



Implemented projects on modernization and service of pumping and compressor equipment





SERVICE CAPABILITIES. MODERNIZATION OF DYNAMIC EQUIPMENT

All divisions of the company and all business partners are involved in the project of modernization and service of pumping and compressor equipment. The company's projects are protected with patents for design and manufacturing technology.

AREAS OF MODERNIZATION

New custom-made equipment::

- pumps for severe operating conditions in the oil and gas industry / production, transportation, processing of hydrocarbons
- centrifugal compressors according to the requirements of the Customer
- spare parts and utilities for pumping and compressor equipment

Methods of modernization:

- improved performance, reliability and extended service life of compressors and pumps
- modifications in the technical characteristics of gas compressor units
- transfer of reciprocating compressors into work without lubrication

Service works:

- commissioning, repair, installation and maintenance of dynamic equipment
- diagnostics of equipment and manufacturing of spare parts for compressors, turbines, pumps, multipliers, gearboxes

(according to drawings or reconstruction projects)





PUMPS FOR HEAVY OPERATING CONDITIONS BB2 и BB5 type according to API 610 standards

Purpose: the NDMs pumps and ANDMs pumps units are designed for transferring oil products with a temperature of up to 200°C, liquefied hydrocarbon gases, solutions of inorganic alkalis in the technological processes of the oil refining industry.

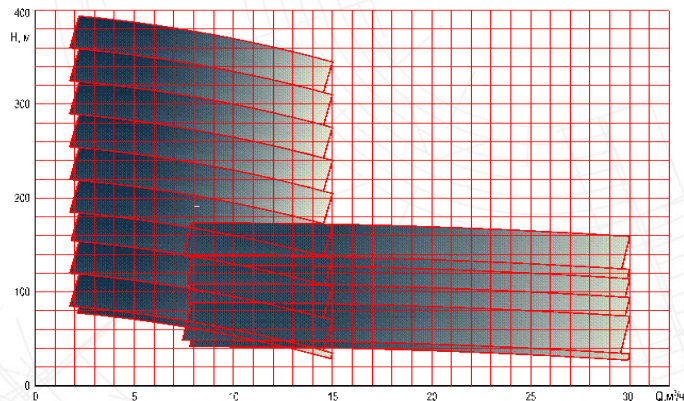
Design: oil double-bearing pumps NDMs - centrifugal horizontal double-bearing single-flow multistage sectional.

Shaft seal: end seals of different performances according to plan 52 or plan 53 API 682.

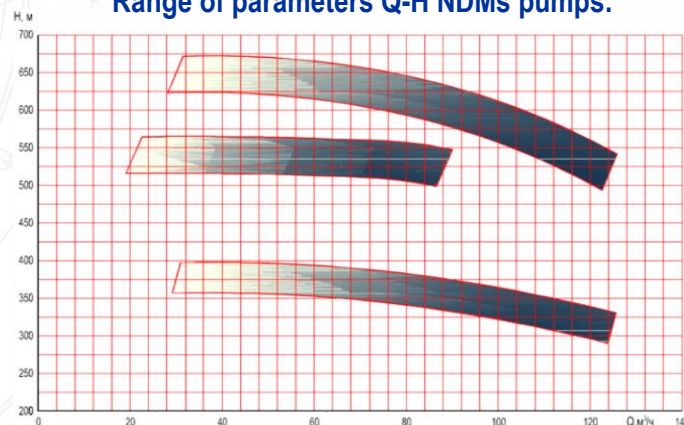
Materials: materials classes for pump units according to API 610 from S-5 to D-1.



Range of parameters Q-H NDMs pumps:



Range of parameters Q-H NDMs pumps:





PUMPS FOR HEAVY OPERATING CONDITIONS according to API 610 standards

BB1 & BB2 type



Purpose: the NDD, NDg, NDMg pumps are designed for transferring oil products with a temperature of up to 400°C in the technological processes of oil refining and petrochemical industries.

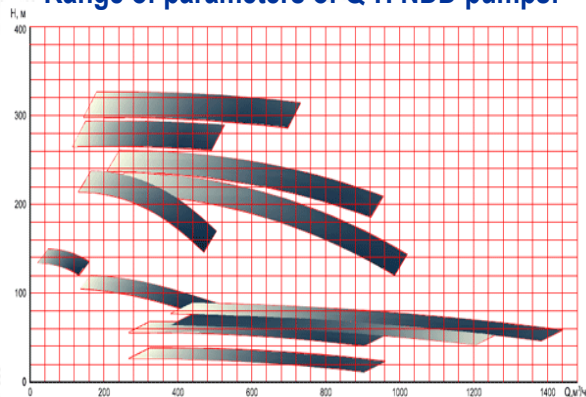
Shaft seal: end seals of different performances according to plan 52 or plan 53 API 682.

Materials: classes of materials for pump units according to API 610 from S-5 to D-1.

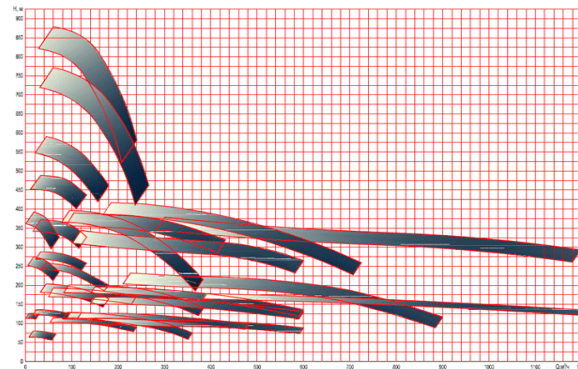
BB2 & BB5 type



Range of parameters of Q-H NDD pumps:



Range of parameters of Q-H NDg, NDMg pumps:





CENTRIFUGAL COMPRESSORS ACCORDING TO API 617

(customized in accordance with the requirements and recommendations of the Customer)

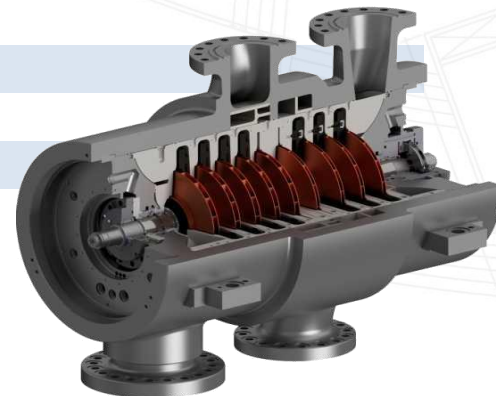
All compressors are equipped with damping support bearings and seals of the original patented design. This minimizes the reactive forces on the rotor and guarantees its dynamic stability in all operating modes, including the most loaded starting and transient modes. To ensure resistance in aggressive environments, corrosion-resistant steels are used.

Main characteristics

Operating medium	Natural gas, methane, nitrogen-hydrogen mixture, carbon dioxide, air, ammonia, hydrogen, nitrogen, etc.
Rated power	up to 32 MW
Minimum suction pressure	0,3 kgf/cm ²
Maximum discharge pressure	1 000 kgf/cm ²
Inlet flow rate range	21.0 to 800 m ³ /min
Rotational speed	up to 24,000 rpm
Type of drive	Electric motor, turbine, combined and other
Low vibration	less than 15 μ m

Advantages:

- high reliability and cost-effectiveness
- sustainable operation in a wide range of operating modes
- low level of vibration
- high maintainability





MODERNIZATION OF CENTRIFUGAL COMPRESSORS

Stages of working of compressors modernization:

- complex inspection under operating conditions, development and approval of technical specifications;
- calculations of gas dynamics and strength;
- design, manufacture, installation, testing of the upgraded unit in operating conditions;

Applied solutions:

- replacement of obsolete units with a low resource for units of modern design;
- reconstruction of damaged compressors;
- increasing the dynamic stability of the rotor, preventing axial displacement of the rotor;
- matching the actual characteristics of the compressor with those required during operation;

Guarantees and advantages:

- high reliability of individual components and the unit as a whole;
- significantly reduced vibration;
- long-term operational life;

Modernization with the usage of technical solutions of our program (in comparison with replacement of the compressor) provides a decrease in initial and operating costs, increases the MTO to two years or more.





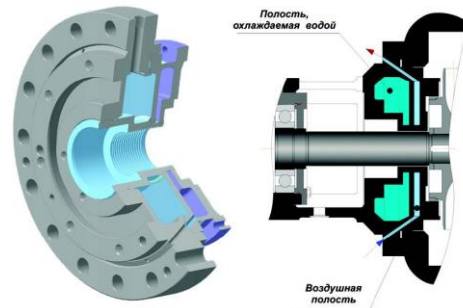
MODERNIZATION OF PUMPING EQUIPMENT

The efficiency and reliability of pumping equipment is characterized with the vibration state of the rotor and bearing units, and also depends on the state of the flow path and the shaft sealing system.

Each upgrade is preceded with a detailed analysis of the operation of the base pump and determination of the cause of its failure.

Completed projects:

- modernization of support units of overhang pumps - used to increase the service life of the support units of the pump and to reduce fluid consumption for cooling;
- conversion of overhang pumps design into inter-support - used to increase the service life and to reduce the vibration characteristics of the unit;
- replacing Plan53A by API682 with Plan53C - allows to increase the operation autonomy of double mechanical seals and significantly increases their service life;
- the usage of a new, more efficient thermal barrier cover - provides a significant decrease in the temperature of the mechanical shaft seals and the support bearing behind the seal, as a result of which the overhaul life of the pump increases in 60%;



For each unit, an individual technical solution is selected based on the analysis of the survey results in operating and transient modes, an assessment of the technical condition, operating conditions and experience in the modernization of similar units.



SERVICE AND MAINTENANCE OF DYNAMIC EQUIPMENT

Comprehensive service maintenance allows to optimize actions of operating enterprises in the field of inspections, diagnostics, supply of spare parts, repairs, as well as to predict long-term costs associated with the maintenance of dynamic equipment.

Suggestions:

- full cycle of works for the supply of pumping and compressor equipment;
- participation in construction projects of production facilities (pumps and compressors);
- warranty and post-warranty service;
- overhaul of dynamic equipment;
- repair after emergency stopping;

Advantages:

- increase in between repairs cycles of dynamic equipment;
- determination of repairs and spare parts required;
- lower operations costs;
- reduction of emergency repair time.





SPARE PARTS OF DYNAMIC EQUIPMENT

Production of spare parts for equipment of various manufacturers (**General Electric, Nouvo Pignone, Siemens, Demag Delaval, Atlas Copco, Dresser-Rand, Flowserve, Piller, MHI, CKD, Howden, Creusot-Loire, Hitachi, Sumy NPO, Kazankompressormash**) according to the available drawings or based on reengineering.

For centrifugal units :

- rotor and impellers for pumps and compressors;
- replaceable flow parts of compressors;
- thermal barriers to centrifugal pumps;
- journal bearings;
- mechanical seals of shafts;
- labyrinth, end, oil seals;
- elastic couplings.



For piston compressors :

- cylinders and case parts;
- crank-shafts;
- crosshead;
- piston rods and plungers;
- connecting rods and connecting rod bolts;
- cylinder liner;
- pistons;
- piston and guide rings;
- oil rod seals;
- gas rod seals;
- valves, etc.



All products meet the requirements of API 610, 617, 682 and are protected with patents for design and manufacturing technology.



EXAMPLES OF IMPLEMENTED PROJECTS

Installation of the centrifugal compressor TK-102



Annual overhaul of dynamic equipment



Installation of the piston compressor BFV-320



Repair after emergency stopover





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