COKE-CHEMICAL EQUIPMENT

ELECTRIC LOCOMOTIVE OF THE AKU TYPE

The electric locomotives AKU-1M and AKU-1-01 are intended for the quenching cars transportation to the quenchers (dry quenching plants or quenching towers) and coke delivery to the coke wharfs (at wet quenching).
Electric locomotives are equipped with the state-of-the-art technical aids providing a maximum operational comfort.
The electric locomotive electric circuit schematic allows short-time operation with one driving motor disconnected.
The electric locomotive is manually controlled.

Electric locomotives consist of as follows:

- locomotive trucks with automatic coupling devices;
- wheel-and-motor assembly;
- brake linkage;
- superstructure with pneumatic and electric compartments (AKU-1M);
- superstructure with pneumatic, hydraulic and electric compartments (AKU-1-01);
- control cab driving desks;
- coupling block for connection to quenching car pneumatic system (AKU-1M);
- coupling blocks for connection to quenching car pneumatic/hydraulic system (AKU-1-01).

Main advantages:

- maximum operational comfort;
- design with the use of diesel locomotive standard components;
- design with the use of separately excited electric motors AD-118AI;
- stepless traveling speed control capability;
- suitable for partial or complete process automation.

SPECIFICATIONS	VALUES
Rated current collector voltage, V	380
Three-phase current frequency, Hertz	50
Current supply	trolley
Axle configuration	2o
Wheel to rail load, kN (t-f)	98,1 (10)
Maximum starting tractive effort min, kN (t-f)	35,5
Weight on driving axles, kN (t-f)	392,4 (40)
Maximum speed, m/s (km/h)	18
Travel speed at coke loading, m/s (km/h):	0,417 (1,5)
Gage, mm	1520
Overall dimensions, mm:	
- wheel base (distance between the wheel axes)	4000
- length over couplers	9745
- width (over superstructure)	2875
- height from rail level	5200
Safe stopping distance, max, m	35
Quenching car gates control drive	hydraulic
Brakes control drive	pneumatic

Manufacturing time – 180 days

MACHINES FOR COKE BATTERIES SERVICING

COKE CAR

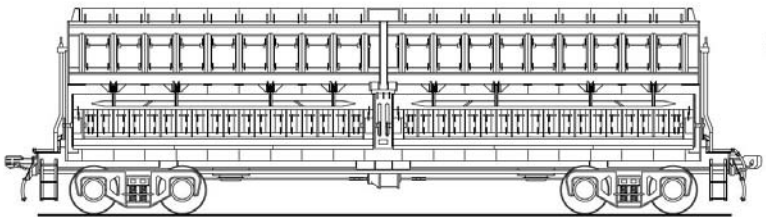
The coke car is intended for receipt of hot coke from the coke oven chambers and transportation of the same to the area of coke dry quenching plant (CDQP) hoist pit, bringing up the body with coke to the charging door of quenching chamber and unloading the coke from the body. In technological cycle the car operates along with electric locomotive, coke pusher, door extracting machine and CDQP.

SPECIFICATIONS	VALUES
Oven useful chamber volume , m^3	35,4
Temperature of hot coke , °C	1050
Volume of the coke to be charged, m^3	45
Overall dimensions, mm: - length - width - height	 12300 5625 5280
Gauge, mm	1520
Minimal radius of performance of the car on the curve of railway, m	80
Time of full coke unloading, sec	10
Car weight, kg	55400
Average operation lifetime, years	10

Manufacturing time – 150 days

COKE QUENCHING CAR

The coke quenching car is intended for receipt of hot coke from coke oven with chamber volume 21,6...41,6 m^3, transportation of coke to the quenching tower where the same is quenched by water, transportation of the cooled coke to the coke wharf and unloading. Car moving -by electric locomotive Car control -from the operator's cab of electric locomotive Signalization -electric, warning lights. Operation mode -heavy duty.



SPECIFICATIONS	VALUES			
Chamber volume , m^3	21,6	30…35	30,9	41,6
Capacity, t	12	23	19	25
Floor slope, degree	28	28	28	28
Gauge, mm	1520	1520	1520	1520
Type of mechanism for locks lifting	lever- pneumatic	lever- pneumatic (lever- hydraulic)	lever- hydraulic	lever- pneumatic
Number of pneumatic cylinders (hydraulic drives)	2	2(4)	4	2
Time of locks opening	12	12	12	12
Length on autocoupling axis, mm	15320	18750	17900	18750
Overall dimensions, mm: - width - height	 4220 4165	 5255 5020	 4330 5490	 5960 5210
Product weight, kg	57770	69700	72260	106650
Average operation lifetime, years	10			

Manufacturing time – 150 days

DOOR EXTRACTING MACHINES

The door extracting machines are intended for servicing the battery coke side with useful chamber volume 14,6...51,0 m^3, provide extracting and mounting the doors, loading the coke into coke quenching car as well as cleaning the frames and doors, removal of the "coke ends" from the area to be serviced, suction of dust- gas mixture.
The door extracting machines are equipped with the special type hoods of different design for trapping and suction of the dust-gas mixture at coke output.
The design of the door extracting machines , overall dimensions and the weight thereof depend on the volume of the oven to be serviced and availability of the dust-gas disposal collector.

SPECIFICATIONS	VALUES			
	14,6…17,5	20…29,8	30…37,3	41,3…51,0
Gauge , mm	1500	1500	1500	1500
Overall dimensions, max, mm: - length - width - height	 16170 3705 10660	 15850 7500 10660	 19250 7500 9000	 17500 8480 10660
Weight, t	60	75	93	135
Movement speed, m/sec : - machine along the battery - door extraction - coke guide	0,9…1,98 0,06 0,06…0,1			
Force, kN : - door separation	70	130	130	150
- door input when mounting on the oven	45			
Average operation lifetime, years	15			

Manufacturing time – 300 days

COAL CHARGING MACHINES

These machines are designed for loading the coal charge in the coke battery ovens with useful chamber volume 14,6...51,0 m^3, and provide opening and closing the coal tower gates, opening and closing the hopper gates, removing and installation of charging door covers, lowering and lifting the "telescopes", opening and closing the post covers and injection cocks, cleaning the covers, leaning-to surfaces, post knees and pits, battery tops, weighing the charge to be loaded into the hopper, etc. The design of coal charging machines, their overall dimensions and weight depend on the chamber volume of the ovens to be serviced. The design of coal charging machines, their overall dimensions and weight depend on the chamber volum of the ovens to be serviced.

SPECIFICATIONS	VALUES			
Chamber volume , m^3	14,6…17,5	20…29,8	30…37,3	41,3…51,0
Gauge, mm	5230	5500	5845	7300
Overall dimensions, max, mm: - length - width - height	 9300 9500 4400	 9500 10900 6150	 10800 10800 6400	 12600 13700 8450
Weight, t	70	85	105	160
Movement speed , m/sec	2,1			
Average operation lifetime, years	15			

Manufacturing time – 300 days

COKE PUSHERS

The coke pushers are intended for servicing the machine side of coke batteries with useful chamber volume 14,6...51,0 m^3, they provide extraction and mounting of the doors, pushing out the coke cake from the oven, leveling the coal charge to be loaded into the chamber as well as de- graphitization of chamber arches, servicing the anchor springs, disposal of the charge from the leveler chute, removal of coke ends.
The design of coke pushers, overall dimensions and weight thereof depend on the volume of the ovens to be serviced and differ in mechanisms and devices equipment, movement parameters of the working components, number of operations and power intensity.

SPECIFICATIONS	VALUES			
Chamber volume , m^3	14,6…17,5	20…29,8	30…37,3	41,3…51,0
Gauge, mm	8686	8686 10000	10000	12000
Overall dimensions, max: - length - width - height	23000 14500 10600	23330 14700 10800	23850 15600 13800	29700 16000 14940
Weight, t	180	230	320	370
Movement speeds, m/sec: - coke pusher along the battery - pushing rod - leveler bar	0,9…1,6 0,4…0,5 1,2…1,5			
Force, kN: - pushing - leveling, - door input when mounting on the oven	250 20	300 25	300 25	400 30
	45			
Average operation lifetime, years	15			

Manufacturing time – 300 days

TECHNOLOGICAL EQUIPMENT

ARMOR PLATES FOR COKE OVENS

The armor plates are intended for reinforcement of coke oven brickworks, protection of outer parts of heating walls and oven input (output) holes against mechanical damages and they are the base for frame installations. The armor plates are pressed to the oven brickwork by means of anchor columns. The armor plate is an iron casting of complex configuration. There are special type slots and skews for laying asbestos cords, shaped pockets for special type bolts for frame attachment, platforms with the holes for installation and fastening of the threshold.

The armor plate is made for coke batteries with chamber volume 20...51 m^3, differ in dimensions and weight.

SPECIFICATIONS	VALUES			
Chamber volume , m^3	21,6	32,3	41,6	51,0
Overall dimensions, mm: - length - width - height	 5048 1140 480	 6300 1320 480	 7740 1400 430	 7700 1570 430
Product weight, kg	2057	2700	3190	3900
Average operation lifetime, years	12			

Manufacturing time – 90 days

COKE OVEN FRAMES

The frames are intended for installation and holding of the doors on machine and coke side of the battery. The frame is an iron casting of complex configuration. There are the special type slots and skews in the frame for laying the asbestos cords. The inner plane of the frame has the machined surface (mirror) for pressing the sealing frame blade to provide the sealing of coking chambers. The hooks with mouths are attached to the side walls of each frame side. In the middle portion of the frame body the rests (shoes) are fastened on the both sides on which the door rollers rest for holding the doors in vertical position. The frames are made for coke ovens with chamber volume 21,6...51 m^3, as well as for coked pitch batteries with coking chamber volume 17,5 m^3. The frames differ in dimensions and weight.

SPECIFICATIONS	VALUES			
Chamber volume , m^3	21,6	32,3	41,6	51,0
Overall dimensions, mm: - length - width - height	 4610 830 430	 6700 970 580	 7600 870 580	 7800 1040 620
Product weight, kg	1160	1600	2000	2200
Average operation lifetime, years	12			

Manufacturing time – 90 days

COKE OVEN DOORS

The coke oven doors are intended for locking the chambers of coke oven on coke and machine sides of the battery. The machine side doors differ from the coke side doors in availability of leveling door. The doors are mounted on the frame with hooks and fixed by cross-bars. Depending on the design of locking device, the door is made with the screw or spring cross bar. The machine side door consists of the body, leveling door, cross-bar, sealing frame, back up rollers. The design peculiarity of the doors is the availability of gas disposal channels, lining block and spring unit for pressing the sealing frame providing the higher gas tightness and reliable door operation.

SPECIFICATIONS	VALUE				
Chamber volume , m^3	13,9…17,5	21,6	32,3	41,6	51,0
Overall dimensions, mm: - length - width - height	 3500 820 750	 4760 810 850	 6400 890 850	 7400 880 905	 7450 1020 1100
Product weight, kg	1600	1790	3900	4350	5500
Average operation lifetime, years	12				

Manufacturing time – 90 days

SEALING FRAMES

The sealing frames are intended for sealing the chambers of coke batteries ovens. The frames are mounted on the coke oven doors and pressed to the frame mirror. The design feature of the frame - availability of angle piece - blade and membrane which provide the flexibility and air - tightness of the frame.

SPECIFICATIONS	VALUES		
	Angle-piece frame	Flexible membrane frame	Special shape frame
Overall dimensions, max, mm: - length - width - height	 7370 630 38	 7370 630 40	 7370 630 35
Weight, kg, max:	100	150	100
Average operation lifetime, years	3		

Manufacturing time – 60 days

SPIRAL CYLINDRICAL CONTRACTION SPRINGS

The spiral cylindrical contraction springs are intended for operation in anchor columns and ties of coke batteries for transfer of the armor forces from anchor columns to the brickwork. The springs are mounted on the anchor columns, longitudinal and cross ties.

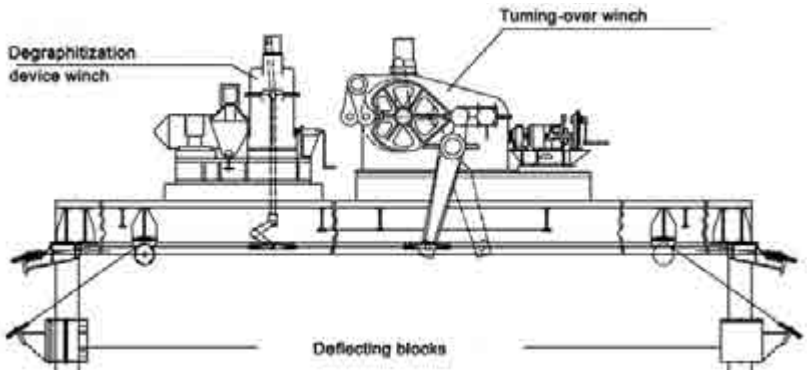
SPECIFICATIONS	VALUES				
Rod diameter, mm	22	25	25	40	40
Main dimensions : - length in free condition, mm	180±4	190±4	290±4	195±4	295±4
- mean diameter, mm	95	92	92	163	163
- outer diameter, mm	117±1,5	117±1,5	117±1,5	203±2	203±2
Spring force at maximal deformation, N	20000	45000	35000	88300	70000
Number of spring working coils	5,00	4,75	7,5	2,75	4,50
Full number of spring coils	6,50	6,25	9,00	4,25	6,00
Spring weight, kg, max	5,8	6,5	10,0	21,3	28,0

Manufacturing time – 60 days

The dimensions and weight of the springs depend on the place of installation and functions.

EQUIPMENT OF GAS DISPOSAL FITTINGS

TURNING-OVER MECHANISM



The turning- over mechanism is intended for control of heating gas reversing cocks of reversing valves and the valves of the decarburization during change of gas and air flow direction tc the heating system of the coke (coked pitch) ovens and disposal of burning products. The mechanism consists of the rods connected with turning-over winch (turning-over device) and the winch of the de-graphitization device.

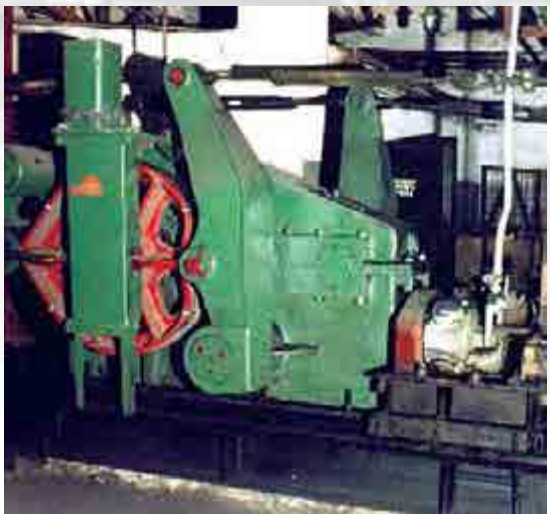
Turning-over winches of two types are used:
- with lower disposition of the levers;
- with upper disposition of the levers.

Two versions of turning-over winches are manufactured depending on the levers forces:
- with force on drive lever of gas-air valves - 30000N and 70000N;
- with force on drive lever of reversing cocks - 15000N and 35000N.

SPECIFICATIONS	VALUES						
Chamber volume, m^3	21,6	30	30,9	32,3	35,4	41,6	51
Distance between the chamber axes, mm	1143	1300	1320	1260	1300	1400	1570
Turning –over winch drive levers stroke, mm	610						
Turning-over time, sec	30						
Degraphitization winch drive lever stroke, mm	305						
Turning-over time of degraphitization winch, sec	1,25						
Product weight, kg	9000…24150						
Average operation lifetime, years	15						
Degraphitization bars drive:	winch of degraphitization device						

Manufacturing time – 120 days

TURNING–OVER WINCHES



Лебедка кантовочная служит приводом механизма кантовочного и предназначена для переключения реверсивных кранов арматуры отопления и газовоздушных клапанов системы обогрева коксовых батарей. Состав лебедки с верхним расположением аналогичен лебедке кантовочной с нижним расположением.

The winch consists of: reduction gear, two eccentric washers, reversing cock lever and gas-air valve lever, electric motor, brake, hand powered drive, master controller.

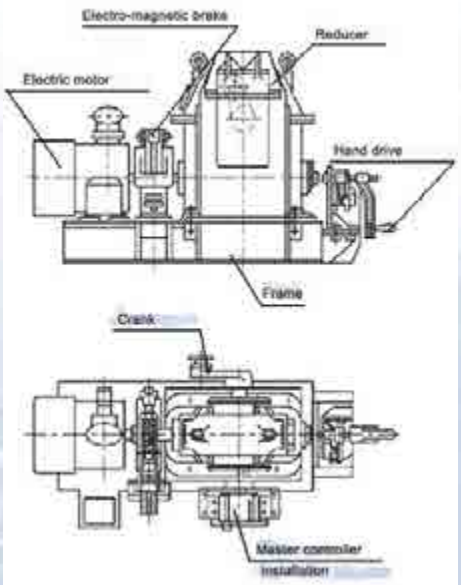
Depending on the number of chambers on the battery, the winches are manufactured for the following forces:
- on the levers of the gas-air valves – 30 000 N and 70 000 N;
- on the levers of the reversing cocks – 15 000 N and 35 000 N.

SPECIFICATIONS	VALUES			
	WITH UPPER DISPOSITION OF THE LEVERS		WITH LOWER LEVERS	
Gas-air valve drive lever force, N	30000	70000	30000	70000
Reversing cock drive lever force, N	15000	35000	15000	35000
Drive levers stroke, mm	610	610	610	610
Turning-over time of electric motor, sec	30	30	30	30
Turning-over time of pneumatic motor, sec	65	65	65	65
Manual drive handle force , N	280	245	280	245
Overall dimensions, mm: - length - width - height	 3200 2340 1300	 3900 2500 1550	 3200 1850 1300	 3900 1990 1600
Weight, kg	4300	9150	4350	9200
Average operation lifetime, years	15		15	

Manufacturing time – 120 days

DEGRAPHITIZATION DEVICE WINCH

This winch is connected with the bars of the degraphitization device of the turning –over mechanism and intended for opening and closing the covers of air valves through which the air goes periodically to the gas channels of the coke ovens for burning out the graphite . The winch is installed on the coke batteries with the side supply of coke gas. In the winch design the hand
powered drive is provided which is intended for turning-over the bars of the degraphitization device in case of absence of electric supply. The winch is controlled automatically.

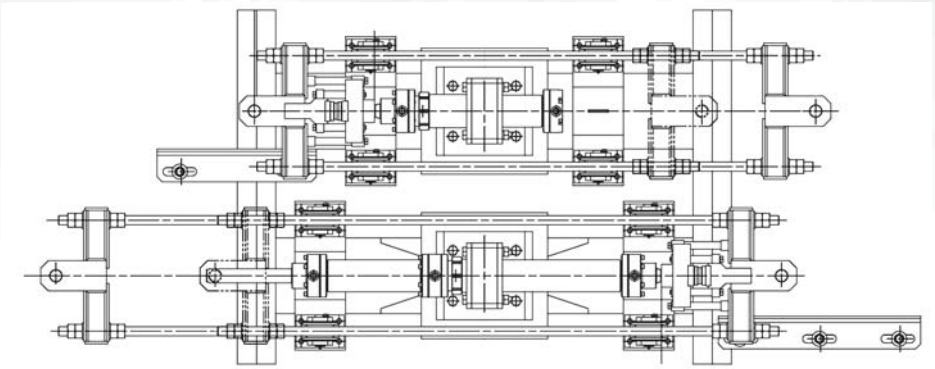


SPECIFICATIONS	VALUES
Max. tractive force on the crank pin, N	17400
Max. force on the hand powered handle, N	330
Turning-over time, sec	1,25
Hand-powered turning-over time, sec	40
Overall dimensions, mm: - length - width - height	 1760 905 890
Weight, kg	690

Manufacturing time – 120 days

TURNING-OVER DEVICE

This device serves as drive for turning-over mechanism and intended for control of heating gas reversing cocks, gas-air valves and degraphitization valves in the system of coke (coked pitch) batteries. The turning-over device is mounted on the counterforts in the lower portion of coke (coked pitch) batteries.



The turning-over device includes:
- gas-air valves drive;
- heating gas cocks drive;
- degraphitization valves drive;
- hydraulic system;
- electric control system.

Depending on the method of heating gas supply to the heating system of coke (coked pitch) batteries, the turning-over device is manufactured of two types:
- consisting of two drives (lower supply of coke gas);
- consisting of three drives (side supply of coke gas).

SPECIFICATIONS	VALUES
Drive force, KN: - gas-air valves - heating gas cocks - decarburization (degraphitization) valves	 50…100 20…50 15…20
Hydraulic cylinder rod stroke, mm: - gas-air valves drive - heating gas cocks drive - decarburization (degraphitization) valves drive	 610±6 610±6 305±5
Working pressure in hydraulic system, MPa	5; 6,3; 10
Weight, kg	5000…8000
Average operation lifetime, years	15

Manufacturing time – 150 days

COKE OVENS HEATING FITTINGS

The heating fittings are intended for coke or blast furnace gas supply from the collector to the heating system of coke ovens as well as air supply for degraphitization of gas supplying As per the method of heating gas supply, the fittings are split up into heating fittings for the ovens with the lower system of coke gas supply and with the side system.

SPECIFICATIONS	VALUES	
Chamber volume, m^3	21,6…51	
Number of furnaces in the battery, pcs.	41…77	
Weight, kg	2600…5800	
Average operation lifetime, years	10	
Part	кран стопорный Dy40 (Dy50 , Dy65)	
	кран реверсивный Dy40 (Dy50 , Dy65)	
	collectors	sleeve flexible
	units for supplying gas to the vertical	valves for air
	units and parts for controlling the gas flow	
	connective fittings	

Manufacturing time – 180 days

REVERSING COCKS

The reversing cocks are intended for periodical supply of the coke gas into coke battery ovens heating system. Included in the heating fittings complete set. Depending on coke battery volume and gas input in coke battery ovens heating system, the reversing cocks are produced in three executions: D_u40; D_u50; D_u65.

SPECIFICATIONS	VALUES		
Flow section diameter	D_u40	D_u50	D_u65
Overall dimensions, max, mm: - length - width - height	 220 278 186	 250 340 240	 510 350 475
Weight, kg	16,5	32,5	48
Average operation lifetime, years	10		

Manufacturing time – 90 days

STOP COCKS

Intended for cutting -out the coke gas upply from distributing gas main to heating system of coke battery ovens for repair and replacement of reversing cock. Included in the heating fittings complete set. The cocks are produced in three executions: D_u40; D_u50; D_u65.

SPECIFICATIONS	VALUES		
Flow section diameter	D_y40	D_y50	D_y65
Overall dimensions, max, mm: - length - width - height	 150 235 130	 170 259 140	 220 325 295
Weight, kg	9	13,6	20,5
Average operation lifetime, years	10		

Manufacturing time – 90 days

REVERSING VALVES (GAS-AIR)

The reversing valves (gas-air) are intended for air and heating gas supply to the generators bottom channels and disposal of combustion products from bottom channels to the flues as well as for changing the direction of gas flows in coke ovens with volume 20...51m^3. The reversing valve consists of cam-lever mechanism, poppet valve, throttle valve, body, cover for air and branch pipe to the flue. The work principle of reversing valves is based on the periodical lifting and lowering of poppet valve by means of cam-lever system connected through the lever with turning-over mechanism tie.

SPECIFICATIONS	VALUES
Medium inside valve	Air, heating gas, combustion products
Medium temperature, ˚C	300...350
Pressure inside valve, MPa	0,005
Flow area, m^2: - air - combustion products - heating gas	 0,05...0,24 0,07...0,24 0,017...0,09
Overall dimensions, mm: - length - width - height	 675...1630 470...1185 1317...2113
Drive lever force, N	400...450
Throttle hand –wheel displacement (rotation) force, N	16
Product weight, kg	350...1840
Average operation lifetime, years	20

Manufacturing time – 120 days

GAS DISPOSAL EQUIPMENT

GAS COLLECTORS

The gas collectors are intended for collection, primary cooling and disposal of coke gas for further processing. Design executions of gas collectors: round or pan-shaped body section.

SPECIFICATIONS	VALUES				
Chamber volume, m^3	14,6...17,5	20,0...29,8	30,0...37,3	41,3	51,0
Distance between chambers axes, mm	1143	1143	1260 1300 1320	1400	1570
Overall dimensions, mm: - length - width - height	 71500 3220 7840	 76900 2850 8256	 104335 2685 8605	 88714 2800 9400	 134000 2800 9400
Weight, t	90,6	105,4	143,6	130,0	194

Manufacturing time – 120 days

The round section gas collectors are produced of the tubes diameter 1200 and 1420 mm depending on oven volume and quantity thereof in coke battery. The gas collectors can consist of one branch to be installed on the machine side or of two branches- on machine and coke side of the battery connected through pass-over gas piping. On each branch the automatic gas releasing vents with hand powered or hydraulic drive of gas release and automatic fuse device are mounted.

PASS-OVER GAS PIPING

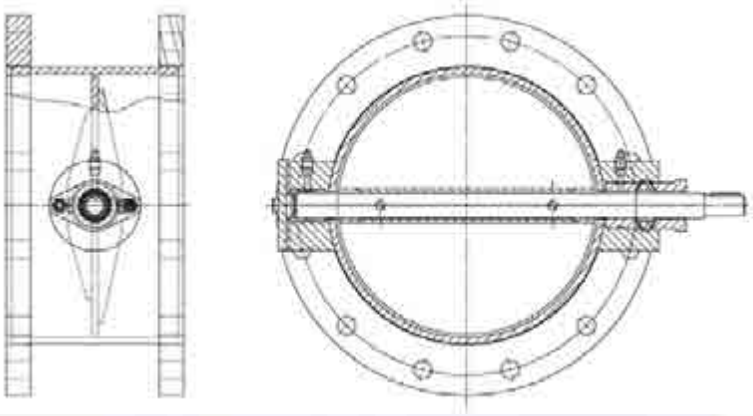
Intended for connection of gas collectors on machine and coke sides of coke battery and gas disposal for further processing through direct coke gas line.
The gas line diameter 1000- 1400m is manufactured, depending on gas flow coming from the coke ovens.
The gas line consists of throttle valve, compensator, nozzle and knee.

SPECIFICATIONS	VALUES		
Chamber volume, m^3	20…51		
Flow section diameter , mm	1000	1200	1400
Overall dimensions, mm: - length - width - height	 20300 2100 9600	 23100 2300 12800	 26500 2400 10200
Weight, kg	13980	22160	26200
Average operation lifetime, years	10		

Manufacturing time – 120 days

THROTTLE VALVES

Intended for adjustment of coke gas flow through pass - over gas line or collector from coke battery to the chemical production plant. Throttle valves with diameter of conditional flow 250-1400 mm are produced, depending of the purpose and installation place are produced with controllable adjustment of turn angle and shaft end for hand powered or gear-operated drive.



SPECIFICATIONS	VALUES						
Conditional flow diameter, mm	250	500	800	1000	1100	1200	1400
Overall dimensions, max, mm: - height - length as per shaft - flange diameter	 175 470 390	 280 800 640	 300 1123 975	 500 1405 1175	 500 1532 1275	 500 1682 1375	 500 1725 1575
Weight, kg	45	118	182	337	406	595	640
Average operation lifetime, years	10						

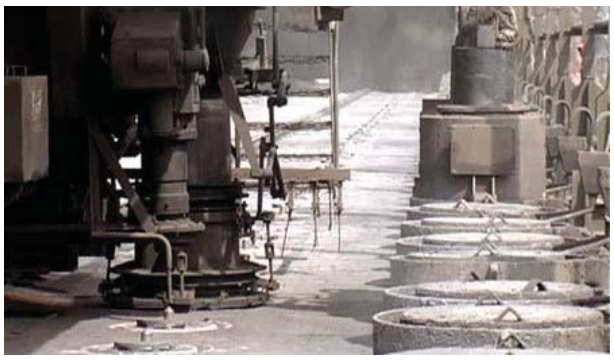
Manufacturing time – 90 days

COKE GAS DISPOSAL POSTS

The coke gas disposal post is installed on the upper portion of coke (coked pitch) battery and intended for primary cooling and disposal of coke gas appearing during coking process from the coking chamber volume 13,9...51m^3 to the gas collector as well as for closing coking chamber during coke output. The post is controlled manually or by the coal charging machine mechanism. On the posts the vapor- or hydro-injection cocks, nozzles or sprayers are mounted. The temperature on the post inlet is up to 900 °C, on outlet-less 90 °C. The peculiarity of the posts are the cover pneumatic sealing, hydraulic sealing of movable joint and cover hydraulic drive (hydraulic cylinder), taken out from the area of high temperatures, i.e. the reliable hermetic sealing and enviroment protection.

SPECIFICATIONS	VALUES						
Diameter of flow section, mm	350	350; 390	350	390	500	550	400
Distance between the axes of Tjoint and valve box, mm	690	690	750	750	900	1000	700
Angle of post cover opening, degrees	90	90; 100	90; 100	90	100	110	100
Turn angle of driving lever, mm	48	48	35	30	35	-	45
Overall dimensions, mm: - length - width - height	 2000 1200 2100	 2000 1200 2100	 2000 1200 2100	 2700 1200 2000	 1600 1300 2500	 1700 1150 2360	 1250 1450 1500
Product weight, kg	1300	1300	1500	1500	2100	2590	710
Average operation lifetime, years	18						

Manufacturing time – 120 days



POSTS FOR CHARGING GAS DISPOSAL

These posts are installed on the top of coke side of the coke batteries with chambers volume 30...41,6 m^3 and intended for dust and gas disposal out of the coking chamber to be charged through overflow sleeve to the next chamber. The overflow sleeve is included in the complete-set of coal charging machine or installed stationary along the coke side connecting two or three posts with each other. Design execution of the posts: with hydraulic- and pneumatic sealing of the cover.

SPECIFICATIONS	VALUES	
Type	Execution with hydraulic sealing of the cover	Execution with pneumatic sealing of the cover
Diameter of flow section, mm	350…450	450
Overall dimensions, mm: - length - width - height	 1000 700 1080	 950 900 900
Weight, kg	350	395

Manufacturing time – 120 days

NOZZLE AND SPRAYER

The nozzle is intended for hydro-injection of ammoniac water supplied under pressure in gas disposal posts.

SPECIFICATIONS	VALUES
Diameter of pass hole, mm	7; 10
Overall dimensions, max, mm: - length - width - height	 200…250 140…170 125…175
Weight, kg	6,0…8,0
Average operation lifetime, years	12

Manufacturing time – 90 days

The sprayer is intended for spraying the ammoniac water supplied under pressure in the gas disposal posts.

SPECIFICATIONS	VALUES
Diameter of flow section, mm	4,5…6
Overall dimensions, max, mm: - length - width - height	 170…200 110…180 90…165
Weight, kg	2,8…4,2
Average operation lifetime, years	12

Manufacturing time – 90 days

INJECTION COCKS

Two types of the injection cocks are produced depending on the purpose:

- vapor - injection cocks;
- hydro - injection cocks.

The vapor-injection is intended for vapor supply to the posts for feeding coke gas during charging the coking chamber.

The hydro-injection cock is intended for supply of ammoniac water for injection to the gas disposal posts during charging the coking chamber.
The cocks are controlled by coal charging machine mechanism.

SPECIFICATIONS	VALUES	
Type	Vapor-injection cock	Hydro-injection cock
Diameter of conditional flow, mm	25	25
Working environment temperature, °C	400	80
Working pressure, MPa	9	4
Overall dimensions, mm: - length - width - height	 495 115 148	 618 175 175
Weight, kg	8	17,7
Average operation lifetime, years	5	5

Manufacturing time – 90 days

HAND GATE

Intended for hand powered adjustment of rarefaction in the coke battery flues caused by the chimney. The hand gate is put in operation by the lever.
Manufactured for coke batteries with chamber volume 20...51m^3.

SPECIFICATIONS	VALUES
Drive lever force, max	250
Blade overall dimensions: - height - width	 3120…3400 3100…4400
Weight, kg	2400…3100
Average operation lifetime, years	12

Manufacturing time – 90 days

AUTOMATED GATES

Intended for automatic adjustment of rarefaction in the coke battery flues caused by the chimney. Manufactured for coke batteries with chamber volume 20...51m^3. The gates are connected in pairs with the ties and put in operation by the actuating mechanism.

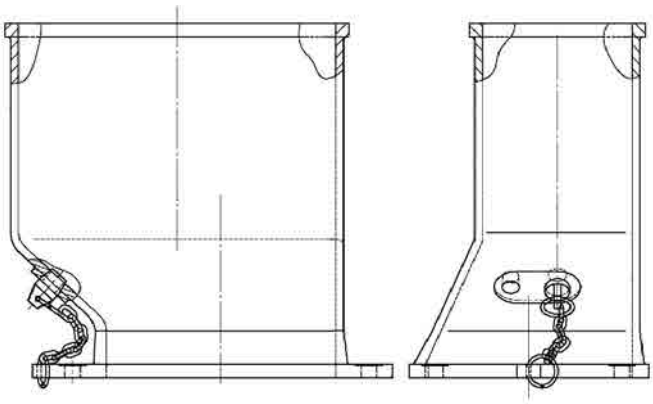
SPECIFICATIONS	VALUES
Blade overall dimensions, mm: - height - width	 1600…3270 1840…2700
Weight, kg	1960…3930
Average operation lifetime, years	12

Manufacturing time – 120 days

REINFORCEMENTS TO BE LAID DOWN IN THE BRICKWORK OF THE COKE BATTERIES

REDUCERS

The reducers are intended for air-, heating gas-and combustion flow in the heating system of coke ovens. The reducers are connected with reversing valve body and laid down in the bottom channels brickwork. The design dimensions and reducers weight are defined by the installation place and design execution of coke battery brickwork.



SPECIFICATIONS	VALUES
Overall dimensions, max, mm: - length - width - height	 430…950 232…750 480…835
Weight, kg, max:	49…214,4
Average operation lifetime, years	20

Manufacturing time – 90 days

CHARGING CHUTES

The chutes are intended for closing and sealing the charging hole of coke battery oven. The chute consists of the cover and frame. The frame is an iron casting of ring or rectangular shape. There is a taper hole and ring seat for guiding and installation of chute cover in the upper frame portion. The chute cover is a round carbon steel casting. The upper portion of the cover has a pin for guiding and centering the gripper of the chute dismantling mechanism. For separation and removal of the chute cover by the gripper of chute dismantling mechanism the sector is attached to upper part of the cover. The lower portion of the cover is made as cylindrical knife and has the ring -shaped cut-out on the side surface for sealing in the frame seat. For fastening of thermal insulation the reinforcement is welded to the lower portion of the cover.

The chutes are produced for coke ovens 20...51m^3, differ in dimensions and weights.

SPECIFICATIONS	VALUES
Diameter of charging hole, mm	396…550
Overall dimensions, mm: - length - width - height	 575…800 575…820 122…250
Weight, kg	133…270
Average operation lifetime, years	8

Manufacturing time – 90 days

SIGHT HOLE UNITS FOR REGENERATOR

Intended for supervision over the condition of the regenerators and measurement of the temperature.
The sight hole units differ in design execution of the body, depending on the mounting place and diameter of the sight hole.

SPECIFICATIONS	VALUES		
Sight hole diameter, mm	40	45	130
Overall dimensions, mm: - length - width - height	 115 75 152	 296 70 170	 520 170 270
Product weight, kg	3	8	19
Average operation lifetime, years	8		

Manufacturing time – 60 days

INSERTS WITH THE SEALING COLLARS

Intended for connecting the reinforcement knee of the heating system to the side coke gas supply and overflow of the same to the heating system of coke battery. The dimensions and weights of the products depend on gas quantity necessary for heating the oven chambers with the volume 16...35,5 m^3.

SPECIFICATIONS	VALUES	
Pass hole diameter, mm	67	85
Overall dimensions, mm: - length - width - height	 470 200 200	 730 200 200
Product weight, kg	46	50
Average operation lifetime, years	8	

Manufacturing time – 60 days

THE UPPER SIGHT HOLE UNITS

Intended for supervision over condition of the vertical channels and measuring the temperature therein. Differ in the dimensions of sight holes.

SPECIFICATIONS	VALUES		
Diameter of sight hole, mm	80	105	116
Overall dimensions, mm: - length - width - height	 120 120 82	 150 150 95	 170 170 84
Weight, kg	7	11	12
Average operation lifetime, years	8		

Manufacturing time – 90 days

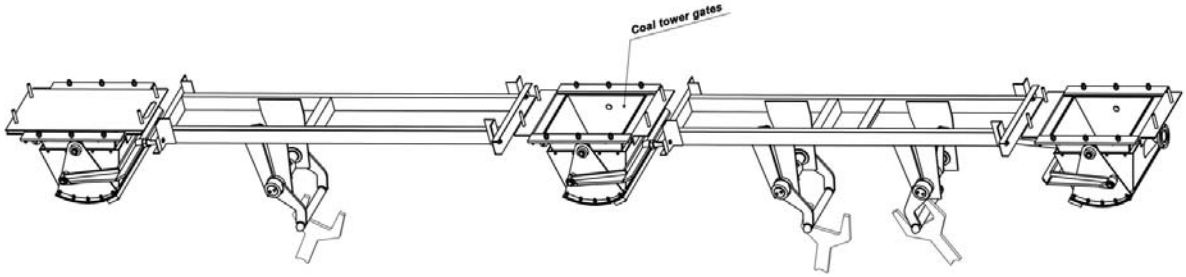
EQUIPMENT FOR OPERATION OF COKE BATTERY

COAL TOWER GATES

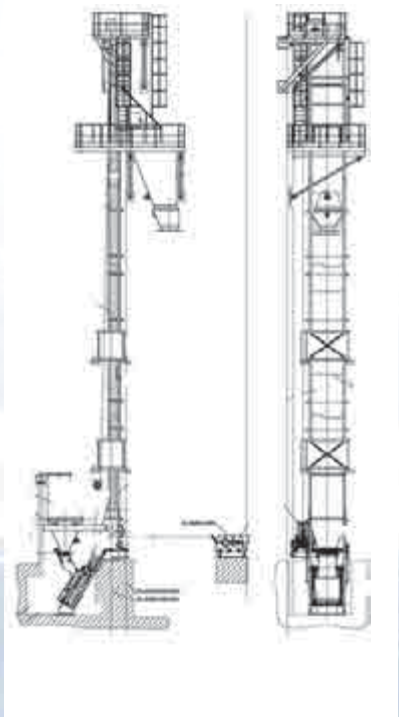
Intended for release of the charge from coal tower and charging the hoppers of coal loading machine.
Gate control - by the drives and mechanisms installed in the coal loading machine. The design execution of the gate is defined by overall dimensions of the gate port and gate control drives type.

SPECIFICATIONS	VALUES				
Distance between the gates, mm	4110	3550	4400	3900	3600
Overall dimensions of gate port, mm	500x740	560x600	560x600	560x600	500x740
Overall dimensions, mm: - length - width - height	 9320 1034 965	 8400 1150 995	 10100 1150 995	 9100 1150 995	 12100 1150 995
Weight, kg	1793	2242	2340	2240	2860
Average operation lifetime, years	10				

Manufacturing time – 120 days



SKIP HOIST



Intended for hoisting the under –leveler charge formed when leveling by the coke pusher. The under-leveler charge is delivered from the hopper installed on the coke pusher to lower hopper of skip hoist. The charge is transferred from the lower hopper of skip hoist to the upper one. From the upper hopper the charge is periodically unloaded to the last hopper of coal charging machine.

Product units: winch, lower hopper, upper hopper, block installation, guide way; support metal structures.

SPECIFICATIONS	VALUES		
Skip hoist height, m	26	27	31
Skip capacity, m^3	1		
Load capacity, kg	2100		
Skip movement speed, m/sec	0,51	0,46	0,51
Overall dimensions, mm: - length - width - height	 11,1 6,0 37	 11,2 3,7 33	 11,5 6,0 37
Product weight, kg	27000	22000	26000
Average operation lifetime, years	10		

Manufacturing time – 150 days

CONVEYER FOR SPILLED COKE DISPOSAL

Intended for mechanical disposal of spilled coke and charge from the coke battery servicing area.

Product units: drive station, tensioning station, pan installation, scrapers, mechanism for opening hopper gate.

SPECIFICATIONS	VALUES
Hopper volume, m^3, max	2,6
Scrapers speed, m/sec, max	0,03
Productivity, t/h, max	1,6
Overall dimensions, max, mm: - length - width - height	 190000 32000 54000
Weight, kg, max:	25000
Average operation lifetime, years	20

Manufacturing time – 150 days

JIB CRANE

Jib-crane is intended for hoisting and lowering the loads. The crane is installed on the top of coke battery over the end platform. Turn angle - 220°.

Product units: drive, jib, suspension, block system, frame.

SPECIFICATIONS	VALUES
Rated load capacity, t	5
Hoisting speed, m/sec	0,075
Hoist working height, m	20
Jib turn method	manual
Overall dimensions, max, mm: - height - width - length	 5800 1050 5200
Weight, kg, max:	3421
Average operation lifetime, years	20

Manufacturing time – 90 days

DOOR REPAIR STATION

The station is installed on the servicing areas of the coke batteries.

Product units: stationary beds, swing beds and lowering bed installation.

STATIONARY BED

The stationary bed is intended for repair of the lining, adjustment of cross-bar gatesof the doors on machine and coke side as well as trying out the stroke of door-extracting devices and cleaning the frames on the coke pusher and door dismantling machine.

SPECIFICATIONS	VALUES					
Oven chamber volume, m^3	21,6	30,9	30,3...32,3	35,4...35,5	41,6	51
Overall dimensions, max, mm: - length - width - height	 830 1275 6100	 910 1228 7130	 710 1216 6160	 980 1300 6700	 1020 1230 8050	 1035 1300 8000
Weight, kg, max:	600	980	720	700	1145	1200
Average operation lifetime, years	20					

Manufacturing time – 90 days

SWING BED

Intended for simultaneous storage of three spare doors. This is a welded metal structure with the central swing axle with turn angle 360º, on which three frames under angle 120º for taking the doors are located.

TECHNICAL PARAMETERS	VALUES					
Oven chamber volume, m^3	21,6	30,9	30,3...32,3	35,4...35,5	41,6	51
Overall dimensions, max, mm: - length - width - height	 2000 2000 6000	 2230 2230 7050	 2230 2230 6285	 2230 2250 6590	 2300 2300 8140	 2350 2350 8200
Weight, kg, max:	1716	1955	1665	1840	2225	2420
Average operation lifetime, years	20					

Manufacturing time – 90 days

LOWERING BED INSTALLATION

Intended for taking the damaged doors from the coke pusher and door extracting machine, turning to the angle 180º and lowering to the horizontal position for repair works.

Lowering beds installation consist of three types:

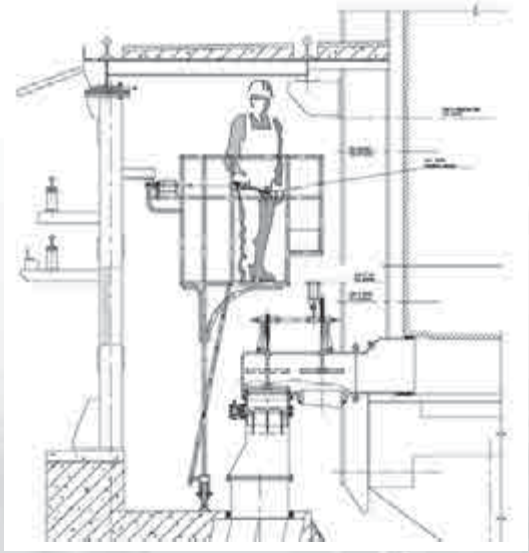
- lowering beds installation with single drum winch, tensioning device and rope-block system;
- lowering beds installation with doubledrum winch, tensioning device and rope-block system;
- lowering hydro-powered beds installation with hydraulic drive.

SPECIFICATIONS	VALUES				
Oven chamber volume, m^3	21,6	30,9	30,3…32,3	35,4…35,5	41,6
Overall dimensions, max, mm: - length - width - height	 2150 2020 5390	 2600 2300 7095	 2150 2020 6525	 2350 2020 6980	 2350 2020 8440
Weight, kg, max:	4220	6610	5731	6446	6800
Average operation lifetime, years	20				

Manufacturing time – 90 days

THE CARRIAGES FOR SIDE TUNNELS AND SERVICING THE HEATING FITTINGS

Intended for servicing the heating fittings in the side tunnels along the machine nd coke side of the coke battery. Carriage movement along the tunnel – hand powered.



SPECIFICATIONS	VALUES
Overall dimensions,max, mm: - length - width - height	 2720 1415 3400
Weight, kg	231

Carriage is intended for servicing the heating fittings in the tunnels along the machine and coke side of the coke battery.
Carriage movement along the tunnels- hand poweredю.

SPECIFICATIONS	VALUES
Overall dimensions, max, mm: - length - width - height	 1720 560 1227
Weight, kg	80

Manufacturing time – 90 days

CONCRETE SPRAYING APPARATUS

Intended for application of refractory solutions while repairing brickworks of coke battery ovens.

Components of the apparatus: body, carriage, sprayer, distributing valve, manometer.

SPECIFICATIONS	VALUES
Apparatus capacity, l	40
Working pressure of compressed air, MPA	0,12… 0,16
Temperature of compressed air, ˚C	55
Overall dimensions, mm: - length - width - height	 1400 510 1200
Weight of empty apparatus, kg	149
Weight with the , kg	200
Average operation lifetime, years	5

Manufacturing time – 90 days

EQUIPMENT FOR COKE QUENCHING

CHARGING DEVICE FOR CDQP

Intended for automatic opening(closing) the chamber neck of the coke dry quenching plant (CDQP) as well as guiding in the same the hot coke from the coke car body.

Product units: charging chute cover, carriage, drive, air duct, funnel.

SPECIFICATIONS	VALUES
Overall dimensions, max, mm: - length - width - height	 9100 7840 3050
Weight, kg	16400
Average operation lifetime, years	12

Manufacturing time – 180 days

DISCHARGING DEVICE CDQP

Intended for portion discharge of the coke with the temperature 180…200 °C from the quenching chamber on the conveyer.

Product units: funnel; hopper; gate drive; shutoff device, intermediate hopper, overcharging hopper; lower hopper, tray.

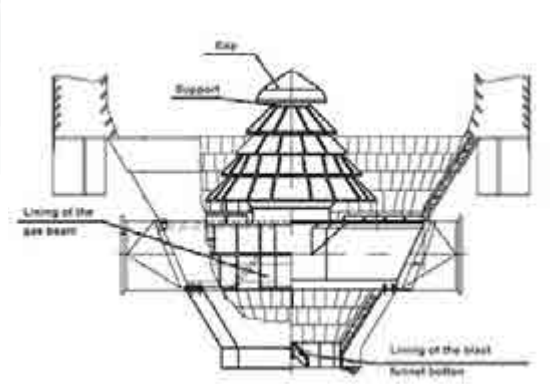
SPECIFICATIONS	VALUES
Carrying capacity , t/h	70
Overall dimensions, max, mm: - length - width - height	 7570 5400 9225
Weight, kg	42150
Average operation lifetime, years	12

Manufacturing time – 180 days

BLAST DEVICE

Intended for supply of cooled inert gas to the lower portion of CDQP chambers and uniform distribution of the same in the chamber section towards the lowering coke.

The blast device is mounted in the lower portion of the quenching chamber and consists of the following units: blast head, blast funnel, dissector, lining plates.



SPECIFICATIONS	VALUES		
Oven chambers volume, m^3	20…41,6		
Quenching CDQP chamber diameter, mm	6500	7860	7860
Coke carrying capacity, t/h	56	70	70
Overall dimensions, mm: - length - blast head diameter - height	 4760 3080 4920	 5605 3200 4423	 5605 3650 5550
Weight, kg	22200	19000	23300

Manufacturing time – 150 days

IRRIGATION DEVICE

Installed in the quenching tower and intended for delivery and uniform water distribution during quenching the hot coke on the coke quenching car.

SPECIFICATIONS	VALUES
Working medium	Circulation phenol slime water
Water pressure, MPa (kg/cm^2)	0,25 (25)
Temperature, °C	80
Coke slime content in the water, g/l	0,2-0,4
Weight, kg	1883
Average operation lifetime, years	5

Manufacturing time – 150 days

COKE RECEIPT AND SCREENING EQUIPMENT

SAMPLE COLLECTORS

Intended for motorized collection of coke (coal) samples from the conveyer, tray or hopper for preparation of lab, analytical and control probes.

The following types of probe collectors are produced:

- horizontal ladle sample collector;
- inclined ladle sample collector.

Product units:

electro-mechanical drive; drive shaft; ladle; tensioning device, limit switches.

SPECIFICATIONS	VALUES
Coke flow capacity, t/h, max	1200
Lump size category of the coke to be collected, mm, max	200
Weight of unit sample, kg, max	60
Ladle speed while passing through the coke flow, m/sec, max	1,5
Overall dimensions, mm: - length - width - height	 11000 4000 3800
Weight, kg, max:	4500
Average operation lifetime, years	10

Manufacturing time – 120 days

THE EQUIPMENT FOR PREPARATION OF COKE PROBES

The equipment for preparation to the tests of lab and analytical probes of black - and pitch coke:
IUDPC – Complex unit for dressing and preparation of coke probes; coke probe drum.

INTEGRATED UNIT FOR DRESSING THE COKE PROBES (CUDPC)

CUDPC is intended for preparing four lab probes weight 0,25kg and four analytical probes weight 0,0625kg from integral sample. The unit is used when inspecting the coke quality in coke-chemical branch of metallurgical industry.

Product composition: jaw crusher, feeder, elevator, reducer, drying cabinet, disc mill, drive.

SPECIFICATIONS	VALUES
Overall dimensions, max, mm: - length - width - height	 2890 1625 2650
Weight, kg	3300
Coke probe to be charged: - size category, max, mm Lab probe to be obtained: - size category, mm	 20…200 0…13
Analytical probe to be obtained: - size category, mm	 0…0,125

Manufacturing time – 150 days

COKE PROBE DRUM

Intended for coke test on mechanical strength. Four angle pieces (100 x 100mm), against which the coke strikes when the drum rotates, are located on inner drum surface parallel to its longitudinal axis.

Product units: drive, drum, cover, tray.

SPECIFICATIONS	VALUES
Overall dimensions, max, mm: - length - width - height	 2090 1365 1650
Weight, kg	1100
Coke probe to be charged: - size category, mm	20…200
Lab probe to be obtained: - size category, mm	0…10 10…25 more than 25

Manufacturing time – 150 days

LOCKING ACCESSORIES

PARALLEL FLANGED GATES WITH NONEXTENDING SPINDLE

Intended for mounting on pipe lines in water supply network.
Pressure – up to 1 MPA. Temperature - up to 1200°C.

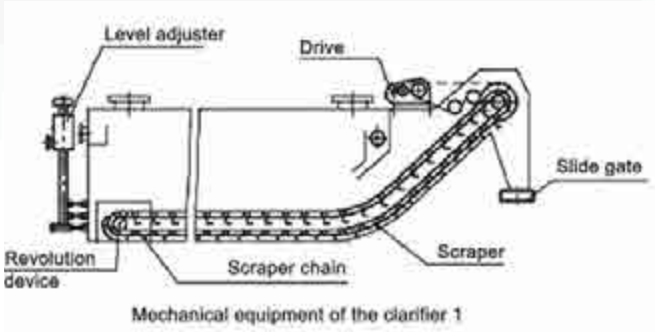
SPECIFICATIONS	VALUES				
Conditional pass diameter, mm	500		600		800
Drive	hand powered	el. drive	hand	el. drive	el. drive
Overall dimensions, mm: - length between joined flanges - width - height	 700 1082 1540	 700 1082 1897	 800 896 2144	 800 900 2071	 1000 1460 2755
Weight, kg	840	970	1320	1270	2930
Average operation lifetime, years	10				

Manufacturing time – 150 days

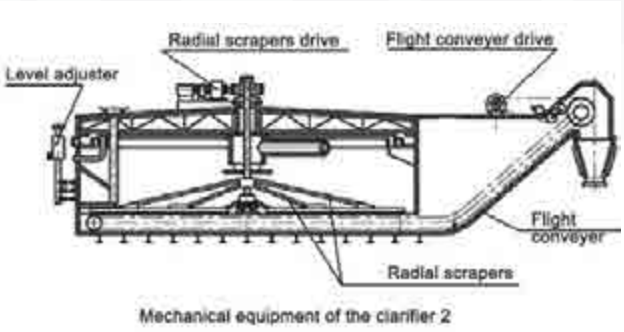
THE EQUIPMENT FOR CHEMICAL SHOPS

MECHANICAL EQUIPMENT OF THE OVER-RESIN WATER CLARIFIER

Intended for clarifying the over-resin water, extraction of the resin and solids (fossils) from the same as well as motorized removal of the solids from the clarifier. The clarifiers are produced of two design executions: rectangular and round shape.



Mechanical equipment of the clarifier 1



Mechanical equipment of the clarifier 2

SPECIFICATIONS	VALUES		
Type	type I		type II
Clarifier volume, m^3	210	380	650
Overall dimensions, mm: - length - width - height	 18350 5670 5600	 22000 5670 8500	 26000 16000 9000
Speed of radial scrapes shaft, $min.^{-1}$	-	-	0,386
Flight conveyer speed, m/h	6,12	6,12	9…28
Product weight, kg	14200	16700	19000
Average operation lifetime, years	12		12

Manufacturing time – 90 days