ROLL REDUCING MILL

WATCH THE VIDEOS

After filling, the elements are reduced to increase the density of the MgO.

The roll reducer machine is designed to allow for tubular heating elements to be reduced in diameter, and for them to have a greater compression of the MgO and elongation.

These machines feature interchangeable V-inserts that have the roll stands and rolls pre-mounted and set for a particular reduction. This provides for very fast changeover times.
The maximum starting tube diameter is 16 mm when using carbide rolls and 19 mm when using tool steel rolls. Carbide rolls are slightly more expensive than tool steel rolls but their life expectancy is 3-4 times longer.

The standard speed of these machines is approximately 20 meters/min
The sturdy mechanical structure, the bearing box assembly, the straight in-line connection between the gearboxes - rolls and the low noise-level of the machine make this machine one of the best-in-class.

Our reducing rolling mill can be equipped with automatic feeding equipment, a marking device and a lay-off table.

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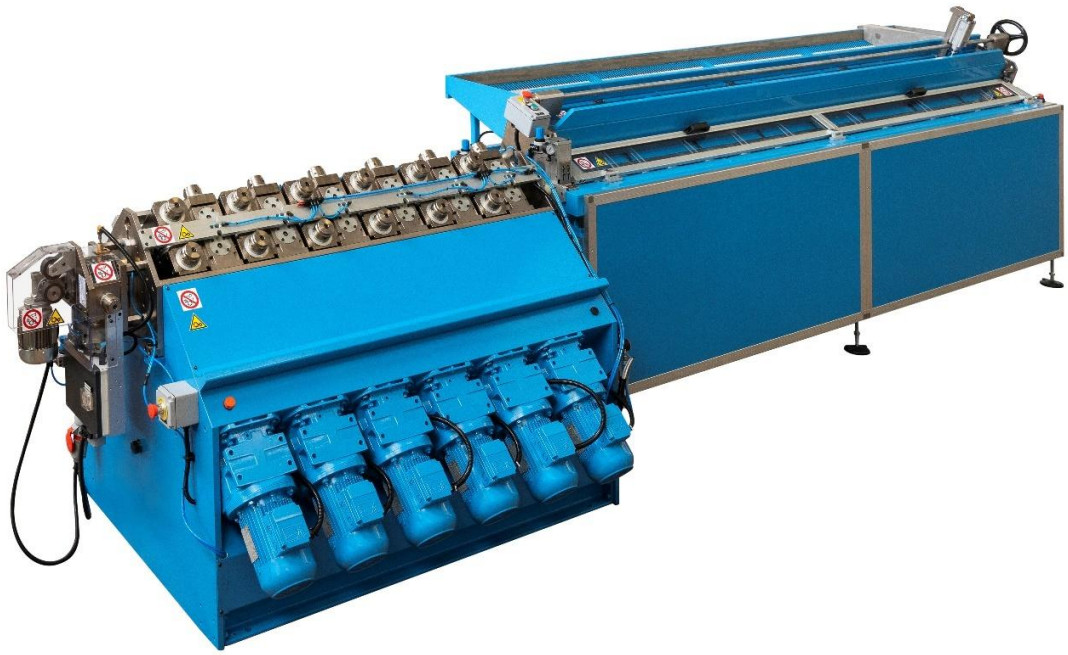


Figure 1: 12-stand roll reducing mill with lubricating system, marking system and table feeder

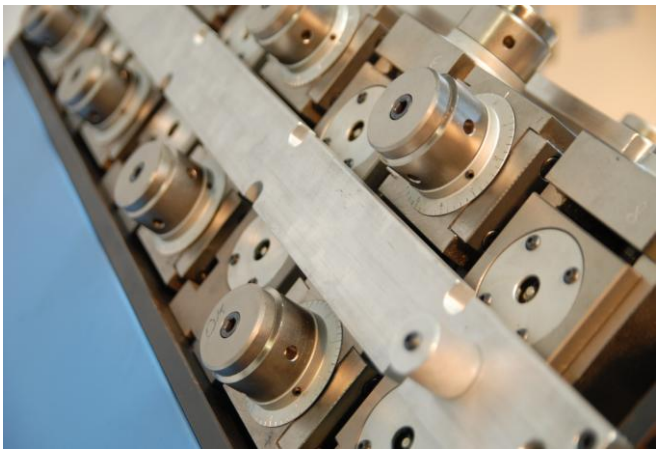
ADVANTAGES

QUICK CHANGE BETWEEN TUBE SIZES THANKS TO THE EXCHANGEABLE BEARING BOX

Our reducing rolling mills contain a number of individually driven pairs of rolls, mounted in a V-shaped bearing box assembly. Each pair of rolls is connected through two universal joints to a gearbox and a constant torque asynchronous motor.

The single unit bearing box assembly can easily be removed from the driving system by releasing the universal joints and four screws.
With a second bearing box assembly, change from one tube diameter to another is much simplified. Changeover time is approximately 30 minutes as opposed to six hours or more for changing a complete set of rolls.

LONG LIFE ROLLS



Roll pass design is principally “oval to oval” with the same degree of reduction in each pair of rolls, and circular grooves in the last two pairs give the tubes a round shape after reduction.

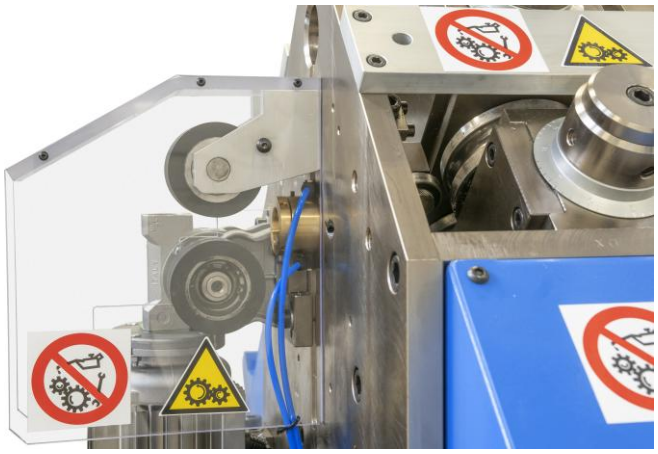
Rolls are manufactured of hardened alloyed steel or of steel with sintered carbide rings. Sintered carbide rolls offer up to 4 times longer service than steel rolls. Consequently, it is advisable to order sintered carbide rolls for frequently occurring tube sizes.

STURDY MECHANICAL STRUCTURE

- No pounding or vibration, causing off-centre coils
- Smooth, continuous, one-step reduction
- Reliable design: straight in-line connection (universal joints) between the gearboxes – rolls
- Roll locking system which ensures that the rolls do not become loose while rolling

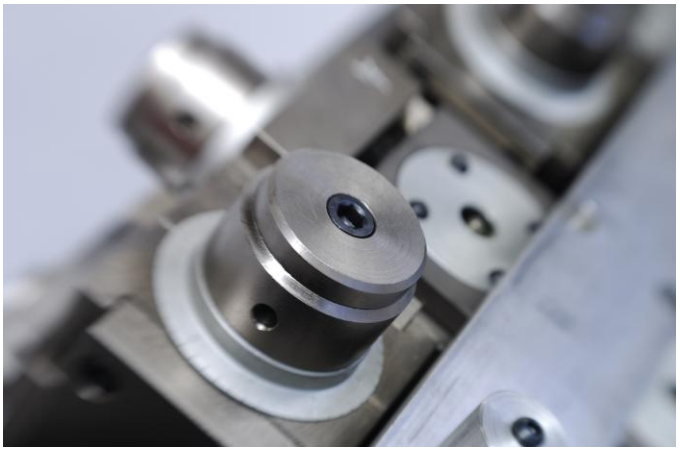
SILENT OPERATION

Low noise-level of the machine



QUALITY

- Straighter elements
- Accurate and consistent diameters



MANY OPTIONS AVAILABLE

- Auxiliary equipment available
- Automation in line possible

GENERAL CHARACTERISTICS

The roll reducing mill consists of:

- machine stand with motors and gear boxes
- transmission shafts
- bearing box assembly with rolls (tool steel or tungsten carbide)
- simpler type of straightening device (other straighteners available on request)

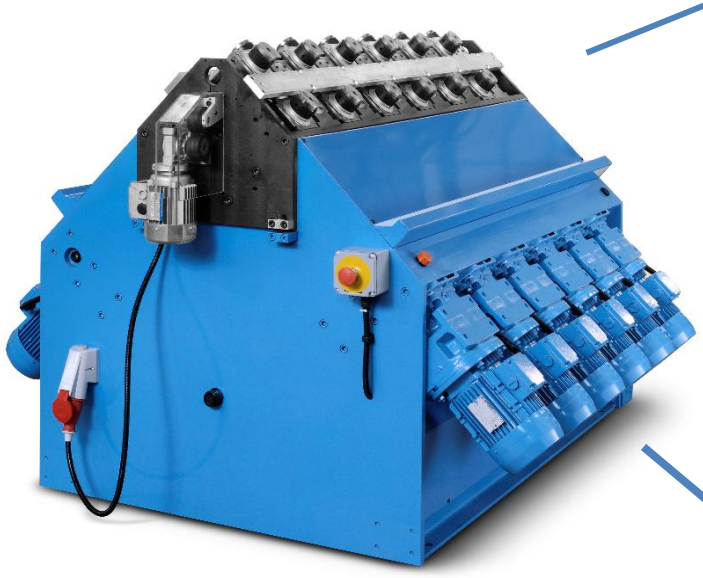
The gear box shafts are connected by transmission shafts. The bearing box assembly is prepared for a specific diameter to diameter reduction. Changing bearing box assembly, in order to change to a new dimension, is made in approximately 30 minutes.

The rolls are made by either tool steel or tungsten carbide. All rolls have the same diameter. The profile of the rolls has been designed so as to avoid “creases”, which usually form at the ends of the elements.

A guide bushing is placed between each pair of rolls ensuring the passage of the heating elements during the rolling process from one roll to the next one.

After the last pair of rolls, the tubes pass a roll-straightener (“Turk’s head”).

A system of motor driven rubber rolls, placed outside the mill, draw the tubes out of the mill.



Two families of roll reducers are available:

FIXED SPEED
Roll reducing mill with rolls having the same rotation speed
Each pair of rolls is driven by a motor/gearbox with a fixed speed.

VARIABLE SPEED
Roll reducing mill with individual speed control for each pair of rolls
Possibility to program the rotation speed for each pair of rolls by means of frequency inverters, depending on the elongation of the elements.
This solution allows to set the machine for different tube materials. Five set up programs scales of roll speed are available
Each pair of rolls will have a speed corresponding to the elongation of the tube, depending on the tube material.
Having control of the speed of each roll station it is possible to match as closely as possible the elongation occurring. This means that there is less friction between rolls and tube, and therefore less heat generated by friction. As a result, the rolls last longer and the elements exit straighter.
The advantages of the version with programmable speed are the following:

- Proportional speed variation as a function of resistance elongation
- Absence of "sliding" of the rollers on the tube: this increases the linearity of the elements and limits the wear of the rollers
- Possibility of storing speed ranges of the rollers for tubes made of different materials and having therefore different elongation
- Greater straightness of the heating element

Figure 2: Control panel of the rolling mill with variable speed

TECHNICAL CHARACTERISTICS

Material of tube to be reduced		Stainless steel, copper
Min. length of heating element	mm	250*
Tolerance on heating element diameter after diameter reduction (new rolls)	mm	±0.05
Rolling axis height from base	mm	915
Power supply	V	to be defined
Dimensions		
• 8 station roll reducing mill - weight 1200 Kg	mm	1350 x 1700 x 1130 h
• 12 station roll reducing mill weight 1800 kg	mm	1670 x 1700 x 1130 h
Reduction in the area of the section (up to)	%	30 (8 station roll reducing mill)
	%	35 (12 station roll reducing mill)
Speed		See available versions

* When the roll reducing mill is equipped with a marking device or with a marking device + lubricating system with a spray nozzle, the minimal length increases as follows:

- minimal length of the heating element if the roll reducing mill is equipped with a marking device: 350 mm
- minimal length of the heating element if the roll reducing mill is equipped with the marking device and the lubricating system with the spray nozzles: 420 mm

Note:

The minimum safety distance between tubes should be one third of the element length, in order to make place for elongation. If this is not respected, a failure may occur which may result in bent shafts, cracked bearings or cracked rolls (carbide rolls).
The capacity (elements per hour) can be estimated to: rolling speed / (element length + safety distance).
For example the rolling mill mod. 140/08.A00000 has a rolling speed of 20 m/min. When rolling 1000 mm long elements and keeping 333 mm safety distance, the capacity is 20 m/min / 1,333 m = 15 elements/ minute = 900 elements per hour

Figure 3: 12-stand roll reducing mill with individual speed control for each pair of rolls and lubricating system

AVAILABLE VERSIONS

The maximum recommended reduction in area for the 8-station machine is 30% of the starting area, and for the 12-station machine, this is increased to 35%.

8-station roll reducing mill

The 8-station version has 8 pairs of rolls, of which six have reducing function and two have calibrating function.

Model	Speed		Material of the rolls	Motors	Max tube Ø	Inst. power
		m/min.		hp	mm	kVA
140/08.A00000	Fixed	20	Tool steel	1	12	13,0
140/08.W00000	Fixed	20	Tungsten carbide	1	12	13,0
142/08.A20000	Variable	0-22	Tool steel	1	12	17,3
142/08.W20000	Variable	0-22	Tungsten carbide	1	12	17,3

12-station roll reducing mill

The 12-station version has 12 pairs of rolls, of which ten have reducing function and two have calibrating function.
The advantages of the 12-station rolling mill compared to the 8-station version are:

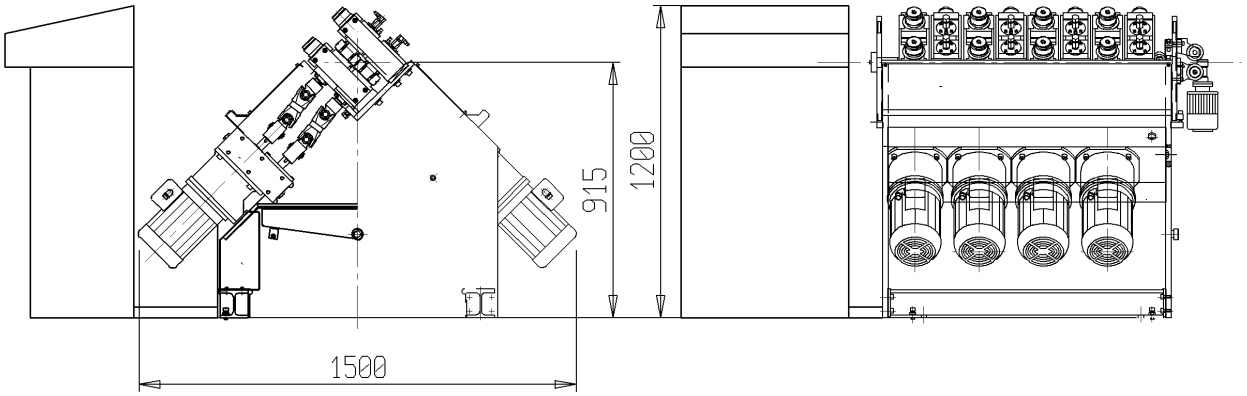
- Lower reduction requirement in each pair of rolls reduces wear, improving rolls' life
- The reduction of the area can be increased to 35% without risk of longitudinal fins on the tubes.
- In lower diameter reductions it is easier to obtain a correct setting of individual pairs of rolls compared to corresponding 8-station version settings.
- Tube straightness is improved.

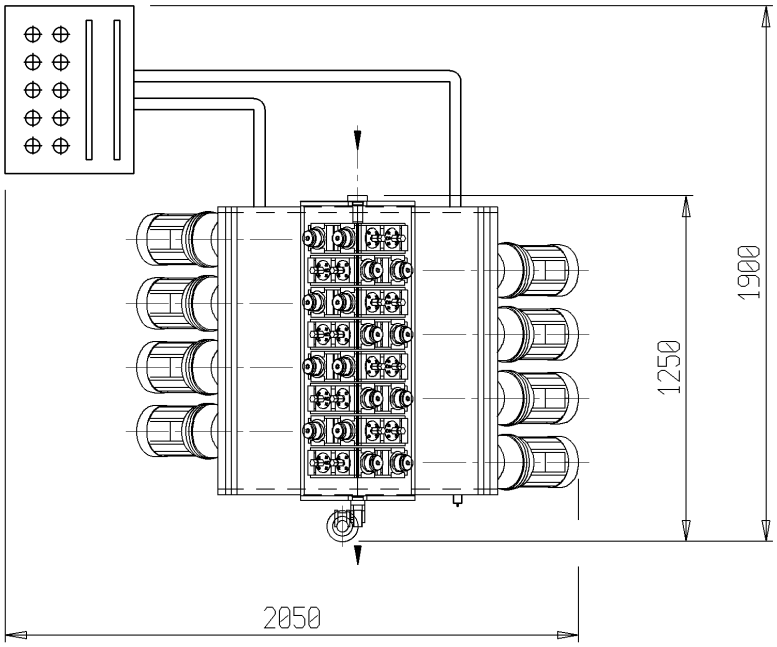
Special versions with larger 2 HP motor size are available, to cope with increased roll pressure caused by increasing tube diameter.

Model	Speed		Material of the rolls	Motors	Max tube Ø	Inst. power
		m/min.		hp	mm	kVA
140/12.A00000	Fixed	20	Tool steel	1	16	18,7
140/12.W00000	Fixed	20	Tungsten carbide	1	12	18,7
142/12.A20000	Variable	0-22	Tool steel	1	16	27,7
142/12.W20000	Variable	0-22	Tungsten carbide	1	12	27,7
140/12.A10000	Fixed	16	Tool steel	2	19	29
144/12.A20000	Variable	0-22	Tool steel	2	19	27,7

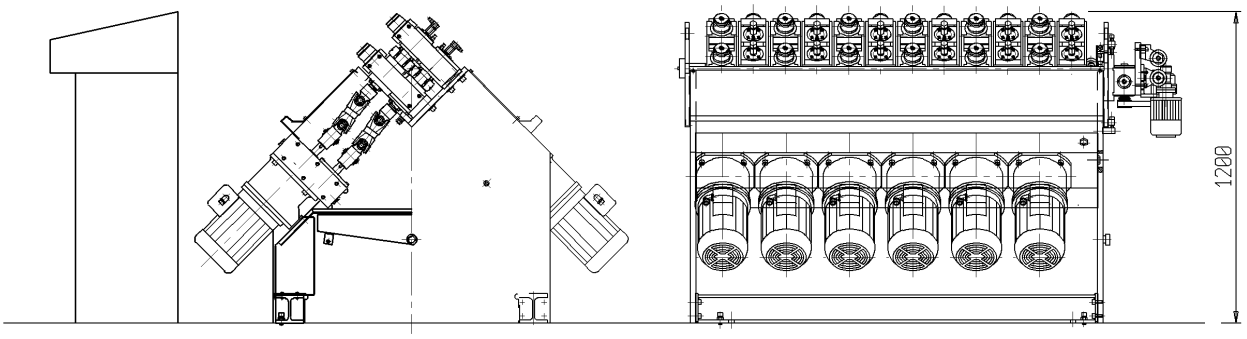
LAYOUT

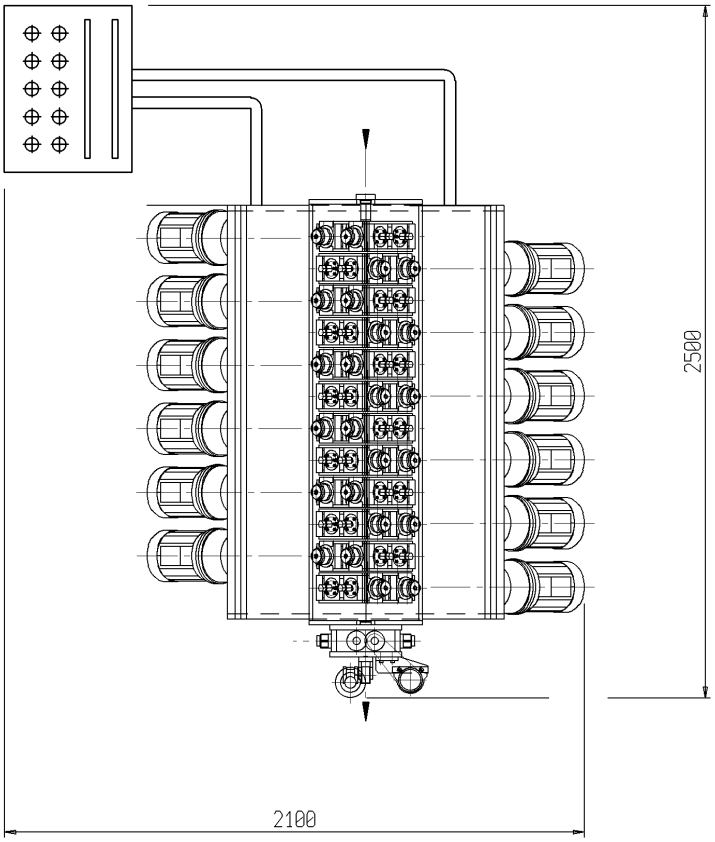
8-station roll reducing mill





12-station roll reducing mill





INDIVIDUAL PARTS

HEAD (V INSERT)

Head (V insert) with motorised unit for the extraction of the rolled elements

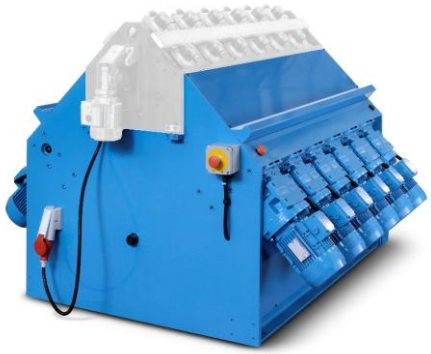
Head without rolls

Model	
140/08. T00000	8-roll version
140/12. T00000	12-roll version

Head with rolls

140/08.TA0000	8 pairs of rolls	Tool steel
140/08.TW0000	8 pairs of rolls	Tungsten carbide
140/12.TA0000	12 pairs of rolls	Tool steel
140/12.TW0000	12 pairs of rolls	Tungsten carbide

MACHINE STAND



Machine stand with motors, gearboxes and electrical system

Base for 8-station roll reducing mill

Model	Speed		Power
		m/min	
140/08.B00000	Fixed	20	1 Hp
140/08.B00000	Fixed	16	2 Hp
142/08.B20000	Variable	0-22	1 Hp
143/08.B20000	Variable	0-42	2 Hp

Base for 12-station roll reducing mill

Model	Speed		Power
		m/min	
140/12.B00000	Fixed	20	1 Hp
140/12.B10000	Fixed	16	2 Hp
142/12.B20000	Variable	0-22	1 Hp
143/12.B20000	Variable	0-42	2 Hp
144/12.B20000	Variable	0-22	2 Hp

REDUCING ROLLS

Reducing rolls are available in tool steel and tungsten sintered carbide.

Model	Number of pairs	Material
140/08.RA0000	8 pairs of rolls	Tool steel
140/08.RW0000	8 pairs of rolls	Tungsten carbide
140/12.RA0000	12 pairs of rolls	Tool steel
140/22.RW0000	12 pairs of rolls	Tungsten carbide

ROLLING MILL HEAD OVERHAUL

Overhauling of mill heads produced by CSM or by other rolling mill manufacturers

Overhaul of a rolling mill head

	8 station	12 station
without rolls	143/08.T00000	143/12.T00000
with tool steel rolls	143/08.TA0000	143/12.TA0000
with tungsten carbide rolls	143/08.TW0000	143/12.TW0000

Overhaul of a rolling mill head, with modification in metric system

	8 station	12 station
without rolls	143/08.TKP000	143/12.TKP000
with tool steel rolls	143/08.TKPA00	143/12.TKPA00
with tungsten carbide rolls	143/08.TKPW00	143/12.TKPW00

Overhaul of a rolling mill head, with conversion from rolls with progressively decreasing diameter to rolls having the same diameter

	8 station	12 station
without rolls	143/08.T00PN0	143/12.T00PN0
with tool steel rolls	143/08.TA0PN0	143/12.TA0PN0
with tungsten carbide rolls	143/08.TW0PN0	143/12.TW0PN0

OPTIONS

TEAR AND WEAR PARTS

Set of tear and wear parts, made of a set of guide bushing and two rubber rolls (to draw the tubes out of the mill)

Mod. 140/08.000001 for 8-stand roll reducer
Mod. 140/12.000001 for 12-stand roll reducer

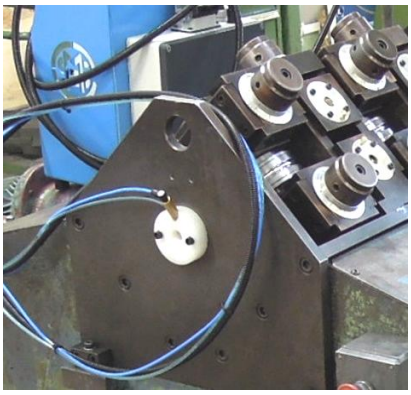
LUBRICATING SYSTEM

Some lubricant can be used to increase the straightness of the element.

LUBRICATING SYSTEM WITH ONE NOZZLE

Roll lubrification system for rolling mill complete with spray nozzle located in the entry bushing.

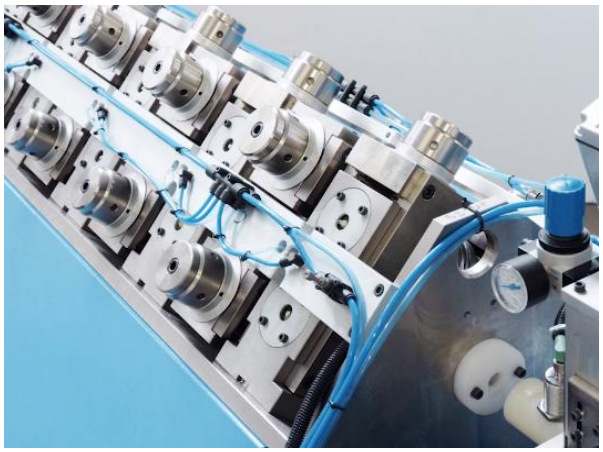
For 8- and 12-station rolling mills: mod. 140/08.SL0000



LUBRICATING SYSTEM WITH MULTIPLE NOZZLES

Roll lubrification system for 8 or 12 station rolling mill for single head complete with spray nozzles and outbound blow-drying

- **For 8-station rolling mills: mod. 140/08.SR0003**
- **For 12-station rolling mills: mod. 140/12.SR0003**



LUBRICATING SYSTEM WITH NOZZLES ONLY (no outbound blow-drying)

- **For 8-station rolling mills: mod. 140/08.SR0004**
- **For 12-station rolling mills: mod. 140/12.SR0004**

MACHINE STAND for head with lubricating system included (no nozzles)

- **Mod. 140/08-12.030**

DEVICE TO MEASURE THE HEATING ELEMENTS LENGTH WITH SORTING IN LENGTH CLASSES

This is an electropneumatic device to collect the heating elements at the exit of the roll reducing mill, to measure their length, to compare its value against the preset range and to unload the heating element, sorting in 3 length classes:

1st length class	length measured within the preset range
2nd length class	greater length than the preset range
3rd length class	shorter length than the preset range

The 2nd and 3rd length classes will be collected in special containers.
The 1st class will be unloaded on your container to be placed at the base of the machine.

The presence of the two plastic plugs at the ends of the heating elements is not relevant to achieve a correct measurement of the real tube length.

Machine composition

- Electronic device completes with encoder, to measure the heating element length.
  - The minimum and maximum length for the 1st range will be set on a suitable programmer.
  - The shorter heating elements will form the 2nd range (shorter heating elements).
  - The greater heating elements will form the 3rd range (longer heating elements).
- Hopper to collect and unload the heating elements.
- Interception doors at the unloading of the heating elements of the 2nd and 3rd ranges, with conveyance in two containers.

The 1st range will not be intercepted and will be conveyed on a container at the base of the machine.

Technical characteristics:

Diameter of heating elements (one diameter to be defined)	mm	6-10
Heating element length	mm	350-8000
Minimum heating element length	mm	350
Preciseness of length measurement	mm	±2
Power supply	V	To be defined
Pneumatic supply	Bar	6

Available versions

Model	Heating element length	Model	Heating element length
Mod. 140/25.100000	350 - 1.250 mm	Mod. 140/25.150000	350 - 2.000 mm
Mod. 140/25.200000	350 - 2.500 mm	Mod. 140/25.250000	350 - 3.000 mm
Mod. 140/25.300000	350 - 3.600 mm	Mod. 140/25.400000	350 - 5.000 mm
Mod. 140/25.500000	350 - 6.000 mm	Mod. 140/25.800000	350 - 8.000 mm