POLYMERSTROY18
MACHINE ENGINEERING COMPANY

COMPOSITE PRODUCTS MANUFACTURING EQUIPMENT

- plastic crushers and agglomerators
- mixers and conveyors
- extruders
- hydraulic presses
- press molds

ABOUT US

"Polymerstroy 18" is an engineering company located in Izhevsk, Russia and specializing in design and manufacture of waste recycling equipment used to produce a wide range of composite items.

We manufacture complex machine lines which allow solving the problem of recovery of domestic and industrial waste of polymers, glass, rubber, construction residuals, etc. with high efficiency and profitability.

Our profile field, in which we've been operating since 2002, is the manufacture of equipment for polymer-sand industry. The machines we offer provide for the full-cycle production chain starting with raw material preparation and ending with the finished product obtaining.

As a standard the machine lines are comprised of:
- Polymer crushers (units aimed at plastic raw material preparation by crushing, grinding, shredding) or agglomerating units and granulators;
- Mixers (units used for high-speed preliminary mixing of the composite components);
- Heating-and-melting units (machines which are operated at the main production stage of molding paste preparation. They provide for heating, plasticization and homogenization of the compound);
- Hydraulic presses (used for direct compaction of the paste in a press mold);
- Press molds;
- Auxiliary machines – conveyors, feeders, stockers and hoppers, pneumatic transport systems – used as intermediate aggregates binding the main stages of the production train together.

The above equipment is available in various executions. It can be fully automatized upon customer's request. We also render custom engineering services.

"Polymerstroy 18" is justly known as an expert in the field. Hundreds of companies in Russia and abroad successfully operate our equipment and prove by their everyday practice its reliability, easiness of operation and high production capacity.

PLASTIC CRUSHERS

Rotor plastic crushers are universal crushing machines designed to reprocess waste of various polymers - almost all types of plastics, particularly hard ones. The crushers will manage wrap film, agro fleece, foam insulation materials, flexible sheet materials, crates, bins, bottles, jars and buckets. The only limitation is crushing units more than 15 mm in section.

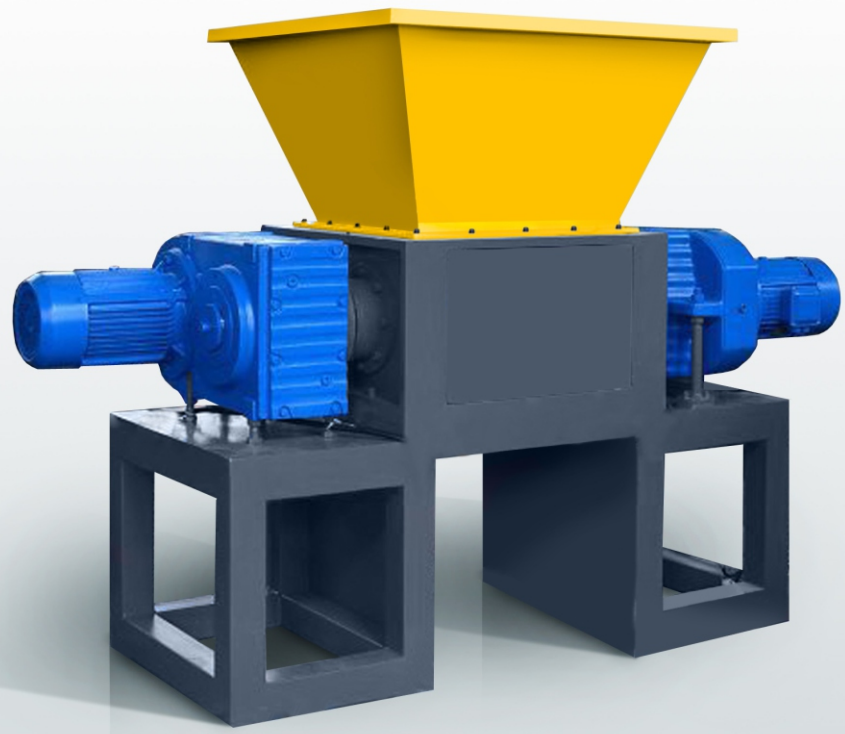
The crushers produced by our company are extremely reliable in their design. Horizontal rotor equipped with plate knives with two-side cutting edges is fixed in strengthened bearing blocks. Processing chambers are assembled of massive bolt joint milled plates (70 ... 100 mm thick) which provides for their highest stability and rigidity. Any torsions or sidesways at high torques are absolutely avoided. Plastic is crushed when gets into the adjustable gap between moving and fixed knives. Cut fraction is determined by the diameter of holes of screening sieve located under the chamber.

Rotor motion is balanced and the unit on the whole is highly thrust resistant.

The crushers are easy to operate and maintain. They can be conveyor belt fed, loaded with either a fork-lift truck or manually by operator.

They present a simple and cost-effective solution in many crushing applications.

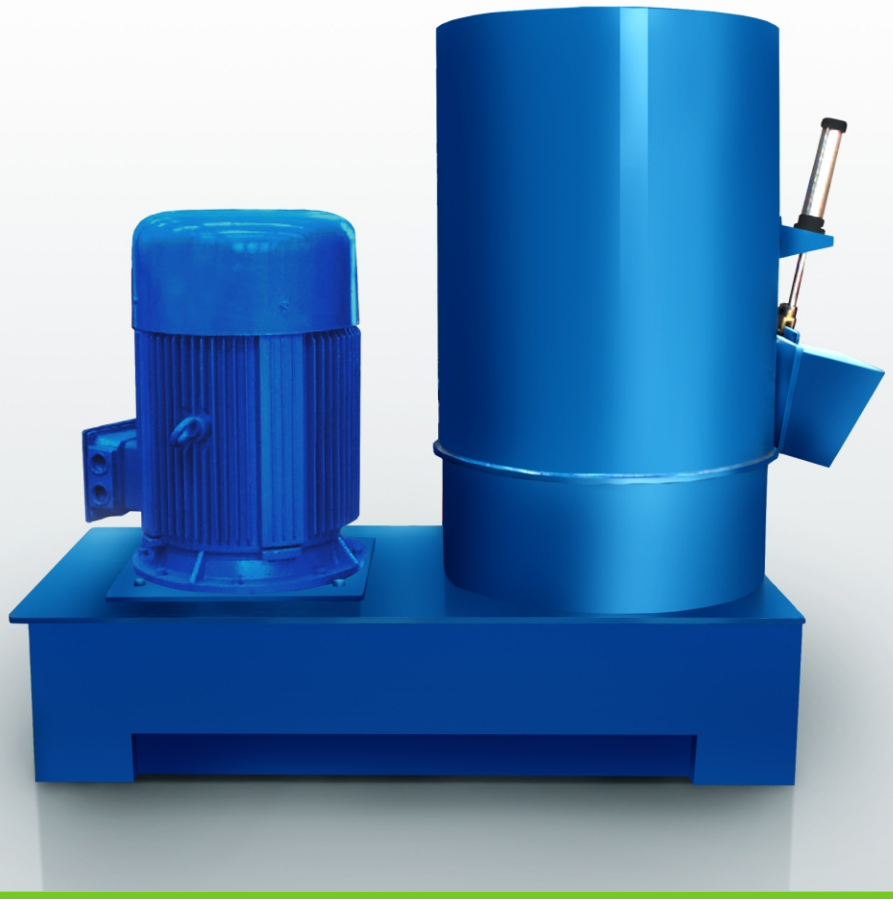
Characteristic	IPR-300	IPR-375	IPR-500
Motor power, kW	15	30	45
Rotor diameter, mm	300	375	500
Rotor length, mm	400	600	800
Rotor rotation speed, rpm	1000	1000	1190
Rotor knives	3 rows (12 pcs)	3 rows (6 pcs)	3 rows (6 pcs)
Fixed knives	2 rows (8 pcs)	2 rows (4 pcs)	2 rows (4 pcs)
Knife length, mm	100	295	395
Charging door dimensions, mm	410 x 460	500 x 600	610 x 820
Sieve hole standard diameter, mm	10	10	10
Overall dimensions (length x height x width), mm	1200x1780x830	1650x2130x1040	2420x2600x1420
Weight, kg	354	1015	2300
Average production capacity, kg/hour	100	400	600



PLASTIC SHREDDERS

Shredders are employed at the preliminary stage of plastic waste recycling to cut plastic items with high resistance to destruction - bulky ones and / or more than 15 mm in section. We manufacture single-rotor and double-rotor multipurpose shredders to crush (cut) thick-wall hard and resilient plastic rejects, such as plastic pipes, crates, canisters, purgings and lumps, automotive and industrial moldings, even foiled laminate and fiber. Enforced transmissions and bearings, strong shafts and cutting discs is what allows our shredders work with high torques and heavy loads and provides for robustness in construction and longevity. Shredders are driven with either spur or bevel gearboxes and motor gearboxes.

		Single-rotor shredders			
Characteristic		1L-550	1L-780	1M-850	1M-1200
Motor power, kW		11	15	22	30 /45
Rotor diameter, mm		250	250	400	400
Rotor length, mm		550	780	850	1200
Disc knives, pc.		42	60	54	74
Charging door dimensions, mm		570 x 700	780 x 960	850 x 1250	1200 x 1250
Average production capacity, kg/hour	film	30	50	200	450
	lumps	60	80	250	500
		Double-rotor shredders			
Characteristic		2M-600	2H-600	2H-800	2H-960
Motor power, kW		7,5 + 7,5	11 + 11	15 + 15	22 + 22
Length of rotors, mm		600	600	800	960
Rotor knives diameter, mm		235	350	350	350
Disc knives on rotor, pc.		80	60	80	96
Gap between rotors, mm		200	300	300	300
Processing chamber dimensions, mm		600 x 400	600 x 600	800 x 600	960 x 600
Average production capacity, kg/hour	film	270	400	530	700
	lumps	700	1100	1500	1800



AGGLOMERATORS

Single-rotor agglomerators APR - are the machines to crush and compact soft, mainly film-type plastic. They serve as an optimal solution for recycling of respectively small volumes of film PE and PP.
Raw material is fed into the processing chamber where it is cut with knives assembled on a vertical rotor. The particles of the crushed film get heated and solidify in the form of irregular-shaped spherical granules by the action of friction force. When the needed consistence of the plastic material is reached water is poured into the chamber which divide the agglomerate into smaller portions. Then the material is dried out and discharged.
Agglomerators of APR series are highly productive and allow recycling not only LDPE, but HDPE, PP, PA as well and get a stable outcome.
The units are equipped with enforced bearing blocks, pulleys of the bigger diameter, enhanced thermal insulation and ventilation of the working chamber.

Характеристика		APR-15	APR- 22	APR-30	APR-55
Motor power, kW		15	22	30	55
Rotor rotation speed, rpm		1000	1500	1500	1200
Number of knives		4	4	6	8
Recycled material	LDPE	+	+	+	+
	HDPE	+	+	+	+
	PP	-	+	+	+
Overall dimensions (length x height x width), mm		1400 1250 650	1800 1250 650	1800 1300 650	2090 1830 860
Weight, kg		500	600	720	1300
Average production capacity. kg/hour		40 - 50	70 - 100	100 - 120	170 - 200

CONVEYORS

Inclined belt conveyors are used as the feeding machines as an element of the complete or partial automatized production train uniting its separate departments. In particular they are employed to feed raw material into crushers, mixers, heating-and-melting units. We manufacture bel coveyors of L-, I- and Z-profile.
Conveying belts are wear-resistant fabric-ply or PVC 8 - 10 mm thick with anti-slip coating. Flat roller construction, trough roller construction or U-profile plating can act as the belt support.
Conveyor length and angle can be made in accordance with the customer's request as well as additional devices such as controllers, magnet rollers, belt cleaning devices, breakaway systems and frequency variators can be installed.
The conveyors can be used both as a detached unit and as a part of a machine line.
Inclined screw conveyors of L- and I-profiles to feed crushed plastic equipped with stirring devices for non-free-running materials can be custom-manufactured.

Characteristic	Value
Production capacity, cubic meters/hour	5 - 30
Drive type	worm or bevel motor gearbox
Motor power, kW	4 - 15
Belt speed, m/sec	0,5 - 2
Belt width, mm	400 / 500 / 650
Length and angle	as per Customer's request
Mobility	stationary / movable

MIXERS

Multimixer design provides for the uniform mixing of sufficiently large volumes of polymer-sand compound within the short time period. The mixers are used to prepare the compound prior to its loading into the heating-and-melting unit.

The components are loaded into the mixer manually or with the help of a belt conveyor, unloading of the mixed compound is performed through the discharge outlet located at the bottom of the mixer. Discharge lever can be equipped with a servo drive if automation is required. Standard execution is manual or semi-automatic. The offered mixers are multipurpose and appropriate for processing of different-fraction materials (granules and powders).

Characteristic	SU-0,5	SU-1
Hopper volume, cubic meters	0,5	1
Number of screws	1	1
Motor power, kW	4	5,5
Screw rotation, rpm	28	26
Time of mixing, min., not more than	2	3
Homogeneity of the compound, %, not less	97	97
Overall dimensions (length x height x width), mm	1700 x 1300 x 830	2050 x 1570 x 960
Weight, kg	750	1015
Production capacity, kg/hour	600	1400

HEATING-AND-MELTING UNITS (EXTRUDERS)

Heating-and-melting units (HMU) is the core equipment in the polymer-sand production train. The unit is similar to an extruder by its functional principle. It is designed to prepare homogeneous polymer-sand mass by heating the compound, melting the polymeric binder, mixing and sticking together the components.

- When premixed compound is fed into a preheated HMU it starts being pushed towards to the output flange by the rotating screw and thus passes through several heating zones. The zones are independent. Their operation is based on tubular heating elements which provides for efficient and uniform heating of the polymer-sand mass throughout its whole volume. Heating is realized without HFC which prevents operating personnel from any harmful effect (compared to induction heating).

- Thermal regulators automatically control switch in and switch out of each heating zone in accordance with the specified temperature mode for preparation of polymer-sand compound, which allows to avoid burning of polymer, as well as its incomplete melting. This solution guarantees adjusting optimal processing temperature for the particular kind of plastic and also allows easy shift from one group of polymers to another. (Though practically all types of polymers can be used for the production, it is highly recommended that the polymers with the same melting temperature were employed. Otherwise either lower-melting-temperature polymer can burn out or higher-melting-temperature can melt incompletely and serve as a filling agent in the compound).

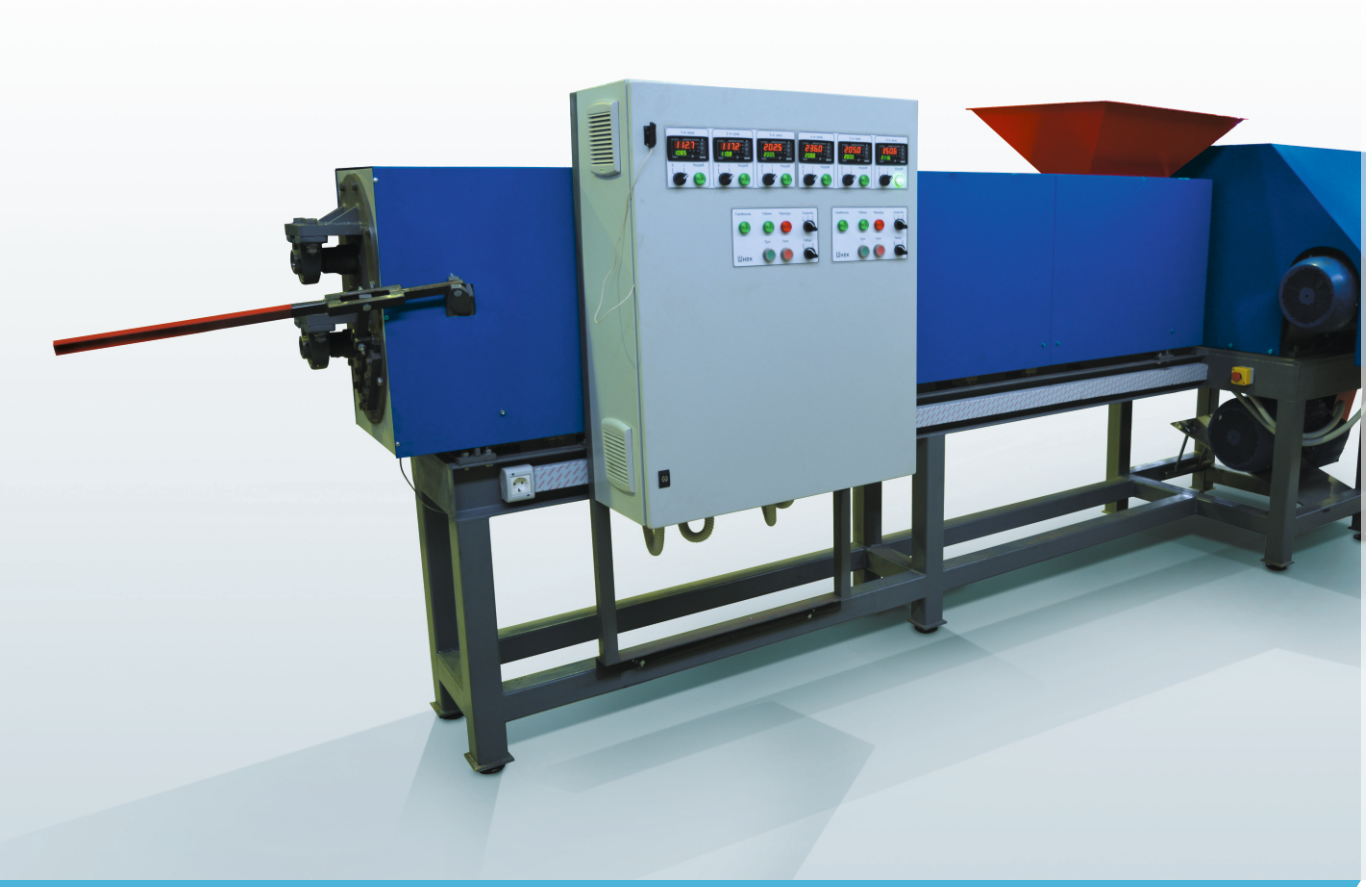
- HMU screws are executed in an improved design to develop a full extrusive force aimed at easier feeding of the ready polymer-sand compound. Screw blades undergo additional tempering which contributes to enhanced wear resistance when coarse abrasive material is processed (polymer-sand compound).

- Temperature settings range from + 50º to + 450ºC. Error of temperature setting amounts to 0.10ºC.

- A single HMU's production capacity is enough for simultaneous molding of the compound on 2 presses.

- Low energy consumption due to the well-advised thermal insulation system on heating elements and respectively low heat loss coefficient.

An indisputable advantage of the heating-and-melting units we manufacture is their capability to process a wide range of polymers in the form of highly contaminated and moisture-laden waste with high outcome.



		Single-screw heating-and-melting units (extruders)		
Characterisric		APN-300	APN-400	APN-500
Motor power, kW		11	11	11
Installed power capacity of the unit, kW		16,5	29	50
Actual power consumption, kW (at standard operation mode)		10,2	18	38
Number of heating zones		3	3	4
Temperature set range , °C		50 - 450	50 - 450	50 - 450
Drive type	motor + belt transmission + gearbox	+	+	+
	motor-gearbox	+	+	+
Motor rotation frequency adjustment		+	+	+
Screw rotation, rpm		6,5 - 13	6,5 - 13	6,5 - 13
Overall dimensions (length x height x width), mm		3000x800x1300	4330x800x1300	5200x900x1400
Weight, kg		1100	1300	1600
Average production capacity, kg/hour		300	450	750

	Double-screw heating-and-melting units (extruders)
Characteristic	APN-2-400
Drive unit power, kW	16,5
Installed power capacity of the unit, kW	61,5
Actual power consumption, kW	33,8
Number of heating zones	6
Drive rotation frequency adjustment	+
Overall dimensions (length x height x width), mm	4545 x 1630 x 1100
Average production capacity, kg/hour	400

HYDRAULIC PRESSES

Polymer-sand units are shaped by means of compression molding in hydraulic presses of D24 series. Control software of the presses is adapted specially for polymer-sand technology, but they can be reprogrammed and thus may have a number of other industrial applications.

Series D24 presses are vertical double-arm semi-automatic presses with upper moving plate designed for direct compaction of thermoplastic-based composite pastes. Press frames made of massive plates totally prevent from warping of the construction at dwelling time and plate strokes.

The presses are offered in five main modifications differing in generated compaction force (63 ... 400 tonnes) and bed plate dimensions (500 x 500 mm ... 1120 x 1250 mm) which allows manufacturing a wide range of composite molded products - various in shapes and sizes.

Operation of the pressing units can be performed either in a fully automatic mode or in semi-automatic or manual mode. All the control parameters are adjustable for the specific operation needs. Every press modification has high actual pressure margin in relation to the nominal value. High operation safety and stability of every unit is guaranteed.

Presses of special execution - with a nonstandard bed plate size or several tables - can be designed and produced as per customer's request.

Characteristic	D2428	D2430	D2432	D2434	D2436
Nominal compression force, kN (t)	630 (63)	1000 (100)	1600 (160)	2500 (250)	4000 (400)
Nominal ejection force, kN (t)	200 (20)	250 (25)	315 (31,5)	500 (50)	630 (63)
Maximum slide stroke, mm	320	400	560	710	800
Upper plate highest position, mm	630	710	900	1250	1400
Bed plate dimensions, mm	500 x 500	630 x 630	700 x 800	1120x1000	1250x1120
Pump motor power, kW	4	5,5	7,5	15	18,5
Overall dimensions (from L to R x front side - back side x height), mm	2100 1150 3200	1740 1185 2780	1200 2270 3820	1430 2720 4500	1745 2820 4905
Weight, kg	2750	3300	5180	10085	14555
Operation mode	semi-automatic				

PRESS MOLDS

Press molds are the main type of tooling for polymer-sand production - they are used to shape finished products. Press molds are manufactured of construction alloy steels (40X, 45 (US analogue – AISI, ASTM, ASME 5140 & 5145)) with further thermal hardening which provides for increased operation life up to 5 million molding cycles.

The system of ducts incorporated in every mold and connected to water circulation system by nozzles is designed to cool polymer-sand compound. Cooling it at dwelling time is obligatory to get a final product with the demanded strength properties and surface appearance. At that, cooling must be performed throughout the whole mass of the paste. That is why the water ducts in a mold are shaped in such a way as to pass around all the sides of the molded item, repeating its configuration.

We produce press molds to manufacture any type of products which can be obtained out of the composite on the basis of recycled plastics. The main groups of press molds are designed to get the following products:
- paving slabs, pavement blocks and curbstones;
- roofing tiles and accessory components;
- cladding materials (facing tileboards);
- water drainage ducts;
- sewer manholes and components of sewage wells;
- decorative fencing for flower beds, compost pits and trunk protection covers;
- fencing and road sign posts;
- railroad ties;
- wall construction blocks;
- Etc.

The molds can be custom-made and produced in accordance with either drawings of a product or just its design sketch.

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