Technical Data No.

4-Roll Plate Bending Machine
HAEUSLER VRM-hy 4000 x 160/190 mm

Modern, Fully Hydraulic, Used.
For Cold and Hot Bending

Max. Plate Width 4000 mm
Prebending 160 mm
Rounding 190 mm

Accessory incl.
- Lateral Plate Supporting Arms

Accessories are not incl.
- Infeeding Waggon (2)
- Swinging Unload Arm For Plate Segments mounted on
- Unloading Carriage
- Top Support Beam to Hold Up And Unload Bend Cylinders inconnection with a Crane, provided by the buyer

Life cycle of the 4-Roll Plate Bending Machine
VRM-hy 4000 x 160/190

This modern, fully hydraulic 4-Roll Machine was constructed and delivered 1978. In the year 1982 the machine was installed and 1984 the production started. But after only appr. 100 hours the production of the whole factory stopped. Before dismanteling the Plate Bending Machine has been controlled by our specialist. Therefore the excellent condition of the machine is confirmed.

Position 1.0
1 Hydr. 4-Roller Plate Bending Machine
Made by Haeusler, Type VRM-hy 4000 x 160/190 mm
for cold and hot prebending and rounding of cylinders and cones.

TECHNICAL DATA
Width of plate 4000 mm
Surface length of rollers 4050 mm

Distance between the columns 4200 mm

Plate thickness at yield point of 240 N/mm²
for edge setting at full width of plate 160 mm
for bending only at full width of plate 190 mm
Flat end X = 1,5 + 2x thickness

Plate thickness at yield point of 450 N/mm²
for edge setting 120 mm
for rounding 135 mm

Plate thickness for hot bending at (≥ 1000 °C) 280 mm

Diameter of rollers: top roller 1320 mm
   bottom roller 1250 mm
   side rollers 1020 mm

Smallest possible bending diameter on top roller 1500 mm

Smallest possible bending diameter at 150 mm plate thickness 2600 mm

Number of rollers 4

Roller material 61 Cr Mn Mo 43

Resistance of the roller material 850 - 1000 N/mm²

Max. force of the bottom roller 3450 to
Max. force of the side roller 1480 to
Max. force against top roll 5557 to

Driven Rollers 2 (top and bottom)

Rollers drive Hydromotors

Operating speed 4 m/min

Speed compensation between top and bottom roller full automatic

Reversing of the roller turning direction electro-hydraulic

Adjustment speed: bottom roller 200 mm/min
   side rollers 500 mm/min

Pressure compensation between top and bottom roller full automatic

Tilting of the hinged front bearing housing hydraulic

Tilting of the top roller hydraulic
Control central, from the mobil control panel

Indication of the side roller position 4 x digital
reading accuracy 0,1 mm
Installed power approx. 550 kW

Weight of the machine approx. 650 ton

**Top roller**

Tilting actuation (upwards) yes
Bearing type 1x roller bearing and 1x SKF spherical bearing
Bearing adjustment during deflection of the roller self-aligning
Inclined position for cone rolling not required
Camber (compensation of the roller deflection) acc. to the bending
Material 61 Cr Mn Mo 43
Resistance of the roller material 850 - 1000 N/mm2
Drive see below
Speed compensation between top roller, plate and bottom roller automatic by hydraulic system

**Bottom roller**

Adjustment bottom roller and side rollers individually or simultaneously
Bearing type spec. roller bearing
Bearing adjustment during deflection of the roller self-aligning
Inclination for cone bending from the control panel
Material 61 Cr Mn Mo 43
Drive see below
Lubrication automatic grease
Overload safety device overload valve

**Side rollers**

Drive not driven
Position adjustment hydraulic
Adjustment range up to the top roller
Other details as per bottom roller

**Drive of rollers**

Drive by hydromotors via planetary gear transmission
Lubrication oil bath
Reverse moment electro-hydraulic
Overload protection electro-hydraulic by overload valve
Emergency brake system electro-pneumatic automatically engaged and disengaged

**Hinged front bearing housing**
Hydraulic Unit
The stroke of the rollers, rollers rotation, tilting of the front bearing housing and the tilting of the top roller are operated hydraulically.

For cylindrical bending, the rollers must be absolutely parallel aligned. A combined hydromechanical equalizing system is incorporated. For cone bending, the bottom and the side rollers can be inclined directly from the control panel. This is achieved by interrupting the oilflow into the cylinder on one side by an electro-magnetic valve. The rollers can be returned to parallel position by the same way. It is a major advantage of the hydraulic system that all subsystems are protected by overload valves. Therefore the machine cannot be damaged by overloading.

Cone bending
Cones can be rounded, depending on size and angle, in several passes. Bending is done continuously, with prebending on both ends. An optional attachment, which guides the cone, is fitted onto the machine frame. To transport the bended plate at the large radius with the driven top and bottom rollers, the bottom roller is to be slightly tilted. The two side rollers are also in an inclined position according to the angle of the cone.

Cone bending attachment included
2 additional readouts for indication at cone bending included
Automatic central lubrication included
Instant brake for roller rotation included
Stepless speed control for roller adjustment included
Safety device against overload of the machine included
Air reservoir for instant brake system included
Safety device against tilting of the hinged front bearing housing when rollers are under pressure included
Safety device to avoid, that bottom roller will be moved when front bearing housing is tilted included
Emergency oil level indicator on the control panel included
Air pressure unit included
Watercooler for hydraulic oil included
Device at the front bearing housing side, required for cone bending included
FOB handling charges included

**Optional Special Equipment**

**Pos. 2.0 Plate infeed carriage**

**Technical Data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of carriages</td>
<td>2</td>
</tr>
<tr>
<td>Driven carriages</td>
<td>1</td>
</tr>
<tr>
<td>Length</td>
<td>each 3,5 m</td>
</tr>
<tr>
<td>Width</td>
<td>3,3 m</td>
</tr>
<tr>
<td>Max. load</td>
<td>25 to</td>
</tr>
<tr>
<td>Speed</td>
<td>6/12 m/min</td>
</tr>
<tr>
<td>Control</td>
<td>from central panel bending machine</td>
</tr>
</tbody>
</table>

The plates are supported by 6 conveyor-rolls (made of high resistance modular cost iron). The front carriage is driven. For short plates is a forward-pusher provided. For centric, rectangular infeeding adjustable side rollers are installed.

**Pos. 3.0 Lateral supporting arm**

**Technical Data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load</td>
<td>8 to</td>
</tr>
<tr>
<td>For bending diameter</td>
<td>1800 mm to 5000 mm</td>
</tr>
</tbody>
</table>

To hold up the thinner plates on the outlet side of the Bending Machine a hydraulically activated hinge arm, provided with a supporting roll, controls the central panel of the Bending Machine.

**Pos. 4.0 Swinging unload arm for plate segments**

**Technical Data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load</td>
<td>2 x 15 to</td>
</tr>
<tr>
<td>Plate bending radius min.</td>
<td>3 m</td>
</tr>
<tr>
<td>Plate bending radius max.</td>
<td>5 m</td>
</tr>
<tr>
<td>Min. plate width</td>
<td>2,5 m</td>
</tr>
<tr>
<td>Max. plate length</td>
<td>12 m</td>
</tr>
</tbody>
</table>
On the outlet side of the Bending Machine are 2 hydraulic swinging arms installed. With these swinging unloading arms the bent plate segments can be supported and laid down on the unload carriage.

**Pos. 5.0 Unloading carriage for bended plate segments**

**Technical Data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of carriage</td>
<td>6 m</td>
</tr>
<tr>
<td>Width of carriage</td>
<td>2 m</td>
</tr>
<tr>
<td>Load</td>
<td>30 to</td>
</tr>
<tr>
<td>Transport length</td>
<td>12 m (can be prolonged)</td>
</tr>
<tr>
<td>Carriage driven</td>
<td>10 kW</td>
</tr>
<tr>
<td>Control from central panel</td>
<td>of Bending Machine</td>
</tr>
</tbody>
</table>

**Pos. 6.0 Supporting roll for cone bending**

**Technical Data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load</td>
<td>10 to</td>
</tr>
<tr>
<td>Supporting length</td>
<td>1,5 m</td>
</tr>
</tbody>
</table>

For cone bending an adjustable supporting roll is on the machine’s frame of the Bending Machine installed.

**Pos. 7.0 Top support beam to hold up and unload bent cylinders**

**Technical Data**

<table>
<thead>
<tr>
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<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. load</td>
<td>15 to</td>
</tr>
</tbody>
</table>

This support beam is hanging in the crane hooks of the bridge crane and will be used to support and unload thinner cylinders.