



Siempelkamp

Maschinen- und Anlagenbau

Siempelkamp Ring-Rolling Mill



With the ring rolling mill, Siempelkamp once again demonstrates its competence as a systems supplier and provider of complete solutions which designs and builds presses for all stages of metal forming.

The first Siempelkamp plant of this type manufactures rings made of steel and special materials such as nickel-based, titanium and aluminum alloys. The rings with rectangular or profiled cross-sections made of these extremely rigid yet lightweight special materials are mainly used as mechanically and thermally stressed components in the aerospace industry.

This ring-rolling mill is the second plant which Siempelkamp has supplied to the Russian customer JSC Metallurgical Plant Electrostal: The company also operates a 20,000-ton precision closed-die forging press made by Siempelkamp which, among other products, provides the feedstock for the ring rolling mill. JSC Metallurgical Plant Electrostal carries out the entire production process of rings made of high-alloyed steel in its own plant and thus raises the depth of value added to its own production.

Precision

The ring rolling mill with maximum radial and axial pressing forces of 6,300 kN each manufactures rings with an external diameter of up to 2,500 mm and a height of up to 600 mm.

With a variety of design details, Siempelkamp achieves exceptionally high precision during ring rolling. For example, the diameter of the rings during ring rolling is precisely measured via laser measurement systems. High process accuracy is also guaranteed by the SicoRoll control which Siempelkamp specially developed for ring rolling. The program package SicoRoll supports the user during process planning. With an advance simulation, which is taking the threshold values of the machine into account, all relevant rolling parameters are determined. The program uses a database which stores the tool and material data. Furthermore, it contains the common rolling curves and strategies as the basis for the planning process. According to the customer requirement, the system can be expanded. The calculated rolling parameters are transmitted to the machine control which ensures the



sions of the blanks for the closed-die forging press.

Siempelkamp not only completely manufactured the rolling mill at the Krefeld location but also assembled and started it there as well as extensively tested the hot rolling process before the mill was delivered to the customer.

optimal ring rolling process and keeps the rolling parameters synchronized with the process. The rolling process can be completely documented and archived.

Innovation

The design offers a variety of technical innovations: The SicoRoll control was specially developed by Siempelkamp for ring rolling. The caps of the axial rolls can be replaced quickly and the position control of the axial slide actively compensates the straining of the frame. Since the drive is directly attached to the radial roll stand, the reaction force of the drive is absorbed by the roll stand. Therefore, this force absorption significantly reduces the stress on the foundation compared to other designs.

Completeness

Next to the rolling mill, the scope of supply includes the complete hydraulic system, the automation of the roll as well as the SicoRoll control - the kernel of which simulates the dimen-

Durability

By using design principles that have proven themselves in other Siempelkamp presses, the equipment achieves a long operating life. Extensive FEM calculations are the guarantee for the high fatigue strength of the mechanical structural components. This is further supported by the fact that the housings for the tapered rolls, which experience high mechanical stresses, are designed as one-piece castings without weld seams. Similarly, all bearings are designed with a long operating life in mind.

Cost-effectiveness

During the design process, the Siempelkamp design engineers placed great importance in using many standard components especially for highly stressed component parts, such as the gears. For our customers this translates into cost savings because maintenance and spare parts are easily procured.



Technical Data

Ring dimensions:	
Maximum diameter	2,500 mm
Height	40 to 600 mm
Rolling force:	
Radial	6,300 kN
Axial	6,300 kN
Drive capacity/Input power:	
Main roll	1,260 kW
Axial roll	2 x 630 kW
Total approx.	3,200 kW
Roll speed:	
Control range	0.3 – 1.2 m/s
Rated speed	0.7 m/s
Diameter:	
Mandrel rolls	200 – 400 mm
Main rolls	max. 1,500 mm
Axial rolls:	
Angle of taper	2 x 22.5
Travelling distance:	
Upper and lower carriage of the mandrel roll	1,100 mm
Axial frame	5,000 mm
Dimensions:	
Main dimensions	approx. 22,000 x 6,500 mm



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