



SOPREM

SWISS QUALITY 

STRAIGHTENERS

STRIP STRAIGHTENERS

SOPREM strip straighteners ensure the quality of your products. They assure that the distorted steel strips are a thing of the past and that you get top products for optimum further processing regardless of the source material.

How do deviations in flatness occur?

Deviations in flatness can occur in machining processes such as punching, laser or plasma cutting, hardening, nibbling, shearing and coating. They are caused by a change in the inner material tension of the strip material during processing.

Your specifications are our benchmark

We manufacture the machine to suit your straightening quality requirements. Our product portfolio includes strip straighteners and part levellers. In many cases, the optimum straightening quality is determined in advance by straightening tests.

Strip spectrum

The following strips can be processed with our straighteners:

- Strips with a thickness from 0,05 to 14 mm
- Strips with a width from 5 to 600 mm
- Strips with an unlimited length

Materials

Steel, aluminium, copper, brass, precious metals, special alloys, bimetallic

Use

Apparatus construction, mechanical and vehicle engineering, strips for electrical engineering, for the building industry, sawing and cutting tools, perforated metal plates, etc.

> 01





>01 Strip feeding installation for fineblanking press

Decoiler, loading capacity 3000 kg, with hydraulic auxiliary motor, hydraulic pressing arm and driven roll, pneumatic disc brake, two bottom hydraulic coil supporting rolls, conical rolls for lateral strip guidance. Strip straightener with 11 straightening rolls for strip thickness range 3 to 14 mm, maximum passage width 300 mm. Hydraulic ventilation of the upper pinch rolls, motorised adjustment of the upper straightening rolls, hydraulic grabber arm for inserting of strip beginning. Modern control by means of a touch panel.

>02 Strip Straightener with 9 straightening rolls

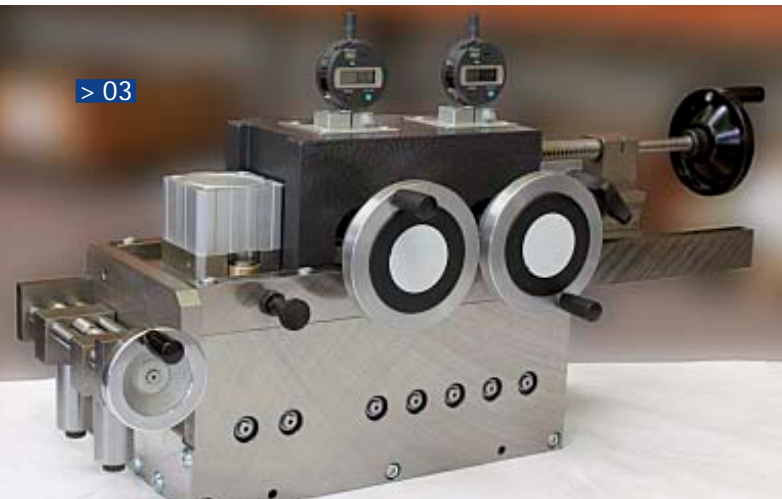
This machine enables straightening of strips with material thicknesses of 0,25 to 3,5 mm, the maximum passage width is 160 mm and the roll diameter 44 mm. As an option, the upper rocker can be pulled out in longitudinal direction which simplifies cleaning of the straightening rolls. Equipped with ultrasonic loop control.

Facts, area of application

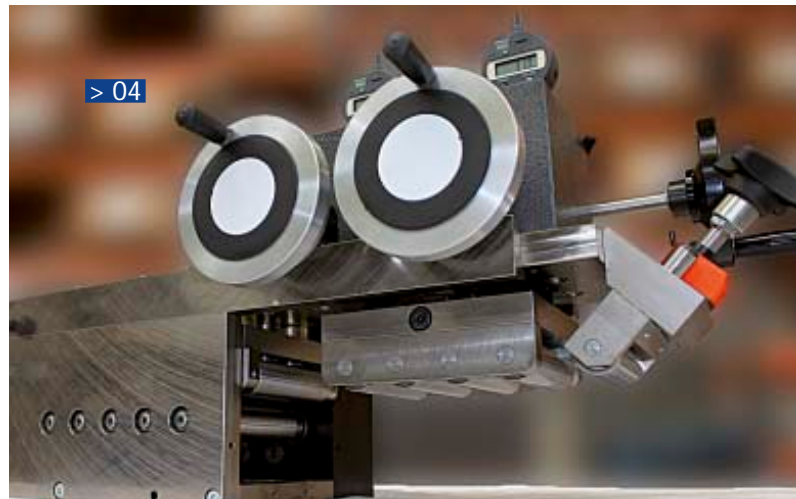
- Medium straightening of strips with average material thickness
- Preservation of the material surface stiffness due to larger bending radius
- Apparatus construction, automotive industry, general metalworking, stamp bending, drop-through stamping, fineblanking

In detail

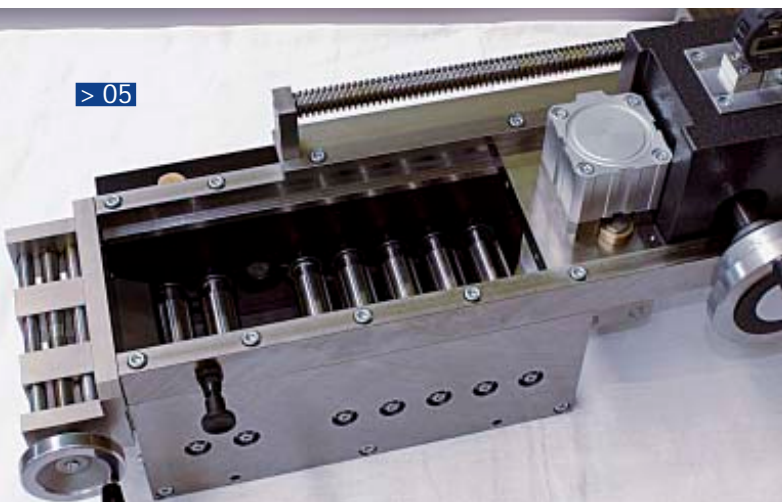
The lower straightening rolls are driven by a gear, the upper rolls are freewheeling. This results in greater roll axis spacings and larger bending radii. An individually adjustable, upper correction roll can be fitted optionally to the straightener outlet, this enables straightening of the run of the strip.



> 03



> 04



> 05



> 06

> 03 Rocker

The rocker is the tool of the straightener, its precision and rigidity are decisive for the quality and result of the straightening process.

> 04 Longitudinal inclination of the rocker

Most material bending will occur at the straightener inlet where the material becomes ductile. Longitudinal inclination of the rocker is achieved by using a hand operated or motor driven spindle lifting element.

> 05 Extendible rocker

As an option, the upper rocker can be designed extendible, this allows free access for cleaning the straightening rolls.

> 06 Additional correction roll

An upper, additional and individually adjustable straightening roll can be fitted optionally at the straightener outlet. This additionally influences the straightening result and optimises the running direction of the strip.

Combined machines

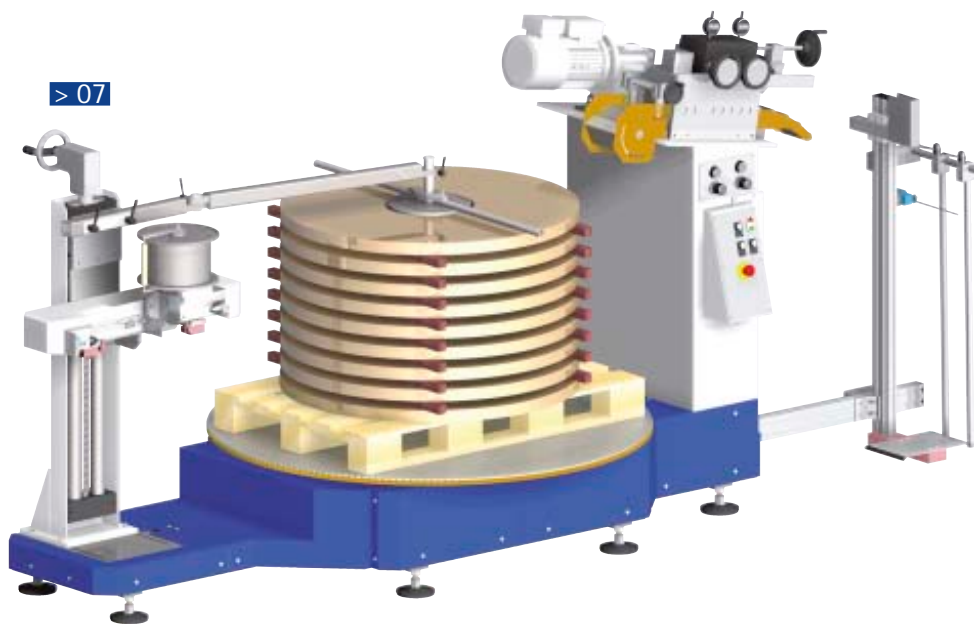
SOPREM'S compact, combination equipment is the ideal solution where space in your production hall is confirmed. We combine the decoiler with the straightener in a strip feeding system.

> 07 Pallet Decoiler-Straightener

Pallet decoiler with linear, horizontal conveying- and detecting pulley. Straightener with 9 straightening rolls for medium straightening results, ultrasonic loop control system.

> 08 Decoiler-Straightener

Motorised vertical decoiler with precision mandrel. Precision straightener with 19 straightening rolls for precision straightening results.



> 09 Precision strip Straightener with 19 straightening rolls

For straightening of strips with material thicknesses of 0,2 to 0,7 mm, the maximum passage width is 450 mm and the roll diameter 16 mm. The upper rocker can be inclined in longitudinal and transversal direction. Equipped with ultrasonic loop control.

Facts, area of application

- Fine straightening of strips with low material thickness but big width
- Apparatus construction, air conditioning technology

In detail

Every straightening roll is driven by a gear. Roll axis spacings for optimal straightening geometry. Material tensions are considerably reduced and evenly distributed, a prerequisite for low-tension further processing.





Strip Straightener with 19 straightening rolls

> 10 Rocker

The rocker is the tool of the straightener, its precision and rigidity are decisive for the quality and result of the straightening process.

> 11 Transversal inclination of the rocker

Wavy edges and slight sword shape of the strips can be eliminated by transversal inclination of the upper rocker.

> 12 Longitudinal inclination of the rocker

The greatest alternate bending will occur at the straightener inlet where the material becomes ductile. Longitudinal inclination of the rocker is achieved by using a hand operated or motor driven spindle lifting element.

> 13 Extendible rocker

The lower part of the straightener can be pulled out by means of a drawer system to clean the straightening rolls. This provides free access to the straightening rolls and backup roll modules.

> 14 Precision strip Straightener with 19 straightening rolls

This machine enables straightening of strips with material thicknesses of 0,07 to 0,9 mm, the maximum passage width is 120 mm and the roll diameter 9 mm. The upper rocker can be inclined in longitudinal and transversal direction. Equipped with ultrasonic loop control.

Facts, area of application

- Precision straightening of strips with low material thickness
- Clock and watch industry, steelworks, solar industry

In detail

Every straightening roll is driven by a cardan shaft. Very small roll axis spacings and bending radii and therefore optimal straightening geometry.

> 15 Strip rewinding installation

This automatic strip rewinding installation produces flat strips with a thickness of 0,05 mm and performs high-precision decoiling, straightening and coiling. Rewinding takes place in top quality and at high speed.

> 14



> 15



> 16



> 17



> 18



> 19



Options

> 16 Opening of upper rocker

Hinged upper part of the straightener for better access for straightening rolls cleaning.

> 17 Hard chrome plated rolls

Hard chrome plated straightening and pinch rolls, 68 – 72 HRC with superfinish to increase the wear resistance and avoid material deposits. Recommended for processing aluminium and copper as well as materials with sensitive surfaces.

> 18 Medium straightening of thin strips

Straightener with 17 hardened, ground and hard chrome plated straightening and pinch rolls. Multiple backup rolls for all straightening rolls. Straightening depth display by two analogue dials. Strip thickness range 0,05 - 0,6 mm, maximum passage width 60 mm.

> 19 Bending device for strips with cross-bow

A bending device can be mounted at the outlet of a straightener for strips with strong cross-bow (roof tile effect). The roll geometry is adapted to the strip width ratio here. A straightening test is called for in most cases.



Strip Straightener with 7 straightening rolls

> 20 Combined strip straightening-decoiling line

This machine enables straightening of strips with material thicknesses of 0,4 to 7,0 mm, the maximum passage width is 300 mm and the roll diameter 80 mm. The straightening depth setting of the three upper straightening rolls is made individually with an Allen key. Elements at the straightener inlet: Hydraulic insertion aid, symmetrically adjustable lateral strip guidance by means of crank handle. Elements at the straightener outlet: Hydraulic strip transfer table, roller basket with adjustable geometry.

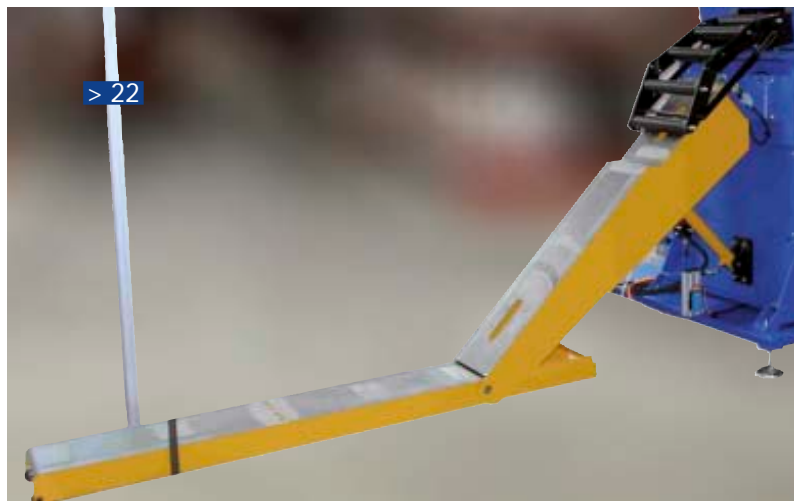
Equipped with ultrasonic loop control. Decoiler, loading capacity 6500 kg, with auxiliary drive, pneumatic safety brake, pressing arm and coil loading cart.

Facts, area of application

- Rough straightening of strips of medium to large material thickness
- Fineblanking, stamp bending, drop-through stamping

In detail

The lower straightening rolls are driven by a gear, the upper rolls are freewheeling. Straightener opening by pneumatic cylinders is available as an option for easier cleaning of the straightening rolls.



Options

> 21 Strip insertion aid

Hydraulic strip insertion aid equipped with extendible pick-up pin, pivotable table and upper pressing roll for introducing the strip beginning into the straightener.

> 22 Conveying table

Hydraulically operated transfer table with hinged steel bridge parts and integrated roller basket, the geometry of which adapts automatically to the position of the transfer table.

> 23 Lateral strip guidance

Unit mounted at the straightener inlet consisting of two vertical, hardened and grounded guide rolls, symmetrically adjustable by hand wheel. Mechanical counter for strip width reading.

> 24 Straightener opening

For easier cleaning of the straightening rolls, straightener opening by means of pneumatic cylinders is available to ensure better accessibility.

Straightening rolls	Thickness range	Maximum passage width	Maximum straightening performance
Precision straightening			
19 × Ø 6 mm	0,05 – 0,6 mm	85 mm	0,2 × 85 mm
19 × Ø 9 mm	0,07 – 0,9 mm	120 mm	0,4 × 120 mm
19 × Ø 12 mm	0,1 – 1,5 mm	160 mm	1,2 × 160 mm
19 × Ø 16 mm	0,2 – 2,0 mm	160 mm	1,5 × 160 mm
19 × Ø 16 mm	0,2 – 2,0 mm	250 mm	1,0 × 250 mm
19 × Ø 16 mm	0,2 – 2,0 mm	350 mm	0,8 × 350 mm
19 × Ø 25 mm	0,3 – 3,3 mm	200 mm	2,0 × 200 mm
19 × Ø 25 mm	0,3 – 3,3 mm	350 mm	1,2 × 350 mm
19 × Ø 25 mm	0,3 – 3,3 mm	450 mm	0,9 × 450 mm
19 × Ø 35 mm	0,5 – 4,2 mm	350 mm	3,1 × 350 mm
19 × Ø 35 mm	0,5 – 4,2 mm	450 mm	2,8 × 450 mm
Precision straightening			
17 × Ø 10 mm	0,05 – 0,6 mm	60 mm	0,3 × 60 mm
9 × Ø 25 mm	0,1 – 1,0 mm	100 mm	1,0 × 100 mm
9 × Ø 25 mm	0,1 – 1,0 mm	160 mm	0,8 × 160 mm
9 × Ø 32 mm	0,15 – 2,3 mm	100 mm	2,2 × 100 mm
9 × Ø 32 mm	0,15 – 2,3 mm	160 mm	2,0 × 160 mm
9 × Ø 32 mm	0,15 – 1,8 mm	250 mm	1,2 × 250 mm
9 × Ø 32 mm	0,15 – 1,4 mm	350 mm	1,0 × 350 mm
9 × Ø 44 mm	0,25 – 4,2 mm	100 mm	4,0 × 100 mm
9 × Ø 44 mm	0,25 – 3,5 mm	160 mm	3,0 × 160 mm
9 × Ø 44 mm	0,25 – 2,8 mm	250 mm	2,4 × 250 mm
9 × Ø 44 mm	0,25 – 2,5 mm	350 mm	1,6 × 350 mm
11 × Ø 50 mm	0,15 – 4,0 mm	200 mm	3,9 × 200 mm
11 × Ø 50 mm	0,15 – 4,0 mm	300 mm	2,8 × 300 mm
11 × Ø 50 mm	0,15 – 3,0 mm	500 mm	1,7 × 500 mm
11 × Ø 80 mm	0,4 – 7,0 mm	300 mm	4,8 × 300 mm
11 × Ø 80 mm	0,4 – 5,4 mm	500 mm	3,8 × 500 mm
11 × Ø 90 mm	0,5 – 8,0 mm	300 mm	7,2 × 300 mm
11 × Ø 90 mm	0,5 – 8,0 mm	500 mm	5,0 × 500 mm
Rough straightening			
5 × Ø 40 mm	0,2 – 3,0 mm	130 mm	2,6 × 130 mm
5 × Ø 40 mm	0,2 – 2,5 mm	300 mm	1,2 × 300 mm
5 × Ø 40 mm	0,2 – 2,0 mm	500 mm	0,9 × 500 mm
7 × Ø 50 mm	0,15 – 4,0 mm	200 mm	3,9 × 200 mm
7 × Ø 50 mm	0,15 – 4,0 mm	300 mm	2,8 × 300 mm
7 × Ø 50 mm	0,15 – 3,0 mm	500 mm	1,7 × 500 mm
7 × Ø 80 mm	0,4 – 7,0 mm	300 mm	4,8 × 300 mm
7 × Ø 80 mm	0,4 – 5,4 mm	500 mm	3,8 × 500 mm
7 × Ø 90 mm	0,5 – 8,0 mm	300 mm	7,2 × 300 mm
7 × Ø 90 mm	0,5 – 8,0 mm	500 mm	5,0 × 500 mm

PART LEVELLERS

SOPREM part levellers ensure the quality of your products. They assure that the distorted metal parts are a thing of the past and that you get top products for optimum further processing, regardless of the source material.

How do deviations in flatness occur?

Deviations in flatness can occur in machining processes such as punching, laser or plasma cutting, hardening, nibbling, shearing and coating. They are caused by a change in the inner material tension of the part during processing.

Your specifications are our benchmark

We manufacture the machine to suit your straightening quality requirements. Part levellers are available at our factory to determine the quality of straightened parts for you in straightening tests.

Parts spectrum

The following parts can be processed with the part levellers from SOPREM:

- Parts with a thickness from 0,05 to 6 mm
- Parts with a width from 5 to 630 mm

Materials

Steel, aluminium, copper, brass, precious metals, special alloys, bimetallic

Use

Parts for apparatus construction, mechanical and vehicle engineering, parts for electrical engineering, for the building industry, sawing and cutting tools, weaving blades, perforated metal plates, etc.

> 01



> 02



> 03



>01 SCHUBERT design

SOPREM builds levellers in SCHUBERT design and equips them with state-of-the-art drive and control technology. We offer retrofits for older lines and keep a wide range of spare parts.

In detail

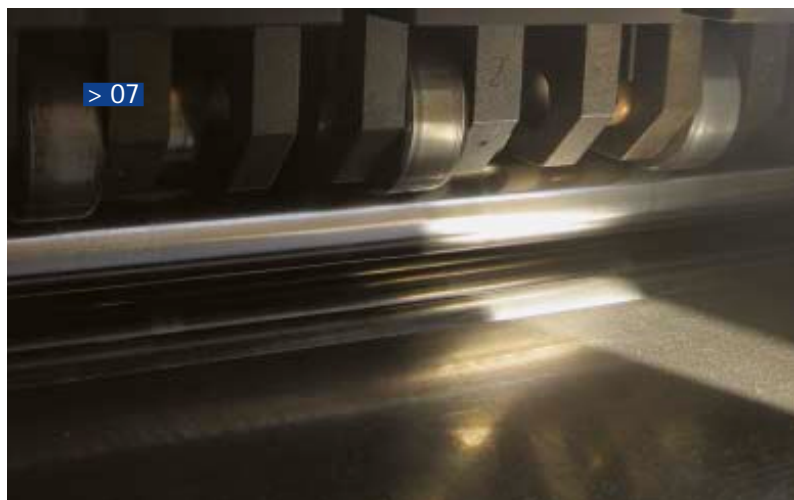
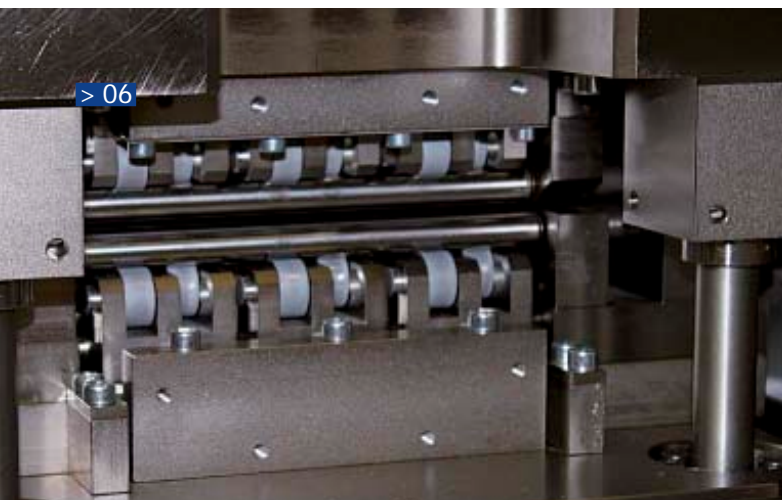
A wide part thickness range can be covered. Every straightening roll is driven by a cardan shaft. This reduces the roll axis spacings to a minimum and allows even small parts to be straightened. Material inner tensions are considerably reduced and evenly distributed, a prerequisite for low-tension further processing.

> 02 Part Leveller with 19 straightening rolls

Machine with a roll diameter of 6 mm, enables straightening of material thicknesses from 0,05 to 1,0 mm. The standard equipment includes a conveyor belt at the inlet and a slide at the outlet of the unit. We also offer you automatic feeding and automatic discharge of parts as options.

> 03 Part Leveller with 19 straightening rolls

Machine with a roll diameter of 18 mm, enables straightening of material thicknesses from 0,15 to 3,0 mm. The standard equipment includes a conveyor belt at the inlet and a slide at the outlet of the unit. We also offer you automatic feeding and automatic discharge of parts as options.



> 04 Rocker

The rocker is the tool of the straightener, its precision and rigidity are decisive for the quality and result of the straightening process. The rocker is set and thus the straightening rolls positions by a hand operated or motor driven spindle lifting element.

> 05 Drive

Speed-controlled drives are used as a rule. The power is transferred to a distributing gear by a toothed belt, here, every straightening roll is driven by a cardan shaft and very low roll axis spacings are therefore possible.

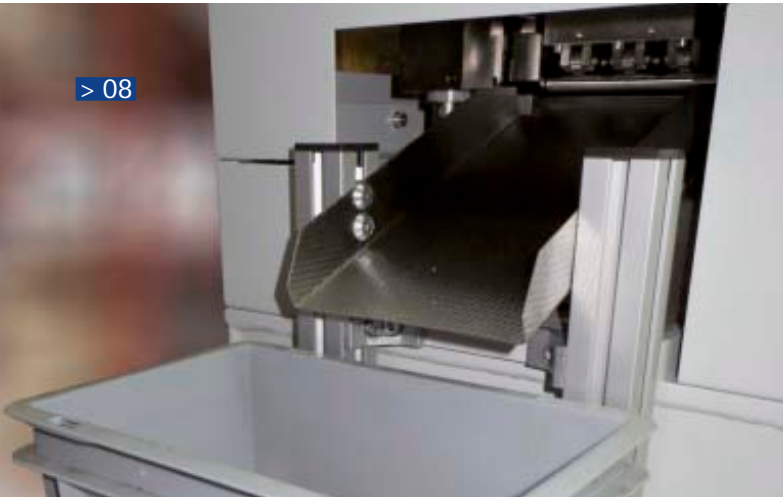
> 06 Backup of the straightening rolls

A constant straightening gap profile is achieved by supporting the straightening rolls by means of backup rolls. This avoids bending during the straightening process. Both the straightening rolls and the backup rolls can be serviced or replaced in a very short time.

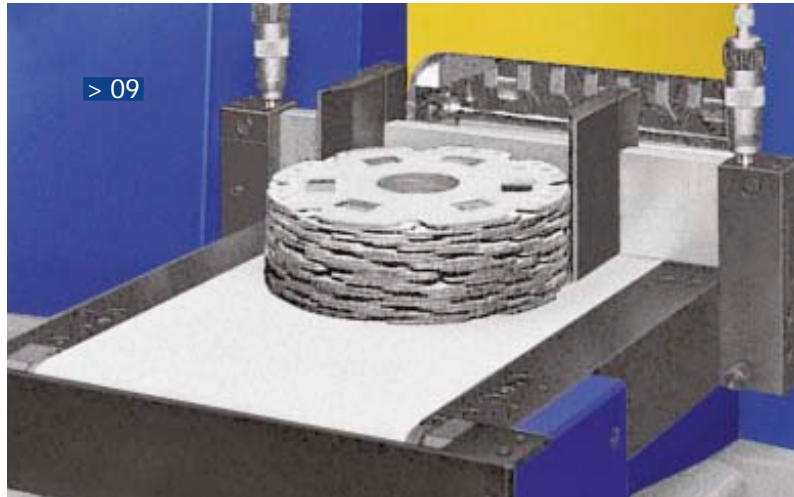
> 07 Height-adjustable support of the straightening rolls

As an option, we can design the backup rolls of the lower straightening roll module with individual height adjustment which leads to bending of the roll. Medium waviness is also eliminated in this way. Motor driven engagement is also possible. However, this option is only available for wide models and on request. Backup cylinders with a spiral groove are available as a further option, the grooves feeds out the dirt on the straightening rolls.

> 08



> 09



> 10



> 11



> 08 Straightener outlet

The figure shows a part slide with receptacle.

> 09 Inlet transport with singling

An inlet transport belt with singling can be fitted at the straightener inlet. The workpiece at the bottom is fed to the machine by a transport belt under a height-adjustable rail.

> 10 Rotary table

Since parts usually have to be corrected in two directions, the rotary table is indispensable for large quantities. The parts are turned 90° on the roller track and fed to the straightener.

> 11 Counter and measuring device

Outlet transport with counter and measuring device for straightened products.



> 12



> 13



> 14



> 15

> 12 Inlet transport belt

The equipment for the inlet transport of parts usually consists of a conveyor belt as shown in the figure.

> 13 Four-point setting

All part levellers are equipped with a four-point control. This allows longitudinal and transversal inclination of the rocker.

> 14 Infeed table

The infeed table can be equipped with a light barrier at the straightener inlet to prevent accidents.

> 15 Stacking table

The straightener can be equipped with a pivotable stacking table at the outlet.

Straightening rolls	Thickness range	Maximum passage width	Maximum straightening performance
19 × Ø 6 mm	0,05 – 1,0 mm	85 mm	0,4 × 85 mm
19 × Ø 9 mm	0,07 – 1,5 mm	120 mm	0,8 × 120 mm
19 × Ø 12 mm	0,1 – 2,0 mm	150 mm	1,0 × 150 mm
19 × Ø 12 mm	0,1 – 2,0 mm	250 mm	0,7 × 250 mm
19 × Ø 12 mm	0,1 – 2,0 mm	400 mm	0,6 × 400 mm
19 × Ø 12 mm	0,1 – 2,0 mm	600 mm	0,5 × 600 mm
19 × Ø 18 mm	0,15 – 3,0 mm	130 mm	1,7 × 130 mm
19 × Ø 18 mm	0,15 – 3,0 mm	220 mm	1,4 × 220 mm
19 × Ø 18 mm	0,15 – 3,0 mm	400 mm	1,0 × 400 mm
19 × Ø 18 mm	0,15 – 3,0 mm	600 mm	0,8 × 600 mm
19 × Ø 24 mm	0,2 – 4,0 mm	260 mm	1,7 × 260 mm
19 × Ø 24 mm	0,2 – 4,0 mm	450 mm	1,3 × 450 mm
19 × Ø 24 mm	0,2 – 4,0 mm	650 mm	1,1 × 650 mm
23 × Ø 30 mm	0,3 – 6,0 mm	350 mm	4,7 × 350 mm
23 × Ø 30 mm	0,3 – 6,0 mm	650 mm	3,5 × 650 mm

STRAIGHTENING TESTS

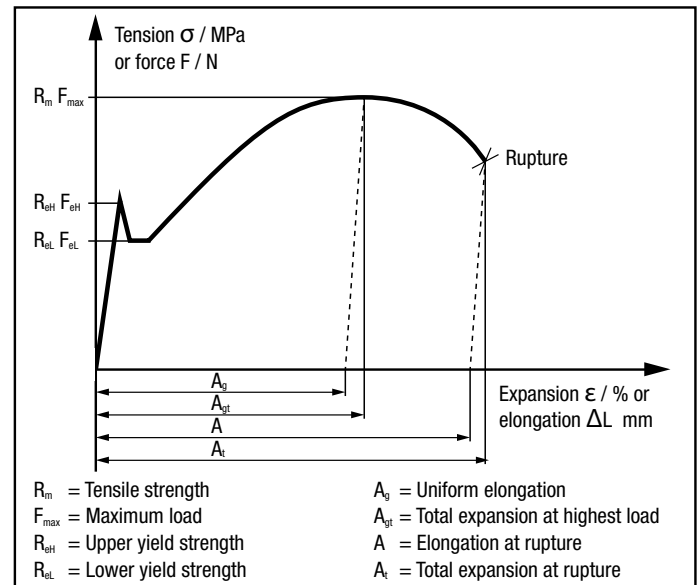
Straightening tests as a first step

With the straightening test we ensure that you can achieve the desired result with a machine. Because every case is different: The combination of your straightening quality requirements with the material quality, the inner tension and the specific surface properties of a work piece is almost always unique and makes the straightening test indispensable. In this way, we determine the optimum straightening process and ensure that the strip is straightened in the desired quality and retains its new form.

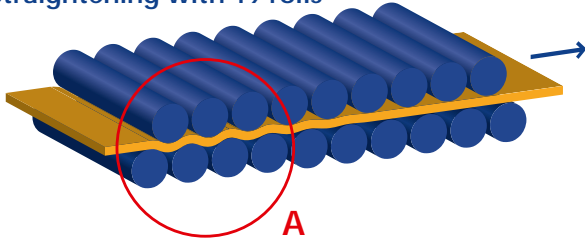
Our experts determine the most suitable straightener size and straightening geometry. The diameter of the straightening rolls, the distance between the straightening rolls, their surface condition and the stiffness of the machine influence the straightening result. Our wide range of straighteners is listed in the two schedules in this brochure.

Tension-expansion diagram

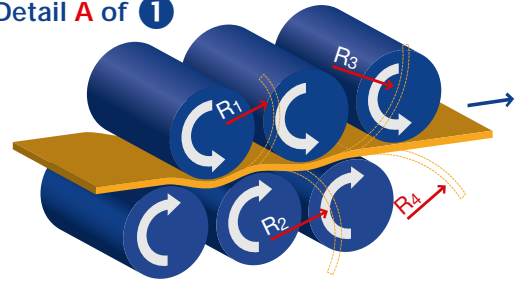
Plastic deformation of the material is important when straightening. If you only work in the elastic zone, the material will roughly adopt its original condition again after the straightening process.



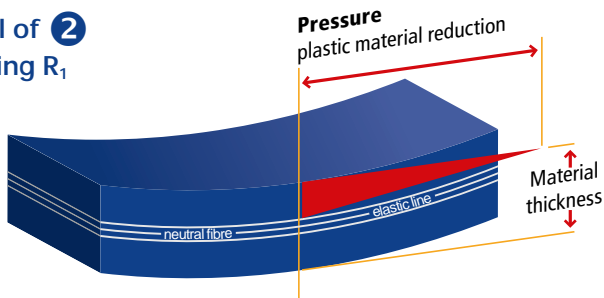
1 Straightening with 19 rolls



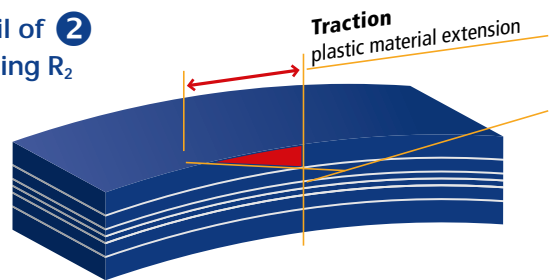
2 Detail A of 1



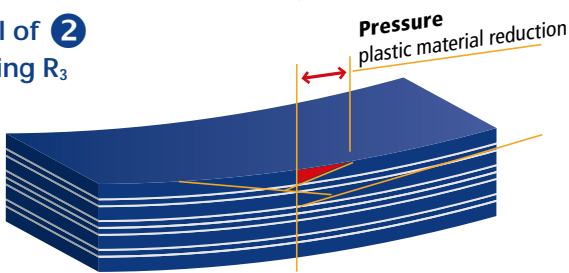
Detail of 2 Bending R_1



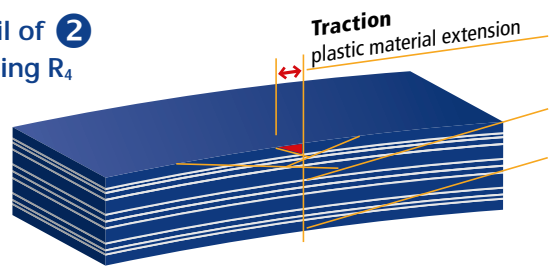
Detail of 2 Bending R_2



Detail of 2 Bending R_3



Detail of 2 Bending R_4



PRECISION STRAIGHTENING FOR HIGH COST EFFECTIVENESS

The advantages at a glance

- Material tensions are considerably reduced and evenly distributed, a prerequisite for low-tension further processing.
- Precision straightening will reduce interruptions and downtime during production, installation and further processing.
- Reduction of the processing complexity for components which have to be processed subsequently.
- Precision straightening provides the basis for high quality and cost effective welded connections.
- Supporting of the production accuracy.
- Precision straightening does away with visible bending and undulation of components.

Effects in the straightening process

Highest flatness accuracy and reduction of the material inner tensions can be achieved by precision straightening. Each of the driven straightening rolls adjusts the strip by alternate bending. To achieve this, the upper and lower row of rolls is staggered and form wedge-shaped profiles which open in the feed direction. Most material bending will occur at the inlet where the material becomes ductile. Depending on the range between the upper and lower yield point, the plastic deformation takes place, more or less material inner tension can be achieved. As the optimum straightening quality can only be found empirically, our experts will analyse your requirements first and then find the most suitable solution in a straightening test.

SOPREM Automation AG
Schlettstadtstrasse 4
CH-2540 Grenchen
Switzerland
Tel. +41 32 644 35 35
Fax +41 32 644 35 11
www.soprem.ch
info@soprem.ch