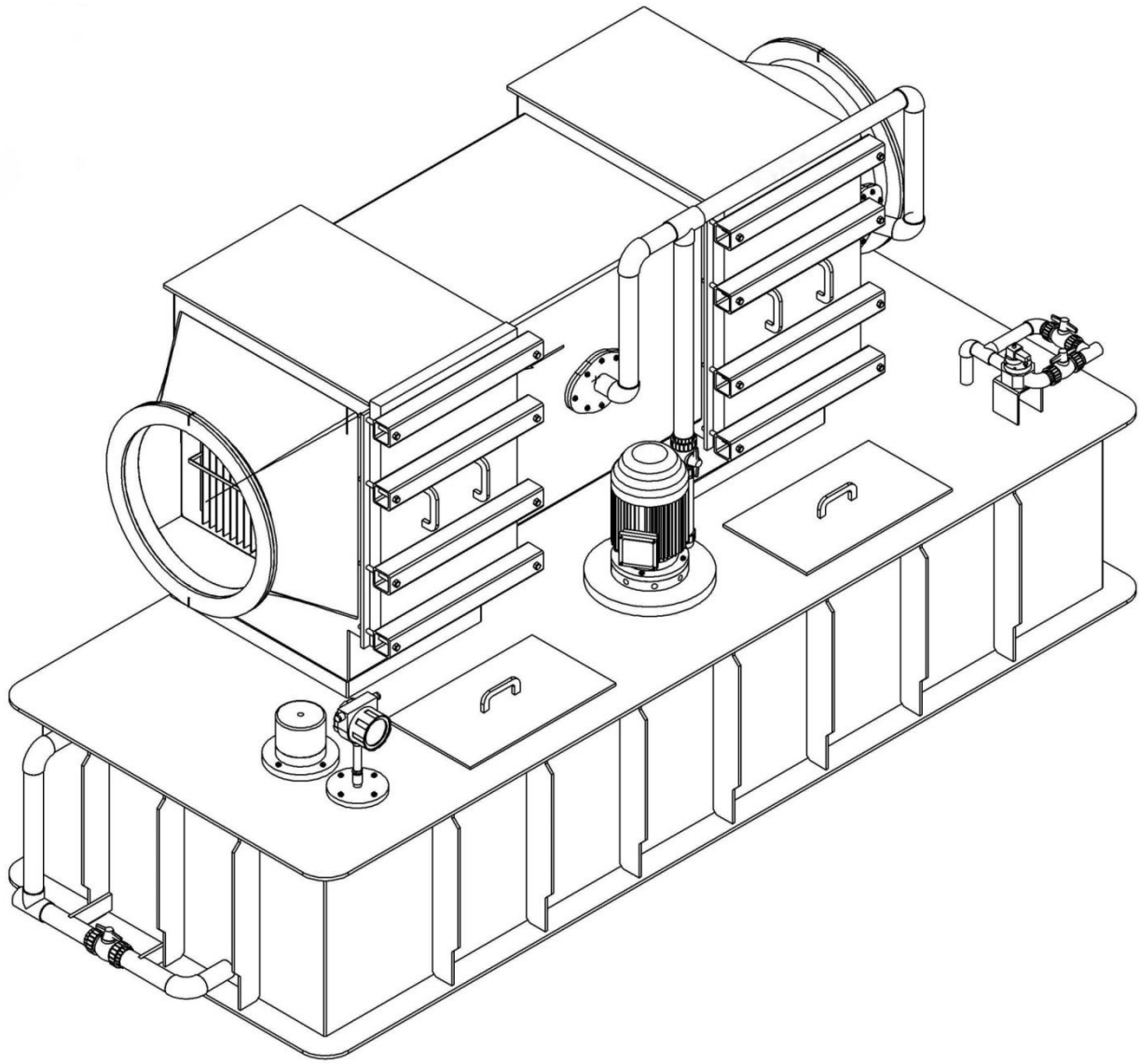
GAS WASHERS

UralActiv



MANUFACTURER OF PRODUCTS FROM POLYPROPYLENE

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CONTENT

Introduction

"Maksimov" gas washers (or scrubbers) are intended to clean the air contaminated with acid and alkali fumes, usually at electroplating industries, laboratories and in technological processes. "Maksimov" gas washers including all its inner parts (nozzle, sprayers, pipelines, pump, valve, level sensor, pH-indicator) are manufactured from polypropylene (PP). On your request we can produce scrubbers from other polymers – PP and its modifications: PVC (polyvinylchloride), PE (polyethylene), PVDF (polyvinylidene fluoride).

Scrubbers can be of two types: horizontal and vertical. Horizontal scrubbers "GM" are more compact and enable cleaning at high speeds of air-gas flow. The capability of scrubber series is 800 – 68800 m^3/h. The scrubber's resistance depends on model and can reach 300 – 800 Pa; scrubbers are intended for gas temperature 5 – 65 grades. The temperature of installation site: +5…+40 C° indoors (modification for outdoor use by -30…+30 C° is possible on special request). The efficiency of gas washers is 99 % for particles min. 15 micron. Depending on air-gas flow and operating side there are possible length and right types of body location. For aerodynamic reasons a straight pipe must be planned with a length of at least 3 times of the pipe diameter for the air inlet. Also it is recommended to plan at the outlet side a straight pipe of at least up to 1 meter.

The necessary parameters for selection:

1. The capability, m^3/h;
2. The gas temperature, grades;
3. The content of air-gas medium (the chemical formula, e.g. HCl, H2SO4, NAOH...);
4. The concentration of vapours before the scrubber entrance, mg/m^3;
5. The necessary affectivity or the concentration at the outlet side (mg/m^3).

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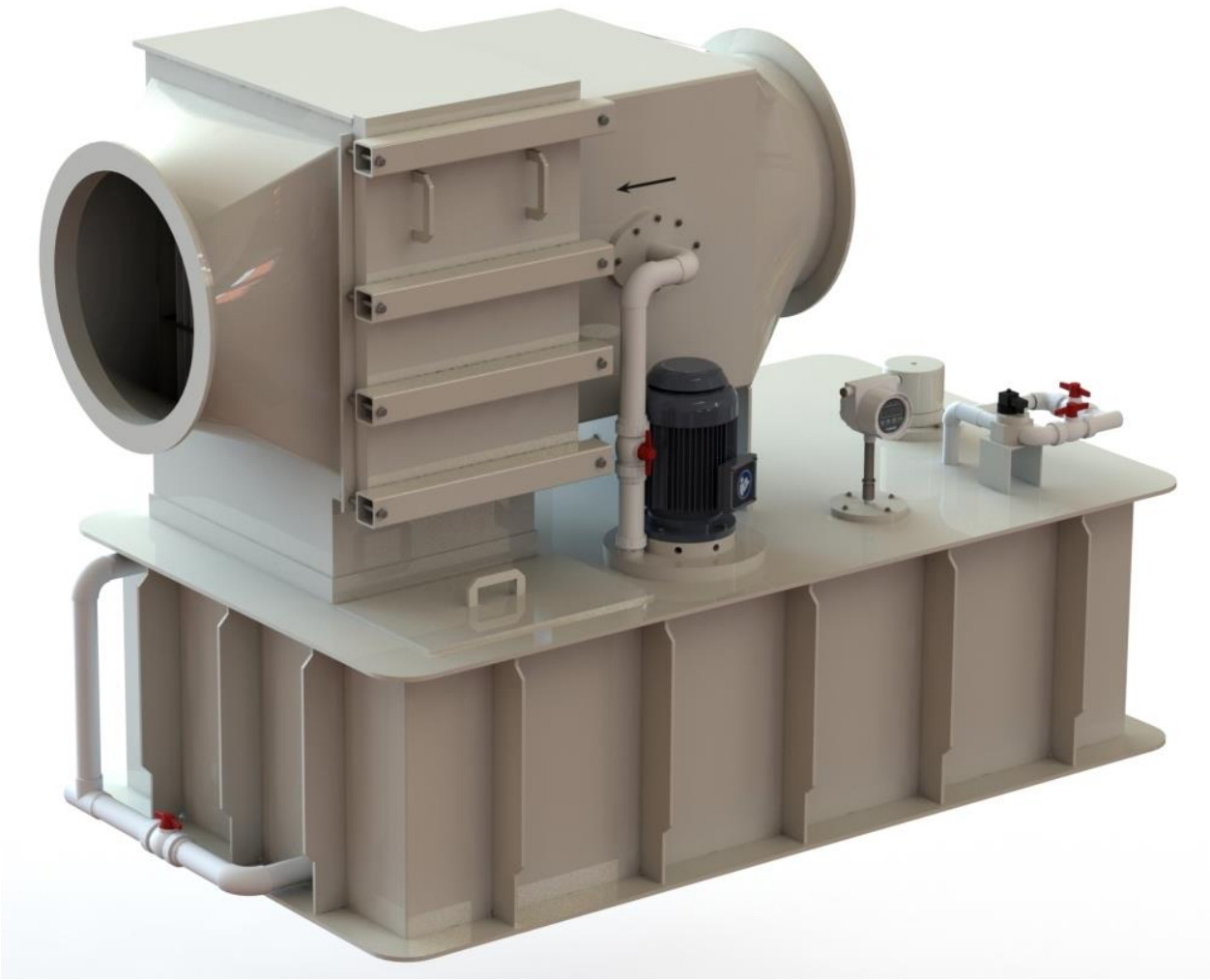
1. Horizontal gas washers “Maksimov”
1.1 Gas washer “Maksimov”, type “GM-2”

The simplest type of wet horizontal gas washer “GM-2” has spray chamber and multi-stage polymeric demister system and is referred to hollow scrubber. It is intended for weak concentrations with the gas temperature max. 40 C°. Not applicable for mixtures of acids.

Principle of operation:

Horizontal scrubber, type “GM-2” works on binding principle of airborne and dust particles with scrubbing liquid. The airflow is irrigated continuously with water (solution) by double sprayers. They spray the liquid in two directions: against airflow and along airflow.



The process of catching is available in wet scrubbers due to condensing effect – enlargement of vapours and particles due to the condensation of water vapours on them. After the air flow with contaminants combined by scrubbing liquid transfers in demisters where the scrubbing liquid is segregated from gas-air mixture. Due to bends of demister's profile the drops are settled on the surface and after they flow down in drain chamber from which the scrubbing liquids goes to the buffer vessel through the hydraulic seal. The hydraulic seal enables the discharged operation of scrubber. After that the liquid is transferred by means of pump for cleaning. The gas washer can be equipped with coagulator optional. The coagulator is integrated between demister's elements accordingly that the smallest particles can enlarge and segregate on demisters.

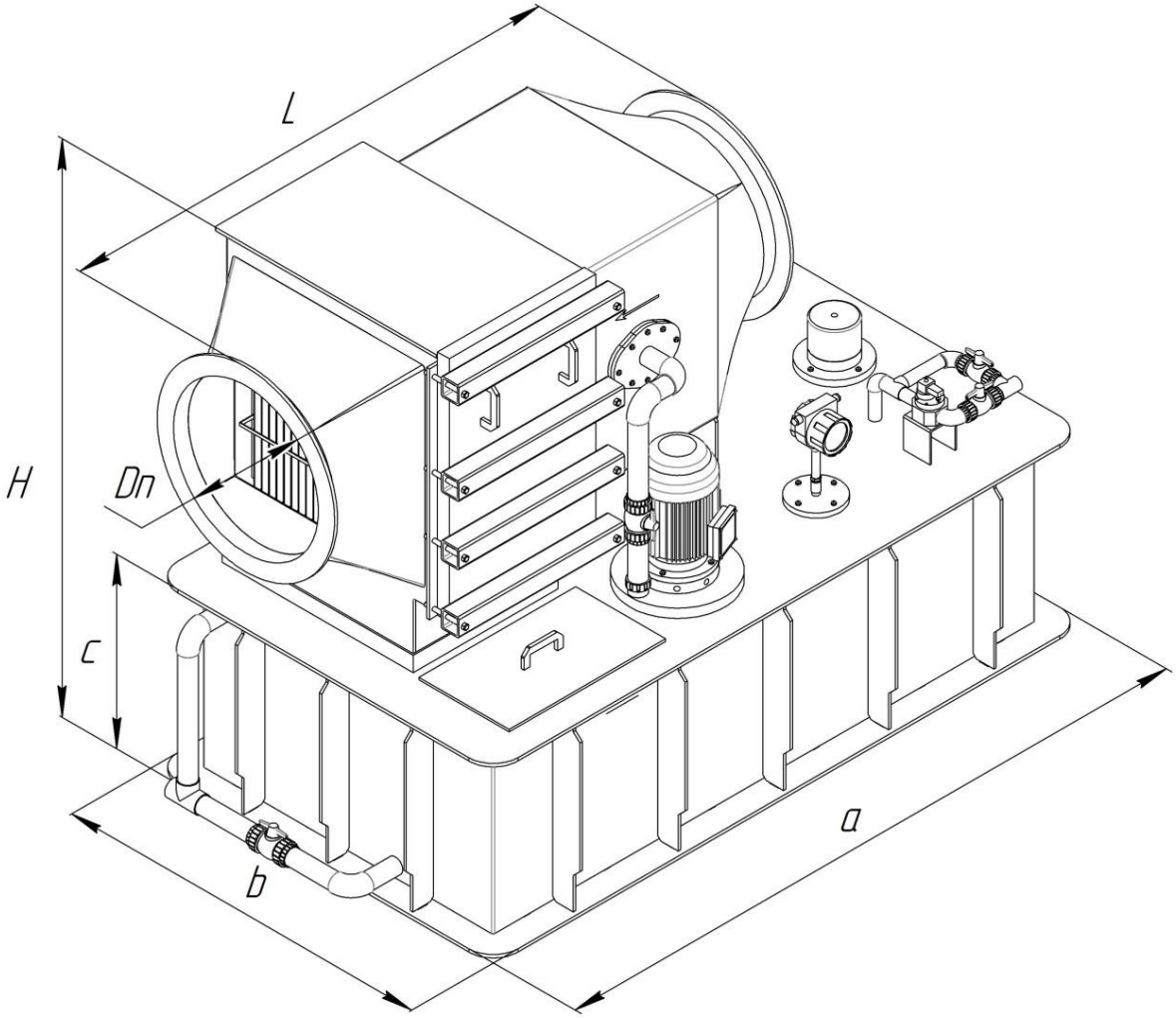


Table 1. Technical characteristics

Diameter	Consumption	L	H	a	b	c	Pump	Weight	Weight (with liquid)
Dn, mm	Q, m³/h	mm	mm	mm	mm	mm	P, kW	m1, kg	m2, kg
160	800-1199	1540	1205	1400	800	570	0.25	99	469
180	1200-1499	1540	1205	1400	800	570	0.25	99	470
200	1500-1899	1540	1205	1400	800	570	0.25	99	470
224	1900-2299	1540	1255	1400	800	570	0.25	103	474
250	2300-2899	1540	1255	1400	800	570	0.25	104	474
280	2900-3599	1540	1355	1400	800	570	0.25	115	486
315	3600-4399	1540	1355	1400	800	570	0.25	115	486
355	4500-5699	1540	1405	1400	950	570	0.25	127	587
400	5700-7199	1540	1455	1400	1000	570	0.25	134	624
450	7200-8999	1540	1555	1400	1100	570	0.25	153	703
500	9000-11099	1540	1605	1400	1150	570	0.25	162	742
560	11100-13999	1640	1655	1500	1250	570	0.25	180	872
630	14000-17699	1720	1755	1580	1350	570	0.75	210	1013
710	17700-22399	2030	1840	2300	1450	570	0.75	269	1589
800	22400-28399	2130	1940	2300	1550	570	0.75	295	1718
900	28400-35599	2230	2050	2300	1650	570	0.75	321	1848
1000	35600-44099	2330	2240	2300	1850	570	0.75	377	2111
1120	44100-55199	2430	2340	2500	1950	570	3.0	424	2436
1250	55200-68800	2530	2540	2500	2150	570	5.5	484	2724

The resistance is 300 – 450 Pa.

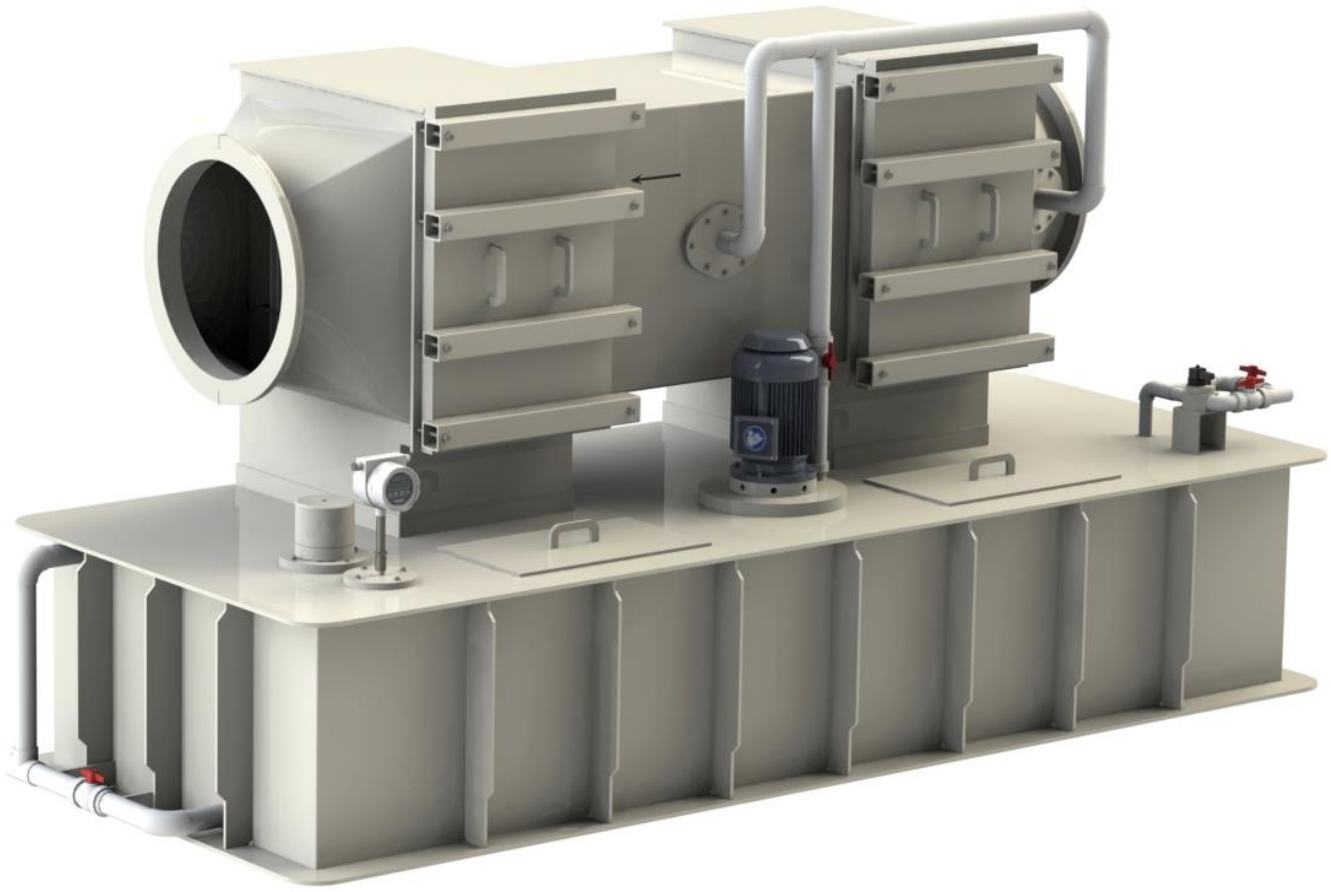
1.2 Gas washer “Maksimov”, type “GM-4”

Double-stage wet horizontal gas washer “GM-4” has packed packed chamber and multi-stage polymeric demister system. It is intended for many acids, alkalis and their mixtures.

Principle of operation:

Scrubber “GM-4” works on binding principle of airborne, vapours and dust particles with scrubbing liquid. The airflow gets through the packed chamber that is irrigated continuously with water (solution) by sprayers. They spray the liquid in two directions: against airflow and along airflow. Due to the nozzle in the packed chamber the contact area of liquid with gas-air mixture increases and it improves the efficiency of cleaning.

The process of catching is available in wet scrubbers due to condensing effect – enlargement of vapours and particles due to the condensation of water vapours on them.



After the air flow with contaminants combined by scrubbing liquid transfers in demisters where the scrubbing liquid is segregated from gas-air mixture. Due to bends of demister's profile the drops are settled on the surface and after they flow down in drain chamber from which the scrubbing liquids goes to the buffer vessel through the hydraulic seal. The hydraulic seal enables the discharged operation of scrubber. After that the liquid is transferred by means of pump for cleaning. The gas washer can be equipped with coagulator optional. The coagulator is integrated between demister's elements accordingly that the smallest particles can enlarge and segregate on demisters.

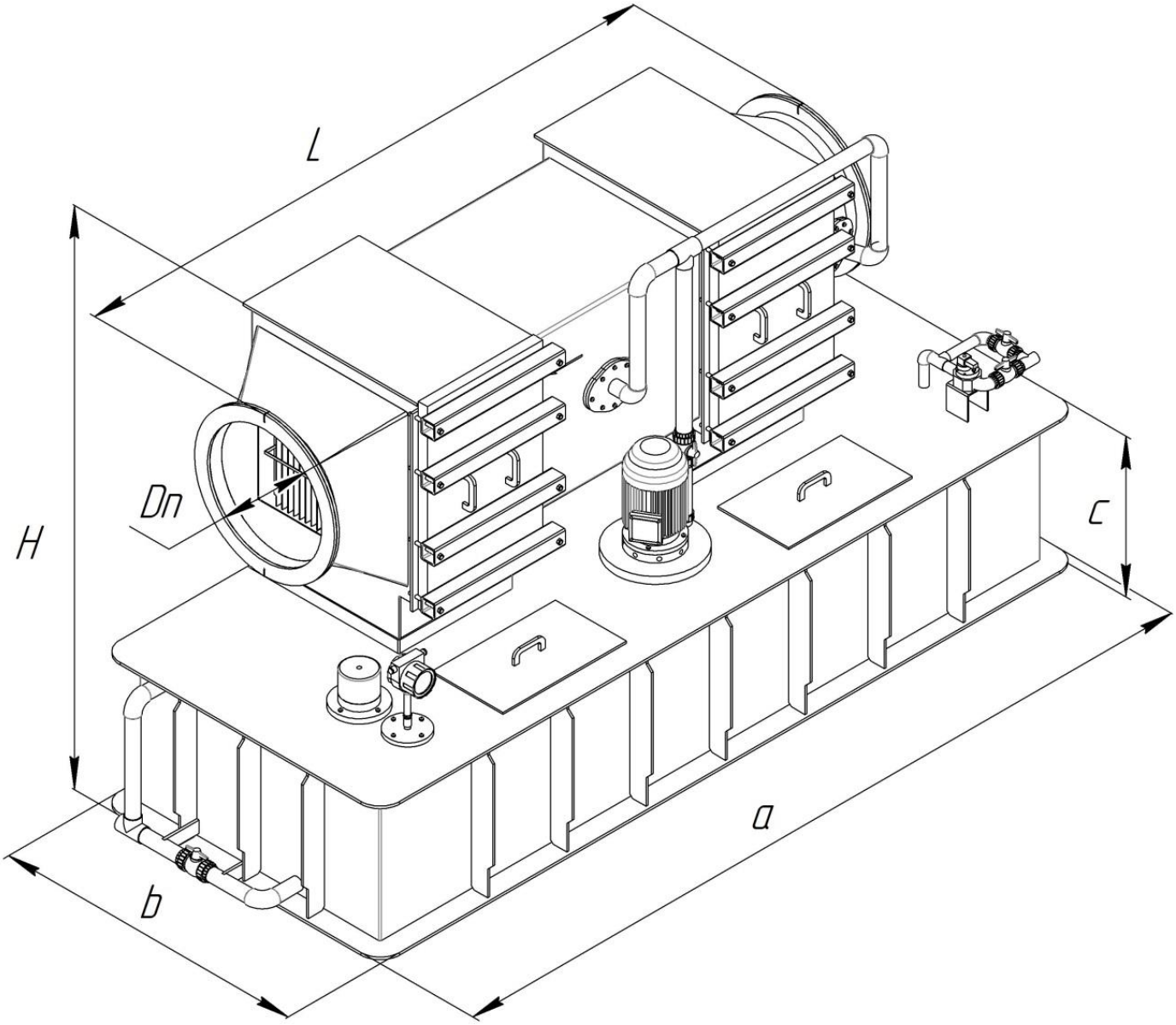


Table 2. Technical characteristics

Diameter	Consumption	L	H	a	b	c	Pump	Weight	Weight (with liquid)
Dn, mm	Q, m³/h	mm	mm	mm	mm	mm	P, kW	m1, kg	m2, kg
160	800-1199	2020	1205	1700	800	570	0.25	125	587
180	1200-1499	2020	1205	1700	800	570	0.25	125	587
200	1500-1899	2020	1205	1700	800	570	0.25	126	587
224	1900-2299	2020	1255	1700	800	570	0.25	132	594
250	2300-2899	2020	1255	1700	800	570	0.25	133	595
280	2900-3599	2020	1355	1700	800	570	0.25	151	613
315	3600-4399	2120	1355	2000	1000	570	0.25	170	901
355	4500-5699	2120	1405	2000	1000	570	0.25	179	910
400	5700-7199	2120	1455	2000	1000	570	0.37	188	919
450	7200-8999	2120	1555	2000	1100	570	0.37	216	1037
500	9000-11099	2120	1605	2000	1150	570	0.37	230	1095
560	11100-13999	2220	1655	2000	1250	570	0.75	260	1214
630	14000-17699	2300	1755	2000	1350	570	0.75	288	1332
710	17700-22399	2510	1840	2300	1450	570	3.0	347	1666
800	22400-28399	2610	1940	2300	1550	570	3.0	382	1805
900	28400-35599	2710	2050	2500	1650	570	3.0	428	2099
1000	35600-44099	2810	2240	2500	1850	570	3.0	508	2407
1120	44100-55199	3060	2340	2700	2000	570	3.0	567	2814
1250	55200-68800	3160	2540	2700	2200	570	5.5	651	3145

The resistance is 600-750 Pa.

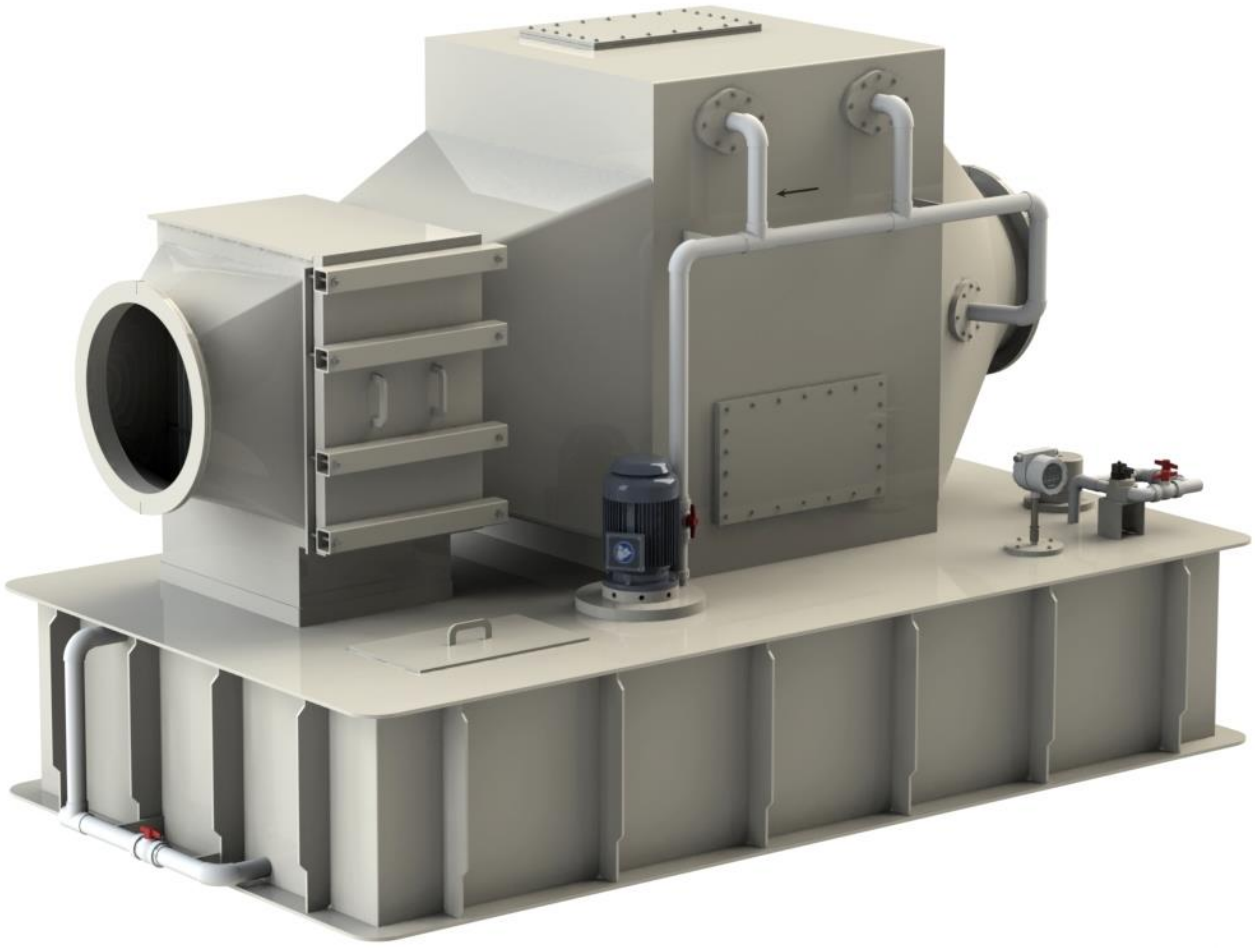
1.3 Gas washer “Maksimov”, type “GM-5”

This type of scrubbers is used for washing of contaminated air at low speed of connection with scrubbing liquid. First of all it is intended for air cleaning from phosphorus vapours or mixed acid gases.

Principle of operation:

The gas washer “GM-5” has larger packed chamber than “GM-4”. Scrubber “GM-5” works on binding principle of airborne, vapours and dust particles with water (solution). The airflow gets through the packed chamber that is irrigated continuously with water (solution) by sprayers. Due to the big size of nozzle in the packed chamber the contact area of liquid with gas-air mixture increases and it improves the efficiency of cleaning.

The process of catching is available in wet scrubbers due to condensing effect – enlargement of vapours and particles due to the condensation of water vapours on them.



After the air flow with contaminants combined by scrubbing liquid transfers in demisters where the scrubbing liquid is segregated from gas-air mixture. Due to bends of demister's profile the drops are settled on the surface and after they flow down in drain chamber from which the scrubbing liquids goes to the buffer vessel through the hydraulic seal. The hydraulic seal enables the discharged operation of scrubber. After that the liquid is transferred by means of pump for cleaning. The gas washer can be equipped with coagulator optional. The coagulator is integrated between demister's elements accordingly that the smallest particles can enlarge and segregate on demisters.

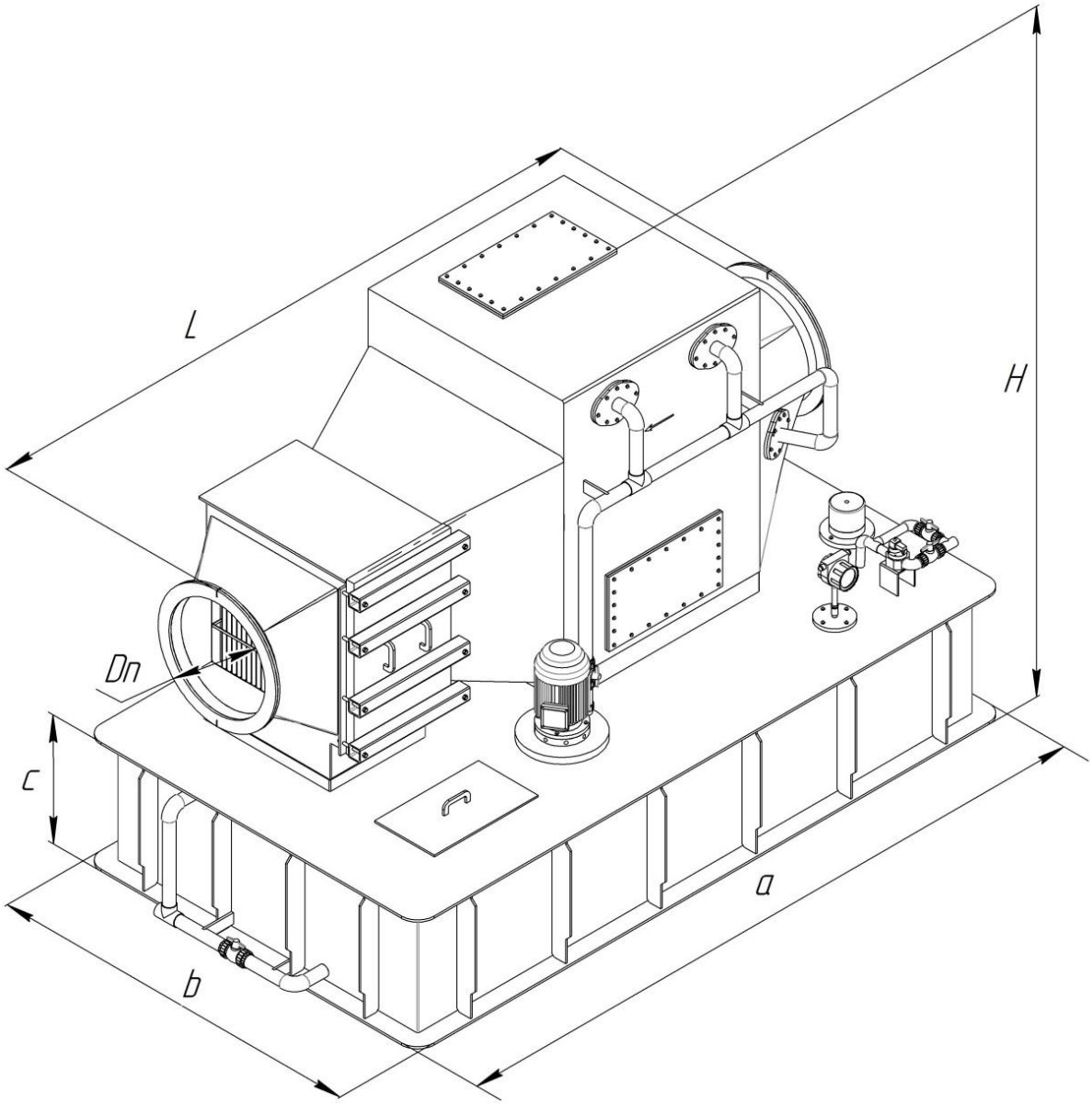


Table 3. Technical characteristics

Diameter	Consumption	L	H	a	b	c	Pump	Weight	Weight (with liquid)
Dn, mm	Q, m³/h	mm	mm	mm	mm	mm	P, kW	m1, kg	m2, kg
160	800-1199	2240	1515	2200	1000	570	0.37	166	977
180	1200-1499	2240	1515	2200	1000	570	0.37	166	977
200	1500-1899	2240	1515	2200	1000	570	0.75	166	977
224	1900-2299	2240	1615	2200	1100	570	0.75	181	1091
250	2300-2899	2240	1615	2200	1100	570	0.75	181	1092
280	2900-3599	2360	1765	2300	1350	570	3.0	227	1442
315	3600-4399	2360	1765	2300	1400	570	3.0	233	1500
355	4500-5699	2360	1815	2300	1400	570	3.0	242	1510
400	5700-7199	2496	1865	2500	1450	570	3.0	266	1710
450	7200-8999	2546	1965	2500	1550	570	3.0	298	1856
500	9000-11099	2710	2015	2650	1600	570	3.0	323	2041
560	11100-13999	2745	2065	2650	1650	570	3.0	352	2131
630	14000-17699	2800	2165	2650	1750	570	3.0	385	2285
710	17700-22399	2830	2265	2650	1850	570	3.0	429	2450
800	22400-28399	3380	2365	3200	1950	570	3.0	509	3129
900	28400-35599	2530	2465	3200	2050	570	3.0	555	3323
1000	35600-44099	2530	2665	3200	2250	570	5.5	648	3711
1120	44100-55199	3580	2765	3200	2350	570	5.5	695	3906
1250	55200-68800	3580	2965	3200	2550	570	5.5	795	4302

The resistance is 630-780 Pa.

2. Vertical gas washers “Maksimov”

The wet vertical gas washer, type “VM” is intended for air cleaning from many acids, alkalis and their mixtures including impurity gases.

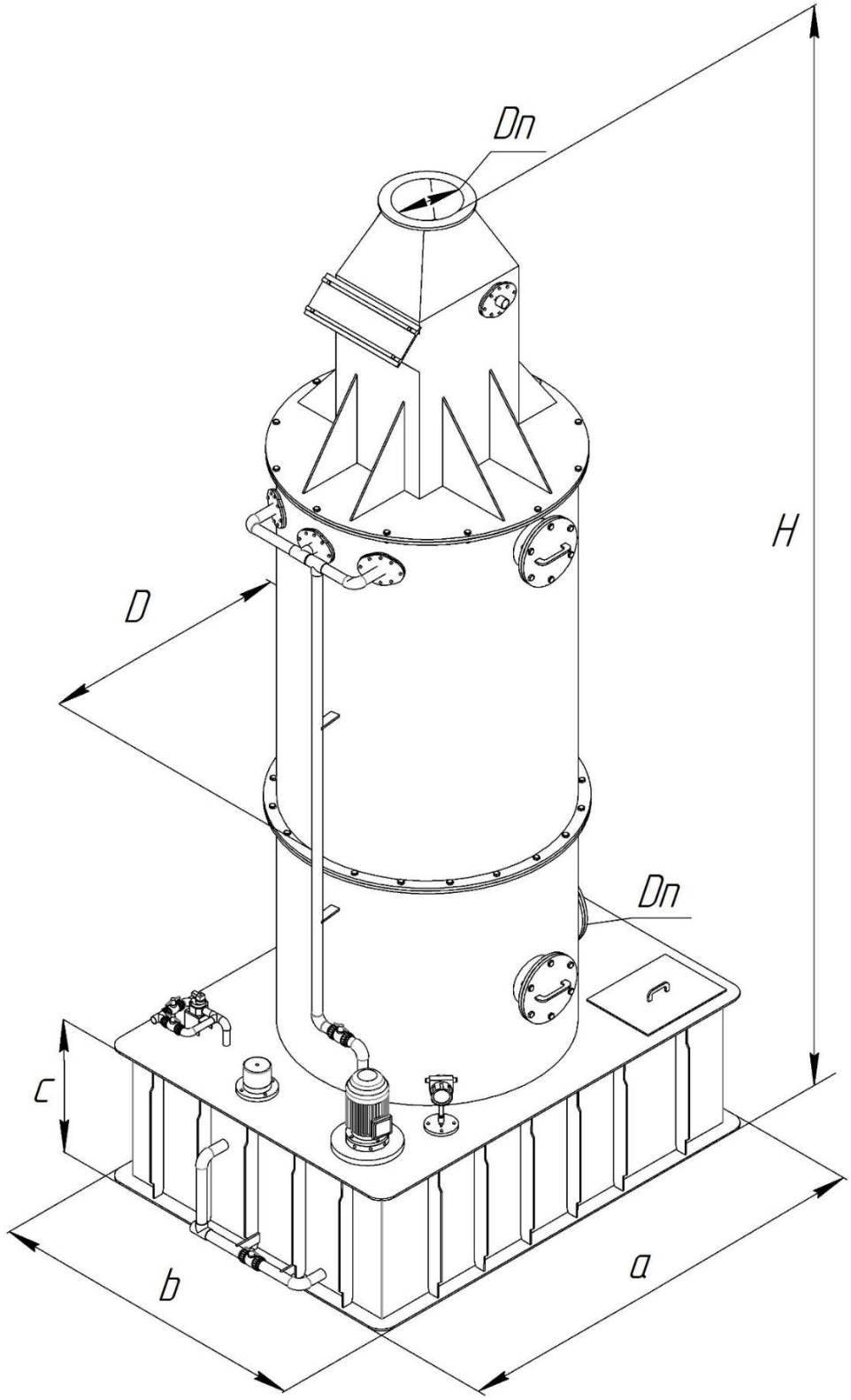
Principle of operation:

Gas washer “VM” has big nozzle layer that enables to use this gas washer as an absorber.

The airflow gets from the bottom upwards through the nozzle layer that is irrigated continuously with water (solution) by sprayers. Due to the big size of nozzle the contact area of liquid with gas-air mixture increases and it improves the efficiency of cleaning.

After the air flow transfers in demisters where the scrubbing liquid is segregated from gas-air mixture. Due to bends of demister’s profile the drops are settled on the surface and after they flow down in drain layer. The scrubbing liquid goes through the nozzle layer and then it transfers to the buffer vessel through the hydraulic seal. The hydraulic seal enables the discharged operation of scrubber. After that the liquid is transferred by means of pump for cleaning.

The gas washer can be equipped with coagulator optional. The coagulator is integrated between demister's elements accordingly that the smallest particles can enlarge and segregate on demisters



Vertical scrubbers are divided into three types according to the flow rate:

VM-05 – scrubber with flow rate 0.5 m/s, resistance until 650 Pa;
VM-1 – scrubber with flow rate 1.0 m/s, resistance until 600 Pa;
VM-2 – scrubber with flow rate 2.0 m/s, resistance until 550 Pa.

Table 4. Technical characteristics BM-05

Diameter	Consumption	D	H	a	b	c	Pump	Weight	Weight (with liquid)
Dn, mm	Q, m³/h	mm	mm	mm	mm	mm	P, kW	m1, kg	m2, kg
160	800-1199	900	5350	1900	1300	750	3.0	347	1638
180	1200-1499	1000	5350	2000	1400	750	3.0	389	1877
200	1500-1899	1120	5300	2120	1520	750	3.0	444	2185
224	1900-2299	1250	5500	2250	1650	750	3.0	513	2552
250	2300-2899	1400	5650	2400	1800	750	3.0	599	3009
280	2900-3599	1600	5700	2600	2000	750	3.0	699	3650
315	3600-4499	1800	5650	2800	2200	750	5.5	814	4360
355	4500-5699	2000	5900	3000	2400	750	5.5	930	5125
400	5700-7199	2240	6000	3240	2640	750	5.5	1085	6128
450	7200-8999	2500	6000	3500	2900	750	5.5	1260	7310
500	9000-11099	2800	6000	3800	3200	750	5.5	1482	8806

Table 5. Technical characteristics BM-1

Diameter	Consumption	D	H	a	b	c	Pump	Weight	Weight (with liquid)
Dn, mm	Q, m³/h	mm	mm	mm	mm	mm	P, kW	m1, kg	m2, kg
160	800-1199	650	5300	1650	1050	750	0.75	252	1109
180	1200-1499	710	5300	1710	1100	750	3.0	270	1224
200	1500-1899	800	5300	1800	1200	750	3.0	304	1412
224	1900-2299	900	5350	1900	1300	750	3.0	348	1638
250	2300-2899	1000	5350	2000	1400	750	3.0	396	1883
280	2900-3599	1120	5300	2120	1520	750	3.0	451	2192
315	3600-4499	1250	5550	2250	1650	750	3.0	522	2561
355	4500-5699	1400	5650	2400	1800	750	3.0	598	3007
400	5700-7199	1600	5700	2600	2000	750	3.0	709	3660
450	7200-8999	1800	5650	2800	2200	750	5.5	824	4370
500	9000-11099	2000	5900	3000	2400	750	5.5	910	5104
560	11100-13999	2240	6000	3240	2640	750	5.5	1057	6101
630	14000-17699	2500	6000	3500	2900	750	5.5	1238	7288
710	17700-22399	2800	6500	3800	3200	750	5.5	1604	8928

Table 6. Technical characteristics BM-2

Diameter	Consumption	D	H	a	b	c	Pump	Weight	Weight (with liquid)
Dn, mm	Q, m³/h	mm	mm	mm	mm	mm	P, kW	m1, kg	m2, kg
160	800-1199	560	4300	1560	1050	750	0.75	199	1003
180	1200-1499	560	4300	1560	1050	750	0.75	200	1004
200	1500-1899	560	4300	1560	1050	750	0.75	200	1005
224	1900-2299	650	4350	1650	1050	750	0.75	224	1081
250	2300-2899	710	4350	1710	1100	750	3.0	247	1200
280	2900-3599	800	4300	1800	1200	750	3.0	274	1381
315	3600-4499	900	4550	1900	1300	750	3.0	319	1610
355	4500-5699	1000	4650	2000	1400	750	3.0	350	1838
400	5700-7199	1120	5200	2120	1520	750	3.0	444	2186
450	7200-8999	1250	5150	2250	1650	750	3.0	494	2533
500	9000-11099	1400	5400	2400	1800	750	3.0	578	2988
560	11100-13999	1600	5500	2600	2000	750	3.0	665	3615
630	14000-17699	1800	5500	2800	2200	750	5.5	773	4319
710	17700-22399	2000	6000	3000	2400	750	5.5	944	5138
800	22400-28399	2240	6350	3240	2640	750	5.5	1108	6151
900	28400-35599	2500	6350	3500	2900	750	5.5	1264	7315
1000	35600-44099	2800	7100	3800	3200	750	5.5	1629	8954