



TUBE INDUSTRY

STRIP EDGE TRIMMING MACHINES

for weld seam optimization



CONTENT

STRIP PROCESSING MACHINES

ADVANTAGES OF STRIP EDGE TRIMMING	4-6
during tube production	
Tube Innovation Network	7
STRIP EDGE TRIMMING BY METAL-CUTTING	8-9
of metal strips	
The modular system	10-15
Strip egde trimming by metal-cutting for heavy-duty use	16-17
STRIP SURFACE MACHINING BY METAL-CUTTING	18-19
of metal strips	
The modular system	20-21
LEVELLING TECHNOLOGY	22-23
for strip processing lines	
REQUEST FOR QUOTATION	24
Questionnaire for technical data	

ADVANTAGES OF STRIP EDGE TRIMMING

DURING TUBE PRODUCTION

OPTIMIZATION OF TUBE WELD SEAM

General aspects

The basic strip material is usually longitudinally split strip (slit strip). Only <35% of the edges are really cleanly cut, the larger portion is broken off and is not clean, i.e. irregular in terms of straightness, angle and structure, and coatings may interfere with welding.

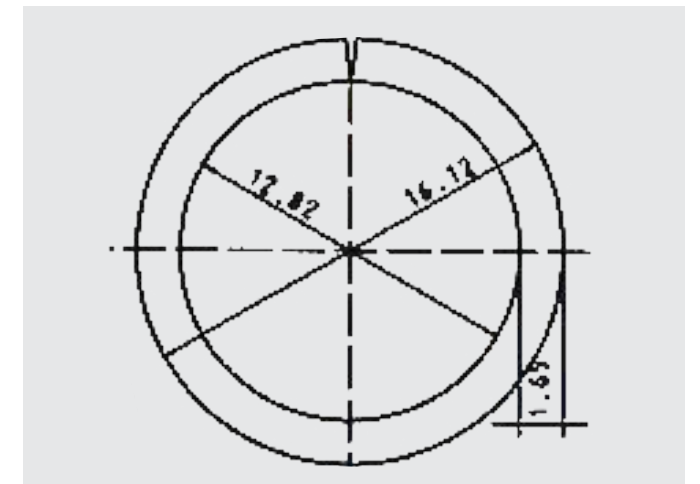
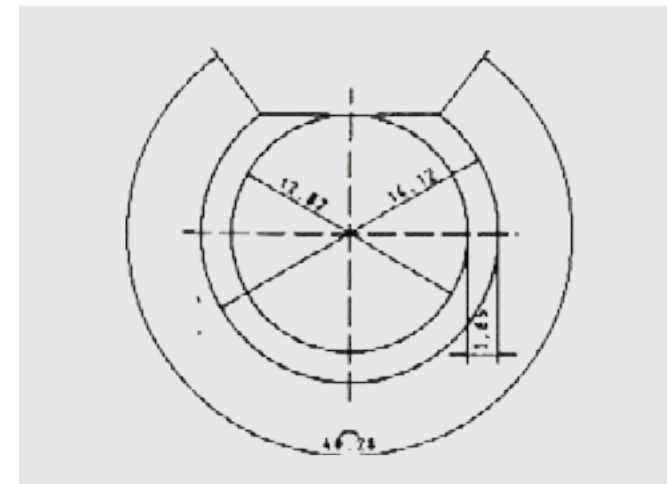
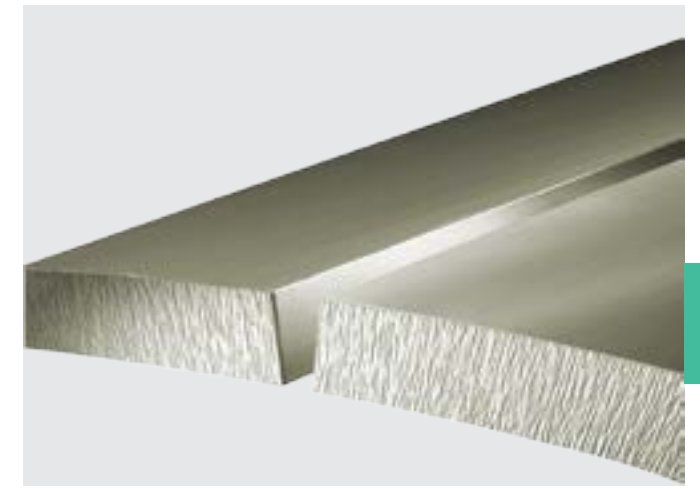
Round profiling

The thicker the wall thickness and the smaller the tube diameter, the greater the V-angle at which the round pipe edges meet. The cross section to be welded that collides with each other becomes smaller and smaller and thus the area to be liquefied necessarily larger.

As a result, the upsetting zone and the upsetting force occurring immediately after welding become larger. This results in ever greater weld seam elevations, which have to be planed off at the top and inside surface in a very time-consuming process.

Welding methods

The welding methods commonly used up to now, such as TIG/MIG/high frequency/induction etc. can cope with the problem, but with the disadvantages mentioned above. The energy input must also be correspondingly large and/or the welding speed must be adjusted downwards accordingly.



Modern welding processes, such as laser welding, which is the only way to weld special materials today, require higher edge and contour qualities, otherwise they become uneconomical, e.g. due to high reject rates.

Advantages of strip edge trimming

The strip edges become evenly clean and straight and also have their inner structure on the surface.

The edges are machined at an adjustable angle so that the V-angle for welding is reduced and coatings on the strip edge are removed.

The colliding cross section of the edges is maximized, so that a smaller volume of material has to be liquefied.

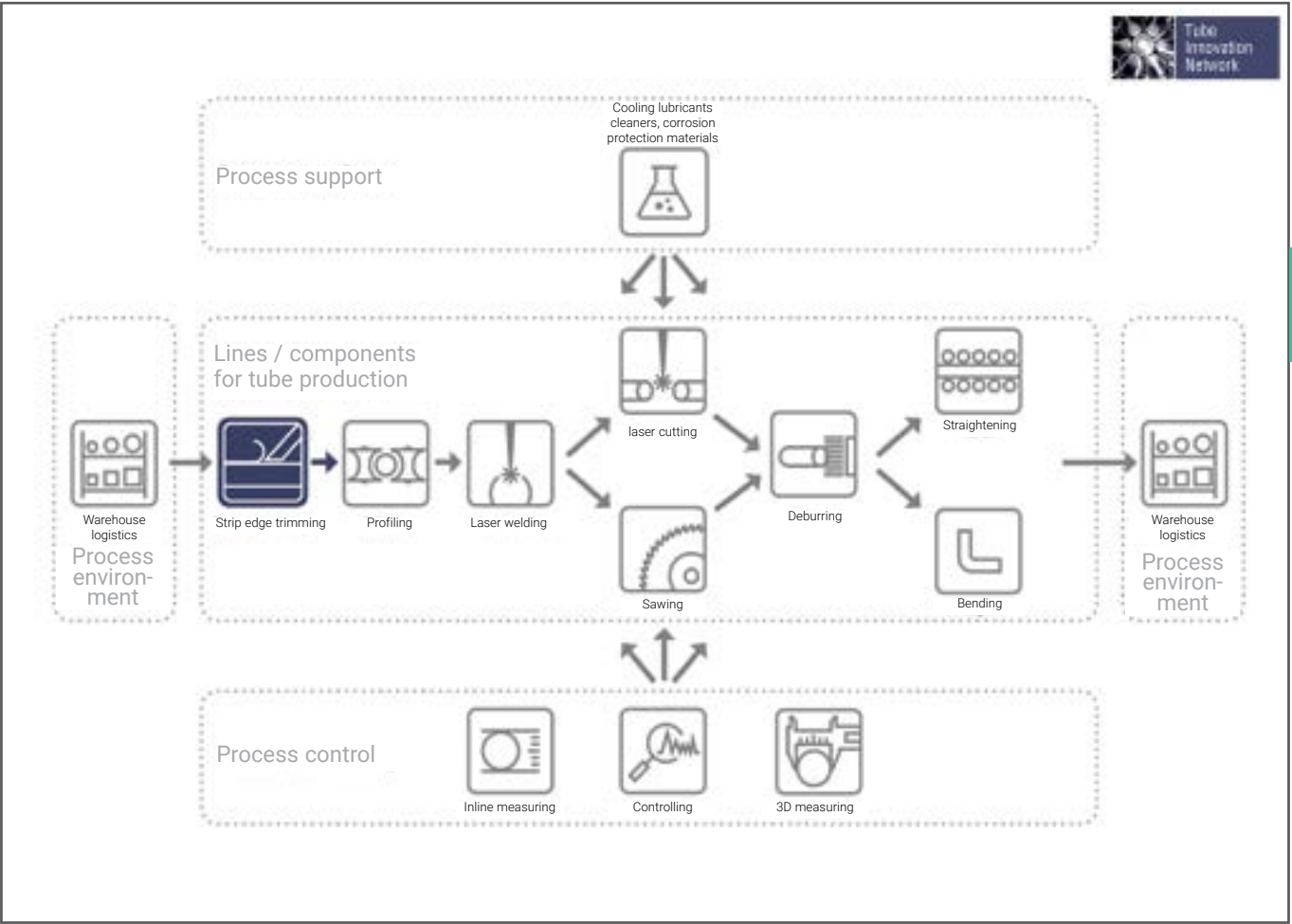
- less energy consumption or higher welding speed
- less upsetting and thus less weld seam superelevation
- less surface and inner surface planing
- minimized reject rate
- material savings, because less strip width addition is required due to less upsetting
- more homogeneous weld structure = quality improvement
- use of special welding processes (e.g. laser) possible
- better form quality due to lower upsetting forces
- more constant strip width by narrowing the width tolerance
- greater constancy of upsetting and thus of weld seam superelevation
- covering-free edges

STRIP EDGE TRIMMING FOR WELD SEAM OPTIMIZATION

Integration in tube welding lines

The modular strip edge trimming machines of the Berger Gruppe are integrated into tube welding lines for weld seam optimization.

They are installed between strip feeding and profiling line. The strip edge trimming machine is often preceded by a flat straightening machine which reduces the waviness of the strip and eliminates coil curvature.



Tube Innovation Network

The Tube Innovation Network group of companies includes JULIUS, Dreistern, TRUMPF, Sema Systemtechnik, FOERSTER, Zumbach, RSA, WAFIOS, AICON, Fehr and Kluthe.

Background is the idea to create an integrated contact in the field of tube manufacturing and tube processing, who covers the entire process chain.

We are bundling together an extensive and decades of knowledge around the topic tubes. You as a customer have the possibility to consult extensively on our worldwide events or to receive customized solutions..

www.tube-innovation-days.com

Tube Innovation Days

The Tube Innovation Network has been organizing events worldwide for five years.

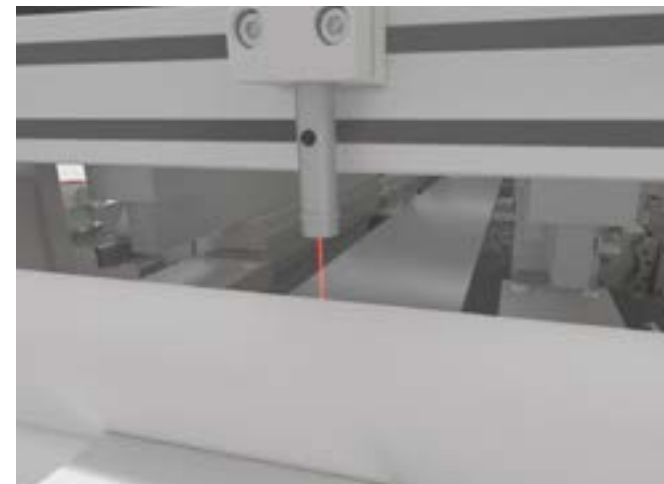
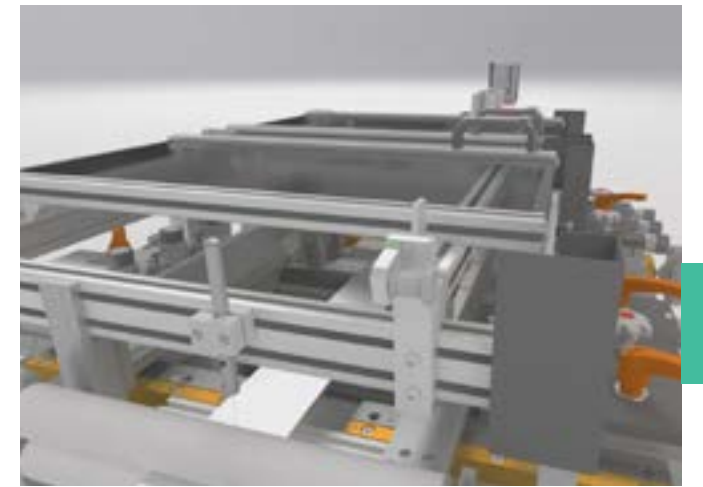
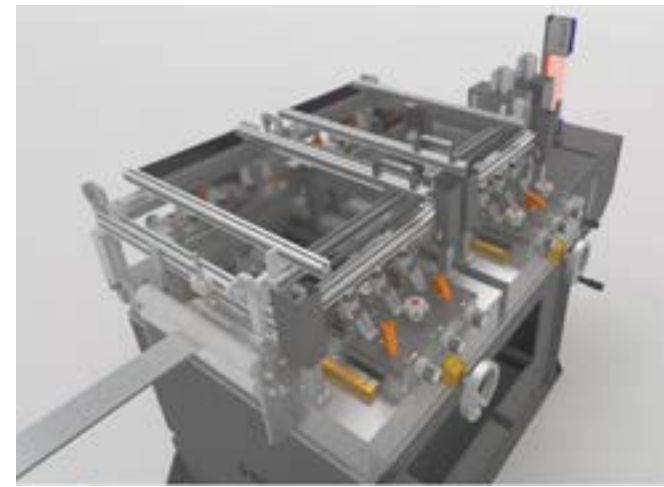
At the Tube Innovation Days, the network presents itself at an exhibition and provides information about the latest developments in the industry in a selection of specialist lectures.

Tube Innovation Days:

- 24.09.2019 in Reutlingen (Germany)
- 12.02.2019 in Kattowitz (Poland)
- 05.10.2017 in Querétaro (Mexico)
- 03.10.2017 in Monterrey (Mexico)
- 07./08.11.2016 in Teheran (Iran)
- 20./21.01.2016 in Ditzingen (Germany)
- 11./12.11.2015 in Mokena (USA)
- 15./16.04.2015 in Shanghai (China)

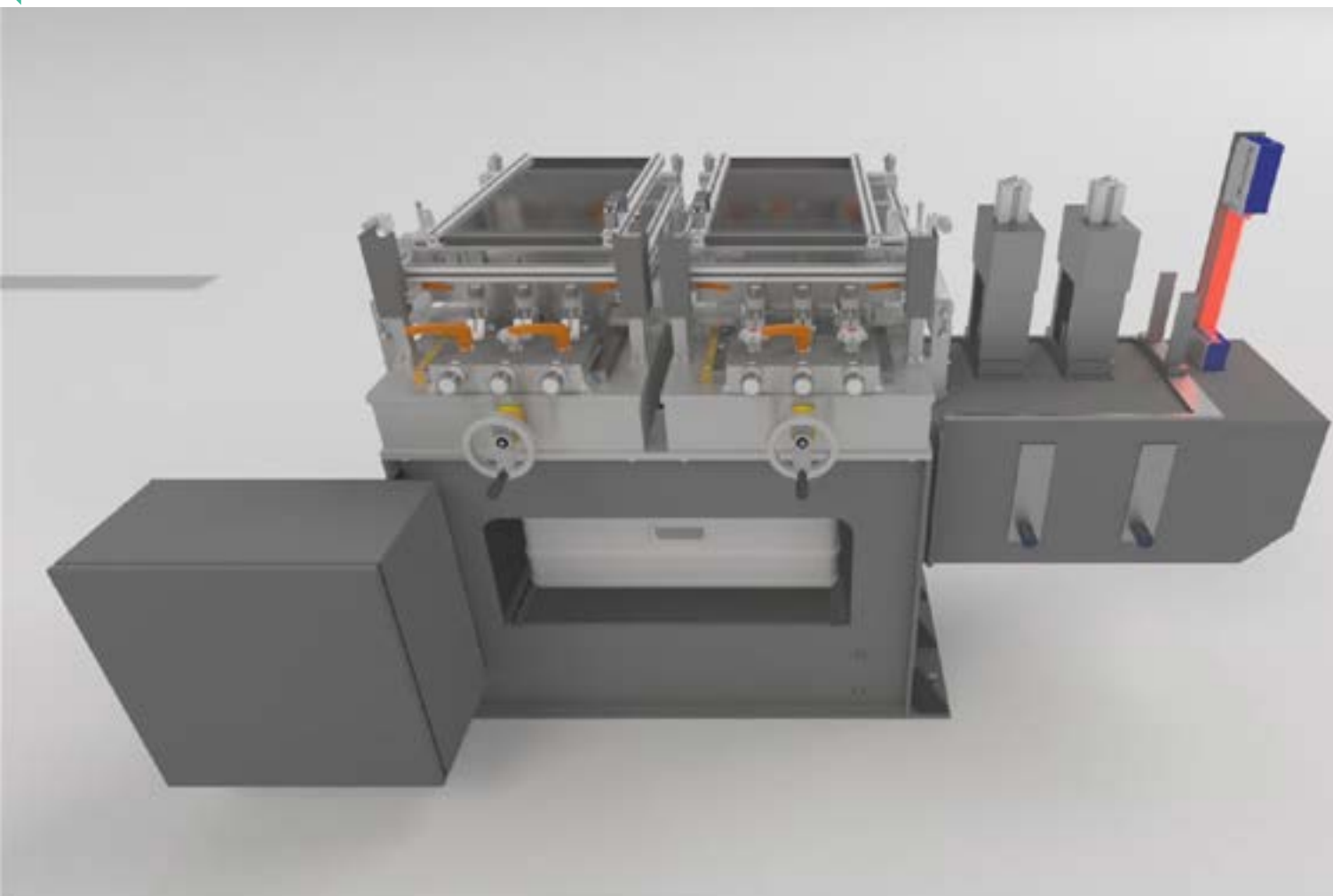
STRIP EDGE TRIMMING

OF METAL STRIPS



STRIP EDGE TRIMMING BY METAL-CUTTING

The strip edge trimming process ensures that the edges of the strips are uniformly clean, straight and true to size. They also retain their inner structure on the surface.



The edges are machined at an adjustable angle, so that coatings are removed and the V-angle for welding can be reduced as required.

This prevents burrs from coming loose during further work processes such as punching or profiling.



In contrast to rolling, the material is not changed during strip edge trimming. The structure of the material surface is preserved.



By precise adjustment of the tools and a well thought-out system of broaching arrangement, even complex chamfers and contours are worked on the strip edge without affecting the surface structure.



THE MODULAR SYSTEM

Thanks to the modular concept, the strip edge trimming machine can be flexibly combined and also expanded later.

Thus, a machine with one work station can be extended to a machine with two, three or more work stations.

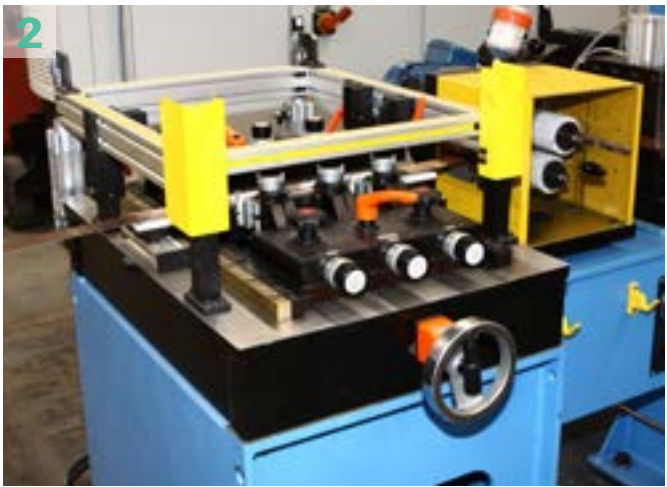
The modules are modular in themselves, so that individual assemblies and components can be added and exchanged in each module.

Each module has three stations per side for tool or roll holders. The tools and rolls can be flexibly adjusted and exchanged.

With the automatic opening, main supports and horizontal guides are opened and closed automatically, hydraulically or pneumatically, in a freely programmable manner.

In case of high speed and/or thick swarfs, energy is generated during machining. A lubricating and/or cooling system optimizes the machining at higher loads.

The modular strip edge trimming machine can be combined with modules for surface treatment.



Technical Data

- strip width: max. 2.000 mm
- strip thickness: 0,1–8 mm
- contours: different contours
- speed: up to 300 m/min
- strip material: all machinable materials
- automatic opening
- hydraulic and pneumatic lifting
- lubrication and coolant systems for tools

Dimensions of the machine (w/l)¹

UNO:	700 mm × 760 mm
DUO:	700 mm × 1.360 mm
TRIO:	700 mm × 1.900 mm
QUATTRO:	700 mm × 2.500 mm
QUINTO:	700 mm × 3.100 mm

¹ The machine width corresponds to a maximum strip width of 80 mm. The machine changes accordingly for wider strips. The height of the machine is adapted to the strip running height of the line.

Examples of use (pictures)

1. UNO strip edge trimming machine with one work station (picture 2)
2. DUO strip edge trimming machine with two work stations (picture 3)

3. TRIO strip edge trimming machine with three work stations (picture 4)
4. QUATTRO strip edge trimming machine with four work stations (picture 5)
5. QUINTO strip edge trimming machine with five work stations (picture 1)



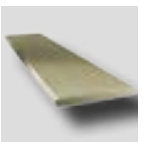
deburring



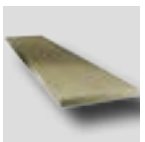
different chamfers/contours



round edges



90°



uncoated edges

THE MODULAR SYSTEM – OPTIONS

The modular system offers the possibility to integrate modules into existing machines at a later date.

Options are offered as follows:

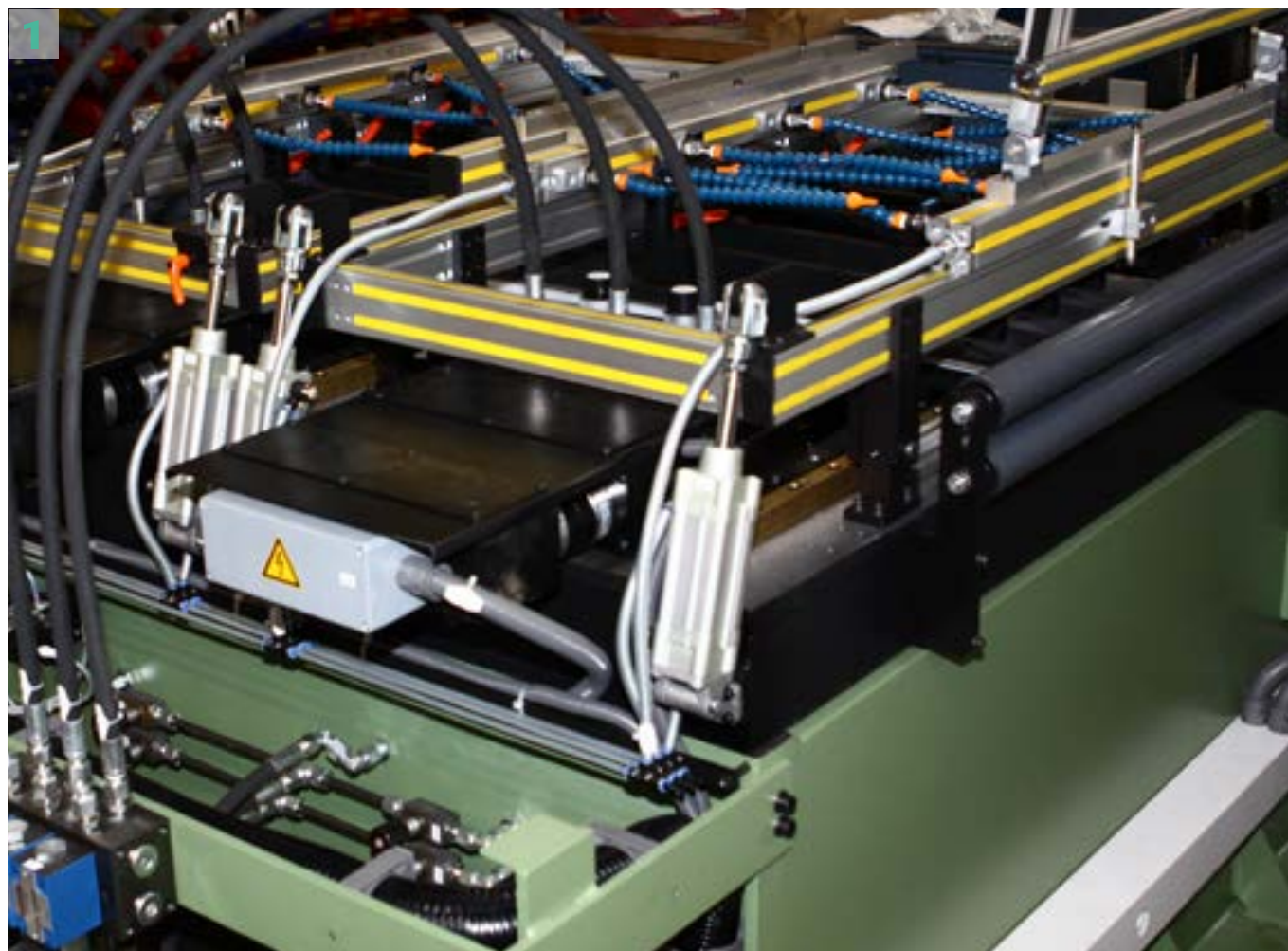
- TRISTEP system
- rail system
- roller cage
- pinch rolls
- swarf hopper / swarf removal
- swarf shredder
- swarf deflecting plates
- blow-off of swarfs
- coolant and lubricant systems
- measuring systems

Motor-driven tool adjustment

With the TRISTEP system, the rear – and if desired also the front – tools and rollers are horizontally adjusted by motor. Adjustment and value resetting are carried out via control panel. The use is recommended from a strip width of 400 mm (picture 1).

Rail system

The processing machine is flexibly moved in and out of the production line system via a rail system. The system is used when the strip center of the line changes, e.g. in the production of tailored strips (picture 2).



Loop operation

A roller cage is flanged to the strip edge trimming machine, which supports the strip as it comes out of the loop. The strip is thus protected against bending (picture 3). In the case of light processing, pinch rolls can pull the strip through the edge processing machine. This is necessary for loop operation.

Automatic strip center control

The strip center control automatically repositions the strip and automatically controls the machine. The system is recommended for strips with a strip width of 1,000 mm or wider (picture 4).

Swarf removal

A swarf hopper can be integrated into the strip edge trimming machine (picture 5).

The swarfs are fed to the swarfs shredder via this hopper. There they are shredded and then fall onto a scrap conveyor belt for removal (picture 6).



THE MODULAR SYSTEM - ACCESSORIES

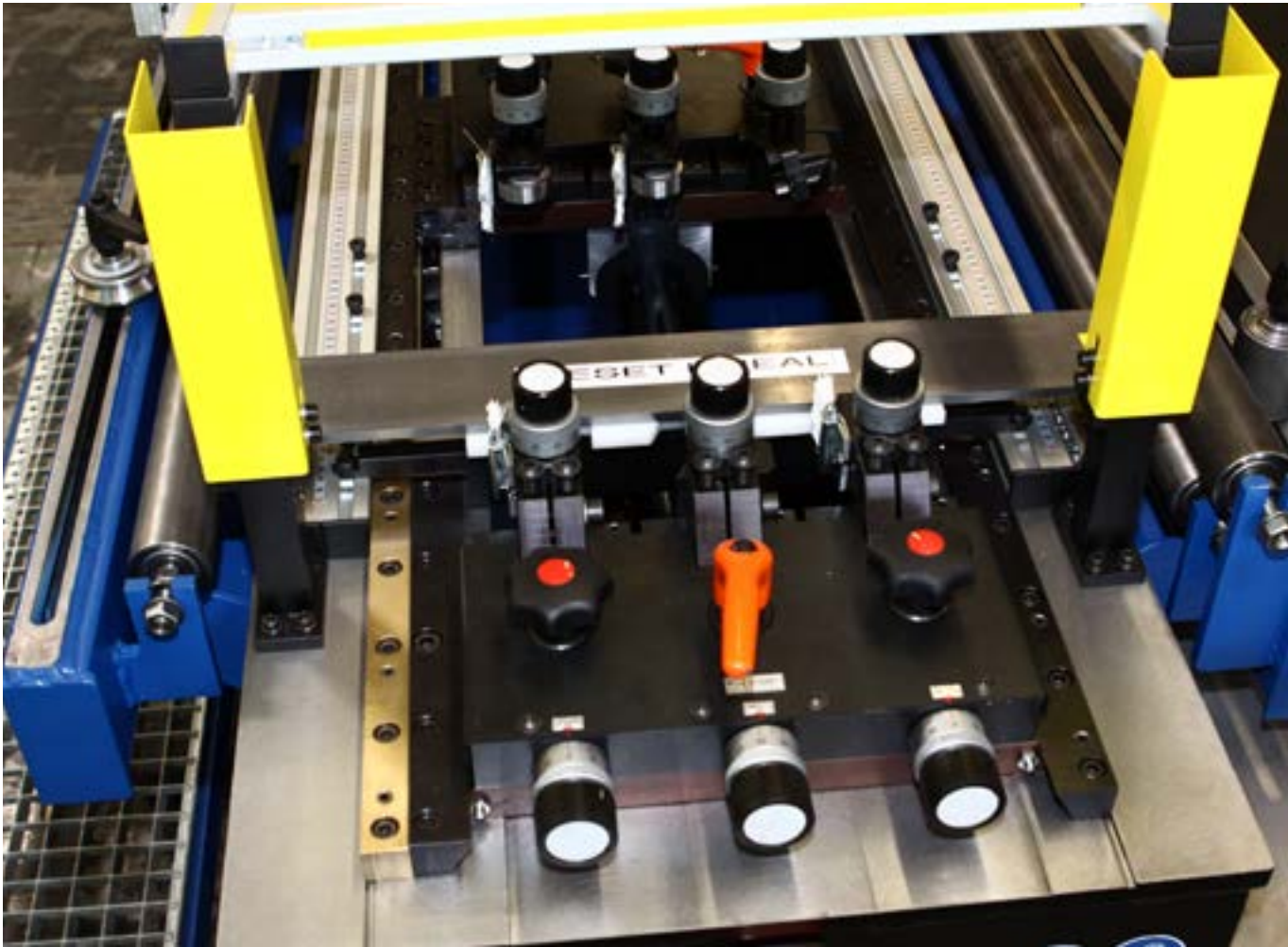
Measuring technique

The Berger Gruppe offers closed-loop machining of the strip edge and strip surface. Strip width, contour and residual wall thickness of the groove are measured and automatically corrected to the specified tolerance values.

Different measuring systems can be integrated:

- strip width and thickness measurement via laser systems

- radius and angle detection via camera systems
- measurement technology systems integrated in a closed control loop with CNC control or installed as monitoring with signal output
- measuring systems for setting up
- automatic error marking



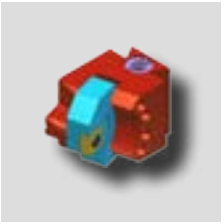
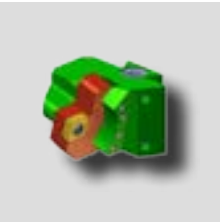
Tool holders

The Berger Gruppe offers various tool holders for different machining operations.

With the modular system it is possible to use and exchange tool and roll holders flexibly.

The angle of the tools can be adjusted continuously. The spindle can be adjusted backlash-free.

The tool holder WZWV 9013 pro allows the angle of the tool to be set and adjusted during the working process. Thus, the weld seam is optimized with only minimal material loss.



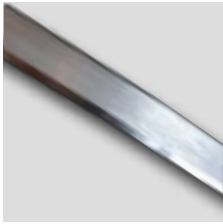
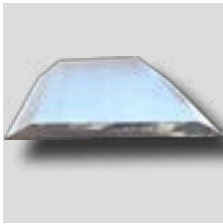
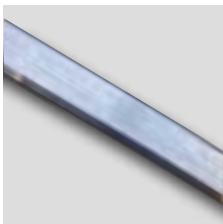
STRIP EDGE TRIMMING BY METAL-CUTTING FOR HEAVY-DUTY USE

With large cutting cross sections and high performance, the stress on the strip edges during machining is very high.

In this case the use of strip edge trimming machines of the /S series is recommended.

They are designed for machining under high load with a high material removal rate.

They can also machine complex contours with wide chamfers on thick and/or hard strips, while maintaining the most precise tolerance values.



A new concept of the support arrangement has optimized swarf removal. It is now possible to work with a thick swarf and remove a maximum amount of material in one pass.

The arrangement of the hydraulic clamping in the guide rails on both sides as well as the use of additional cylinders have increased the capacity, so that the machine can work vibration-free even under high loads.

Technical data

- strip width: max. 2 000 mm
- strip thickness: 0,1–8 mm
- contour: all contours and chamfers
- speed: up to 300 m/min
- strip material: all machinable materials



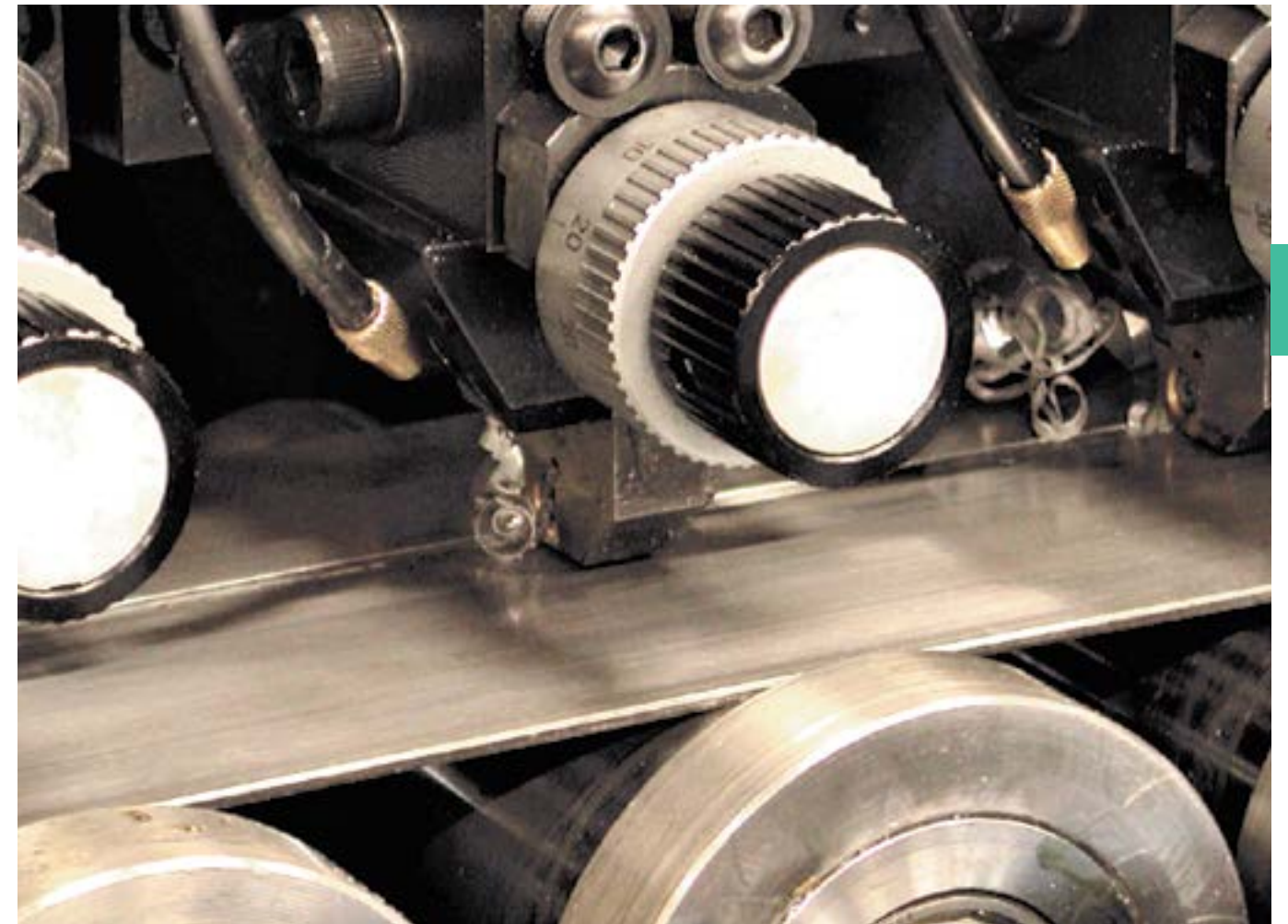
STRIP SURFACE MACHINING BY METAL-CUTTING

OF METAL STRIPS

MACHINING OF THE STRIP SURFACE

Oil grooving

In some work processes it is necessary to process both the edge and the surface of the strip in order to be able to feed the strip to further production processes.



In the production of hollow profiles, for example, a line of the coating is removed so that the strip can be welded onto itself.

This is where the JULIUS grooving systems come into play. They remove one or more lines of the coating from the surface and thus prepare the welding process in an optimal way.

Since the tools are adjustable vertically, horizontally and in angle, the width and depth of the groove can be flexibly adapted to the respective requirements.

If the strip is very hard or if a lot of material has to be removed from the surface of the strip edge, it makes sense to machine the strip edge vertically. This is where the grooving machines of the TRINU series are used.

THE MODULAR SYSTEM

The Berger Gruppe offers various modular series for machining the strip surface. Thanks to the modular design, the machines can be combined with modules for strip edge trimming and/or integrated into existing systems – even retrospectively.

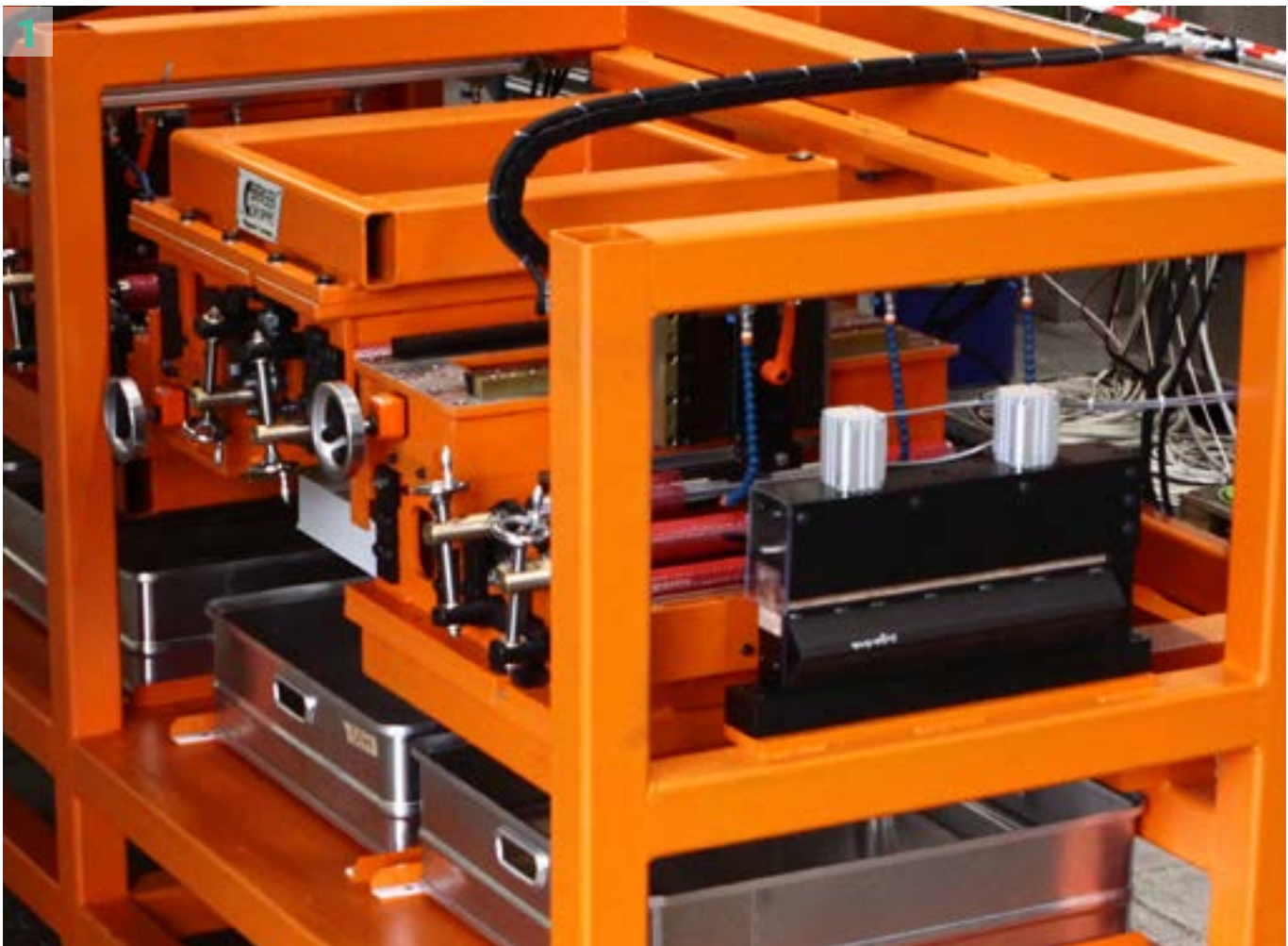
Series NU

The grooving unit of the NU series removes a line of the coating from the strip surface with one tool. The tool is adjustable vertically and horizontally.

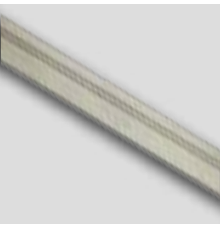
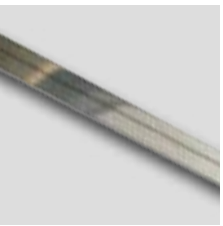
With the grooving unit type DNU two grooving units are connected in series.

The DNUU machines the surface from below and removes two lines of the coating. It is used when the groove has to be drawn in on the lower side of the strip surface.

- groove width: 3 mm
- groove depth: 0,1–0,2 mm
- n° of grooves: 1/machine
- speed: up to 300 m/min
- strip material: all machinable materials
- options: Lubrication systems
Special tool holder
Swarf blow-off
Swarf deflecting plates



Series TRINU



The TRINU series grooving machine works with three tools offset or simultaneously in broaching arrangement. Flexible three-axis adjustment and angle adjustment make it possible to drive a groove wider and/or deeper into the strip.

Up to three lines can be driven into the surface with a maximum spacing of 10 mm for three grooves and 20 mm for two grooves.

In addition to decoilers and recoilers, vertical and flat straightening machines, brushing machines and modules for strip edge processing, a TRINU grooving machine can be integrated into a surface processing plant.

- groove width: 20 mm
- groove depth: 0,01–1 mm
- n° of grooves: 3/machine
- speed: up to 300 m/min
- strip material: all machinable material
- options: Lubrication systems
Special tool holder
Swarf blow-off
Swarf deflecting plates

Example of use (pictures)

1. Grooving machine of the DNUU series for processing from below (picture 1)
2. Grooving machine NU flanged to a TRIO strip edge trimming machine (picture 2)
3. Grooving machine of the DNUU series (picture 3)
4. Grooving machine of the TRINU series for surface machining with three tools (picture 4)
5. Grooving line with two grooving machines of the TRINU series (picture 5)

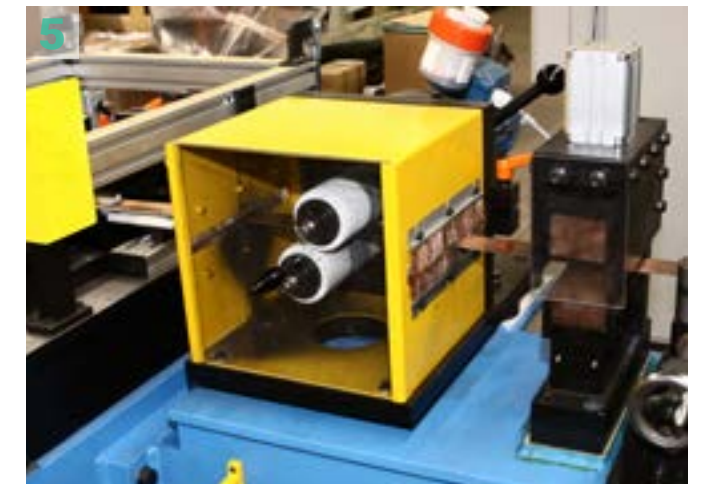
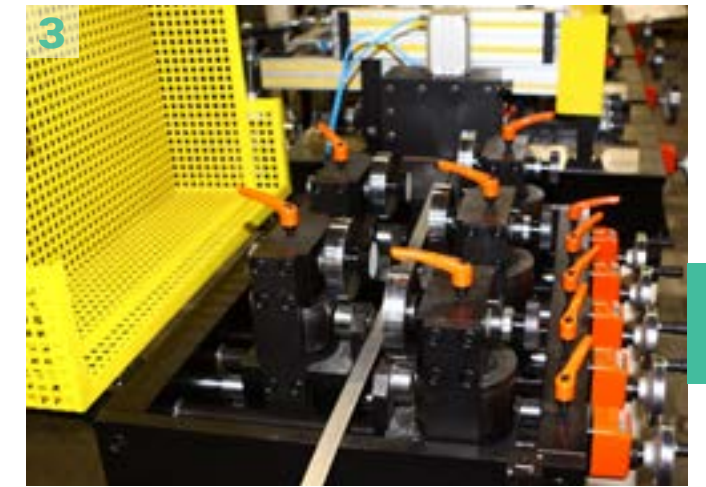
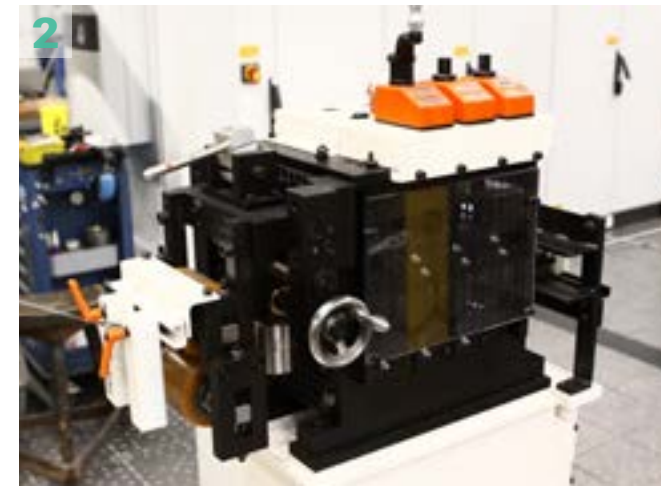
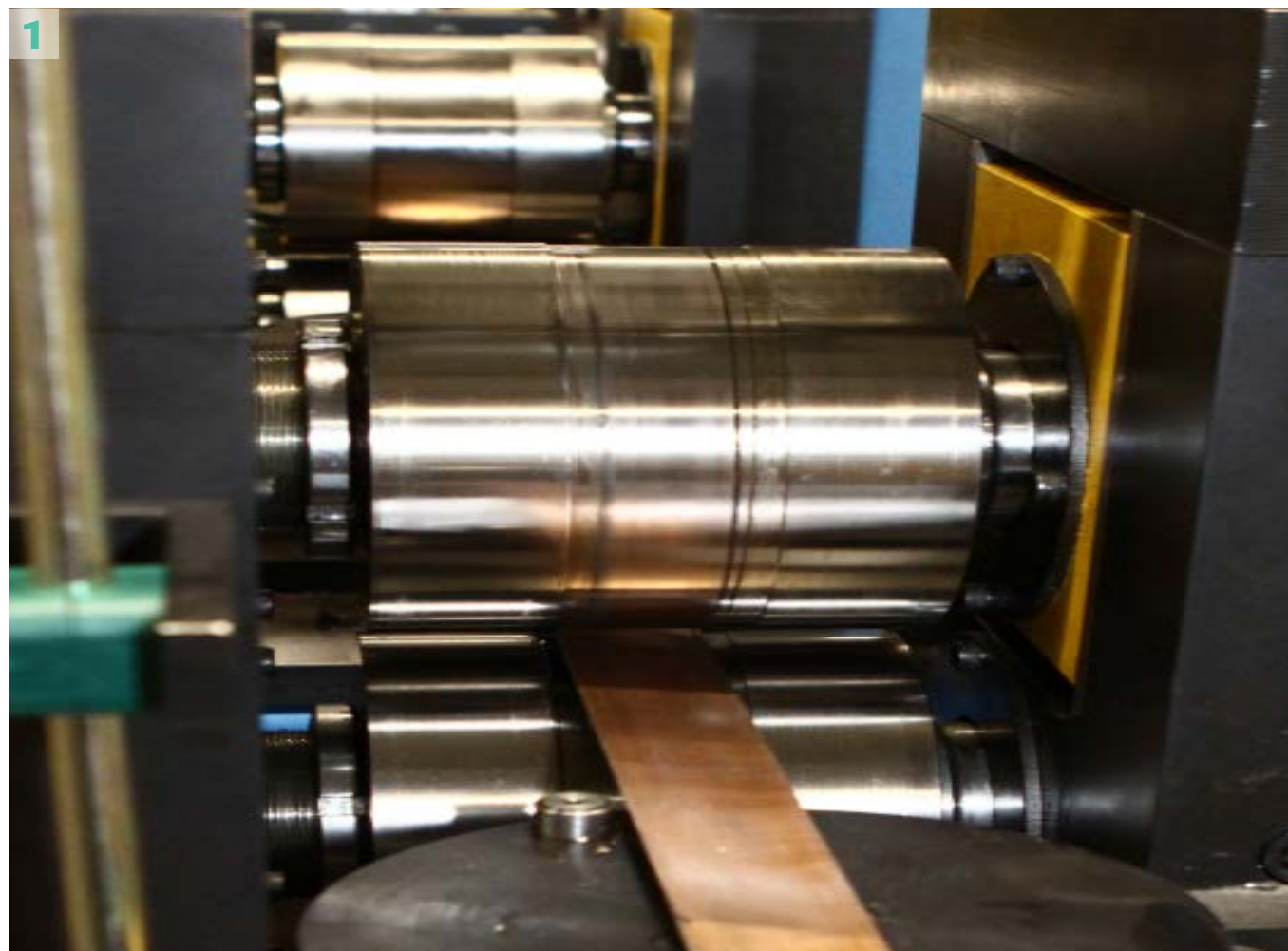
LEVELLING TECHNOLOGY

FOR STRIP PROCESSING LINES

CALIBRATING FLAT LEVELLING VERTICAL LEVELLING

For many work processes, such as edge or surface processing, the strip must be flat and straight.

Coil curvature and sabre must be straightened if further production processes are to be carried out optimally.



Calibrating

The aperture roller of the series FW is used to calibrate the strip thickness with an accuracy of $\pm 0,005$ mm (0.0002").

- strip width: max. 50 mm (1.97")
- strip thickness: max. 3 mm (0.12")

Flat levelling

The flat levelling machine of the series DRAP reduces the waviness of the strip and removes the coil set.

- strip width: up to 1500 mm (59.1") as a standard
- strip thickness: up to 6 mm (0.24")
- number and \varnothing of levelling rolls: variable
- options: drive system, supporting rolls, pinch rolls, alligator system and wipers

Examples of use (pictures)

1. FW double calibrating rolls (picture 1)
2. DRAP flat levelling machine (picture 2)
3. DRAP with alligator opening (picture 3)

Vertical levelling

The vertical levelling machine of the series HDR eliminates the edge bow of strips. It is designed for narrow strips with a corresponding thickness/width ratio.

- strip width: up to 50 mm (1.97") with a corresponding thickness/width ratio
- five sets of vertical levelling rolls
- five sets of positioning rolls

Brushing

The brushing machine of the series BS removes dirt particles from the strip surface.

- brush width: 70–500 mm (2.76"–19.69")
- brush- \varnothing : 70–250 mm (2.76"–9.84")
- number of brushes: 2
- power: 0,5/0,75/1,5 kW

4. HDR vertical levelling machine (picture 4)
5. BS brushing machine integrated into a strip processing line (picture 5)

REQUEST FOR QUOTATION

QUESTIONNAIRE FOR TECHNICAL DATA

Company	_____
Contact	_____
E-Mail	_____
Tel./Fax	_____

Please send a quotation for:

	MACHINES	PAGE
	STRIP EDGE TRIMMING MACHINE (to be integrated into an existing line) Strip width Strip thickness Strip material Required contour Decoiling speed Tensile strength	8-11
	STRIP EDGE TRIMMING FOR HEAVY -DUTY USE Strip width Strip thickness Strip material Required contour Tensile strength	16-17
	STRIP SURFACE MACHINING BY METAL-CUTTING Strip width Strip thickness Strip material Number of grooves required Width of the groove (s) Tensile strength	18-21