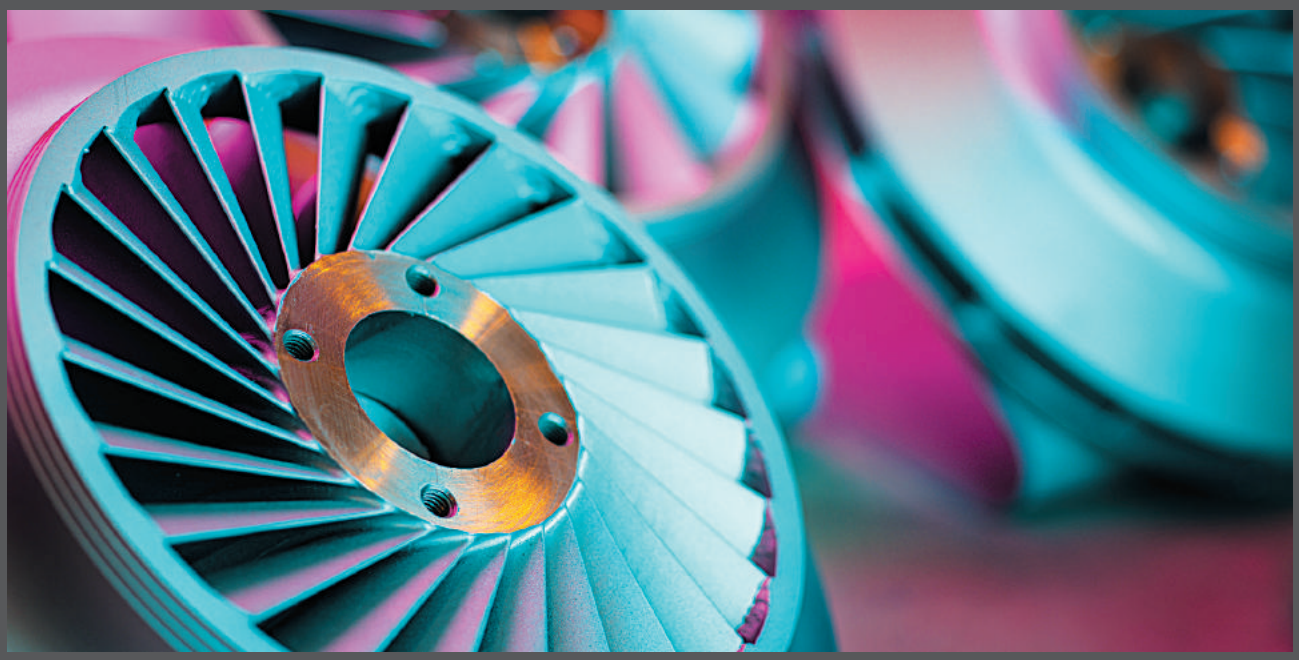
REP HOLDING



CENTRIFUGAL COMPRESSORS

www.reph.ru

REP HOLDING

JSC «REP HOLDING» IS A LEADING RUSSIAN POWER ENGINEERING COMPANY, DESIGNER, MANUFACTURER AND SUPPLIER OF NEW-GENERATION POWER EQUIPMENT.

It carries out engineering developments, manufacturing and package supplies of power generation and electrical equipment for the gas, oil, metallurgical and chemical industries, for power engineering and integrated power grid.

REP Holding incorporates a large industrial enterprise of Saint-Petersburg - Nevskiy Zavod. It provides strong foundation for engineering and production of high quality competitive products. REP Holding also includes its own Engineering Center which carries out R&D activities and innovative development.

Since 2019 RE P Holding is incorporated in Gazprom Energoholding Group.

COMPETITIVE ADVANTAGES

- Scientific and technological potential, unique design and process solutions solutions;
- Extensive manufacturing, engineering and design capabilities;
- Successful experience in localization of advanced foreign technologies;
- Production of modern energy-saving turbo-compressor equipment;
- Unified production management system;
- All stages of the manufacturing cycle, from designing to servicing;
- High reliability and operational readiness of the units;
- Automated manufacturing techniques;
- Improved environmental measures.

THE HOLDING ENTERPRISES DESIGN AND MANUFACTURE

- New generation gas-pumping units rated at 16, 22/25, 32 MW;
- Steam turbine units rated from 6 up to 25 MW;
- Complete electrically driven gas- pumping units rated at 4,0; 6,3; 10,5; 12,5 MW;
- Centrifugal and axial compressors with a capacity of up to 32 MW;
- Power generating units based on steam and gas turbines with a capacity of up to 32 MW;
- Variable frequency electric drives up to 100 MW;
- Systems for complete integrated automation of industrial facilities.

CENTRIFUGAL COMPRESSORS PRODUCED BY REP HOLDING

REP HOLDING DEVELOPS AND MANUFACTURES NEW GENERATION CENTRIFUGAL COMPRESSORS WITH A HIGH-PERFORMANCE FLOW PASSAGE FOR ELECTRICALLY-DRIVEN AND GAS TURBINE GAS-PUMPING UNITS OVER THE POWER RANGE FROM 4,0 TO 32,0 MW.

Based on the accumulated design experience REP Holding develops high-performance flow passages for centrifugal compressors over a wide operation range. The new models have advantages over the previous generation centrifugal compressors, especially in the polytropic efficiency and commonality and standardization of the compressor flow passage components and assemblies.

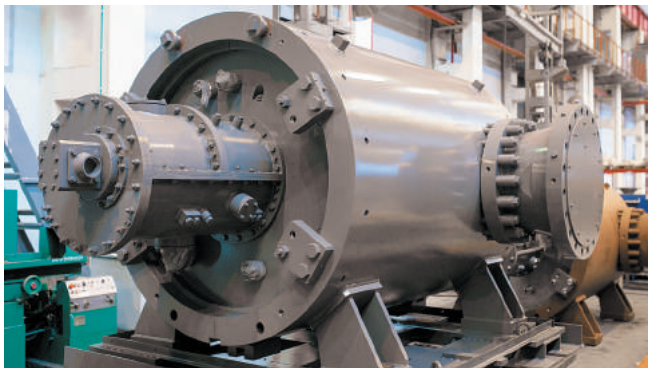
The impellers with 3D blades are developed using models (model test bed). Stages with 3D impeller blades increase essentially the efficiency of the centrifugal compressor flow passage. The domestic advanced engineering technologies used in the design of centrifugal compressors enabled REP Holding to provide high efficiency of the flow passages due to increased polytropic efficiency.

REP Holding has its own production of magnetic bearings (under the license from SKF). Active magnetic bearings are successfully applied not only in electrically-driven gas-pumping units, but also on centrifugal compressors as parts of the gas-pumping units at the gas trunk line facilities and booster compressor stations.

ADVANTAGES OF REP HOLDING COMPRESSORS WITH MAGNETIC BEARINGS:

- Operating costs reduction;
- Increased service life of the bearings compared with oil ones;
- Higher efficiency due to no mechanical losses;
- Fewer additional equipment is needed;
- Higher reliability;
- Enhanced environmental performance

According to the program of GPA standardization (PJSC “Gazprom”) REP Holding company has developed and manufactured a standardized centrifugal compressor rated at 16 MW and with polytropic efficiency no lower than 87–88%. Standardization of centrifugal compressors consists in the development of universal elements of the flow passage, bearing and seal assemblies. Reduction of the production time and costs is one of the advantages of standardized centrifugal compressors.



VARIETY OF COMPRESSORS

CENTRIFUGAL COMPRESSORS FOR GAS TRANSFER UNIT

- Electric Motor Drive
- (Gas and Steam) Turbine Drive

REPLACEABLE BUNDLE FOR PEPLACEMENT OF OPERATING COMPRESSORS

- Replacement of compessors that reached the end of their service life
- Replacement due to Change of CS Mode

COMPRESSORS FOR UNDERGROUND GAS STORAGE

COMPRESSORS FOR COMPESSIONS OF ASSOCIATED OIL GAS

VARIOUS TYPES OF COMPRESSOR PACKAGE CONTENT

- Bearings
  - Oil
  - Magnetic
- Sealings
  - Oil
  - Dry Gas

CENTRIFUGAL COMPRESSORS FOR GAS INDUSTRY

170-31-1С

220-11-1СМП

200-21-1СМП

300-21-1СМП

405-21-1С

400-21-1С

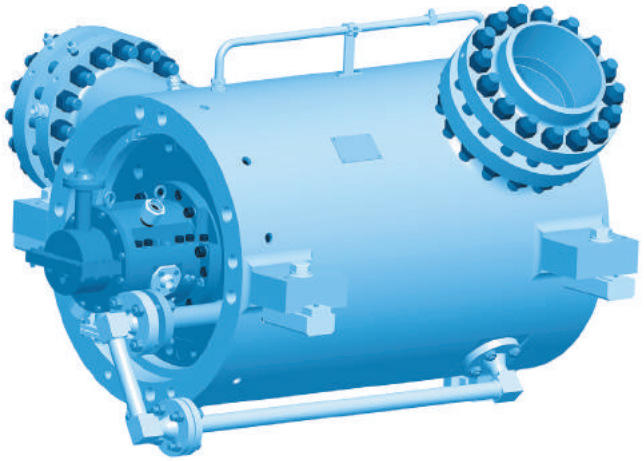
CENTRIFUGAL COMPRESSOR 170-31-1C

POWER RATING
4 MW

Compressor 170-31-1C is used as part of GPA-4RM-03 units and is designed to compress and transmit natural gas via gas trunk lines. Efficiency – no less than 0,85.

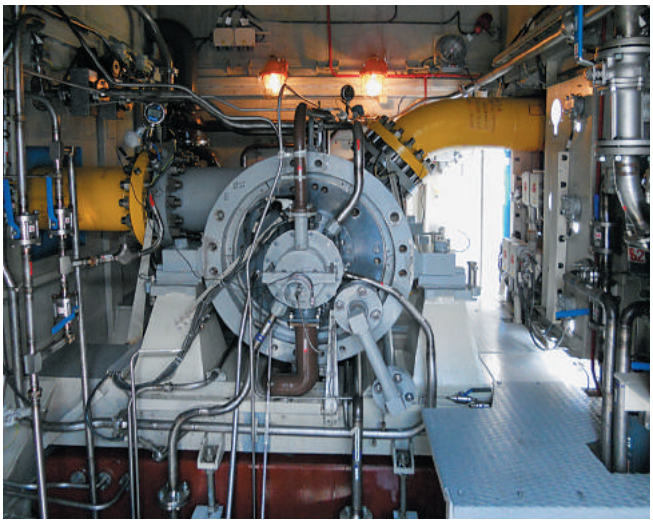
CONFIGURATION

- Compressor casing;
- Compressor package with rotor;
- Lubrication system;
- Dry seals system;
- Tool kit for assembly and disassembly of the compressor;
- Compl. set of oil bearings.



TECHNICAL CHARACTERISTICS

Commercial capacity, MMSCMD	5,25
Final pressure, abs., MPa	3,74
Pressure ratio	1,7
Compressor rotor speed, rpm	10300

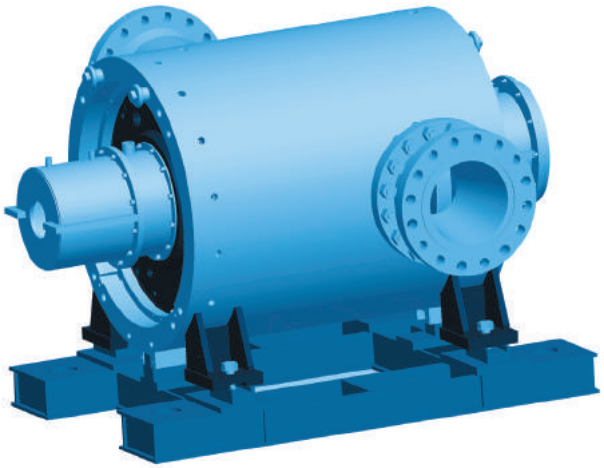


CENTRIFUGAL COMPRESSOR 220-11-1СМП

POWER RATING
4 MW

CONFIGURATION

- Compressor package with rotor;
- Compressor casing;
- Gas dynamic seals system (GDS);
- Active magnetic bearing system for the rotor (compl. set of magnetic bearings) produced under the license from SKF (S2M);
- Confuser, compl. set of transducers to measure gas flow for operation of the anti-surge protection system and process measurement of the CC capacity with an error no more than 4%;
- Tool kit for assembly and disassembly of the compressor.



TECHNICAL CHARACTERISTICS

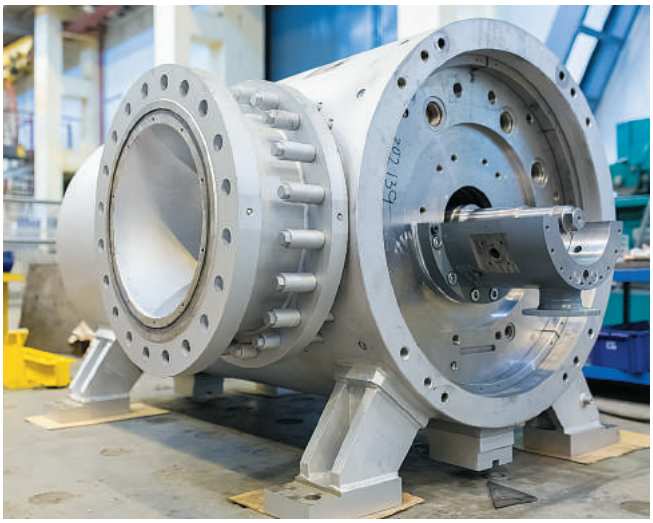
Commercial capacity, MMSCMD	1,25
Final pressure, abs., MPa	4,41
Pressure ratio	1,26
Compressor rotor speed, rpm	8200

CENTRIFUGAL COMPRESSOR 200-21-1СМП

POWER RATING
6,3 MW

CONFIGURATION

- Compressor package with rotor;
- Compressor casing;
- Gas dynamic seals system (GDS);
- Active magnetic bearing system (AMB) for the rotor (compl. set of magnetic bearings) produced under the license from SKF (S2M);
- Confuser, compl. set of transducers to measure gas flow for operation of the anti-surge protection system and process measurement of the CC capacity with an error no more than 4%;
- Tool kit for assembly and disassembly of the compressor.



TECHNICAL CHARACTERISTICS

Commercial capacity, MMSCMD	12
Final pressure, abs., MPa	5,49
Pressure ratio	1,44
Compressor rotor speed, rpm	8200

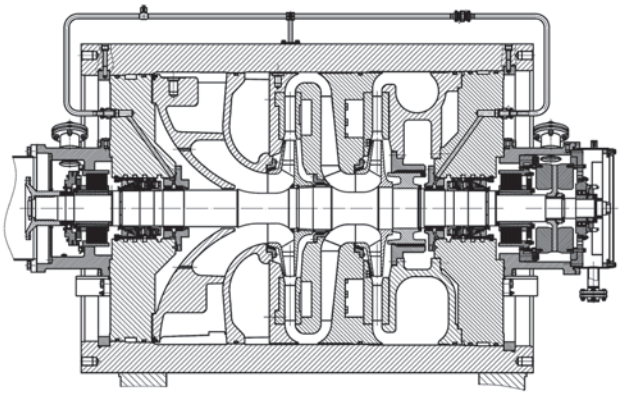
CENTRIFUGAL COMPRESSOR 300-21-1СМП

POWER RATING
12,5 MW

CONFIGURATION

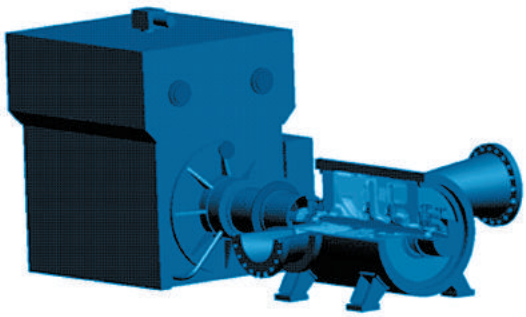
- Compressor package with rotor;
- Compressor casing;

  Gas dynamic seals system (GDS);
- Active magnetic bearing system (AMB) for the rotor (compl. set of magnetic bearings) produced under the license from SKF (S2M);
- Confuser, compl. set of transducers to measure gas flow for operation of the anti-surge protection system and process measurement of the CC capacity with an error no more than 4%;
- Tool kit for assembly and disassembly of the compressor.



TECHNICAL CHARACTERISTICS

Commercial capacity, MMSCMD	22,1
Final pressure, abs., MPa	7,45
Pressure ratio	1,5
Compressor rotor speed, rpm	6500



CENTRIFUGAL COMPRESSOR 405-21-1C

POWER RATING
16 MW

Centrifugal compressor 405-21-1C is designed to transmit gas via gas trunk lines. Its casing is vertically split, the compressor is equipped with dry gas seals and oil sliding bearings. The compressor provides application of replaceable flow passages with pressure ratio 1,35, 1,44 (1,5) and 1,7 for final pressure 9,91 MPa.

THE MAIN ADVANTAGES

- Commonality of assemblies and elements of the flow passage;
- Efficiency – 87,2%;
- Compatibility with various types of GTU.

CONFIGURATION

- Compressor package with rotor;
- Lubrication system;
- Dry gas seals system;
- Tool kit for assembly and disassembly of the compressor;
- Compl. set of oil bearings.

TECHNICAL CHARACTERISTICS

Commercial capacity, MMSCMD	33,00
Final pressure, abs., MPa	7,45
Pressure ratio	1,44
Compressor rotor speed, rpm	5200

CENTRIFUGAL COMPRESSOR 400-21-1C

POWER RATING
32 MW

Centrifugal compressor 400-21-1C is designed to transmit gas via gas trunk lines as part of the gas-pumping unit rated at 32 MW.

THE MAIN PARAMETER AND DESIGN FEATURES

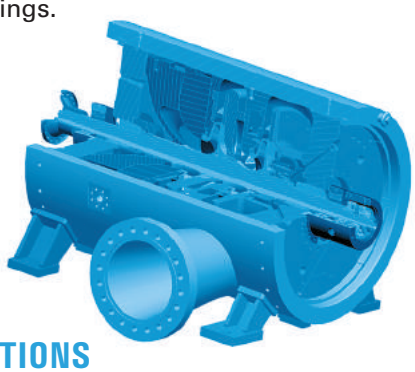
- Efficiency no less than 0,85;
- Pressure ratio 1,44;
- Capacity referred to the initial conditions 505 m^3/min;
- Compressor rotor speed 5550 rpm;
- Application of various geometry flow passages providing gas flow and compression required by the Customer;
- Application of forged casings makes it possible to operate at a higher final pressure, longer service life; replaceable flow passages can be replaced on site.

TECHNICAL CHARACTERISTICS

Commercial capacity, MMSCMD	78,9
Final pressure, abs., MPa	11,86
Pressure ratio	1,4
Compressor rotor speed, rpm	5550

CONFIGURATION

- Compressor casing;
- Compressor package with rotor;
- Lubrication system;
- Dry gas seals system;
- Tool kit for assembly and disassembly of the compressor;
- Compl. set of oil bearings.



DELIVERY DESTINATIONS

The compressor is supplied as part of GPA-32 “Ladoga” to the compressor stations of gas trunk lines and for reconstruction and construction of the PJSC “Gazprom” facilities.

CENTRIFUGAL COMPRESSORS FOR OIL INDUSTRY

K320-131-1

CENTRIFUGAL COMPRESSOR K320-131-1

Centrifugal compressor K320-131-1 is designed to compress oil-associated gas at gas processing plants.

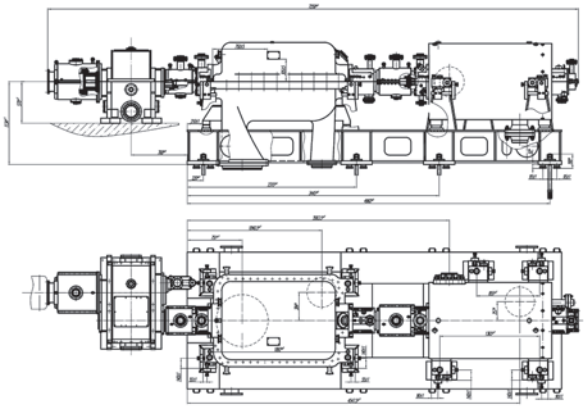
The compressor and all its accessories are explosion-proof. It can be operated in explosion-hazardous premises of Class B-1A, with explosive mixture of 2T-2 category and group.

The compressor is two-cylinder, two-section, 13-stage. The compressor cylinder tightness is provided by means of oil end seals. The low pressure cylinder has a cast steel casing horizontally split. The high pressure cylinder has a forged barrel-type casing with the end cover.

Compressor K320-131-1 has been designed for the foundation dimensions of the K380-103-1 and K354-101-1 units, providing replacement of the old equipment at minimum costs.

DELIVERY DESTINATIONS

The equipment is supplied to the facilities of Gazprom Neft, LUKOIL, Rosneft, Russneft, SIBUR Holding, Surgutneftegaz, Tatneft, TNK-BP Holding, AK “Transneft”, KazMunaiGas.



TECHNICAL CHARACTERISTICS

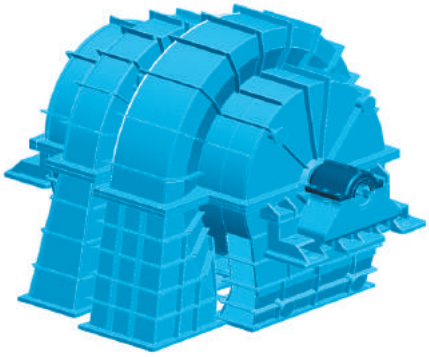
Commercial capacity, MMSCMD	1,16
Final pressure, abs., MPa	3,1
Pressure ratio	12,4
Compressor rotor speed, rpm	10800

CENTRIFUGAL COMPRESSORS FOR METALLURGY

K5500-41-1M

CENTRIFUGAL COMPRESSOR K5500-41-1M

Centrifugal compressor K5500-41-1M, with a capacity of 5200 m^3/min, driven by a heavy-duty steam condensing turbine rated at 23 MW, is designed to compress atmospheric air and supply it to the blast furnace (OJSC "NLMK"). It is incorporated into the TKA-5200/22 turbo-compressor unit.



TECHNICAL CHARACTERISTICS

Commercial capacity, MMSCMD	5000
Final pressure, abs., MPa	0,51
Compressor rotor speed, rpm	3450

DELIVERY DESTINATIONS

The compressor equipment produced by REP Holding is supplied to the metallurgical plants and enterprises in Russia and abroad, including Integrated Iron and Steel Works in Magnitogorsk , Novolipetsk, Nizhniy Tagil, Severstal, iron and steel plants, such as Mechel, Evraz, Kazakhmys Corporation (Kazakhstan), Metinvest Group (Ukraine), Bokaro Steel Plant, Bhilai Steel Plant, Durgapur Steel Plant (India), Paksteel Integrated Iron and Steel Works (Pakistan) etc.

CENTRIFUGAL COMPRESSORS FOR CHEMICAL INDUSTRY

540-41-1

CENTRIFUGAL COMPRESSOR 540-41-1

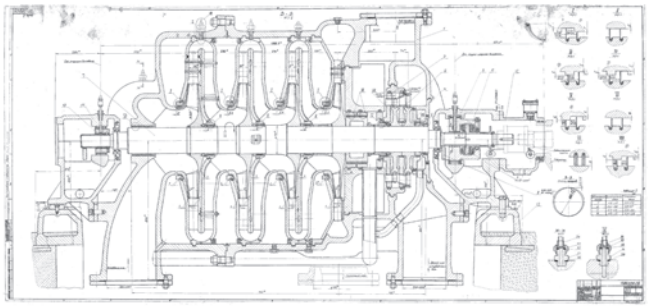
Centrifugal compressor 540-41-1 is designed to compress nitrous gas in the production of weak nitric acid.

DELIVERY DESTINATIONS

The equipment produced by REP Holding is installed at chemical industry facilities, such as United Chemical Company "Shchekinazot", "Akron", "Kirovo-Chepetsky Chemical Integrated Plant", "Grodno Azot", "Naftan", "Nizhnekamskneftekhim", "Kazanorgsintez", "Ufaorgsintez", "EUROKHIM", "FOSAGRO", "Minudobreniya", "Gazprom Neftekhim".

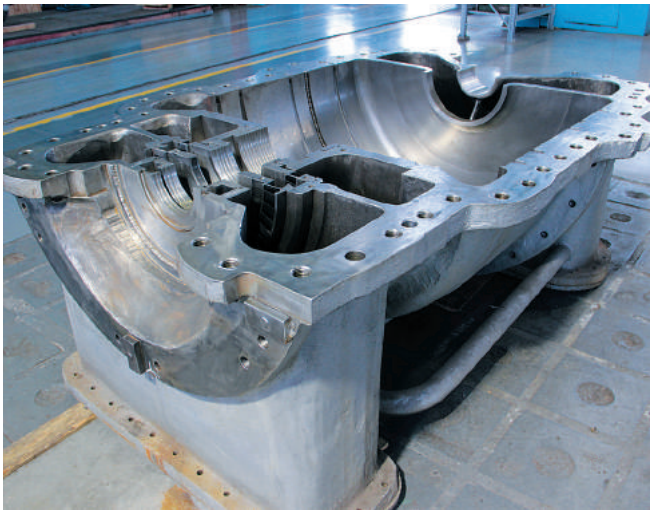
CONFIGURATION

- Compressor with a built-in turboexpander;
- Speed increaser;
- El. motor drive;
- Lubrication system;
- Thermal monitoring, control, protection and alarm system



TECHNICAL CHARACTERISTICS

Commercial capacity, MMSCMD	540
Final pressure, abs., MPa	0,41
Pressure ratio	4,42
Compressor rotor speed, rpm	8455



ACTIVE MAGNETIC BEARING SYSTEM

REP Holding has set up at its facilities its own production of electric drives and magnetic bearings under the license of SKF (S2M). The innovative production of centrifugal compressors using magnetic bearings and dry gas dynamic seals has been localized.

The active magnetic bearing system provides contactless rotation or the rotor in the controlled magnetic field.

CONFIGURATION

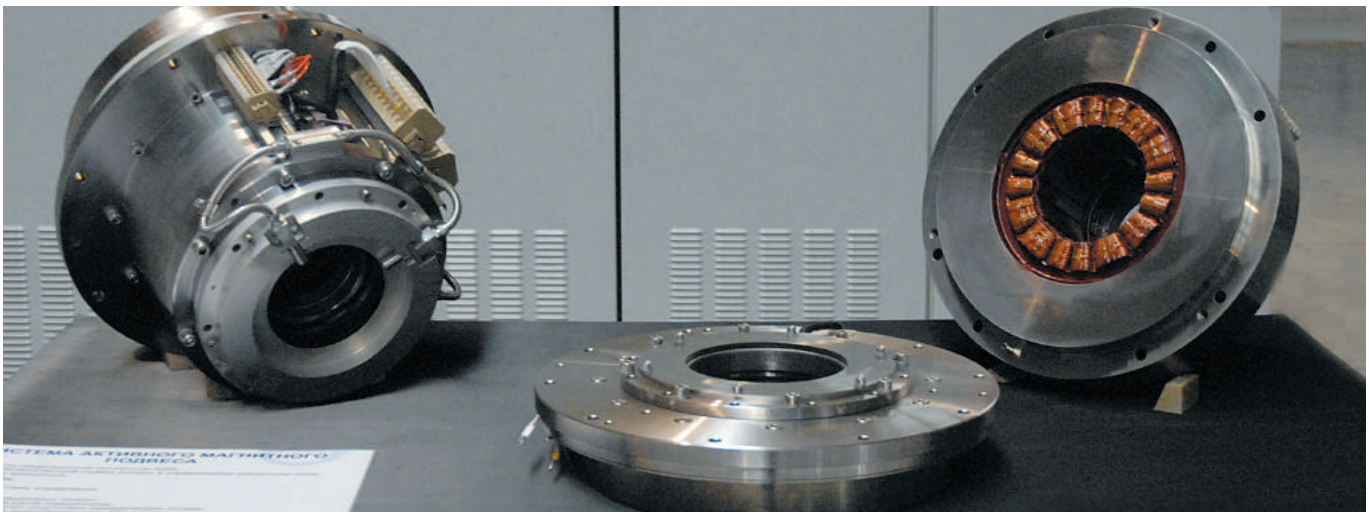
- Bearings;
- Electronic control system.

ADVANTAGES:

- Operating costs reduction;
- Increased service life of the bearing assemblies;
- Increased efficiency due to no mechanical losses;
- Reduction in the quantity of the additional equipment ;
- Higher reliability;
- Enhanced environmental performance.

DELIVERY DESTINATIONS

The active magnetic bearing system is used as part of electrically-driven gas-pumping unit (EGPA) rated at 4 MW at “Gazprom Transgaz Tomsk” compressor stations, 6,3 MW - at “Gazprom Transgaz Saint Petersburg” compressor stations, “Gazprom Transgaz Ukhta”, 16 MW - at “Gazprom Transgaz Samara”, “Gazprom Transgaz Belarus”, “Gazprom Dobycha Noyabrsk”.



REPLACEABLE FLOW PASSAGES

Replaceable flow passages are designed to renovate the operating centrifugal compressors. The replaceable flow passages are installed into the existing casings, without changing the overall dimensions of the standard equipment.

THE MAIN PARTS OF THE REPLACEABLE FLOW PASSAGES

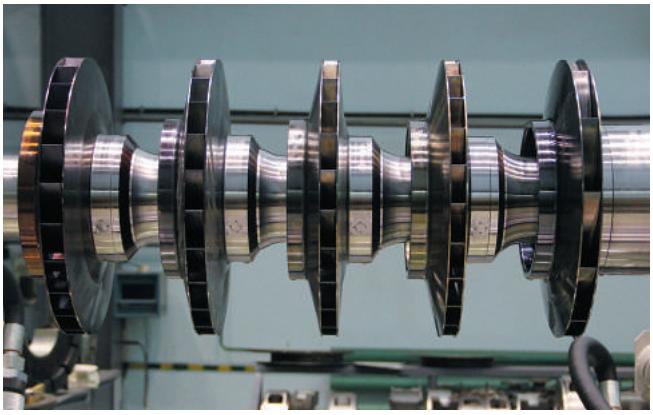
- Package (stator and rotor elements of the flow passage);
- Seal assemblies (if necessary);
- Compl. set of bearings (if necessary);
- Compl. set of replacement parts;
- Changing parts and tools.

REP Holding produces replaceable flow passages with various design versions of seals (dry gas dynamic seals, oil seals) and bearings (magnetic bearings, oil bearings). Up-to-date replaceable flow passages can be designed and manufactured for installation into the compressors made by other Manufacturers.

The range of REP Holding products includes replaceable flow passages for booster and line compressor stations, gas underground storage compressor stations.

The replaceable flow passages made by REP Holding undergo a full cycle of tests at its own testing facilities.

The full life cycle of replaceable flow passages using active magnetic bearings is no less than 20 year. The repair interval is 50 ths. hours.



SERVICE MAINTENANCE

REP Holding performs a whole package of services on erection supervision and service maintenance for the whole range of the units produced, including routine repair and overhaul, and training of the Customer's personnel. A special subdivision of REP Holding provides service maintenance and supply of spare parts for the whole period of the unit operation.

Highly qualified specialists of the Installation and Service Maintenance Department perform installation, pre-commissioning activities, as well as warranty and post- warranty service during the whole life time of the units.

WARRANTY PERIOD

- Participation in the equipment acceptance at the Customer's warehouse
- Erection supervision
- Pre-commissioning
- Staff training
- Full package of services

POST-WARRANTY PERIOD

- Scheduled preventive inspection
- Technical supervision
- Diagnostics
- Spare parts supply
- Engineering support
- Equipment upgrade

SERVICE LIFE EXTENSION

TESTING FACILITIES

The REP Holding production sites are equipped with unique high-tech test beds. Mechanical, gas dynamic and investigation string tests of the produced turbo-compressor equipment are performed at these test beds.

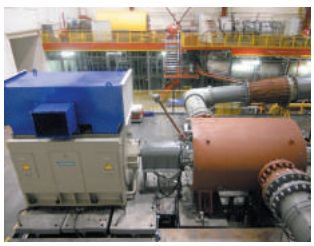
Test bed for centrifugal compressors

Replaceable flow passage on the test bed (up to 16 MW)

3D impellers test bed

Schenk high-speed balancing machine

Replaceable flow passage on the test bed (over 16 MW)

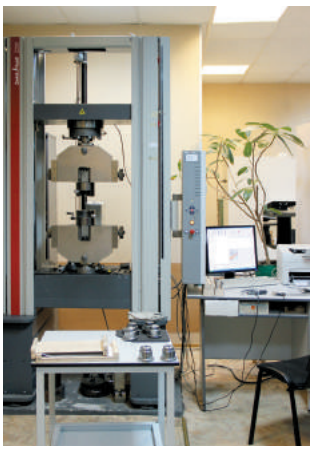


Test bed for compressor 405-21-1C

The product quality is assured and controlled in a special subdivision of REP Holding – Interplant Metrology, Tests and Inspection Laboratory.

The laboratory is equipped with up-to-date equipment from the leading foreign Manufacturers:

- Spectrometer – ARL 3460 Advantage;
- Machines for sample preparation – Herzog VNU 300 and grinding machine – Herzog HT 350, machines for express analysis of chemical composition when melting steels and cast iron in melting furnaces;
- Flaw detector – P920 Magnaflux – for magnetic particle inspection of the rotor parts and castings of the turbine and compressor casing parts;
- Equipment produced by Zwick company to determine the mechanical properties of metal (strength and viscosity) – testing machine Z250 and impact testing machine RKP450.
- A wide range of investigations is performed in the laboratory: X-ray flaw detection, chemical, spectrum, capillary analysis, magnetic particle inspection, ultrasonic testing



Testing facilities to define the mechanical performances for blades metal

DELIVERY DESTINATIONS

- More than 40 regions of Russia
- More than 20 neighboring countries and beyond
- More than 180 units of different types in operation

GAS INDUSTRY

OIL INDUSTRY

POWER GENERATION

METALLURGY

CHEMICAL INDUSTRY

REP HOLDING

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