

**Production cooperation.
Heat treatment facilities.**

- Heat hardening of teeth, bushings, cages, wheels, gear shafts, pistons, screws, rolls, chocks, discs and other parts by means of high induction hardening and by means of commercial frequency current hardening.
 - Surface impregnation of teeth of power gears.
- Annealing, isothermal annealing, normalization with tempering, blank parts tempering.
- Quenching with tempering of forged large-sized blanks weighing up to 65 tons. Their dimensions are: for cylindrical blanks: diameter is up to 2500 mm, length is up to 25000 mm; for rectangular blanks: thickness is up to 200 mm while width is up to 2500 mm; thickness is 200 mm to 700 mm while width is up to 2000 mm; thickness is starting from 700 mm and more while width is up to 1500 mm; rings, bands weighing up to 25 tons and with diameter up to 4500 mm.
- Quenching with tempering of cast parts.
- Tempering of metal works, iron castings, age hardening of castings and forgings during machining.
- Gaseous carburization of machined parts with length up to 3500 mm and 1850 mm of diameter is effected.
- High-temperature quenching of parts having diameter up to 2500 mm, and weight 25 tons of such grades of steel: ЭИ-415, 2X13, 3X13, ЭИ-961, ЭИ-802 and other heat resistant steels is produced.

CAR-BOTTOM HEAT-TREATING FURNACES

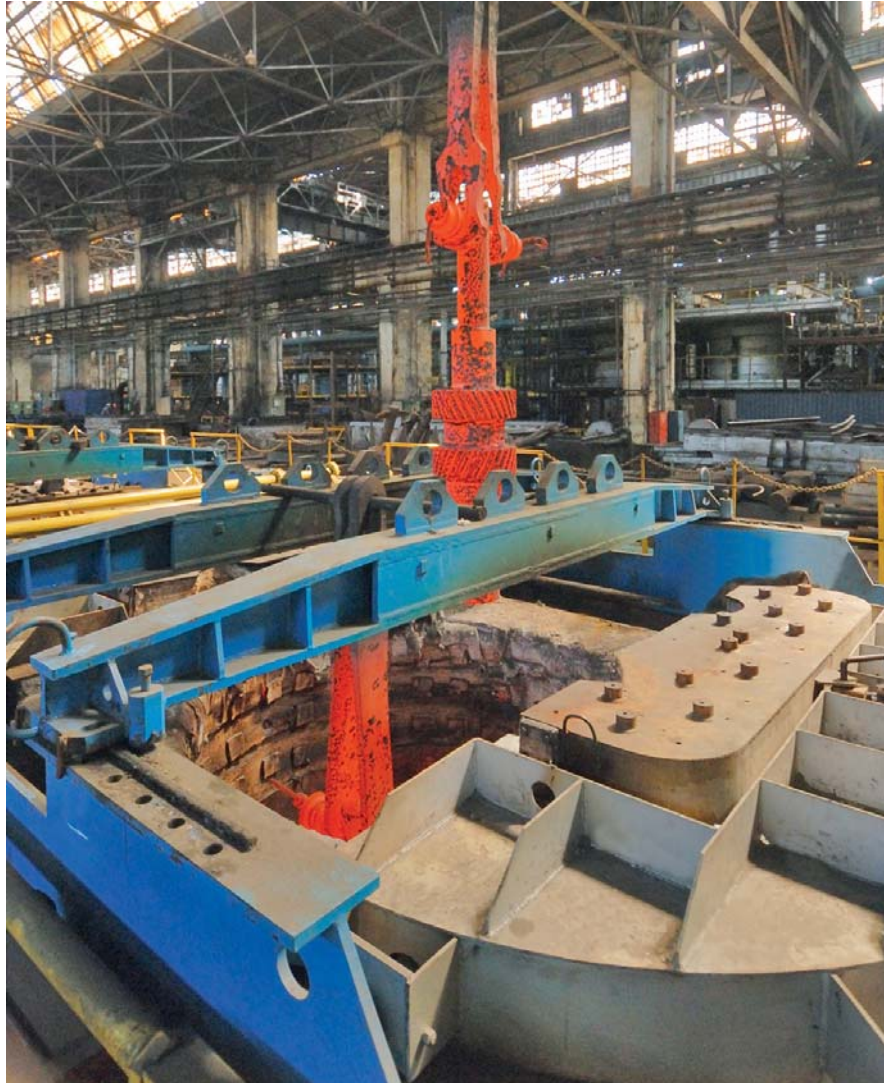


Technical characteristics

Parameter	Value	
Dimensions, m	3,2x8,0;	3,9x10,2;
Car-bottom area, m ²	25,6	39,7
Metal heating temperature, °C	1000	
Charge weight, t	100	180
Fuel type	Natural gas	
Differential temperature, °C	±5	
Application	Annealing, tempering, normalization with blow-off	

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SHAFT-TYPE QUENCHING AND TEMPERING
FURNACES



Technical characteristics

Parameter	Value	
Operating space dimensions, D x H, m	2,1x4,5	2,7x4,5
Maximum charge weight, t	34,6	34,6
Operating temperatures range, °C	250-1050	150-1050
Temperature non-uniformity at furnace operating space, °C	±5	
Lining	Ceramic fiber	
Burners	Impulse, Kromschroder, Germany	
Automation system	Siemens	
Application	heating for quenching, normalization, tempering	

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BACKING FURNACES FOR COLD ROLLED WORK ROLLS



Technical characteristics

Parameter	Value
Chamber 1	12 rolls (D_{barrel} up to 600 mm) 8 rolls (D_{barrel} from 600 mm)
Chamber 2	6 rolls (D_{barrel} up to 500 mm) 4 rolls (D_{barrel} from 600 mm)
Chambers 3, 4, 5	6 rolls (D_{barrel} up to 600 mm) 4 rolls (D_{barrel} from 600 mm)
Preheating chamber	1 roll (D_{barrel} up to 850 mm)
Operating temperatures range, °C	80-300
Temperature nonuniformity	±2,5
Lining	Ceramic fiber
Burners	Impulse Kromschroder, Germany
Automation system	Siemens
Application	Cold work rolls tempering after power current hardening.

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VERTICAL HEAT TREATMENT FURNACES



Technical characteristics

Parameter	Value	
	№№ 46, 47, 48, 50	№ 51, № 52
Dimensions of workspace, D x H, m	2,6x8 3,2x8 №50	2,6x10
Maximum weight of charge of auxiliaries, t	50	
Max temperature, °C	1150	
Temperature nonuniformity, C°: - 100...400 - 400...1150	±10 ±5	
Lining	Ceramic fiber Parok, Finland Keratech, Czech Republic	
Burners	impulse, Kromschroder, Germany	
Automation system	Siemens	
Application	Rotors and semi-rings hardening; tempering of large hot work and back up rolls after power current hardening	Final heat treatment of compound hot rolling rolls with deposited layer of HCr

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CAR BOTTOM-TYPE FURNACES



Technical characteristics

Parameter	Value
Dimensions of furnace space, LxBxH, m	8,5 x 4,2 x 2,7
Maximum charge weight, t	180
Maximum temperature, °C	1000
Temperature variation, °C	±7,5
Lining	Ceramic fiber, ШИВП
Automation system	Siemens
Application	Preheating and tempering of back-up rolls manufactured as per differentiated heat treatment technology.

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DIFFERENTIATED HEAT TREATMENT TECHNOLOGY
HIGH-SPEED HEATING FURNACES



Technical characteristics

Parameter	Value
Dimensions of furnace space, DxL, mm	2800 x 2170
Maximum charge weight, t	60
Maximum heating speed, °C/ hour	800
Maximum temperature, °C	1000
Temperature variation, °C	±2,5
Lining	Ceramic fiber
Automation system	Siemens
Application	High-speed heating of back-up rolls barrel surface layers.

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DIFFERENTIATED HEAT TREATMENT TECHNOLOGY
HIGH-SPEED HEATING FURNACES



Technical characteristics

Parameter	Value	
	Spray unit No1	Spray unit No 2
Rolls dimensions: - Barrel diameter, mm - Barrel length, mm - Total length, mm	Up to 1600 Up to 2500 Up to 8000	Up to 1600 Up to 2030 Up to 8000
Maximum water consumption, m ³ / hour	Up to 100	Up to 200
Obtained hardness, HSD: - barrels - necks	38 - 50 38 - 50	55 - 75 -
Hardness variation, HSD	Up to 3	
Application	Back-up and work rolls hardening for obtaining specified hardness and mechanical properties of necks and barrels.	Hardening of back-up roll barrel after high-speed heating in high-speed heating furnace with the purpose of obtaining the specified hardness on the surface and at depth of the hardening layer.