ROLLING-MILL EQUIPMENT

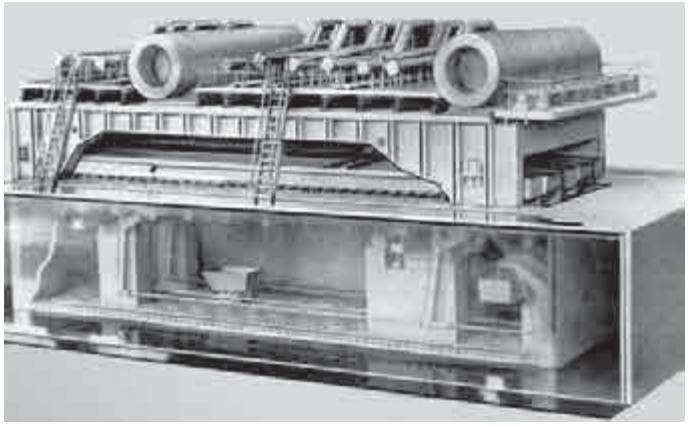
ROTARY HEARTH FURNACE

Rotary hearth furnace is used in pipe rolling and is designed to heat the ingots before rolling. The furnace hearth travels along the supporting rolls. The centering rolls are applied from the lateral hearth travel. The hearth consists of the upper and lower rings made of segments. The furnace is equipped with water-sealed valves arranged at the inner and outer hearth diameters.

SPECIFICATIONS	VALUE
Mean furnace diameter, mm	24000
Maximum capacity, t/h	50
Heating temperature, maximum, °C	1280
Working door height, mm	900
Hearth weight (unlined), kg	190000

Manufacturing period – 180 days

REHEATING FURNACE WITH WALKING HEARTH



Reheating furnace with walking hearth is designed for heating or heat treatment of stocks made of carbon and special steel and of alloys before rolling. Metal is heated in the furnace with flat-flame burners during the radiating low-oxidation and low-decarburization heating process.
The furnace is equipped with butt shock-free workpiece loading system or shifter loading system, scale handling system. All the furnace systems and mechanisms are interconnected with control, start-up and other equipment and operate in automatic mode.
The furnaces are designed and produced to the Customer's individual orders and according to the Customer's documentation.

SPECIFICATIONS	VALUE			
Furnace capacity, t/h	15	40	35	15
Stocks dimensions, mm:				
- height	60...140	150...200	126...180	0,89...168
- length	0,4...2	1,7...5	0,6...2,5	0,086...0,17
Heating temperature, °C	1250	1030	1250	1050
Maximum load of active hearth, kg/m2 h	230	400	390	60
Weight, kg	269000	358000	308000	450000

Manufacturing period – 180 days

REHEATING FURNACE WITH WALKING BEAMS

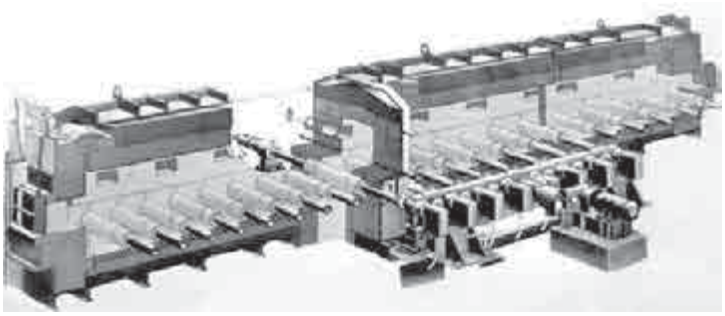
Reheating furnace with walking beams is designed for heating or heat treatment of stocks made of carbon, alloyed and special steel before rolling. Metal is heated in the furnace with different heating devices during the radiating low-oxidation and low-decarburization heating process.
The furnaces are equipped with loading and discharge units and scale handling units. The furnace equipment of different types is designed depending on capacity, type of stocks, heat treatment modes and shop parameters.

The furnaces are designed and produced to the Customer's individual orders and according to the Customer's documentation.

SPECIFICATIONS	VALUE
Furnace capacity, t/h	80
Stocks dimensions, mm: - height - width - length	 200...265 340...500 5...6
Stocks weight, t	3,1...5,9
Heating temperature, °C	1250
Maximum load of active furnace hearth, kg/mg h	220
Stocks discharge	51
Stocks layout	single-row
Loading of stocks to the furnace	machine
Discharge of stocks from the furnace	machine
Weight, kg	875000

REHEATING ROLL-HEARTH FURNACE

Reheating roll-hearth furnace with roll hearth with shielding atmosphere is designed for heat treatment of steel and bimetal pipes.
The furnace consists of the heating and cooling chambers. The pipes are transported along the roll furnace hearth as one-layer charge. The roll drive is a chain or group drive. The furnaces are designed and produced to the Customer's individual orders and according to the Customer's documentation.



SPECIFICATIONS	VALUE
Charge weight (maximum), t	18
Furnace capacity, t/h	12
Heat treatment time, h	1,5
Stocks transfer rate, m/min	0,4...12
Furnace temperature, °C	1100
Total furnace length, m	93,2
Dimensions of pipes:	
- outer diam, mm - length, m	20...102 2,1...10
Installed capacity, kW	59,5
Weight, kg	246 000

Manufacturing period – 180 days

FURNACE ROLLS

Furnace rolls are designed to move the stocks in the furnace working chambers. Wide range of rolls for reheating and heat-treatment furnaces is produced according to the customers' basic requirements. The rolls are used either as part of the scope of equipment supplied or separately, as replacement parts for service maintenance of the customers.

- The rolls with cooled spouts are used at furnace temperature of up to 950°C, barrel diameter of 160 to 900 mm, length of up to 3,5 m. There may be several holes on the spouts for cooling system.
- The rolls with cooled spindle are used at furnace temperature of 900…1500°C, barrel diameter of 250 to 600 mm, length of the barrel defined by the width of the furnace chamber. In order to reduce the heat consumption the spindle surface under the barrel is isolated with metal shields.
- The rolls with cooled barrel are used at furnace temperature of 1200…1300°C, barrel diameter of 200 to 400 mm, length of up to 3 m.
- Overhung furnace rolls are used on the roll beds being the part of the furnaces with walking beams.

Manufacturing period – 160 days .

BLASTING BURNERS

Blasting burners of "tube in tube" type of DNS-130 and DNB-200 series are designed to burn the gases with heating value of 900…2400 kcal/m^3 for heating thermal furnaces. The burners can operate on either gas or preheated air of up to 400°C.

SPECIFICATIONS	VALUE				
Burner nose diameter, mm	130	200	225	250	275
Gas nipple diameter, mm	40 to 110				
Air pressure before the burner, up to, mm Hg	300				
Gas pressure before the burner, up to, mm Hg	800				
Gas flow with density of 1.0 kg/m^3, up to, m^3/h	1800				
Weight, kg	83	237	241	264	272

LOW PRESSURE BURNERS

Burners of GNP-2, GNP-3, GNP-4, GNP-5, GNP-6, GNP-7, GNP-8, ГНП-9 types are designed to burn the natural and liquefied gases in furnaces, driers and other heating units. The burners are dual-duct with forced air supply. Stable ignition and burning of the flame is ensured with the tunnel of burner block.

SPECIFICATIONS	VALUE
Heating rate at natural gas burning, kW (Mcal/h)	170 (145) to 4300 (3700)
Heating rate at liquified gas burning, kW (Mcal/h)	99 (85) to 2020 (1740)
Burner length, mm	205 to 560
Weight, kg	7,2, 14, 32, 41, 46, 58, 72, 96

Manufacturing period – 120 days

NJECTOR BURNERS

Injector burners of Ø235(P-235/63) and Ø178(P-178/52) are designed to burn furnace gas and mixtures of coke and furnace gases in the furnaces, driers and other heating units.

The burners operate on the mixture of heated air and cold gas.

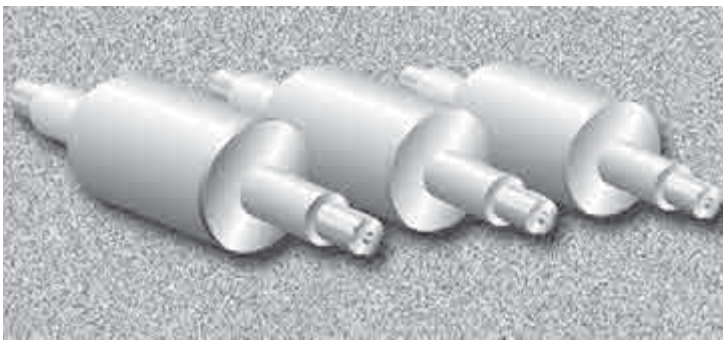
SPECIFICATIONS	VALUE	
Burner type	ø235(P-235/63)	ø178(P-178/52)
Nozzle diameter, mm	63	52
Combustion value, MJ/m³ (kcal/m³)	6,65-7,11 (1600-1700)	6,28-6,65 (1500-1600)
Nominal pressure, kPa (mm Hg)	14,7 (1500)	14,7 (1500)
Overall dimensions, mm: - length - width - height	 2799 755 677	 2219 755 612
Gas flow, nm³/h	2,16	1,39
Heating rate, kW	3060	1970
Air temperature, °C	500	500
Gas temperature, °C	684	536
Weight, kg	20	20

Manufacturing period – 60 days

ROLLS FOR HOT-ROLLING MILLS

Hammered rolls are designed for hot rolling of ferrous metals in breakdown sheet and section rolling mills. The rolls are produced of construction and alloyed steels with further heat treatment.

SPECIFICATIONS	VALUE
Barrel diameter, mm	505...670
Roll length, up to, mm	3100
Weight, up to, kg	6250



Manufacturing period – 80 days

CHAIN SECTION

Chain section is a part of conveyor chain designed to transfer the coils of cold- or hot-rolled sheet in sheet rolling in metallurgic plants.

SPECIFICATIONS	VALUE
Width, mm	470
Height, mm	350

Manufacturing period – 120 days

TUBULAR LOOP RECUPERATORS

Tubular loop recuperators are designed to recuperate heat of the waste combustion gases with temperature of up to 1000°C and to heat the air available in furnace units for fuel combustion up to 350-400°C.

The production of recuperators of special heat and scale resistant materials ensures their operational stability in the high temperature zone including the sulfur-bearing mediums.

The recuperators consist of inlet and outlet boxes interconnected through the base with the bundle of loop-shaped tubes. The availability of the loop in every tube provides the necessary compensation at heat expansion.

Depending on furnace heat capacity the following types of recuperators may be distinguished:

- single recuperators for furnaces with heat capacity of 2.5 to 20 mln. kcal/h;
- built-up recuperators, consisting of two or more sections arranged inline along the smoke duct, for furnaces with heat capacity over 20 mln. kcal/h.

The recuperators are installed in the furnace flues. Heat output to the shop is excluded that allows to ensure good working conditions for operating personnel. The use of recuperators allows to increase the specific furnace density by 15-20%, fuel economy makes 15-25%.

The turbulizers (T-shaped ribbed elements) may be installed between the tubes in order to intensify the heat transfer along the smoke duct that allows to increase the temperature of air heating by 10%.

SPECIFICATIONS	VALUE
Heating surface area by smoke, m^2	25...250
Supply by air, $м^3/h$	2800...19000
Overall dimensions, mm:	
- length	1740...3340
- width	1060...2090
- height	3280...5700
Weight, kg	1705...12330

Manufacturing period – 60 days

THROTTLE VALVES

Throttle valves are designed to regulate pressure and amount of gas and air supplied to the burners of heating and heat treatment furnaces of mill and other productions. The throttle valves operate within the system of automatic regulation. The throttle valves may be equipped with manual control at the customers' request.

Depending on the temperature state of the medium the following types of the throttle valves are produced:

- DH – for regulation of medium with temperature of up to 100°C;
- DHO – shut-off valve for regulation of medium with temperature of up to 100°C
- DP – for regulation of medium with temperature of up to 400°C;
- DG – for regulation of medium with temperature of up to 600°C.

Advantages:

- control precision

SPECIFICATIONS	VALUE
Nominal pressure, MPa	0,1…0,25

Manufacturing period – 80 days

GRIPPING UNITS

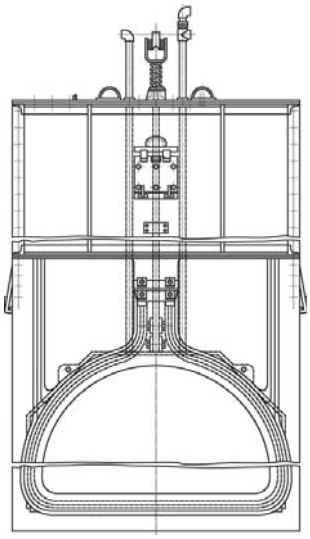
Gripping units are designed to transport the sheet piles and transfer the coils.
The gripping units operate automatically and driveless.

SPECIFICATIONS	VALUE
Mechanical grab for sheet piles	
Lifting force, kg	10000
Piles dimensions, mm: - length - width - height	 1200...2600 920...1520 20...590
Weight, kg	3300
Automatic clippers for coil transfer	
Lifting force, kg	15000
Weight, kg	2300

Manufacturing period – 90 days

INCLINED DRIVELESS SLIDING DAMPERS

Inclined driveless sliding dampers are designed to shut off the gas duct intended to discharge the combustion products from the Martin furnace through the generator to the smoke chimney or to shut off the air duct intended to supply air through regenerator to the Martin furnace.



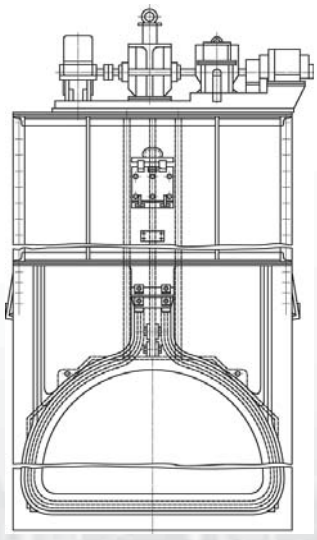
SPECIFICATIONS	VALUE		
Sliding damper	2100x3000	2000x2600	1800x2100
Sliding damper pitch, mm	3230	2830	2240
Overall dimensions, mm: - length - height - width	 3154 7280 2775	 3060 6170 2700	 2350 2450 5185
Weight, kg	10600	10000	6970

Manufacturing period – 80 days

INCLINED DRIVEN SLIDING DAMPERS

Inclined driven sliding dampers are designed to shut off the gas duct intended to discharge the combustion products from the Martin furnace through the generator to the smoke chimney or to shut off the air duct intended to supply air through regenerator to the Martin furnace.

SPECIFICATIONS	VALUE		
Sliding damper	1800x2100	2000x2600	2100x3000
Sliding damper pitch, mm	2240	2740	3230
Sliding damper travel rate, m/min	1,6	1,6	1,6
Total sliding damper opening time, min	1,4	1,7	2,0
Traction force on the rack, kg:	2180	2500	3000
Overall dimensions, mm: - frame width - support width - shield width - total width - height in open position - height in closed position	 2350 2450 2625 8413 6173	 2560 2660 2730 9928 7188	 2650 2750 2780 11503 8273
Weight with electric equipment, kg	8060	9260	10410



Manufacturing period – 90 days