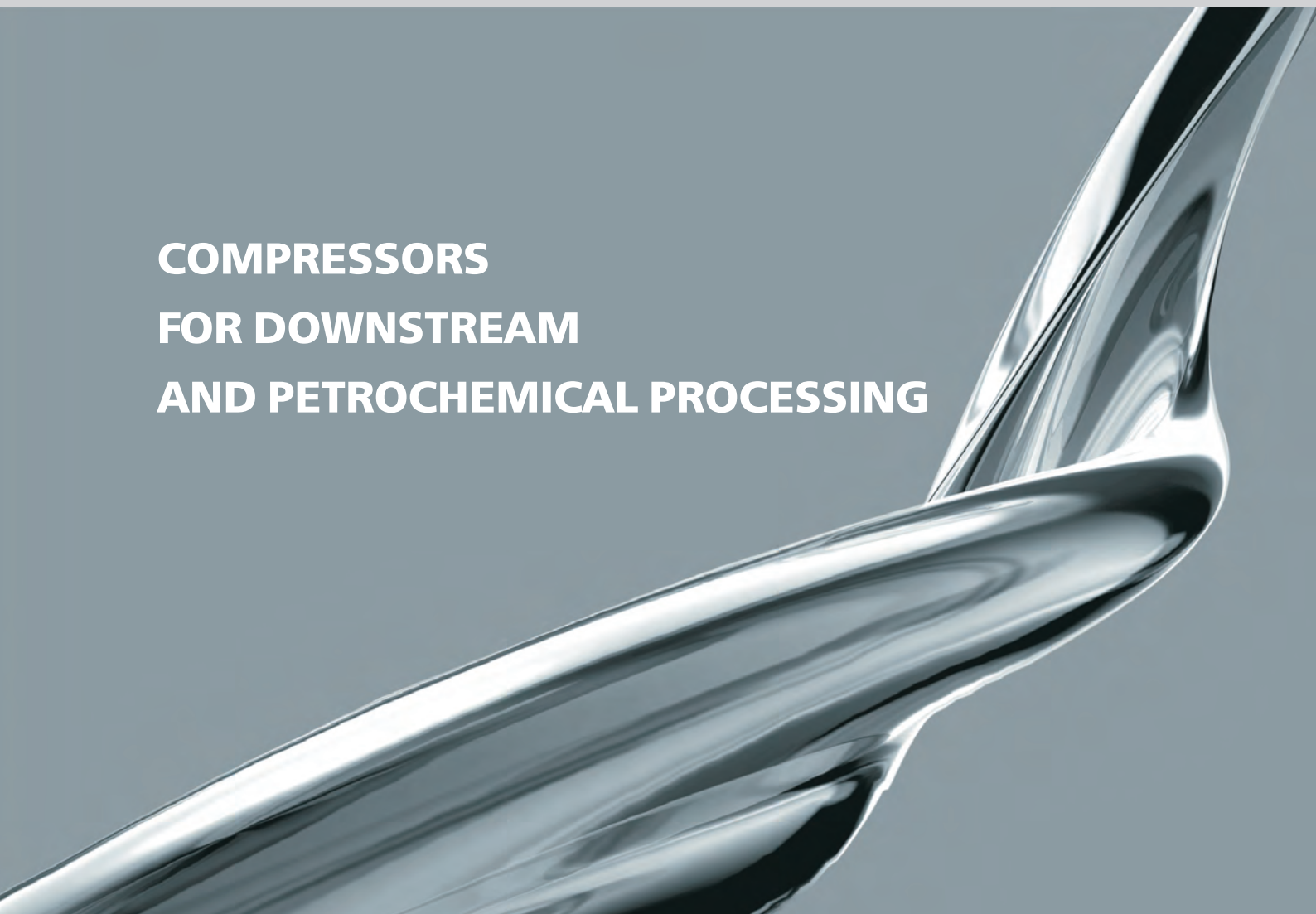




**KAZANCOMPRESSORMASH**



**COMPRESSORS  
FOR DOWNSTREAM  
AND PETROCHEMICAL PROCESSING**



# HMS GROUP IS ONE OF THE LEADING MANUFACTURERS AND INTEGRATED SOLUTIONS PROVIDERS FOR OIL & GAS INDUSTRY IN RUSSIA AND CIS



## KEY FACTS AND FIGURES

- Founded in 1993
- One of the leading in Russia and CIS manufacturers of equipment and provider of integrated solutions for oil & gas, nuclear & thermal energy, water & utilities
- Manufacturing facilities in Russia, Belarus, Ukraine and Germany
- Over 16 500 employees

## R&D AND STANDARDS

The R&D infrastructure is represented by the six centrally managed R&D centers in Russia, CIS and Europe where the latest versions of engineering software and simulation methods are used including 3D modeling.

The equipment is manufactured in accordance with international standards as ISO, API, DIN, ANSI, NORSOK and can be tailored to the customer specification.

## WORLDWIDE ACTIVITIES

Equipment supply, commissioning and after sales service including complex EPC projects in Russia, Europe, Iraq, Indonesia, India, China, USA and other countries.

## MAIN BUSINESS ACTIVITIES IN OIL & GAS

- PUMPS
  - Pumps, pump packages, and pumping stations for upstream (including offshore), midstream and downstream applications
- COMPRESSORS
  - Compressor systems, gas transportation units and complete compressor stations
- OILFIELD EQUIPMENT
  - Skid-mounted & modular equipment for production stimulation; recovery increase; well works; repair, insulation and hydraulic fracturing
  - Tanks, pressure vessels, separators and heat exchangers
  - Flow meters and systems for oil, gas and water
  - Oil & gas equipment repair and maintenance
- FACILITIES ENGINEERING
  - Oil & gas field facilities engineering and construction
  - Complex supplies of integrated systems and units

# **KAZANCOMPRESSORMASH (HMS GROUP) IS A MAJOR COMPRESSOR EQUIPMENT ENGINEERING AND MANUFACTURING COMPANY**



**KAZANCOMPRESSORMASH** is a manufacturer of compressors, compressor systems and complete compressor stations as well as the integrated solutions provider for oil & gas industry.

Kazancompressormash today:

- Over 60 years of experience
- A wide range of high efficiency compressor equipment
- Unique capabilities to manufacture compressors for variable composition hydrocarbon gases, toxic, corrosive and explosive gases
- Testing facilities of assembled units with 35 stands
- Cooperation with major R&D company
- Customized and integrated compressor solutions including packaging, process and auxiliary equipment supply
- Over 2000 compressor units supplied to downstream and chemical processing applications

## **DOWNSTREAM APPLICATIONS:**

- Hydrocarbon gases primary distillation units, conversion and refining
- Hydrogen gas compression for hydro treating, hydro cracking, isomerization, etc.
- Nitrogen and air compression in cracking units, sulfur recovery and other processes
- Hydrocarbon gas utilization
- Gases and liquids cooling (refrigeration units)

## **PETROCHEMICAL APPLICATIONS**

- Compression of hydrocarbon gases of various compositions at input and output of petrochemical processes
- Compression of air, helium, nitrogen, xenon, argon, chlorine, methyl chloride vapor
- Gases and liquids cooling (refrigeration units)

**Kazancompressormash has international experience in equipment supply, commissioning and after sales servicing in Europe, Tajikistan, Uzbekistan, Turkmenistan, Iraq, China, India and other countries.**

## COMPANY PROFILE



### RESEARCH & DEVELOPMENT

Engineering of compressors and complete solutions on their base is performed by the specialists of NIIturbokompressor – a foremost R&D center in Russia and CIS, situated in Kazan.

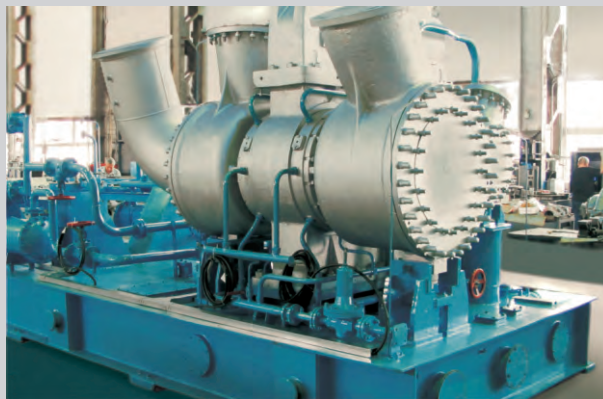
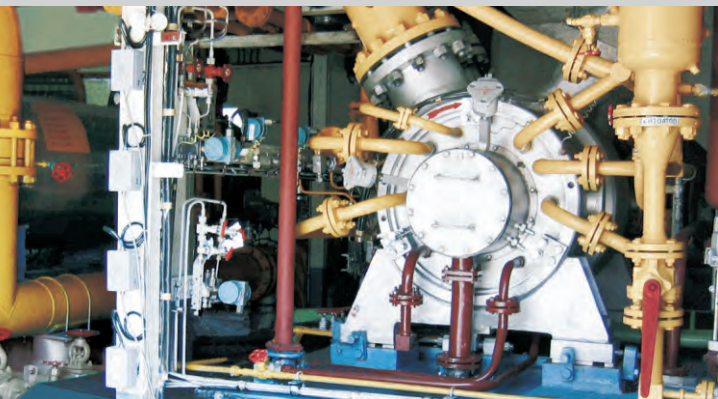
A team of experienced industrial designers in a combination with up-to-date technological infrastructure ensure a high level of the projects. A systematic approach to design allows to find and realize the most efficient technical solutions:

- Highly qualified personnel
- Newest gas dynamic simulation methods
- Systemic approach in engineering by unification and modularity
- Original design and up-to-date solutions (dry gas seals, magnetically suspended rotors, etc.)
- Factory and on-site tests in actual operation conditions for mechanical parts and gas dynamics
- On-site diagnostics and acoustic analysis according to ISO and API requirements

### MANUFACTURE AND TESTS

- Up-to-date equipment, machines, and tools in manufacturing processes
- High quality components
- Cooperation with international manufacturers
- Quality control at all production stages
- One of largest in Europe testing facility of 35 stands
- Supply of compressors with confirmed parameters

## KAZANCOMPRESSORMASH AT A GLANCE



### PRODUCTS

- Centrifugal compressors with flow rate up to 1400 m<sup>3</sup>/min and discharge pressure up to 450 bar
- Integrally geared compressors with flow rate up to 1100 m<sup>3</sup>/min and discharge pressure up to 50 bar
- Oil-injected rotary screw compressors with flow rate up to 1100 m<sup>3</sup>/min and discharge pressure up to 50 bar
- Oil-free rotary screw compressors with flow rate up to 1100 m<sup>3</sup>/min and discharge pressure up to 50 bar
- Refrigeration units based on centrifugal and rotary screw compressors
- Gas compression units, superchargers and replaceable flow parts
- Compressor stations

Centrifugal, screw and integrally geared compressors are the most demanded products in downstream and petrochemical processing.

### SERVICE

Installation & commissioning on a customer's premises with supervision by the high-skilled specialists of Kazancompressormash.

On-site maintenance, supervision and uninterrupted supply of spare parts and accessories within the equipment lifecycle.

Compressor equipment audit and retrofit programs.

### QUALITY

The management system of Kazancompressormash is complied with ISO 9001:2008, ISO 14001:2004, and OHSAS 18001:2007 (quality, health, safety, environmental protection).

The compressor equipment meets Russian and international standards including API 617.

## DOWNSTREAM AND PETROCHEMICAL PROCESSING COMPRESSORS

### CENTRIFUGAL RADially SPLIT COMPRESSORS

#### APPLICATION

Compression of natural gas, associated petroleum gas (APG), various hydrogen containing gases, hydrocarbon gases and other process gases.

#### PERFORMANCE RANGE

Flow rate: 12.0 to 600 m<sup>3</sup>/min  
Discharge pressure: 5 to 450 bar

#### FEATURES

- Number of compression stages depends on the pressure boosting extent
- Each stage consists of an aerodynamic part (internal case) placed into a steel cylinder
- Rotor and stator diffuser are made in axially split diaphragms
- Forged caps with special locks for closure of the cylinder ends
- Bearings and seals are easily accessible for installation and maintenance without the cylinder caps removal

### CENTRIFUGAL AXIALLY SPLIT COMPRESSORS

#### APPLICATION

Compression of APG, hydrocarbon gases and other process gases.

#### PERFORMANCE RANGE

Flow rate: 40.0 to 1400 m<sup>3</sup>/min  
Suction pressure: up to 45 bar

#### FEATURES

- Axially split casing with embedded diffuser parts
- Bearings and seals maintenance without disassembling of the compressor casing
- Access to embedded parts and rotor through the upper casing part

### INTEGRALLY GEARED COMPRESSORS

#### APPLICATION

Compression of air, nitrogen, inert gases, chlorofluorocarbon (CFC), propylene, chlorine, hydrocarbon gases and other process gases.

#### PERFORMANCE RANGE

Flow rate: 20.0 to 1200 m<sup>3</sup>/min  
Discharge pressure: 2 to 50 bar

#### FEATURES

Step-up gear (multiplier) and compressor stages combined in a single unit.

#### ADVANTAGES

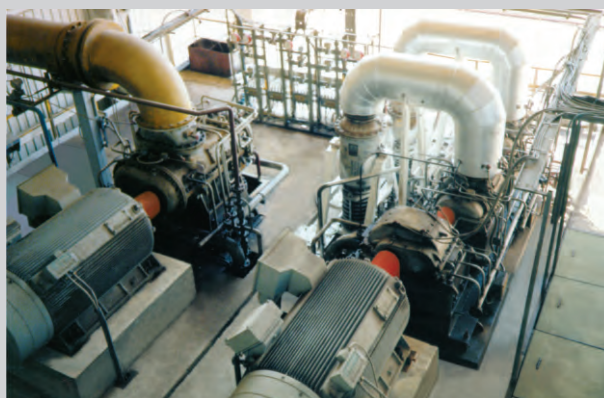
High efficiency and wide performance range due to:

- Selectable number of compression stages with optimally designed impellers
- Optimal speed for each impeller or group of impellers depending on the gears diameter of the driven shafts
- Uniformity of axial entry for all impellers
- Possible cooling of compressed gas after each stage of compression, i.e. close to ideal isothermal compression with minimal power consumption

#### BENEFITS

- Significantly lower capital costs
- Compact size, installation on a base plate
- Increased energy efficiency
- Improved performance range
- Enhanced regulation range within 30-110 % of performance

## COMPRESSORS FOR DOWNSTREAM AND PETROCHEMICAL PROCESSING



### OIL-INJECTED ROTARY SCREW COMPRESSORS

#### APPLICATION

Compression of natural gas, APG, flare gas, air, nitrogen, helium, and other gases.

#### PERFORMANCE RANGE

Flow rate: 4.0 - 100 m<sup>3</sup>/min  
 Suction pressure: from 0.7 bar  
 Discharge pressure: up to 50 bar

#### FEATURES

- Handling the gases containing hydrogen sulfide, carbon dioxide and other corrosive components due to separated lubrication systems of bearings, injection unit, and seals
- Flow rate controller of the slide valve type for efficient oil degassing with simultaneous energy saving within 20-100% of the flow rate range
- Shorter commissioning works lead time due to skid-mounted & modular design of the compressor systems

### OIL-FREE ROTARY SCREW COMPRESSORS

#### APPLICATION

Compression and supply of the gases uncontaminated by the lubricating oil: air for food industry & cosmetics, hydrocarbon gas, flare gas, process gases for chemical applications including gases with aggressive components.

#### PERFORMANCE RANGE

Flow rate: 8.0 - 300 m<sup>3</sup>/min  
 Suction pressure: from 1 bar  
 Discharge pressure: up to 20 bar

#### FEATURES

- Connection gears eliminating contact between rotors
- Absence of contact between lubricating oil and compressed gas
- Water cooling jacket
- Silencers for suction and discharge lines
- Multiplier

## CUSTOMIZED SOLUTIONS



**AEROCOM AS-621/10.4**

**Customer:** TANECO (Tatneft), Russia.

TANECO is a complex of refineries and petrochemical plants in Nizhnekamsk, Russia. The complex is able to process up to 14 million ton of sour crude oil into extensive range of petrochemical products.

**Scope of work:** engineering, manufacturing, supply, installation supervision and commissioning.

**Project status:** in operation since 2010.

**Equipment:** integrally geared compressor system AEROCOM AS-621/10.4

**Application:** compressed air supply for air separation station.

**Features:**

- Flow rate: 621 m<sup>3</sup>/m
- Discharge pressure: 10 bar



**AEROCOM AS-840/4.5**

**Customer:** TAIF-NK, Russia.

TAIF-NK is a modern oil processing complex that includes refinery, gasoline plant and a gas condensate processing plant. TAIF-NK manufactures 97% of the oil products in Tatarstan being one of the largest regional resource providers for petrochemical processing.

**Scope of work:** engineering, manufacturing, supply, installation supervision and commissioning.

**Project status:** in operation since 2007.

**Equipment:** integrally geared compressor system AEROCOM AS-840/4.5

**Application:** air supply into reactor of catalytic cracking unit at a gasoline plant.

**Features:**

- Flow-rate: 840 m<sup>3</sup>/m
- Discharge pressure: 4 bar

**Benefits & advantages:**

- Compact size and low installation cost due to integral design
- Uniform axial entry at all stages
- A wide range of flow rate control: 30-110%
- Maximum level of prefabrication



## CUSTOMIZED SOLUTIONS



**5GC1-387/12**

**Customer:** Inkor Engineering for butyl rubber plant by Panjin Zhenao Chemical Co. Ltd. (China).

Inkor Engineering is a Russian company, patentee of more than 50 know-how in Russia and abroad for technologies, catalyst systems, equipment solutions and units for downstream, chemical processing and related applications.

**Scope of work:** engineering, manufacturing, supply, installation supervision and commissioning.

**Project status:** in operation since 2013.

**Equipment:** centrifugal compressor system 5GC1-387/12 with axially split casing.

**Application:** chloromethyl containing gas compression in butyl rubber manufacturing.

**Features:**

- Flow rate: 387 m<sup>3</sup>/m
- Discharge pressure: 12 bar



**4GC1-146/1.5-13**

**Customer:** Kuibyshev Refinery (Rosneft), Russia.

Kuibyshev Refinery is located in Samara region, Russia. The main activity is production of the high-quality motor fuel.

**Scope of work:** engineering, manufacturing, supply, installation supervision and commissioning.

**Project status:** installation in progress.

**Equipment:** centrifugal compressor system 4GC1-146/1.5-13 with axially split casing.

**Application:** wet hydrocarbon gas compression in a gas fractionation plant.

**Features:**

- Flow rate: 146 m<sup>3</sup>/m
- Discharge pressure: 12 bar

**Benefits & advantages:**

- Flow part based on high efficient compression stages
- High reliability and efficiency of structural elements confirmed by years of operation
- Engineered and manufactured by the customer requirements
- Parameters confirmed at the testing facilities of Kazancompressormash
- Single baseplate for casing and multiplier for easy installation and shipment
- Stringent requirements to construction materials and explosion protection
- Centrifugal compressor system 4GC1-146/1.5-13 bears the dry gas seals in accordance with special technical requirements

## CUSTOMIZED SOLUTIONS



5GC2-216/14-26

**Customer :** Syzran Refinery (Rosneft), Russia.

Syzran Refinery, a subsidiary of Rosneft, is located in Samara region, Russia. The main activity is oil processing.

**Scope of work:** engineering, manufacturing, supply, installation supervision and commissioning.

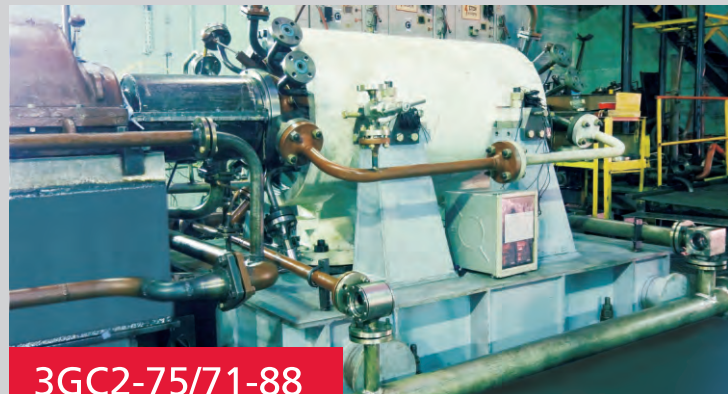
**Project status:** installation in progress.

**Equipment:** centrifugal compressor system 5GC2-216/14-26 with radially split casing.

**Application:** process gas compression.

**Features:**

- Flow rate: 216 m<sup>3</sup>/min
- Discharge pressure: 26 bar
- K4.5-2.65 model steam turbine drive by EKOL, Czech republic



3GC2-75/71-88

**Customer :** Angarsk Petrochemical Company (Rosneft), Russia.

Angarsk Petrochemical Company is one of the largest Russian refineries playing important role in the oil product supply for Siberia and the Far East. The refinery counts over 200 items in the product range including petrol, diesel fuel, jet fuel, various grades of bitumen, coke, oil.

**Scope of work:** engineering, manufacturing, supply, installation supervision and commissioning.

**Project status:** installation in progress.

**Equipment:** centrifugal compressor system 3GC2-75/71-88 with radially split casing.

**Application:** hydrogen-containing process gas compression.

**Features:**

- Flow rate: 75 m<sup>3</sup>/min
- Discharge pressure: 88 bar

**Benefits & advantages:**

- Minimal cost of assembling & installation due to compressor casing design
- Highly efficient compression stages
- High reliability and efficiency confirmed by years of operation
- Engineered and manufactured by the customer requirements
- Parameters confirmed at the test stand of Kazancompressormash

## CUSTOMIZED SOLUTIONS FOR DOWNSTREAM AND PETROCHEMICAL PROCESSING

| Customer                                                     | Compressor / system           | Compressed gas  | Flow rate, m <sup>3</sup> /min | Pressure, bar |           | Power, KW     | Year of supply |
|--------------------------------------------------------------|-------------------------------|-----------------|--------------------------------|---------------|-----------|---------------|----------------|
|                                                              |                               |                 |                                | suction       | discharge |               |                |
| Angarsk Petrochemical Company, Rosneft                       | 3GC2-75/71-88 (1 unit)        | Hydrogen gas    | 75                             | 71            | 88        | 3800          | 2013           |
| Lukoil Neftochim Burgas, Bulgaria                            | 96GV-285/19C (1 unit)         | Flare gas       | 285                            | 1             | 19        | 1600+<br>1400 | 2013           |
| Kuibyshev Refinery, Rosneft                                  | 4GC1-146/1.5-13 (2 units)     | Wet gas         | 146                            | 1.5           | 13        | 1600          | 2012           |
| Gazprom Neftekhim Salavat                                    | 3GC2-34/40-55 (1 unit)        | Hydrogen gas    | 34                             | 40            | 55        | 2000          | 2012           |
| Butyl rubber plant by Panjin Zhenao Chemical Co. Ltd., China | 5GC1-387/12 (1 unit)          | Methyl chloride | 387                            | 1             | 12        | 3150          | 2011           |
| Syzran Refinery, Rosneft                                     | 5GC2-216/14-26 (1 unit)       | Process gas     | 216                            | 14            | 26        | 4500          | 2010           |
| TANECO, Tatneft                                              | AEROCOM AS-621/10.4 (2 units) | Air             | 621                            | 1             | 10        | 4000          | 2010           |
| Sibur-Chimprom                                               | TAKAT 50.07M3 (1 unit.)       | Flare gas       | 50                             | 1             | 7         | 400           | 2010           |
| Angarsk Petrochemical Company, Rosneft                       | 2GC2-16/27-37 (1 unit)        | Hydrogen gas    | 16                             | 27            | 37        | 800           | 2010           |
| Komsomolsk Refinery, Rosneft                                 | 3GC2-174/1.2-17 (1 unit)      | Process gas     | 174                            | 1.2           | 17        | 2500          | 2008           |
| TAIF-NK                                                      | AEROCOM AS-840/4.5 (2 units)  | Air             | 840                            | 1             | 4.5       | 4000          | 2007           |

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