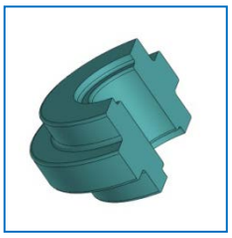
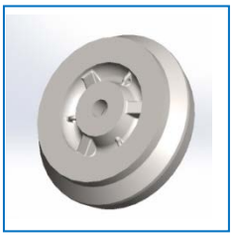
TYAZHPRESSMASH

PRIME METAL PRODUCTION



MANUFACTURING CAPABILITIES

COMPANY PROFILE

Tyazhpressmash is a leading Russian company producing a large and versatile range of press- and forging machinery since 60 years. Machines and equipment bearing Tyazhpressmash logo are efficiently used at the companies located in 40 countries of the world.

Incorporated in our production program for press- and forging equipment are heavy-duty plate metal hydraulic presses, special-purpose hydraulic presses, multi-station hot formers and cold upsetters and complete automatic production lines based on these machines, comprehensive series of horizontal forging machines, radial swaging machines, plate bending machines, forging manipulators and other types of machinery.

Tyazhpressmash maintains good business relations with various sectors of Russian industry. We cooperate with oil-and gas producing companies, automobile producers, railway and aircraft industries, nuclear industry, municipal engineering and many others.

A system of automatic production management employed at out facilities serves to achieve the following goals: actual control of main production process, technical preparatory process, daily control and analysis, automatic design development and manufacture preparation.

Tyazhpressmash facilities consist of a unique system of large production shops with metallurgical, welding and mechanic-erecting equipment.

The metallurgical shops at Tyazhpressmash accommodate the following production sectors: steel-casting, iron foundry, forging shop, thermal treatment shop, non-ferrous metal-casting, processing and feeding of charging materials.

We can meet every need of our customers in nearly any particular metallurgical product required for a large variety of industries: steel-, non-ferrous- and ferrous casting, parts forged from ingots and rolled stock; we can also render a wide variety of services thermal treatment and machining for semi-finished parts and products.

With our half-a-century experience we have gained recognition from a lot of companies acting in machine-building-, power supply-, metallurgy, - processing, bridge-building and food processing industries. Among these companies are AO Autovaz, AMO ZIL, OAO GAZ, OAO KAMAZ, MZ CIITO, PO BELAUTOMAZ, ZAO Tyazhmechpress Voronezh, Azov Press and Forging equipment company, OAO TAGMET, companies of Mostsostroyindustry Group, Mosvodokanal and many others.

METALLURGICAL PRODUCTION

Tyazhpressmash is a company with a sixty years' experience in machine building activities. High professional level and expertise of our personnel combined with powerful and versatile production facilities based on the state-of-art specialized equipment (metallurgical, forging, thermal treatment, boiler and welding, machining and machine assembly equipment) make it possible for us to manage full in-house production cycle starting from technical solution development and up to finished products. We can produce large size parts in weights of up to 10 t and high-quality metal structures of any level of complexity.

SHAPED STEEL CASTING

Our facilities include electric arc furnaces in capacities of 1, 6 and 20 ton used for steel casting. 20t arc steel-melting furnace with A/C power supply was modified into a furnace with D/C power supply. It allowed to reduce power consumption: 150 kW per 1t of molten metal, for ferroalloy - 10-15%, graphitized electrodes - 75%, to shorten melting time by 1.5 h, to improve mechanical properties by 15-20%, to reduce impurities, to improve steel structure. Due to implementation of these new facilities the efficiency of the steel-melting furnace Model ДППТУ-20 greatly increased.

Production range

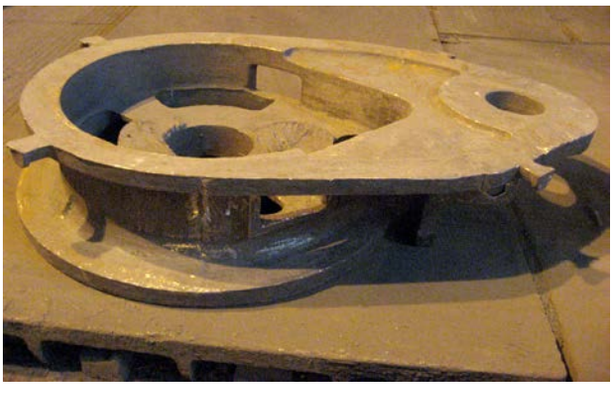
Frames, housings, conrods, pulleys, eccentrics, gears etc.

Steel grades

20Л-45Л, 40ХЛ, 35ХМЛ, 12Х18Н9ТЛ, 20Х20Н14С2Л etc. as per GOST 977-88

Casting weight: from 50 up to 15000 kg.

Overall dimensions: up to 3500×3500×2000 mm.



SHAPED PIG IRON CASTING

Shaped pig iron castings are produced in an induction furnace Model ДС6-1Н, ДППТУ-1 with capacity of 1 ton.

Production range
Machine frames, housings, wheels, plates, rims, municipal castings (manhole covers, gully gratings, surface boxes) for VODOKANAL.

Iron grades
СЧ15 - СЧ20, СЧ25, АЧС, ВЧ-50
Casting weight: from 0.5 up to 800 kg.






METALLURGICAL PRODUCTION

NON-FERROUS CASTING

Non-ferrous cast parts are produced in a copper-smelting furnace ДМК-0.5 and in a resistance furnace СМБ-0.6. Chill casting method is used.

Production range
Bushes, plates, round blocks etc.

Bronze grades: 010Ф1, О5Ц5С5 GOST 613-79; БрА9Ж3Л GOST 493-79
Bronze casting weight: from 1 up to 500 kg
Bushes in diameters of up to 600 mm, plates sized maximum to 1000 x 300 x 50 mm, round blocks in diameters of from 40 mm to 20 mm and in heights of up to 400 mm.

Aluminum grades: АК12, АК12М2, АК5М2 - GOST 1583-93.
Aluminum casting weight: from 0.5 up to 50 kg

DISPOSABLE PATTERN CASTING

Disposable pattern casting from iron, steel and non-ferrous metal is performed in an induction furnace Model ИСТ1/0.8 and in a DC furnace Model ДППТ-1 with capacity of 1 t. This method ensures high production output and allows to produce high-accuracy castings of various shape.

Production range
Shut-off valves, parts for oil/gas equipment, municipal castings (manhole covers, gully gratings, surface boxes) for VODOKANAL, castings for our own use.

Casting weight: from 0.1 up to 25 kg.







METALLURGICAL PRODUCTION

FORGING INGOTS

Forging ingots are produced in steel-melting furnaces. Molten steel is poured from the bottom-pour ladle into casting molds with capacity of 0.75 t, 3 t, 5 t, 7 t, 10 t, 12 t, 13 t.
High-quality refractory materials are used for ingot production.

Production range
Shafts and pipes designed for nuclear industry, forging ingots for high-pressure vessels, forged parts for machine-building industry, aircraft industry, shipbuilding industry and oil/gas industry.

Grades
More than 100 steel grades are used for forging ingot casting: structural steel, tool steel and heat-resistant stainless steel.
Ingot weight: from 0.75 up to 13 t.
Weight of forged part: from 0.1 up to 9.8 t.

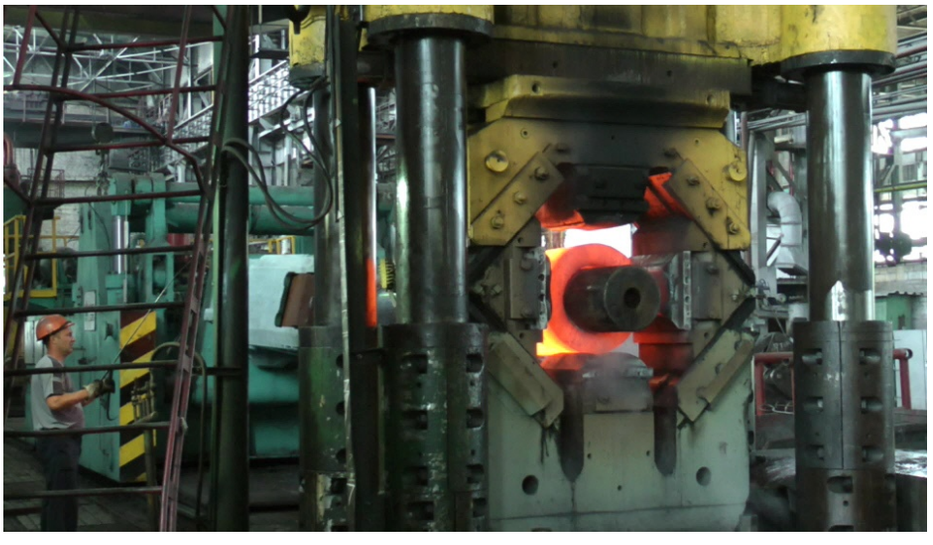


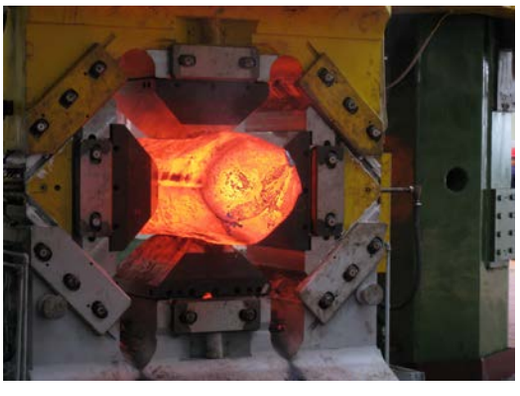



FORGED PARTS FROM INGOTS AND ROLLED STOCK

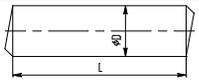
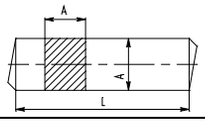
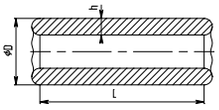
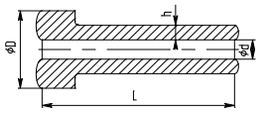
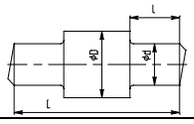
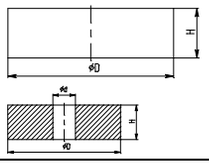
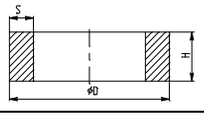
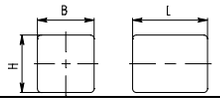
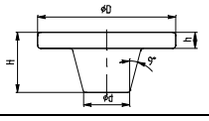
Forged parts from ingots and rolled stock are produced on two hydraulic forging presses in capacities up to 25 MN, on forging hammers with drop weight of 150 kg, 450 kg, 3000 kg and on 2500 kN Horizontal Forging Machines.
To increase output of forged parts, to improve quality of forged parts and to reduce power consumption, the four-die forging devices designed and produced at OAO Tyazhpressmash are installed on hydraulic forging presses. Four-die forging devices are patented and successfully used in Russia, Korea, Germany and Spain. They are designed for production of forged parts starting from ingots and rolled stock of all steel grades of easily deformable steel, alloys and non-ferrous metals on forging presses rated up to 120 MN.

Production range
Forged parts produced from ingots and rolled stock of round and square cross-section, solid and hollow (disks, bars, plates), round stepped forged parts (rods, plungers, roll shafts, pinion shafts, single- and double flanged shafts, spindles), forged rolled rings and rims.
Grades of forged parts are respectively the same as the ingot material produced from carbon, structural and tool steel.
Overall dimensions
Shafts: diameter – up to 600 mm, length – up to 8000 mm; Plates: width – up to 1200 mm; Pinions: diameter – up to 1100 mm; Rings: diameter – up to 2400 mm. All forged parts are subjected to mechanical properties testing and ultra-sound control inspection as per GOST 24507-80.





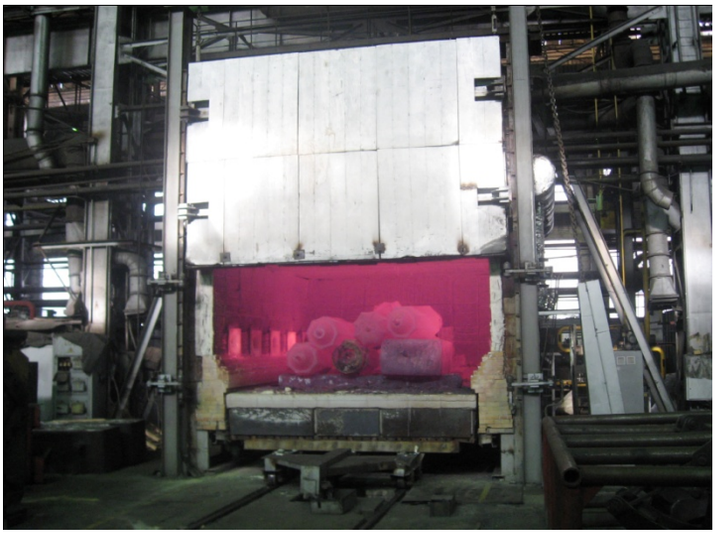
FORGING PRODUCTION

Description	Sketch	Dimensions, mm	Weight, t
Plain round forged parts		D от 200 до 700мм L≤7500мм	0,3 – 7,5
Plain square forged parts (bars, plates)		Бруски: A, H до 500; Пластины: H от110 до 320, A до 1200 L≤7500	0,3 – 7,5
Hollow cylinders		D≤850 L≤8000 h≥100	0.3 – 7.5
Hollow flanged cylinders		D≤850 d≤450 L≤8000 h≥100	0.3 – 7.5
Round stepped forged parts		D≤700 d= 210 – 675 L≤8000	0.3 – 7.5
Hollow and solid disks		D≤1500 D=125-320 H≥0.2D	0.3 – 7.0
Rolled rings		D≤2200 d≤2000 0.2D≤H≤730 S≥100	0.3 – 6.0
Blocks		H, B≤620 L≤800	0.3 – 6.0
Forged hub flanges		D≤1000 d≤700 200≤h≤260 400≤H≤600	0.3 – 3.0

JET HEATING FURNACES FOR INGOTS HEATING

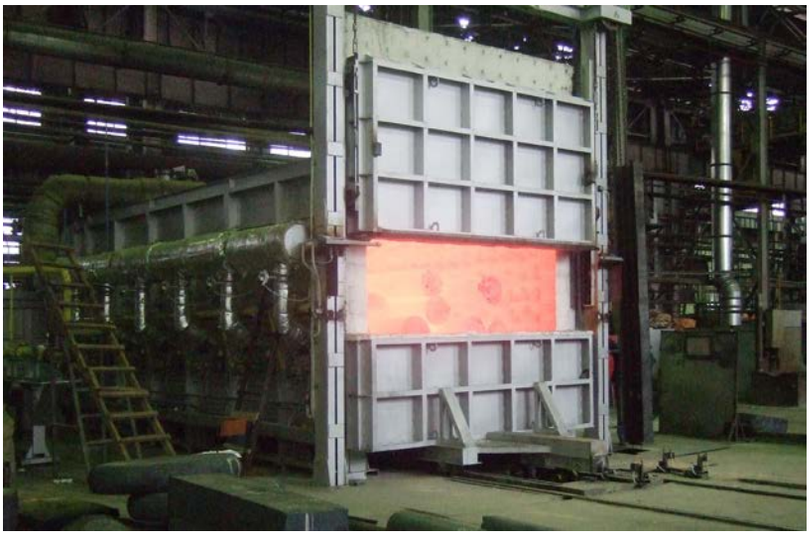
Tyazhpressmash in cooperation with OOO SovPromPech designed and employed innovative bogie-type hearth furnaces designed for heating of ingots in weights up to 10 t. Nowadays we operate 7 furnaces of this type. In these furnace we employ innovative heating method, so called jet heating, which allows to pre-heat the material by means of direct influence of gas combustion products. The combustion products generated in this furnace are ejected at a higher speed out of the burners and immediately contact the ingots surfaces. Working zone insulation is made by means of light-weight fiber refractory materials. To reduce heat loss through gates, the new furnace is equipped with a lifting hearth. The furnace is equipped with comprehensive automatic means and meets all the safety requirements applicable thereto. Scale building is brought to minimum and no deterioration of the material surface layer structure occurs during heating. The new furnace is easy and user-friendly in service.
Provided in the furnace is an optimized and stable operation of all the control/measuring devices and automatic devices – burners ignition devices and burners monitoring devices included.

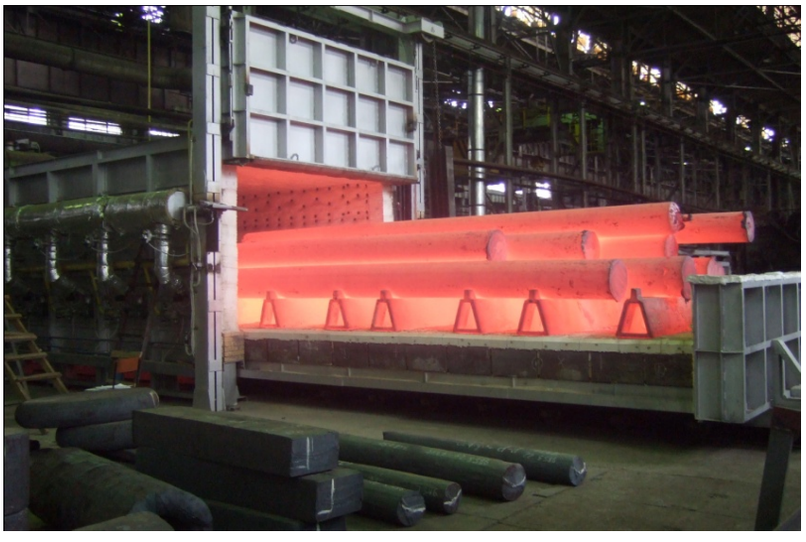
Burners ignition is effected by means of a push-button in accordance with the pre-set operation cycle. Incorporated into the automatic heating cycle is also a blow-through period. It takes maximum 10 minutes to heat the furnace up to the operating temperature.



THERMAL TREATMENT FACILITIES

A batch bogie-type furnace ThermoGas-ДО-25.75.15/1000-И4-Н produced at ZAO Kerammash /Slavyansk/ is used to carry out the thermal treatment of forged parts, while heating furnace ThermoGas-ДО-35.51.23/1280-И3-НФ is used to heat ingots for forging. This furnace is also a product of ZAO Kerammash /Slavyansk/ .
These new-generation furnaces realize energy-saving technologies, include advanced components and insulating fiber materials, which allow to carry out heat treatment in automatic mode and to obtain high quality products and simultaneously eliminate the subjective influence of human element on heat treatment process.
High efficiency of the furnaces is reached due to heat recovery of exhaust gases (air heating for burning – up to the temperature of 300-400ºC); reduction of heat losses for accumulation of lining heat by means of the advanced fiber materials application; usage of up-to-date gas burners equipped with an automatic system intended to adjust the «gas-air» ratio and recuperative burners from "WS GmbH" company (Germany).





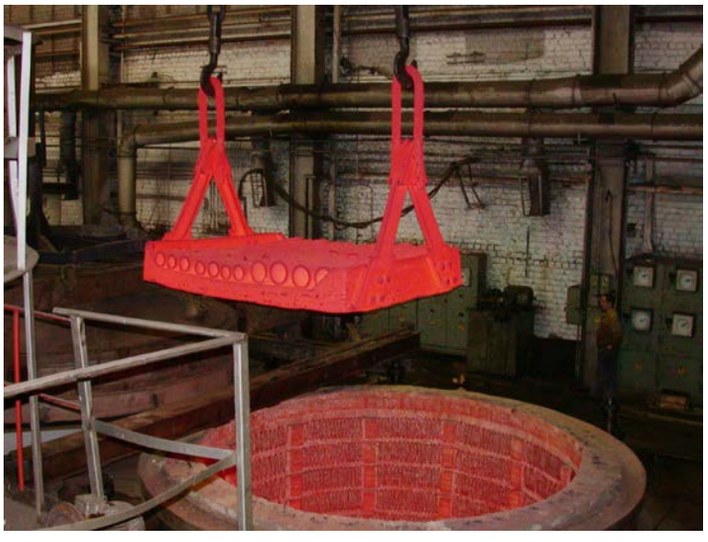
THERMAL TREATMENT

Our thermal treatment facilities incorporate all the necessary equipment required for thermal treatment of parts produced from construction and alloy steels. The following thermal treatment procedures can be performed at our facilities: annealing, normalizing, hardening, tempering, nitriding, carburizing and HFC hardening.
Nitriding is generally performed on components in diameters of up to 900mm and in lengths of up to 5800mm.
At our facilities we carry out hardening of large-sized parts, such as: shafts, rolls, columns, plungers – in diameters of 100-150mm, in lengths of up to 9000mm; crankshafts – in diameters of 200-500mm, in lengths of up to 6000mm; toothed gears – in diameters of 1000-3500mm, made of carbon-, alloy-, constriction- and tool steel grades in weights of up to 500 kg.

The following equipment is available for the thermal treatment purposes: a gas furnace dia. 1600 x 10500 mm long intended to harden and to temper extra-long parts, a pinion-hardening furnace dia. 4000 x 2000 mm intended to anneal, to harden and to temper parts, an electric shaft furnace intended to perform nitriding treatment of parts with dia 1200 x 6000mm.
Along with customarily used oil hardening mediums we also use innovative water-based polymer hardening fluid UNIFLOC-ФБ. Many years of experience have proven that this hardening medium can be successively used to ensure high-quality hardening of construction steels and also for intricate-shaped parts.

In a quenching bath with a capacity of 200 m^3 a wide variety of large-sized parts can be treated. These are shafts, rolls, press columns, plungers, crankshafts in dias. from 200 to 600 mm, eccentric shafts made of steels which are quite hard to be treated: 40ХН2МА, 40ХН, 38ХНВА, 38ХМЮА, 35ХМА, 30 ХМА, 30ХГСА, 35ХМЛ, 35ГЛ, etc.

The hardening medium cooling rate can be changed by using of respective additive components.
The hardening medium cooling rate can be determined by the cooling periods in different temperature ranges – in the perlit- and martensite intervals by means of respective cooling process curves. The hardening medium cooling capacity can be controlled with the help of semi-automatic control device.
With the help of the hardening medium concentration correction and due to development of innovative treatment procedure it has become possible to prevent cracks building on the hardened parts.
The hardening medium is highly versatile, suitable to a large variety of applications and heat resistant. It positively ensures hardening capacity and hardening depth required. Besides, it is an explosive-proof/inflammable-proof and environment-friendly fluid.



MACHINING FACILITIES

MACHINING

Parts machining is performed in specially equipped machining shops which accommodate unique and state-of-the-art machine-tools suitable to perform high-quality cutting-, turning-, vertical turning- , boring/milling operations, as well as rough- and finish machining for parts weighing as much as 125 T and sized up to 3000 x 3000 x 12000 mm. Among these machines are heavy-duty horizontal boring machines Skoda, multi-purpose machines like planar mill Liné, rotary borer grinder mill Berthiez, gear grinding machines Hőffler, specialized machines used for machining of heavy crankshafts with one, two and three connecting rod journals, etc.
Installed in our production shops is a large number of CNC machines including “machining centers ” which ensure high accuracy surface machining.
Our production facilities include 832 metalworking machines, 190 forging machines and presses, 148 welding machines

Turning machines are designed to perform surface machining on columns, shafts, plungers, cylinders in diameters of up to 2000 mm and in lengths of up to 21000 mm. Vertical turning- , boring/milling machines are used for machining of parts in diameters of up to 6300 mm and in heights of up to 3200 mm. High-accuracy tooth cutting- and gear grinding machines are capable to produce coarse pitch spur gears (modulus 32) of the 7-th accuracy grade in diameters of 3200 mm, with tooth grinding (dia. up to 2500mm), straight bevel gears (modulus 30) in diameters of 1600 mm and circular teeth gear (incl. grinding) (modulus 16) in diameters of up to 800 mm. CNC milling machines are used to process parts of intricate shape with overall dimensions up to 3000x600 mm or parts which require high accuracy surface finishing.

QUALITY CONTROL

Tyazhpressmash is a leading Russian company producing high-quality press- and forging machinery. Our company supplies a large and versatile range of metallurgical products such as castings, closed-die forged parts, open-die forged parts and finished products which are to be used in machine-building industry. Our products are certified for conformity with BS EN ISO 9001:2008, STO Gazprom 9001-2012.

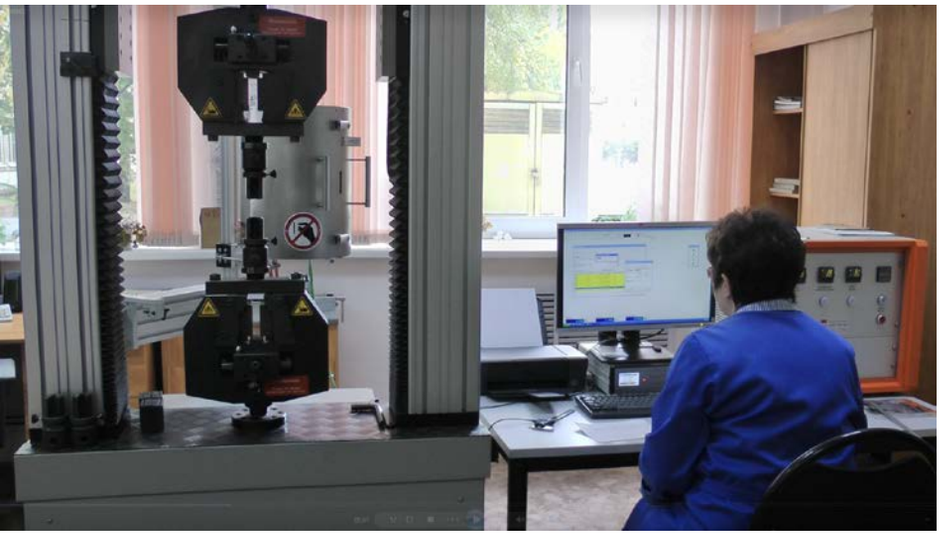
All products undergo strict quality control at each production stage.
Prior to melting all initial materials are tested in our laboratory.
While melting deoxidation process is controlled and when required respective additives are added.
Large forged parts are produced on hydraulic presses Model ПА 1343, П156 equipped with manipulators. The presses incorporate size control devices intended to control the forged parts size and temperature sensors designed for temperature control during the forging process. Thus, the forging process is under complete control.

The Lab employed at Tyazhpressmash is equipped with the up-to-date testing devices designed for the following:
- incoming material control,
- control of physical/mechanical properties of metals and welds (at low temperature (-60°) and high temperature (+350°),
- non-destructive test (for mechanical structures).

Our Central Measuring Laboratory ensures quality control throughout the whole production cycle.

We use only state-of-the-art devices to perform laboratory testing:
- spectroscopes for chemical composition analysis (models Belck Bario-lob, SPECTROLAB, SPECTROUSOPT (Germany), ДФС-51, BELEC);
- ultra-sound control devices models USM35-X, USM GO, OMHISKAH (Germany), PELENG
- comprehensive range of devices used for mechanical properties testing and metallographic analysis.

The specialists of Tyazhpresmash employ full spectrum of quality control methods: visual and measuring control, radiographic test, dye penetrant inspection, magnetic particle inspection.



FOUR-DIE FORGING DEVICES

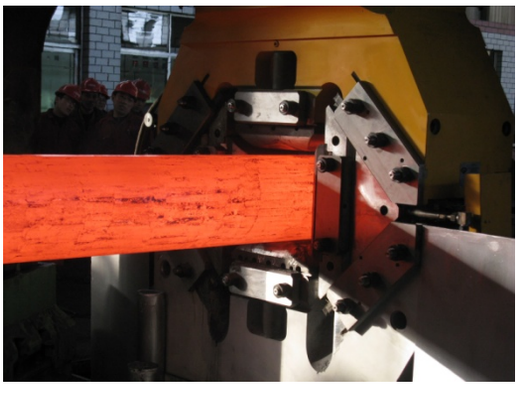
FOUR-DIE FORGING DEVICES

Tyazhpressmash is the only company in the world where a series production of industrial four-die forging devices for hydraulic forging presses (forging units) has been introduced. Among our customers are the well-known companies like Corporation VSMPO AVISMA, OAO Bummash, CCM Tyazhmash. Eight four-die devices are in operation at PRC companies, one device is installed at a German company. A four-die forging device is a unique machine combining the advantages of radial forging method implemented on radial-forging machine (RFM) and conventional two-die forging implemented on open-die forging presses.
Innovative solution of the lateral guideways provides not only for the alignment of the top body relative to the bottom body and of the slides relative to the bodies, but it also allows to bring the slides apart together with the lateral dies fixed to them and thus to open the device working zone without any need to use some additional mechanism. The benefits of this solution are the compact design and high reliability in operation.

The benefits of a forging plant equipped with a four-die forging device benefits are easy servicing, compact size, high reliability and a considerably lower price as compared to a radial forging machine. Forging process implemented in a four-die device provides for high metal quality, isothermal forging conditions and high accuracy of forged products in a variety of shapes and cross-sectional sizes with high efficiency.



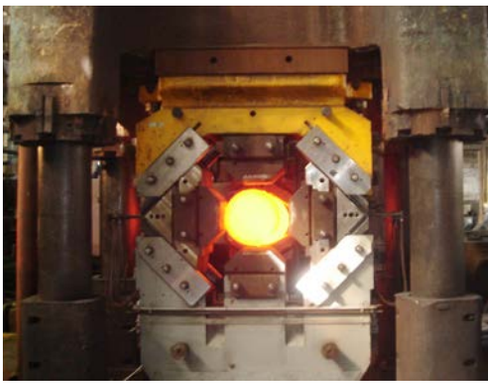


FOUR-DIE FORGING DEVICES

MODELS	РУК39	РУК40	РУК41	РУК42	РУК43	РУК45	РУК46	РУК48	РУК49	РУК50	РУК51	РУК52
Rated force of the top body of the device (press rated force, MN)	8	10	12,5	16	20	31,5	40	50	60	80	100	125
*Max. cross-sectional diameter of initial ingot (billet), mm	450	520	600	800	950	1300	1450	1550	1650	1800	2000	2300
*Minimum cross-sectional size of forged product, mm	80	100	120	150	180	250	300	320	340	360	380	400

*Initial ingots size and forged product size produced in a four-die forging device are valid for medium-alloyed steel grades.



NEW PROJECTS

Our many-years experience and profound expertise, continuous research and development activity in prime metal production and metal forming practice combined with advanced technologies and state-of-art production facilities – these are the reasons making it possible for Tyazhpressmash to offer optimized technical solution for the most challenging customer's needs. The certified quality management and advanced quality control methods used at out company contribute to meeting all the requirements of our customers.

To build more new business relations we are working now in close cooperation with such scientific research institutes and universities as The Central Research Institute of Ferrous Metallurgy named after I. BARDIN, Bauman Moscow State Technical University, Moscow State Institute of Steel and Alloys, Moscow State Technological Institute STANKIN, Moscow State Industrial University and many others. Main directions of our joint activity are as follows:

Under production at our shop is now a centrifugal casting machine intended to produce initial castings for production of thick-wall pipes in diameters of up to 700 mm with a wall thickness of up to 270 mm. The a.m. centrifugal casting machine is a high demand for nuclear power plant construction and for machine-building industry for production of rolled rings and flanges with the specified technical data. The centrifugal casting machine project is a development of Tyazhpressmash.

We are planning to put into production a disposable pattern casting line designed for production of steel castings in weights from 100 g up to 20 kg. At present the casting line is used for production of castings from grey cast iron and high-duty cast iron and also for production of aluminum die molds.

We are also working on upgrading our electric arc furnaces which will be used to supply molten steel to the disposable pattern casting line in our iron-melting shop. Our next project will be modivication of an A/C arc steel-melting furnace with Model ДСВ6 installed in our steel-melting shop. It will be modified into a furnace with D/C power supply.

To increase weights of our forged products, we have started to produce bottom-poured ingot molds for ingots up to 16 t.

To perform hardening with tempering treatment, a new shaft furnace capable to perform thermal treatment of shafts in lengths of up to 10 m is put into production.

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