



140 years
in the Engineering Industry

PRODUCT LINEUP



JSC "Berdichev Machine-Building Plant "Progress"

Dear colleagues!

Joint-Stock company Berdichev Machine-Building Plant “Progress” is one of the biggest enterprises of Ukraine. Industrial engineering company, which combines the experience and capabilities of the management company LLC «FZ SOLUTIONS», LLC «KB Energomashproekt», research and production enterprise Dniproenergostal produces filtering, drying, heat-exchanging and ecological equipment, various vessels and tanks as well as equipment for industrial and domestic wastewaters treatment.

Founded in 1880, the plant has highly qualified personnel, powerful production facilities and modern equipment providing the possibility to manufacture units, parts and machines of high quality and reliable operation. The guarantee of the quality of the product’s brand ‘Progress’ is the certified quality management system operating at the enterprise and meeting the highest requirements of the International Standard ISO 9001:2015 (IQNet -DQS GmbH registration number: DE-451663 QM15).

Having received worldwide recognition, the products manufactured by the plant are operated at the enterprises of the chemical, metallurgical, mining, coal, food and other industries and have established themselves as reliable, highly efficient and high-quality equipment.

- Tower (chamber) filter presses with filter area from 2.5 to 196 m²;
- Horizontal filter presses of various types with filter area from 2 to 500 m²;
- Belt filter presses;
- Disk and Belt vacuum filters;
- Leaf filters;
- Furnaces with rotating drum and Drum coolers;
- Bag filters;
- Electrostatic precipitators;
- And many other equipment that you can find on our website www.progress.ua and get acquainted with technological possibilities.

The list of the equipment produced by “Progress” is expanding permanently with the consideration of the requirements of the market. We offer our partners effective bilateral business development programs, one of which is the “Volume in exchange for prices” program, providing substantial business discounts on product deliveries.

The range of services we provide covers many practical problems: from the development of design documentation and manufacturing, to the implementation of a set of construction and installation works, as well as commissioning.

We are ready to manufacture any non-standard equipment in accordance with the technical documentation provided by the Customer.

By introducing our equipment in production, you get maximum performance at minimum cost.

Low operating cost and user-friendly operation provide maximum convenience for our customers.

If you are interested in a particular type of equipment, we are ready to give all the necessary information and a quote for you.

We will be glad to meet your delegation at our plant to get you acquainted with our company.

We hope for fruitful mutually beneficial cooperation.

Sincerely,

Gennadii LOSOVSKYI

Deputy Chairman of the Board on Commerce

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Tower Filter Presses KMP, KMPm



Automatic tower filter presses are optimally suitable equipment for separation of splitting polydisperse slurries. The cake formed in the filtration process has uniform thickness and homogeneous structure. These features allow efficient washing and drying.

The unique design of filter presses with a horizontal arrangement of filter elements provides optimal conditions for the filtering process, which reduces auxiliary operations and, as a result, increases the productivity of these filter presses compared to other types of filters.

Filter presses are equipped with automatic control system (PLC) based on microprocessors of the leading world manufacturers, such as Siemens, Allen Bradley, ABB, Bernecker & Reiner and others. PLC system makes it possible to control the filtration process in automatic mode as per preset cyclogram and to change the cyclogram during operation process.

Filter presses design incorporates modern wear-resistant valves, mounted on the manifolds of slurry feed and discharge, washing water and drying air feed and discharge.

Filtering area range:

- of automatic chamber tower filter presses KMP - from 2,5 up to 32 m²;
- of specialized automatic chamber tower filter presses KMPm - from 12,5 up to 196 m².

Peculiarities of automatic tower filter presses:

- full automation of the working process, which does not require the personnel interference ;
- possibility to adjust on a wide scale the thickness and moisture content of the cake ;
- optimal conditions for cloth recovery (washing) during the filter operation process;
- discharge and recovery of cloth are combined in one operation;
- low electrical energy consumption, minimum expenditures for operation and maintenance;
- complete cake discharge;
- minimum time for auxiliary operations.

Automatic tower filter presses are used in all industries where slurries are to be separated into solid and liquid phase by means of pressure filtration, as well as in technological operations where thorough cake washing and drying is required, namely: chemical, mining,



metallurgical, pharmaceutical, food industries, municipal and industrial waste waters cleaning.

Automatic Horizontal Chamber Filter Presses with Top Bar Suspension of Polypropylene Plates FKMM and FKMs



Automatic chamber filter presses FKMM with top bar suspension of polypropylene plates are used in chemical, mining, metallurgical and other industries, in technological operations of filtration average-

and difficult-to filter slurries to separate them into solid and liquid phase. Filter presses FKM are partially (1/2 of filtering plates pack) or completely equipped with plates with pressing membranes allowing mechanical squeezing before «washing» and «drying» operations.

Filter presses are manufactured on the basis of the standard sizes of filter plates from 800x800 mm to 2440x2440 mm with the filtering surface area from 25 m² to 1000 m² and with chamber from 15 mm up to 50 mm deep.

By special order, filter presses based on filter plates of the following sizes can be manufactured: 315x315 mm, 470x470 mm, 630x630 mm; the filtering surface area 2-6 m²; manual or electromechanical clamping of filter plates.

At the customer's request, filter presses can be equipped with a cleaning device and a safety light curtain for safe maintenance of filters.



Filter presses FKM are equipped with an automation system based on an industrial controller for automatic control of filter press mechanisms, shut-off valves, and valve blocks.

Horizontal-type Chamber Filter Presses FKMM with Polypropylene Plates and a filtering surface area of 16 -80 m² are designed for filtering slurries with various characteristics. Automatic control system guarantees control of electromechanical plates clamping.

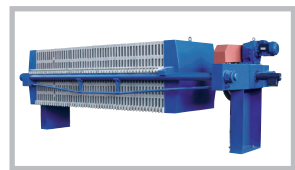


Horizontal-type Chamber Filter Presses FOM are designed for filtration of kaolin, porcelain, ceramic, majolica mass and other slurries containing 15% and more

of solids.

Plate and Frame Filter Presses RZR, RZM, ROR, ROM of closed and open type

and filtering surface area of 2-140 m² are designed for filtration of neutral, alkaline and acidic slurries containing up to 500 kg/m³ of solids. Cotton, polypropylene, polyether and polyamide cloths are used as filter partitions.



Disc Vacuum Filters DOO

with filtering surface area of 16–250 m² are designed for separation of suspensions with solids content up to 70% and max. density 5000kg/ m³ which form non-cracking and requiring no washing cake.



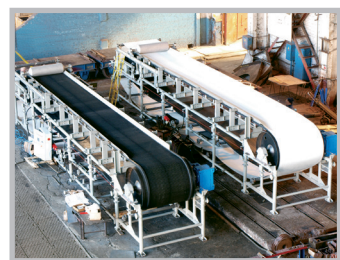
Belt filter presses LMN

with belt width from 1,0 up to 3,0 m are designed for continuous filtration of unenriched coal slime and for mechanical dewatering of industrial sewage and wastewater sludge, primarily treated with flocculants. Filter presses are characterized by powerful corrosion protection, high reliability, and ease of operation.



Belt Vacuum Filters LON, LOP

with filtering surface area from 1,8 to 12 m² are designed for separation of aggressive and nonaggressive quickly settling slurries with inhomogeneous solid phase, also for filtering of halite settlings in floatation potassium making, for production of citric acid and detergents.



Highly efficient dewatering is achieved by adjusting the belt rotation speed using AC frequency converters.



Vertical Leaf Filters MVR, MVK, MVV, MVJ with filtering surface area 3,5 - 250 m² are designed for filtration of fine-disperse, highly viscous, acidifying, toxic and easily evaporating slurries.

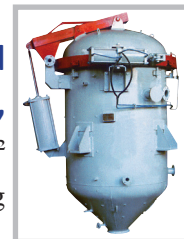
Horizontal Leaf Filters MG with filtering surface area from 20, 60 m² up to 200 m², air-tight, with heating and vibration cake removal are designed for cleaning of the



molten sulfur in sulfuric acid production, for clarifying filtration of solutions and melts, for boric acid production and other chemical applications.

Ceramic Candle Filters PKJ, PKO and Pressure Candle Filters PMJ, PTJ, PTV, PTK

with filtering surface area of 1,0 - 80 m² are designed for thickening and clarifying filtration of slurries under pressure.



Capacitive Pressure Filters EDM are designed for filtration of various slurries and for separating solutions into solid and liquid substances.

Apparatuses with Mixing Devices with a capacity of 1,0 to 32 m³ are designed for performing the following processes: homogenization, suspension, emulsification, dispersion, and heat exchange.

Batch and Continuous Belt Mixers

with a mixing chamber volume of 1,0-2,5 m³ are designed for mixing of granular materials, as well as granular materials with small quantity of liquid components.



Continuous Rotating Drum Dryers BN, Drum Kilns V, Drum Coolers B

with a diameter of 1,0 - 4,5 m and a length of 4 - 27 m are designed for heat-treatment of non-explosive, flameproof and non-toxic granular materials.



Dryers BN are manufactured in direct-current and counter -current version.

Right-hand location of the actuator on the loading side corresponds to direct-current version, and a left-hand location corresponds to counter-current version.

Continuous Rotating Drum Crystallizers BJ, BV

of 6 - 20 m long, with liquid and air cooling are designed for crystallization of non-toxic, non-explosive and inflammable organic and inorganic substances from water solutions.

Rotating Drum Galvanic Coagulators KB-1, KB-2, KB-8

are designed for treatment of waste waters, blowdown waters and recycled waters from metals ions, organic

substances and other harmful impurities.

Galvanic coagulators can be used at different concentrations of harmful impurities in purified water and pH from 0 to 14. Working volume 0,45 - 6,5 m³, length 3 - 9 m.

Water Preparation Equipment

Ionite Filters FIPa, FIPr and Clarification Filters with capacity at rated filtration speed 10 - 180 m³/h.

Salts dissolving units.

Vessels for storage of concentrated sulfuric and nitric acids.

Circulation hydraulic mixers.

Valves:



Pinch valves are designed for working with abrasive and corrosive slurries, liquids and powders.

Self-cleaning elastomeric tube is the only part contacting with the production flow. It is selected for a precise product and guarantees long

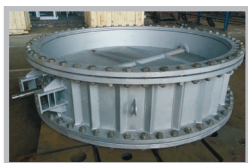
service-life. DN 50 - 200 mm. Temperature of working medium:

15 + 120°C. Valve actuators: manual, pneumatic, hydraulic, electro-mechanical.

Gate valves pneumatically and manually actuated are used as cut-off valves in process lines with aggressive and neutral liquid non-cementing media. DN 50-300 mm.

Throttle valves and shutter valves with electric drive.

Throttle valves are designed to regulate the shut-off of the gas flow with a temperature of up to +550° C



Disc Pressure Filters DPR

Filters are designed for filtration of Copper sulfate, Nickel sulfate and other electrolytes. Filters provide high quality electrolyte, its heat-resistance up to 60° C, high capacity and time savings.



The design of a filtering pack enables its quick replacement resulting in time savings; and the small size of the filter allows you to quickly rearrange the filter in the required bath. DPR filters provide high degree electrolyte purification and allow obtaining of nonporous galvanic coating.



Automatic chamber filter presses FKMs with top bar suspension of filtering plates are intended for one stage filtration of first and second carbonation juice as well as for two stage filtration of first carbonation juice liquor and melt liquor. Filter press is equipped with washing unit designed for filter cloth regeneration. Washing water pressure is up to 60 bar. Filter cloth regeneration (washing) is automatically operated.



Automatable Plate-and-frame Filter Presses RKO



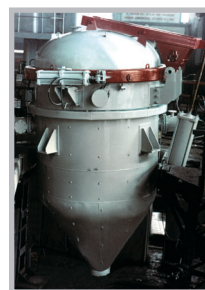
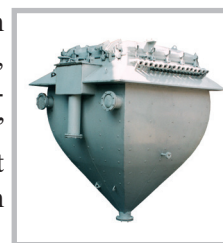
Automatic and semiautomatic operation filter presses RKO are designed for filtration of first carbonation juice thickened suspension. We produce filters with filtering surface area of 25 - 32 m².

Horizontal position of filter plates provides cake uniform thickness and its best washing. Sugar content in the cake after filtration with Filter Press RKO is more than three times lower as compared to other processing equipment.

Automatable Sheet Thickener Filters PROGRESS-MVJ 60, MVJ 60m

These top performance cost-competitive filters are used for first and second carbonated juice suspension thickening, thick juice polishing, filtration of remelts with a content of dry substance up to 60%.

Due to intensification of regeneration process (sectioning of filtration area, successive mono- and multi-pulse air-liquid regeneration) filtration partitions' penetrating quality is 90-95% that ensures standardized filter output even when filtering difficult to filter juices.



Automatable Cartridge-type Thickener Filters PTO 100 (125, 150) are designed for filtration of the first and the second carbonated juice and carbonated melts with a content of dry substance up to 65% in beet-sugar industry.

Cartridge-type Filters SH1-PFF40 and SH1-PFF80

are designed for filtration of thick juice and remelts, and for thick juice polishing in beet-sugar and refinery industry.



Gas cleaning equipment.



Bag filters.

Mechanical filtration is the most effective method of capturing fine dust from outgoing gases, aspiration emissions of various technological processes and aggregates. Progress specialists are constantly working on increasing the efficiency and reliability of filters using the following methods:

- Construction improving;
- Modernization of separate parts;
- Using of modern filter fabrics (with high dedusting ability, resistant to high temperatures and aggressive environments).

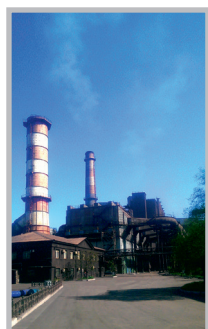
Electrostatic Precipitators

Electrostatic precipitators are designed to clean gases in the metallurgical, chemical, petrochemical and others industries. New developments have been applied that guarantee the specified efficiency of dust collection based on the intensification of electron-ion processes with minimal maintenance during the service life. We propose full service (design, manufacturing of new equipment and reconstruction of existing equipment).

The proposed gas cleaning systems are not inferior to their foreign counterparts, and surpass them in some characteristics, while having a lower cost.



Purification of dusty flue gases from sulfur dioxide (SO₂)



Sulfur oxides (SO₂ and to a lesser extent SO₃) are among the largest and most difficult to clean air pollutants, while the acid formed when they combine with water vapor (H₂SO₃ and H₂SO₄) causes the destruction of metal structures and building materials.

The greatest current interest is the use of technologies of gas desulphurization of

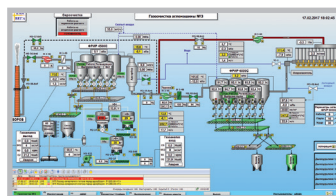
dust air flow, which is capable of ensuring the effective (> 90%) binding of sulfur dioxide.

One of the most effective methods is the method of semi-dry desulfurization, which was created and implemented taking into account the use of technological schemes and equipment produced by the Progress plant.

The essential advantages of this dust-cleaning and desulphurization method are the following:

- Low capital cost and easy installation;
- Easy maintenance and repair, if necessary;
- No waste water;
- High reliability;
- Possibility of implementing of automatic process control;
- Low power consumption;
- Final product: a mixture of calcium salts and agglomerate dust or ash coming out of the boiler.

Automated control system of technological process



The system is divided into two levels and is an integrated system under the hierarchical principle.

Lower level:

- Process parameters control subsystem;
- Technological equipment control subsystem;

Upper level:

- The level of operational management of technological process, providing operational displaying and registration of information for creating an optimal connection interface between controller / operator and the system to allow a reliable assessment of the process.

Modernization of dust cleaning structures

We can offer the following services:

- I – Overhaul (with an increase in the filtering area up to 1.5 times, while structural changes are made to the housing and system of filtering elements of the bag filter);
- II – Partial reconstruction (without significant changes to the filter housing and maintaining performance);
- III – Combined.



1. Preparatory and press forging facilities

- 1.1 Dimensioning of flat steel and bar iron.
- 1.2 Cutting of bar iron.
- 1.3 Guillotining of flat steel up to 14 mm thick.
- 1.4 Thermal cutting of flat steel 16 – 100 mm thick with the application of CNC portal or photocopying machines.
- 1.5 Sheet straightening and hydraulic flattening.
- 1.6 Hole perforating in sheet iron up to 1500 mm wide and 3500 mm long; min. hole dia. is 1.5 of thickness.
- 1.7 Bending of flat steel with sheet bending press:
 - thickness up to 6 mm, length 5000 mm;
 - thickness up to 8 mm, length 3500 mm;
 - thickness up to 10 mm, length 2100 mm;
 - thickness up to 12 mm, length 1400 mm.
- 1.8 Stamping of bottoms dia. 90-1200 mm made of carbon and alloy steel 4-25 mm thick.
- 1.9 Cold and hot stamping of blank parts with force up to 630 tnf.
- 1.10 Bending and calibrating of tubular billets dia. 16-426 mm, up to 3000 mm long.
- 1.11 Bending of rings dia. 220-1800 mm out of strip bar, max. section 100 x 140 mm
- 1.12 Bending of segments and semi-rings dia. 1200-3000 mm out of rough forging with section not more than 180 x 225 mm with application of hydraulic press Q 400 tnf.
- 1.13 Making forgings weighing less than 180 kg with application of air hammer; falling weight 2000 kg.

2. Subassembly welding facilities

- 2.1 Edge planing machining of sheet bars up to 8000 mm long before welding
- 2.2 Rolling of sheet bars dia. 500-3000 mm, up to 2000 mm wide, up to 50 mm thick with plate-bending rolls.
- 2.3 Assembling of metal structures and capacitive equipment of carbon and alloy steel for further welding.
- 2.4 Manual, semiautomatic, automatic welding of metal structures.
- 2.5 TIG welding of Titanium, Aluminum and other nonferrous metal articles.
- 2.6 Hydraulic testing of capacitive equipment with max. pressure up to 160 kgf/cm².
- 2.7 Cleaning operations on removing oxidizing films, corrosion spots and other impurities of carbon and corrosion-resistant articles using wet blasting, shot blasting and pickling treatment. Article dia. is up to 4000 mm.

3. Machining Facilities

- 3.1 Lathe machining of workpieces and units with following dimensions:
 - facing lathe machining, max. dia. 3600 mm and max. length 10550 mm;
 - screw lathe machining: over support max. dia. 1600 mm and max. length 12000 mm, over bed max. dia. 2000 mm.
- 3.2 Vertical boring and turning machining of workpieces with max. dia. 5000 mm and up to 2500 mm high.
- 3.3 Planing machining of workpieces up to: 6500 mm long and 2000 mm wide.
- 3.4 Milling machining of workpieces up to: 6300 mm long, 2000 mm wide and 2000 mm high.
- 3.5 Horizontal boring machining of workpieces and units up to: 4000 mm long, 3000 mm high and max. counterboring depth 1900 mm.
- 3.6 Jig boring machining of workpieces and units up to: 1000 mm long, 630 mm wide and 700 mm high.
- 3.7 Vertical and radial drill machining of workpieces and units with max. drilling dia. 100 mm.
- 3.8 External grinding of parts with max. dia. 400 mm and up to 2800 mm long.
- 3.9 Internal of parts with max. dia. 200 mm and up to 200 mm long.

- 3.10 Planer-type surface grinding of workpieces up to 2000 mm long, 400 mm wide and 500 mm high.
- 3.11 Rotary-type surface grinding of workpieces with max. dia. or circumference 1800 mm and up to 500 mm high.
- 3.12 Deep boring of workpieces with max. boring dia. 400 mm and up to 6000 mm long with application of special boring machines.
- 3.13 Cylindrical wheel hobbing with max. rifling dia. 5000 mm and up to 2000 mm high using up to 40 mm modules for cast iron and 30 mm for steel.
- 3.14 Horizontal cylindrical wheel hobbing with max. rifling dia. 500 mm and up to 2500 mm long; module max. 20 mm.
- 3.15 Straight bevel gear hobbing with max. pitch dia. 1250 mm, cutted teeth length max. 200 mm, module max. 24 mm (standard); 15 mm (helical).
- 3.16 Skew bevel gear hobbing with max. pitch dia. 450 mm, module max. 10 mm.
- 3.17 NC turning, max. swing over bed 400 mm; turning of bar, max. dia. 65 mm, max. length 1200 mm.
- 3.18 NC vertical drill machining, max. drilled dia. 45 mm.
- 3.19 NC mill machining, workpieces max. 1000 mm long, 400 mm wide, 350 mm high.
- 3.20 NC horizontal boring mill machining, workpieces and units max. 1250 mm long, 1000 mm high, 710 mm wide (boring depth).
- 3.21 Profile grinding machining, workpiece max. grinding area 150 x 60 and up to 78 mm high.
- 3.22 Thread grinding, max. threaded dia. 125 mm, max. pitch 6 mm, max. length 75 mm.
- 3.23 Other kinds of work:
 - benchwork and assembly.
 - electrical installation work, manufacturing of control panels and control rooms with relay and microprocessing hardware components.
 - shop painting.
 - electroplating (chrome-plating, max. plated area 100 square decimeter; zinc plating, max. plated area 15 square decimeter).
 - rubber coating, max. article dimensions: length 6000 mm, dia. 2600 mm.
 - production of general rubber goods, max. dia. 500 mm.
 - packing.

4. Tool-making facilities

- 4.1 We manufacture:
 - punches and molds, casting forms, various form and configuration accessories as per customer's design documentation;
 - different pitch lathe jaws Ø160, Ø 200, Ø 250, Ø 320, Ø 400;
 - guillotine knives made of steel 5XB2C, 6XB2C, X12M, XBF; max. L=1100 mm.
 - punches and dies for sheet bending presses;
 - rolls and shafts for rolling mills;
 - stamps symbolic and numeric.
- 4.2 Operations we perform:
 - turning, benchwork, milling, grinding and others as per customer's design documentation;
 - grinding of guillotine knives, max. L=2000 mm;
 - SHF thermal treatment and in heat-treating furnaces;
 - annealing and normalizing of large parts;
 - abrasive disks impact testing.

5. Testing methods used to calibrate materials and welds

- 5.1 Chemical analysis of carbon and alloy steel, non-ferrous metal and alloy.
- 5.2 Metallographic of carbon and alloy steel, non-ferrous metal and alloy.

5.3 Corrosion testing of stainless steel.

5.4 Mechanical testing of carbon and alloy steel, titanium alloys.

5.5 Mechanical testing of welds.

5.6 Viscosity and film hardness test, time-of-setting and adhesion test of coating, filler, enamel, paint.

5.7 Viscosity, burning, neutralization tests of industrial oil lubricant, compressor oil, transformer fluid.

5.8 Elongation test, scleroscope hardness test, resistance to attack by corrosive media test of general rubber goods.

5.9 Metal and alloy radiography:

- iron-base alloy, max. thickness 20 mm;
- titanium-base alloy, max. thickness 45 mm;
- aluminum-base alloy, max. thickness 97 mm.

5.10 Ultrasonic inspection:

5.11 Carbon and low-carbon steel thickness range 1 - 5000 mm controlled by crack detector УД-12.

5.12 Visible dye penetrant testing to reveal surface cracks including welds penetration defects.

6. Foundry

6.1 Gray iron castings (CЧ10 - CЧ20 GOST 1412-85) weighing 2 - 3000 kg.

6.2 Special iron castings (ЧX1, ЧC5, other cast iron grades are dealt singly for each casting) weighing max. 1000 kg.

6.3 Aluminum castings as AK – 7 alloy grade, max. weight 300 kg.

6.4 Bronze castings (grade Бp05Ц5C5, БpAЭЖ3Л), max. weight 200 kg.

6.5 Carbon steel castings: steel 25Л - 55Л weighing 30 - 800 kg

6.6 High-alloy steel castings as 12X18H9TЛ grade, weighing 30 - 250 kg.

6.7 Custom-tailored approach to each casting order.

6.8 Constructional design of molding tools and manufacturing technology development using up-to-date equipment.

6.9 Wooden and metal mold making for foundry using up-to-date metalworking equipment.

6.10 Heat treatment.

7. Main materials used for pressure equipment manufacturing

Steel:

Ст3пс2, Ст3пс5 GOST 380, Steel 20 GOST 1050, Steel 09Г2С GOST 5520, GOST 19281

Steel 12X18H10T GOST 5632

Steel 08КП GOST 1050, Steel 20K GOST 5520

Steel 0X17H13M2T, 10X17H13M3T GOST 5632, Steel 06XH28MДТ GOST 5632

Alloy BT1-0 GOST 19807-91

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