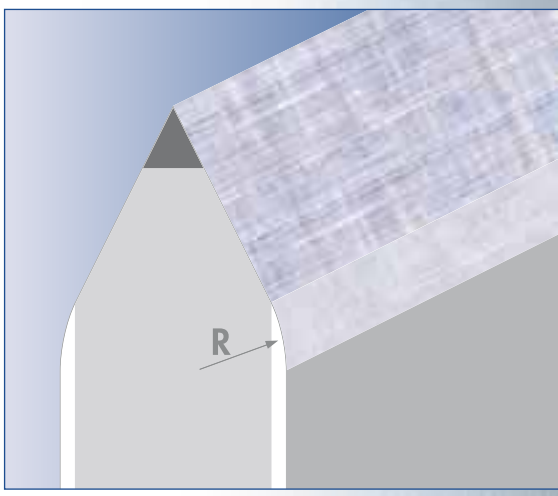


Due to a new grinding technology we are able to achieve a further increase of quality regarding sharpness and surface finish of our ground rules.

The die cutting industry benefits from the following advantages:

- improved cutting performance when working with difficult materials (e.g. foils, coated cardboard, corrugated board, plastic, polyester, etc.)
- strongly reduced cutting pressure due to the extremely sharp cutting edge. (easy penetration, thanks to a micro serration effect)
- reduced creation of dust during cutting process compared to rules with conventional grinding.
- excellent bendability as a result of the cross grinding structure, which can be compared with rules in shaved edge execution.

Polished edge: (P)



Our new polished cutting rules represent a technology which combines the advantages of a shaved (drawn) and a ground (sharpened) execution.

Due to the very smooth surface the following advantages were achieved:

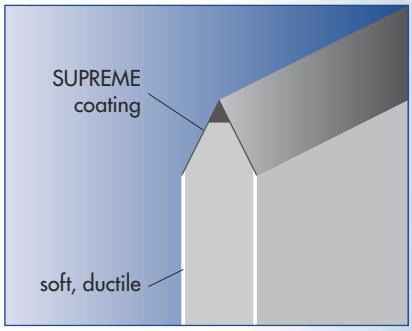
- lower friction due to reduced cutting pressure during the die cutting process, causing a further decrease of dust build up.
- cleaner cut
- high-quality cutting performance when cutting plastics, foils, laminates, …
- improved bending properties due to the smooth surface compared to ground cutting rules

The rounding at the transition of the bevel to body **(R)** offers advantages during cutting to lengths and when bending on automatic process equipment. This execution is also available with **polished long bevel (PL)** as well in SF and SFDB bevels.

REFINEMENT OF THE CUTTING EDGE

SUPREME

The Supreme cutting rule was originally developed for the label industry with a view to restricting the build-up of adhesive on the cutting edge. This type of rule is now used successfully in a variety of applications.
The dust-reducing property of the Supreme cutting rule is particularly valued by our customers.
When it is necessary to have long production runs, the Supreme-coating significantly reduces mechanical wear and tear on the cutting edge by reducing friction, and thereby considerably increases the life of the cutting die.
In the same way the required press force is substantially lowered, which contributes considerably to extending the life of the expensive automatic platens.
The Supreme Universal Super has no difficulty in dealing with recycled cardboard because it is combined with a slimmer and thus sharper cutting edge. This successfully cuts through the short fibres of this material and thus facilitates dust-free cutting and an increased service life.



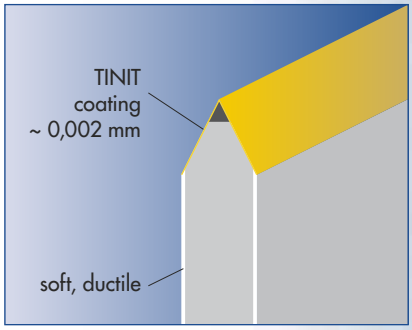
Product Information:
By means of a special process the cutting edge of the Supreme rule is coated with a thin anti-friction-film which fills the microscopically small pores and marks on the cutting edge and thereby adds to the smoothness.

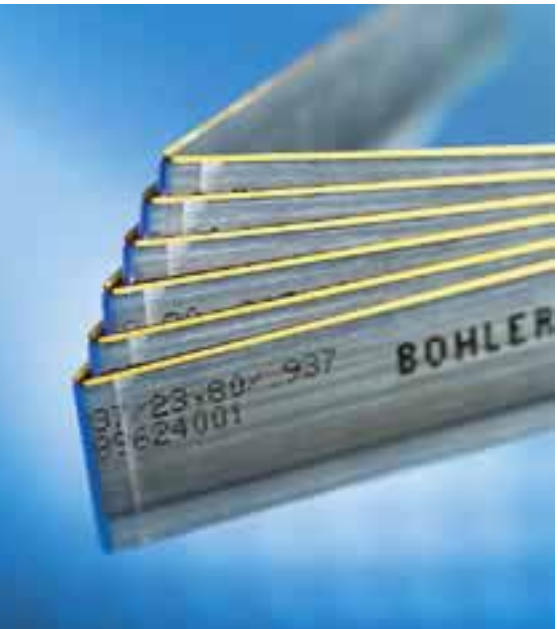
Special Characteristics:
- dust-reduced cutting
- reduction of press force
- reduction of friction between cutting edge and material being cut
- substantially increased service life of the die

TINIT (TiN)

The TiN-layer is only at the very outside surface of the cutting rules bevel, which ensures excellent bendability.
The hardness of the TiN-surface is approx. 2400 HV and the cutting edge itself approx. 640 HV.

Hardness, bendability, structure, cutting geometry and dimensions are equivalent to our standard Böhler Universal.





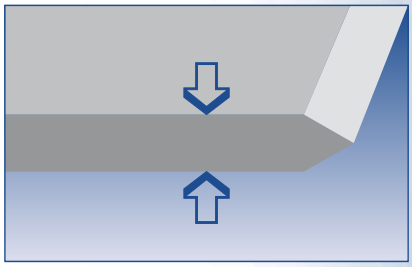
The user benefits from the following advantages:

- higher efficiency and quality during the converting process
- increase of the cut-ability and cut-stability / higher lifetime
- reduced make-ready time
- higher wear-resistance of the cutting edge with same good bendability
- reduces the tendency of adhesive materials to cling to the cutting edge
- decrease of dust during the cutting process
- extremely high impression requirements (e.g. tobacco and pharmaceutical industry)

DIMENSIONS AND TOLERANCES:

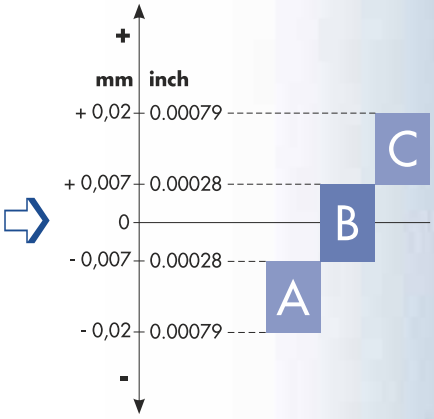
Range of Thickness: 0,40 – 2,13 mm (1,1pt – 6pt)

Rule Thickness s			Thickness Tolerance	
[pt]	[mm]	[inches]	[mm]	[inches]
1,1	0,40	0.016″	± 0,015	± 0.0006″
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″



Range of Height: 8,00 – 100,00 mm (0.315″ – 3.937″)

Rule Height h		Height Tolerance		
[mm]	[inches]	[mm]	[inches]	classified
8,00 – 25,40	0.315″ – 1.000″	± 0,020	± 0.0008″	A / B / C
> 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″	—



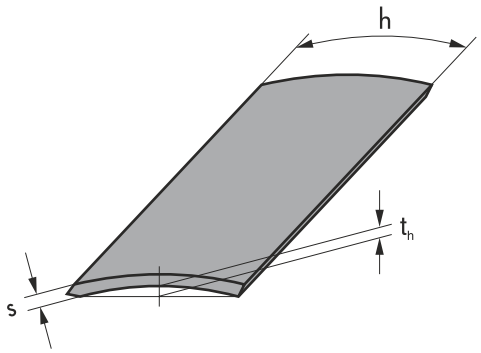
Classification:

The height classification is only done when the rules are manufactured in cut lengths up to 1000 mm.

TOLERANCES OF FORM:

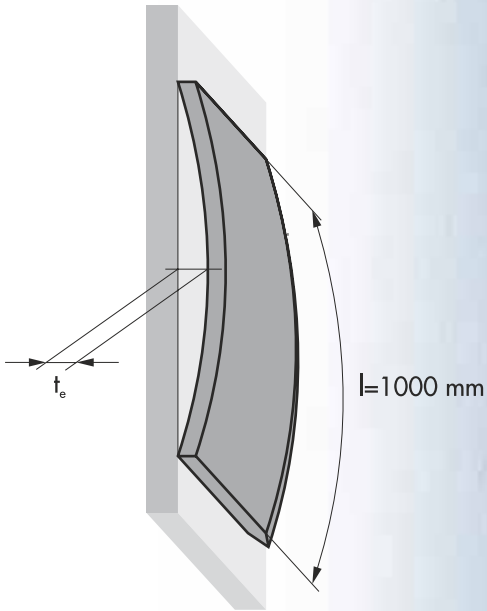
Cross Camber:

t_h: = max. 1 µm/mm rule height h



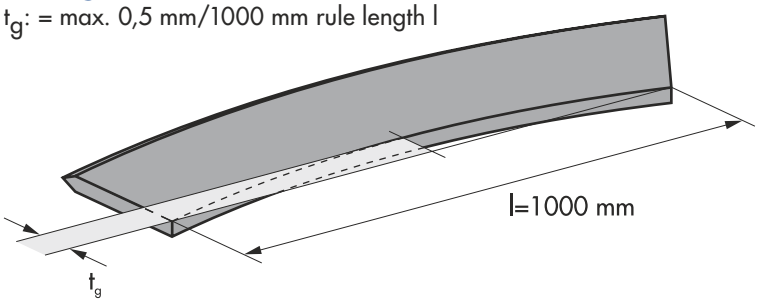
Flatness:

t_e: = max. 5 mm/1000 mm rule length l



Straightness:

t_g: = max. 0,5 mm/1000 mm rule length l



GENERAL INFORMATION

Creasing rules are used for embossing the folding lines of a box.
Folding box design and the precision of the final product are always becoming more demanding which underlines the significance of using high quality creasing rules.

Böhler creasing rules are adjusted in their accuracy to the Böhler cutting rules and offer:

- very smooth crease head surface
- a perfectly radiused, smooth profile
- a flowing continuity from the radiused profile to the side faces of the rule
- minimum eccentricity
- minimum height tolerances
- rule thickness complementary to cutting rules
- SUPREME-coating possible

MANUFACTURING RANGE

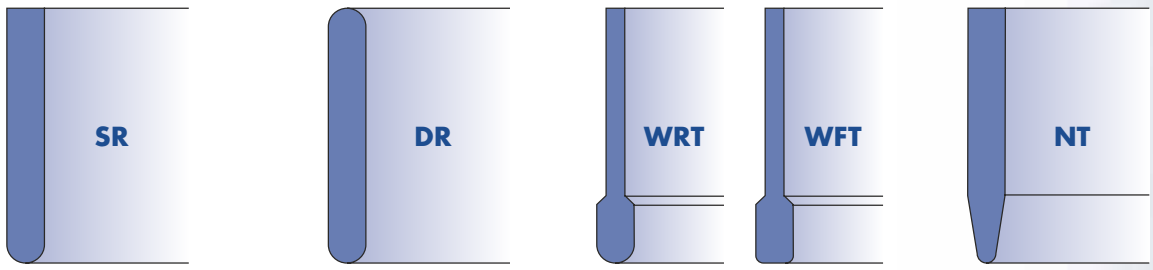
BÖHLER creasing rules are produced in two manufacturing methods, depending on the rule thickness required:

HT - Hardened and Tempered Creasing Rules:
This method of manufacture guarantees the required stability of rules, with a relatively small thickness.

HR - Hard Rolled Creasing Rules:
Using a special rolling process the required tensile strength and stability of the rule is guaranteed.

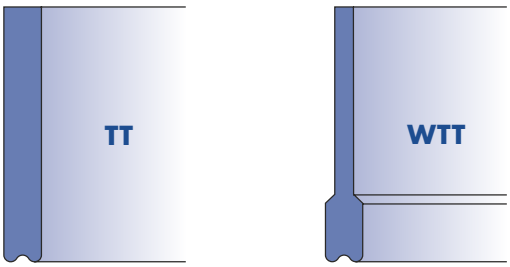
Brand	Hardness	1,5 pt 0,53 mm	2 pt 0,71 mm	3 pt 1,05 mm	4 pt 1,42 mm	6 pt 2,13 mm
BÖHLER HT	~ 380 HV (39 HRC)	✔	✔	✔	–	–
BÖHLER HR	min. 265 HV (850 N/mm^2)	–	–	–	✔	✔

STANDARD PROFILES



Single Round SR		Double Round DR		Wide Top WRT / WFT		Narrow Top NT	
[pt]	[mm]	[pt]	[mm]	[pt]	[mm]	[pt]	[mm]
1,5	0,53	1,5	0,53	2 / 3	0,71 / 1,05	2 / 1	0,71 / 0,36
2	0,71	2	0,71	2 / 4	0,71 / 1,42	2 / 1,3	0,71 / 0,45
3	1,05	3	1,05	3 / 6	1,05 / 2,13	2 / 1,4	0,71 / 0,50
4	1,42			3 / 8	1,05 / 2,84	2 / 1,5	0,71 / 0,53
6	2,13			4 / 8	1,42 / 2,84		
Standard		**American style**		LASER CREASE			

SPECIAL PROFILES



Twin-Track TT		Wide Twin-Track WTT	
[pt]	[mm]	[pt]	[mm]
2	0,71		
3	1,05	3 / 8	1,05 / 2,84
4	1,42	4 / 8	1,42 / 2,84

(other thickness on request)

Especially for plastic- and corrugated packaging a new edge profile has been developed in order to achieve best creasing results.
The twin-track rule is producing a narrow, parallel double-track on the punched board, which considerably facilitates the subsequent folding process.

RANGE OF DIMENSIONS

Rule thickness s			Standard heights h	
[pt]	[mm]	[Zoll]	[mm]	[inches]
1,5 - 6	0,53 - 2,13	0.021″ - 0.084″	20,30 - 24,40	0.800″ - 0.960″

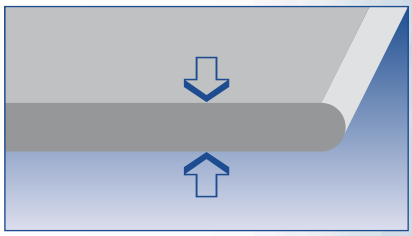
other rule heights on request

The height of the creasing rule depends on the cutting rule being used and the thickness of the material to be cut.

TOLERANCES OF DIMENSION:

Thickness Tolerance:

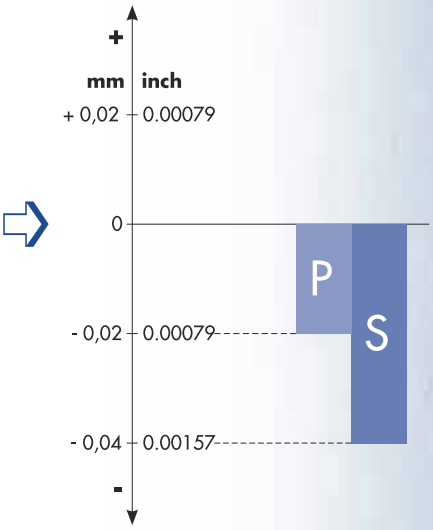
Rule Thickness s			Thickness Tolerance	
[pt]	[mm]	[Zoll]	[mm]	[inches]
1,5	0,53	0.021″	± 0,015	± 0.0006″
2	0,71	0.028″	± 0,015	± 0.0006″
3	1,05	0.041″	± 0,020	± 0.0008″
4	1,42	0.056″	± 0,020	± 0.0008″
6	2,13	0.084″	± 0,025	± 0.0010″



Height Tolerance:

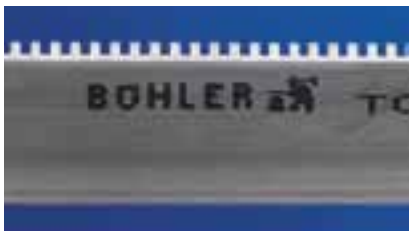
Rule Height h		Height Tolerance		
[mm]	[inches]	[mm]	[inches]	
20,30 - 24,40	0.800″ - 0.960″	+0 / –0,04	+0 / –0.0016″	Standard
		+0 / –0,02	+0 / –0.0008″	Precise *)

*) on request



PERFORATING RULES:

BÖHLER perforating rules are available in a wide range of various thicknesses and tooth/gap combinations.
The spacing is usually given in mm. On request, we can also manufacture in point and inch spacings.



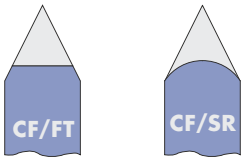
Brand:	BÖHLER TOP
Bevels:	CF, CFDDB
Thickness:	0,71 / 1,05 / 1,42 mm 2 pt / 3 pt / 4 pt
Heights:	21,30 – 25,40 mm 0.840″ – 1.000″
Spacing P:	tooth/gap

COMBINATION (CUT-CREASE) RULES:

With these rules the time-consuming task of alternately inserting individual parts of cutting and creasing rules is avoided.

BÖHLER cut-crease rules are produced in standard punched (CF), or in flat- or round machined executions for high-quality demands (CF/FT and CF/SR).

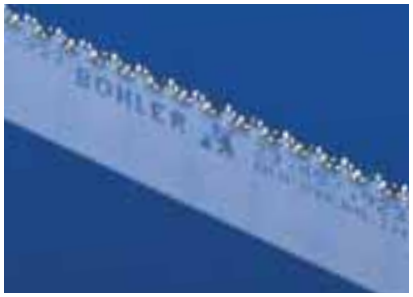




Brand:	BÖHLER TOP
Bevel:	CF, CF/ST, CF/SR
Thickness:	0,71 / 1,05 / 1,42 mm 2 pt / 3 pt / 4 pt
Heights:	HS = height of the cutting part HR = height of the creasing part
Spacing P:	cut/crease

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 to obtain a firm grip surface for the adhesive.

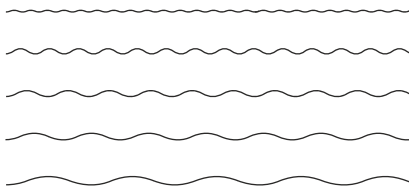


Brand:	BÖHLER TOP
Bevel:	CF
Thickness:	0,71 mm 2 pt
Heights:	23,32/23,50/23,60 mm 0.918″/0.925″/0.929″
Spacing P: (Zahn/Lücke)	0,71 / 0,71 mm 2 pt / 2 pt
Wave Spacing W:	5,0 mm

WAVE EDGE AND DECKLE EDGE RULES:

The main area of application for wave edge rules is in the production of safety cutting edges on cardboard and corrugated board, to avoid hand injuries during manual erection of the box sections.
Deckle edge rules are used to cut post cards, greetings cards and business cards.

Wave Edge Rules



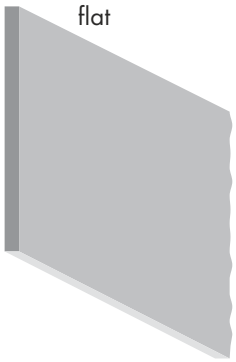
Deckle Edge Rule

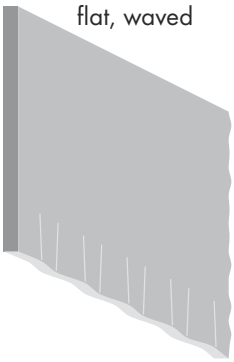
Brand:	BÖHLER TOP, UNI
Bevels:	CF, CFDB
Thickness:	0,71 / 1,05 mm 2 pt / 3p
Heights:	21,30 – 25,40 mm 0.840″ – 1.000″
Wave Spacing W:	2,0 mm – super fine 3,5 mm – very fine 5,0 mm – fine 7,0 mm – medium 10,0 mm – large

STRIPPING RULES:

BÖHLER stripping rules are the optimum solution for ejecting the waste material during the die cutting process.

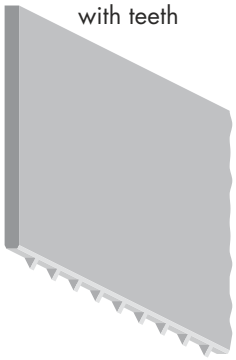
Our production range includes the following types:

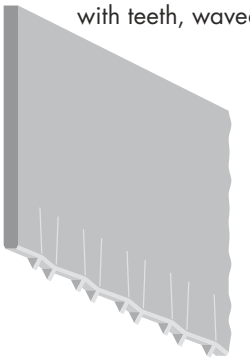




Brand:	BÖHLER TOP 36
Profile:	FT (Flat Top)
Thickness:	1,05 mm 3 pt
Heights:	30 / 40 / 45 / 50 mm 1.181″/1.575″/1.772″/ 1.969″
Wave Spacing W:	3,5 mm – very fine 5,0 mm – fine 7,0 mm – medium 10,0 mm – large

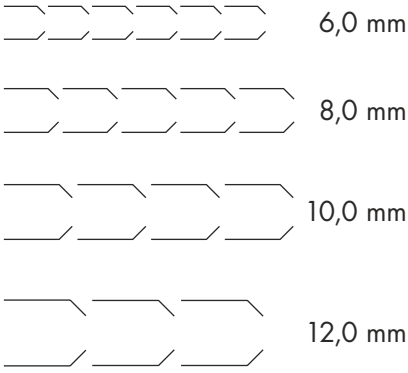
SURE-STRIP





Brand:	BÖHLER TOP 36
Bevel:	CF
Thickness:	1,05 mm 3 pt
Heights:	30 / 40 / 45 / 50 mm 1.181″/1.575″/1.772″/ 1.969″
Spacing P: (tooth/gap) Wave Spacing W:	0,5/1,5 – 0,5/5 – 0,5/10 mm 7,0 mm – medium

ZIPPER EDGE RULES:





Brand:	BÖHLER TOP
Bevel:	CF
Thickness:	0,71 / 1,05 mm 2 pt / 3 pt
Heights:	21,30 – 25,40 mm 0.840″ – 1.000″
Tooth Spacing A:	6,0 mm 8,0 mm 10,0 mm 12,0 mm
Packing:	in pairs



STRIP STEEL TECHNOLOGY SINCE 1872

BÖHLER UDDEHOLM

precision *strip*

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