

# Oil and Gas Industry Equipment

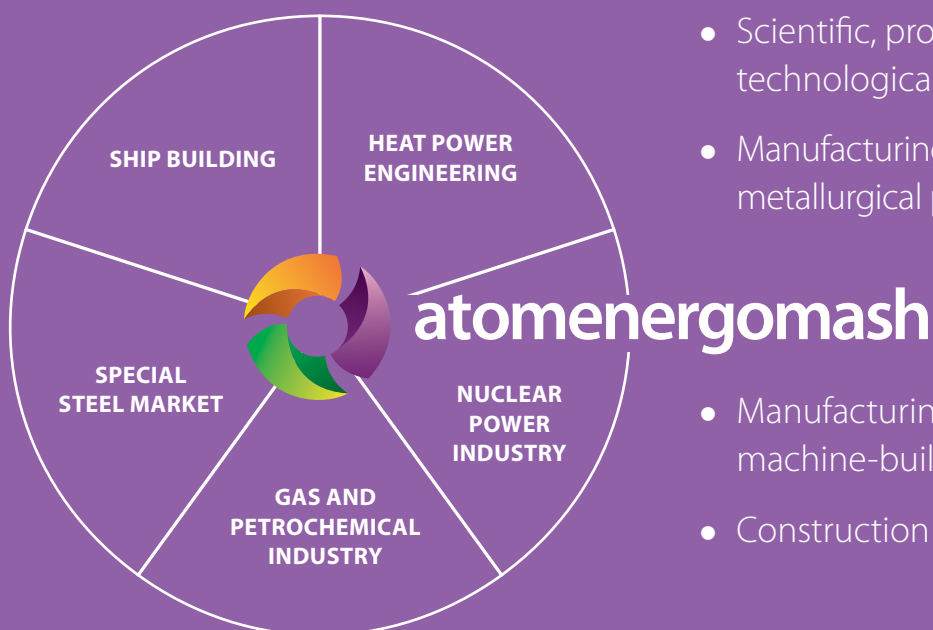


**atomenergomash**  
COMPANY OF ROSATOM

# GROUP OF COMPANIES

## ATOMENERGOMASH

JSC Atomenergomash (Company, Holding, AEM) is an Engineering Division of State Corporation for Nuclear Energy Rosatom. It is one of the largest power engineering holdings in Russia's power industry offering its clients a full range of solutions in the sphere of design, production and supply of equipment for nuclear and thermal power plants, oil and gas industry, ship building and wind power industry.



- Scientific, project designing and technological works
- Manufacturing of special semi-finished metallurgical products and materials

- Manufacturing and delivery of machine-building equipment
- Construction and installation works

- More than 30 enterprises in Russia and abroad
- About 20% of domestic power engineering machine-building market
- About 21 000 employees
- Equipment of AEM manufacture is operated in more than 20 countries all over the world

# MACHINE-BUILDING FOR OIL AND GAS INDUSTRY

AEM offers equipment and solution for support of main oil and gas production, refining and transportation processes.

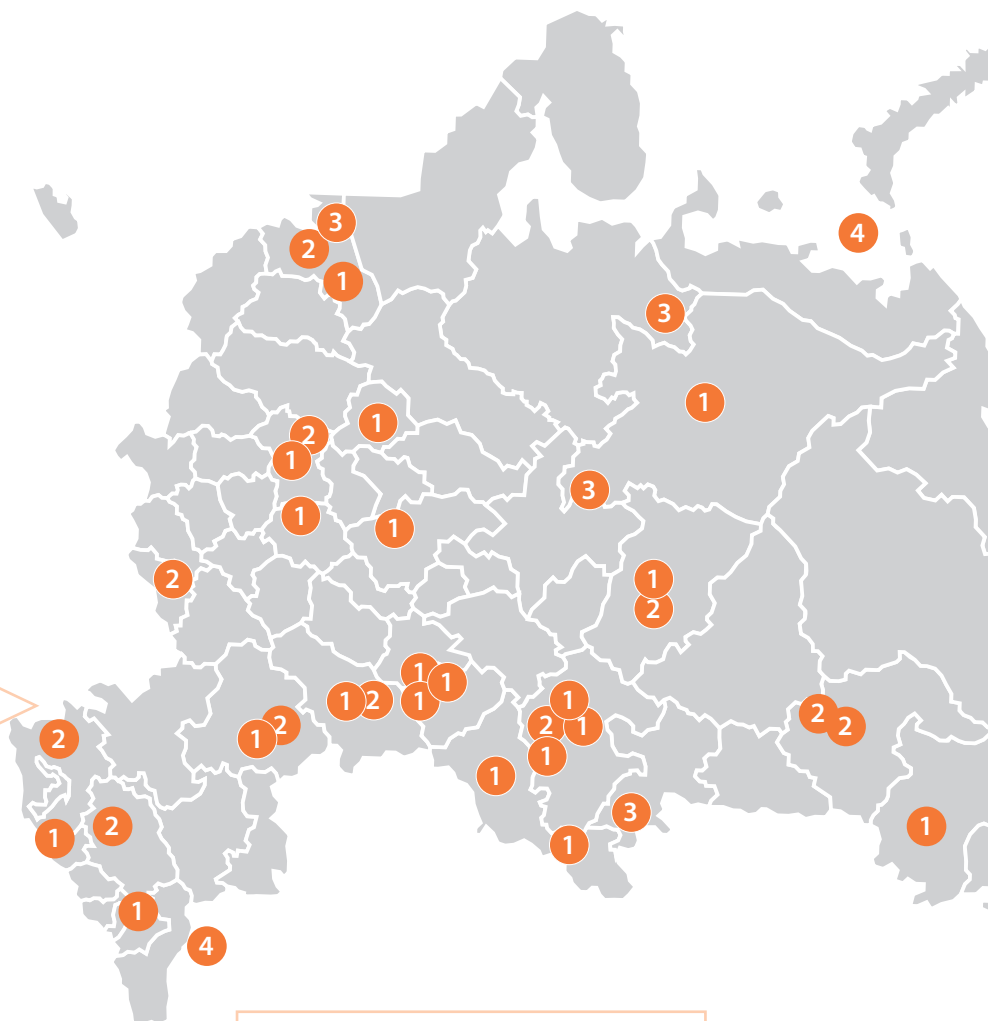
Companies of AEM group have been designing, manufacturing and supplying machinery for oil and gas industry starting with 1931 when ZiO-Podolsk machine building plant manufactured the first cracking unit.

Based on traditions of quality, reliability and scientific base of nuclear industry, machine building and engineering companies of AEM ensure production of a wide range of equipment for oil and gas industry.

Design and engineering companies within Atomenergomash JSC have high potential for developing and designing a complete cycle from process design to issuing working documentation and further manufacturing of equipment.



# SALES GEOGRAPHY FOR OIL AND GAS INDUSTRY



## 1 Refining and petrochemical companies

- Angara refinery
- Achinsk refinery
- Volgograd
- Grozny refinery
- Kuybyshev refinery
- Moscow refinery
- Novokuybyshevsk refinery
- Ryazan oil refinery company
- Omsk refinery
- Saratov refinery
- Syzran refinery
- Tuapse refinery
- Ufa refinery
- Ukhta refinery
- Kirishinefteorgsintez
- Orsknefteorgsintez
- Permnefteorgsintez
- Salavatnefteorgsintez
- Ufanefteorgsintez
- Yaroslavlnefteorgsintez
- LUKOIL-neftekhim Burgas
- Nizhegorodnefteorgsintez
- Orengurnefteorgsintez

## 2 Hydrocarbon transportation companies

- Bashtransgaz
- Beltransgaz
- Volgogradtransgaz
- Kavkaztransgaz
- Lentransgaz
- Kubantransgaz
- Mostransgaz
- Permtransgaz
- Samaratransgaz
- Tyumentransgaz
- Yugtransgaz
- Transneft



**3 Gas industry companies**

- Nadymgazprom
- Noyabrskgazdobycha
- Severgazprom
- Uralgazprom
- Urengoygazprom
- Yamalinvest
- Yamburggazdobycha
- Astrakhangazprom
- Khimgazkomplekt
- Yamburgsnabkomplekt

**4 Off-shore production facilities**

- Prirazlomnya (Barents sea)
- Gazprom
- LSP-1, LSP-2 (Caspian Sea)
- LUKOIL

**5 Export**

- Azerbaijan
- Belarus
- Bulgaria
- Brazil
- Hungary
- India
- Lithuania
- Latvia
- Kazakhstan
- Mexico
- Nicaragua
- Poland
- Romania
- Uzbekistan

# EQUIPMENT AND SERVICES FOR OIL AND GAS PRODUCTION, REFINING AND TRANSPORTATION

## Oil industry

HEAT EXCHANGERS

TOWER VESSELS

TANK VESSELS

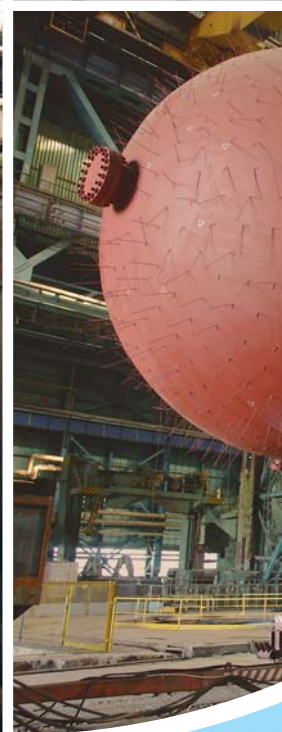
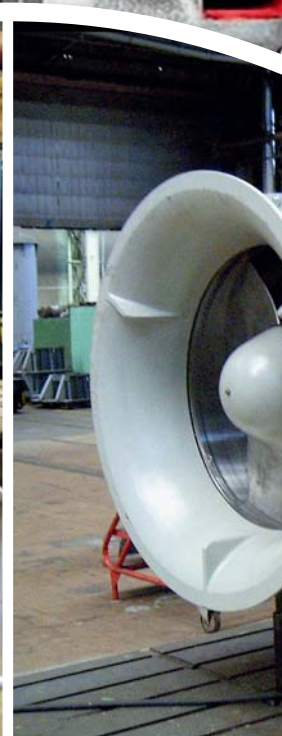
REACTOR EQUIPMENT

TUBULAR FURNACES  
PRODUCT COILS

TRUNK OIL PUMPS

PUMPING EQUIPMENT  
OF DIFFERENT FUNCTION

SLIDE GATES FROM TRUNK OIL LINES



# Gas production, processing and transportation



AIR COOLERS

REGENERATIVE AIR HEATERS

DUST COLLECTORS




FUEL, PILOT, PULSE GAS  
CONDITIONING PLANTS



MOTOR FUEL PRODUCTION  
PLANTS

STOP AND CONTROL VALVES



AEM companies produce equipment for processing of oil, gas, gas condensate and process equipment for oil refineries: up to 700 equipment items per year.

# MANAGEMENT SYSTEM

The basis for quality assurance of gas and petrochemical equipment manufacturing is quality management system, corresponding to state-of-the-art worldwide practice, norms of international standards ISO 9000 series.

Enterprises of Atomenergomash are specialized in manufacturing of the equipment for different industries of heat and nuclear power engineering, gas and petrochemical industries. For this purpose at the enterprises of the Holding certification of quality management system and manufacturing of the core products was carried out by independent certification authorities (international and domestic ones).

Quality management system of Atomenergomash enterprises includes the whole management system for Company and its subsidiaries, functioning of which is aimed at quality assurance for the provided services and applied processes.

All equipment manufactured by the enterprises of Atomenergomash Holding is subject to the strictest quality inspection, including detailed expert review of the documentation and tests performance with the highest quality level.

The inspection starts from the moment of the contract signing. According to its requirements the manufacturer develops and agrees with the customer quality plans comprising all main stages of the equipment creation, starting from the agreement with the customer of design documentation, inspection of production readiness, certification of the technologies, equipment and personnel, incoming inspection of the purchased materials and completing items, to production progress and acceptance by the customer.

Prior to production starting 100% incoming inspection of the purchased materials and completing items takes place. Visual and dimensional inspection of the obtained materials, semi-finished products, welding materials is performed as well as inspection of supporting documentation. Laboratories of the Holding enterprises perform the following types of inspection during equipment manufacturing: chemical analysis, metallographic examination, corrosion tests, mechanical tests of metal and welded joints, radiographic, ultrasonic, magnetic particle testing, dye penetrant testing, metal and welded joints leakage testing.

Laboratories of Atomenergomash enterprises have all required licenses, certificates and accreditation for performance of these types of inspection, and specialists of subdivisions monitoring product quality have certificates in accordance with regulatory requirements. Measurement devices used during manufacturing of products shall be verified both by metrology departments using their own resources in accordance with accreditation certificate in the sphere of measurements uniformity and by state metrology service authorities headed by Federal Agency for Technical Regulation and Metrology.

Products may be designed and manufactured in accordance with standards of American Society of Mechanical Engineers (ASME) as confirmed by ASME Code conformance certificates.

Well functioning processes, focus on quality, highly skilled personnel and experience are key elements of our success in the market.





# MANUFACTURING CAPABILITIES

The unique manufacturing capabilities of AEM allows us offer the customer equipment as per the highest requirements. Currently, owing to upgrade of Holding enterprises in Karelia, Moscow and Rostov Regions and in Ukraine, AEM is one of leading companies at Russian power engineering market.



One of the largest engineering companies in Russia with over 90 years of history. Having a unique fleet of equipment, this plant manufactures up to 700 items of equipment for gas and petrochemical industry per year with total weight up to 20.000 tons. Nowadays, the plant has almost all types of the main machine-building facilities allowing manufacturing state-of-the-art process equipment. Rosatom production system (RPS) is implemented at the plant allowing to detect and reduce all kinds of losses in manufacturing and business processes.



It is the largest machine-building enterprise in the South of Russia with total area 1.7 ha. The process capabilities allow manufacturing any heat-exchanging, package units and vessel equipment, 3D machine-building structures and boiler equipment of high readiness in modular design. The company owns extended fleet of the unique metal cutting, press, thermal and welding equipment. The advantage of the enterprise is also the possibility of equipment transportation by means of trucks and railway transport as well as sea transport from specialized port terminal.



One of the largest engineering companies in northwestern region of Russia supplying shells, tanks and other equipment. The plant owns unique melting and load-lifting facilities providing output of castings of almost all required standard sizes. The company has unique machine fleet: turning-and-boring mills, horizontal-milling lathes, deep boring machines, multi-spindle drilling, grinding and finishing CNC machines, balancing and other machines.

Production areas are connected to all European ports via its own port terminal and Volga-Baltic Route.



Energomashspetsstal OJSC is the largest in the Eastern Europe enterprise producing special heavy castings and forgings of special steels. Energomashspetsstal OJSC owns extended fleet of metal cutting equipment, including turning, boring, turning-and-boring lathes, deep boring lathes, planer-type milling machines, slotting machines, gear-milling machines, bandsaw machines and others. Manufacturing capabilities of electric-furnace melting shop allow producing steel forged blanks of different steel grades of virtually unlimited size.

- Blank production
- Forging
- Steel casting
- Thermal processes
- Welding
- Stamping
- Assembly
- Machining

# HEAT EXCHANGERS

Group companies manufacture a wide range of heat exchangers of different design, design parameters and materials.



Heat exchanger for Sakhalin II project (fully compliant with ASME code requirements)

## Types of vessels being manufactured

- Shell and tube heat exchangers with stationary tubesheet
- Floating head heat exchangers
- Spiral heat exchangers
- Helix type heat exchangers
- Reboilers
- Boilers
- Thermosyphon evaporators
- Refrigerant condensers
- Vacuum condensers
- Evaporators with steam space and tube bundles
- Pipe-in-pipe heat exchangers



Evaporator



Spiral heat exchanger with spirally bent pipes

## Technical Parameters

- Shell diameter: 325 mm and over
- Temperature: -70 to +950 °C
- Nominal pressure: up to 16 MPa
- Material: carbon and stainless steel, titanium alloys, iron-nickel alloys



Helix type heat exchanger

## References

The following heat exchangers were manufactured based on orders from different companies:

- hydrocyanic acid and acrolein producing (ERA, Mexico);
- sewage water treatment plant for Nevinnomyssk (TEC, Japan);
- sulfuric acid alkylation for Omsk Refinery (TECHNIP, France);
- vacuum distillation unit for LUKOIL-Permnefteorgsintez.

Heat exchangers:

- spiral heat exchangers for Orenburg helium plant, Helix type for LUKOIL-Permnefteorgsintez (under license of ABB, LHT);
- fully compliant with ASME Code requirements (Sakhalin II project, AMEC, UK).

# TANK VESSELS

The vessels are used in process installations for gas, oil, oil-refining, petrochemical and other industries, including inflammable and hazardous media.



Gas condenser

## Types of Vessel Equipment

- Vessels operated under pressure to 70 MPa, to 1,000 m<sup>3</sup>
- Horizontal and vertical vessels for liquid media
- Vertical vessels for air and gases
- Evaporators



Vessel for Saratov Refinery

## Technical Parameters

- Volume: up to 300 m<sup>3</sup>
- Diameter: up to 3,800 mm
- Nominal pressure: up to 70 MPa
- Temperature: -70 to +950 °C
- Material: carbon and stainless steel, iron-nickel alloys



Steam separation unit for Verkhne-Mutnovskaya Geothermal Power Plant

## References

- Vessels for catalysts producing at Ishimbaysky Oil Refinery Plant (JGC Corporation, Japan)
- Vessels for hydrocyanic acid and acrolein producing (ERA, Mexico)
- Sewage water treatment plant for Nevinnomyssk (TEC, Japan)
- Steam collectors, separators, receivers, filters and other equipment for vacuum residue plant (LUKOIL-Permnefteorgsintez LLC)
- Degasifier, acid settler tanks, separators, economizers, tanks for alkylation for Omsk oil refinery (TECHNIP, France)
- Vessels for sulfuric acid producing plant (LUKOIL-Permnefteorgsintez LLC)
- Separators for development of Verkhne-Salymskoye oil and gas field. (Salym Petroleum Development, subsidiary company of SHELL)

# TOWERS

Towers are designed for oil processing. Diameter of assembled vessels is limited only by possibility of railway transportation. Large diameter vessels are transported dismantled and are mounted on site. Vessels are fitted with trays of various design.



Column for Kirishinefteorgsintez

## Types of tower vessels

- Rectification columns
- Packed columns
- Towers for condensate refining
- Hydrogen peroxide production vessels
- Absorbers
- Adsorbers
- Stabilizers
- Evaporators



Vacuum column for Mažeikių nafta, Lithuania

## Process specifications

- Diameter: up to 9,000 mm
- Height: up to 100,000 mm
- Nominal pressure: up to 16 MPa or vacuum
- Temperature:  $-60$  to  $+550$  °C
- Type of contact devices — Trays of different types, regular and random packings
- Material: carbon and stainless steel, iron-nickel alloys plated with corrosion resistant material as required by technical design
- Service life — 20 years



67 m long column, weigh 346 tons for JSC Taneko

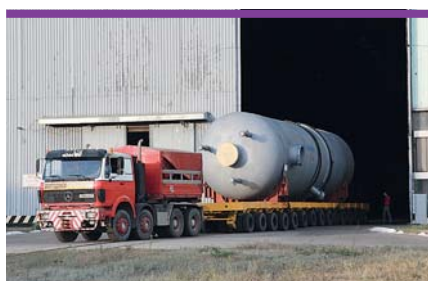
Large size vessels are shipped completely assembled from proprietary pier with «river — sea» class vessels to any port of the world.

Dock type pier of Volgodonsk branch with reinforced concrete 70 m long and 18 m wide chamber for entry of vessels is equipped with two gantry cranes with load capacity of 1,350 tons.

# REACTOR EQUIPMENT



Hydrotreater for Ryazan refinery



Hydrotreater for Saratov refinery



Hydrotreater R202



Column shipping from pier

Reactors are designed, manufactured and supplied in accordance with GOST R 52630–2006, OST 26.291–94 and/or EN 13445–4:2002, ASME Section VIII Div.1&2. Criteria for selection of materials for manufacturing of reactor shells and piping are based on rich practical experience of AEM specialists in the sphere of oil refining, chemical and power units. Vessel designs may be complemented with other elements depending on input technical requirements and process parameters as defined at design stage.

## Types of reactors

- Hydrotreaters
- Reformers
- Isomerization reactors, etc.

## Technical specifications

- Diameter: up to 5000 mm
- Nominal pressure: up to 20 MPa
- Wall thickness: up to 300 mm
- Design fluid temperature: up to 550°C
- Material: single metal plated with corrosion resistant material, type 08X18H10T, 08X13, or other as required by technical design
- Internals — UOP, AXENS, RIFING, etc.
- Service life — 30 years

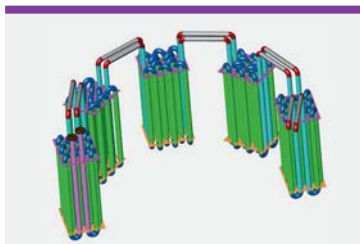
## References

- Achinsk refinery — Hydrotreater P-301B
- Ryazan oil refinery company — Hydrotreaters P-101H (201H)
- Saratov refinery — Hydrotreaters P-2H (3H)
- JSC LUKOIL — Reactor 13-R-001B
- JSC Metaprocess — Methanol synthesis reactor
- Orsknefteorgsintez — Hydrotreaters
- Kirovo-Chepetsk Chemical Plant — Catalytic purification reactor P-40 (2)
- JSC Slavneft YANOS — prereformer
- JSC LUKOIL — hydrogenation reactor

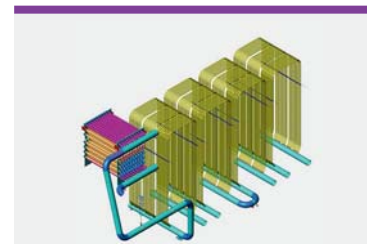
# TUBULAR FURNACES PRODUCT COILS



Convective coil



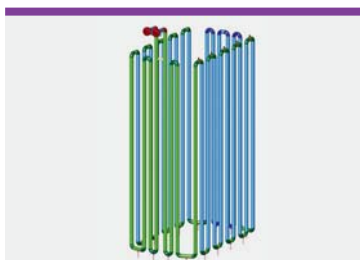
LUKOIL-Permnefteorgsintez



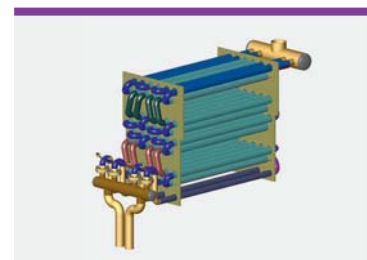
Kirishinefteorgsintez



Radiant coil

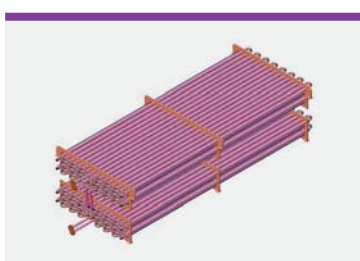


Kuybyshev refinery

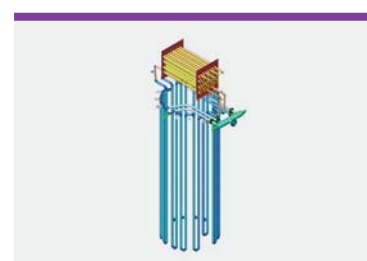


YUKOS-ACHINSK refinery

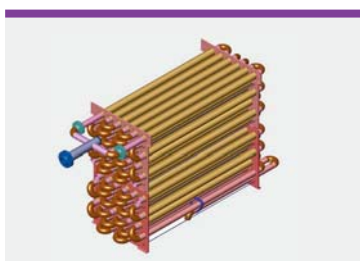
- Hydrocarbon gas steam conversion unit was manufactured for hydrogen production plant with capacity of 6 Ktons per annum (BPK-6M) for Kremenchug refinery, Equipment for JSC Surgutneftegaz
- Performed revamp of tubular furnaces at Mažeikių refinery, Lithuania
- Supplied equipment for Ryazan, Kuybyshev, Novokuybyshevsk, Yukos-Achinsk, Antipinsky refineries, Cherepovets Steel Mill, Kirishinefteorgsintez, LUKOIL-Ukhtaneftepererabotka, etc.



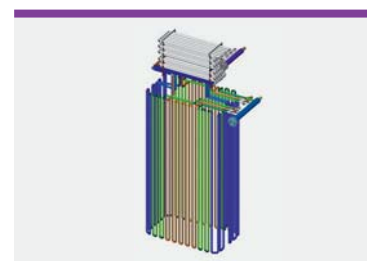
Kirishinefteorgsintez



Kirishinefteorgsintez



Novokuybyshevsk refinery



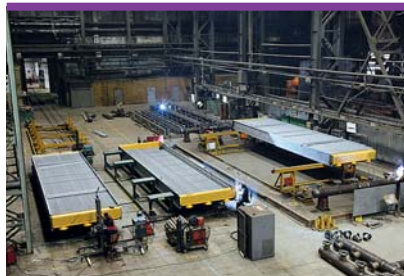
LUKOIL-Ukhtaneftepererabotka

# AIR COOLERS

Air coolers are designed for refrigeration of liquid and gaseous media heated in process cycle of different types of production. Air coolers are made for new and old production facilities during revamp. Individual heat exchange sections may be supplied.



Air coolers AVG-85MG  
(Kursk Compressor Station)



Air coolers manufacturing process



General view of feed gas air cooler

## Technical specifications

| Cooler type        | AVG-85MG | AVG-100  | AVG-120 | AVG       | 2AVG        | AVG-BM      | AVZ  | AVZD        | AVM            |
|--------------------|----------|----------|---------|-----------|-------------|-------------|--|-------------|----------------|
| Operating pressure | 8.5      | 10.0     | 12.0    | 0.6 to 16 | 0.6 to 10.0 | 0.6 to 10.0 | 0.6 to 10.0                                | 0.6 to 10.0 | 0.6 to 6.3 MPa |
| Inlet temperature  |          | 60       |         |           |             |             | 40 to 700°C                                |             |                |
| Design             | B1       | B1       | B1      |           |             |             | B1, B2, B3, B4, B5                         |             |                |
| Rib type           |          | Al knurl |         |           |             |             | Al weave, steel band weave with HF current |             |                |

Heat exchange tubes applied may have different design with welded or extruded aluminum ribs.

Feed gas air coolers with air recirculation are made for natural gas cooling after compression.

### References

JSC Gazprom compressor stations:

- Compressor station Urdoma;
- Compressor station Nuksenitsa;
- Compressor station Sindor;
- Compressor station Gryazovets;
- Compressor station Vyaznikovskaya;
- Compressor station Proskokovo;
- Compressor station KRP-16;
- Compressor station Kubanskaya;
- Compressor station Nizhneturinskaya;
- Compressor station Gorbatovka;
- Compressor station Ekaterinovka;
- Compressor station Bubnovka;
- Compressor station Pisarevka;
- Compressor station Usinskaya;
- Compressor station Intinskaya;
- Compressor station Gagaratskaya.

# DUST COLLECTORS

Dust collectors are designed for natural gas cleaning of mechanical impurities and liquid at compressor stations of trunk gas lines.



Dust collectors installed at Kholm-Zhirkovskaya compressor station



Shipment of dust collectors to Usinsk compressor station

Dust collectors are manufactured starting with year 2003. Currently, serial manufacturing of dust collectors has been established.

## References

Over 260 units were manufactured including:

- units to be installed at export pipelines «Blue Stream» (Russia-Turkey) and «Yamal-Europe»;
- dust collectors CPU-7,5B with cyclotubes by PECO for compressor stations Salskaya, Olkhovskaya and other compressor stations;
- dust collectors CPU-8,3 and CPU-10 with multi-cyclones by PROSERNAT for compressor stations Stavropolskaya Krasnodarskaya, Smolenskaya, Torhokskaya and other compressor stations;
- dust collectors GP-628 with cyclones by CKBN for compressor stations Stavropolskaya Krasnodarskaya, Smolenskaya, Torhokskaya and other compressor stations.

## Technical specifications

|  | CPU-5.4   | CPU-7.4   | CPU-8.4 | CPU-9.8   | CPU-11.8 |
|--|-----------|-----------|---------|-----------|----------|
| Design pressure  | 5.4       | 7.4       | 8.4     | 9.81      | 11.8     |
| Operating pressure   | 5.4       | 7.35      | 8.34    | 9.81      | 11.78    |
| Hydraulic test pressure  | 6.9       | 9.5       | 10.8    | 12.6      | 15.1     |
| Nominal diameter of gas inlet/outlet nozzles                             | 500–700   | 700       | 700     | 500–700   | 700      |
| Rated performance, million nm/day  | 5–20      | 20–30     | 20      | 5–30      | 30       |
| Gas purification degree for solid particles with diameter, $\mu\text{m}$ |           |           |         |           |          |
| — 5 to 10 $\mu\text{m}$  | 94%       | 94%       | 94%     | 94%       | 94%      |
| — 10 to 20 $\mu\text{m}$   | 96%       | 96%       | 96%     | 96%       | 96%      |
| — 20 $\mu\text{m}$ max   | 100%      | 100%      | 100%    | 100%      | 100%     |
| Gas purification degree for capillary liquid                             | 100%      | 100%      | 100%    | 100%      | 100%     |
| Hydraulic resistance at nominal modes, MPa max                           | 0.033     | 0.033     | 0.033   | 0.033     | 0.033    |
| Corrosion allowance, mm  | 2         | 2         | 2       | 2         | 2        |
| Weight, tons, max (without auxiliary equipment)                          | 6.8–15.3  | 18.7–20.0 | 20      | 9.2–23.4  | 31.2     |
| Hydraulic test weight, t, max  | 12.5–22.9 | 27.2–32.3 | 28.3    | 14.0–32.8 | 43.8     |



# REGENERATIVE AIR HEATERS

Tubular regenerative air heaters for gas turbine units of trunk gas line compressor stations are manufactured for replacement of plate type regenerators with expired service life.



Regenerator RVP-3600-03



Modular regenerator RVP-3000BS-01

## Types of regenerators

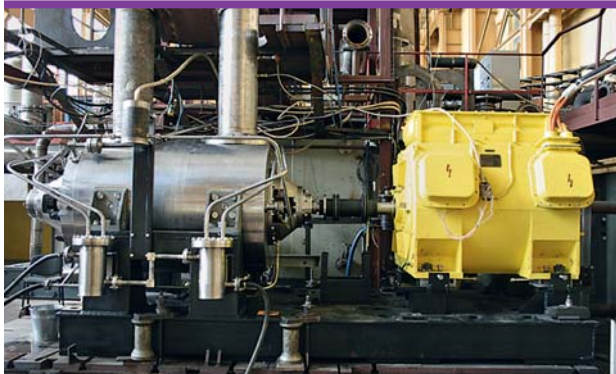
- Tubular: vertical and horizontal
  - Modular
- Regenerators are fitted with air and flue gas piping and waste heat exchangers of full flow and bypass type with different thermal capacity as agreed with customer.
  - Operation reliability and tightness of regenerators are ensured by tight pipe seating in tubesheets made with tube expanding and welding using well elaborated and verified manufacturer's technology. The quality is confirmed by many years of experience in manufacturing and operation of tubular regenerative heat exchangers.
  - Design features of regenerators and methods of their manufacturing are secured by Russian patents for utility models.

## Technical specifications

| Regenerator designation    | RVP-3600-02 (RVP-3600-01)      | RVP-2400 RVP-2400-1             | RGU-1800-01 (RGU-1800)                   | RVP-3600-03                  | RGU-1800-02 | RVP-3600-04                    | RVP-3000BC-01 (RVP-3000BC)  | RVP-3000BC-02 |
|----------------------------|--------------------------------|---------------------------------|--|------------------------------|-------------|--------------------------------|---|---------------|
| Unit type                  | GTK-10-4                       | GT-750-6<br>GT-750-6M           | GTK-10-4                                 | GTK-10-4                     | GTK-10-4    | GTK-10-4                       | GTK-10-4  | GTK-10-4      |
| Regeneration degree, $\mu$ | 0.81                           | 0.8                             | 0.73 (0.68-0.7)                          | 0.815                        | 0.73        | 0.815                          | 0.73  | 0.776         |
| Total strength ratio, %    | 4.63 (4.42)                    | 3.57 (4)                        | 5 (4.17)                                 | 5                            | 5.5         | 5                              | 5   | 4.04          |
| Weight of sections, t      | 53 (50)                        | 34 (32)                         | 23,5 (24)                                | 48                           | 23,5        | 42.7                           | 4x5.5=22<br>2x11=22<br>(4x7=28)                                   | 13.5+13=26.5  |
| Layout type                | Vert.                          | Horizont.<br>Vert.              | Horizont.                                | Vert.                        | Horizont.   | Vert.                          | Modular   |               |
| Waste heat exchanger type  | UTB-1.5-0.6 or UTB-1.5-0.6-130 | UTB-1.75-0.7 or UTB-1.2-1.2-115 | UT-1.5-0.6; UT-2.5-0.6(M); UT-1.7-1.2-11 | UTB-1.5-0.6; UTB-1.5-0.6-130 | –           | UTB-1.5-0.6 or UTB-1.5-0.6-130 | Standard waste heat exchanger or UT-2.5-0.6(M); UT-1.7-1.2-11 (–) |               |

# PUMPING EQUIPMENT

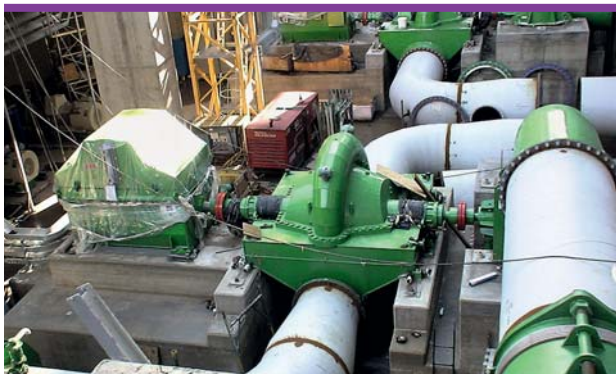
AEM companies manufacture a wide range of pumps of different design, design parameters and materials.



Multi-stage centrifugal horizontal sectional ones and ones with a double casing



Horizontal centrifugal ones with double inlet impeller with a horizontal and a vertical split



Horizontal and vertical centrifugal single-stage ones with a scroll case



Single and multiple stage centrifugal vertical semi-submersible pumps



Axial and angular-flow single-stage semisubmersible pumps with regulation system for hydraulic characteristics



Turbomolecular pumps

# TIGHT ELECTRIC PUMPS

The concept of tight electric pumps presents the most consistent approach intended to create new generation pumps to be used during pumping of explosive, flammable, toxic, aggressive liquids, liquefied gases for refining, petrochemical, chemical, gas and other industries.

## Design features

Sealing against pumped fluid escape to atmosphere is ensured by absence of shaft seal, minimum number (two) and effective sealing of housing openings, flow tight design of pump stator welded housing.



Yakeevskaya pump station for transportation of natural gas liquids equipped with tight electric pumps GEN 50/400 (JSC Tatneft)



Pump station of AVT-5 unit (gasoline production) equipped with tight electric pumps GEN 170/190 and GEN 90/100 (JSC LUKOIL-Nizhegorodnefteorgsintez)

## Model range of electric pumps being manufactured

| Pump           | Rated feed, m <sup>3</sup> /h | Rated head, m | NPSH, m, min | Design pressure, MPa | Temperature of pumped fluid, °C, max | Motor power, kW | Weight, kg |
|----------------|-------------------------------|---------------|--------------|----------------------|--------------------------------------|-----------------|------------|
| KhGN-1         | 210                           | 220           | 5            | 3.5                  | 90                                   | 300             | 4700       |
| GEN 170/190    | 170                           | 170           | 4            | 3                    | 180                                  | 120             | 3900       |
| GEN 60/150     | 60                            | 165           | 2            | 3                    | 350                                  | 120             | 3900       |
| GEN 80/220M    | 80                            | 220           | 2            | 3                    | 350                                  | 120             | 3900       |
| GEN 50/400     | 50                            | 400           | 3            | 4                    | 90                                   | 120             | 3500       |
| GEN 400/170    | 400                           | 170           | 5            | 4                    | -30...+50                            | 300             | 3200       |
| GEN 50/125-02  | 50                            | 125           | 3            | 4                    | -30...+50                            | 44              | 900        |
| GEN 50/125-03  | 50                            | 150           | 3            | 4                    | 20                                   | 44              | 900        |
| GEN 50/125-04  | 50                            | 100           | 3            | 4                    | -30...+50                            | 44              | 900        |
| GEN 100/80     | 100                           | 80            | 4            | 4                    | 20                                   | 44              | 900        |
| GEN 100/80-01  | 100                           | 70            | 4            | 4                    | 20                                   | 44              | 900        |
| GEN 50/250     | 50                            | 250           | 3            | 4                    | 20                                   | 65              | 1300       |
| GEN 50/250-01  | 50                            | 270           | 3            | 4                    | -30...+50                            | 65              | 1300       |
| GEN 50/250-02  | 50                            | 300           | 3            | 4                    | 20                                   | 65              | 1300       |
| GEN 100/500    | 100                           | 500           | 3            | 4                    | 20                                   | 300             | 3200       |
| GEN 50/125-01  | 50                            | 125           | 3            | 4                    | 50                                   | 44              | 1100       |
| GEN 90/100-01  | 100                           | 100           | 3            | 4                    | 50                                   | 44              | 1100       |
| GEN 130/60-01  | 130                           | 60            | 4            | 4                    | 50                                   | 44              | 1100       |
| GEN 170/190-01 | 170                           | 200           | 4            | 4                    | 50                                   | 120             | 4170       |
| GEN 170/190-03 | 170                           | 140           | 4            | 4                    | 50                                   | 120             | 4170       |
| GEN 50/50      | 50                            | 50            | 3            | 2.5                  | 50                                   | 22              | 620        |
| GEN 25/80      | 25                            | 80            | 3            | 2.5                  | 50                                   | 22              | 620        |
| GEN 50/50-01   | 50                            | 50            | 3            | 2.5                  | 350                                  | 22              | 1000       |
| GEN 25/80-01   | 25                            | 80            | 3            | 2.5                  | 350                                  | 22              | 1000       |
| GEN 10/40      | 12                            | 45            | 2            | 2.5                  | 90                                   | 5               | 170        |

## Service life

- Assigned service life (without dismantling or repair) — 40000 h.
- Assigned service life — 10 years
- Continuous operation — 2-5 years

# TRUNK OIL PUMPS

## NMM SPLIT CASING SERIES



Centrifugal split casing pumps for trunk oil lines are intended for supply of oil products via trunk oil product lines. Serial production and servicing of trunk pumps is performed by subsidiaries JSC Atomenergomash jointly with developer, JSC Gidromash-Holding.

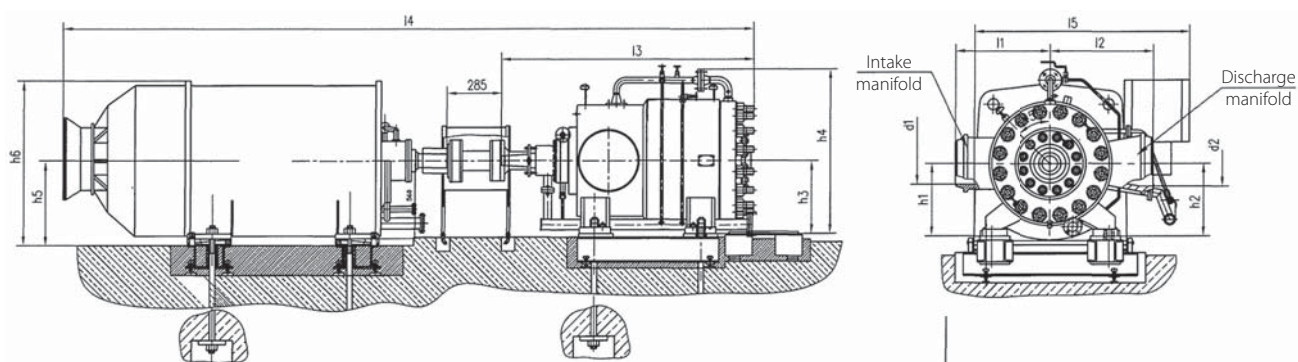
**Capacity:** 125–1250 m<sup>3</sup>/hr

**Head:** 280–800 m

### The pumps are based on fundamentally new technical solutions:

- radial forces are perceived with friction bearing integrated in pump housing lubricated by the fluid being pumped, which prevents use of expensive oil unit, reduces the vibration level and loss of friction;
- rotor axial forces are offset by hydraulic balancing device that ensures stable operation of the pump within operating curve and reduces volume losses;
- primary helical wheel increasing NPSH to minus 2 m, thus allowing operation without booster pumps;
- sealing self aligning rings reduce volume losses;
- rotor end seals with additional protection chamber ensure reliable protection in case of emergencies;
- intrinsically safe disc coupling increases operation stability and pump durability.

- Pump design is patented.
- Pilot model of pump NMM 1250–400–2UKhL(4) is operated by JSC AK Transneftproduct since 2008.



Dimensional drawing of type ANMM1250-400-2(1) units with 4AZMV motors

# TRUNK OIL PUMPS

## SERIES NMM UNIFIED RANGE

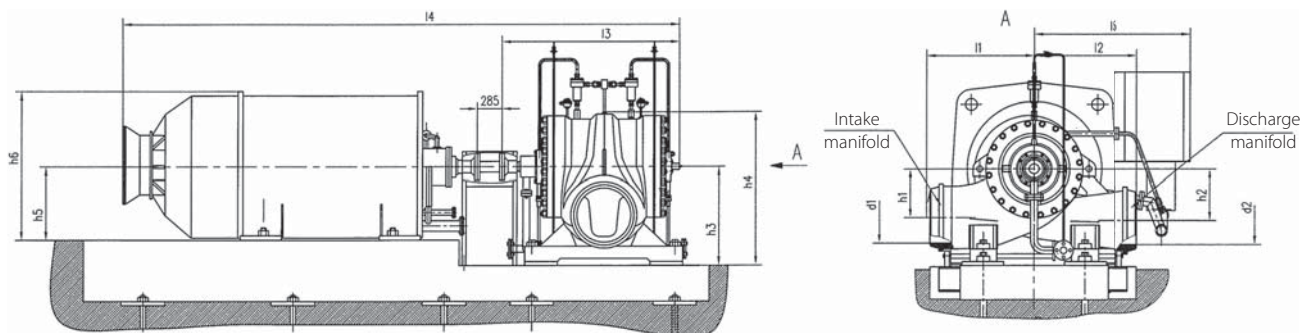


Horizontal single stage motors with double inlet impeller, helical liquid inlet and outlet are designed for oil and oil product pumping. Serial production and servicing of trunk pumps is performed by subsidiaries JSC Atomenergomash jointly with developer, JSC Gidromash-Holding.

### The pump design is based on fundamentally new highly effective scientific and technical solutions:

- new type of integrated friction bearing lubricated and cooled by pumped fluid, which prevents using complex and expensive oil unit and reduces vibration level;
- change of housing opening plane from horizontal to vertical increases housing rigidity and pump maintainability;
- hydraulic units balancing the axial loads ensure stable operation of pump in the whole pump curve range;
- sealing self aligning slot rings reduce volume losses;
- rotor shaft end seals with additional protection chamber ensure reliable protection in case of emergencies;
- intrinsically safe disc coupling increases pump operation stability and durability.

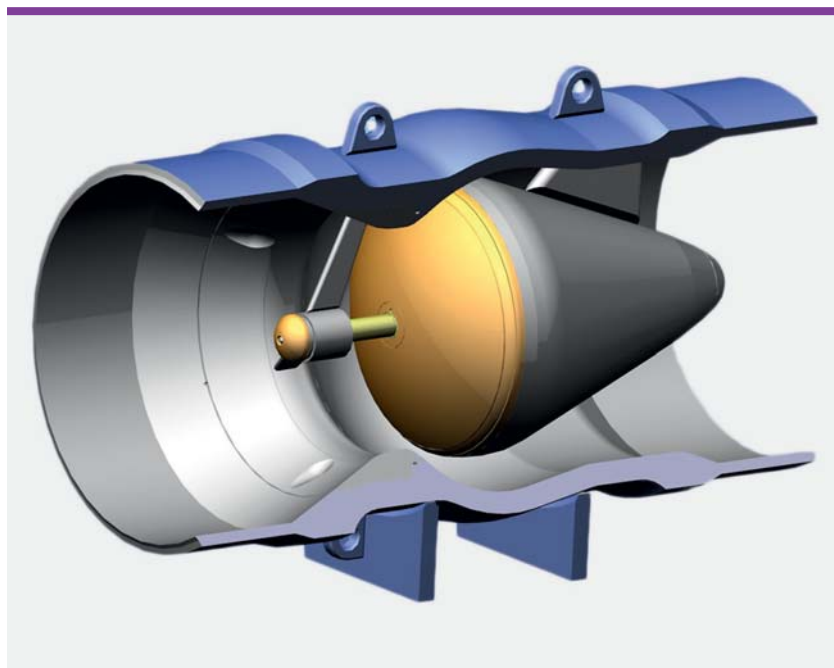
- Pumps are operated by JSC AK Transneftproduct and get serially manufactured and serviced.



Dimensional drawing of horizontal single stage pump with double sided impeller

# NON-RETURN VALVES FOR GAS LINES

DN 300—1400 non-return valves with PN 6.3—16.0 MPa are applied in pipeline systems as non-controllable automatic protection devices and are intended to prevent backflow of natural, oil and synthetic gases in the areas of their production, processing and storage.



DN 800 non-return valve housing before machining

## Operation stability

The valves smoothly react to pressure change. The design with auxiliary spring ensures quick and smooth closure and easy opening at pressure drop of 0.01 MPa.

|                           |  |
|---------------------------|--|
| Application               | Protection of trunk gas lines, compressors and pumps against work fluid backflow |
| PN nominal pressure range | 8 to 16 MPa  |
| DN nominal diameter range | 100 to 1400 mm   |
| Shutoff classes           | A, G per GOST R 54808-2011   |

## Manufacturability

Stable manufacturing process and monitoring system at all stages from design to final issue of products.

## Structural simplicity

Structural simplicity ensures reliability of operation throughout the whole service life. The valves are repairable, restorable items with regulated restoration discipline.

## Design features

The valves are fitted with adapter spools, which allows their installation on pipelines without additional heat treatment.

## Low hydraulic losses

Valve body fitted with Venturi nozzle ensures low hydraulic resistance and absence of turbulence, which prevents erosive wear and vibration and ultimately reduces pump and compressor operation costs and maintenance costs.

# SLIDE GATES FOR OIL PIPELINES

The branch has experience of serial manufacturing of slide gates for trunk oil pipelines. DN 700—1200 mm slide gates with pressure range of PN 6.3—12.5 MPa are applied as isolation device to stop working fluid flow in linear part of trunk oil pipelines.



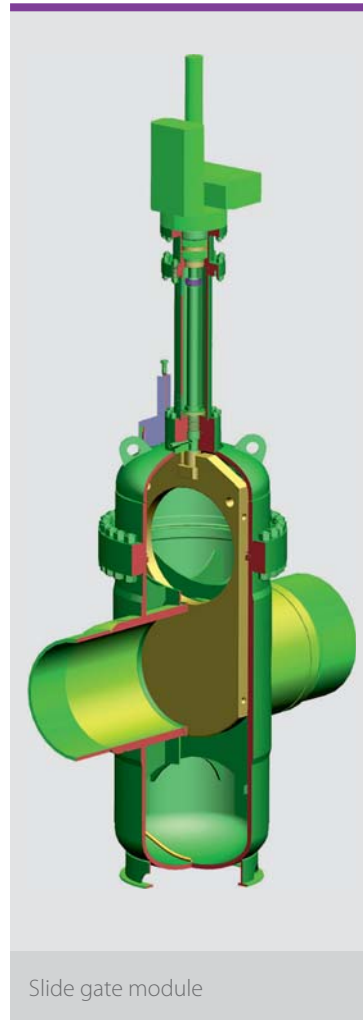
## Working fluid:

crude oil with density from 700 to 920 kg/m<sup>3</sup>, viscosity from 0.05 to 1.0 cm<sup>3</sup>/sec, (total) sulfur content 5% by weight maximum, wax 7% by weight maximum, H<sub>2</sub>S content 20.0 mg/l max, salts 20 to 330 mg/l, impurities (cross size up to 2 mm) — 0.06% max.



Gate and seat design ensure gate tightness class A in pressure range up to PN.

The company has certified quality management system in IQnet system according to requirements of ISO 9001:2008 international standard.



In order to ensure protection against overpressure in valve body, seat design ensures automatic pressure release from valve body cavity.

Overpressure exceeding the upstream pipeline pressure overcomes the force holding the seat against the gate and moves away from shutoff element.

# WATER TREATMENT AND WATER PURIFICATION



## Specialization as per Water Treatment Technologies

### VNIAM



### SVERDNIKHIMMASH

#### Ion-exchanging Technologies:

- Counter flow and parallel flow ionization of water in filters

#### Diaphragm Technologies:

- Reverse osmosis;
- Nanofiltration;
- Ultrafiltration;
- Electric deionization.

#### Thermal Technologies:

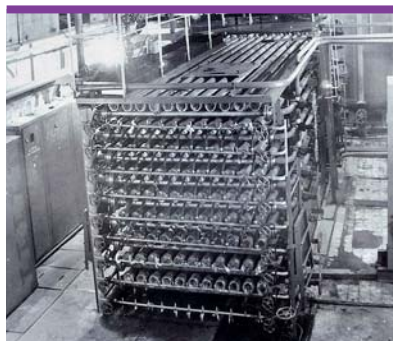
- Evaporators;
- Evaporator vessels;
- Distilling desalination units.

## Products and Technologies

- JSC Tatneft: In 2010 turn-key delivery of automated water treatment plant for fine desalination of surface water and purification of fuel oil contaminated condensates of petrochemical facilities of Taneko JSC
- JSC Taif: Implementation in 2014-2018, development and stage by stage delivery of purification system for oil containing condensates to Nizhnekamskneftekhim OJSC

## References

- Purification of associated formation waters ( $\text{æ} \leq 1.0 \mu\text{S}/\text{cm}$ );
- Producing desalinated water for power plants in oil and gas industry ( $\text{æ} \leq 0.2 \mu\text{S}/\text{cm}$ );
- Water desalination systems, including potable water supply (SanPiN);
- Trapping radioactive elements.



In 1989, All-Russian Research and Design Institute for Atomic Power Engineering developed the first in the USSR industrial reverse osmosis plant ROP-50 (Russian: YOO-50) with capacity of 50m<sup>3</sup>/h for Zuyevskaya Experimental Combined Heat and Power Plant



OJSC Nizhnekamskneftekhim: Purification system for oil containing condensates, capacity 800 m<sup>3</sup>/h, TOC  $\leq 200 \mu\text{g}/\text{dm}^3$



Tatneft petrochemical plants, JSC Taneko: Water treatment for fine desalination of water, capacity 1,000 m<sup>3</sup>/h



JSC LUKOIL-Komi: Formation waters purification with capacity 700 m<sup>3</sup>/h,  $\text{æ} \leq 1.0 \mu\text{S}$



JSC Sibur-Khimprom: Water treatment for desalination, capacity 700 m<sup>3</sup>/h,  $\text{æ} \leq 0.2 \mu\text{S}$



# NEW MATERIALS, WELDING AND COATING TECHNOLOGIES



Engineering subdivision for development of new materials, welding and coating technology is presented by scientific center RF CNIITMASH. CNIITMASH established in 1929 was at the origin of Russian engineering industry. The scientific and production unit combines 5 specialized engineering centers (metallurgy and engineering industry institute, surface technology and nanomaterials institute, welding and monitoring institute, metal non-destructive testing institute), experimental production, test and certification centers, post graduate programs and dissertation committees.

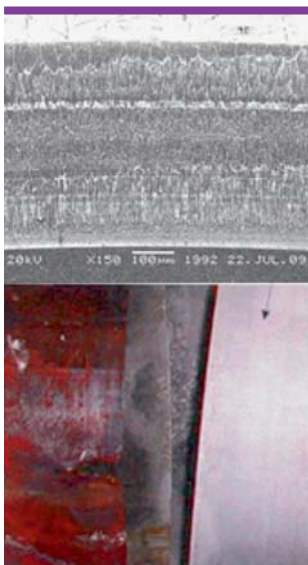
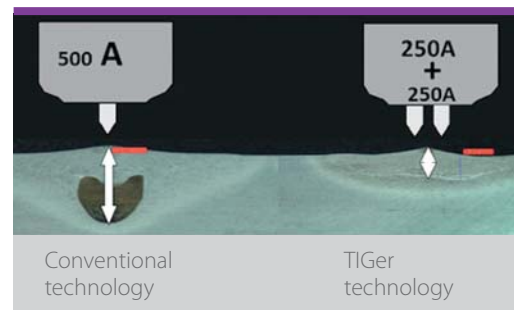
## Spheres of competence and engineering

- Stable manufacturing process and monitoring system at all stages from design to final issue of products
- Development of new structural materials
- Metallurgy technologies
- Casting technologies
- Pressure forming
- Welding technologies
- Cold working
- Non-destructive examination
- Strength, residual life and other analyses
- Computer aided modeling of processes
- Development and manufacturing of non-standard equipment
- Project engineering
- Certification of non-destructive and destructive testing laboratories

## New highly efficient welding technologies and welding materials

### Welding using TIGer technology:

- Highest plating quality as for traditional process;
- Low pressure makes high welding speeds possible even with high current;
- Non-symmetric arc and welding bath forming.



## New types of protective high performance coatings. Equipment and materials for their application.

**Structural coatings:** single layer, multi layer, nano layer, nano-structured.

**Components:** Multi-component alloys, gradient alloys with borium.

**Wear resistant and protective coatings:** single layer, multi layer. Components: TiN, TiAlN, TiCN, CrN, diamond like coatings (DLC), AlTiN+DLC.

**Erosion resistant coatings:** single layer, multi layer.

**Components:** Ti, TiN.

**Corrosion resistant coatings:** single layer, multi layer, gradient.

**Components:** EP302 type alloys on sub-layer of alloy type 10Kh9MFBS, non-crystalline iron, nano-structural pure iron ( $\alpha$ -Fe).

**Ceramic coatings:** single layer, multi layer.

**Components:**  $ZrO_2+Y_2O_3$ ,  $Al_2O_3$ , AlN.

# SHUTOFF AND CONTROL VALVES

Shutoff and control valves by Czech company Arako are intended for usage in oil and gas industry. The valves are manufactured according to the standards ČSN, DIN, EN, ANSI. The product range of the company includes the valves made of carbon, alloyed and stainless steels. Product range of the company comprises stop and check valves, bellows valves, quick-action valves, filters, drain and blow down valves, gate valves, check valves, ball valves.

|   |   |   |   |   |   |  |   |   |   |
|---|---|---|---|---|---|--|---|---|---|
|  |  |  |  |  |  |  |  |  |  |
| Gate valves   | Shutoff and control valves  |   |   | Drain and blow down valves  | Check valves  |  | Check gate valves   | Ball valves   | Filters   |

|                                   | High pressure gate valves | Low pressure gate valves   | Shutoff and control valves and bellows valves                                | High pressure shutoff valves   | Drain and blow down valves   | Check valves   | Check gate valves  | Ball valves   | Filters |
|-----------------------------------|---------------------------|--|--|--|--|--|--|---|---------|
| DN                                | 50–350                    | 40–500   | 15–200   | 10–150   | 10–50  | 10–200   | 50–400   | 10–150  | 10–150  |
| PN                                | 160–500                   | 10(6)–100  | 10–40  | 63–630   | 63–500   | 10–630   | 10–630   |   | 10–160  |
| Minimum operating temperature, °C | –50                       | –105   | (–196)–50  | –196   | (–196)–10  | –196   | –105   | –196  | –196    |
| Maximum operation temperature, °C | 600                       | 540  | 400  | 650  | 580  | 600  | 540  | 200   | 550     |
| Application                       | Gas, water etc.           | Gas, steam, water, oil, oil products, corrosive and non-corrosive media etc. | Gas, steam, water, oil, oil products, corrosive and non-corrosive media etc. | Gas, steam, water, oil, oil products, corrosive and non-corrosive media etc. | Steam, waste water, gas, steam, water, oil, oil products, corrosive and non-corrosive media etc. | Gas, steam, water, oil, oil products, corrosive and non-corrosive media etc. | Gas, steam, water, oil, oil products, corrosive and non-corrosive media etc. | Gas, water, oil, oil products, corrosive and non-corrosive media etc. |         |

## References


- Shell & DEA Oil GmbH, Germany
- OMV AG, Austria
- SLOVNAFT a.s., Slovakia
- OJSC NAFTAN, Belarus
- Mažeikui Nafta, Latvia
- Siemens AG, Germany
- ČEZ a.s., Czech Republic

The main requirement for products supply to European markets is AD 2000-Merkblatt HP 0 / HP 100 R, TRD 201, AD 2000-Merkblatt A4 and EN ISO 3834-2 certification. «Fire Safe» or Ta-Luft version of valves is supplied for customers in this region.



# PIPELINE CONNECTING ACCESSORIES

Pipeline connecting accessories are intended for tight connections, changing directions, branches with pressure variation and closure of pipelines. The accessories are intended for climatic areas with moderate and cold climate (t: –20 to –60°C). Transporting medium (natural gas, oil): non-corrosive and corrosive with H<sub>2</sub>S content.

|   |   |   |   |
|---|---|---|---|
|    |    |   |    |
| Weldolet BT<br>TU 1469-005-58154529-2011  | Branch pipe PT<br>TU 1469-005-58154529-2011   | Elbow OG<br>TU 1469-005-58154529-2011<br>TU 1469-001-58154529-07                    | Adapter PTK<br>TU 1469-005-58154529-2011  |
|   |   |  |   |
| Blind ZT<br>TU 1469-005-58154529-2011<br>Bottom D<br>TU 1469-002-58154529-07        | Tee TT<br>TU 1469-005-58154529-2011   | Angle UT<br>TU 1469-005-58154529-2011   | Obturator ring OT<br>TU 1469-005-58154529-2011  |
|  |  |  |  |
| Blind flange ZTF<br>TU 1469-005-58154529-2011                                       | Oval gasket POT<br>TU 1469-005-58154529-2011  | Nozzle IN<br>TU 1469-005-58154529-2011  | Flange FT<br>TU 1469-005-58154529-2011  |

Quality management system is confirmed to comply with requirements of ISO 9001:2008, Gazprom Company Standard 9001:9012, Russian regulations conformance certificates.

Technical specifications have been developed jointly with LLC Gazprom VNIIGAZ with relevant technical expert review of production status. Pipeline connecting accessories have been entered in the register of piping products of JSC Gazprom.

## References

Pipeline connecting accessories supplies for JSC Gazprom:

- Kirinsk gas condensate field, Orenburg gas condensate field, Yamburg gas condensate field;
- Urengoy field, Port Local Gas Line Management Division (Vyborg);
- Trunk gas line Bovanankovo-Ukhta, Trunk gas line Ukhta-Torzhok;
- North-European gas line and many others.

# AUXILIARY EQUIPMENT



## Fuel, pilot, pulse gas conditioning plants

These plants are intended for conditioning:

- fuel gas for gas turbine engines, gas pumping units;
- pilot gas for gas turbine engines;
- pulse gas for control over air actuated valves of compressor station;
- auxiliary fuel gas for compressor station and camp.

These plants are supplied completely ready for operation. They are transported with any type of transport. Based on customer's request, fuel, pilot and pulse gas conditioning plants may include local control system based on programmable controller that may communicate with local control system of compressor station for transmission of information and reception of control commands..



## Motor fuel production plants

These plants are designed for conversion of stable gas condensate and oil into diesel fuel, and gasoline and boiler fuel fractions. They represent the main process module of engine fuel production complex. Feedstock is separated

using rectification method. Process equipment intended for operation in Extreme North is placed in a heated box (UMT-5, UMT-15), equipment for moderate climate regions is supplied without it (UMT-25).

The plants were supplied to Novy Urengoy, Norilsk, Naryan-Mar, Stavropol Region.



## Automated modular gas metering stations

Automated modular gas metering stations are equipped with:

- quick change orifices;
- metering tubes;

- multiple measurement microprocessor complexes «Superflow II E»;
- chromatograph;
- moisture meter;
- density meter;
- local control systems for life support and valve remote control.



## Quick change orifices

Quick change orifices are designed to create gas pressure drop at diaphragm and are installed in trunk gas lines. They allow increasing accuracy of volumetric flow rate measurements due to regular monitoring of measurement diaphragms and reducing labor intensity of works.

Quick change orifices are fitted with device for easy lifting of diaphragm (DN300 or more).

Manufacturing options: removable (flanged) and weldable. Operating temperature — up to — 60 °C.

Service life — at least 20 years.

Quick change orifices have been supplied to JSC Gazprom enterprises including Mostrans-gaz, Permtransgaz, Volgograd-transgaz, etc..

# BOILER EQUIPMENT

The Company has a great experience in designing and manufacturing boiler equipment for heat power engineering. The main products are steam boilers for power units with capacity from 50 to 800 MW and heat recovery steam generators (HRSG) for state-of-the-art CCGTs with capacity from 2.5 to 450 MW.

## TYPES OF MANUFACTURED EQUIPMENT

### Steam Boilers

They are intended for generation of process steam or operation within power sources at oil and gas industry plants.

During designing burner units of steam and hot water boilers for gas and petrochemical plants, combustion of different kinds of fuel (associated gases, oil processing waste products, etc.) is provided as per the agreement with the customer.

### Hot Water Boilers

Modern gas and fuel oil fired hot water boilers are designed and

manufactured with capacity of 70 and 120 Gkal/h. The boilers are manufactured in gas leak-proof design of all-welded panels with tower-type arrangement of heating surface, delivered complete with auxiliary equipment, including valves of gas-air ducts, blowdown fans, noise suppressors, and fume stacks.

### Heat Recovery Steam Generators

We offer complete recovery units, including HRSGs with inlet and outlet gas ducts and fume stacks, auxiliary equipment, including

blowdown expanders, deaerators within low pressure drum, station pipelines, water-water heat-exchangers, feed and circulation pumps, non-metallic condensers, after-burning units etc.

### Hot Water HRSGs

There are hot water HRSGs for gas turbines with capacity from 6 to 45 MW. In water heating HRSGs of such series there is a possibility to regulate the output heat rate with saving nominal electric load of gas turbine plant. Regulation of the heat rate is achieved due to tight gas valves of own design.

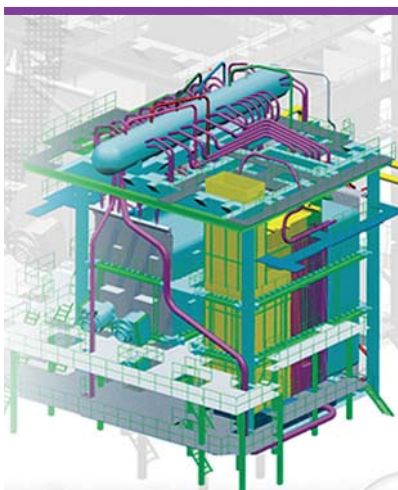


Diagram of boiler P-95 (E-160-4,0-440G) for GES-1 of Mosenergo



Installation of boiler P-92 for PO NAFTAN



KUV-13,0/150 for GTD-6RM for Regional Heating Station Kuryanovo

# CONSTRUCTION AND INSTALLATION WORKS

AEM performs construction & installation and repair works for oil and gas and power engineering enterprises. During the period of its activity at oil and gas piping transport construction market, the company proved itself as a reliable partner, stable in performing its liabilities for the customers.

## Main Types of the Performed Works:

- general contractor functions;
- construction, reconstruction and overhaul of process pipelines;
- construction at well pads after drilling, reconstruction of well pads;
- construction, reconstruction and overhaul of automated process control systems;
- installation of production equipment;
- installation of utility systems and lines;
- instrumentation for the sites of treatment and oil and gas production;
- process equipment installation.

Construction and installation companies of AEM are equipped with all necessary production means, advanced equipment and technologies including:

- lifting and transport means;
- metal cutting, grinding and sheet bending machines;
- press and welding equipment;
- tooling and accessories.

## Key Projects

- Reftinskaya GRES
- Troitskaya GRES
- Sredneuralskaya GRES
- Ikryanskoye gold deposit
- Urnskoye field
- Ust-Tegusskoye field
- Processing enterprises



Construction and installation works. Troitskaya GRES



Deepening of underground tanks. Urnskoye field



Construction and installation works. Urnskoye field



Tank equipment installation. Urnskoye field



Construction and installation works. Reftinskaya GRES

# COMPANIES OF ATOMENERGOMASH GROUP



## 1 Moscow, Russia

### CNIITMASH

Telephone: +7-495-675-83-02  
Website: [www.cniitmash.ru](http://www.cniitmash.ru)  
E-mail: [cniitmash@cniitmash.ru](mailto:cniitmash@cniitmash.ru)

### GSPI

Telephone: +7-495-988-80-50  
Website: [www.aoagspi.ru](http://www.aoagspi.ru)  
E-mail: [info@aoagspi.ru](mailto:info@aoagspi.ru)

### VNIIAM

Telephone: +7-495-748-86-54  
Website: [www.vniiam.ru](http://www.vniiam.ru)  
E-mail: [mail@vniiam.ru](mailto:mail@vniiam.ru)

### SNIIIP

Telephone: +7-499-198-97-64  
Website: [www.sniip.ru](http://www.sniip.ru)  
E-mail: [info@sniip.ru](mailto:info@sniip.ru)

### EMKO

Telephone: +7-495-789-97-15  
E-mail: [emko@aem-group.ru](mailto:emko@aem-group.ru)

### Atomtruboprovodmontazh

Telephone: +7-495-540-10-86  
Website: [www.atom-tm.ru](http://www.atom-tm.ru)  
E-mail: [atom@dol.ru](mailto:atom@dol.ru)

### Neftegazspecstroy

Telephone: +7-495-971-98-91  
Website: [nfss-itd.ru](http://nfss-itd.ru)  
E-mail: [info@ngss-ltd.ru](mailto:info@ngss-ltd.ru)

### IFTP

Telephone: +7-496-216-27-89  
Website: [www.iftp.ru](http://www.iftp.ru)  
E-mail: [iftp@dubna.ru](mailto:iftp@dubna.ru)

## 2 Kramatorsk, Ukraine

### Energomashpetsstal

Telephone: +38-062-646-01-32  
Website: [www.emss.ua](http://www.emss.ua)  
E-mail: [kants@emss.dn.ua](mailto:kants@emss.dn.ua)

## 3 Podolsk, Russia

### OKB GIDROPRESS

Telephone: +7-495-502-79-10  
Website: [www.gidropress.podolsk.ru](http://www.gidropress.podolsk.ru)  
E-mail: [grpress@grpress.podolsk.ru](mailto:grpress@grpress.podolsk.ru)

### ZIO-PODOLSK

Telephone: +7-495-747-10-25  
Website: [www.aozio.ru](http://www.aozio.ru)  
E-mail: [kd@eatom.ru](mailto:kd@eatom.ru)

### ZIOMAR

Telephone: +7-495-747-10-17  
Website: [www.aozio.ru](http://www.aozio.ru)  
E-mail: [kd@eatom.ru](mailto:kd@eatom.ru)

## 4 Nizhny Novgorod, Russia

### OKBM Afrikantov

Telephone: +7-831-241-87-72  
Website: [www.okbm.nnov.ru](http://www.okbm.nnov.ru)  
E-mail: [okbm@okbm.nnov.ru](mailto:okbm@okbm.nnov.ru)

## 5 Nizhnyaya Tura, Russia

### Venta

Telephone: +7-343-422-30-20  
Website: [www.venta-nt.ru](http://www.venta-nt.ru)  
E-mail: [venta@venta-nt.ru](mailto:venta@venta-nt.ru)

## 6 Saint Petersburg, Russia

### CKBM

Telephone: +7-812-676-63-63  
Website: [www.ckbm.ru](http://www.ckbm.ru)  
E-mail: [postbox@ckbm.ru](mailto:postbox@ckbm.ru)

## AEM Technologies

Telephone/fax: +7-812-457-05-88  
Website: [www.aemtech.ru](http://www.aemtech.ru)  
E-mail: [info@aemt.su](mailto:info@aemt.su)

## 7 Yekaterinburg, Russia

### SverdNIIhimmash

Telephone: +7-343-263-90-91  
Website: [www.sverd.ru](http://www.sverd.ru)  
E-mail: [niihm@ural.ru](mailto:niihm@ural.ru)

## 8 Petrozavodsk, Russia

### AEM-technology, branch «Petrozavodskmash»

Telephone: +7-814-271-69-20  
Website: [www.pzm.su](http://www.pzm.su)  
E-mail: [info@pzm.su](mailto:info@pzm.su)

## 9 Opava, Czech Republic

### ARAKO spol. s.r.o.

Telephone: +420-553-694-111  
Website: [www.arako.cz](http://www.arako.cz)  
E-mail: [arako@arako.cz](mailto:arako@arako.cz)

## 10 Volgodonsk, Russia

### AEM-technology, branch «Atomash»

Telephone: +7-863-929-20-79  
Website: [www.atommash.ru](http://www.atommash.ru)  
E-mail: [office@atommash.ru](mailto:office@atommash.ru)

## 11 Budapest, Hungary

### Ganz EEM LLC

Telephone: +36-1-872-58-00  
Website: [www.ganz-eem.com](http://www.ganz-eem.com)  
E-mail: [info@ganz-eem.com](mailto:info@ganz-eem.com)

**ATOMENERGOMASH JSC**  
**Nuclear and Power Engineering**

Address: 28/3 Ozerkovskaya nab., Moscow, 115184

Telephone: +7(495) 668-20-93

Fax: +7(495) 668-20-95

Website: [www.aem-group.ru](http://www.aem-group.ru)

E-mail: [aem@aem-group.ru](mailto:aem@aem-group.ru)