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ISO 14001:2015
OHSAS 18001:2007
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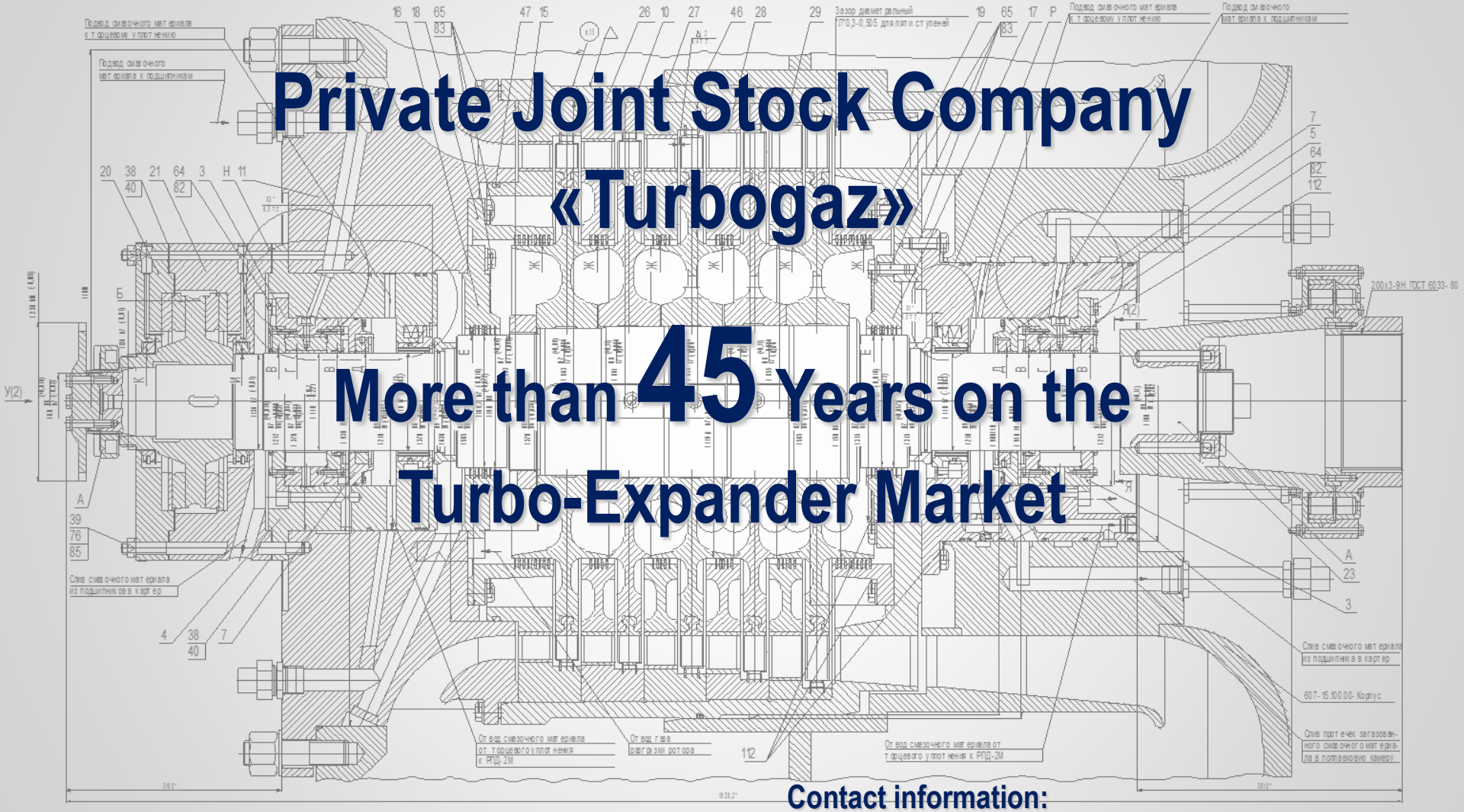


Private Joint Stock Company «Turbogaz»

More than 45 Years on the Turbo-Expander Market

Contact information:
Tel. +38-068-905-13-04 (Telegram, Viber, WhatsApp)
E-mail: ved2@turbogaz.kharkov-ua.com
Nikolay Titsky

Company Development History

1975-1991 – All-Union scientific-production amalgamation “Soyuzturbogaz” (part of “Ministry of Gaz industry USSR” before 1991).

1992-1994 – State scientific-production enterprise “Turbogaz” (part of “Ukrgazprom”).

1994-2011 – Open Joint Stock Company “Turbogaz”.

2011-2017 – Public Joint Stock Company “Turbogaz”.

2017 – till present time – Private Joint Stock Company “Turbogaz” including Head Office (Kharkov City), Pilot Plant and Testing Facilities (Kharkov Region).





Company Structure

"Turbogaz" Subsidiary Pilot Plant

PrJSC «Turbogaz»

PrJSC "Turbogaz" Testing Facility

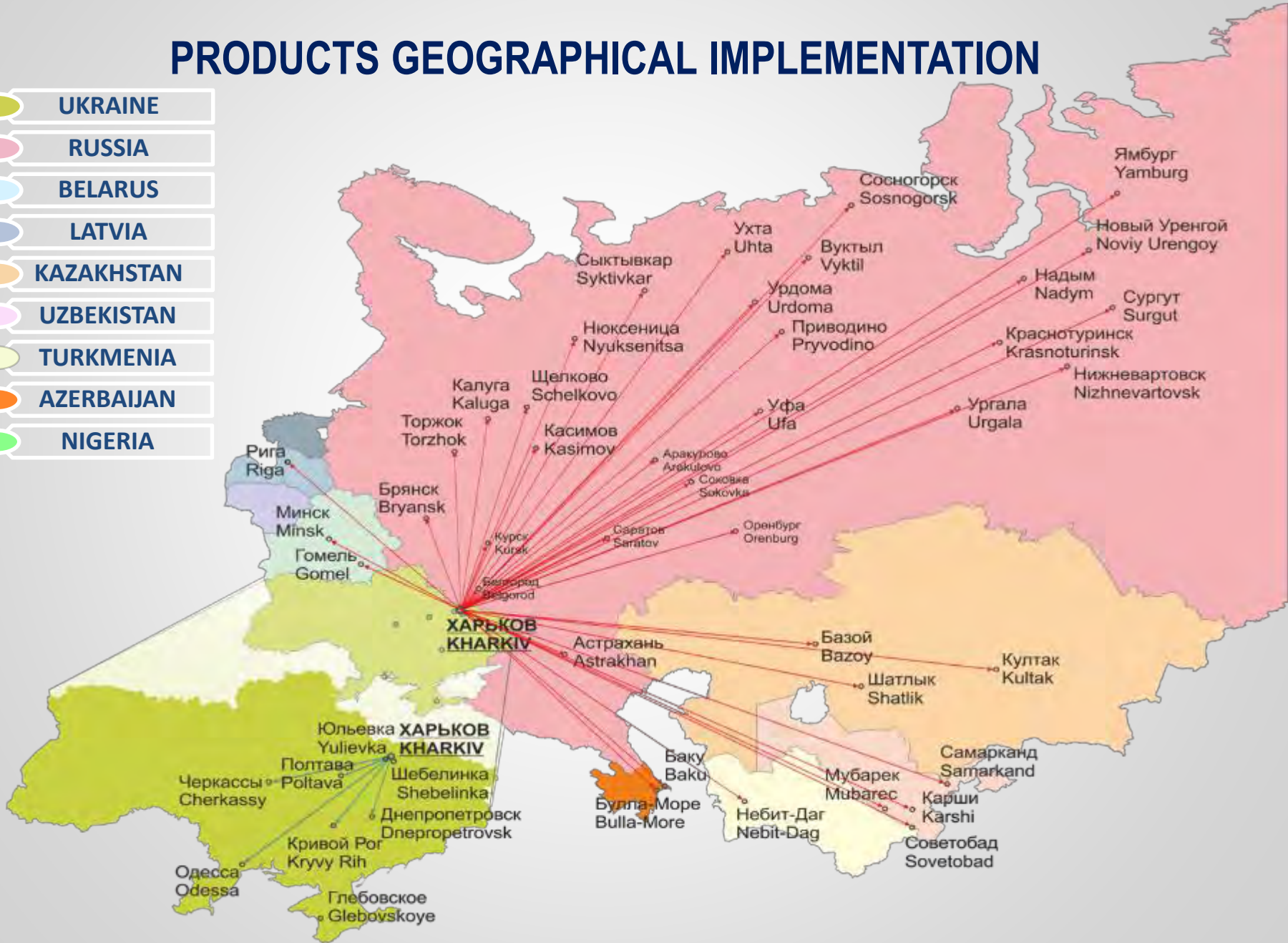
PrJSC "Turbogaz" Engineering Center

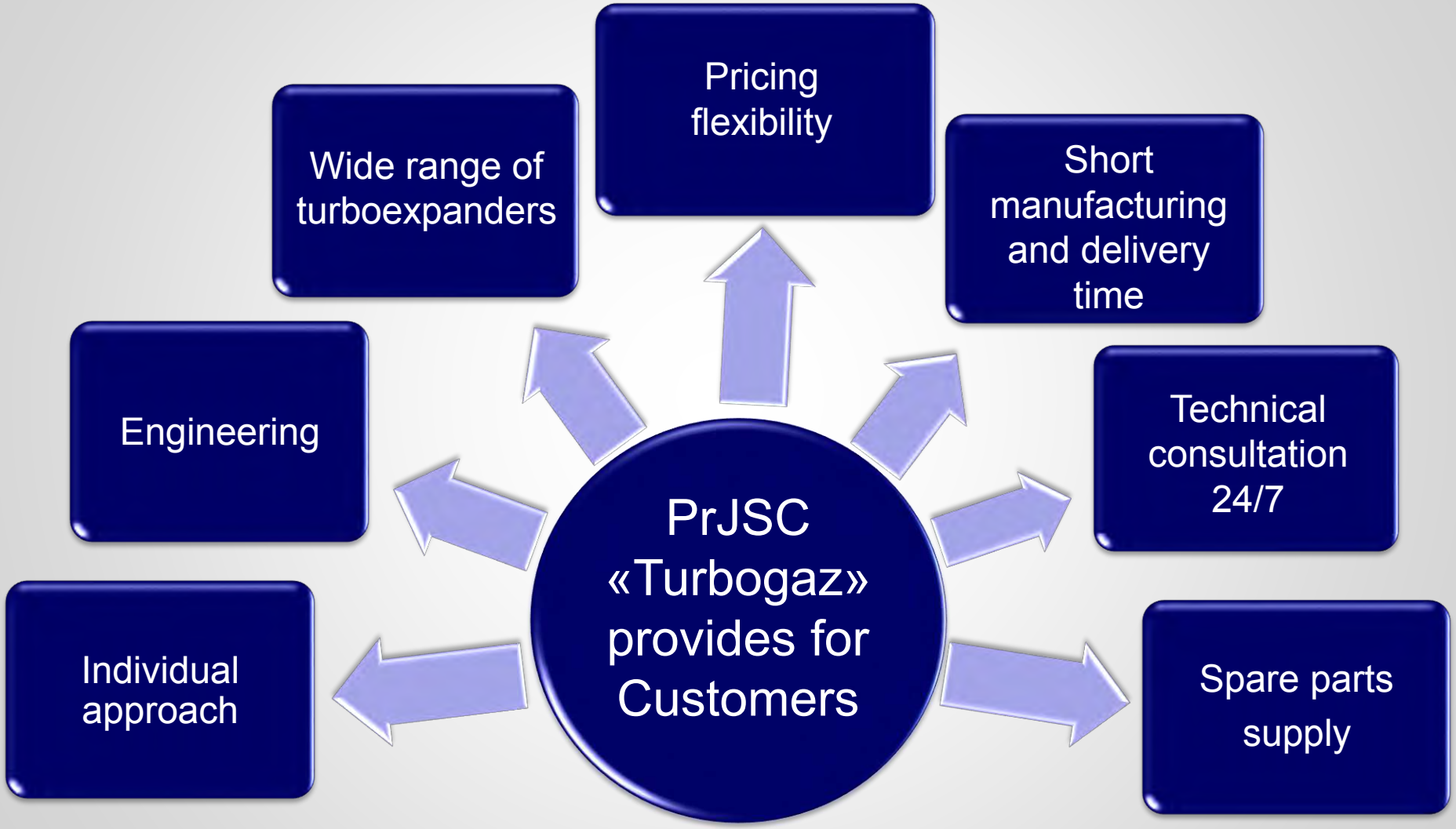
"Turbogaz" PrJSC manufacturing range since 1975

- **> 228** expander-compressor units; **45** – out of them with magnetic bearings
- **11** expander-generator units;
- **212** gas compressor plants;
- **20** gas turbine power plants with total capacity 300 MW;
- **> 900** downhole equipment sets;
- Fully equipped gas treatment plants provided for **16** Ukrainian gas-condensate fields;
- Equipment for Treatment of Soils Polluted With Oil Products.

PRODUCTS GEOGRAPHICAL IMPLEMENTATION

- UKRAINE
- RUSSIA
- BELARUS
- LATVIA
- KAZAKHSTAN
- UZBEKISTAN
- TURKMENIA
- AZERBAIJAN
- NIGERIA





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“Turbogaz” PrJSC main areas of activity

Expander-compressor units for Natural Gas (NG) and associated oil-gas (AG) treatment and processing

Expander-generator units for NG and AG treatment and Power Generating Units

Equipment for Treatment of Soil Polluted With Oil Products

Expander-generator units

EXPANDER-COMPRESSOR UNITS




Gas treatment at gas condensate fields occurs mainly with the help of low-temperature separation. Using automated expander units for gas treatment provides for considerable increase in gas fields' technical level.

Expander-compressor units main purpose is gas cooling.

Expander-compressor units are designed to produce deep cold in natural gas preparation and treatment units, providing temperature difference up to 55°C.

In accordance with the temperature at the unit outlet, expander-compressors can be used:

- For cooling natural gas (2°C below zero)
- To extract fraction C5 + (to 30°C below zero)
- To obtain propane-butane fraction (to 80°C below zero)
- For low-temperature gas separation in production of olefins (to 153°C below zero)

Expander-compressors are used:

1. For low-temperature preparation of natural gas as well as its cooling for subsequent transportation.
2. For gas processing at gas treatment plants by low-temperature separation of heavy fractions from natural gas.
3. For production of various technical gases (O2, N2, Ar etc.) in air separation plants by their low-temperature separation from air.
4. In chemical and petrochemical industry, during production of olefins, ammonia, nitric acid, hydrogen etc. (low-temperature separation of different compounds in gaseous form).
5. For production of liquefied natural gas.
6. In cryogenic plants for obtaining low temperatures (liquefaction of various gases, helium recovery).

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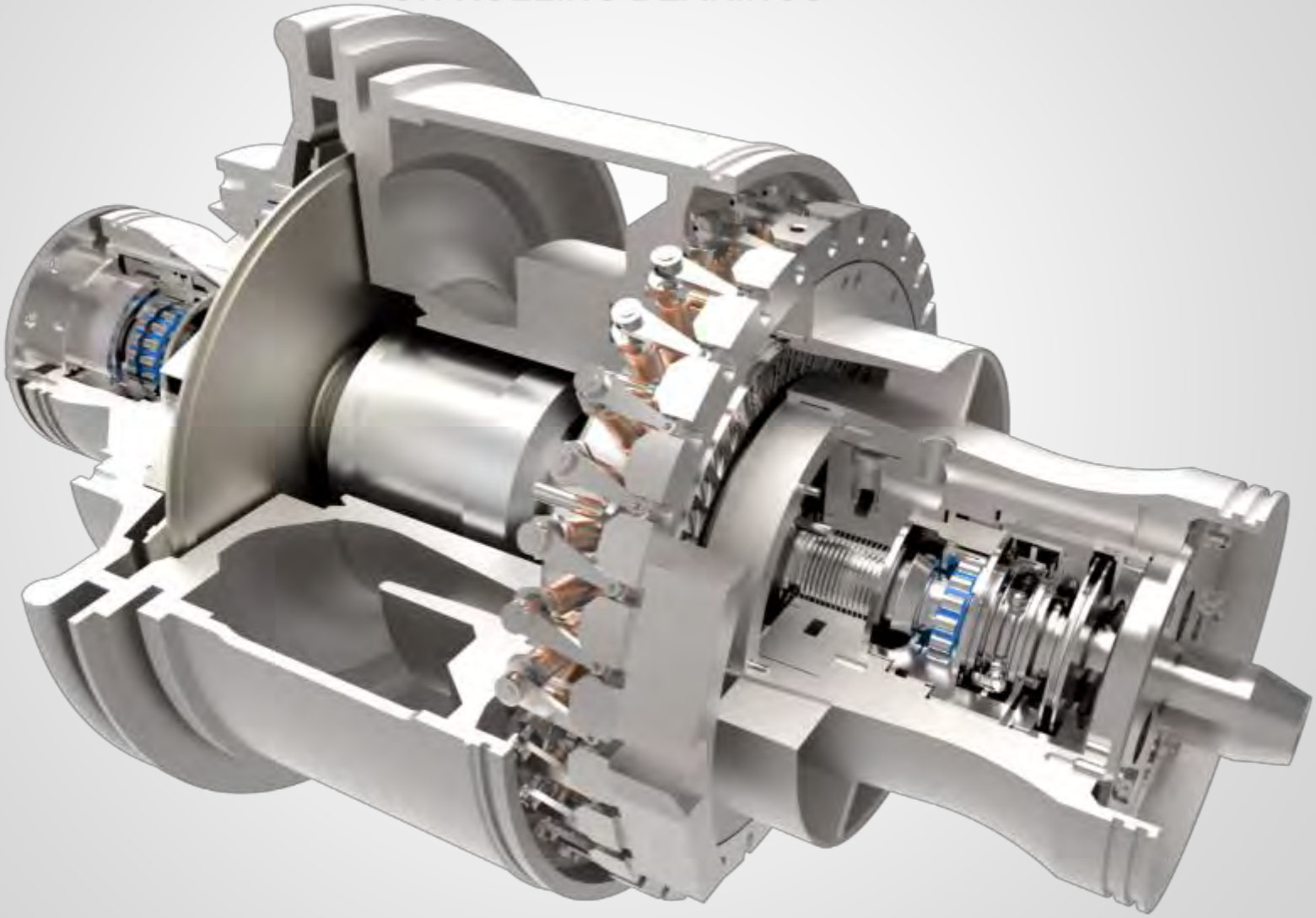
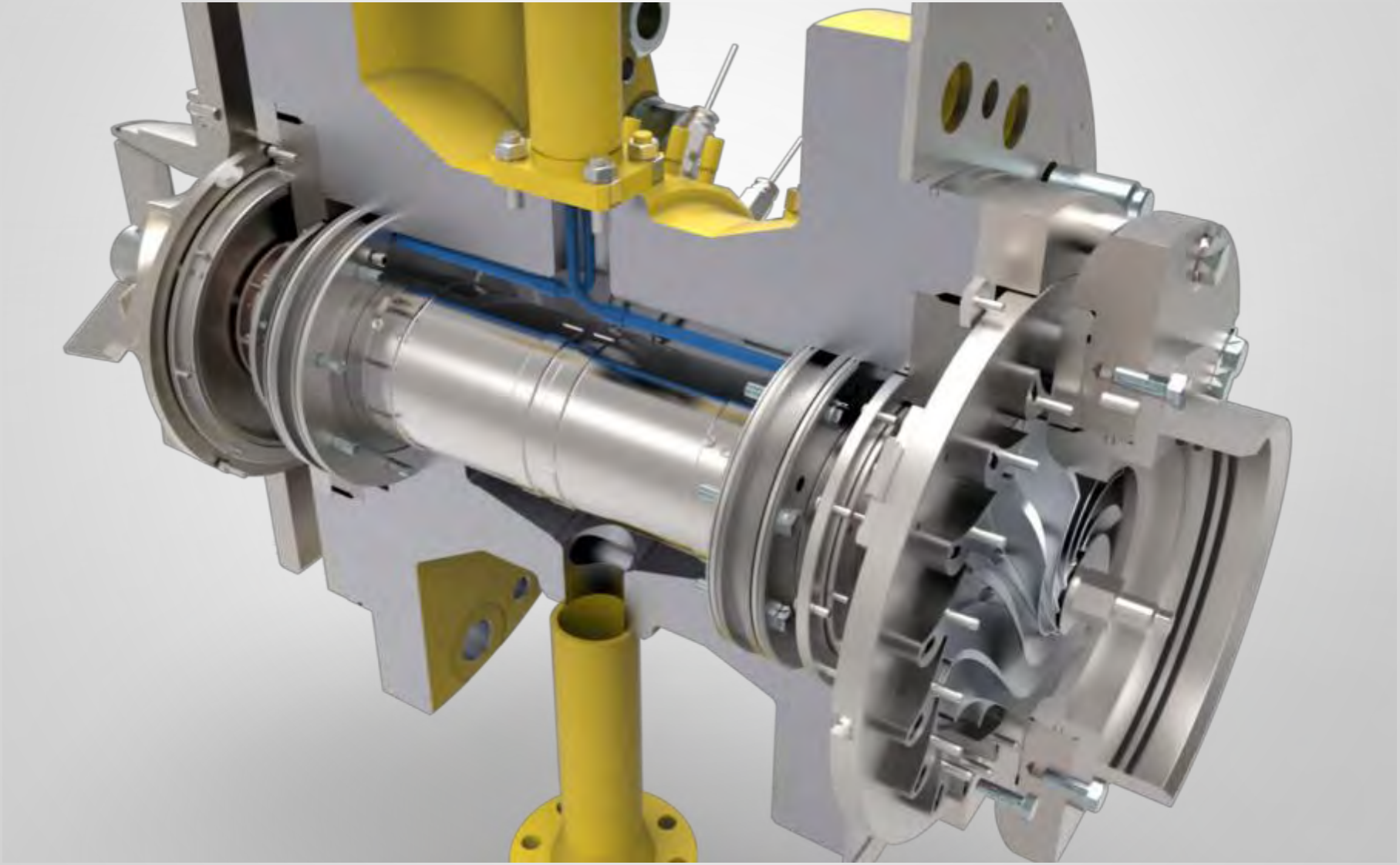
EXPANDER-COMPRESSOR DESIGN & MANUFACTURING

Frame size	Flow rate, Nm^3/h	Inlet pressure, bar(g)	Temperature, °C	Bearing Type	Compliance with API 617 (Yes / No)
Q 1	Up to 45,000	Up to 209	From -200°C up to 280°C	AMB or Oil	Yes
Q 3	Up to 125,000	Up to 209	From -200°C up to 280°C	AMB or Oil	Yes
Q 5	Up to 210,000	Up to 209	From -200°C up to 280°C	AMB or Oil	Yes
Q 10	Up to 425,000	Up to 209	From -200°C up to 280°C	AMB or Oil	Yes
Q 20	Up to 850,000	Up to 209	From -200°C up to 280°C	AMB or Oil	Yes

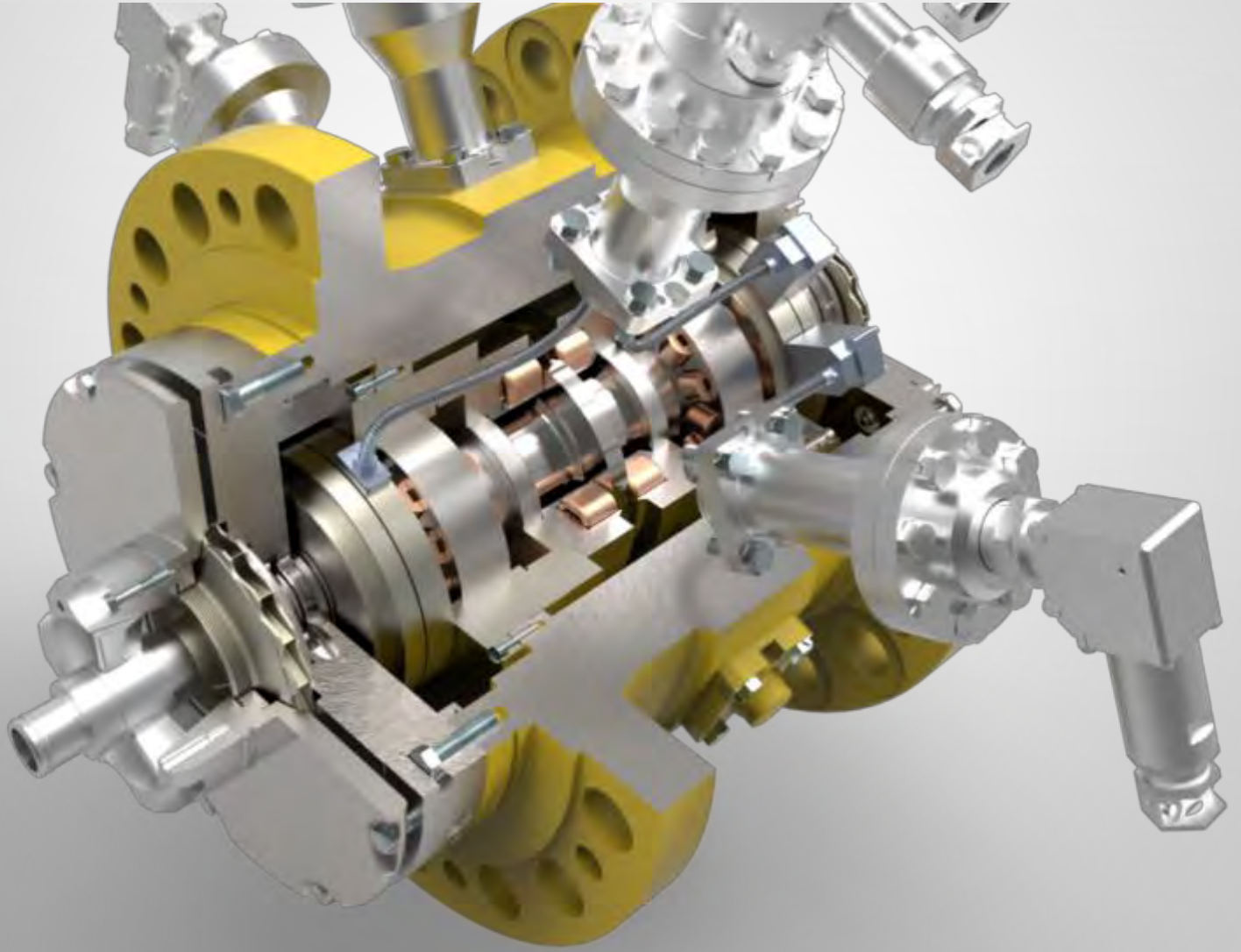
EXPANDER-COMPRESSOR UNIT ON ROLLING BEARINGS



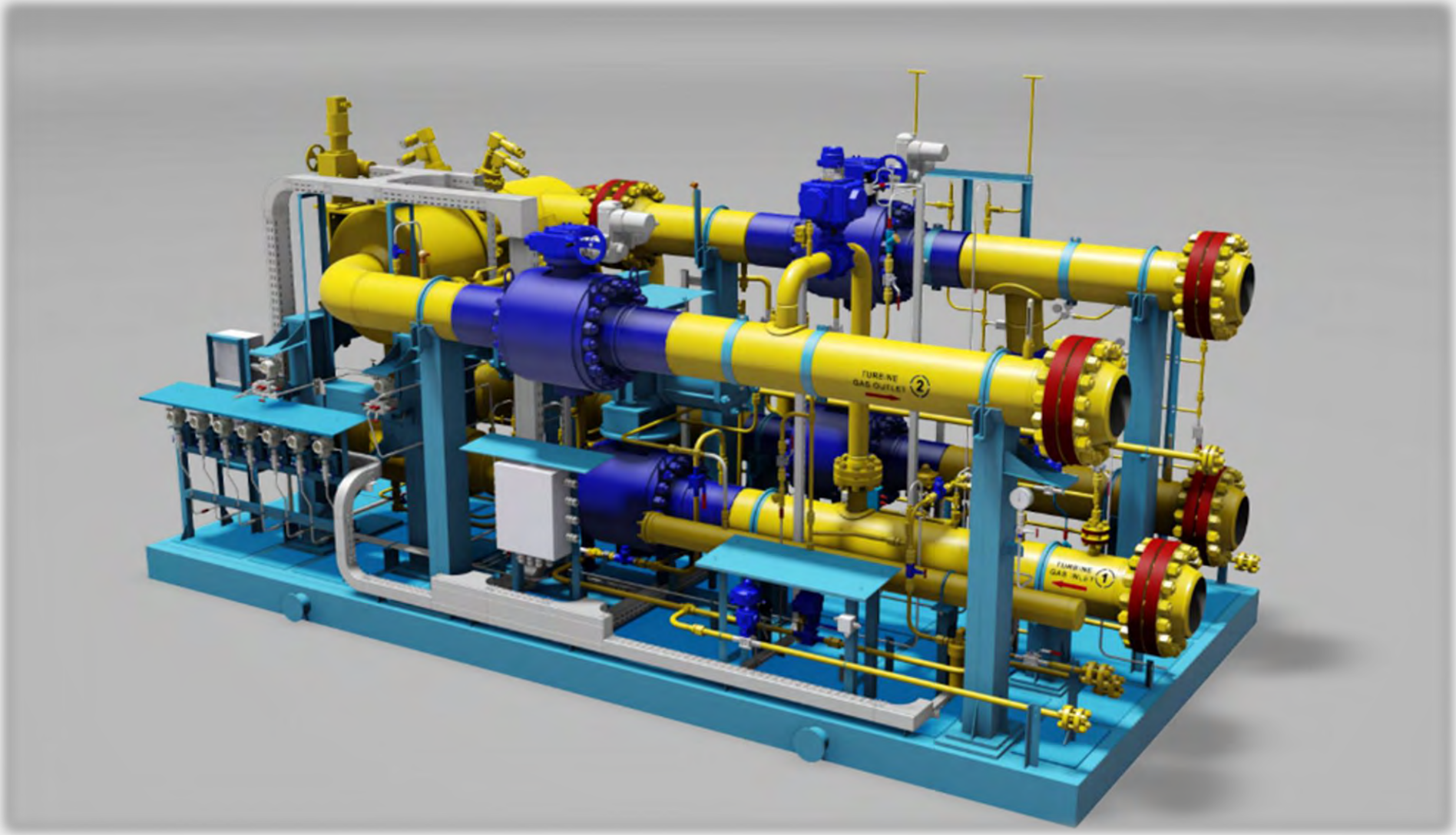
EXPANDER-COMPRESSOR UNIT ON SLEEVE BEARINGS



EXPANDER-COMPRESSOR UNIT ON ACTIVE MAGNETIC BEARINGS

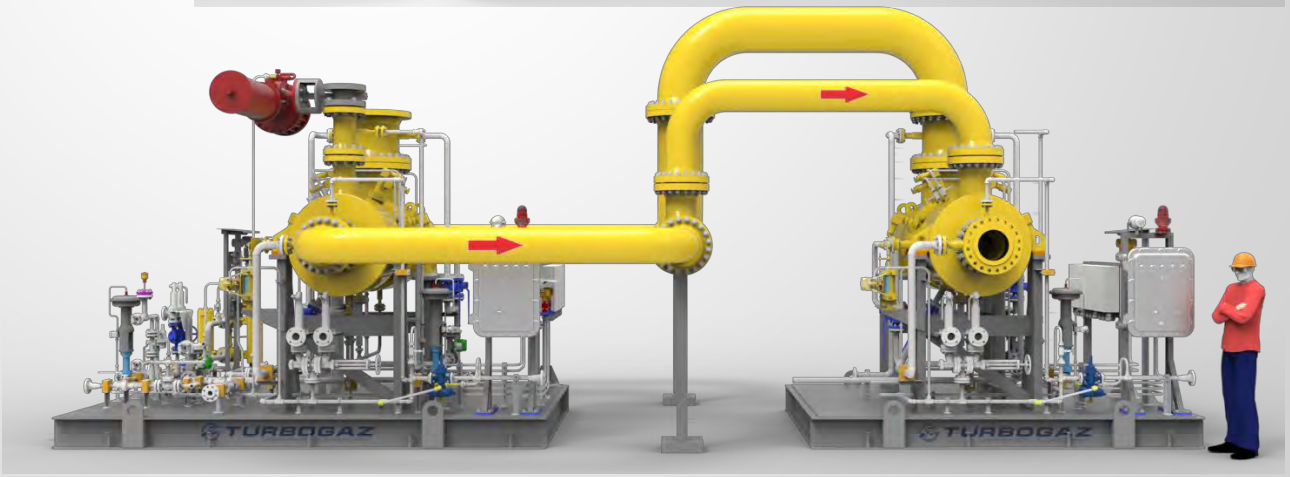


MODERNIZED EXPANDER-COMPRESSOR, MANUFACTURED SINCE 2014.



EXPANDER COMPRESSOR VERSIONS

OLEFIN PROJECT ON MAGNETIC BEARINGS



Expander –compressor unit MTDA -9,0-4,5-U1,
UPBS-2 “Shurtan”,(Uzbekistan), since 2007. Active magnetic bearing.

EXPANDER-GENERATOR UNITS




An expander-generator is a turbo-expander unit in which the mechanical energy of rotor rotation is used to rotate the shaft of an electric generator and, accordingly, to generate electrical power.

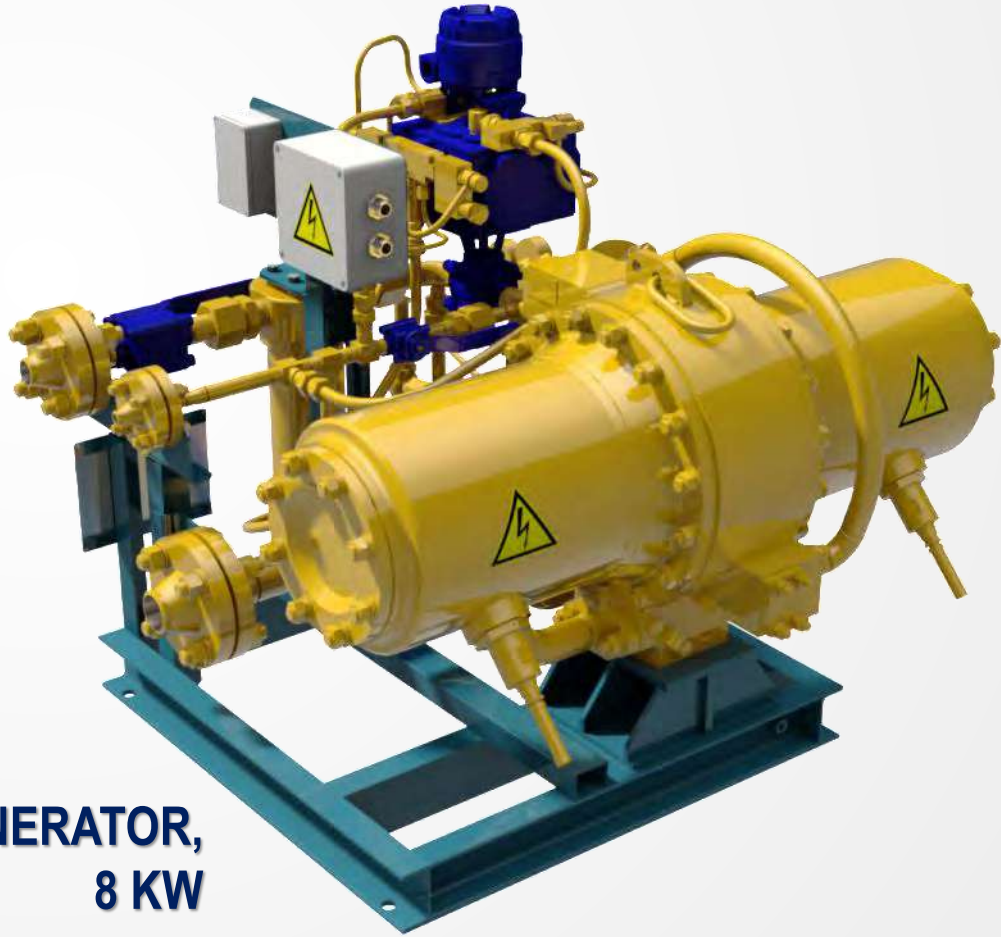
The expander-generator units can be applied:

1. To generate electrical power at natural gas reduction units at gas distribution stations, at gas letdown stations of large gas consumers - thermal power plants, metallurgical, chemical plants and other large gas consumers of gas transmission systems.
2. To generate electricity during reduction of various process gases having excess pressure: in the chemical, petrochemical, metallurgical and other industries.
3. To generate power during regasification of liquefied natural gas.
4. To generate power by recovering low-grade (low-pressure) heat (ORC cycle / Rankine cycle).

EXPANDER-GENERATOR
BASIC CHARACTERISTICS

Standard Size	Power, кW e	Gas flow, St.m3/hour	Gas Pressure, bar	Expander Type	Reduction Gear (Yes/No)	Generator Type	Bearing Type
Small	Up to 25	Up to 10,000	Up to 63	Radial	Not used	High-speed	Oil
Medium	From 100 to 500	Up to 50,000	Up to 63	Radial	Not used	High-speed	Magnetic bearing
Large	From 1000 to 6000	Up to 250,000	Up to 160	Radial or axial	Yes	Synchronous or induction (1500 or 3000 rpm)	Oil
Very large	From 8000 to 16000	Up to 800,000	Up to 160	Radial or axial	Yes	Synchronous or induction (1500 or 3000 rpm)	Oil

EXPANDER-GENERATOR, 3,5 KW



EXPANDER-GENERATOR, 8 KW

EXPANDER-GENERATOR,
GENERATOR COMBINED WITH ACTIVE MAGNETIC BEARINGS
300 KW

EXPANDER-GENERATOR, MULTI-STAGE AXIAL-FLOW DIRECT-DRIVE TURBINE 4000 KW

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Turboexpander-generator UTDU-4000, 4 MW capacity,
UTDU– 4000-4,5-4,5-UHL4 at Severodonetsk gas distribution station, Ukraine, 2008.

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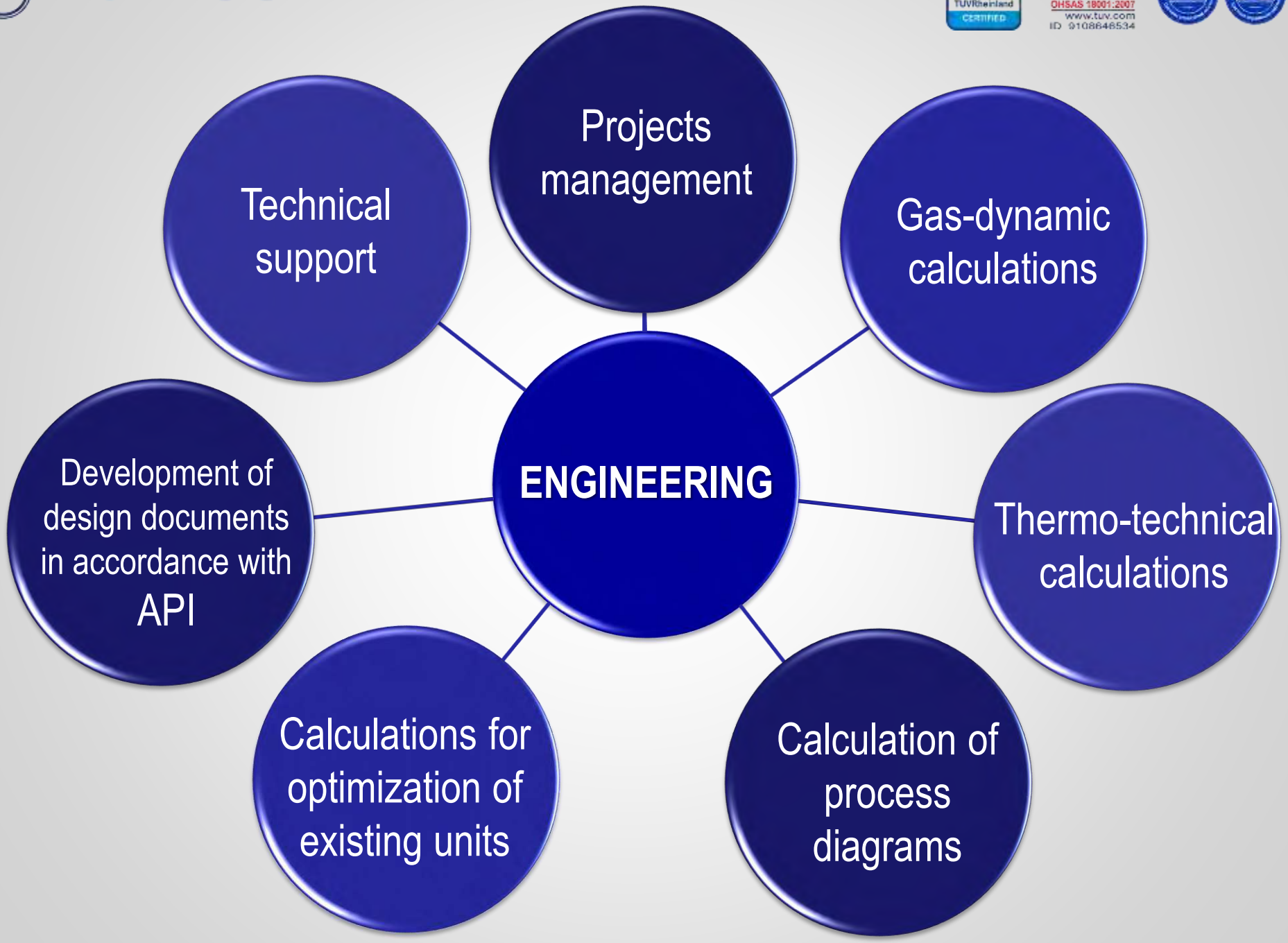

PRODUCTION PROCESS

PrJSC “Turbogaz” production process is based on the principle on outsourcing and placing orders for manufacturing component parts with profile co-manufacturers each of them is the most competent in their branch segment.

Purchased components are supplied by vendors approved by the Customer. Vendors must have reputation of reliable partners manufacturing products complying with top standards.

Operations related to manufacture of basic parts (piping, assembling, testing) are performed at the “Turbogaz” Pilot Plant.





Equipment production process at co-manufacturers' companies

Equipment production process at co-manufacturers' companies

Final assembly at “Turbogaz” Pilot Plant

Testing process at “Turbogaz” testing facility

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Rotor parts

Thrust bearing

Position sensor

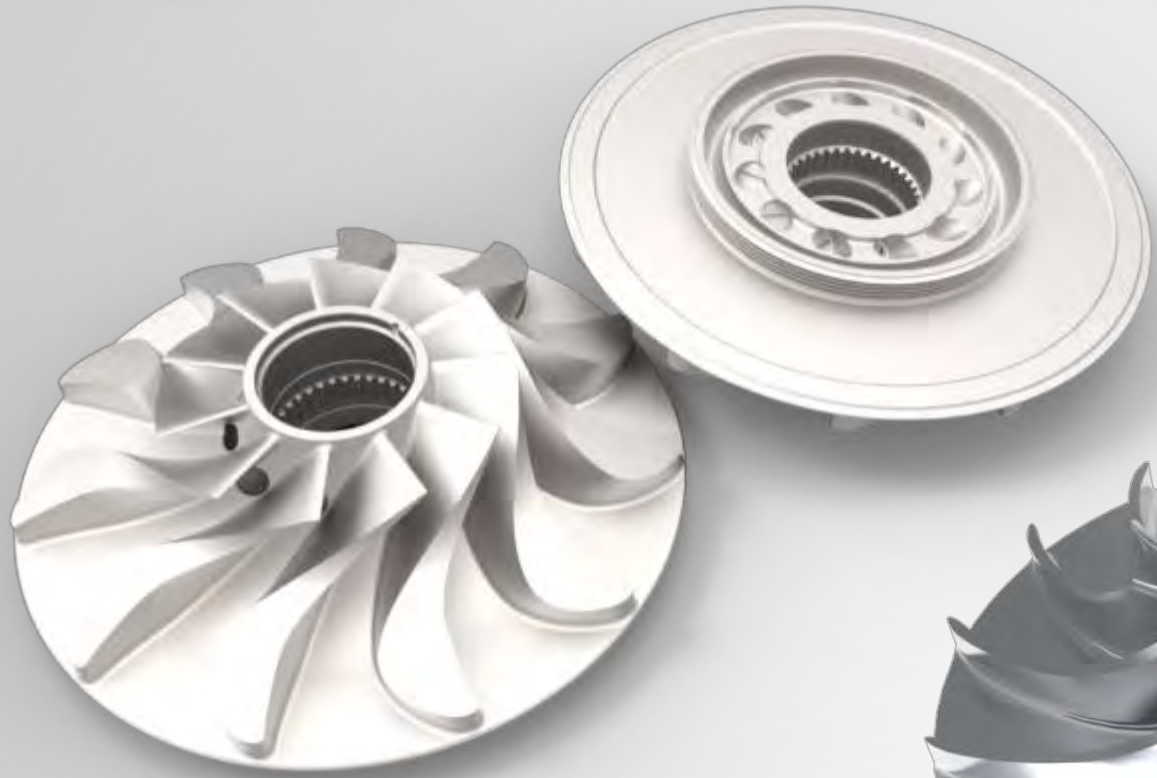
Bearing disc

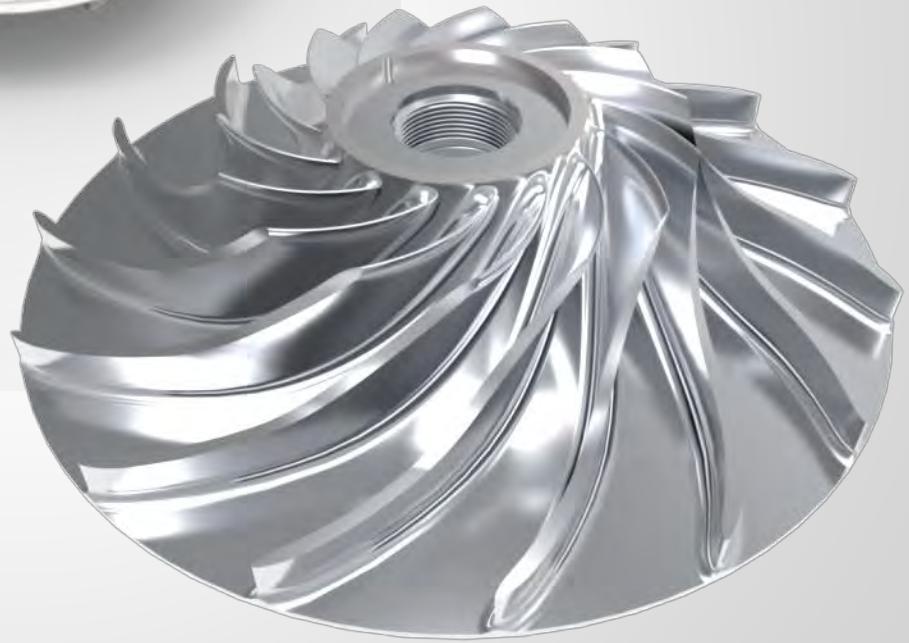
Stator parts

Control cabinet E300/30

magnetic bearing set for PrJSC “Turbogaz” manufacturing

3D TURBINE WHEEL BLADES





TYPE ON MATERIAL:
TITANIUM
ALUMINUM
STEEL

3D COMPRESSOR WHEEL BLADES

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CERTIFICATION

In March 2018 the authorized representative of TÜV RHEINLAND in Ukraine conducted an audit of the quality management system of PJSC "Turbogaz" in accordance with ISO 9001: 2015, ISO 14001: 2015 and OHSAS 18001: 2007.

In August 2018 PrJSC "Turbogaz" was awarded the Certificate of Integrated Quality Management System.


Certificate

Standard: ISO 9001:2015

Certificate Holder: MC: Private Joint Stock Company "Turbogaz"


Certificate

Standard: ISO 14001:2015

Certificate Holder: MC: Private Joint Stock Company "Turbogaz"


Certificate

Standard: BS OHSAS 18001:2007

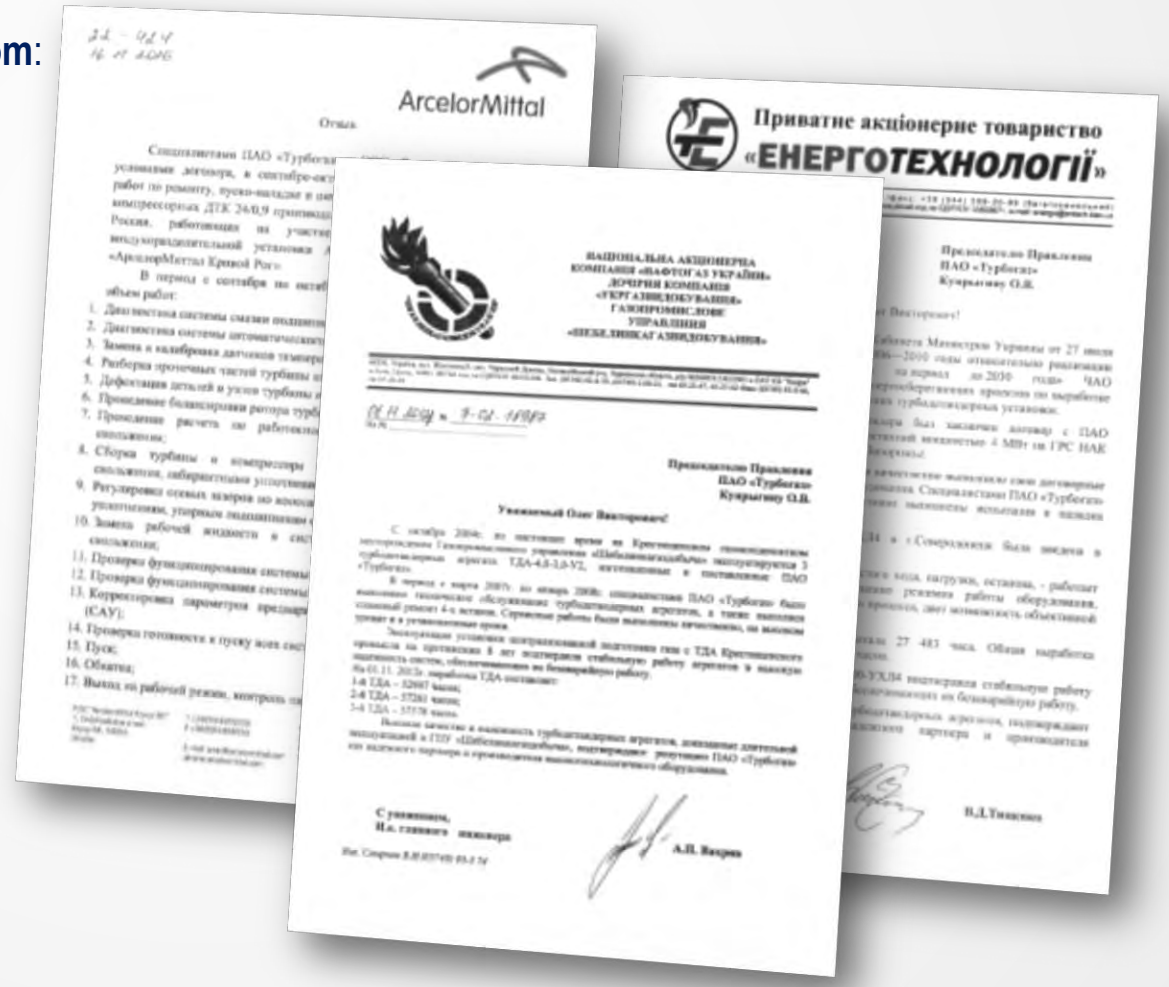
Certificate Holder: MC: Private Joint Stock Company "Turbogaz"

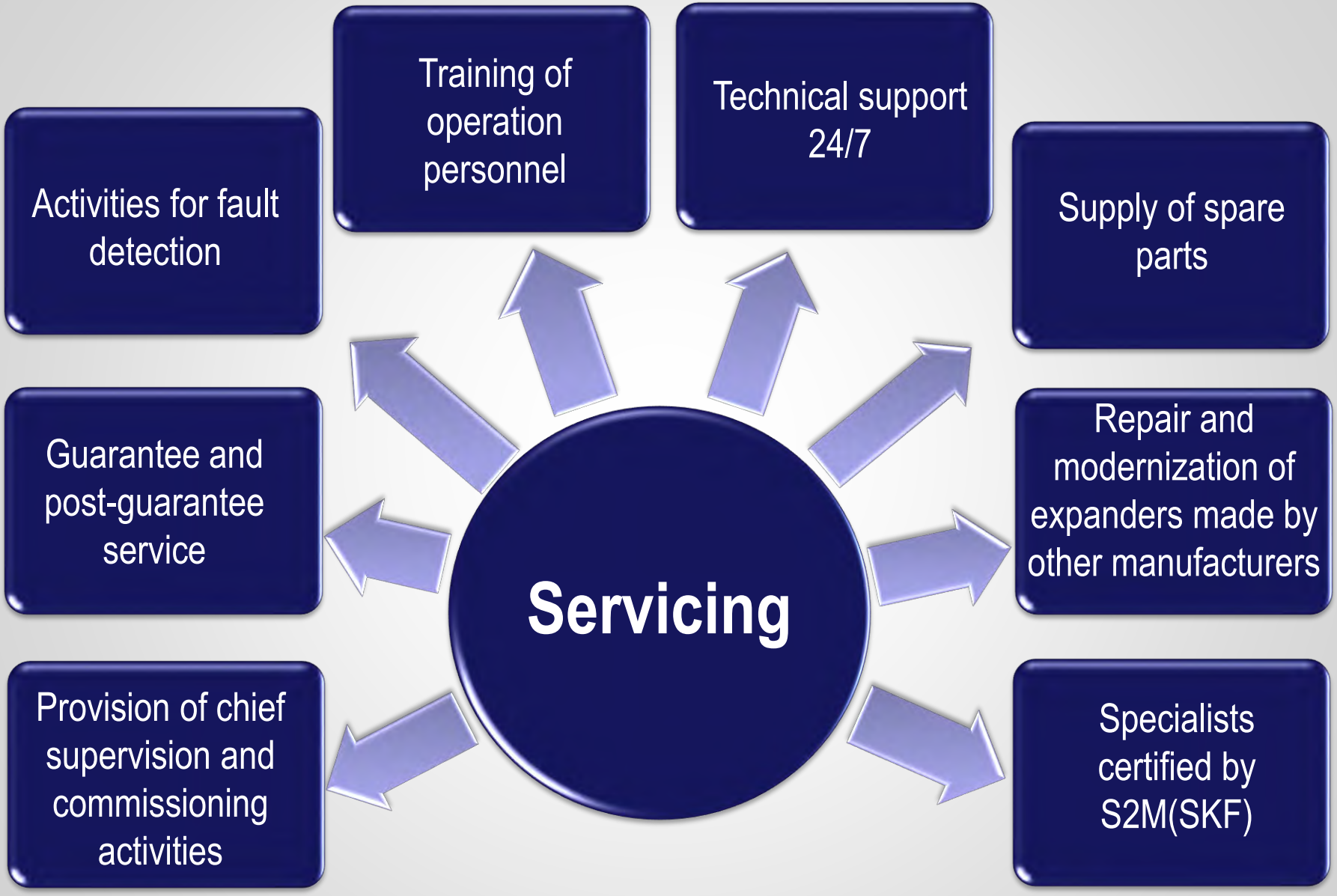
CUSTOMERS' REFERENCES

PrJSC "Turbogaz" policy is to win Customer's trust and respect, to create and maintain conditions, when present-day and prospective requirements and aspirations of the Customer are dominant in every "Turbogaz" employee routine work.

PrJSC «Turbogaz» received references from:

- JV "Uz-Kor Gas Chemical"
- ArcelorMittal;
- GPU «Poltavagazdobycha»;
- GPU «Shebelinkagazdobycha»;
- GPU «Kharkovgazdobycha»,
- UMG «Kharkovtransgaz» -
- NAK "Naftogaz of Ukraine";
- UZBEKNEFTEGAZ;
- MUBORAKNEFTGAZ;
- SHURTANNEFTGAZ;
- LLC «Gazrom Dobycha Yamburg»;
- PrJSC «Energotechnologies»;
- Minsk TETs-4;
- Lukoml hydroelectrical power station;
- Gomel TETs -2.





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PrJSC "Turbogaz"

Experience that brings results

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