

Research and Production Company  
"Machinery and Tools  
Engineering Group" LLC

**NPO "GKMP" LLC**

**MAKING YOUR IDEAS  
COME TRUE!**



**INDUSTRIAL  
THERMAL  
EQUIPMENT**



**GKMP**  
RESEARCH & PRODUCTION  
COMPANY

# ABOUT COMPANY



The “NPO “GKMP” LLC became the flagship of scientific, experimental and production industries in Russia. The hardware designed for thermal nuclear fusion, cryogenic and thermal vacuum hardware for testing reached a substantially new level.

Our experimental set-ups are unmatched and serially produced hardware meets the highest international standards.

Our company’s frontline products are successfully used for more than 10 years by the top advanced manufacturers of our country. Making big ideas come true, our experts are capable to complete the most challenging research and development projects.

Today the “NPO “GKMP” is a leader in research of natural and technical science.



## FROM CONCEPTION TO SOLUTION

The “Research and Production company” Machinery and Tools Engineering Group” LLC is the Russian developer and manufacturer of special-purpose industrial equipment, high temperature gas and vacuum electric furnaces of different design and application, technological lines for thermal treatment, quenching, annealing and tempering of complex shape and size pieces, vacuum sputtering machines, thermal diffusion, thermal compression machines, machines for monocrystal growing, test benches, thermal vacuum chambers, vacuum shutoffs and other high-tech hardware.

Quality management system of the “NPO “GKMP” LLC is certified in accordance with requirements of the standard GOST R ISO 9001-2015 and confirmed by the respective conformity certificates. The “NPO “GKMP” LLC successfully completes audit checks on yearly basis. Moreover, the company is subject to regular internal audits of the quality management systems.

The company managed to gather the best specialists in their fields of expertise. Many years of experience accumulated by few generations of engineers and technicians along with workmanship of employees and proper management enabled to create a world-renowned production company. The contracts successfully completed for the last few years contribute to the ability of the company’s team to tackle any challenges.

## TOGETHER TOWARDS SUCCESS

The long-term cooperation with various companies engaged in electronic, nuclear and aerospace industry ensures our company’s sustainable growth and mastery over new products and hardware. Well-developed production standards, as well as client targeted policy put our company among leaders at the domestic market.

The hardware produced by our company operates at the most challenging sites of nuclear and electronic industry. As of this moment, our company is the only domestic manufacturer with a full production cycle of machines designed for vacuum sputtering, thermal diffusion and thermal compression facilities; our vacuum chambers are officially renowned as the best among domestically produced facilities.

Over the years the company earned several local and federal awards.

## OUR MISSION

By making ideas come true our experts are capable to put into life the most complex scientific and research works. Our production capacities enable us to create hardware with completely unique characteristics.

**We are the best and always move on!**



**Dear partners,**

“NPO “GKMP” LLC is a corporate group with the mission to promote machine engineering, electronic, nuclear and aerospace industry at national and world level alike. For more than 10 years the innovative solutions of our company are successfully used by leading factories of our country.

Professional designer-engineers, highly qualified experts, in-the-house production and design capacities, as well as all required licenses ensure the complete production cycle of high-quality products for general industrial, nuclear, aerospace and customized application.

Each item produced goes a long way – from marketing research and design discussions to the final test and production. The application of state-of-the-art materials enable us to provide the best lifetime. This is the result of hard work of the well-aligned team of professionals, hundreds of work hours, tons of materials, numerous meetings and thorough analysis.

Our team is highly motivated in its aspiration towards perfection: we develop new product lines, implement new projects, adopt the best practices and technologies. We undergo changes, so does the world. Nevertheless, we do our best in order to keep the highest quality standard and pursue our company’s mission.

By acknowledging the importance of our work, we feel every bit of our responsibility in the face of those who choose our holding for machinery and tools. And this choice is completely true.

**We appreciate the stable and mutually  
beneficial business cooperation!**

Best wishes,  
General Director of the “NPO “GKMP” LLC  
Nikolay Inutin

# THE FULL SCOPE OF SERVICES



## In-the-house production

The company's production site is subject to scheduled upgrade with a specific emphasis on system improvement and equipment. Over 250 machines are equipped with up-to-date tools.



## Comprehensive solutions

We provide the entire scope of services - from conception to construction, mounting activities and commissioning.



## Well-aligned staff

There are over 750 employees that represent the team of highly qualified experts in the field of comprehensive engineering, as well as efficient management and project management. There are more than 110 employees engaged in engineering.

**QUALITY ASSURANCE**

## Quality assurance

Expanded guarantee for machines produced, as well as post-warranty maintenance.



## Certificates and permissions

Any permission documents and certificates are available.

## WE KNOW HOW TO MAKE YOUR PROJECT BETTER!

- Engineering, design, specification drawing up, calculations;
- Manufacture;
- Delivery;
- Mounting, supervised mounting;
- Training of customer's specialists;
- Test;
- Warranty, post-warranty maintenance;
- Disposal.

## The NPO “GKMP” LLC provides a wide range of services for metal and piece treatment:

- Preparatory operations – gas oxygen cuttings, plasma cutting, hydro abrasive cutting,
- guillotine shear cutting, bending, casting etc.;
- Any mechanical machining – lathe, milling, gear machining, planing, polishing;
- Manual and mechanized welding;
- Thermal treatment – gas cementing, release, annealing, tempering, high-frequency brazing etc.;
- Additional services on painting and shot blasting.

## PRODUCT LINES OF THE “NPO “GKMP” LLC:

- Vacuum shut-offs, pumping systems and customized technical hardware;
- Test vacuum benches and facilities;
- Industrial thermal equipment;
- Crystal growing machines;
- Coils for electromagnetic systems;
- Stainless steel metal bellows;
- Parts from refractory metals and alloys;
- Road construction machinery;
- Magnetic systems and elements for large-scale magnetic system;
- Spare parts for vacuum and thermal hardware.

## OUR PARTNERS:

We are awarded by industrial leaders  
You are welcome to join our team!



## OVER 75 SUCCESSFUL PROJECTS OF THE FOLLOWING INDUSTRIES:

- Metallurgy
- Aerospace
- Machinery
- Energy
- Electronics
- Additive technologies
- Nuclear industry

# QUALITY MANAGEMENT SYSTEM

- Our company is certified under GOST ISO 9001-2015 of the quality management system.
- QMS covers design and development, production, selling, maintenance and repair of the products manufactured.

When so requested by Customer, the items can be produced as experimental workpieces, experimental or small batches.



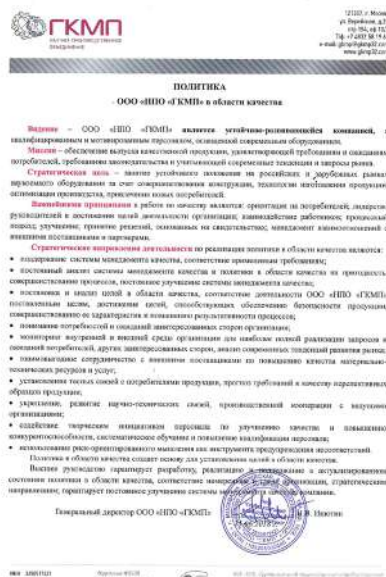
QMS certificate with attachment page 1



QMS certificate with attachment page 2



QMS certificate for road construction machines



## Quality assurance policy

- The "NPO "GKMP" LLC today successfully implements external inspection audits. The organization performs on regular basis internal audits of the quality management system.
- Licenses for design and manufacture of hardware for propellant nuclear cycle, propellant and waste storage.
- 8 patents for utility models.

## Quality management system of the NPO GKMP LLC

### Система менеджмента качества ООО «НПО «ГКМП» при производстве изделий широкого назначения и специализированного оборудования

Сертификат соответствия системы менеджмента качества (Общества с ограниченной ответственностью «НПО «Группа компаний машиностроения и приборостроения», включая компании: ООО «НПО «ГКМП» (головная компания), ООО «Финтех-Классик», ООО «Элемент», ООО «Азимут-Брикс», профинансированного в соответствии с требованиями ГОСТ Р ИСО 9001-2015, распространяющегося на проектирование и разработку, производство и обслуживание систем в условиях вакуума, оборудования технологического назначения для электрической, электротехнической, машиностроительной, приборостроительной отраслей и энергетики, оборудования для комплексов, в которых содержится радиоактивные вещества (включая комплексы, расположенные вне территории ядерной установки), электротехнического оборудования для объектов использования атомной энергии, оборудования для хранения (переработки) радиоактивных отходов, оборудования транспортно-технологического для атомных электростанций, принадлежностей к приборам для измерения и регулирования параметров среды.

1. ООО «НПО «ГКМП» (головная компания) выполняет следующие виды деятельности: проектирование и разработку, производство и обслуживание систем в условиях вакуума, оборудования технологического назначения для электрической, электротехнической, машиностроительной, приборостроительной отраслей и энергетики, оборудования для комплексов, в которых содержится радиоактивные вещества (включая комплексы, расположенные вне территории ядерной установки), электротехнического оборудования для объектов использования атомной энергии, оборудования для хранения (переработки) радиоактивных отходов, оборудования транспортно-технологического для атомных электростанций, принадлежностей к приборам для измерения и регулирования параметров среды.

2. ООО «Финтех-Классик» выполняет следующие виды деятельности: предоставление услуг (производственная компания) по изготовлению полуфабрикатов, сборочных единиц оборудования специального технологического.

3. ООО «Азимут-Брикс» выполняет следующие виды деятельности: маркетинг, реализацию выпускаемой продукции и предоставление грузовой компании услуг.

4. ООО «Элемент» выполняет следующие виды деятельности: проектирование и разработку, производство и обслуживание систем в условиях вакуума, оборудования технологического назначения для электрической, электротехнической, машиностроительной, приборостроительной отраслей и энергетики, оборудования для комплексов, в которых содержится радиоактивные вещества (включая комплексы, расположенные вне территории ядерной установки), электротехнического оборудования для объектов использования атомной энергии, оборудования для хранения (переработки) радиоактивных отходов, оборудования транспортно-технологического для атомных электростанций, принадлежностей к приборам для измерения и регулирования параметров среды.

Система менеджмента качества ООО «НПО «ГКМП» при производстве изделий широкого назначения и специализированного оборудования

Сертификат соответствия системы менеджмента качества (Общества с ограниченной ответственностью «НПО «Группа компаний машиностроения и приборостроения», включая компании: ООО «НПО «ГКМП» (головная компания), ООО «Финтех-Классик», ООО «Элемент», ООО «Азимут-Брикс», профинансированного в соответствии с требованиями ГОСТ Р ИСО 9001-2015, распространяющегося на проектирование, разработку, производство, поставки и обслуживание специального и специализированного транспортного средства на основе отечественного и импортного производства, машин планировочных, дорожных, катков дорожных и машин уплотняющих, экскаваторов многоцелевых, экскаваторов тракторных цепных, прицепов дорожно-ремонтного оборудования.

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# INDUSTRIAL THERMAL EQUIPMENT

**Industrial thermal equipment** is one of the main products of the "NPO "GKMP" LLC.

For a single, periodic and small batch production, as well as for laboratory studies, single bell-type furnaces are the most convenient. When a non-stop production is required or the scope of the output is considerable, double bell-type furnaces are preferable as they can operate consecutively. A convenient intuitive automatized control system enables one operator to efficiently operate few furnaces.

Furnaces can have a closed loop cooling water supply system that allows to operate together with a chiller, or via an open-loop circuit to visually adjust the cooling plume. In order to prevent the pilling corrosion inside the water-cooling system of the furnace, a cathode protection can be embedded.





# CHAMBER ELECTRIC FURNACE

**Chamber electric resistance furnace** is a device (equipment) designed for contact-free transfer of thermal energy from the heating source to the object heated in a closed loop.

The peculiar feature of electric furnace produced by the the “NPO “GKMP” LLC is a low gradient of the temperature zone and high cleanliness maintained inside the chamber.

The electric chamber furnace is a batch-action facility.

**The chamber furnaces can be subdivided as follows:**

- In terms of design: Bell-type furnace, shaft furnace;
- In terms of medium inside the chamber: Vacuum furnace, gas filled furnace.

**The key advantages of bell-type furnace:**

- High output percentage of good items produced;
- Possibility to manage small batches;
- Resource and energy saving;
- Flexible technological process;
- Possible selection of the best treatment conditions;
- Wide range of technological applications.

**Application area:** extra clean processes while production of electronic devices, welding in shielding atmosphere, thermal treatment of high-precision parts, refurbishment of metallic powders etc.



## The “NPO “GKMP” LLC produces bell-type furnaces with the following characteristics:

- **By quantity of chambers:**  
Single bell and double bell furnaces with consecutive bell heating.
- **By type of chamber locking:**  
With movable bell (with movable and stationary heating system), lowering pods and movable cover.
- **By type of medium inside the chamber:**  
vacuum (backing, high vacuum, and super high vacuum), with inert atmosphere (Ar, He, Ni, etc.), with protective and refurbishment atmosphere (H, forming gas in a given proportion). It is possible to moisturize the operating gas up to the given dew point and mix few gases in a given proportion before these are supplied to the chamber.
- **By maximum operating temperature:**  
Low temperature (up to 1200°C), average temperature (from 1200°C to 1600°C). By special request one can order to manufacture a furnace with maximal temperature up to 2500°C (all-metal heaters and thermal insulation) and up to 300°C (heaters and thermal insulation from carbon composite materials).
- **By size of the operating zone:**  
Small-sized (operating zone diameter up to 200 mm, operating zone height up to 250 mm), average sized (diameter up to 400 mm, height up to 500 mm), large-sized (diameter over 400 mm, height over 500 mm).
- **Furnaces can be manufactured having a non-standard operating zone of any size and increased maximal operating temperature.**



## Benefits of bell-type furnace produced by the “NPO” GKMP”:

- High quality of applied materials;
- Multiple-step quality assurance at any stage of production;
- All specification aspects are approved with the Customer;
- High production culture comparable with the European one;
- State-of-the-art materials and components that enabled to substantially improve precision, reliability and lifetime of the hardware;
- One-of-the-kind automated control system that enables to navigate through technological process that enables to easily operate either in automatic or in manual mode;
- Low energy consumption thanks to the cutting-edge energy transformer and high-quality converters;
- Maintaining the required temperature within operating range with high precision, the best temperature gradient inside the operating zone;
- High precision adjustment of the propellant flowrate;
- Closed loop of water cooling, enabling to operate together with any existing chillers and heat-exchange unit;
- Full and comprehensive control of any performances of the hardware;
- Configuration convenient for technical maintenance and use;
- Comprehensive warranty for any unit produced.

## Standard dimensions of the working area and maximum temperatures:

Height Diameter	100 mm	150 mm	200 mm	250 mm	320 mm	400* mm	500 mm	600 mm	700* mm
100 mm	2500°C	2500°C	2500°C	2200°C					
120 mm	2200°C	2200°C	2200°C	2200°C	2150°C				
150 mm	2200°C	2200°C	2200°C	2200°C	2150°C	2100°C			
180 mm		2200°C	2200°C	2200°C	1800°C	1800°C			
200 mm		2150°C	2150°C	2150°C	1800°C	1800°C	1800°C		
250 mm				1600°C	1600°C	1600°C	1600°C		
300 mm					1500°C	1500°C	1500°C	1500°C	1500°C
350 mm					1400°C	1500°C	1500°C	1500°C	1500°C
400 mm					1400°C	1400°C	1500°C	1500°C	1500°C
500 mm						1400°C	1400°C	1400°C	1500°C

\* There is a standard design of double bell furnace with operating zone 380 mm high (2.250 x 380 - 1200) and single bell furnace with a dropping pod and operating zone 710 mm high (1.500 x 710 - 1300). It is also possible to manufacture furnaces with non-standard design of the operating zone, of any size and increased maximal operating temperature.

In order to ensure the most convenient operation and maintenance, it is recommended to manufacture the furnaces with 300 mm diameter of the operating zone with heaters attached and fixed versus bell. Furnaces of over 300 mm in diameter are recommended to be manufactured with fixed bell (lowering pod). In order to minimize the gradient of the temperature field of the operating space it is recommended to select the height of the operating zone exceeding the diameter of the one by 20...40%.

### A short application form to order electric resistance bell-type furnaces:

**АПВД N.DDDxHHH-TTTT**

**АПВД, АПГВ, ПЭВ** —

are the registered trademarks of furnaces produced by the NPO GKMP LLC;

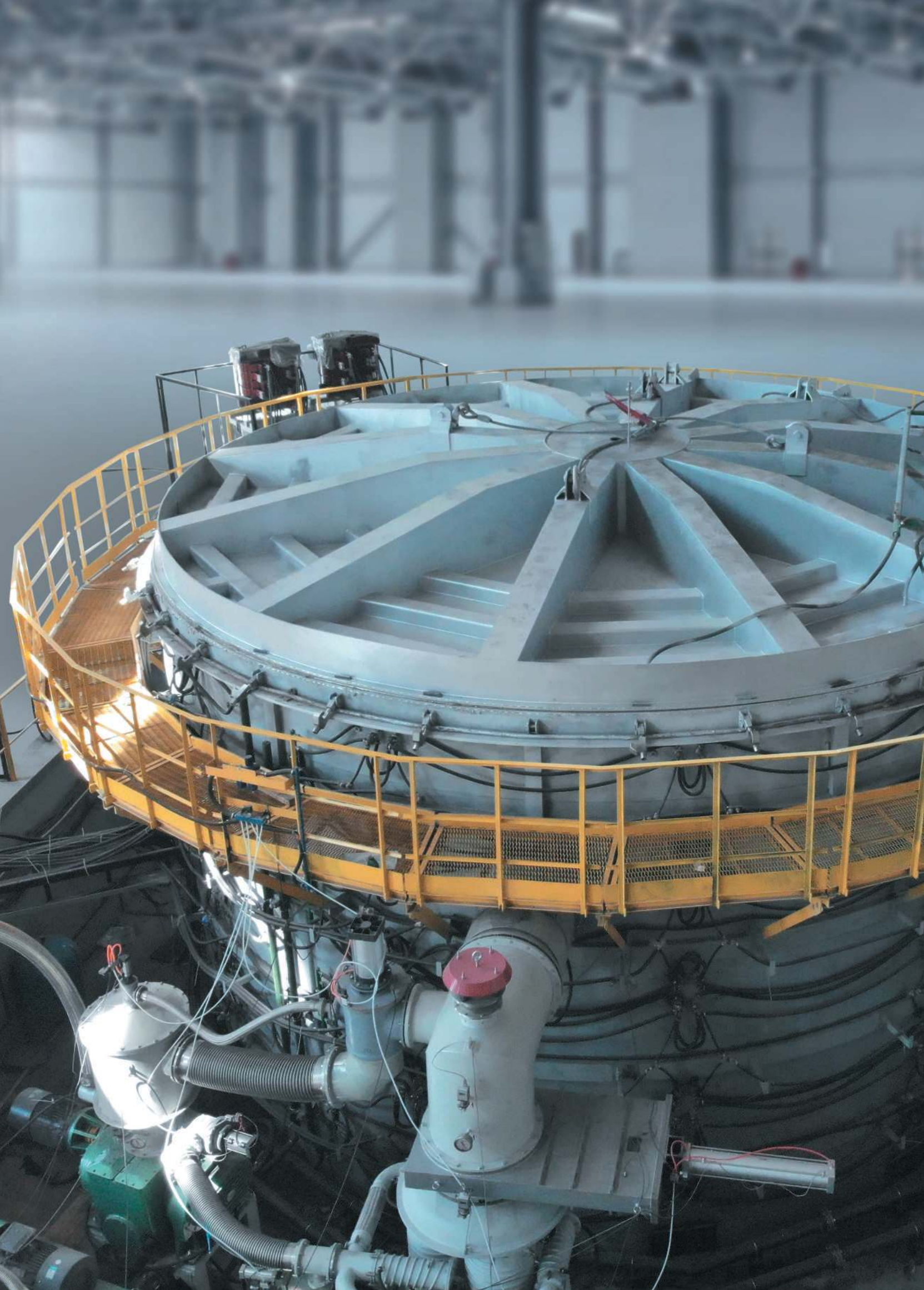
**N** — number of bells (1 or 2);

**DDD** — maximal diameter of the operating zone

**HHH** — maximal height of the operating zone;

**TTTT** — maximal temperature of the operating zone.





# SHAFT ELECTRIC FURNACES

**Shaft electric furnace** is an electric resistance furnace with a sealed chamber and removable cover.

The specific features of the shaft electric furnace enable to ensure a uniform heating up within a large operating zone. The scope of the operating zone of shaft furnaces produced by the “NPO” GKMP” LLC is more than 150 m<sup>3</sup>, and the vacuum maintained reaches  $6.5 \cdot 10^{-2}$  Pa.

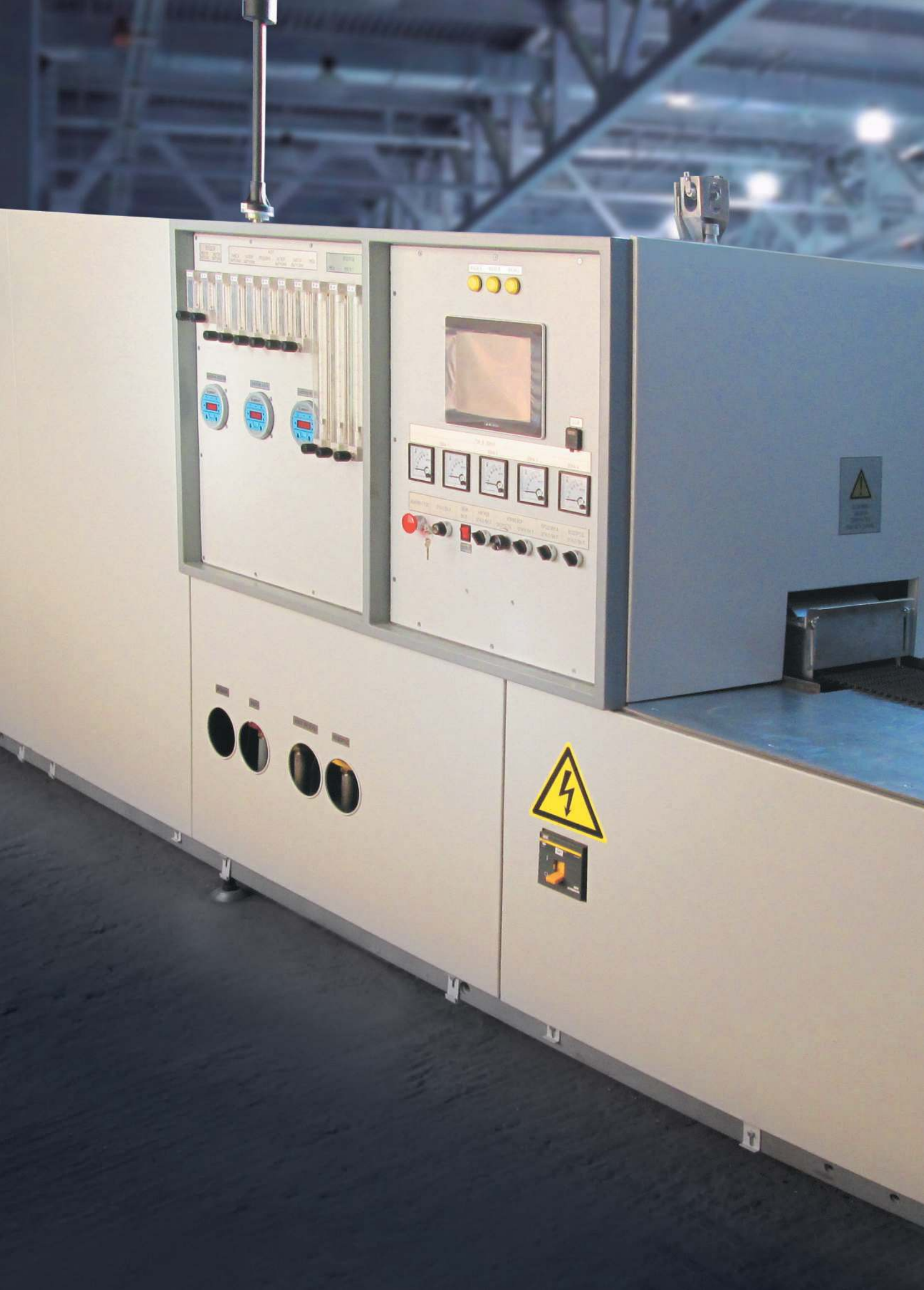
The shaft electric furnaces are sealed, have controllable atmosphere and of batch-operation.

#### **The main benefits of shaft furnaces:**

- Large parameter range of operating zone;
- Easy loading and unloading of items treated;
- Convenient sealing of the operating space;
- Easy repair and maintenance;
- Ergonomics and cost efficiency.

#### **Application area:**

Annealing, tempering, standardization of large-sized items from brand and stainless steels.







# CONVEYOR ELECTRIC FURNACES

**Conveyor electric furnace** is a through-type resistance furnace with constant or periodically moving conveyor.

The key benefit of conveyor furnace is its capability to treat a large scope of items in protective or protective-refurbishing atmosphere.

This type of furnaces is the best for serial and mass production. The “NPO” GKMP” LLC produces conveyor furnaces with straight and curved (elbow) channel.

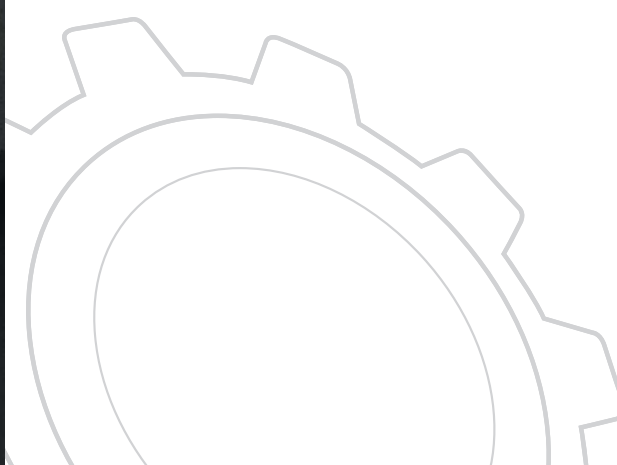
Conveyor electric furnaces are not leak-proof with partially controlled atmosphere, and can be operated continuously.

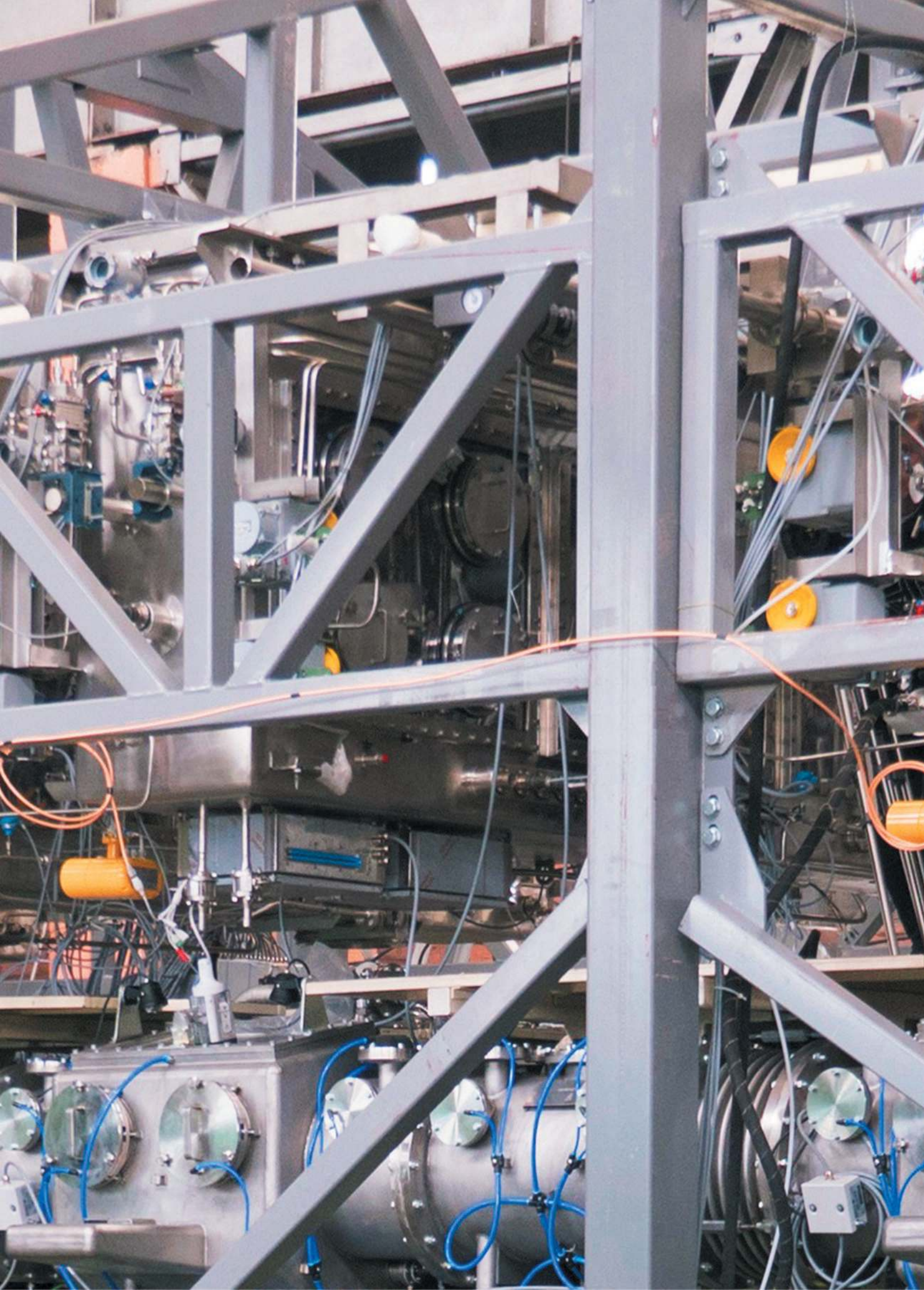
## **Key advantages of conveyor furnaces:**

- Continuous operation in several shifts;
- Treatment of large batches within a non-stop technical process;
- Implementation of several operations within a single cycle;
- Easy maintenance and repair;
- Modular design.

## **Application area:**

Mass production of ceramic substrates, refurbishment of metals, sintering of single type items etc.







# TECHNOLOGICAL LINES

**Technological line** is a complex of lifting and transportation machines and mechanisms, leak-proof containers, electric furnaces and refrigerators, as well as other devices designed to adjust a continuous and closed-loop treatment cycle.

The key benefit of a technological line is that it renders possible to treat a large scope of items within a single treatment facility.

Technological lines enable to implement the most challenging and dangerous technological processes. The “NPO” GKMP” LLC produces special purpose technological lines of any complexity.

Technological lines are leakproof, continuously operated and completely automatized and insulated, thus capable to operate in fully automatic mode.

## **Key advantages of technological lines:**

- Full technological treatment cycle within one closed-loop facility;
- Minimal interaction between staff and items treated, thus almost completely excluding the human factor that may affect the process;
- Full comprehensive automatization of production process;
- High reliability and precision treatment;
- Resource and energy saving, energy efficiency and safety.

## **Application area:**

Any completely automated production where involvement of an operator is unnecessary or undesirable.

Technological lines produced by the “NPO” GKMP” are in line with the international standard Industry 4.0.



СД.ОМ-3/100-2М



# THERMAL DIFFUSION

**Thermal diffusion** is a physical and chemical process that alters the surface structure of the item treated when under thermal stabilization and controlled atmosphere.

Presently the “NPO “GKMP” is the only domestic manufacturer of thermal diffusion facilities of SD.0M type designed to treat semiconductor plates about 100 mm in diameter. It is possible to manufacture such facilities to treat plates of 150 mm in diameter. In coming years facilities for thermal diffusion of 200-300 mm diameter plates might be developed.

Depending on Customer’s requirements, thermal diffusion facilities can perform oxidation (including the pyrogenic one) and diffusion processes by using different oxidizers and diffusants (nitrogen, chlorine, arsenic, phosphorus, boron etc.).

## **Technical characteristics:**

- Number of heating chambers: 2 or 3
- Maximal treatment temperature: 1250°C
- Length of thermal operating zone: 60 mm
- Distribution accuracy of temperature field:  $\pm 1^\circ\text{C}$ ;
- Temperature reproduction accuracy:  $\pm 1^\circ\text{C}$ ;
- Material of heating source: Kanthal or Eurofechral;
- Loading and unloading: manual or via embedded loaders;
- State-of-the-art automated process control system;
- Independent operation of each reactor;
- Energy efficient supply system of heaters;
- High precision adjustment system for oxidizers and diffusant flow rate.





# THERMAL COMPRESSION

**Thermal compression** is a physical process that combines heating of a single or few item by applying regulated force resulting in a certain physical process.

**Common application areas for thermal compression facilities:**

Contact welding of two dissimilar metals, welding or brazing of brass with ceramics, reinforcement of ceramic elements, hot punching or burnishing.

Thermal compression welding is a process aimed at welding of heated parts made of dissimilar metals under pressure. The idea of this process is as follows: when the treated surface is exposed to pressure and temperature, the material of one part is being deposited and starts flowing over another one. As a result, a contact point is heated and thus cleansed of oxide film, so a robust welded seam is created. This process is well known for its low sensibility to fluctuations of operating parameters, stable welding process for all over the procedure and efficient handling by adjustment of temperature and pressure.

Thermal compression technology is applied in powder metallurgy to produce items from refractory metals, dissimilar metals and composites. By varying process parameters one can produce parts of complex shape with identical composition but different physical and chemical properties.

Hot punching and burnishing are used at critical production sites for complicated items when other production technologies do not ensure the proper quality.

Thermal compression facilities produced by the “NPO” GKMP” LLC are manufactured according to the Customer’s roadmap or strictly under technical specification. Thanks to its own production capacities necessary to manufacture electrothermal hardware, as well as the vast experience in manufacture of leak-proof chambers, sealed feedthrough, controlled hydraulic cylinders, pneumatic cylinders and compression oil stations; it is also possible to manufacture thermal compression facilities with different operating pressure values – from few kilos to tens of tons, and temperatures alike – up to 2200°C.

Thermal compression facilities produced by the “NPO” GKMP” are completely automated. The control system efficiently processes feedback in terms of temperature of a welded seam and force applied. The composition of the atmosphere or vacuum degree inside the chamber are constantly maintained at the set value. The control system is good at responding to any emergency situations or alarms; in case of a minor failure it is capable to complete the process in safe manner.



150 Питание 240



ПИТАНИЕ Вкл/Выкл	ВСДА Вкл/Выкл	КАПУСЬ Вкл/Выкл	КАМЕРА Вкл/Выкл	НАТЕКАТЕЛЬ Вкл/Выкл	МАГНИТРОН Вкл/Выкл
РЕЖИМ РАБОТЫ Вкл/Выкл	ИОННАЯ ОЧИСТКА Вкл/Выкл	ВРАЩЕНИЕ Вкл/Выкл	НАГРЕВ ПОДДОЖКИ Вкл/Выкл	НАПЬЕРЖЕНИЕ Вкл/Выкл	ЗАСЛОНКА И1 Вкл/Выкл
ПРОХЛАДА Вкл/Выкл	Вкл/Выкл	Вкл/Выкл	Вкл/Выкл	Вкл/Выкл	Вкл/Выкл
Вкл/Выкл	НАСОС N1 Вкл/Выкл	НАСОС N2 Вкл/Выкл	НАСОС N3 Вкл/Выкл	ЗАТВОР Вкл/Выкл	ЗАСЛОНКА M2 Вкл/Выкл
Вкл/Выкл	Вкл/Выкл	Вкл/Выкл	Вкл/Выкл	Вкл/Выкл	Вкл/Выкл





# VACUUM SPUTTERING

The process of thin film vacuum sputtering is considered as the basic one for numerous technologies in modern microelectronics, aviation, tool production, medicine, nuclear energy. The overwhelming majority of the cutting-edge construction materials used in the most critical items are made with the help of **vacuum sputtering machines**.

The “NPO” GKMP” LLC produces vacuum sputtering machines with resistive, magnetron and electron beam type evaporators. State-of-the-art methods for evaporation and coating control enable to create facilities apt not only for multilayer metallic coatings but also those of alloys, composites and ceramic substances (oxides, nitrides, carbides and combinations).

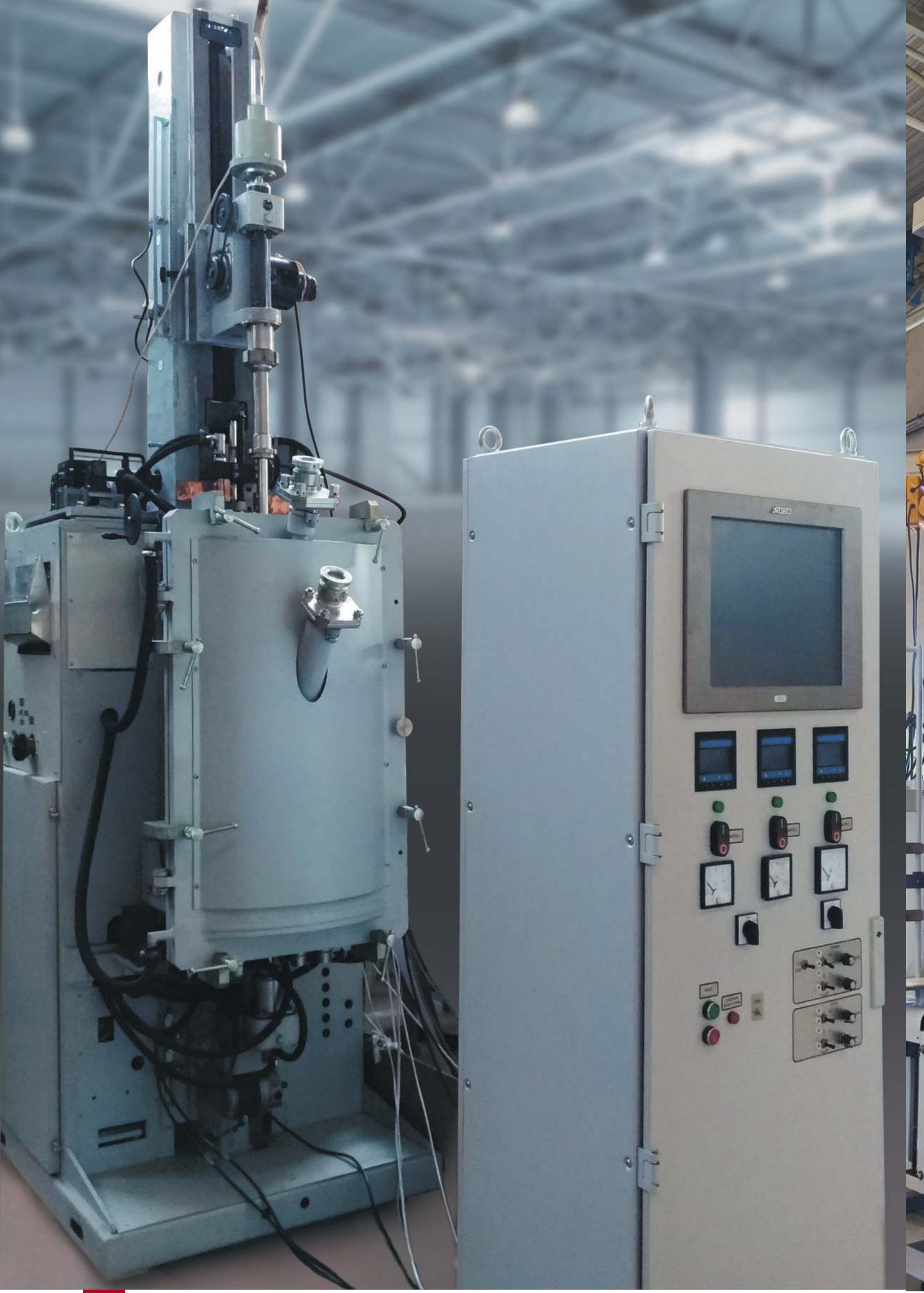
Thanks to the internally produced heating elements, magnetrons, vacuum chambers and sealed inputs, transportation containers, force transfer mechanisms and other high-tech elements, the Customer can purchase a vacuum sputtering machine of a required configuration.

## **Benefits of machines produced by the “NPO” GKMP” LLC:**

- No model line-up, one-off production;
- Variety of bell-jar and internal chamber mechanics;
- Option of two-side thread sputtering in small volume;
- Option of hybrid facilities;
- Selection of basic components with customer’s approval;
- Production site located in the Russian Federation;
- Unique production practices;
- Unconditional manufacturer’s warranty.

## **Application area:**

Basic production processes of modern electronic micro circuits, condensers, semi-conductor elements, electric vacuum devices, protective coating of metal processing tool, antifriction coating of machine parts, medicine, decorative coatings etc.





# CRYSTAL GROWING MACHINES

**Crystal growing machines** are crucial for electronics. All current components are based on substrates cut from monocrystal boules – artificially grown monocrystals produced by one of available methods, like horizontally directed crystallization, Kyropoulos or Czochralski methods etc.


As of this moment, the “NPO” GKMP” LLC has a substantial experience in growing monocrystals like leukosapphire, gallium arsenide and indium, silicon, silicon carbide, indium antimonide.

Research and development activities are conducted in order to grow monocrystals over 250 mm in diameter in order to manufacture in future silicon and silicon carbide plates of 300 mm diameter.

## **Peculiar features of facilities produced by the “NPO” GKMP” LLC:**

- Optimal combination of price and quality;
- Fully automated process;
- High precision and wide range of heater power regulation, force and mechanism moving speed;
- Innovative methods of kindling process control;
- Unprecedented accuracy in maintaining the temperature;
- Full production cycle;
- Unique production practices;
- Unconditional manufacturer’s warranty.





# VACUUM CHAMBERS

**Vacuum chamber** is a technologically sealed volume where one uses vacuum pumping devices (vacuum pumps) to create pressure below atmosphere.

The “NPO” GKMP” LLC produces vacuum chambers from stainless steel or construction steel, titanium, aluminum alloys, nonferrous metals etc. several elements of the chamber can be manufactures from glass or ceramics. When necessary one produces sealed current inputs and outputs. Configuration and size of the chamber are selected by the Customer.

Vacuum chambers can be divided into low vacuum chambers (up to 10<sup>-3</sup> mmHg), high vacuum (up to 10<sup>-7</sup> mmHg) and super high vacuum (up to 10<sup>-12</sup> mmHg and over).

## **Peculiar features of facilities produced by the “NPO” GKMP” LLC:**

- Facilities for outgassing of materials;
- Vacuum furnaces for thermal treatment;
- Sputtering and ion-plasma treatment facilities;
- Crystal growing machines;
- Facilities for leakage checks;
- Space environment simulators;
- Accelerators for elementary particles;
- Thermal insulation for cryogenic products.

If requested by the Customer, it is possible to perform thermal outgassing right after the manufacture is complete, and warm up the walls up to 250...300°C.





# THERMAL VACUUM FACILITIES

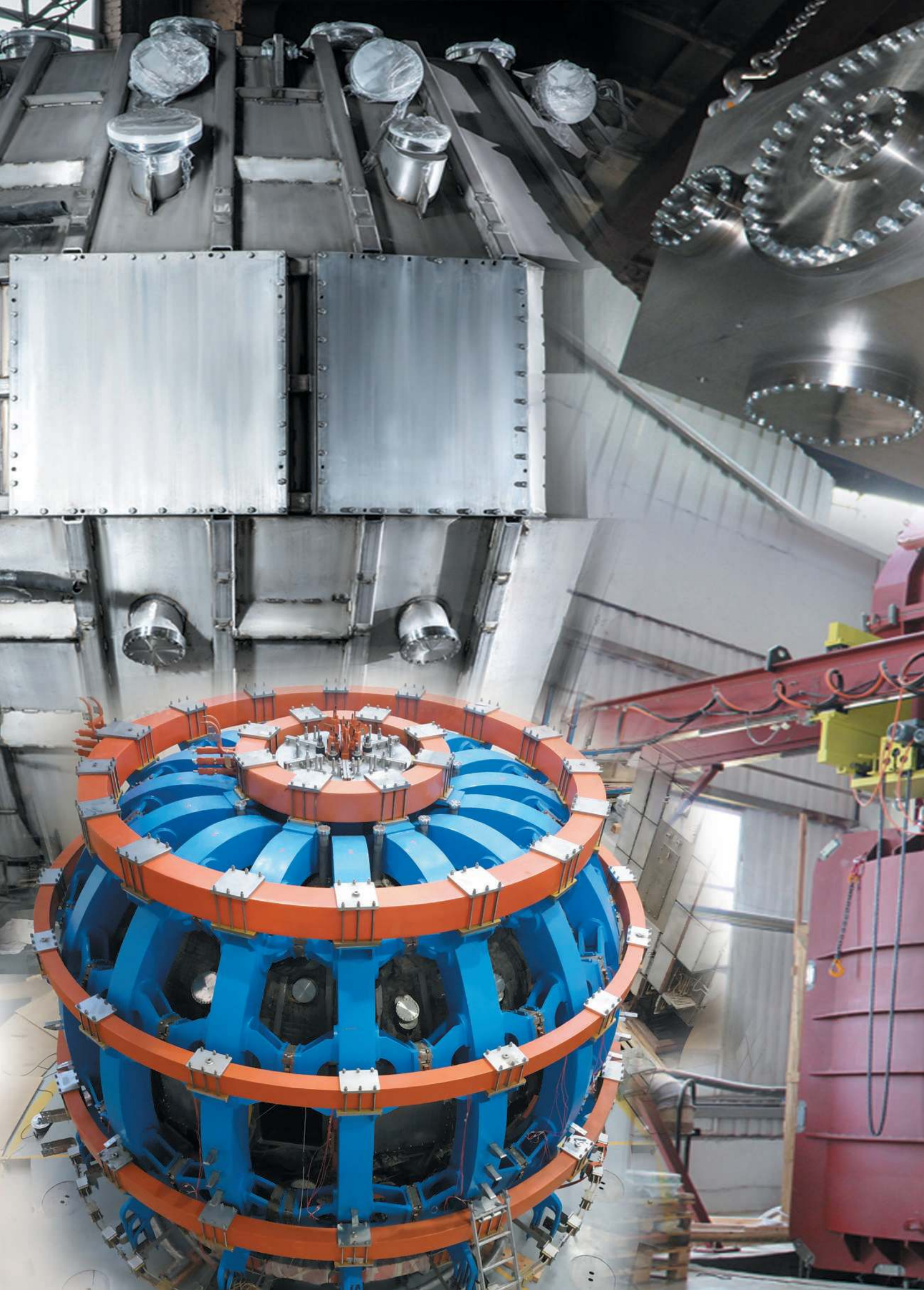
**Thermal vacuum technological facility** is a complex technological hardware designed to perform specific processes in vacuum, like thermal, physical and chemical one. Generally, such facilities consist of a vacuum chamber, vacuum pumping system with respective pipelines and seals, technological jig, control system and, depending on the processes performed, heating, cooling or electrophysical system or combination of such systems.

The main idea of these facilities is to produce high quality materials (vacuum smelting of metals) or with specific physical features (monocrystals, thin-film structures) that are impossible to treat using atmospheric processing methods. Moreover, facilities are used for operational checks of electronic and mechanical devices in conditions close to space environment. Vacuum leakage control methods are widely used for variety of applications, including microelectronics, avionics, spacecrafts, chemical and nuclear industry. Charged particle accelerators enable to perform the most challenging fundamental research, obtain new chemical elements and carry out medical treatment of cancer diseases. The most sophisticated thermal vacuum facilities are thermonuclear vacuum facilities (TOKAMAK, ITER project) promise a scientific breakthrough in world's energy.

This one and many other issues are dealt with for several years by the experts of the "NPO "GKMP" LLC using one-of-the-kind equipment.

## **Application areas of thermal vacuum facilities:**

- Outgassing and vacuum smelting of metals in vacuum;
- Thermal treatment of metals and alloys in vacuum;
- Vacuum sintering;
- Vacuum sputtering and deposition of thin films;
- Benches simulating infrared thermal or solar radiation;
- Low temperature and cryogenic cooling, simulation of cold space environment;
- Production, storage and release of liquid gases;
- Thermonuclear reactors and plasma studies;
- Thermal vacuum tests of devices and units.







# OUR ACCOMPLISHMENTS

For the last few years NPO GKMP managed to develop and produce few unique production facilities and units unmatched in the world, including:

- Experimental facility to obtain and study controlled thermonuclear fusion TOKAMAK T-15MD. The Customer is the Kurchatov Research Center;
- Technological complex for thermal vacuum test under conditions close to the space environment TVACF-2.
- The customer is “Kometa” LLC;
- Technological line for carbothermal synthesis of nitrides. The Customers are the Siberian Chemical Factory and SCERI;
- Hardware facility to test pieces and nodes of avionics life support system. The Customer is the «NPO “Nauka”;
- Multi-gas vacuum furnace for studies, testing and processing of high temperature materials. The Customer is the NTO “IRE-Polus”;
- Super high vacuum octagonal shaped chamber. The Customer is the Samara University.

Apart from implementing unique projects, the “NPO” GKMP” LLC is a reliable partner of the largest industrial companies involved in nuclear, electronic and aerospace industries, on yearly basis takes part in international exhibition forums like “Army”, “Vacuum Tech Expo”, “Termoobrabotka” (Thermal treatment machinery) and many others. Among regular customers one can name the NPP “ISTOK” Scientific company, the “Phazotron-WMZ”, the Scientific Production Association of Automation and Instrument-Building, Russian Institute of Aviation Materials “VIAM”, Russian scientific institute for rare metal products “Giredmet”, as well as many other companies that form holdings of “Rosatom”, “Rostech”, Concern Radio-Electronic Technologies “KRET”, the “Almaz-Antey” etc.

Each customer that ever worked with the “NPO” GKMP” speaks well of our cooperation and is keen to award us with new beneficial contracts. In its turn the management of the “NPO” GKMP” is open for cooperation and is always ready to develop new products, design and produce items in high demand either in its own land, or far beyond.



**МИНИСТЕРСТВО  
ПРОМЫШЛЕННОСТИ  
И ТОРГОВЛИ  
РОССИЙСКОЙ ФЕДЕРАЦИИ  
(МИНПРОМТОРГ РОССИИ)**

Пресненская наб., д. 10, стр. 2, Москва, 125039

Тел. (495) 539-21-66

Факс (495) 547-87-83

<http://www.minpromtorg.gov.ru>

31.01.2023 № 8536/05

На № \_\_\_\_\_ от \_\_\_\_\_

ООО «НПО «ГКМП»

ул. Толбухина, д. 10, корп. 2, пом. 1,  
комн. 11, вн. тер. г. муниципальный округ  
Можайский, г. Москва, 121596

### **ЗАКЛЮЧЕНИЕ**

#### **о подтверждении производства промышленной продукции на территории Российской Федерации**

Министерство промышленности и торговли Российской Федерации по результатам рассмотрения документов, представленных в соответствии с Правилами выдачи заключения о подтверждении производства промышленной продукции на территории Российской Федерации, утвержденными постановлением Правительства Российской Федерации от 17 июля 2015 г. № 719, подтверждает производство следующей промышленной продукции на территории Российской Федерации:

Наименование юридического лица (фамилия, имя, отчество (при наличии) индивидуального предпринимателя): Общество с ограниченной ответственностью «НПО «Группа компаний машиностроения и приборостроения» (ООО «НПО «ГКМП»)

Реквизиты заявления: от 11.01.2023 № 32\2023

ИНН 3250517421 ОГРН (ОГРНИП) 1103256000540

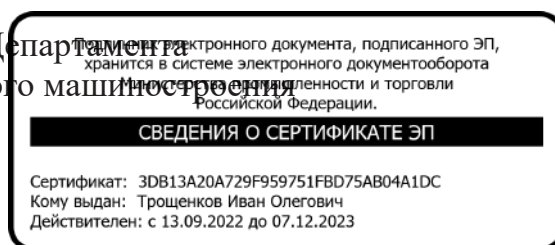
Адрес местонахождения (адрес регистрации по месту пребывания либо по месту жительства): 121596, г. Москва, вн. тер. г. муниципальный округ Можайский, ул. Толбухина, д. 10, корп. 2, пом. 1, комн. 11

Адрес местонахождения производственных помещений, в которых осуществляется деятельность по производству промышленной продукции: 241022, г. Брянск, бульвар Щорса, д.7

№	Наименование производимой промышленной продукции	Код промышленной продукции по ОК 034 2014 (КПЕС 2008)	Код промышленной продукции по ТН ВЭД ЕАЭС	Реквизиты документа, содержащего требования к производимой промышленной продукции
1	Печь автоматизированная газовакуумная АПГВ	28.21.13.111	8514 19 900 0	ТУ 6361-003-65807096-2012
2	Печь автоматизированная водородная АПВД	28.21.13.111	8514 19 900 0	ТУ 6361-003-65807096-2012

Срок действия: заключение действительно в течение 3 лет со дня его выдачи.

Заместитель директора Департамента  
станкостроения и тяжелого машиностроения



И.О. Трощенко

### \*CERTIFICATE

#### To approve production of industrial hardware on the territory of the Russian Federation

The Ministry of Industry and Trade of the Russian Federation, having considered the documents provided in accordance with the Regulation of Certification for production of industrial hardware on the territory of the Russian Federation approved by the Decree of the government of the Russian Federation No. 719 dated July 17, 2015 hereby certifies production of the following hardware on the territory of the Russian Federation:

Name of the legal body (family name, name, patronymic (if any) of the private entrepreneur): Limited Liability Company "NPO Corporate Group for machinery and tool construction"

("NPO" GKMP" LLC).

Application details: dated 11.01.2023 No.32/2023

TID No. 3250517421 OGRN code (Primary State Registration Number of the Sole Proprietor) 1103256000540

Residency (registered address or place of residence): Bld. 2, 10 Tolbukhina str., room 11, office 1, Mozhaisky intracity territory of a federal city, 121596 Moscow, Russia

Location place of production sites where industrial products are manufactured:

7 Shorsa boulevard, 241022 Bryansk

No.	Name of industrial product	Code of industrial product in OK 034 2014 (KPES 2008)	Code of industrial product in EAEU Commodity Nomenclature of Foreign Economic Activity	Details of document with requirements to products manufactures
1	Automatized gas vacuum furnace APGV	28.21.13.111	8514 19 900 0	TY 6361-003-65807096-2012
2	Automatized nitrogen vacuum furnace	28.21.13.111	8514 19 900 0	TY 6361-003-65807096-2012

**Validity term: valid within 3 years since after issue.**



# GKMP

RESEARCH & PRODUCTION  
COMPANY



## **NPO "GKMP" LLC**

Bld.2, 10 Tolbukhina street, room 2, office  
11, the Mozhaisky intracity of a federal city,  
Moscow 121596, Russia

## **Production site:**

7 Boulevard Shorsa, Bryansk 241022, Russia  
Tel. +7 (4832) 58 19 66

Email: [gkmp@gkmp32.com](mailto:gkmp@gkmp32.com)

[www.gkmp32.com](http://www.gkmp32.com)

