



RUSSIAN SCIENCE
AND TECHNOLOGY
FOR THE PROGRESS
OF OUR COUNTRY

ENGINEERING IN THE COUNTRY'S INTEREST

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*General Director,
Head of Technology
and Science Department
Igor Anatolyevich Mnushkin*



Dear Colleagues,

SRDI O&G PETON is a Russian engineering holding which ensures the technological sovereignty in the area of engineering in the fuel and energy industry.

For more than 30 years we have been revamping existing production facilities and developing new ones in gas processing & oil refining, gas production, petrochemical and ultra-pure substance chemical applications.

Our company is focused on the development of domestic participants in the fuel and energy sector: the technical solutions that we offer to our customers are based on Russian industrial equipment. This ensures the maximum involvement of domestic engineering and machine building in the modernization of the fuel and energy complex. The participation of domestic engineering and industrial companies in science-intensive projects provides the industry with the best available technologies. This allows, within the framework of the current import substitution program, with the support of state-owned enterprises, to concentrate on the development of their own potential function of knowledge and performance capabilities.

Any product which rests on advanced emerging technologies allows the economy to secure not only stability and flexibility but also lay basis for sustainable development. Our major objective is further improvement of technologies and engineering boosted by synergy effects when the economy is supported by science, financial tools and industrial facilities.

Development of the domestic engineering is the main driver of the oil and gas industry in Russia. And the development of the oil and gas industry is linked with growth of fuel and energy sector backbone enterprises, enhanced quality of living for communities, formula for stable national development.

ABOUT THE HOLDING

FROM A BUSINESS IDEA
TO ITS IMPLEMENTATION

FROM BUSINESS IDEA TO IMPLEMENTATION

PETON IS THE FIRST RUSSIAN TECHNOLOGICAL ENGINEERING HOLDING THAT HAS A FULL SET OF RUSSIAN LICENSES FOR TURNKEY PROJECTS FOR THE CONSTRUCTION OF GPP, REFINERIES AND LNG COMPLEXES WITH THE NELSON COMPLEXITY INDEX OF 10+.

SRDI O&G "Peton" LLC is an EPC contractor delivering oil and gas projects.

ALL PETON PROJECTS SUPPORT DEVELOPMENT OF THE RUSSIAN FUEL AND ENERGY INDUSTRY

The technological engineering holding PETON is an EPC contractor executing the works on turnkey basis in oil and gas production, oil and gas processing and petrochemical industries.

Holding PETON includes a number of companies employing approx. 8,000 people in total, of which more than 1,000 people are currently design and engineering, scientific and manufacturing personnel.

The holding has large facilities for implementing large large-scale projects, it has several representative offices: in Moscow, Ufa, Saint-Petersburg,

Omsk, Rostov Rostov-on-Don, Novy Urengoy, Oktyabrsky, Orsk, Saratov, settlement of Kondratyev, Orenburg, Svobodny; its own buildings, office centers, and manufacturing facilities.

Over the past 30 years, the company has implemented more than 170 projects in Russia, the CIS countries, Asia, Eastern and Western Europe.

Successful cooperation with leading Russian and foreign partners made PETON a leader in the engineering service market and allowed implementing projects worldwide.

"PETON is a world world-class Russian technological engineering company"

Cheng Tianli, Member of the Board of Directors of China First Heavy Industries (China Heavy Machinery Corporation)

Experience and competences of PETON allow adapting technologies of a range of leading industrial companies within the import substitution program.

Peton is a leading player in the market due to its comprehensive approach to execution of O&G projects. PETON has focused on smart solutions which combine design, construction and process management technologies to become successful.

Finally, the Holding offers project delivery of the best quality and shortest construction time time-frame.

Strategically, the Company stakes on developing expert knowledge and human resources, allowing to deal with any challenges in the national oil and gas industry.



PETON IS AN ACTIVE IMPORT SUBSTITUTION PLAYER

PETON HAS COMPETENCIES, EXPERIENCE AND TECHNOLOGIES FOR IMPORT SUBSTITUTION THROUGHOUT THE EPC CHAIN. FROM DEVELOPMENT OF TECHNOLOGICAL SOLUTIONS TO PRODUCTION, CONSTRUCTION OF LARGE TURNKEY FACILITIES.

Import substitution on the whole EPC chain

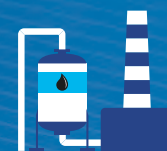
RESULTS:

1. Creation of additional opportunities for domestic manufacturers of equipment and services
2. Systematic modernization of fuel and energy complex facilities in Russia



INDUSTRY SPECIALIZATION:

- OIL AND GAS PRODUCTION
- OIL AND GAS PROCESSING
- PETROCHEMICAL



THE HOLDING IN FIGURES

RELIABILITY AND REPUTATION

ECONOMIC
RESPONSIBILITY

TRANSPARENCY
AND OPENNESS

ENVIRONMENTAL
RESPONSIBILITY

MINIMIZATION OF NEGATIVE ENVIRONMENTAL IMPACT

SOCIAL
RESPONSIBILITY

- IMPROVEMENT OF EMPLOYEES LIFE QUALITY
- INVESTMENTS TO DEVELOPMENT OF COMPETENCES, KNOWLEDGE EXTENSION
- SOCIAL PARTNERSHIP (STATE AND MUNICIPAL AUTHORITIES, MEDIA, UNIVERSITIES, ETC)



OF EXPERIENCE
IN THE FUEL
AND ENERGY
INDUSTRY



MORE THAN

120

PATENTS

+18

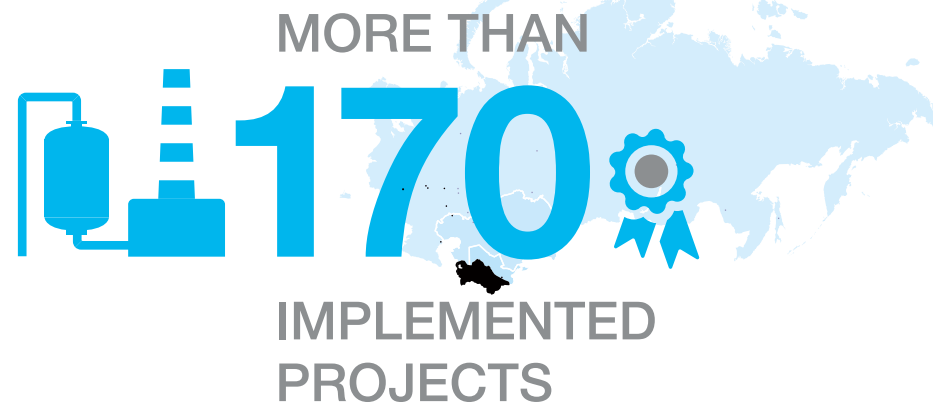
APPLICATIONS
PENDING
EXPERT APPROVALS

+16

INTERNATIONAL
APPLICATIONS
PUBLISHED

8000

EMPLOYEES



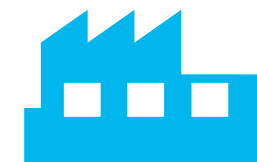
OFFICES IN MOSCOW
ST. PETERSBURG
ROSTOV ON DON
NOVY URENGOY, ORENBURG
KONDRATYEVO settlement
SVOBODNY

THREE OWN
BUILDINGS IN UFA

11 500 m²

1 place

IN THE RATING OF EPC
COMPANIES OF FUEL
& ENERGY COMPLEX *



27 500 m²

AREA OF PRODUCTION
FACILITIES

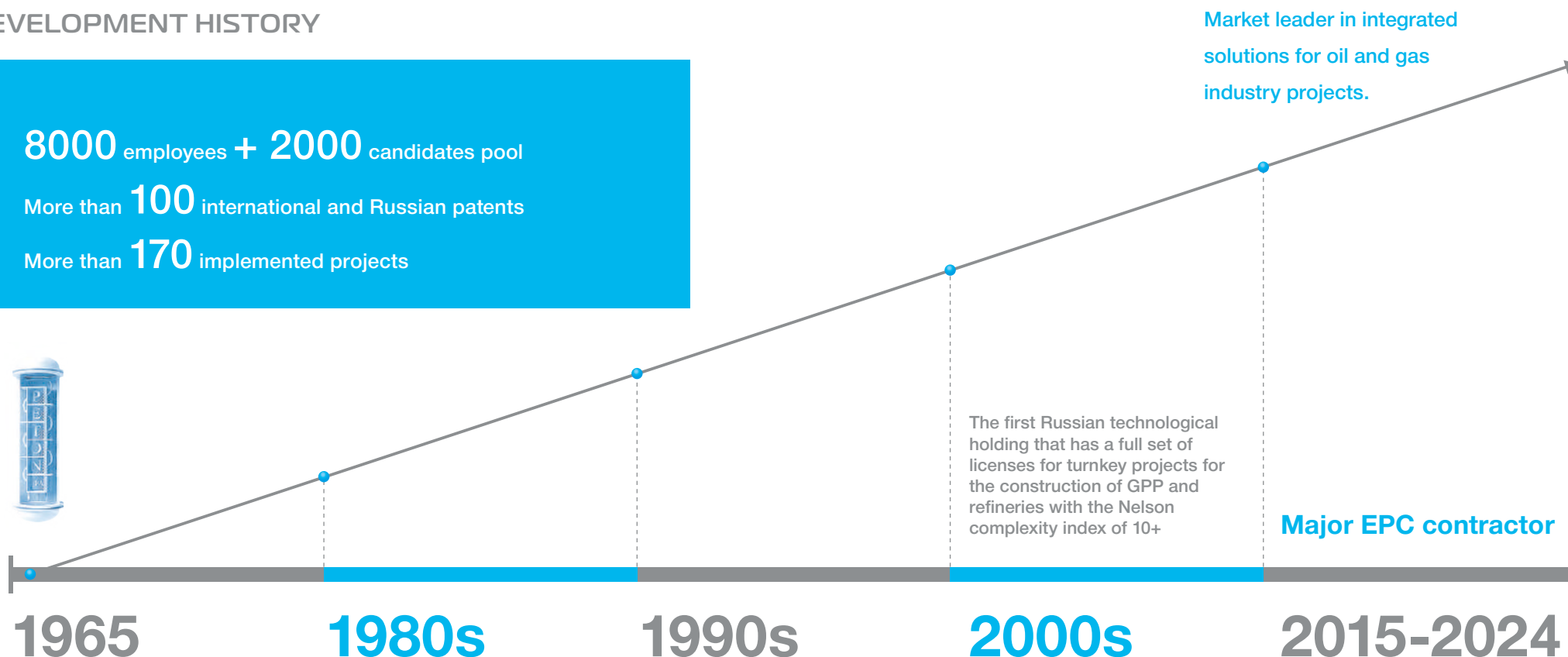
DEVELOPMENT HISTORY

Today:

8000 employees + **2000** candidates pool

More than **100** international and Russian patents

More than **170** implemented projects



1965

An innovative rectification technology with a new type of internal contact devices (internals) has been developed in Ufa Petroleum Institute

1980s

Launch of the first column with a new type of internals at Salavatnefteorgsintez plant
Development of various types of contact device designs

1990s

Establishment of Peton company
Launch of production facilities in cities: Ufa, Oktyabrsky, Orsk
Launch of a laboratory for practical rectification process simulation
Adoption of PETON process solutions as part of the revamping of oil and gas plants in the Russian Federation
The beginning of cooperation with Gazprom PJSC

2000s

Implementation of projects in the CIS countries.
Expansion of the core assets portfolio:
• Creating of an asset management company
• Establishing of additional offices in Russia
Partnership with LINDE AG.

2015-2024

Participation in the Eastern Gas Program

Participation in Import Substitution and Local Manufacturing Program

One of the Largest Partners of Gazprom PJSC

1 place in the rating of EPC companies of Fuel & Energy Complex

Creation of its own construction company "Peton Construction"



SCIENTIFIC AND TECHNICAL ACHIEVEMENTS OF THE SOVIET SCIENCE



Professor
B.K. Marushkin

In 1965, the Department of processes and devices of the Ufa Petroleum Institute developed a scientific idea **consisting in separation of oil mixtures in a rectification column with a cross-phase flow (gas-liquid)**, and a scientific group was created for calculations. Before, the only shapes of contact devices that were known were horizontal trays and packings operating at the phase counter flow (the further development thereof was limited due to the constraints of the flow), and the calculation methodology belonged to institutes of the USA and Europe. Thus, the creation of the first Russian research group allowed analyzing and creating our own calculation model based on the domestic equipment.

The author of that idea was professor B. K. Marushkin, well known among the national refiners.

This event resulted in one of the essential instances how import substitution is applied in our national oil and gas industry.

By that time, the rectification group created by Marushkin had performed dozens of renovations of rectification columns in three refineries: the Ufa refinery, the Moscow refinery and the Volgograd refinery, and developed the Soviet Union's first fully functional program of mathematical modelling for practical rectification in oil refining.

The task group headed by B. K. Marushkin was assigned to bring into operation a powerful 8 m vacuum column at **Salavatnefteorgsintez JSC in AVT 4 unit.**



COMPANY NAME

PETON was created in 1990, its name was formed as the abbreviation of the Russian for "Cross Flow Regular Packing" ("PErekrestno TOchnaya Nasadka") that designates a new type of contact devices. The Company experience, its unique technical and workforce capacity allowed it to take leading positions in the market of domestic engineering.



Five years of intensive work resulted in a successful commissioning of the column with new contact devices. The achieved process **performance was high**: maximum recovery of gas oil in the entire industry; extremely low power consumption. The main achievement of this development for the refining industry of the USSR was the evidence that:

- packing columns can be used successfully and efficiently for oil refining, in particular, they can process heavy sour Bashkir oil
- a cross flow packing has high efficiency and extremely low pressure drop.

Theoretical grounds were set up for further intensification of mass transfer processes which ensured development of resource saving and energy efficient technologies and high marketability of domestic vendors of mass transfer equipment. These ideas continue being successfully implemented and developed, which allows Peton to actively participate in the import substitution program.

"Russian companies have the requisite potential needed for import substitution in oil and gas industry process applications. It is necessary to invest in specialists, to develop scientific base and and share experience more with national and international peers".

I. A. Mnushkin,
a student of Professor
B. K. Marushkin

MISSION

FACILITATION OF THE RUSSIAN ECONOMY
DEVELOPMENT BY EFFICIENT ENGINEERING AT OIL
AND GAS INDUSTRY OBJECTS

DEVELOPMENT STRATEGY

Holding's development strategy for 2015-2030, developed in accordance with the requirements of relevant ministries, departments and the Strategy for the Development of the Largest Domestic Fuel and Energy Companies until 2030, is being constantly adapted to new economic conditions.

The Strategy reflects the current situation and prospects of Russia's economic development and forms the main priorities:

- Creation of own national technological expertise and world class competencies
- Attraction of leading Russian enterprises for production of high tech equipment, materials for the Fuel and Energy Complex, active participation in the formation of the national personnel reserve for the Fuel and Energy Complex
- Compliance with advanced environmental and ecological safety standards.

Within the framework of the Strategy implementation the following tasks are being solved:

- Expansion of the area of responsibility towards the Customer (increase of the portfolio of projects implemented under the EPC model)
- Active development of relations with foreign partners
- Continuous enhancement of in house technical and administrative competence by implementing the personnel professional development programs

FROM A BUSINESS IDEA TO THE PROJECT
IMPLEMENTATION, REINFORCING THE SUCCESS
WITH COMPREHENSIVE RESPONSIBILITY

OUR GOAL IS TO ACHIEVE A LEADING POSITION
ON THE ENGINEERING SERVICES MARKET

DEVELOPMENT DIRECTIONS

ONE OF THE MAIN HOLDING'S PRIORITIES IS TO SUPPORT RUSSIAN MACHINE BUILDING PLANTS IN ENGINEERING AS PART OF IMPORT SUBSTITUTION PROGRAM

DEVELOPMENT STRATEGY reflects the current situation and prospects of economic development of Russia, meets the requirements of relevant ministries departments, takes

into account the main concepts of development of the largest domestic fuel and energy companies, constantly adapts to new economic conditions

SUSTAINABLE DEVELOPMENT PHILOSOPHY & PRIORITIES



Future-oriented innovative developments with creation of new generation of products, technologies, and services for oil- and gas processing industry



Efficient use of hydrocarbon feedstock at all the stages of its processing



Use of own licensed technologies which allows us to cut down OPEX and CAPEX, to enhance energy efficiency, efficiency factor of processing, to make processing conversion deeper, and all in all, to increase investment appeal of our product



Creating own national technological expertise and world class competencies



Involving the leading Russian enterprises to manufacture high tech equipment, materials, and components for fuel and energy industry



International cooperation, active development of relations with foreign partners



Active participation in forming the national pool of human resources for the energy sector.

THE HOLDING'S STRUCTURE HAS BEEN CREATED AND ADAPTED BASED ON THE INTEGRATED APPROACH TO THE IMPLEMENTATION OF MAJOR PROJECTS IN OIL AND GAS PRODUCTION, OIL AND GAS PROCESSING AND PETROCHEMICAL INDUSTRY



HOLDING TODAY

Company name	Location	Functions
Scientific Research Design Institute Oil and Gas PETON	Ufa	The Holding's main R&D center develops new technologies and designs facilities for the oil production, refining, and petrochemical industry. It holds licensed technologies of PETON
Separate subdivision of SRDI O&G PETON LLC	Moscow	Project management, implementation of the environmental engineering strategy for the fuel and energy industry
Separate subdivision of SRDI O&G PETON LLC	St. Petersburg Kondratyev	Management of LNG projects in the area of Portovaya CS
Separate subdivision of SRDI O&G PETON LLC	Orenburg	Orenburg GPP project management
Separate subdivision of SRDI O&G PETON LLC	Svobodny	AGPP project management
Separate subdivision of SRDI O&G PETON LLC	Rostov on Don	New project's design and revamping of existing chemical, petrochemical, as well as oil and gas facilities.
The Holding's companies		
Peton Construction	Ufa, Moscow, St. Petersburg, Novy Urengoy, Kondratyev, Ust-Kut, Kazan	Conducts civil construction, construction and installation activities for oil and gas complex facilities. Manages construction for all PETON projects. Peton Construction ensures that high productivity is maintained during construction and installation works.
Peton Mekhanizatsiya	Ufa	A company that leases special equipment to enterprises and organizations for the performance of construction and road works, for the transportation of large and heavy cargoes.
Consortium with production organizations		
Consortium of production subcontractors	Moscow, Ufa, Omsk, St. Petersburg, Rostov on Don, etc.	The Consortium combines the Holding's production enterprises, as well as joint enterprises with leading licensors under import substitution programs.

EPC PROJECTS

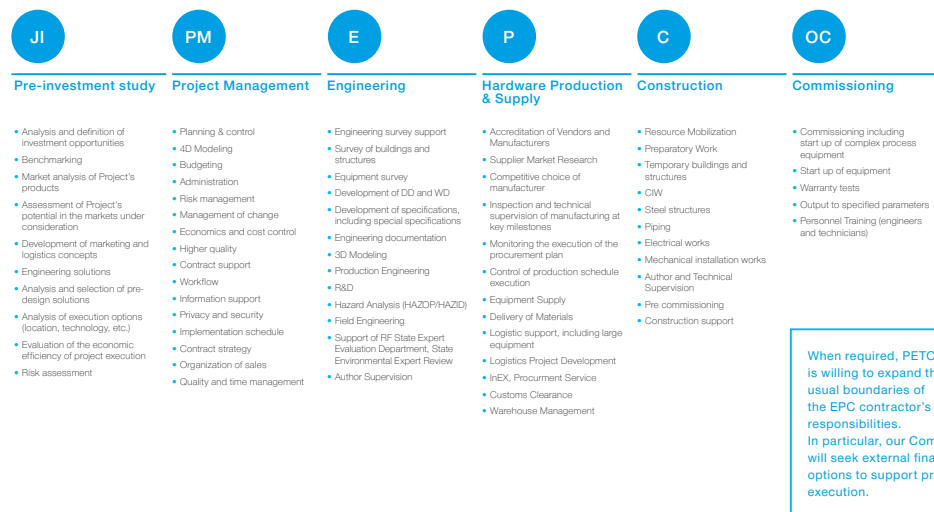
Advantages of the EPC approach

PETON is a unified engineering center

- Reduction of project implementation timeframe
- Higher quality
- Risk management and mitigation
- Optimized CAPEX–OPEX

OPTIMIZED PROCESS
SOLUTIONS WITH DUE
CONSIDERATION OF RUSSIAN
NORMS AND REGULATIONS

PETON MANAGES PROJECTS OF ANY COMPLEXITY AS PART OF THE FOLLOWING ACTIVITIES:



FOR ALL STAGES OF THE WORK

QA
QC

Quality Assurance & Quality Control

- Discipline specific quality control:
- Materials
 - Production
 - Technologies
 - Works
 - Transportation

HSE

HSE

- Measures for occupational, industrial, fire safety and ecology, and monitoring of compliance with the requirements
- Environmental monitoring during construction

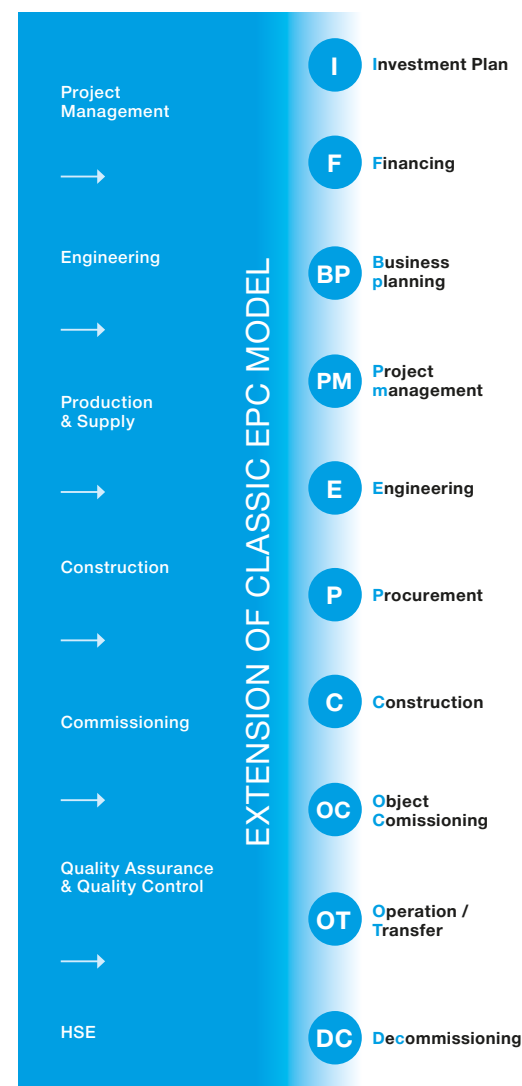
AP

Approvals & permits

- Acquisition of permits
- Holding public consultations
- Cooperation with local authorities
- Land plot allocation

FULL CYCLE EPC CONTRACTOR INNOVATIVE APPROACH

PETON PROVIDES DOMESTIC AND FOREIGN CONSUMERS WITH HIGH QUALITY PROJECT SPECIFIC PRODUCTS, HIGH TECH EQUIPMENT AND INTEGRATED ENGINEERING SERVICES ON THE BASIS OF THE INNOVATIVE APPROACH TO IMPLEMENTING EPC/M PROJECTS IN OIL AND GAS PRODUCTION, OIL AND GAS PROCESSING AND PETROCHEMICAL INDUSTRIES.



CONCEPTUAL ENGINEERING:

Study, analysis, assessment of the areas of strategic development, idea formalization, selection of options, concept development

FINANCIAL ENGINEERING:

Search for financing sources, determination of financing structures and tools, preparation of documents

TECHNICAL AND ECONOMIC ENGINEERING:

Preparation of the economical model and the project budget, TA development and coordination of the main project parameters, tender documentation preparation, preparatory work

ORGANIZATIONAL ENGINEERING:

Project management, project administration, risk management monitoring, audit, control

BASIC AND DETAIL DESIGN:

Project development (P), detail design (DD), expertise

FURNISHING, PROCUREMENT AND LOGISTICS:

Main and Auxiliary Equipment Management and Supply

PRODUCTION ENGINEERING:

Preparatory work, organization and performance of civil and construction and assembly operations, equipment acceptance, supervision

TEST AND STARTUP ENGINEERING:

Installation supervision, start-up and commissioning, supervision equipment startup, guarantee testing, commissioning of the whole facility

OPERATIONAL/SALES ENGINEERING:

Staff training and transfer of management to the operator, operation overhaul and running repair, renovation and restoration

LIQUIDATION ENGINEERING:

Study, project development, suspension of production, shutdown and organization of equipment disassembly and structure demolition, disposal of waste

EPC PROJECTS OF PETON

EPC-project:

COMPLEX FOR LNG PRODUCTION, STORAGE, AND OFFLOADING IN THE REGION OF CS PORTOVAYA

Location:

the Vyborg district of Leningrad region of Russia

Customer:

Gazprom Invest LLC

Scope of work

A turnkey project for design, construction, start-up, and commissioning of "The complex for production, storage and shipment of liquefied natural gas in the vicinity of CS Portovaya".

Project Importance

The complex's purpose is production, storage and shipment of LNG i.e. the most prospective fuel.

The undertaken construction efforts, which are aimed at achieving local gasification of the Kaliningrad Oblast and establishing foothold in the Baltic States, are an integral part of the economically significant LNG projects currently being carried out by the Russian Federation.

EPC-project:

AMUR GAS PROCESSING PLANT

Location:

In the vicinity of Svobodny, Amur region

Customer:

Gazprom Pererabotka Blagoveshchensk LLC

Scope of work

In cooperation with LINDE, a German company, PETON develops design and FEED documents for LINDE-PETON owned technology for ethane extraction unit, NGL unit, nitrogen rejection unit, helium concentrate production unit and helium production plant. Also, PETON develops technical regulations and specifications for all the commercial products the plant manufactures.

Project Importance

Amur GPP will become the biggest in Russia and one of the biggest natural gas processing plants in the world. The plant is expected to become an essential link in the future natural gas supply process chain designed to meet China's demand via the Power of Siberia pipeline.

Ethane, propane, butane, pentane-hexane cuts, and helium are valuable components for gas chemical and other sectors of industry.

When this project is delivered, Amur region and other Far East regions will experience a strong momentum for social and economical development.

Total building area **723 770 m²**
 Mobilized (peak values):
 Staff **4 408 persons**
 Machinery **550 pieces**
 The design capacity of the plant is **1.5 million tons/year** of LNG.
 The service life of the complex is at least **25 years**.
 The complex includes **45** different buildings and structures.



Process lines **6 pcs.**
 Plant area **800 ha**
 Steam-generator block **42 billion m³**
 Helium production per year **60 million m³**
 Ethane production per year **2,5 million tons**
 Propane production per year **1 million tons**
 Butane production per year **500 thousand tons**
 Production of pentane-hexane fraction per year **200 thousand tons**



EPC-project:

CONDENSATE STABILIZER UNIT FOR THE ACHIMOV DEPOSITS IN THE NADYM-PUR-TAZ REGION

Location:

Novy Urengoy

Customer:

Gazprom Pererabotka, LLC

Scope of work

EPC project implementation:

- expert review of design and estimate documentation
- correction of design documentation
- passing the State Expert Evaluation (Glavosekspertiza)
- development of detailed documentation in full
- delivery of equipment and materials
- set of CIW and commissioning
- facility commissioning

Project Importance

Purpose of the CSU (condensate stabilization unit): treatment of unstable condensate from Achimov field with de-ethanization and stabilization for transportation using Urengoy – Pur-Pe oil-condensate pipe.

The construction of the CSU facility will ensure the processing of heavy hydrocarbon raw materials from fields in Western Siberia.

The construction of the facility is aimed at ensuring the implementation of PJSC Gazprom's promising plans for the development of oil and gas condensate fields and the development of facilities for processing and preparation for the transport of liquid hydrocarbons.

Rated capacity – **4 million tons/year**Number of trains – **2**Train capacity – **2 million tons/year**

Peak number of people involved:

- human resources – **1000 people**
 - construction and special equipment – more than **250 units**
- 90** title area and **4** linear objects comprising 4 main functional units
- During construction process, a set of construction and installation works will be carried out, including:
- driving of more than **21,000 piles**
 - manufacturing and installation of **20,000 tons** of steel structures
 - construction of pipelines with a total length of more than **37,000 m**
- Building area – **75 ha**



EPC-project:

DEETHANIZATION GAS TREATMENT UNIT / BOOSTER COMPRESSOR STATION

Location:

Urengoy Condensate Transportation Preparing Plant, Novy Urengoy

Customer:

Gazprom Pererabotka, LLC

Scope of work

Development of working documentation for the facility "Deethanization Gas Treatment Unit of Urengoy Condensate Transportation Preparing Plant". EPC contract for construction of DGTU. Reconstruction of BCS. Implementing EPC projects for DGTU / BCS:

- expert review of design and estimate documentation (designing)
- development of project documentation
- passing the State Expert Evaluation (Glavosekspertiza)
- development of detailed documentation in full
- delivery of equipment and materials
- set of CIW and commissioning
- facility commissioning

Project Importance / BCS

Purpose of DCS: compression of deethanization gases generated at process units of Condensate Transportation Preparing Plant

Project Importance / DGTU

Purpose of DGTU: ensuring uninterrupted supply of feed gas to the facilities of Novourengoy Gas Chemical Complex (NGCC)

Figures and Highlights

Total productivity – **1,850 million m³/year****42** title positions**3,791 pcs.** of piles**5,861 tons** of steel structures**85** pieces of major equipment**40,989 m** total length of pipelineArea in the development boundary – **80,972 m²**

The peak number is **393** personnel in 2 shifts **57 units** of construction and special equipment

21 title items and **4** linear objects**1,880 pcs.** of piles**3,416 tons** of steel structures**73 pcs.** of major equipment**18,829 m** total length of pipelineArea in the development boundary – **36,782 m²**

Peak number:

310 personnel in 2 shifts**54 units** of construction and special equipment

PROJECT COMPLETED



UNIQUE SOLUTIONS FOR THE PROJECT OBJECTIVES

PETON OFFERS UNIQUE TECHNICAL SOLUTIONS AND INDIVIDUAL APPROACH TO EVERY PROJECT

Project

CONVERSION OF MARINE SHIPS

Activities on conversion of a gas carrier into the "Portovy" floating storage (IMO 9246621) were performed within the framework of the "Portovaya LNG Complex" EPC project. The creation of the interim floating storage on the basis of a gas carrier ensures the accumulation of the required LNG shipload at the Complex.



**20 YEARS – FACILITY LIFETIME,
WITHOUT DECOMMISSIONING**



PETON transformed gas carrier "Excel" (2003 year built) into a storage ship. The following complex engineering, administrative tasks were solved and unique technical solutions were implemented during execution of this project:

- Possibility of simultaneous receiving, offloading of LNG and sending boil-off gas to the Complex .
- Revamping of boil-off gas compressor and automatic control system
- Possibility to use low-sulphur fuel (increased environmental level)
- Possibility to perform large-scale repairs and examinations at the jetty
- Expansion of functionality for transmission of process data between the ship and the Complex
- Operation in low temperature and ice conditions, increase of time between overhauls, improvement of endurance
- Transfer of the ship to the Russian flag and registration in the Russian International Register of Vessels

The ship was handed-over to the Client in December 2020 in accordance with the terms of reference and schedule dates. PETON fulfills the following scope of works/services depending on the project objectives and contract configuration:

- PETON integrates special purpose companies into the project and controls achievement of the final result and quality of works
- PETON acts as a single provider of services for the end Client, combining efforts of multiple special purpose companies and making it possible to create unique facilities and to solve complex tasks
- PETON provides ready-made solutions, integrating achievements of the leading companies in the industry, and provides integrated warranty for the facility to the Client.
- PETON possesses successful experience in international cooperation with key companies at LNG transportation market (Exmar Shipmanagement, Dubai Dry Dock World, Cryostar, Harris Pye, etc.).

Figures and Highlights

11 000 M³/H

MAXIMUM RATE OF LNG OFFLOADING TO
THE GAS CARRIER

450 TONS

WEIGHT OF THE ICE-RESISTANT
BELT

3 000 M³/H

MAXIMUM RATE OF LNG
RECEIVING FROM THE SHORE

SCIENTIFIC RESEARCH AND DESIGN INSTITUTE OF OIL AND GAS PETON, LLC OF UFA

IS THE MAIN ASSET OF THE HOLDING

The experience and competencies of employees allow us to carry out large-scale design and research work for fuel and energy facilities.

TYPES OF WORK

Process design of oil and gas industry facilities:

- field facilities related to the development of gas and oil and gas condensate fields;
- main pipelines and underground storage facilities for gas, oil, gas condensate and their processing products;
- plants and separate units for the processing of natural gas, oil, gas condensate and related products;
- gas fuel supply facilities with a pressure of up to 1.2 MPa for enterprises and settlements;
- automotive filling stations using liquefied, compressed hydrocarbon gases and petroleum products

Architectural design

Civil design

Work on supply of VCU of absorption, rectification, extraction columns and separators

Design of utility networks and systems:

- heating, ventilation, air conditioning;
- water supply, incl. recycling, sewerage, treatment facilities of industrial storm sewage;
- heat and gas supply, cold supply;
- power supply up to 35 kV;
- electric lighting and heating;
- automation and instrumentation, communications, radio, television;
- mechanization and transport (external and on-site), incl. railway;
- fire fighting system

Development of special sections of projects

protection of the environment, protection of building structures against corrosion, engineering and technical measures and structures of civil defense, production and enterprise management, estimate documentation, etc.

Project Engineering

development of investment plans and feasibility studies for construction, receipt and execution of initial data for design, technical support of projects and author supervision of construction

Engineering-geodetic, engineering-geological, engineering-hydrometeorological, engineering-ecological surveys



PETON CONSTRUCTION

COMPREHENSIVE RESPONSIBILITY – GUARANTEE OF SUCCESS

PETON CONSTRUCTION carries out a variety of construction and installation works (civil, electrical and mechanical installation works) for oil and gas complex facilities. It is part of the PETON technological engineering holding.



E	Engineering
P	Procurement
C	Construction



Corporate programs

Peton Construction is a socially responsible company. Our priority is occupational safety and security of employees during work. The company employs techniques for environmental management and efficient use of resources. The Company observes a policy of equal rights and opportunities for candidates and employees, and also builds relationships based on the principles of transparency, openness and high standards of work.

Areas of activity of Peton Construction:

- development of oil and gas condensate fields,
- construction, modernization, reconstruction of fuel and energy facilities

Peton Construction maintains high productivity during construction and installation work.



Our material and technical resources, combined with the Company's vast experience, enable us to perform services in any part of Russia and within the required timeframe.

Own material and technical base:

AUTOMOTIVE-TYPE CRANES

 × 140

incl. crane equipment with a lifting capacity of 100-300 tons, lifting mechanisms

WELDING UNITS

 × 484

ELECTRICAL EQUIPMENT, MEASURING INSTRUMENTS

 × 313

TB&S

 × 454

DMICS LABORATORY

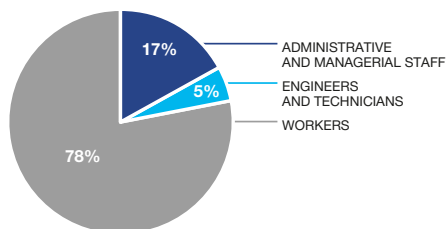
(certified in the NDT System)

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- The laboratory of metal diagnostics and welding control is certified in the NDT System.
- Main activity: visual, measuring and radiographic control, ultrasonic flaw detection and thickness measurement, penetrating substance control, insulation control.
- The laboratory is fully equipped with non-destructive testing equipment and meets the demands of the corresponding certification process. These are PION 2M, ARINA-7, ARINA-9, ARSENAL 200PS X-ray machines, A1212 Master and A1208 ultrasonic inspection instruments, as well as Corona 2.2 inspection instruments for insulation monitoring, etc.
- Mechanical and construction testing sectors are equipped with modern high-tech equipment that allows one to carry out the entire range of tests within the framework of accreditation.
- In December 2018, LDMiKS received accreditation (certificate No. IL/LRI-01073) for:
 - destructive control, for mechanical and statistical tests of welded joints for tension and bending, mechanical and dynamic tests of impact strength, hardness and corrosion resistance measurements, material structure studies and determination of the content of elements in metals and welded joints;
 - construction tests, for testing of construction materials and structures, soils, sand, crushed stone, concrete mixtures and mortars, concrete and reinforced concrete products.

4000 EMPLOYEES

PERCENTAGE OF EMPLOYEES BY CATEGORY



PETON MECHANIZATION

Peton Mechanization has its own fleet of vehicles for efficient, prompt and high-quality fulfillment of its obligations.

Company Services:

Transportation by road



Provision of lifting mechanisms and special equipment



Peton Mechanization handles all turnkey construction activities by utilizing a full range of specialized vehicles within the framework of all projects managed by the PETON Holding.

Organization has a road service that performs work on the maintenance of the roadway at construction sites.

Landmark projects in the oil and gas industry provided with the necessary turnkey special equipment:

CONSTRUCTION OF COMPLEX FOR PRODUCTION, STORAGE AND SHIPMENT OF LIQUEFIED NATURAL GAS IN THE AREA OF PORTOVAYA CS (LENINGRAD REGION)



CONDENSATE STABILIZER UNIT FOR THE ACHIMOV DEPOSITS IN THE NADYM-PUR-TAZ REGION



DEETHANIZATION GAS TREATMENT UNIT / BOOSTER COMPRESSOR STATION



PETON PRODUCTION FACILITIES

PETON has its **own production facilities** for the creation of licensed non-standard equipment and its components in the field of rectification, heat exchange, air-cooling units, coils for furnace pipes. The Holding's production bases are located in the cities of Ufa and Oktyabrsky.

More than 100 people work at production facilities.

Production activities are carried out on an automated line for the production of certified products.

SCIENTIFIC AND PRODUCTION ACHIEVEMENTS

- A range of cross-flow packing designs, distributors, and devices with various packing arrangements have been developed and protected by copyright
- More than 170 industrial implementations were carried out on the basis of technical solutions of PETON* contact devices at facilities in the oil and gas processing, petrochemical and nitrogen industries
- More than 50 technical solutions for separation of mixtures for various processes protected by patents of the Russian Federation have been developed
- For the first time in the Russian Federation, PETON* technical solutions have been developed and implemented for ultra-clear rectification in the framework of nanotechnological processes for the production of solar silicon on an industrial scale
- Theoretical foundations and simulation process of catalytic distillation have been developed
- Licensed technology of vacuum distillation decomposition gas purification has been developed
- High-efficiency separation equipment utilizing cyclone-type injection devices for gas-liquid mixtures has been developed
- Technology of displacement of high-molecular components of residual oil using carbon dioxide has been developed
- Method of efficient repair of process facilities for gas processing and gas condensate has been developed
- Unique mass exchange extraction column developed and successfully implemented at phenol oil purification plant



* PETON is a brand of licensed equipment developed by PETON Holding

STAFF

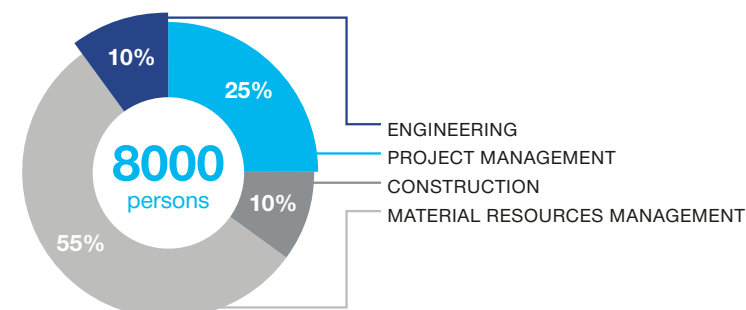


PETON employees have experience in implementing major projects in the oil and gas producing, oil and gas processing and petrochemical industries.

The staff of PETON technological engineering holding is composed of **highly qualified specialists**, including doctors and candidates of sciences, experts in the field of industrial safety, auditors. The employees of the Holding have experience in the largest Russian and international companies.

PETON Technology Engineering Holding is **one of the leading employers in the oil and gas industry**. The Company provides employees with opportunities to gain multifaceted experience and apply their professional knowledge in developing technologies, executing design work and construction-related activities, and handling project management tasks.

STAFF STRUCTURE OF PETON FROM THE POINT OF VIEW OF PROJECT MANAGEMENT



PETON CORPORATE UNIVERSITY

The Company has obtained a license to carry out educational activities and implement educational programs in the following fields: Additional education (subtypes: Additional education of children and adults, Additional vocational education) and Vocational training.

Corporate university includes compulsory training (obtaining certificates, permits, approvals, etc.), production training (integrated training of production personnel)

and development training (mastering knowledge and approaches for effective implementation of R&D and EPC projects).

The corporate university also serves as a career development center that ensures both professional and career development of employees in accordance with their goals, as well as in line with Company's own objectives and current trends in the industry.

TRAINING AND EDUCATIONAL PROGRAMS

1. In-house employee training

- Lectures and master classes
- Mentoring

2. External employee training

- Training of personnel in specialized universities and training centers
- Internships at industrial enterprises of Russia and CIS countries
- Internships in partner companies

3. Internship of university students

4. Training in our own Training Center

Trainee program

In Ufa division of PETON, a training program for students from specialized universities is successfully implemented.

The goal of the program is to introduce students to the specifics of domestic engineering and the implementation of large-scale EPC projects in the oil and gas industry.



B.K. Marushkin scholarship

Together with Ufa State Petroleum Technological University, which is the reference university of Russia, PETON established a scholarship named after Professor B.K. Marushkin for talented students of the Faculty of Technology. The purpose of the project is to increase the prestige of Russian science, material support for young scientists, develop the scientific potential of specialists and form the personnel potential of SRDI Oil & Gas Peton.

On the basis of Ufa State Petroleum Technological University, Peton organized two basic departments "Modeling and Design of Processes and Devices of Chemical Technologies" and "Design of Oil and Gas Processing Enterprises".

SCIENCE

RESEARCH AND DEVELOPMENT CENTER PETON

PETON has established a research and development center comprising several divisions:

- **laboratory for studying the internals of mass transfer equipment** to study the operation of contact devices for rectification and absorption processes, knock-out devices and testing benches to study the operation of contact devices for extraction process;
- **laboratory for synthesizing chemical products**, also at high temperatures and pressure;

- **chemical analytical laboratory** for identifying the resulting compounds, separating and analyzing complex mixtures in terms of quantity and also for meeting the challenges of reverse engineering;

- **laboratory for studying hydrodynamic processes to study and develop new technologies and equipment in the field of hydrodynamic processes.**

SCIENTIFIC AND TECHNICAL COUNCIL OF PETON

In 2014, the PETON Scientific and Technical Council was created. The STC is a permanent advisory body that considers the main problems of the development of science and technology, forms, on the basis of systematic analysis, a science-based technical policy of PETON aimed at implementing programs for the development of the oil and gas industry, as well as further improving the experimental base, scientific, technical and industrial potential of the Holding for the development and implementation of modern technologies.

Main tasks of STC

Development of scientifically based recommendations on the formation of the scientific and technical policy of the Holding, incl. issues related to import substitution

Review and evaluation of advanced technical ideas and technological solutions

Preparation of recommendations for development of the Holding's resource, production and technological potential

Review and evaluation of long -range forecasts and development directions

Management of Technical Competence Centers

Review of applications for R&D

PETON Laboratory



PETON PATENTS

There are **135** Russian patent applications in total, **16** are under examination and **120** patents have been granted.

Name	Patent No.	Priority date
GAS TREATMENT		
Method for cleaning liquefied hydrocarbon gas from carbon dioxide	2469773	14.07.2011
Method for cleaning liquefied hydrocarbon gas from carbon dioxide	2488430	14.07.2011
Adsorption drying unit for liquid mercaptans	2569351	27.11.2013
Method for producing ethylmercaptan	2539652	13.12.2013
Zeolite regeneration gas treatment unit	2548082	12.02.2014
Method and unit for the purification of natural gas from carbon dioxide and hydrogen sulphide	2547021	20.02.2014
Method for the purification of natural gas impurities in its preparation for the production of liquefied methane, ethane and broad fractions of hydrocarbons	2602908	31.07.2015
Method and unit for the purification of natural gas from carbon dioxide and hydrogen sulphide	2624160	25.03.2016
Method for absorption purification of hydrocarbon gas from acidic components	2621754	15.08.2016
Adsorption drying unit for liquid mercaptans	2640233	21.03.2017
Multifuel fuel gas preparation system for powering an internal combustion gas engine	2682465	22.06.2018
Method for preparing natural ethane-bearing gas for transport in northern latitudes	2689376	30.11.2018
Unit for preparing ethane-bearing gas for transport in northern latitudes	2682647	05.12.2018
Method for purifying natural gas from impurities	2691341	28.12.2018
Distillation column heat supply system (options)	2725305	21.11.2019
Method and installation for adsorption drying and purification of natural gas	2717052	30.12.2019
Method for purifying natural gas from impurities	2751635	17.12.2020
Method for purifying natural gas from carbon dioxide and methanol impurities	2022113348	19.05.2022

Name	Patent No.	Priority date
GAS PROCESSING		
Method for gas separation	2483783	07.03.2012
Natural gas processing method	2560406	29.10.2013
Hydrocarbon processing plant in northern regions	2556691	19.08.2014
Natural gas processing cluster with helium recovery	2574243	17.12.2014
Method for the complex extraction of valuable impurities from natural helium-bearing hydrocarbon gas with increased nitrogen content	2597081	29.12.2014
Method for the complex processing of natural hydrocarbon gas with increased nitrogen content	2576428	12.01.2015
Method for processing natural hydrocarbon gas	2580453	25.03.2015
Multistream production for natural gas processing	2603874	25.03.2015
Method for processing natural hydrocarbon gas with varying nitrogen content	2597700	29.06.2015
Method for producing liquefied hydrocarbon gas	2607631	24.08.2015
Method and unit for preparation of de-ethanisation gas for transportation by pipeline	2612235	28.08.2015
Method for processing natural hydrocarbon gas	2613914	11.12.2015
Method and unit for variable de-ethanisation gas processing	2618632	16.12.2015
Method for processing natural gas with a low calorific value	2615092	24.03.2016
Method for separating a gas stream into individual components or fractions	2627849	22.07.2016
Method for separating a gas stream into individual components or fractions	2626354	25.07.2016
Production cluster for extraction and processing of offshore gas condensate	2635799	29.12.2016
Production cluster	2685099	06.11.2018
Complex for production, collection, processing and transportation of natural gases of a group of fields with different ethane content	2688530	28.12.2018
Method for processing natural gas that is characterized with a high content of acidic components	2705352	26.06.2019

Name	Patent No.	Priority date
Layout of the gas processing complex	2722255	06.08.2019
Complex for processing natural hydrocarbon gas into marketable products	2715838	01.10.2019
Complex for processing main natural gas into marketable products	2744415	06.08.2020
Complex for processing main natural gas into marketable products	2772595	07.10.2021
Complex for liquefaction, storage and shipment of natural gas with increased productivity	2774546	02.12.2021
OIL PROCESSING		
Method for separating the isopentane-pentane-hexane fraction	2478601	23.01.2012
Oil distillation method	2484122	20.03.2012
Method for separation of gases in the catalytic cracking of petrol	2479620	10.04.2012
Deep processing method for refinery hydrocarbon gas	2502717	13.07.2012
Method and unit for delayed coking of heavy oil residues	2541016	29.10.2012
Method for purification of exhaust gases from hydrogen sulfide	2526455	06.12.2012
Method of secondary hydrogen sulfide elimination from the viscosity breaking residue	2514195	29.01.2013
Light gasoline fraction isomerisation method	2533810	05.03.2013
Method and installation for C5-C6 hydrocarbon isomerisation, with supply of purified circulating hydrogen flow	2540404	09.07.2013
Method and installation for bitumen production	2562483	18.07.2013
Deep processing method for refinery hydrocarbon gas	2540270	20.12.2013
Method of hydrogen sulfide removal from degradation gases from the atmospheric vacuum and vacuum crude distillation units	2544993	24.12.2013
Method and installation for stabilization of unstable gas condensate mixed with crude oil	2546668	30.12.2013
Weathering and stabilization method for unstable gas condensate mixed with oil, with mercaptan absorption extraction	2548955	09.01.2014
Elementary sulphur production method and installation, with tail gas cleanup	2562481	29.01.2014
Hydrocracking method and installation, with production of motor fuels	2546677	27.03.2014

Name	Patent No.	Priority date
Crude oil primary distillation method and installation	2544994	10.04.2014
Oil, condensate and high molecular weight compound extraction method	2613644	30.12.2015
Method of oil, gas and condensate extraction from the well	2636988	28.09.2016
Light gasoline fraction isomerisation method	2646751	14.07.2017
Method of gasoline fraction separation during isomerisation	2680377	10.09.2018
Diesel fuel hydrotreatment method	2691965	25.01.2019
Diesel fuel hydro-skimming method	2729791	11.12.2019
PETROCHEMISTRY		
Multi-tonnage petrochemical cluster 2539977	2539977	19.12.2013
Petrochemicals Cluster	2550690	06.03.2014
Method of ethylene production from raw hydrocarbons	2548002	06.03.2014
GAS CHEMISTRY		
Gas processing and gas chemical facility	2570795	15.07.2014
Gas Chemical Cluster	2647301	25.05.2017
Petroleum and Gas Chemical Cluster	2652028	21.07.2017
Gas Chemical Facility	2648077	29.08.2017
Gas chemical production facilities for ethylene and propylene	2670433	29.12.2017
Gas Chemical Facility	2703135	07.03.2019
Gas Chemical Facility	2702540	15.03.2019
Gas chemical facility for polyethylene production	2710906	30.04.2019
Gas processing and gas chemical facility	2710228	23.08.2019
Gas chemical hydrogen production	2729790	28.02.2020
Facility for processing raw hydrocarbons from the fields located in challenging climatic conditions into gas chemical products	2771006	31.05.2021
Bound hydrogen marine transportation system	2763607	14.09.2021
Hydrogen production, storage and transportation facility	2768354	28.09.2021
Low carbon footprint fuel and energy scheme	2776579	19.10.2021
Bound hydrogen marine transportation system	2770042	23.12.2021

Name	Patent No.	Priority date
LIQUEFACTION		
Natural gas liquefaction, storage and shipment facility	2629047	17.10.2016
Multimodal terminal	2658256	29.08.2017
Liquefied natural gas storage and shipment method	2680914	20.11.2017
Natural gas liquefaction, storage and shipment facility	2670478	18.12.2017
Natural gas processing and liquefaction facility (options)	2702441	10.05.2018
Natural gas processing and liquefaction facility	2699160	28.12.2018
Natural gas processing facility, with regulated-quality liquefied natural gas production	2715126	31.05.2019
Gas Processing Cluster	2720813	10.12.2019
Integrated natural gas cooldown plant	2738531	21.02.2020
EQUIPMENT		
Pressure Filter	2534076	17.04.2013
Heat-exchange machine	2527772	18.07.2013
Unit of heat exchange machines of process installations of gas processing processes for earthquake prone districts	159488	07.10.2014
Dewatering unit for oil and refined products, gas condensate, liquid hydrocarbons	2569844	17.10.2014
Centrifugal collector for gas flow treatment from liquid phase drops	2618708	01.07.2016
Gas pumping unit	2685802	28.12.2017
Cryogenic Pipeline	2686646	13.07.2018
Gas pumping assembly exhaust system	2685158	19.07.2018
Vessels		
Column with plate-type contact unit	2482898	21.10.2011
Gas treatment adsorber	2569349	10.09.2014
Fractionating machine	2562482	10.09.2014
Settling tank for separating a heterogeneous gas (vapour)-liquid system	2573469	22.10.2014
Depositing tank for separation of the heterogeneous gas (steam)/ liquid system with low dispersion gas (steam) phase concentration in the liquid phase	2574622	28.10.2014
Mass transfer column with cross flow of liquid and gas phases	2602863	10.07.2015

Name	Patent No.	Priority date
Mass transfer column with cross flow of liquid and gas (steam) phases of the PETON system	2607730	02.11.2015
Method and column for absorption purification of gases from unwanted impurities	2627847	30.12.2015
Column-type extractor with regular reverse-flow head piece	2640525	08.06.2017
Adsorber for short-cycle nonheating adsorption process	2686142	13.07.2018
Ring adsorber	2683738	18.07.2018
Reactor		
Catalytic reactor	2674950	09.04.2018
Turbulent mixing reactor	2717031	06.12.2019
Internal contact devices		
Distributor for head piece irrigation	2541031	17.04.2013
Mesh tray for mass exchange units operating in gas-liquid and gas-liquid-liquid systems	2542265	14.11.2013
Contact device for thermal mass exchange and phase separation in sectioned crossflow packed columns in gas-liquid and liquid-liquid systems	2568706	17.10.2014
Vertical separator for the separation of heterogeneous gas-liquid systems of fog type	2577055	20.10.2014
Mass exchange plate	2738591	13.11.2019
Valve tray of a mass exchange column 2744742	2744742	09.07.2020

INTERNATIONAL APPLICATIONS

The Company holds **16 published international applications** and **2 international patents**.

Name	Publication no.	Priority date
GAS PROCESSING		
Multi-tonnage production for the processing of natural gases from various fields	WO 2015/065239	29.10.2013
Raw hydrocarbon refining plant for northern regions	WO 2016/028192	19.08.2014
Method of complex extraction of valuable impurities from helium-rich hydrocarbon natural gas with high nitrogen content	WO 2016/108731	29.12.2014
OIL PROCESSING		
Method and installation for bitumen production	WO 2015/009208	18.07.2013
Hydrocracking unit and method to produce motor fuels	WO 2015/147704	27.03.2014
Primary oil distillation unit and method	WO 2015/156701	10.04.2014
PETROCHEMISTRY		
Multi-tonnage petrochemical cluster	WO 2015/094013	19.12.2013

Name	Publication no.	Priority date
EQUIPMENT		
Heat exchange machines	WO 2015/009205	18.07.2013
Adsorber for gas purification	WO 2016/039664	10.09.2014
Fractionation unit	WO 2016/039665	10.09.2014
Contact device for heat/mass exchange and phase separation	WO 2016/060593	17.10.2014
Vertical separator for separating inhomogeneous mist-type gas/liquid systems	WO 2016/064302	20.10.2014
Settling tank for separating a heterogeneous gas (vapour)-liquid system	WO 2016/064304	22.10.2014
Settling tank for separating a heterogeneous gas (vapour)-liquid system	WO 2016/068753	29.10.2014
Mass transfer column with cross flow of liquid and gas phases	WO 2017/010916	10.07.2015
Absorption gas treatment method and column	WO 2017/116284	30.12.2015

Name	Publication no.	Priority date
Contact device for heat/mass exchange and phase separation	US 9,770,701 B2	17.10.2014
Heat/mass exchange and phase separation contact device	UZ IAP 2017 0188	17.10.2014
Mass transfer column of cross flow of liquid and gas (vapour) phases	US 10,350,510 B2	10.07.2015
Method for processing natural gas that is characterized with a high content of acidic components	UZ IAP 2020 0283	26.06.2019
Method and installation for adsorption drying and purification of natural gas	UZ IAP 2020 0412	30.12.2019



RESEARCH AND DEVELOPMENT WORKS

Gas and Liquid Hydrocarbon Processing Facilities

GAZPROM, PJSC

R&D: "Development of the Comprehensive Program for the Reconstruction and Technical Re-equipment of Gas and Liquid Hydrocarbon Processing Facilities for 2016-2020"

R&D: "Development of Proposals for the Technological Process of Fine Purification of Helium by the Short Cycle Heatless Adsorption Method". Development of the Main Technical Solutions for the Development of Energy-Efficient Heat-Exchange Equipment".

R&D: "Preparation of Proposals for the Main Technical Solutions for Heat-Exchange Equipment"

R&D: "Preparation of Proposals for the Major Heat-Exchange Equipment of Gas Liquefaction Process"

Pre-Investment Study: Feasibility study for the Construction of an LNG Plant on the Black Sea Coast Region (Krasnodar Territory)

Gas treatment units of gas-condensate fields

GAZPROM, PJSC

R&D: "Conducting Research and Development of Equipment for Intensive Degassing with Preliminary Separation of Liquid-Gas Mixtures for Gas Treatment Units of Gas-Condensate Fields"

Legal framework for oil and gas industry

STO Gazprom development

R&D: "Development of Regulatory Documents for Maintenance and Repairs of Process Equipment at the Facilities the Processing of Gas, Gas Condensate and Oil of PJSC GAZPROM"

Main gas pipeline "The Power of Siberia"

Pre-investment study: "Technical and Economic Analysis of Construction of Packaged Units for Isolation of Helium from Fuel Gas Supplied for the Needs of Compressor Stations of the Main Gas Pipeline 'The Power of Siberia'"

Gas-condensate fields

Development of GOST R

R&D: Technical and Economic Analysis of the Prospects of Development of the High Molecular Raw Material Resources at Gas-Condensate Fields. Conducting Research for Determining the Composition of Separator Gas, Unstable Gas Condensate and Formation Gas

The work is aimed at ensuring the design volumes of gas and liquid hydrocarbons processing; guarantee of product quality compliance with the requirements of the technical regulations of the Russian Federation and foreign standards; compliance with the norms and instructions of supervisory authorities; compliance with the industrial and fire safety requirements of gas and liquid hydrocarbon processing facilities of PJSC Gazprom's processing sub-sector for 2016-2020.

The work on the project resulted in the development of a set of national standards for determining the detailed component-fractional composition of the separation gas, unstable gas condensate and gas condensate mixture, including the presentation of component-fractional compositions in two different formats: including the separation of non-hydrocarbon and sulfur-containing components, methanol, C1-n hydrocarbons - C5 in the form of individual components, hydrocarbons from C6 and above; in the form of fractions formed by the number of carbon atoms in a hydrocarbon molecule or by boiling points, and including the presence in the compositions. The procedure for determining the fractional composition of C5+ hydrocarbons in unstable gas condensate and gas condensate mixture is harmonized with the International Standard ISO 3924 Petroleum Products. Determination of Boiling range Distribution. Gas Chromatography Method, taking into account the needs of the national economy of the Russian Federation and the peculiarities of national standardization.

PARTNERS

LLC Gazprom Pererabotka PJSC

VNIPIgazdobycha

Federal State Unitary Enterprise VNIIM named after D.I. Mendeleev JSC

Giprospetsgaz

Gazprom VNIIGAZ LLC

VolgoUralNIPIgaz LLC

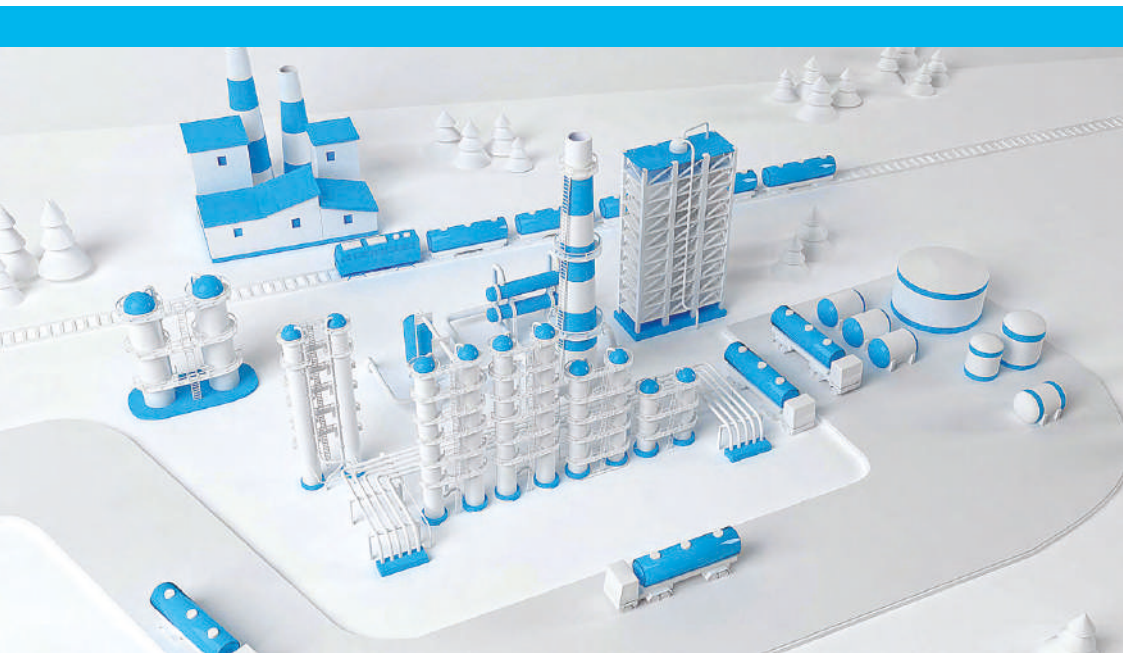


TECHNOLOGIES

GAS

Technological Engineering Holding PETON has the following licensed technologies related to gas refining:

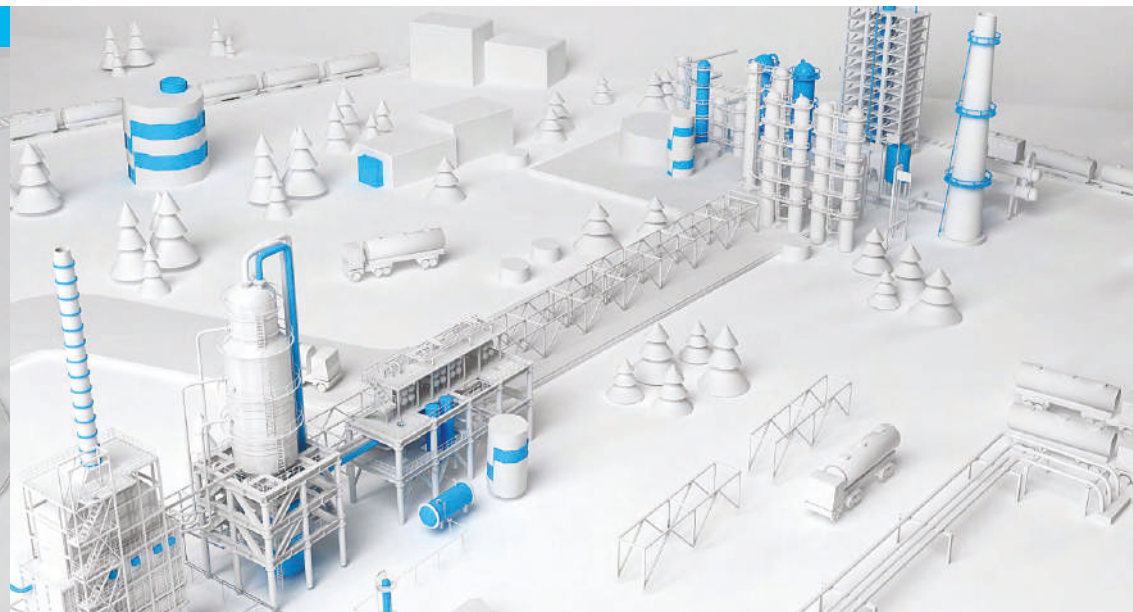
- gas absorption treatment technology
- technology of low-temperature separation of gas with external refrigeration cycle
- technology of low-temperature separation of gas with internal refrigeration cycle
- technology of gas dehydration using glycols
- zeolite dust cleaning technology for regeneration gas
- technology for LPG production from natural gas
- technology for producing ethane from natural gas
- GC stabilization technology
- NGLs fractionation technology
- technology for extraction purification of liquefied gases and NGLs from acidic components



OIL

Technological Engineering Holding PETON has the following licensed technologies related to oil refining:

- Oil Fractionation with Reflux "Cross-flows" between Columns
- Refinery Fuel Gas Deep Conversion in Ethylene Gasoline Field
- Fractionation at C_5-C_6 Isomerization
- C_5-C_6 Isomerization with Purification of Hydrogen Recycle
- Gas Fractionation during Catalytic Cracking
- Fractionation for Production of AI-95 Gasoline as per EURO-5 Standard
- Deasphalted Oil and Solvent Purification in the Process of Selective Oil Tar Deasphaltizing
- Hydrocracking Products Fractionation
- Hydrogen Recycle Purification during Hydrocracking



GAS PROCESSING

GAS ABSORPTION TREATMENT TECHNOLOGY

Purpose of the Technology

The technology makes it possible to deeply or selectively purify natural and associated gases from H_2S and CO_2 using alkylamines (MEA, DEA, MDEA and their mixtures) at various pressures, from 0.1 MPa and above, and at various temperatures from 5°C and above. The technology is applicable for almost any concentration and any ratio of $H_2S:CO_2$.

Description of the Technology

The feed gas passes through the raw gas separator (1) to the absorber (2), into which the regenerated amine is fed. The purified gas is removed from the plant through a separator (3). The saturated amine solution enters the expander (4), where hydrocarbon gases are released; after heating in the amine-amine heat exchanger, the specified solution enters the regenerator (5). Acid gas is removed from the upper part of the regenerator, and the regenerated amine solution is cooled and fed to the absorber (2) for irrigation. Licensors SRDI O&G Peton LLC, Russia, Ufa.

Why PETON technology is better than standard technology

All devices use a PETON cross-flow packing; numerous examples of practical implementation have proven that this packing is in all respects the best contact device for this process; amine is cooled using licensed PETON high efficiency air cooler unit (ACU) sections; mechanical impurities and degradation products up to 5 microns in size are removed from saturated amine due to "in-line" filtration on PETON filters.

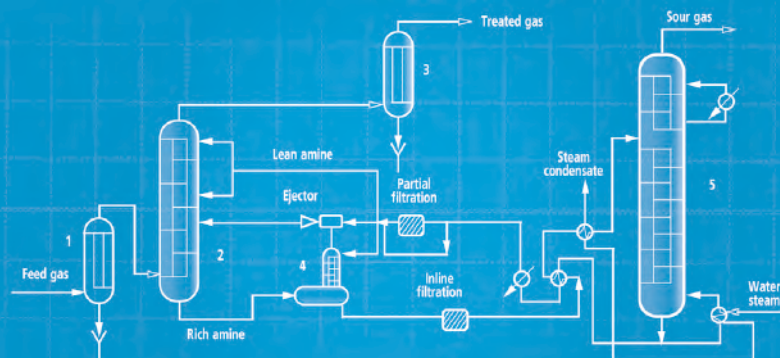
Automatic flushing of these filters is provided, including the collection and removal of cake, to completely eliminate problems with clogging of the apparatus and operate them non-stop for at least 4 years; the temperature of the saturated amine rises to a maximum level, not lower than 105°C, due to the fact that it is additionally heated by steam condensate at the inlet to the regenerator; return to the absorption of the expander gas is due to the ejection of the flow of amine rather than its additional treatment.

Advantages of the Technology

Deep amine purification ensures the production of purified gas with the content of H_2S not more than 2-5 ppm and CO_2 as low as 2 to 150 ppm. With selective purification, the content of H_2S is also low, and CO_2 remains up to 60% in the purified gas. More than a decade of operation of more than a hundred devices equipped with PETON packings confirmed that plants based on PETON technology are simple and reliable in operation, they have a high throughput in terms of absorption gas to be purified.

Industrial Use

30 plants for amine treatment of natural and associated gases with a total capacity of up to 80 billion m^3 per year use PETON technology at enterprises in the Russian Federation, Turkmenistan, Uzbekistan and Kazakhstan. Some businesses have increased productivity by 50% through the use of technology.



GAS PROCESSING

TECHNOLOGY OF LOW-TEMPERATURE SEPARATION OF GAS WITH EXTERNAL REFRIGERATION CYCLE

Purpose of the Technology

The technology is designed for gas stripping by low-temperature separation with an external refrigeration cycle.

Description of the Technology

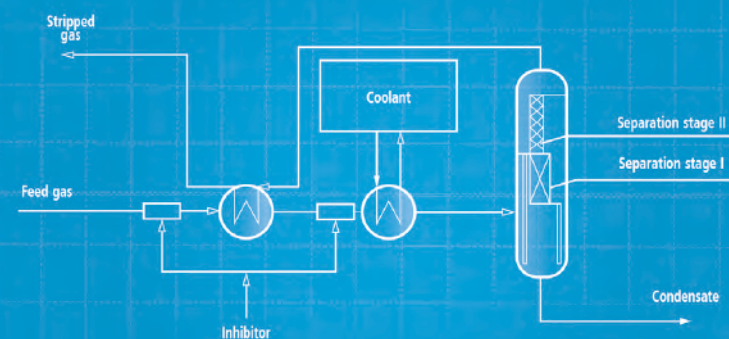
Two-stage gas separation in one apparatus is provided by using an external refrigeration cycle using various types of refrigerants (single-component, multi-component, mixed), which provide a cooling temperature from minus 10°C to minus 30°C. The cooled raw material, which contains up to 200 g/ m^3 of liquid hydrocarbons, enters the first separation stage, from where the inhibitor saturated with moisture is taken, as well as the bulk of liquid hydrocarbons. At the second stage of separation, a packing with a higher specific surface and a larger cross section is used to let the gas flow through. Due to this, the gas velocity is reduced, which eliminates the possibility of liquid entrainment. Due to the circulation of part of the liquid hydrocarbons between the first and second stages of the operation, their deep removal from the gas is put into effect. The liquid from each stage enters the cubic part of the separator, from where, together with the inhibiting agent, it is removed for separation. As a result, a high degree of gasoline extraction from gas is achieved. Moreover, up to 98% of mechanical particles as large as 5 microns are removed from gas. Licensors SRDI Oil & Gas Peton, LLC, Russia, Ufa.

Advantages of the Technology

The PETON technology allows to achieve high efficiency of gas separation and purification from mechanical impurities in a wide range of pressure variation and crude capacity. The range of stable operation of the separator is from 60 to 140% of the nominal capacity. A conducted comparative test of separators on the single-type low-temperature separation units (LTS) with a capacity of 4 million m^3 per day illustrated the advantage of PETON technology and equipment in comparison with other well-known suppliers. The structural design of separators with the use of PETON technology allows you to work in the most difficult conditions, ensuring a separator service life of at least 10 years.

Industrial Use

The PETON technology has been implemented and successfully operated for more than 10 years at 4 LTS units of Uzbekneftegaz National Holding Company with a total gas production rate of 10 billion m^3 per year.



GAS PROCESSING

TECHNOLOGY OF LOW-TEMPERATURE SEPARATION OF GAS WITH INTERNAL REFRIGERATION CYCLE

Purpose of the Technology

The technology is designed for gasoline extraction from gas by the method of low-temperature separation with an internal refrigeration cycle.

Description of the technology

Double-stage gas separation in one apparatus is brought about through the use of an internal refrigeration cycle due to isenthalpic expansion of gas in throttle devices with a cooling temperature from minus 10°C to minus 25°C or isentropic expansion of gas in expanders with a cooling temperature from minus 10°C to minus 50°C. Combined cooling is possible. After cooling, the raw material containing up to 200 g/m³ of liquid hydrocarbons arrives at the first separation stage, from which the main mass of liquid hydrocarbons is taken, as well as the inhibiting agent saturated with moisture.

A fitting-on with a higher surface area and a larger cross section is used at the second separation stage that allows gas to pass through the fitting-on, reducing the gas velocity, which eliminates the possibility of liquid entrainment. Due to the circulation of part of the liquid hydrocarbons between the first and second separation stages, their deep removal from the gas is put into effect. The liquid from each stage enters the cubic part of the separator, where from, together with the inhibiting agent, it is removed for separation.

For the prevention of hydrate formation, mono-, diethylene glycol or methyl alcohol are applied. At all separation stages, including the coalescence stage, the appropriate types of PETON cross-flow fitting-on are used.

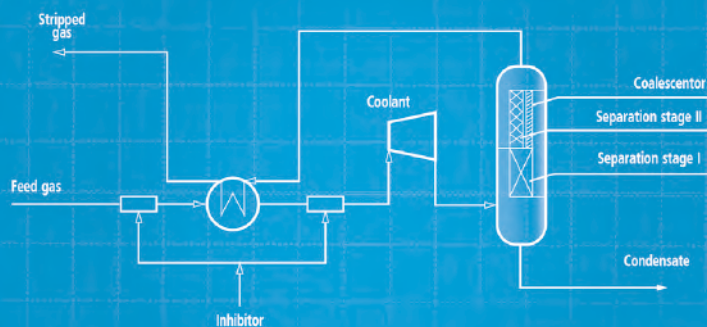
The used thus principle of cross-flow gas flow and the liquid withdrawal from directly within the volume of the fitting-on eliminates the phenomenon of liquid reentrainment and allows the maximum extraction of the liquid phase from the gas (at the level of 99.9% of the equilibrium content). Moreover, up to 98% of mechanical particles as large as 5 microns and up to 80% of aerosols as large as 0.5 microns are removed. The operation of the apparatus is stable even with salvo emissions of liquid, where the nominal value of impurities is exceeded by dozens of times. Licensor SRDI O&G Peton LLC, Russia, Ufa.

Advantages of the Technology

The PETON technology allows to achieve high efficiency of separation in a wide range of pressure variation and crude capacity. The range of stable operation of the separator is from 60 to 140% of the nominal capacity. A conducted comparative test of separators on the single-type low-temperature separation units (LTS) with a capacity of 4 million m³ per day illustrated the advantage of PETON technology and equipment in comparison with other well-known suppliers. The structural design of separators with the use of PETON technology allows you to work in the most difficult conditions, ensuring a separator service life of at least 10 years.

Industrial Use

The PETON technology has been implemented and has been successfully operated for more than 10 years at 6 NTS units of NHC Uzbekneftegaz with a total gas capacity of 12 million m³ per day.



GAS PROCESSING

TECHNOLOGY OF GAS DEHYDRATION USING GLYCOLS

Purpose of the Technology

Glycol dehydration of gases of natural, petroleum and synthetic origin, having different moisture content, to a dew-point temperature (DTP) of minus 40°C.

Description of the Technology

According to this technology, gas dehydration and glycol regeneration are conducted in vertical vessels equipped with a PETON fitting-on. Degradation products and water-soluble salts are continuously removed from the glycol to ensure the long run of the apparatus. The rich glycol is completely cleaned by the salt-retentive filter (1). The lean glycol is partly cleaned with a fine filtration filter (2), the rest operation of the installation is classical. Deep dehydration up to DTP minus 30-40°C of gas by means of glycol can be achieved due to the high efficiency of the PETON fitting-on, specially designed for this system. The gas production rate of the absorbing tower with the PETON fitting-on is twice that of the absorbing tower with trays. To reduce the loss of glycol with dehydrated gas to equilibrium values in the absorbing tower, a special PETON demister of hyperfine purification is applied. The dimensions of the plant, even for large gas volumes, shall be negligible. This makes it possible to place it on sites with limited dimensions, such as offshore platforms. Licensor SRDI O&G Peton LLC, Russia, Ufa.

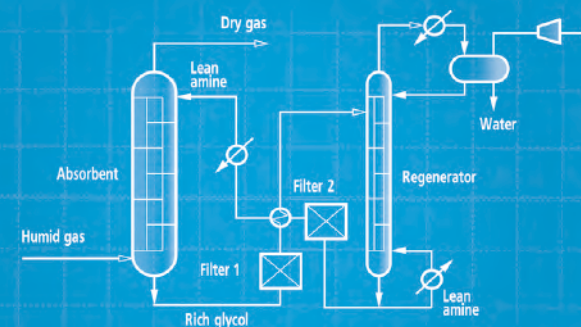
Advantages of the Technology

PETON technology in dehydration reduces specific energy consumption by 10% and capital expenditures by 30% compared to known technologies. The non-stop running time of the plant is at least 4 years.

Industrial Use

Glycol absorption dehydration using PETON technology has been adopted for implementation in Uzbekneftegaz National Holding Company for three natural gas dehydration plants with total capacity of 12 million m³ per day.

At Lukoil's gas processing plant, the PETON technology is used to dehydrate cracking gas to a dew point of minus 40°C.



GAS PROCESSING

ZEOLITE DUST CLEANING TECHNOLOGY FOR REGENERATION GAS

Purpose of the Technology

Deep adsorption dehydration of natural, petroleum and synthesis gases with various moisture contents to a dew point of minus 100°C, including a unit for additional regeneration gas cleaning from zeolite dust.

Description of the Technology

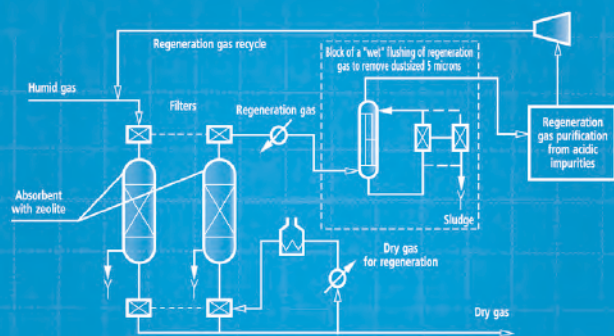
The PETON technology provides for retrofitting of various typical gas dehydration schemes with a modular unit for "wet" regeneration gas scrubbing from zeolite microparticles (up to 5 microns). These impurities are almost impossible to catch with conventional filters after adsorbers. In addition, gas scrubbing makes it possible to remove water-soluble salts that accumulate on zeolites over time. These impurities impede the operation of the regeneration gas recirculation compressor and also interfere with this gas cleaning process if acidic impurities are present in the feed gas. The regeneration gas is scrubbed in a separator with a PETON head piece. Water is used as scrubbing liquid, which is then filtered in PETON filters. Up to 99% of the zeolite microparticles are removed during filtration. The unit operates in automatic mode with backwashing of filters and collection of sludge in the container. Licensor SRDI O&G Peton LLC, Russia, Ufa.

Advantages of the Technology

The PETON regeneration gas cleaning unit ensures stable and reliable operation of the compressor and gas cleaning assembly. The payback period does not exceed six months. The non-stop running time of the unit is at least 5 years. The greatest effect is achieved at facilities of high capacity, from 2 billion nm³ per year.

Industrial Use

The PETON technology is implemented at Uzbekneftegaz National Holding Company for natural gas with a total capacity of 20 billion nm³ per year.



GAS PROCESSING

TECHNOLOGY FOR LPG PRODUCTION FROM NATURAL GAS

Purpose of the Technology

The PETON technology is designed to produce LPG by low-temperature condensation and rectification (LTC and LTR).

Description of the Technology

The fundamental differences of this PETON technology for LTC and LTR processes include:

- use of PETON cross-flow packings in the deethanizer column and two separators in order to increase the efficiency of mass transfer;
- a special scheme of operation of the deethanizer column (three-level feeding of feed streams of different composition is applied, additional circulation irrigation in the upper section of the column is arranged in order to improve the temperature control);
- use of a multi-flow cooler, which makes it possible to effectively recover the expansion gas cold and further reduce the gas temperature in the turbo-expander (TEA) by 2-3°C, compared to other known technologies.

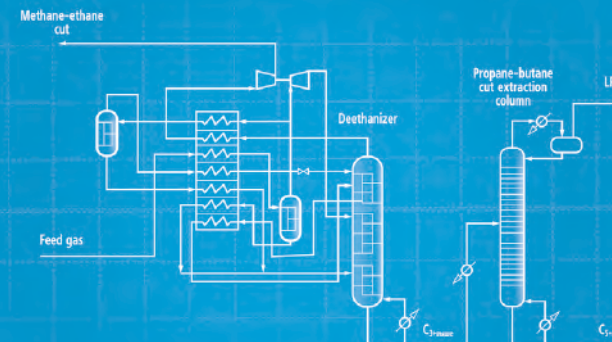
To prevent hydrate formation, methanol is injected using a multipoint injection scheme, which significantly reduces methanol consumption and the final methanol content in the resulting LPG to 50 ppm. This technology allows for the LPG recovery of 99.5% of the potential. Licensor SRDI O&G Peton LLC, Russia, Ufa.

Advantages of the Technology

The energy-saving PETON technology achieves high separation efficiency over a wide range of pressure changes and feed stock capacity. PETON cross-flow packings increase the efficiency of mass transfer by independently adjusting the steam and liquid passages, and reduce heat transfer and steam removal operating costs due to the lower pressure drop inherent in cross-flow packings. Both high-efficiency PETON packings and disk-shaped contact devices can be used in the debutanizer to reduce energy costs by reducing the amount of liquid and steam irrigation. Comprehensive technical solutions in terms of multistream cooler, turbo expander and high-efficiency disk-shaped contact devices and packings allow reducing energy costs, eliminating additional expensive propane cooling plant and increasing the degree of LPG recovery. The range of stable operation of separation and rectification equipment varies from 60-140%. The cost of a facility using PETON technology is 20% lower than in the case of other known solutions at the same depth of extraction of LPG.

Industrial Use

The PETON technology is implemented in two plants for production of propane/butane mix of Uzbekneftegaz National Holding Company with a total capacity of 6 billion m³/year.



GAS PROCESSING

TECHNOLOGY FOR PRODUCING ETHANE FROM NATURAL GAS

Purpose of the Technology

The PETON technology is used to produce ethane from natural gas by low-temperature condensation and rectification (LTC and LTR).

Description of the Technology

The fundamental differences between the PETON technology and the classical LTC and LTR processes are as follows:

- use of PETON cross-flow packings in the demethanizer, deethanizer columns and two separators in order to increase the efficiency of mass transfer;
- a special scheme of operation of the demethanizer column (three-level feeding of feed streams of different composition is applied, additional circulation irrigation in the upper section of the column is arranged in order to improve the temperature control);
- use of a multi-flow cooler, which makes it possible to effectively recover the expansion gas cold and further reduce the gas temperature in the turbo-expander (TEA) by 2-3°C, compared to other known technologies.

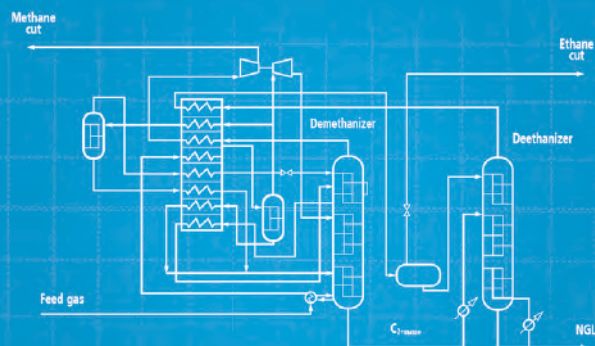
To prevent hydrate formation, methanol is injected using a multipoint injection scheme, which significantly reduces the total consumption of methanol. This technology allows for the ethane recovery of 99% of the potential. Licensor SRDI O&G Peton LLC, Russia, Ufa.

Advantages of the Technology

The energy-saving PETON technology achieves high separation efficiency over a wide range of pressure changes and feed stock capacity. PETON cross-flow packings increase the efficiency of fractionation and ethane recovery degree by independently adjusting the steam and liquid passages, and reduce heat transfer and heat removal operating costs due to the lower pressure drop inherent in cross-flow packings. The pressure drop in the packing does not exceed 5 mm Hg. Technical solutions in the use of a multi-flow cooler, turbo expander and PETON packing allow for reduction of energy costs and elimination of the need for an additional expensive propane refrigeration system. The range of stable operation of separation and rectification equipment varies from 60-140%. The cost of a facility using PETON technology is 20% lower than in the case of other known solutions at the same length of extraction of ethane.

Industrial Use

The PETON technology is implemented in two plants for production of propane/butane mix of Uzbekneftegaz National Holding Company with a total capacity of 6 billion m³/year.



GAS PROCESSING

GAS CONDENSATE STABILIZATION TECHNOLOGY

Purpose of the Technology

Removal of light hydrocarbons, hydrogen sulfide and mercaptans from the unstable gas condensate coming from the GPP field and plants to the requirements for commercial products.

Description of the Technology

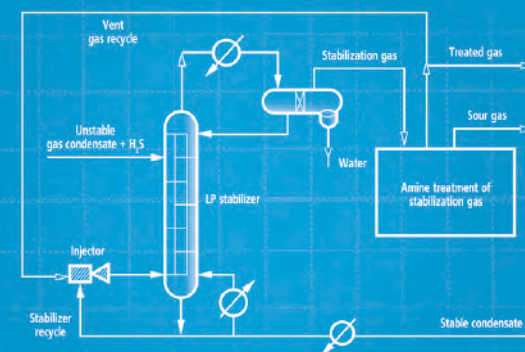
The difference between the PETON approach compared to conventional technologies, in which either stripping the stabilized output with the inner gas recycle with purification from hydrogen sulfide, or heating the bottom of the column by heat input into the boiler, is a simultaneous combination of these methods. This allows the condensate stabilization process to be implemented at a lower pressure, thereby reducing energy consumption. This method is realized due to the complex of process solutions: return of stripping gas to the column by injecting part of the hot stream of stabilized output; absorption purification of stripping gas recycle from hydrogen sulfide and mercaptans under atmospheric pressure to the quality typical for main gas using the PETON technology; removal of dissolved gas from the recycled stabilized output to equilibrium state by "degassing" liquid on the PETON packing in the bottom part of the column. Licensor SRDI O&G Peton LLC, Russia, Ufa.

Advantages of the Technology

Application of this technology reduces capital expenditures for a facility with gas condensate capacity of more than 100 thousand tons per year by 20% compared with conventional technologies. The selection of stable gas condensate increases due to the quality of fractionation when using cross – flow nozzles.

Industrial Use

This technology is proposed for the technical re-equipment of stabilization units in the total volume of up to 2 million tons/year at the plants of petrochemical complex "Uzbekneftegaz" and PJSC "Gazprom".



GAS PROCESSING

NGLS FRACTIONATION TECHNOLOGY

Purpose of the Technology

Providing highly efficient fractionation of LHG (NGLs) with the production of pure or ultrapure products: propane, butane, isobutane, propane-butane mixture (LPG) and C_{5+} gas gasoline.

Description of the Technology

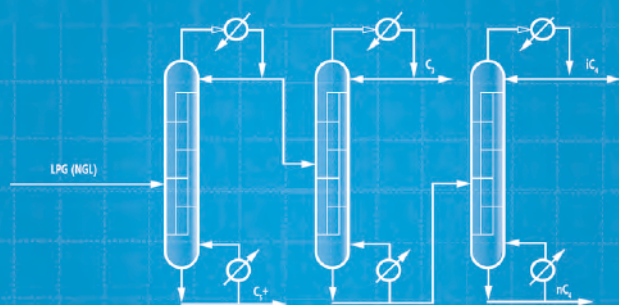
An important problem at NGLs separation plants is a shortage of key products and non-compliance with the required quality due to significant fluctuations in the composition of the feedstock. This is especially inherent in powerful installations where raw materials come from different sources. PETON technology solves this problem. The use of the PETON cross-flow nozzle in the fractionation columns of the NGLs fractionation unit completely eliminates this problem. Unlike cymbals, the PETON nozzle has a wider range of stable operation from 10% to 150% and the ability to provide high efficiency over a wide range of vapor-liquid loads. Installations where PETON nozzles are used provide a potential selection of propane, butane, isobutane and their mixtures of at least 99.6%. Licensor SRDI O&G Peton LLC, Russia, Ufa.

Advantages of the Technology

Columns with a PETON nozzle, in comparison with poppet columns, with the same diameter of the device, can increase the productivity of the installation by 10-15% and reduce the specific heat consumption by 10-20%. The cost of columns with a PETON nozzle is 10-15% lower than with trays, since the mass of auxiliary parts, supports, etc. is significantly reduced.

Industrial Use

PETON technology has been implemented at two NGLs separation plants with a capacity of 1.1 million and 0.8 million tons/year at the Gas processing plant of Gazprom PJSC and Bashneft PJSC, respectively. It is also being implemented at the NGLs separation plant with a capacity of 1.2 million tons/year in PJSC Lukoil.



GAS PROCESSING

TECHNOLOGY FOR EXTRACTION PURIFICATION OF LIQUEFIED GASES AND NGLS FROM ACIDIC COMPONENTS

Purpose of the Technology

Purification of liquefied petroleum gas (LHG) or NGLs of various compositions, in tons.h. containing ethane, from impurities of hydrogen sulfide, mercaptans and carbon dioxide, by extraction with an aqueous solution of amines with various additives.

Description of the Technology

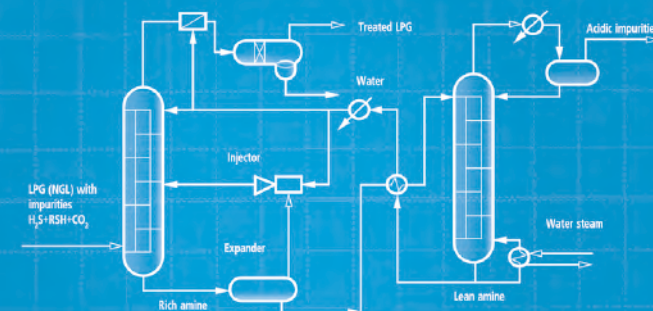
The technology provides for the use of PETON nozzles in the extractor. The use of this nozzle ensures the purification of LHG (or NGLs) from H_2S , RSH and CO_2 to "traces" with the simultaneous or separate presence of these impurities. To minimize the presence of light hydrocarbons in the acid gas, for example, for the possibility of dumping CO_2 onto a candle without additional combustion in furnaces, an expander is used, after which the expander gas is returned to the purification process by injection with regenerated amine. The technology makes it possible to obtain purified LHG that fully meets the requirements for raw materials for the production of ethylene and LPG without any additional purification from impurities. The technology makes it possible to produce purified liquefied gas with a minimum moisture content, at the level of 50 ppm, due to its coalescence in a two-phase separator. Deeper drying of the LHG, if necessary, is carried out with methanol, glycols or zeolites. Licensor SRDI O&G Peton LLC, Russia, Ufa.

Advantages of the Technology

Capital expenditures on the facility with a capacity to produce NGLs of more than 100 thousand tons/year when using this technology is reduced by 50%, compared to the technology where part of the NGLs is purified from acidic impurities in an amine absorber. PETON technology ensures reliability of LHG (or NGLs) purification regardless of fluctuations in the composition of feedstock.

Industrial Use

This technology is used by Gazprom PJSC for deep removal of acidic impurities from propane and LPG at a NGLs separation plant with a capacity of up to 1 million tons/year.



OIL PROCESSING

OIL FRACTIONATION WITH REFLUX "CROSS-FLOWS" BETWEEN COLUMNS

Purpose of the Technology

The technology is aimed at achieving maximum productivity of the refining process of oil, gas condensate and their mixtures with the production of straight-run fuel fractions of the required quality at a reduced specific heat capacity of furnaces.

Description of the Technology

In the process, a method of oil distillation is implemented with an "overflow" of reflux streaming down from the concentration part of the columns, and their gravity supply to the next column with a lower pressure. The figure shows a VDU with the "overflow" of the entire reflux flowing from the topping column (1) into the lower irrigation zone of the atmospheric column (2), and the "overflow" of of a certain part of the reflux from the concentration part of the atmospheric column into the distillation part of the vacuum column (3). The "overflows" are supplied into the column, bypassing the feedstock heaters. It reduces heat consumption, in the absence of any negative impact on the selection and quality of distillates. The volume flow rate of the "overflow" is adjusted according to the variation of the fractional composition and may amount to as much as 10% of the supplied feedstock.

The greatest economic effect from the implementation of this technology is achieved when processing gas condensate or its mixture with oil. Modernization of the units being in operation requires small expenses at a significant economic effect. The increase of a VDU capacity in terms of feedstock may reach up to 10% of the nominal value. Licensor SRDI O&G Peton, LLC, Ufa, Russia.

Advantages of the Technology

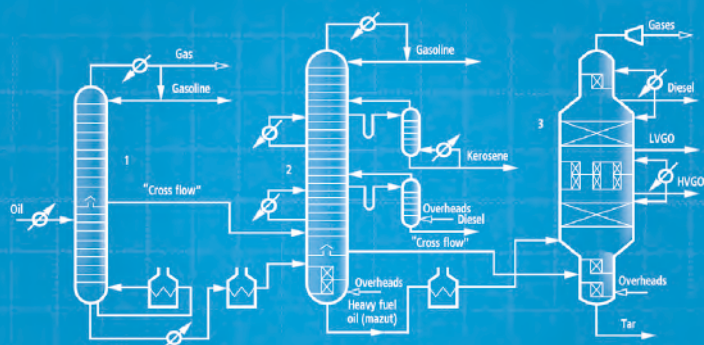
Columns with PETON packing, compared to tray columns, with a similar diameter of the apparatus, may increase the unit performance by 10-15% and reduce the specific heat consumption by 10-20%. The cost of columns with PETON packing is 10-15% lower than of those with trays, since the weight of the auxiliary parts is significantly reduced (supports, etc.)

Economic factors,

Reduction of capital expenditure, million RUR **20-25**
 Reduction of heater thermal capacity, % of nominal value **to 10**
 Reduction of water vapor consumption, % of nominal value **to 15**
 Project payback period, month **1-2**

Industrial Use

The process is in operation at 4 AT and VDU units with the overall capacity of up to 9,6 million tons/year at PJSC "Gazprom", PJSC "Gazprom Neft" and at the refinery with the capacity of 600 thousand tons/year in Kazakhstan for gas condensate processing. It was accepted for implementation by PJSC "Lukoil" within a VDU with the capacity of up to 9,0 million tons/year.



OIL PROCESSING

TECHNOLOGY OF ADVANCED PROCESSING OF REFINERY FUEL GASES IN THE ETHYLENE-GASOLINE DIRECTION

Purpose of the Technology

The expedient use of the refinery's hydrocarbon gas produced at various process units refineries to obtain valuable raw materials of petrochemistry and oil refining in the ethylene-gasoline direction. Several optimized process scenarios have been developed for one or a group of refineries of different capacities, taking into account the compensation of the fuel network with natural gas.

Description of the Technology

Refinery methane-containing gases (RMCG) from various process units are collected at the dedicated facilities (1) within the refinery for treatment. With the help of PETON technology, hydrogen sulfide, mercaptans and carbon dioxide are almost completely removed from ethane-containing gas due to the use of amine. Other undesirable impurities are removed by catalytic cleaning. After that, the treated gas is compressed and sent to the gas processing plant (GPP), where it is dried on zeolites until its dew point temperature (DPT) is minus 80°C and undergoes the low-temperature rectification by means of the PETON technology with the use of an expander-booster and recovery of ethane up to 98% of the potential. Hydrogen-containing refinery gas (HCRG) is also recovered at the GPP, which is returned to the fuel network of the plant, for example, through the recovery of hydrogen at the PSA installation. A mixture of hydrocarbon gases (LPG), recovered at the GPP, is sent to the GPP, where CPBM, PPF, BBF and RECG are

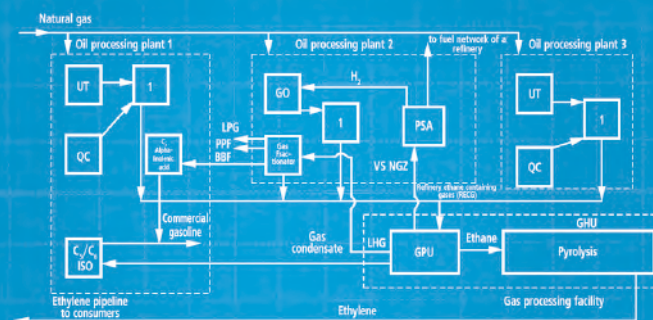
recovered. CPBM is a commercial automobile natural benzene. BBF enters the process with 4-alkylation (With 4-ALA) to produce commercial gasoline. PPF is sent to the production of polypropylene. The ethane fraction is sent to a gas chemical plant (GCP) to obtain ethylene pyrolysis at the plant, which enters the ethylene pipeline. Gas condensate enters C₅-C₆ isomerization (C₅-C₆-ISO) to produce high-octane commercial gasoline. Licensor SRDI O&G Peton, Russia, Ufa.

Advantages of the Technology

The greatest effect is achieved when implementing technology for one or more refineries with an oil refining volume of 20 million tons/year, and a distance between plants of up to 160 km. In this case, the production of ethylene will be at least 200 thousand tons/year. The costs will pay off in 2 years. The required volume of natural gas purchases to compensate for the fuel network of the refinery will not exceed 600 thousand nm³ per year.

Economic factors,

Necessary investments
 excluding the gas pipeline, billion rubles **6-8**
 Operating costs, billion rubles/year **to 2**
 Expected sales volume of additional products, billion rubles/year **to 10-12**
 Annual profit, billion rubles **4-5**
 Project payback period, years **at level 2**



OIL PROCESSING

FRACTIONATION AT C_5 - C_6 ISOMERIZATION

Purpose of the Technology

PETON fractionation technology for the process of C_5 - C_6 isomerization is aimed at the maximum increase in the octane number (ON) of gasoline by creating optimal conditions for the operation of the catalyst and reducing energy consumption.

Description of the Technology

The technology provides for fractionation of raw materials and isomerization products with separate production of "raw" and "product" isopentane, separation of the "pentane" fraction in the DIP+DP column and its supply together with the "hexane" fraction obtained in the DIG column for repeated isomerization. When processing gasoline of straight – run and secondary origin, their separate fractionation is provided. Licensor SRDI O&G Peton, Russia, Ufa.

Example

When applying a fraction of 40-80°C of straight-run origin for isomerization, "raw" isopentane is first released in the DIP column. The bottom product is sent to the mixing unit with "hexane" and "pentane" recycles and hydrogen. Next, this mixture enters the isomerization reactor unit. Hydrogen, depending on the properties of the catalyst, can be supplied in a small volume only by feeding fresh or in a large volume due to its circulation. From the reactor unit, the stabilized isomerizate enters the DIP+DP column. Raw materials – a fraction of 40-80°C of secondary origin – are fed into this column to remove components that "inhibit" isomerization. Distillate is selected in the column – "product" isopentane, on the side – the "pentane" fraction, and the bottom product is sent to the DIG column. In this column, the target

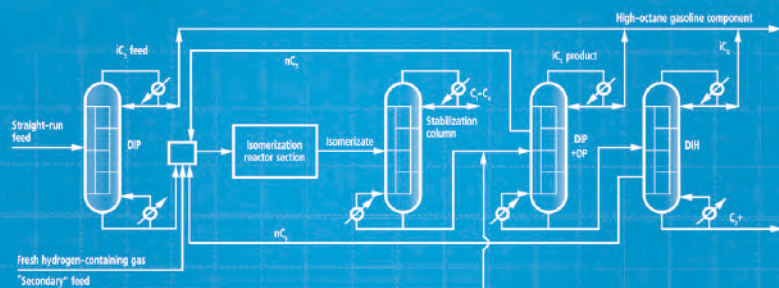
isohexanes are removed overhead, the "hexane" fraction is removed from the side, and hydrocarbons C_7 and higher remain in the bottom. The production of fractions in which the extremely low presence of undesirable impurities is steadily maintained is provided by a combination of the following solutions: the proper effectiveness of the columns is created through the use of the PETON packing, the efficiency of which exceeds the capabilities of the trays; low pressure in the columns, at the level of 0.5-0.6 atm, even in hot summer, is maintained through the use of air coolers with sections specially designed for these conditions. Maintaining a stable temperature of the bottom with various methods of heat supply: "hot jet", heat transfer agent circulation, water vapor supply – is carried out through the process solutions.

Advantages of the Technology

The technology makes it possible to obtain an isohexane fraction with ON 93-94, and also due to the isomerization of light gasoline fractions of secondary origin, this technology allows to involve low-octane gasoline fractions (raffinate, etc.) into the process of developing marketable products according to the EURO-5 standard. The specific energy consumption for fractionation based on 1 ton of products is 0.8-1.0 Gcal/t, and the specific capital costs are 4-5 thousand \$/t. The payback period is not more than 0.5 years.

Industrial Use

The technology was applied at 2 isomerization plants (the Isomalk process) in PJSC "Bashneft" with a total capacity of up to 1.0 million tons/year.



OIL PROCESSING

 C_5 - C_6 ISOMERIZATION WITH TREATMENT OF HYDROGEN RECYCLE

Purpose of the Technology

The proposed technology is a modification of the classical method of C_5 - C_6 isomerization, where the hydrogen recycle is used to maintain the molar ratio of hydrogen / raw materials on the catalyst at the level of 0.01-10. This technology eliminates the problem of the decrease in the catalyst effectiveness due to the accumulation of impurities in the hydrogen recycle effluent which inhibit the isomerization reaction. As a result, the production of end products increases. According to the technology patented by SRDI Oil & Gas Peton, LLC, impurities may be removed in various ways: by membrane treatment, absorption using our own or third-party sorbent, low-temperature separation.

Description of the Technology

The figure shows the technology of selective removal of the end isohexane from the hydrogen flow by absorption method by feeding the absorbent specially allocated in the fractionation unit. The rest of the scheme remains classic for this process. The hydrogen recycle flow leaving the reaction section contains 8-10 wt. target isohexane, namely 2,2-DMB.

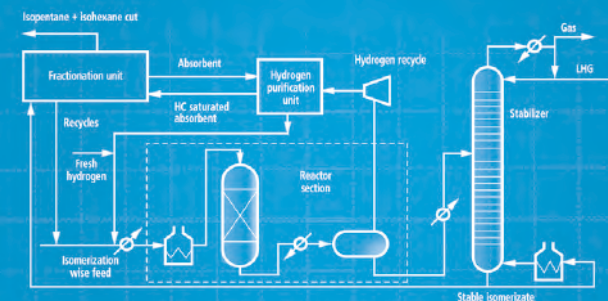
Its presence in the raw material significantly reduces the conversion of target isohexanes and significantly increases the cost of further fractionation. To remove it from the hydrogen flow by selective absorption up to a value of 0.3-0.5% it is necessary to feed as much as 0.3-0.4 m³/h of absorbent for every 1000 nm³/h of hydrogen. In the fractionation the consumed impurities are removed from the absorbent which comes into the target isohexane fraction and is not returned to the reactor section. Licensor – SRDI Oil & Gas Peton LLC, the Russian Federation, Ufa.

Advantages of the Technology

Purification of the hydrogen flow from impurities allows to increase isomerizate ON by 0.5-0.8 and to reduce the load on the reactor section by 2%. This, accordingly, allows you to either raise productivity or reduce the expenses on the process. The required capital costs pay off in less than 3 months.

Industrial Use

The licensing process is implemented in Bashneft, PJSC



GAS FRACTIONATION TECHNOLOGY IN THE CATALYTIC CRACKING PROCESS

Purpose of the Technology

The technology is intended for maximum recovery (not less than 99.9% of the potential) of C₃-C₄-olefins from catalytic cracking products of the "gasoline" and "gas" fields.

Description of the Technology

Vapors from the cracking reactor enter the main column (1) from where light (LG) and heavy (HG) gas oils are removed from the side, and unstable gasoline and rich gas are removed overhead. Column (1) uses three circulation flashes the heat of which is completely distributed throughout the gas fractionation unit. Unstable gasoline and rich gas are fed to the gas fractionation unit where a modified method of the classical separation of C_3 - C_4 -olefins from gases and gasoline cracking fractions is used. In this section, fractional gas absorption is carried out in the column (2) with the recycle of stable gasoline educed in the stabilizer (4), and flushing of dry gas in the absorber (3) with light cracking gas oil from column (1). The C_3 - C_4 -olefins isolated from the stabilizer are resolved in column (5) into separate fractions: propane-propylene fraction (PPF) and butane-butylene fraction (BBF). In the proposed technology, to increase the selectivity of absorption and minimize heat consumption in the bottom of the column along the height of the fractionation absorber optimal temperatures are maintained.

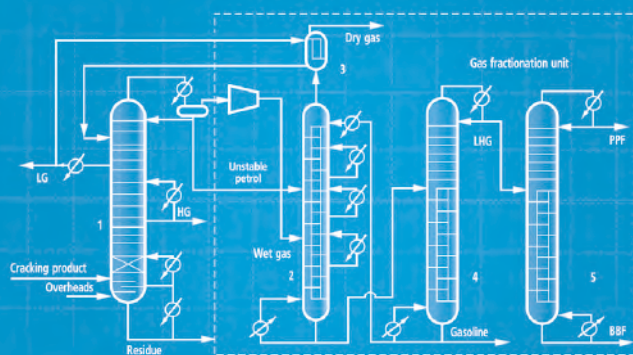
This is achieved through the use of the PETON packing and the use of three circulating flashes with optimal consumption distribution and placement of circulating streams throughout the height of the column. These possibilities allowed to achieve high effectiveness of separation and sorption in this column, and also to ensure its reliable operation. Licensor LLC SRDI O&G Peton, Ufa, Russia.

Advantages of the Technology

The use of this technology ensures the recovery of C₃-C₄-olefins up to 99.9% for both "gas" and "gasoline" areas. The need for HFC columns in heat is fully covered by the heat recovery of the circulating irrigation of the main column, and the absorbent consumption is reduced by 10-50% compared to other known solutions. The maximum effect is achieved in the processing of catalytic cracking products of the "gas" FCC area with a propylene content of 25-30%.

Industrial Use

The process was implemented at the NK Rosneft Syzran Oil Refinery and accepted for implementation at Bashneft, PJSC.



FRACTIONATION FOR PRODUCTION OF AI-95 GASOLINE AS PER EURO-5 STANDARD

Purpose of the Technology

The proposed fractionation technology is intended to produce High-octane gasoline according to the EURO-5 standard and aromatic hydrocarbons as petrochemicals.

Description of the Technology

Stable straight-run gasoline after hydrotreating enters the primary rectification unit where in column (1) a C_5 - C_6 front-end fraction is recovered, sent for isomerization and in a column (2) a fraction of 80-85°C sent for aromatic reforming. Benzene-forming components (methylcyclopentane and cyclohexane) and benzene up to 99% of the potential are selected from this fraction. From the bottom of the column (2) a fraction of 85-180°C is produced without benzene, with a CH content of not more than 0.1%. This fraction is directed to fuel reforming. The resulting reformate enters the afterfractioning unit where the "secondary" C_5 - C_6 fraction is extricated in column (3) which is sent for isomerization to increase the octane number (ON). At the unit of fractionation of raw materials and isomerization products according to the PETON technology valuable isohexanes are preliminarily removed from the "secondary" C_5 - C_6 fraction, then it, together with the front-end fraction, is sent to isomerization. From the top of the afterfractioning column (4) a "secondary" fraction of 80-85°C is extricated which is sent to the aromatic reforming for additional production of aromatic hydrocarbons. From the bottom of the column (4) the main end product of this process is removed – a high-octane naphtha with the absence of benzene.

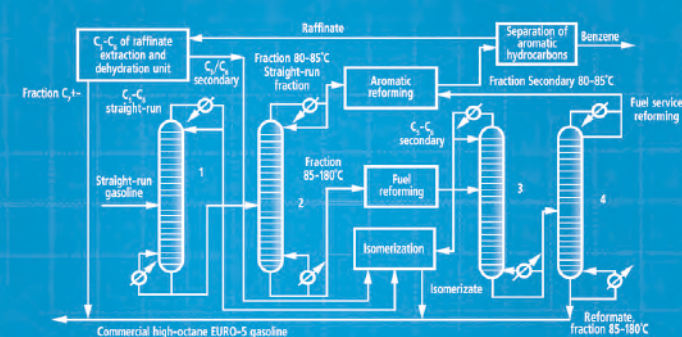
The products of "aromatic" reforming and the extraction unit are the benzene fraction which is sent for further processing and the raffinate which comes to the separation unit. In this unit the "secondary" fraction C_5-C_6 is separated from it by close rectification after which it is dried and sent for isomerization in a mixture with the same fraction from the "fuel" reforming. The remainder from the separation of the raffinate, the C_{7+} fraction, which has a low octane number, is sent for mixing with isomerizate and reformate. The quality of the resulting 95 RON gasoline fully complies with the requirements of the EURO-5 standard. Licensor SRDI O&G Peton, LLC, Ufa, Russia.

Advantages of the Technology

The proposed technology is distinguished by high recovery of target components, at least 98% of the potential. As compared to other process schemes, it provides a 30% increase in benzene production and a 20% reduction in specific heat consumption. The 95 RON commercial gasoline obtained by this technology fully complies with the EURO-5 standard. Heat consumption for fractionation is 0.25-0.30 Gcal per 1 ton of feedstock, while capital costs are approximately 1.5-2.0 thousand \$ per 1 ton of feedstock.

Industrial Use

Separate stages were implemented for Gazprom, PJSC. The technology was proposed to PJSC "Bashneft", to combine three oil refinery plants containing three fuel reformers with a total capacity of 2.6 million tons/year and one aromatic reforming process with a capacity of 1 million tons/year.



OIL PROCESSING

TECHNOLOGY OF DEPURATION OF DEASPHALTIZATE AND SOLVENT IN THE PROCESS OF SELECTIVE DEASPHALTING OF TAR

Purpose of the Technology

The technology of resin removal from deasphalted oil from resins in the process of selective tar deasphalting provides the maximum recovery of deasphalted oil with an end boiling point of 640°C, the quality of which, in mixture with vacuum gas oil, meets the highest requirements, and the use of the technology to remove hydrogen sulfide from solvent makes it possible to completely eliminate equipment corrosion.

Description of the Technology

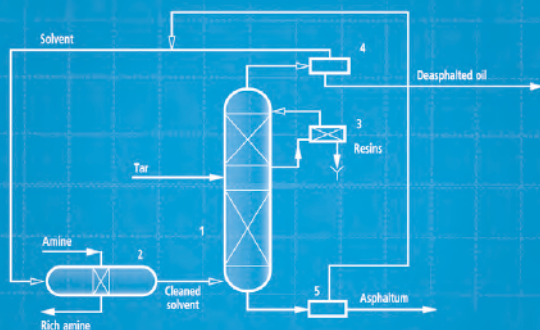
Straight-run tar is fed into the middle part of the extraction column (1), and the solvent, with no impurities, enters the lower part. To remove resins and metals from the deasphalted oil, it is recirculated to the upper part of this column using catalytic purification (3). Thus, the yield of high-quality deasphalted oil is almost doubled compared to the classical technology, while the content of metals in it is no more than 4-5 ppm and coke is no more than 2-3%. The column uses PETON packing, providing twice the separation efficiency of other devices. The extraction of the solvent from the deasphalted oil and asphalt is carried out in the classical way in blocks (4) and (5), respectively. To remove hydrogen sulfide impurities from the solvent, its "contact" cleaning is carried out in the apparatus (2), using a PETON packing. Licensor LLC SRDI O&G Peton, Ufa, Russia.

Advantages of the Technology

This technology allows the maximum recovery of straight-run gas oil fractions from the tar, boiling out at up to 640°C, which cannot be obtained by vacuum distillation. The low content of coke and metals in the resulting deasphalted oil makes it possible, when mixed with vacuum gas oil, to provide catalytic cracking and hydrocracking processes with high-quality raw materials.

Industrial Use

The tar deasphalting process was proposed to PJSOC ANK Bashneft for a unit with a capacity of up to 1.3 million tons/year.



OIL PROCESSING

HYDROCRACKING PRODUCTS FRACTIONATION

Purpose of the Technology

Ensure effective fractionation of hydrocracking (HC) products of gas oil or heavy residues with a decrease in the content of light fractions in the unconverted residue to 3% wt.

Description of the Technology

In standard technologies, the content of light fractions in the residue is reduced due to the increased supply of water vapor to the feedstock with the risk of watered distillates, or "dry" distillation under vacuum is carried out with a significant increase in process costs. PETON Holding has developed and patented a technology that allows to reduce the content of light fractions in the residue to 3% wt. and solve the problem of watering distillates through a set of interrelated solutions: in the main column (2) a low pressure is maintained, no more than 0.5 atm, which is ensured by reducing the steam load in the condensers through the use of top pump-around, which reduces the consumption of acute irrigation to a minimum, and due to selection of a part of gasoline fractions in the form of light gasoline from the side of the stripping column (1). Dissolved gases and hydrogen sulfide are removed from this distillation cut at low pressure in the light gasoline stabilization unit. Separate stripping of the residue is carried out in the distillation

part of the main column (2), including its recycle through the furnace, and stripping of reflux flowing down from the concentration part of the column (2). The reflux is first stripped in a separate stripper and then mixed with the residue recycle.

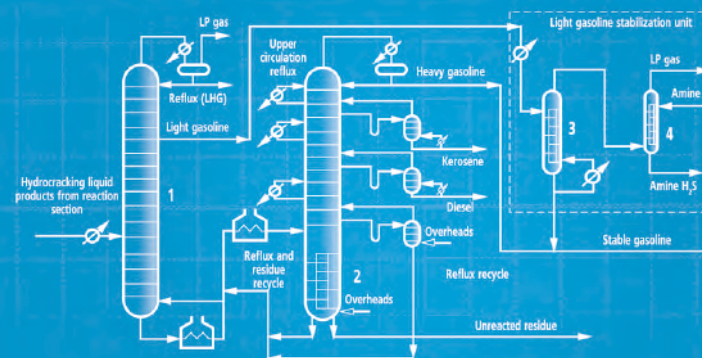
PETON packing is used in these parts of the column. Thanks to the unique ability of this nozzle, high stripping efficiency is ensured with a low supply of water vapor, no more than 0.4% of the feedstock. With such a volume of water vapor, the proportion of dissolved moisture in the flows flowing from the main column (2) to the strippings with boilers is many times reduced, thus eliminating the risk of producing watered distillates. Licensor SRDI O&G Peton, LLC, Ufa, Russia.

Advantages of the Technology

Thanks to the use of PETON technology, the consumption of water vapor for fractionation is reduced tenfold. Capital costs for the process are reduced by 15-20%.

Industrial Use

The technology was proposed to PJSOC "Bashneft", for implementation at the existing gas oil hydrocracking unit with a capacity of 1.3 million tons per year.



OIL PROCESSING

HYDROGEN RECYCLE TREATMENT DURING HYDROCRACKING

Purpose of the Technology

Improvement of the reliability and efficiency of the process of hydrocracking of heavy gas oils and oil residues by eliminating the phenomenon of "foaming" of the amine in the process of cleaning the hydrogen recycle treatment.

Description of the Technology

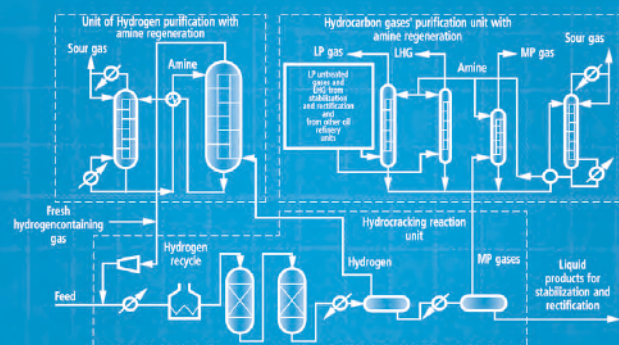
When using the PETON technology in the hydrocracking process, the hydrogen is treated independently of the treatment of hydrocarbon gases. A separate amine regenerator is used to treat hydrogen, which makes it possible to exclude the deterioration of the quality of the amine due to its contact with various hydrocarbon gases. In this unit, a special sectioned cross-flow PETON packing is used for the processes of separation, absorption and regeneration of the amine. This packing ensures removal of hydrogen sulfide from the amine up to 3 ppm and completely eliminates the possibility of its "foaming". At each section of this packing, liquid hydrocarbons are separated from the amine and discharged into the bottom section, bypassing contact with the gas. This property of the cross-flow packing is unique, and has been repeatedly tested in practice during amine treatment of large volumes of various gases. The absorber and separators with a PETON packing are resistant to ammonium sulfide hydrates; an original technical solution is used to remove them from the apparatus in a continuous mode. Licensor SRDI O&G Peton, LLC, Ufa, Russia.

Advantages of the Technology

As compared to other technologies that use classical solutions for treatment the hydrogen recycle using a plate absorber, the PETON technology allows treatment of the hydrogen recycle to a hydrogen sulfide content of no more than 3 ppm with a lower consumption of amine. In addition, energy consumption for the treatment process is reduced by up to 20%, the weight of the absorber is reduced by almost 2 times, and the cost of its manufacture is reduced by 40-50%. The use of this technology is most effective in processes where the volume of hydrogen recycle exceeds 200 thousand Nm³/h.

Industrial Use

The technology has been adopted by PJSC "Bashneft" for a new gas oil hydrocracking unit with a capacity of 2.0 million tons/year and is being considered for implementation at an existing gas oil hydrocracking unit with a capacity of 1.3 million tons/year. An absorber with a PETON packing was proposed to JSC Taneko for a gas oil hydrocracking unit under construction with a capacity of 2.0 million tons/year.



PRODUCT

PETON CONTACT DEVICES

SRDI Oil & Gas Peton develops, designs, manufactures and supervises installation of a wide range of PETON contact devices of packing and tray types and related products: gas and liquid distributors, input devices, demisters and coalescers, supporting and pressing grids, parts for mounting removable products among themselves, to supporting elements and the housing, parts for mounting devices into existing heat-treated devices without welding to the housing (with metal to metal contact and through the gasket).

PETON TRAYS

Valve tray with moving valves

The tray is available with or without a PETON droplet separator. Single and multi-threaded trays for machines from 400 to 9000 mm.

Jet tray

The tray is available with or without a PETON droplet separator. Single and multi-threaded trays for machines from 400 to 9000 mm.

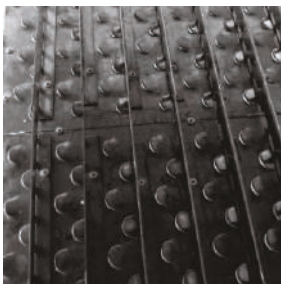
Bubble-cap tray

The tray is available with or without a PETON droplet separator. Single and multi-threaded trays for machines from 400 to 9000 mm.

Valve Tray



Jet tray

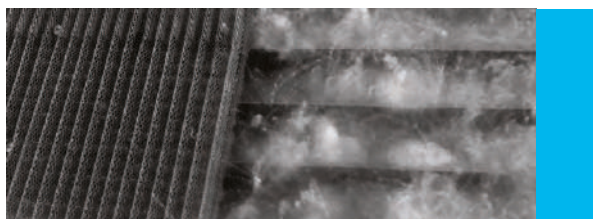


Bubble-cap tray



PETON TRAYS WITH PETON DROPLET SEPARATOR

The PETON tray design is based on a combination of classic trays and a special droplet separator positioned optimally above or below the tray surface. The droplet separator can improve the efficiency of the valve tray by 10-15% and increase its capacity by 20%.



IRREGULAR STRUCTURE PETON PACKINGS

Rashig Rings No. 16, 25, 38, 50, 76

Pall rings No. 16, 25, 38, 50, 76

Head piece metal Intallocs metal No. 16, 25, 38, 50, 76

Example :

Pall ring size No. 25: height 25 mm, diameter 25 mm, thickness 0.6 mm.

REGULAR STRUCTURE PETON PACKINGS

Materials for manufacturing:

- A – corrugated expanded metal;
- B – corrugated perforated sheet;
- C – grid.

Specific surface

- for corrugated sheeting is 160-520 m²/m³;
- for corrugated perforated sheet 125-750 m²/m³;
- for the mesh is 250-700 m²/m³.

Angle of inclination of the corrugation:

- X – 45°;
- Y – 60°;
- Z – 90°.

Metal thickness 0.1 – 1.0 mm.

Examples of packings produced:

PETON – A150X; PETON – A250Y; PETON – A350X; PETON – A520Z;

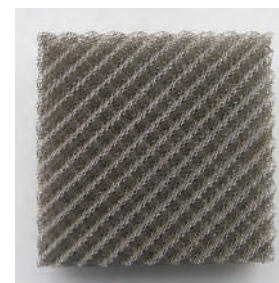
PETON – B250X; PETON – B350X; PETON – A750Y;

PETON regular structure packings are available in countercurrent and crosscurrent versions.

Intalox irregular structure packings



PETON regular structure mesh packings



Counterflow packings PETON regular structure of corrugated perforated sheet



BENEFITS OF THE PETON CROSS-FLOW PACKING

In the PETON cross-flow packing it was possible to eliminate the disadvantages of trays, regular and bulk packing of the counterflow type.

Advantages of crossflow packed columns:

- expansion of the range of stable column operation and elimination of the possibility of choking due to the fact that the flow paths do not coincide and the cross sections for the passage of steam and liquid can be selected independently;
- possibility to increase the efficiency at disproportional (sharply different) loads of steam and liquid;
- ability to work effectively with high-foaming liquids;
- increased efficiency of steam-liquid contact due to the possibility to select optimal specific steam-liquid loads;
- elimination of "wall" effect of liquid flow and "channel" movement of flows;
- increase of separation efficiency of mixtures with extremely low surface tension;
- increased reliability of packing operation in contaminated media.

The main characteristics of the PETON nozzle in comparison with trays:

- the flow capacity of the crossflow column can be 1.5-2.5 times higher both for gas and liquid;
- the lower limit of the operating range is 10% of the nominal, for plates – 40% of the nominal;
- the pressure drop in the nozzle is from two to five times lower at the same loadings, depending on the design.

Brief information about the characteristics of the cross-flow packing

Bench tests of the PETON nozzle, confirmed by industrial testing of columns in various processes with disproportionate steam and liquid loads, have shown:

- the steam throughput of the column is significantly higher in comparison with countercurrent nozzles;
- the possibility of selecting laterals from different levels in order to expand the range of products obtained
- the efficiency of one section of a column with PETON packing is from 60 to 99% at the height of sections commensurate with the distance between the trays in the column equipped with trays;
- due to the possibility of selecting optimal specific steam-liquid loads, the range of stable and effective operation of cross-flow packing is higher than that of countercurrent packing;
- due to the possibility of sectioning and redistribution of steam and liquid the efficiency increases, on average, by 1.5 times;
- the pressure drop at the PETON nozzle is adjustable over a wide range. The pressure drop of one stage is 0.015 to 1.5 or more kPa, depending on the type of nozzle, the design of nozzle modules and vapor-liquid loads.

PETON CROSSFLOW PACKING NEW TYPE OF CONTACT DEVICES FOR GAS-LIQUID SYSTEM

The basic principle of packing design in each section of the column is a close relationship between the packing and liquid distributor. This relationship is ensured by the modular design principle.

PETON liquid distributor designs are based on the principle of formation of a developed droplet-film or fine-jet low-pressure liquid flow directly at the inlet to the packing.

The developed PETON regular crossflow packing, unlike known types of contact devices such as countercurrent packing, direct flow devices, cross-flow tray, allows combining the advantages of these devices and substantially eliminating their disadvantages.

The PETON cross-flow regular packing has the ability to independently adjust the steam cross-section in the packing from the liquid cross-section when designing the column. This cross-current property in the packing solves the problem of organizing effective contact at disproportionate flows of steam and liquid in the column.

Figures 1, 2, 3 show examples of change of the same packing volume at cross-current depending on ratio of steam (G) and liquid (L) loads. Three-dimensional resizing of the packing volume in the column, taking into account the loads, allows for optimal gas velocity in the packing and optimal irrigation density for a different range of steam-liquid ratios.

Fig. 1 Packing placement at low liquid load and high gas load.

Fig. 2 Packing placement at medium fluid load and medium gas load.

Fig. 3 Packing location at high liquid load and low gas load.

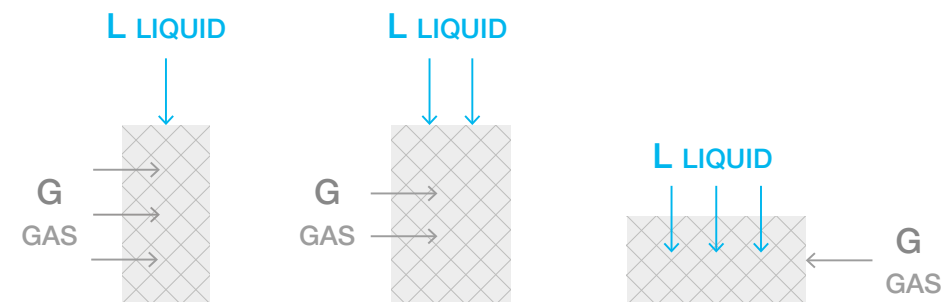


Fig. 1

Fig. 2

Fig. 3

COLUMNS WITH PETON PACKING

SRDI Oil & Gas Peton has developed a series of apparatus designs with different arrangement of packing modules.

The images below show two examples of apparatuses with a Peton packing.

1. In the process of vapor condensation in the column, when vapor flow decreases sharply to the top of the column, and liquid flow is relatively constant, the column design with gradual reduction of the cross section for gas passage in the packing at each upstream stage is used.

This maintains the same gas velocity in each section.

Depending on the vapor flow rate, the geometric shape of the packing volume is selected. It may be both simple (Fig. 2) – "single-line" and "multi-line", and complex – "ring" (Fig. 1) with a square and round forms of "rings" and "chessboard" (Fig. 3), etc.

In order to create a small pressure drop, which is important for vacuum distillation, the cross section of the vapor in the section can be larger than the cross section of the column itself.

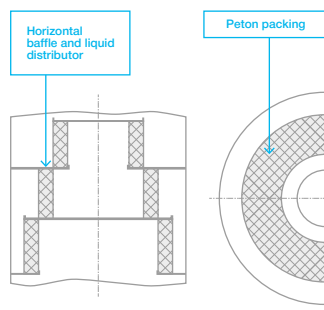


Fig. 1

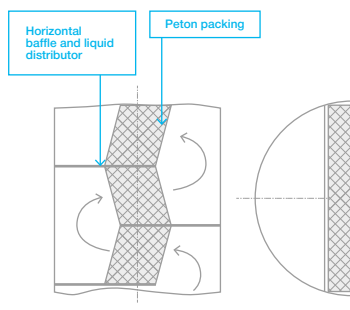


Fig. 2

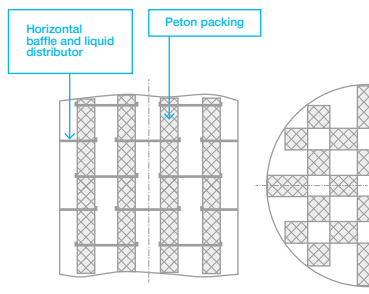


Fig. 3

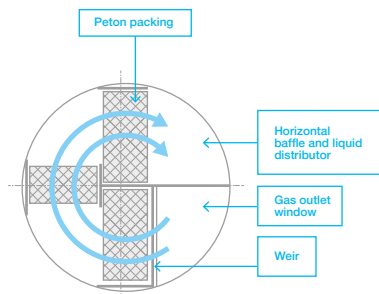


Fig. 4

The choice of figure or thickness of "ring" is adjusted by taking into account the value of liquid load and contact time of gas and liquid.

2. For distillation parts of the column under conditions of small vapor loads and considerably large liquid loads a design with small gas passage cross-section is used.

The shape of the packing arrangement may be both simple "single-line" (Fig. 2), or complex with "spiral" movement of vapor (Fig. 4)

The choice of location figure is determined by vapor-liquid loads. By changing the cross section of the figure such a gas velocity is achieved at which intensive turbulization of the liquid is ensured. The gas velocity in the packing may be several times higher than in recalculation of the full cross-section of the column.

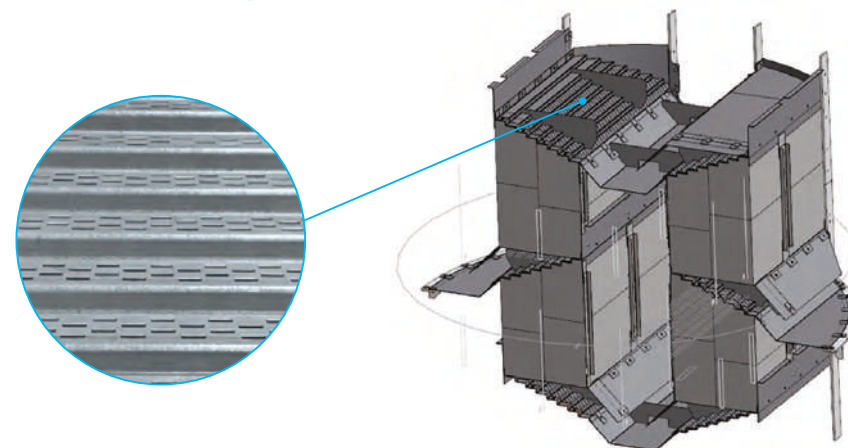
DISTRIBUTION DEVICES

SRDI Oil & Gas Peton manufactures a wide range of distribution devices that meet the following requirements:

- wide range of loads;
- distribution of suspensions and emulsions;
- distribution of media with a high content of mechanical impurities.

Multi-stage distribution devices developed at SRDI Oil & Gas Peton make it possible to expand the operating range of loading for raw materials from 10% to 110%

Section of a column with a multistep distributor

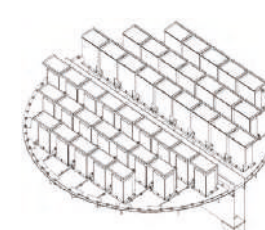
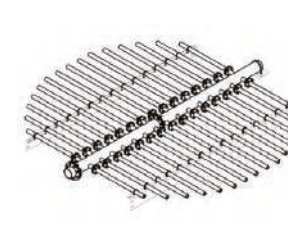
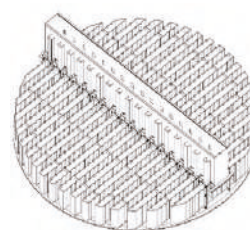


Distribution devices manufactured by SRDI Oil & Gas Peton:

1 Trough distributors

2 Tubular distributors

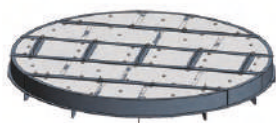
3 distributor trays



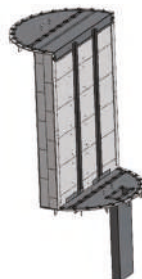
CROSS-FLOW KO DRUMS

Developed single – and double-section counter-flow and cross-flow KO drums designed for devices with a diameter of 200 to 9000 mm.

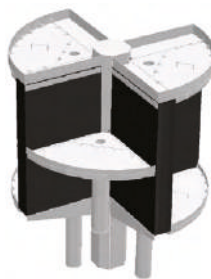
Cross-flow horizontal KO drums



Cross-flow single stage KO drums



Cross-flow double-stage KO drums



PETON PRODUCTS

Gas and Liquid Filtration Equipment

Technical parameters

- filtration of the entire gas flow up to 500 thous. nm^3/h , liquids – up to $3000 \text{ m}^3/\text{h}$, with a filtration fineness of 0.1-40 microns;
- pressure drop – 0.5 atm max;
- long service life of the filter elements – up to 5 years;
- removal of accumulated impurities (cakes) from filters by backwashing with purified flow;
- automatic flushing mode;
- no manual labor or human factor
- filtration product (cake), classified as category 4 waste

Separation Equipment

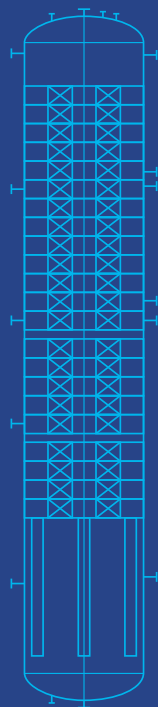
Technical parameters

- almost complete gas purification from water and hydrocarbon condensate;
- deep removal of liquid hydrocarbons during gas stripping;
- high-quality treatment of gas containing increased amounts of liquid and dust (including in case of multiple flow), before supplying to the compressor or turbo expander, where the allowed particle size is not more than $5 \mu\text{m}$
- deep removal of liquid droplets and impurities in low-temperature separation with coalescence of aerosols in the same apparatus

UNIVERSAL ABSORBER WITH PETON NOZZLE

A "universal" absorber with a Peton nozzle was designed and manufactured.

The design of the universal absorber enables selective or complete removal of CO_2 (from 10 ppm up to 40 thousand ppm) during deep H_2S removal by adjusting the number of packing sections (from 3 to 25) with the same overall height of the packing in the absorber.



FILTRATION MODULE OF THE NATURAL GAS WATER WASH UNIT (LATEST GENERATION MODULE)

The filtration module of the natural gas "wet cleaning" unit was designed and manufactured. The technology makes it possible to clean the gas from microscopic dust up to $5 \mu\text{m}$ in size.

Example of a completed project

NATIONAL HOLDING COMPANY «UZBEKNEFTEGAZ»

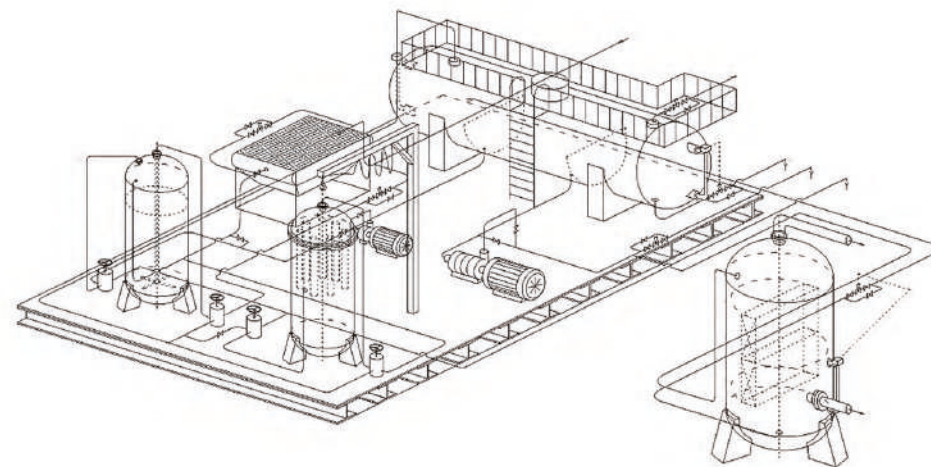
Karshi, Unitary Subsidiary Enterprise Shurtanneftegaz, GPP with the design capacity of $20 \text{ bln m}^3/\text{year}$

*Unit ASO-1
($1.5 \text{ bln m}^3/\text{year}$)*

Gas purification technology has been developed, and detailed design has been performed for the package of wet scrubbing of regeneration gas from the zeolite drying unit with the capacity of $20 \text{ bln m}^3/\text{year}$ with the use of PETON packing.

The PETON nozzle and the block-modular two-stage automatic PETON filtering unit (filtration fineness of $10 \mu\text{m}$) were supplied.

Removal of zeolite dust up to $5 \mu\text{m}$ is ensured.



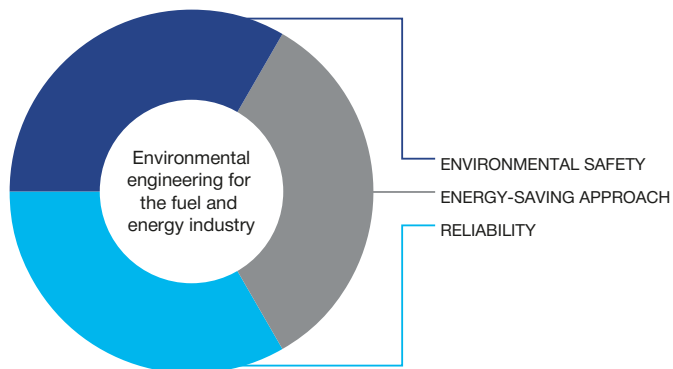
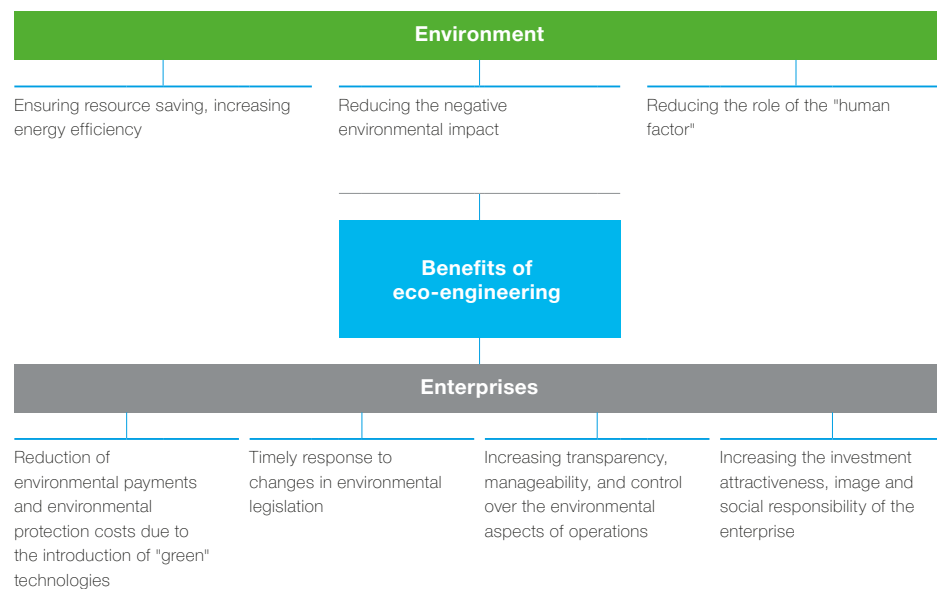
ENVIRONMENTAL ENGINEERING



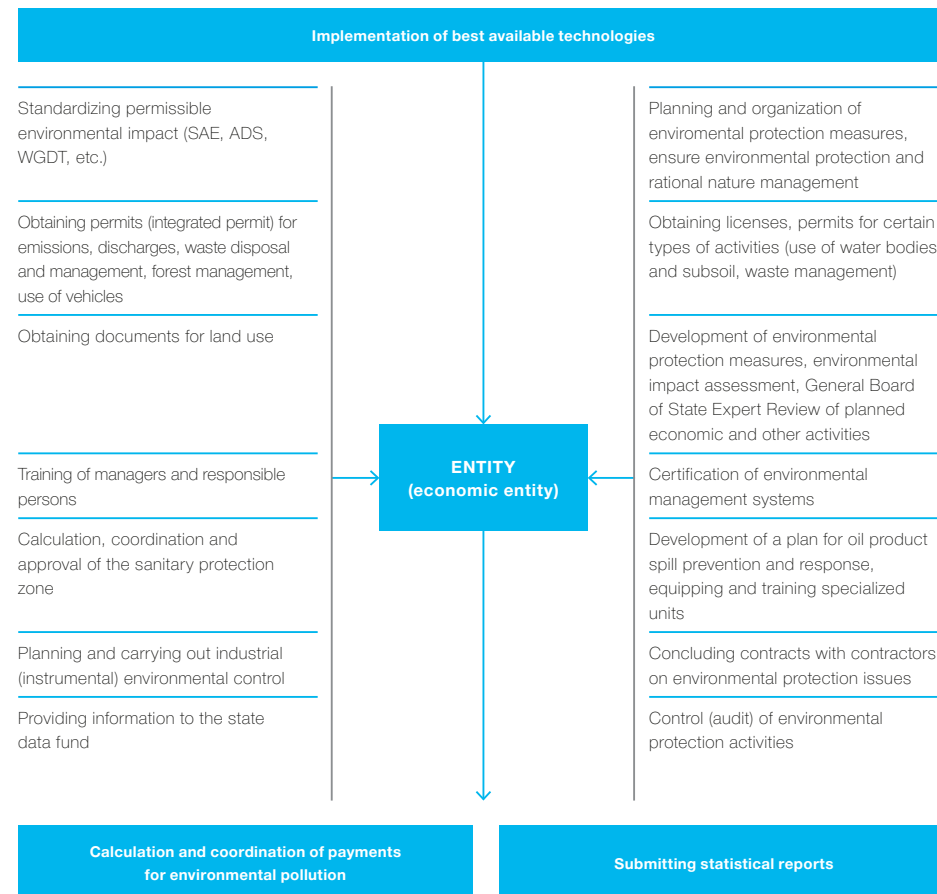
ENVIRONMENTAL ENGINEERING

As part of PETON, the Department of Environmental Protection and Ecological Safety operates, which provides the following services:

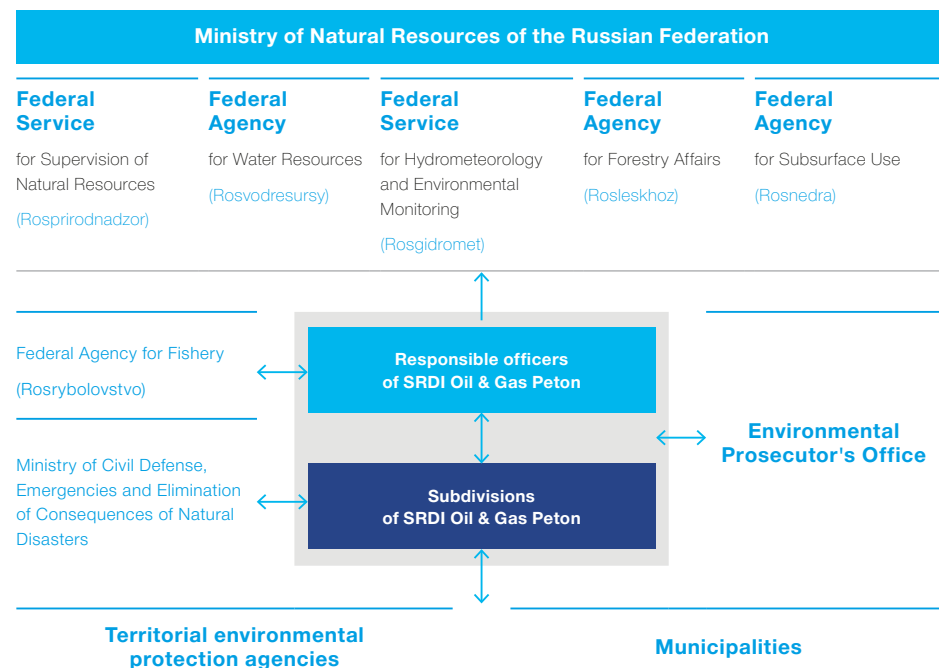
- Environmental control
- Environmental consulting
- Environmental audit
- Development of regulatory and guidance documentation, design and detail design documentation



NECESSARY ENVIRONMENTAL PROTECTION MEASURES



INTERACTION WITH ENVIRONMENTAL AUTHORITIES*



Key issues of interaction:

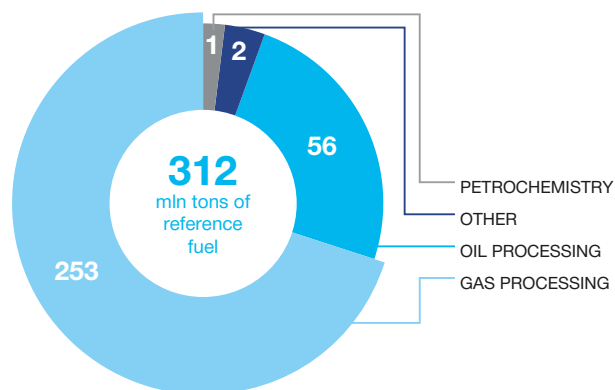
- Scientific research in the field of environmental protection;
- Provision of data services for pre-investment and project activities, assessment of environmental risks;
- Conducting an environmental impact assessment;
- Passing the State Environmental Expertise;
- Obtaining licenses, decisions, permits for certain types of activities in the field of environmental protection;
- Providing information to the state data collection;
- Conducting environmental certification of activities;
- Conducting state, public environmental oversight;
- Training of managers and specialists in the field of environmental protection and environmental safety

* In the design, construction and reconstruction of facilities that have a significant negative impact on the environment and related to the application of the best available technologies

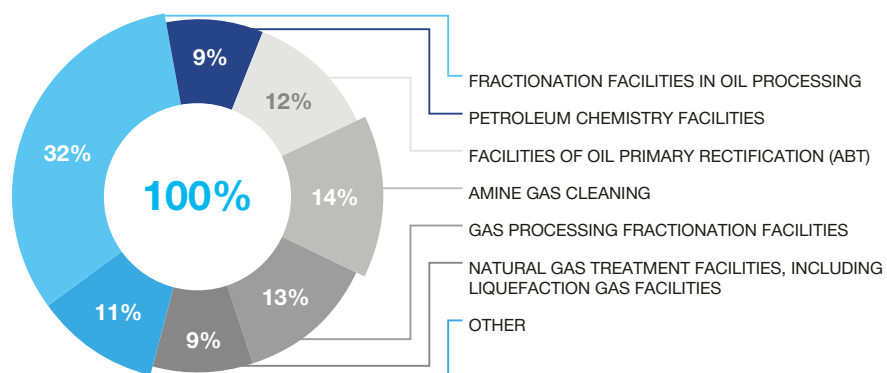
PROJECTS

PROJECTS IN FIGURES

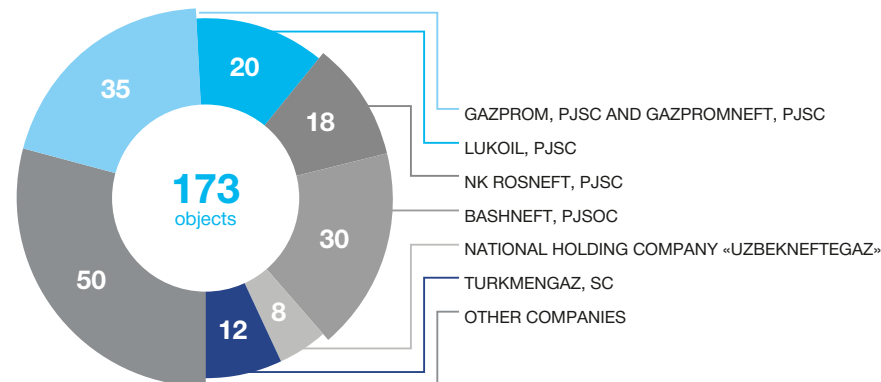
CAPACITY OF PROJECTS DESIGNED BY PETON



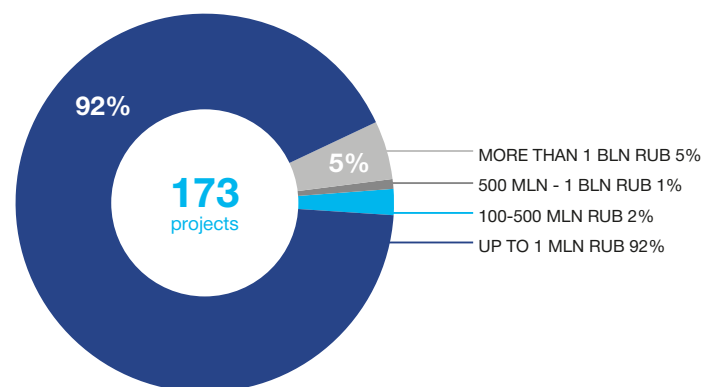
PROJECT BREAKDOWN FOR MAJOR FACILITIES



COMPANIES FOR WHICH MAJOR PROJECTS HAVE BEEN IMPLEMENTED



PROJECT COST STRUCTURE (EP-PHASE)



PETON PROJECTS

Reference list of the main works on the modernization of existing industrial facilities and commissioning of new industrial facilities in oil and gas processing and petroleum chemistry, performed by SRDI O&G PETON, LLC over the past 20 years.

Entity	Contract*	Scope of work	Equipment delivered	Achieved Results
NZNP ENGINEERING, LLC				
Novoshakhtinsk city, Novoshakhtinsk Refinery				
<i>Motor Gasoline Production Complex</i>	<i>E</i>	Input data collection, engineering surveying. Development of detailed design and estimate documentation for the facility comprising: <ul style="list-style-type: none"> naphtha hydrotreating unit, 893 KTPA; naphtha isomerization unit, 461 KTPA; UI&O facilities. 	—	In the implementation phase
	<i>C</i>	Performing a complex of works for facility construction and putting into operation.	—	In the implementation phase
<i>Construction site and temporary site facilities (TSF) at the preparatory stage</i>	<i>C</i>	Performing a complex of construction and installation works for preparation of the construction site and arranging TSF at the preparatory stage.	—	Project completed
<i>Utilities, Infrastructure and Offsites comprising:</i> <ul style="list-style-type: none"> circulating water supply. 	<i>EPC</i>	Implementing the project under EPC contract: <ul style="list-style-type: none"> design and estimate documentation development; equipment and materials supply; construction, installation and commissioning works; putting the facility into operation. 	EPC Contract	In the implementation phase
RUSGAZDOBYCHA, JSC				
Kingiseppsky district, Leningrad region, Ust-Luga settlement, ECGPC (Ethane-Containing Gas Processing Complex)				
<i>Ethane-Containing Gas Processing Complex</i>	<i>M</i>	Organization of an independent comprehensive marketing research for the ECGPC (Ethane-Containing Gas Processing Complex). Development of the initial concept of the marketing strategy for the ECGPC.		Project implemented in 2019.

Entity	Contract*	Scope of work	Equipment delivered	Achieved Results
<i>Ethane-Containing Gas Processing Complex</i>	<i>JI</i>	Pre-investment study "Feasibility study of investments in the construction of gas processing facilities based on hydrocarbon reserves and resources of Gazprom, PJSC in the Nadym-Pur-Tazovsky region and on the Yamal Peninsula".		Project implemented in 2019.
	<i>JI</i>	Pre-investment study "Justification of investments in the construction of the gas chemical complex as part of Ethane-Containing Gas Processing Complex".		Project implemented in 2019.
	<i>E</i>	Development work of Pre-FEED "Ethane-Containing Gas Processing Complex. Gas Processing Plant".		Project implemented in 2019.
	<i>E</i>	Development work of Pre-FEED "Ethane-Containing Gas Processing Complex. Gas Chemical Plant".		Project implemented in 2019.
	<i>E</i>	Development work of Pre-FEED "Ethane-Containing Gas Processing Complex. Gas Chemical Complex".		Project implemented in 2019.
	<i>E</i>	Development work of Pre-FEED "Ethane-Containing Gas Processing Complex. Offsite facilities".		Project implemented in 2019.
RUSHIMALLIANCE, LLC				
Kingiseppsky district, Leningrad region, Ust-Luga settlement, ECGPC (Ethane-Containing Gas Processing Complex)				
<i>Ethane-Containing Gas Processing Complex</i>	<i>JI</i>	Justification of investments in the construction of the "Ethane-Containing Gas Processing Complex".		Project implemented in 2018.
GAZPROM, PJSC				
<i>Regulatory framework for GAZPROM, PJSC</i>	<i>R&D</i>	R&D (Research&Development): "Development of regulatory documents for maintenance and repair of process equipment at gas, gas condensate and oil processing facilities of GAZPROM, PJSC".	—	In the implementation phase
	<i>JI</i>	Pre-investment study "Development of the direction of strategic development of Gazprom neftekhim Salavat, LLC". Development of a development strategy for the oil refining and petrochemical complex	—	In the implementation phase
	<i>JI</i>	Justification of investments in the modernization project of the "Novourenoy Gas Chemical Complex".	—	Project implemented in 2019.
	<i>JI</i>	Justification of investments in the construction of the plant reduced natural gas in the area of the Black Sea coast (Krasnodar Territory).	—	Project implemented in 2019.
<i>Gas and liquid hydrocarbon processing facilities of GAZPROM, PJSC</i>	<i>JI</i>	Pre-investment study "Feasibility study of investments in the construction of gas processing facilities based on hydrocarbon reserves and resources of Gazprom, PJSC in the Nadym-Pur-Tazovsky region and on the Yamal Peninsula".	—	Project implemented in 2018.

Entity	Contract*	Scope of work	Equipment delivered	Achieved Results
Gas and liquid hydrocarbon processing facilities of GAZPROM, PJSC	R&D	R&D (Research&Development): "Conducting research to determine the component composition of the separator gas, unstable gas condensate and formation gas".	–	Project implemented in 2017.
	R&D	R&D (Research&Development): "Development of a comprehensive program for the reconstruction and technical re-equipment of gas and liquid hydrocarbon processing facilities for 2016-2020".	–	Project implemented in 2016.
	R&D	R&D (Research&Development): "Development of proposals for the operating procedure of helium fine purification by means of short-cycle non-heating adsorption. Development of main technical solutions for the development of energy-efficient heat exchange equipment".	–	Project implemented in 2014.
	R&D	R&D (Research&Development): "Preparation of proposals for the main heat exchange equipment of the gas liquefaction process".	–	Project implemented in 2014.
Gas treatment units of gas-condensate fields of GAZPROM, PJSC	R&D	R&D efforts: "Conducting research and development of equipment for intensive degassing with preliminary separation of gas-liquid mixtures for gas treatment units of gas condensate fields".	–	Project implemented in 2018.
Gas condensate fields of GAZPROM, PJSC	JI	Technical and economic analysis of the prospects for the development of resources of high-molecular raw materials in gas condensate fields.		Project implemented in 2017.
Main gas pipeline "Power of Siberia"	JI	Technical and economic analysis of construction of packaged units for isolation of helium from fuel gas supplied for the needs of compressor stations of the main gas pipeline "Power of Siberia".	–	Project implemented in 2016.
	HSE	Development of environmental monitoring project of the booster compressor stations of the gas pipeline "Power of Siberia".	–	Project implemented in 2020.
YNAO (Yamalo-Nenets Autonomous Okrug), Novy Urengoy, Gazprom Pererabotka, LLC, Novy Urengoy CTPP (Condensate Transportation Preparation Plant)				
Booster Compressor Station	EPC	Project implementation under an EPC contract: <ul style="list-style-type: none"> • development of design and estimate documentation; • delivery of equipment and materials; • construction & installation and commissioning; • start-up. 	EPC Contract	Project implemented in 2018.
Condensate stabilizer unit for the Achimov deposits in the Nadym-Pur-Taz region	EPC	Project implementation under an EPC contract: <ul style="list-style-type: none"> • acceptance of design and construction documents to identify risks; • delivery of equipment and materials • construction & installation and commissioning; • start-up. 	EPC Contract	Project implemented in 2021.
De-ethanization Gas Treatment Unit	EPC	Project implementation under an EPC contract: <ul style="list-style-type: none"> • development of design and estimate documentation; • delivery of equipment and materials; • construction & installation and commissioning; • start-up. 	EPC Contract	Project implemented in 2018.

Entity	Contract*	Scope of work	Equipment delivered	Achieved Results
Svobodny, Gazprom Pererabotka Blagoveshchensk LLC Amur Gas Processing Plant				
Gas treatment and processing facilities. Main U&O and MTS facilities. (Design gas capacity up to 42 bln m ³ /year).	EPSS	Development of AGPP technological regulations and specifications for all marketable products (jointly with Gazprom VNIIGAZ). Development of the project for gas treatment at GPP, purification and gas fractionation of LGN on the basis of PETON licensed technology. Development of the project for UI&O facilities, including the logistics of shipment of commercial products and material supply facilities, including railway branch, station, loading/unloading rack, berth for the reception of equipment with the weight of up to 1,000 t, motor roads, bridges, etc. FEED development on the basis of PETON-LINDE licensed technology for ethane and NGL isolation and production of commercial helium. Development of regulatory documents for the environmental part of the project.	EPSS Contract	In the implementation phase
Astrakhan, Gazprom Invest Yug LLC Field facilities of Gazprom Dobycha Astrakhan LLC				
Field facilities: 1.Substation 35/6 kV at UPPG- 1, UPPG-2 (Preliminary Gas Processing Terminals) 2.Facilities commissioned in 2015–2017.	E	Development of detailed documentation by the facilities "Reconstruction of Substation 35/6 kV at UPPG-1, UPPG-2" and "Facilities Commissioned in 2015–2017" as part of the project "Reconstruction of field facilities of Gazprom Dobycha Astrakhan LLC".	–	Project implemented in 2014.
Astrakhan, Gazprom Dobycha Astrakhan, LLC, Astrakhan GPP				
Automated Process Control System	E	Detailed design, engineering surveys and initial data collection for the project: "Reconstruction of the Automated Process Control System (APCS) of Astrakhan GPP (Stage II)".	–	Project implemented in 2019.
Orenburg region, Gazprom Dobycha Orenburg LLC				
Gas field management facilities	E	Design and detailed design documentation development for the project "Technical upgrade of run-down and outmoded equipment of Gazprom dobycha Orenburg, LLC gas production department for the needs of Gazprom Dobycha Orenburg, LLC".	–	Project implemented in 2016.
Orenburg, Gazprom Dobycha Orenburg, LLC, Orenburg GPP				
Stage 1 of E Orenburg GPP (design capacity of 15 bln m ³ /year)	E	Development of the Main Technical Solutions and Design Documentation for the project "Stage I equipment upgrade of Orenburg GPP"	–	In the implementation phase
Orenburg GPP	E	Design of a separate gas processing project for the Karachaganak and Orenburg Oil and Gas Condensate Fields at the Orenburg GPP.	–	Project implemented in 2018.
	E	Design of a project to upgrade the Amine Gas Purification Units at the 1st and 2nd stage units.	–	Project implemented in 2015.
	EP	Design project (BD, DD and DDD) for revamping of Stage 1 and Stage 2 Amine Gas Treatment Units, using PETON contact units in 24 units on 12 half strings of 2.5 bln m ³ /year gas treatment and dehydration units each, to produce commercial gas purified from CO ₂ at most 200 ppm for supply to the Helium plant in the context of increasing gas processing volume at KOGCF from 2 to 9 bln m ³ /year, resulting in a 30% increase in the CO ₂ and H ₂ S in the feed gas.	Delivery of PETON internal contact devices have been carried out.	Project implemented in 2008.

Entity	Contract*	Scope of work	Equipment delivered	Achieved Results
Orenburg, Gazprom Dobycha Orenburg, LLC, Helium refinery				
<i>Unit No. 26 for NGL separation (design capacity of 750 000 t/year)</i>	<i>EP</i>	New technology has been developed for increasing the capacity and improving the quality for commercial liquefied gases*. Technical project for modernization of the columns.	PETON packing has been supplied for depropanizer K-01 of section 540 (D = 3800/3000) and debutanizer K-01 of section 560 (D = 3600/3000).	Project implemented in 2005.
<i>Helium package No. 6 (with the capacity of up to 3 bln m³/year)</i>	<i>EP</i>	Design and detailed design documentation for the replacement of internal contactors.	PETON packing has been supplied for the new demethanizer.	Project implemented in 2002.
Republic of Tatarstan, Gazprom Invest Yug LLC				
<i>Arbuzovskoye UGS</i>	<i>E</i>	Detailed design and estimate documentation.	–	Project implemented in 2016.
Salavat, Gazprom Neftekhim Salavat, OJSC Monomer plant				
<i>Propane-propylene fractionation unit (85,000 tonnes/year)</i>	<i>E</i>	Development of design documentation and state expert appraisal by Glavosekspertiza (Main State Expert Review Board). Development of working documentation.	–	Project implemented in 2016.
<i>Units ELOU-AVT-4</i>	<i>EP</i>	Development of working design documentation for the replacement of the internal contact devices of the vacuum column K-310.	Completed delivery of the PETON crossflow head piece for the vacuum column K-310.	Project implemented in 2016.
<i>Propane-propylene fractionation unit (85,000 tonnes/year)</i>	<i>EP</i>	Development of design documentation and state expert appraisal by Glavosekspertiza (Main State Expert Review Board). Development of working documentation.	Completed delivery of PETON crossflow head piece for column K-100 (D = 3200 mm).	Project implemented in 2015.
<i>Hydrotreating and light hydrocracking of L-16-1 vacuum gas oil (design capacity 1.5 mtpa)</i>	<i>EP</i>	MDEA-absorption for the purification of gas with a higher hydrogen sulphide content, by using a PETON* cross-flow packing.	Delivery of the PETON cross-flow packing for absorber K-8 (D = 1800 mm) and absorber K-9 (D = 1200 mm).	Project implemented in 2010.
<i>Gas condensate hydrotreater GO-4 (design capacity 1.8 mtpa)</i>	<i>EP</i>	Development of technology to convert MEA- absorption to MDEA-absorption and modernisation of the gas cleaning unit by using a PETON* cross-flow packing.	Delivery of the PETON cross-flow packing for absorber K-8 (D = 1800 mm) and absorber K-9 (D = 1200 mm).	Project implemented in 2010.
	<i>EP</i>	Modernisation of the evaporator column to reduce the content of benzene-forming components in the reforming feed from 3 wt.% to 0.6 wt.% by using a PETON packing.	Delivery of the internal contact devices (trays and PETON packing) for the evaporation column K-4 (D=3200 mm).	Project implemented in 2008.
<i>EP-300 plant (design capacity up to 300,000 tonnes/year of ethylene)</i>	<i>EP</i>	Upgrade of the primary pyrogas separation column with a PETON* cross-flow packing.	Delivery of the PETON cross-flow packing for the primary pyrolysis separation column K-1 (D = 7000 mm).	Project implemented in 2001.

Entity	Contract*	Scope of work	Equipment delivered	Achieved Results
Sakhalin Region, Yuzhno-Kirinskoye GCF				
<i>Integrated Gas Treatment Facility as part of the Yuzhno-Kirinskoye Gas Condensate Field Development Project</i>	<i>EP</i>	Development and approval of technical designs for non-standardised process equipment of the integrated gas treatment plant within the facility.	Delivery of non-standardised process equipment for the gas treatment plant.	Project implemented in 2016.
Lensk district of Yakutia, Chayanda OGCF				
<i>Development of Chayanda Oil and Gas Condensate Field</i>	<i>E</i>	Detailed design documentation development for landfill at deposit. Detailed design documentation for the industrial environmental monitoring of the deposit.	–	Project implemented in 2016.
PJSC GAZPROMNEFT				
Moscow, JSC Gazpromneft – Moscow Refinery				
<i>Unit L-24-5</i>	<i>EP</i>	Development of detailed design documentation for the replacement of the internal contact devices of columns K-4, K-5.	Delivery of PETON valve trays have been made	Project implemented in 2017.
<i>AT-VB Unit</i>	<i>EP</i>	Development of detailed design documentation for the replacement of the internal contact devices of columns K-3, K-3a.	Delivery of PETON valve trays have been made	Project implemented in 2016.
<i>Facilities G-43/107</i>	<i>EP</i>	Development of working design documentation for replacement of internal contact devices of columns K-108, K-109, K-203, separator E-303.	PETON valve trays and head piece for column K-108, PETON valve trays for columns K-109, K-203, PETON entrainment trap of separator for gas inlet of compressor unit E- 303 have been delivered.	Project implemented in 2016.
Noyabrsk, Gazpromneft - Noyabrskneftegaz JSC				
<i>Yarainer field booster pumping station</i>	<i>EP</i>	Development of working documentation for the replacement of the internal contact devices for the GS-1 separator.	The PETON head piece is in delivery.	In the implementation phase
<i>Ety-Purov field compressor station</i>	<i>EP</i>	Development of working documentation for the replacement of the internal contact devices of the C- 2 separator unit.	Delivery of the PETON head piece have been carried out.	Project implemented in 2019.
Omsk, Gazpromneft-ONPZ JSC				
<i>Catalytic reformer unit L/35-11-600</i>	<i>EP</i>	Development of working documentation for replacement of internal contact devices for column 63K-7.	Delivery of PETON internal contact devices have been carried out.	Project implemented in 2019.
<i>Oil dewaxing unit 39/1 No. 2</i>	<i>EP</i>	Development of working design documentation for the replacement of the internal contact devices of column K-8	Delivery of the PETON head piece have been carried out	Project implemented in 2018.
<i>Process condensate treatment unit (design capacity 876,000 tonnes/year)</i>	<i>E</i>	Development of design and working documentation.	–	Project implemented in 2018.
<i>Unit L-24-7</i>	<i>EP</i>	Development of working documentation for the replacement of internal contact devices of columns K-1 and K-2	Delivery of PETON internal contact devices have been carried out.	Project implemented in 2017.

Entity	Contract*	Scope of work	Equipment delivered	Achieved Results
<i>KT-1/1 revamp. Section 200/300</i>	<i>EP</i>	Development of the detailed design documentation to replace the internal contact devices.	Performed delivery of the PETON internal contact devices for the column K- 303/1.	Project implemented in 2015.
<i>Unit L-24-9</i>	<i>E</i>	Development of the design and detailed design documentation to perform technical upgrade of the unit (heat recovery)	-	Project implemented in 2013.
<i>CDU-8 (nameplate capacity of 3.5 mln t/ year)</i>	<i>EP</i>	Development of the technology to improve light fraction extraction.* Development of the design and detailed design documentation to perform technical upgrade of the unit.	Performed delivery of the PETON internal contact devices for columns K- 2,K-3, stripping columns K-3v, K-3c and K-3n.	Project implemented in 2011.
<i>CDU-7 (nameplate capacity of 3.5 mln t/ year)</i>	<i>EP</i>	Development of the technology to improve light fraction extraction.* Development of the design and detailed design documentation to replace the column internal contact devices.	Performed delivery of the PETON valve trays and packing for atmospheric column K-2, stripping columns K-3v, K-3c and K-3n.	Project implemented in 2012.
<i>CDU-6 (nameplate capacity of 1.7 mln t/ year)</i>	<i>E</i>	Development of the technology to improve light fraction extraction.*	-	Project implemented in 2011.
BASHNEFT, PJSOC				
Ufa, Bashneft-Novoi subsidiary				
<i>Installation of "Zhena" gas purification unit MEA</i>	<i>E</i>	Development of the detailed projects for the installation of additional heat exchangers E-101, 102, 103 to increase the energy efficiency.	-	Project implemented in 2013.
	<i>EP</i>	Development of the technical project for the replacement of the internal contact devices of column C-403 to increase the column productivity.	Delivery of PETON internal contact devices have been carried out.	Project implemented in 2013.
	<i>EP</i>	Development of the technical project for column C-402.	Performed delivery of PETON internal contact devices for absorber C- 402.	Project implemented in 2010.
<i>Commodity production</i>	<i>E</i>	Development of the detailed design for tank replacement.	-	Project implemented in 2012.
<i>Atmospheric gas fractionation unit 1</i>	<i>EP</i>	Development of the technology using deisopentanization and depentanization columns in section related to isomerization plant in order to increase additional power and octane value of isomerization products and to recalculate the technology of separation of propane- butane-pentane fraction in the AGFU section to improve the quality of products and to reduce the energy consumption. Development of design and detailed documentation.	Performed delivery of PETON valve trays for depentanizer K-40, deizopentanizer K-41, deizobutanizer K-8.	Project implemented in 2011.
<i>Unit LCh-24-7, gas MEA treatment section</i>	<i>EP</i>	Development of the detailed design documentation for plant fuel network revamp. Development of the column technical designs.	Performed delivery of PETON internal contact devices for absorber columns K-103 and K- 104.	Project implemented in 2011.
<i>Sulphuric acid alkylation unit</i>	<i>EP</i>	Development of the technical designs to replace PETON packing type internal contact devices to coalesce water from hydrocarbon streams.	Performed delivery of PETON internal contact devices for the coagulators V-105, V-109, V-113, V-115.	Project implemented in 2011.

Entity	Contract*	Scope of work	Equipment delivered	Achieved Results
Ufa, Bashneft-Ufaneftekhimi subsidiary				
<i>Atmospheric vacuum distillation unit (AVT-3)</i>	<i>EP</i>	Development of the detailed design documentation to replace the internal contact devices of atmospheric column K-2.	Performed delivery of PETON valve trays.	Project implemented in 2018.
<i>Vacuum gasoil hydrotreatment unit L-24-5</i>	<i>EP</i>	Revamp of the columns to produce quality products. Development and delivery of the trough distributor of column K-5.	Performed delivery of the PETON valve trays for hydrotreated vacuum gasoil stabilizers K-2 and K-3. Performed delivery of the trough distributor of column K-5.	Project implemented in 2017.
<i>Tar oil and secondary residue visbreaking unit</i>	<i>EP</i>	Development of the detailed design documentation to replace the internal contact devices of absorber K-6.	Performed delivery of PETON cross-flow packing.	Project implemented in 2015.
<i>Tar oil and secondary residue visbreaking unit</i>	<i>E</i>	Development of clean-up technology for cleaning low pressure gases from hydrogen sulphide. Development of design and detailed design documentation.	-	Project implemented in 2014.
	<i>E</i>	Development of rectification modernization technology for the visbreaking unit. Development of the technical project for column K-3.	-	Project implemented in 2011.
<i>Gas-catalytic production, GFU.</i>	<i>E</i>	Development of a new operation technology for the section of butanes and pentanes separation at GFU*. Basic and detailed engineering of plant unit revamp and technical designs of the new shells of columns II-K-4 and II-K-5 using PETON packing and trays.	-	Project implemented in 2013.
	<i>E</i>	Re-estimation of the depropanization section technology and equipment. Development of columns I-K-1 and II-K-1 technical designs.	-	Project implemented in 2012.
<i>Gasoil hydrocracking unit (nameplate capacity of 1.35 mln t/year)</i>	<i>E</i>	Section 800 (cleaning of process condensate collected from several facilities of the unit). Development of a new operation technology for double capacity increase.* Design works on the unit revamp, including replacement of the contact devices, heat exchangers, boilers and the use of the new ammonia incinerator. Performance of the design documentation industrial safety expert review.	-	Project implemented in 2012.
	<i>E</i>	Section 400 (rectification). Development of the revamp detail design to avoid diesel fraction clouding. Development of the technical design for replacement of the internal contact devices in column C-402.	-	Project implemented in 2012.
<i>Delayed coking unit (nameplate capacity of 1.2 mln t/year)</i>	<i>EP</i>	Section 200 (gas separation). Development of technical designs for non-standard equipment and internal contact devices of columns K-201, K-205. Development of equipment referencing projects.	Performed delivery of PETON trays and demisters for columns and separators.	Project implemented in 2012.
	<i>E</i>	Re-estimation of the existing technology to eliminate the identified "bottlenecks" in the original project for processing of superheavy raw materials and increase the plant capacity from 1.2 to 1.6 million tons / year. Development of design and detailed documentation. Performance of the design documentation industrial safety expert review.	-	Project implemented in 2012.
	<i>EP</i>	Section 100 (coking). Development of technical designs for non-standard equipment and internal contact devices of the columns. Development of equipment referencing projects.	Performed delivery of PETON internal contact devices and non-standard equipment.	Project implemented in 2012.

Entity	Contract*	Scope of work	Equipment delivered	Achieved Results
<i>Delayed coking unit (nameplate capacity of 1.2 mln t/year)</i>	E	Section 400. Recalculation of the technology and equipment to enable operation of the existing equipment under the increased capacity conditions. Engineering of new coke pumping boxes, revamp of the underground tank.	–	Project implemented in 2012.
	EP	Section 300 (purification of fuel gas from the whole refinery). Development of technical designs for non-standard equipment and internal contact devices of columns K-302, K-305 and K-307. Development of equipment anchoring projects.	Performed delivery of the internal contact devices (PETON valve trays and demisters) and PETON filters.	Project implemented in 2010.
<i>Crude distillation units CDU-1, 2, 3 and 4 (total nameplate capacity of 9 mln t/year)</i>	EP	Development of a new technology for vacuum columns decomposition gas purification using PETON absorbers*. Development of the basic and detailed designs.	Performed delivery of the absorbers with PETON internal contact devices.	Project implemented in 2011.
	EP	Revamp of atmospheric column K-1.	Performed delivery of PETON valve trays.	Project implemented in 2011.
	EP	Development of the revamp technical design.	Performed delivery of the new casing for K-4 gasoline stabilizer of CDU-4 unit with PETON internal contact devices.	Project implemented in 2011.
<i>Production of aromatic hydrocarbons (PAH) (nameplate capacity of 2 mln t/year)</i>	EP	Development of a new energy-saving technology.* Development of basic and detailed designs to revamp the existing facility, and detail engineering of the new unit to increase capacity, extraction and product quality. Performance of the design documentation industrial safety expert review.	Performed delivery of internal contact devices (PETON trays and packing) for the units of hydrotreatment, separation, reforming and isomerization of straight-run gasoline, including: dehexanizer 10 DT-112; rerun column 10 DT-121; stripping column 10 DT-221; depentanizer K-601.	Project implemented in 2011.
	EP	Development of technical and detail designs of furnace P-1, Unit 35-5. Construction design supervision (three-piece box type furnace with vertical radiant coil tubes, a top fume extraction and free vertical flame fuel combustion).	Performed delivery of furnace P-1.	Project implemented in 2010.
Ufa, Bashneft-Ufa Refinery subsidiary				
<i>DO hydrotreating unit LCh-24-7</i>	EP	Development of the technical design to replace the internal contact devices of K-303, K-304, K-101 rectifiers.	Performed delivery of PETON internal contact devices.	Project implemented in 2011.
<i>Cat-cracked gasoline hydrotreating unit</i>	EP	Development of the technical design to replace the internal contact devices of DA-105 catalytic distillation column.	Performed delivery of PETON trays and dispensers.	Project implemented in 2011.
Ufa, Ufaorgsintez OJSC				
<i>Production of phenol, acetone and alphamethylstyrene</i>	EP	Revamp of acetone production through the use of new columns K-80 and K-150. Development of revamp technical and detail designs. Performance of the design documentation industrial safety expert review.	Performed delivery of PETON trays and packings for columns K-80 and K-150.	Project implemented in 2012.

Entity	Contract*	Scope of work	Equipment delivered	Achieved Results
TATNEFT PJSC				
Almetyevsk, Minnibaev GPP OJSC				
<i>Associated gas amine desulphurization unit, Bavly village (nameplate capacity of 60,000 Nm³/year)</i>		Development of a new technology of gas amine treatment*.	Performed delivery of PETON packing for absorber K-200/1 and strip column K- 202/1.	Project implemented in 2009.
TAIF JSC				
Kazan, Kazanorgsintez PJSC				
<i>Phenol/acetone separation unit.</i>	EP	Development of the technology to separate azeotropes by optimizing operation of existing columns K-21-1 and K- 21-2 for azeotropic distillation of acetone-phenol to reduce phenol content in effluents.*	Performed delivery of PETON internals for columns K-21-1 and K-21-2.	Project implemented in 2009.
Nizhnekamsk, Nizhnekamskneftekhim PJSC				
<i>Isoprene monomer production plant, workshop No. 1808</i>	EP	Replacement of column Kt-20 internal contact devices to ensure stable column operation and acceptable quality of isoprene- isobutylene separation in a power supply load range of 70 to 140 t/h after implementation of the isoprene plant production scale-up program.	Performed delivery of PETON valve trays.	Project implemented in 2015.
<i>Isoprene monomer production plant, workshop No. 1806</i>	EP	Replacement of column Kt-24 internal contact devices to ensure stable column operation and acceptable quality of isobutylene fraction separation from isoprene-containing hydrocarbon fraction in a power supply load range of 30 to 90 t/h.	Performed delivery of PETON valve trays.	Project implemented in 2015.
	EP	Replacement of the internal contact devices of columns Kt-130, KT-150.	Performed delivery of PETON valve trays.	Project implemented in 2014.
	EP	Replacement of the internal contact devices of columns Kt-418 (gas absorber), KT-420 (absorbent section).	Performed delivery of PETON valve trays.	Project implemented in 2014.
<i>Gas Separation Node of BK-3 section of workshop No. 1813</i>	EP	Examination of gas separation node with identification of bottleneck places. Development of input data for designing. Technical design for replacement of internal contact devices.	Performed delivery of PETON cross-flow packing.	Project implemented in 2014.
<i>Isobutylene Azeotropic Dehydration Unit</i>	EP	Revamp of column Kt-53, workshop No. 1306, and column Kt-140 of PO azeotrope degassing. Development of the technical design for replacement of internal contact devices.	Completed delivery of PETON cross-flow packing for column Kt-53 and columns Kt-140.	Project implemented in 2012.
LUKOIL, PJSC				
<i>Construction of new GPP with capacity of 120 mln. m³/year in the Alibekmola and Kozhasay fields (Kazakhstan)</i>	J1	Feasibility study of the investments for flare gas recovery at the field with the capacity of 2 mln t/year.	–	Project implemented in 2006.
Budyonnovsk, Stavrolen LLC				
<i>Ethylene production unit EP-350</i>	E	Development of the basic design for the replacement of failed aluminium plate heat exchangers with new shell-and-tube heat exchangers, including their location in confined space conditions and ensuring propylene column higher capacity maintaining.	–	Project implemented in 2013.

Entity	Contract*	Scope of work	Equipment delivered	Achieved Results
Kogalym, LUKOIL-West Siberia LLC, Kogalymneftegaz TPE				
Refinery revamp	EP	Development of the detailed engineering documentation to replace internal contact devices.	Performed delivery of PETON internal contact devices for columns K- 301, K-302, K401, K- 403-1,2.	Project implemented in 2013.
Kstovo, LUKOIL-Nizhegorodnefteorgsintez LLC				
Hydrogen sulphide cracked oil stripper	E	Development of the detailed documentation for technical upgrading of the fractionation scheme in the unit for cracked oil stripping from hydrogen sulphide in the tar visbreaking unit.	–	Project implemented in 2013.
Penex isomerization unit	EP	Development of technical designs for the internal contact devices of Penex isomerization unit columns.	Performed delivery of the internal devices for columns 9-VC1001, 9- VC2001, 9-VC5001, 9- VC5002.	Project implemented in 2013.
CDU-6	E	Verification analysis of equipment (for heat exchangers, columns, furnaces, etc.) including the identification of "bottlenecks" in the technology to increase productivity up to 9 mln t/year. Development of the procurement documentation.	–	Project implemented in 2012.
Langepas, LUKOIL-West Siberia LLC, Langepasneftegaz TPE				
Associated petroleum gas processing division	EP	Development of the detailed engineering documentation to replace internal contact devices.	Performed delivery of PETON internal contact devices for column K- 302.	Project implemented in 2016.
Perm, LUKOIL-Permneftegazpererabotka LLC				
Sulphur Recovery Unit (amine treatment of refinery gases and associated petroleum gases of 0.8 bln. nm ³ /year)	E	Development of the MDEA-absorption technology for ultra- deep APG and refinery gas purification when increasing a capacity from 0.8 to 2 bln Nm ³ /year using new columns and PETON packings*.	–	Project implemented in 2014.
	EP	Development of the technical designs for replacement of internal contact devices.	Performed delivery of PETON internal devices absorbers A-1, A-2 and strip column D-1, D-2.	Project implemented in 2013.
	EP	Development of the technical designs for replacement of internal contact devices.	Performed delivery of PETON internal devices for separators S-1, S-2, SO-1, SO-2, SK-1, SK-2, E-2.	Project implemented in 2013.
Low-temperature condensation and rectification unit (LTCR-2)	EP	Development of the technical designs for replacement of the internal contact devices of column-type apparatus.	Performed delivery of PETON internal devices (cross-flow type) for columns 202.2S-1, 202.2S-2, 202.2S-3 of the LTCR unit and columns 203.3S-1, 203.3S-2, 203.3S-3 of the GFU block.	Project implemented in 2012.
Perm, LUKOIL-Permnefteorgsintez LLC				
Solvent recovery unit of dewaxing unit 39-30	EP	Development of the technical design for replacement of ketonic column K-11 internal contact devices.	Performed delivery of PETON internal contact devices.	Project implemented in 2013.
Unit 35-11-600 hydrotreating section	EP	Development of the technical design for replacement of ketonic column K-1 internal contact devices.	Performed delivery of PETON internal contact devices.	Project implemented in 2012.

Entity	Contract*	Scope of work	Equipment delivered	Achieved Results
Ukhta, LUKOIL-Ukhtaneftepererabotka LLC				
CDU (nameplate capacity of 1.5 mln t/year)	EP	Revamp of the column to increase viscosity of bitumen raw materials*.	Performed delivery of PETON trays, baffle plates, and packing for stripping section and rectification zone of the third cut of the vacuum column (D=6,400 mm).	Project implemented in 2010.
	E	Development of the basic transfer design for new vacuum column K-203 intended to process Yarega heavy oil in the amount of 1 mln t/year and fuel oil of Usinsk light oil in the amount of 2 mln t/year.	–	Project implemented in 2013.
OIL COMPANY ROSNEFT PJSC				
Angarsk, Angarsk Petrochemical Company JSC				
Lube oil solvent extraction unit A-37/3M, Lube Refinery workshop No. 101	EP	Development of the detailed engineering documentation to replace the internal contact devices of extraction column K-1.	Performed delivery of PETON internal contact devices.	Project implemented in 2016.
Sulphuric Acid Alkylation Unit	EP	Development of the technical designs for fabrication of columns and internal contact devices.	Performed delivery of columns K-101, 102, 103, 301, 302 with PETON internal contact devices.	Project implemented in 2013.
Ryazan, Ryazan Oil Refining Company JSC				
Thermal Cracking Unit TK-1	EP	Development of the detailed engineering documentation to replace the internal contact devices of extraction column K-3.	Performed delivery of PETON internal contact devices.	Project implemented in 2015.
Novokuybyshevsk, Novokuybyshevsk Refinery, OJSC				
Hydrocracking complex 1	EP	Development of the detailed engineering documentation to replace column equipment T-404.	Performed delivery of column T-404 with PETON internal contact devices.	Project implemented in 2014.
Syzran, Syzran Oil Refinery Plant JSC				
Light Hydrocracking Unit L-24-8s (nameplate capacity of 350,000 tons per year)	EP	Development of the technical design to replace the internal contact devices in absorber K-103 and final separator S-105 of HBG amine treatment to double the existing apparatus capacity.	Performed delivery of PETON packing and baffle.	Project implemented in 2011.
CDU-VDU-5 (nameplate capacity of 3 mln t/year)	EP	Development of the new technology to revamp the rectification process* and technical revamp project of K-6 vacuum column.	Performed delivery of PETON cross-flow packing for vacuum distillation column K-6 (D=8,000 mm).	Project implemented in 2010.
Compression, absorption and stabilization unit catalytic cracking unstable gasoline separation unit (nameplate capacity of 700 thousand tons per year)	EP	Development of new technology for absorption gas treating.	Performed delivery of PETON trays and packing for columns K-1 and K-2.	Project implemented in 2010.
Industrial fuel gas amine scrubber (nameplate capacity of 300,000 Nm ³ /year)	EP	Development of the technology* and technical design for the new MDEA unit apparatus to absorb plant gases.	Performed delivery of PETON packing for absorber K-1.	Project implemented in 2005.

Entity	Contract*	Scope of work	Equipment delivered	Achieved Results
ROSNANO PJSC				
Ussolye-Sibirskoye, NITOL Group LLC (Ussolye-Sibirskiy Silicon LLC)				
<i>Chlorosilane synthesis and rectification unit of workshop No. 94 (nameplate capacity of 10,000 t/year by purified trichlorosilane)</i>	<i>E</i>	Development of input data to increase capacity from 5 to 15 thous. t/year for trichlorosilane and purification of trichlorosilane from boron to 1 ppb: phosphorus to 2 ppb and carbon to 2 ppm.	–	Project implemented in 2013.
<i>Rectification unit TRICSI-2 (nameplate capacity of 25,000 t/year by purified trichlorosilane)</i>	<i>EP</i>	Completion of basic design of rectification unit TRICSI-2.	Performed delivery of the PETON packing and trays for the rectification columns VK-405, VK-415, VK-425, VK-485, VK-436, VK-151.	Project implemented in 2013.
SIBUR PJSC				
Pyt-Yakh, Tyumen Oblast, Yuzhny Balyk Gas Processing Plant				
<i>Propane/butane production plant (nameplate capacity of 3 bln m³/year)</i>	<i>EP</i>	Development of the technical design for replacement of the internal contact devices of demethanizer 300.3S-1.	Performed delivery of PETON packing.	Project implemented in 2016.
Vyngapur Field, Purovsky District, Yamalo-Nenets Autonomous Okrug, Vyngapur Gas Processing Plant				
<i>Propane/butane production plant (nameplate capacity of 2 bln m³/year)</i>	<i>EP</i>	Development of the technical design for replacement of the internal contact devices of demethanizer K-1.	Performed delivery of PETON packing.	Project implemented in 2011.
United Chemical Company URALCHEM JSC				
Berezniki, Azot Branch				
<i>Process condensate treatment unit (nameplate capacity of up to 300,000 tons per year)</i>	<i>EP</i>	Development of the technical project for replacement of the internal contact devices of distillation column S-904 of the unit for wastewater treatment from ammonium nitrogen.	Performed delivery of PETON packing.	Project implemented in 2011.
The Republic of Uzbekistan				
UZBEKNEFTEGAZ, NHC				
Mubarek, Mubarek Gas Processing Plant				
<i>Sour and sweet gas selective amine desulfurization unit (nameplate capacity of up to 2.5 bln Nm³/year)</i>	<i>EP</i>	Revamp of the desulfurization unit to increase the nameplate capacity and reduce energy consumption*.	Performed delivery of absorber K-1 (D = 3,600 mm) with PETON packing.	Project implemented in 2011.
Shurtan settlement, Shurtan Gas Chemical Complex				
<i>Unit for production of propane/butane mix UP-PBS-3-1, 2, 5 phase</i>	<i>EP</i>	Development of the detailed design documentation to replace the internal contact devices of methane-ethane mix separation columns K-1 at each phase.	Performed delivery of PETON packing.	In the implementation phase
<i>Unit for amine treatment of gas ASO-2</i>	<i>EP</i>	Development of the detailed design documentation to replace the internal contact devices of absorber 20K-1, regenerator 20K-2.	Performed delivery of PETON packing.	In the implementation phase
<i>Low-temperature separation unit (nameplate capacity of 12 bln m³/year)</i>	<i>EP</i>	Revamp of the equipment to improve gasoline extraction from gas and extend the LTS operation range.	Performed delivery of PETON packing.	Project implemented in 2009.

Entity	Contract*	Scope of work	Equipment delivered	Achieved Results
<i>Natural gas low-temperature separation units UPBS (units for production of propane/butane mix) Nos. 3 and 4 (nameplate capacity of 3 bln m³/year)</i>	<i>EP</i>	Development of the design and detailed engineering documentation for the internal contact devices of new columns K-1, K-2 and K-3.	Performed delivery of PETON packing.	Project implemented in 2009.
<i>Unit for amine treatment of gas ASO-1 (nameplate capacity of 1.5 bln m³/year)</i>	<i>EP</i>	Development of the gas purification technology* and detail design of the unit for wet scrubbing of recycle gas from dust supplied from the zeolite drying unit of 20 bln m ³ /year using the PETON packing.	Performed delivery of PETON packing and modular automatic two-stage filtration package PETON (filtration fineness of 10 microns).	Project implemented in 2009.
	<i>EP</i>	Development of a new amine treatment technology*. Performance of design and survey works for the unit revamp to increase the unit capacity by 50 % and reduce energy consumption.	Performed delivery of PETON packing for absorber 10K-1, regenerator 10 K-2, separator 10 Ye-1.	Project implemented in 2009.
<i>Unit for amine treatment of gas ASO-2 (nameplate capacity of 3 bln m³/year)</i>	<i>EP</i>	Development of a new amine treatment technology*. Performance of design and survey works for the unit revamp to increase the unit capacity by 50 % and reduce energy consumption.	Performed delivery of PETON packing for absorber 20K-1, regenerator 20K-2, separators 20Ye-1, 20Ye-2.	Project implemented in 2009.
The Republic of Turkmenistan				
TURKMENGAZ SC				
Sarabs City, Dovletabad-3 gas field				
<i>Dovletabad-3 field sulphurous gas processing GPP (nameplate capacity of up to 25 bln m³/year)</i>	<i>EP</i>	Development of a new sweet gas amine treatment technology and detail technical revamp designs of 8 amine treatment units at the GPP*.	Performed delivery of the PETON packing for the absorber K-1 (D = 3,400 mm), amine strip column K-2 (D = 2,800/1,800 mm).	Project implemented in 2006.
Gazojak, Achak and Gugurtli gas fields				
<i>Achak and Gugurtli gas fields sulphurous gas processing facilities</i>	<i>EP</i>	Revamp of three natural gas desulfurization units. Development of design and detailed engineering documentation.	Performed delivery of PETON packing.	Project implemented in 2004.
The Republic of Kazakhstan				
CONDENSATE JSC				
Aksay, Karachaganak gas field				
<i>CDU to process Karachaganak GCF unstable gas condensate with a capacity of 600,000 tons per year</i>	<i>EP</i>	Revamp of the non-purified gas condensate processing unit.	Performed delivery of PETON packing.	Project implemented in 2008.
	<i>E</i>	Development of the feasibility study and basic design of the new flare gas recovery unit of 8 thousand t/h (25 % H ₂ S) to obtain fuel gas, LPG and sulphur.	–	Project implemented in 2008.

*Abbreviations:

M stands for Marketing Study

R&D stands for Research & Design

JI stands for Justification of Investments

E stands for Engineering

P stands for Procurement

C stands for Construction

EPSS stands for Engineering, Procurement, Site Services

HSE stands for Health, Safety & Environment

*licensed technologies of PETON


PETON PROJECT MAP*

ENGINEERING
FOR THE NATIONAL INTEREST



* The complete list of projects is given in the section «Reference List»

EXPERIENCE WITH INTERNATIONAL LICENSORS

No.	Kind of work/Units	Licensor
1	Hydrotreating units	Honeywell UOP  A Honeywell Company
		Haldor Topsoe Group 
		Criterion Catalysts & Technologies L.P. 
		Shell 
2	Hydrowaxing units	Sud-Chemie 
3	Hydrocracking units	Criterion Catalysts & Technologies L.P. 
		ExxonMobil 
4	Catalytic cracking units	Axens 
5	Sulfur recovery	Petrochemistry Axens 
		Maire Tecnimont 
		Jacobs 
		Honeywell UOP  A Honeywell Company
6	Catalytic reforming units with preliminary hydrotreating units	Criterion Catalysts & Technologies L.P. 
		Axens 
		Sud-Chemie 
7	8 Isomerization units	UOP  A Honeywell Company
		Axens 
8	7 Hydrogen production units	Haldor Topsoe Group 
		Foster Wheeler 
9	Ethane and NGL isolation and nitrogen and helium mixture production units Limun technology (multi-stage liquefaction process with mixed refrigerant)	LINDE  THE LINDE GROUP

CUSTOMERS





PERMISSION DOCUMENTS AND CERTIFICATES

PERMISSION DOCUMENTS AND CERTIFICATES

Peton holding provides domestic and foreign consumers with quality design products, high-technology equipment and complex engineering services on the basis of an innovative approach to the implementation of EPC/EPCM projects in fuel and energy sector. To carry out its activities, PETON Holding has the necessary package of permissions and certificates:

- Positive conclusion on the company's organisational and technical readiness to carry out the following types of PJSC Gazprom PJSC work:
 - General Contractor function performance
 - Design and survey work
 - Process equipment commissioning and testing

- Certificate of compliance with ISO 14001:2015;
- Certificate of compliance with ISO 45001:2018;
- Certificate of compliance with ISO 9001:2015;
- Certificate of compliance with the requirements of STR GAZPROM 9001-2018;
- Certificate IQNet ISO 14001:2015;
- Certificate IQNet ISO 45001:2018;
- Certificate IQNet ISO 9001:2015;
- Work permit certificate for works that have an impact on the safety of capital construction projects for construction and erection work;
- Work permit certificate for works that have an impact on the safety of capital construction projects for the performance of design work;
- Work permit certificate for works that have an impact on the safety of capital construction facilities, for carrying out survey works;

- Declaration of conformity in accordance with TR TS 010/2011 for pallet-type mass exchange PETON contact devices;
- Declaration of conformity in accordance with TR TS 010/2011 for mass exchange PETON contact devices of headbox type;
- Declaration of conformity in accordance with TR TS 010/2011 for PETON brand DEG fire regeneration unit

CERTIFICATE OF COMPLIANCE TO ISO 9001:2015



INTEGRATED MANAGEMENT SYSTEM

PETON Holding has developed, implemented, certified and is successfully operating an Integrated Management System for.

PETON Holding's Integrated Management System includes the following management systems:

- Quality Management System
- Occupational Health and Safety Management System;
- Environmental Management System

Every year, PETON Holding successfully passes the certification of its Integrated Management System in accordance with the requirements of the quality standards. The activities of PETON Holding are aimed at the continuous development of its competences, efficient use of human resources and Customer needs satisfaction.

CERTIFICATE OF COMPLIANCE TO ISO 14001:2015



CERTIFICATE OF COMPLIANCE TO OHSAS 45001:2018



CUSTOMS UNION DECLARATION OF CONFORMITY

ЕАЭС

**ТАМОЖЕННЫЙ СОЮЗ
ДЕКЛАРАЦИЯ О СООТВЕТСТВИИ**

Заявитель, Общество с ограниченной ответственностью «НИИ НП» (далее, ООО «НИИ НП»),
102173692/99

Адрес: 450077, РОССИЯ, Республика Башкортостан, г. Уфа, ул. Новоомская, д. 28/1,
фактический адрес: 450077, РОССИЯ, Республика Башкортостан, г. Уфа, ул. Новоомская,
д. 28/1, Телефон: 7347246870/5, Факс: 7347246870/4, E-mail: reit@nnp.ru,
в лице Генерального директора Гаскова Эдуарда Сергеевича

заявляет, что оборудование химическое, нефтехимическое/лаборное: Блок отечной
регистрации ГДТ буровой марки РЕТОН

итоговая форма с ограниченной ответственностью «НИИ НП» (далее, ООО «НИИ НП»),
450077, РОССИЯ, Республика Башкортостан, г. Уфа, ул. Новоомская, д. 28/1,
фактический адрес: 450077, РОССИЯ, Республика Башкортостан, г. Уфа, ул. Новоомская,
д. 28/1, Телефон: 7347246870/5, Факс: 7347246870/4, E-mail: reit@nnp.ru
по ТН ВЭД. 8419099900, Серийный номер, УП 3647-05/1752969-2015

соответствует требованиям

ТР ТС 010/2011 «О безопасности машин и оборудования»

Декларация о соответствии принята на основании

Протокола испытаний № 6953/07 от 08.05.2014г., Испытательная лаборатория ООО
«ШкольникТест», рег. № РОСС RU.0001.21A8370 от 28.10.2016, адрес: 127015, Москва,
Бумажный пер., д.1, стр.1

Дополнительная информация

Срок годности (срок службы) указан в прикладной к продукту товаросопроводительной
документации и/или не указан

Декларация о соответствии действительна с даты регистрации по 19.05.2018
включительно

Гасков Эдуард Сергеевич
(подпись и фамилия руководителя организации-
заявителя или физического лица, зарегистрированного в
качестве индивидуального предпринимателя)

Сведения о регистрации декларации о соответствии:

Регистрационный номер декларации о соответствии: TC N RU.Д.РУ.А.У14.В.23781

Дата регистрации декларации о соответствии: 20.05.2015

**ТАМОЖЕННЫЙ СОЮЗ
ДЕКЛАРАЦИЯ О СООТВЕТСТВИИ**

Заполняет: Общество с ограниченной ответственностью «Национальный Технологический Институт» с/о/в «Искон», ОГРН: 103026443-ИП/А, Свидетель о государственной регистрации, выданный 04.06.2009 под №М/ИФНС №39 по РТ, Московская область в фактический адрес: 450071, РОССИЯ, Республика Башкортостан, город Уфа, Пресненный Салемский Квартал, 60 корпус 1, Фактический адрес: 450071, РОССИЯ, Республика Башкортостан, город Уфа, Пресненый Салемский Квартал, с 40 корпус 1, Телефон 7347-680809, Факс: 7347-648578, E-mail: reprod@nti.ru

в лице Генерального директора Мухоморова Игоря Александровича

подтверждает, что: Максимальные контактные данные «РЕПО» выданы ниже

Наименование: Общество с ограниченной ответственностью «Национальный Технологический Институт» с/о/в «Искон», Московская область в фактический адрес: 450071, РОССИЯ, Республика Башкортостан, город Уфа, Пресненый Салемский Квартал, с 60 корпус 1, Фактический адрес: 450071, РОССИЯ, Республика Башкортостан, город Уфа, Пресненый Салемский Квартал, с 08 корпус 1

Телефон: 7347-680809, Факс: 7347-648578, E-mail: reprod@nti.ru

Код ТН ВЭД: 8443, Код ОКЕД: 361100, Серийный номер, ТУ 3461-01-12753960-07

соответствует требованиям:

Требованиям документа Таможенного союза "ТН ВЭД" к маркировке и оформлению" (ТР ТС 010/2011)

Декларация о соответствии принята на основании

Протокола испытаний № 278/17 от 25.05.2016 года, Исключительного права Общество с ограниченной ответственностью "ТЕСТ-РУ" №1265-5 сроком действия до 28.12.2017 года

Дополнительная информация:

Срок (срок/сроки) защиты в патентной и/или авторской собственности интеллектуальной собственности: 10 лет/10 лет

Декларация в соответствии с требованиями к документам по дате регистрации по 22.05.2021 действительна


Мухоморов Игорь Александрович
(подпись) (инициалы и фамилия заявителя организации)
(наименование заявителя организации, зарегистрированной в качестве юридического лица)

Свидетель о регистрации декларации в соответствии:

Регистрационный номер декларации о соответствии: ТС N 17-3-8E.1010-0.8E2162

Дата регистрации декларации о соответствии: 23.05.2016

GAZPROMSERT CERTIFICATE

ЕАИ

**ТАМОЖЕННЫЙ СОЮЗ
ДЕКЛАРАЦИЯ О СООТВЕТСТВИИ**

Заявитель, Общество с ограниченной ответственностью «Национальная исследовательская Проектная Институт» и/или и/или «Национал», ОГРН 1036441104515 Ссылка на государственной регистрации: зарегистрировано 06.06.2009 года МИРФИ. Адрес по РФ: Московская область и датский адрес: 4-50071, РОССИЯ, Республика Башкортостан, город Уфа, Преслов Салавата Юмарева, д. 60 корпус 1, Фактический адрес: 450071, РОССИЯ, Республика Башкортостан, город Уфа, Преслов Салавата Юмарева, д. 60 корпус 1. Телефон: 7472568784, факс: 7447246024, E-mail: info@npi.ru

в лице (существенно) директора Мухоморова Игоря Анатольевича

заявляет, что Массовые/массовые контактные устройства «РПОН» торгового типа

Изготовитель, Общество с ограниченной ответственностью «Национальная исследовательская Проектная Институт» и/или и/или «Национал», ОГРН 1036441104515 Ссылка на государственной регистрации: зарегистрировано 06.06.2009 года МИРФИ. Адрес по РФ: Московская область и датский адрес: 4-50071, РОССИЯ, Республика Башкортостан, город Уфа, Преслов Салавата Юмарева, д. 60 корпус 1, Фактический адрес: 450071, РОССИЯ, Республика Башкортостан, город Уфа, Преслов Салавата Юмарева, д. 60 корпус 1.

Технические характеристики: 40 корпус 1

Код ТН ВЕД ЕАИ: Код ОКВЭД 161100, Серийный номер: TPU 36111-002-14725666-08

осуществляет требования

Заявитель гарантирует выполнение Заявителем условий «О безопасности машин и оборудования» ТР ТС 016:2011.

Декларация о соответствии принята на основании

Протокол испытаний № 279-15 от 23.05.2016 года. Испытательного центра Общества с ограниченной ответственностью «ТНЦ-ТА РУПРП» аттестат № 4055-02 сроком действия до 26.12.2017 года

Дополнительная информация

Срок годности (сроком) указан в сертификате к продукции (торговофирменной) заявителем и/или на упаковке.

Декларация о соответствии действительна с даты регистрации по 22.05.2021 включительно


Мухоморов Игорь Анатольевич
(лично) в качестве руководителя организации
(лично) в качестве ответственного лица, уполномоченного в
качестве ответственного (представителя)

Ссылка на регистрацию декларации о соответствии:

Регистрационный номер декларации о соответствии: ТС RU.Д.И.ИИИИ.02176

Дата регистрации декларации о соответствии: 23.05.2016

 СИСТЕМА ДОБРОВОЛЬНОЙ СЕРТИФИКАЦИИ
ГАЗПРОМЦЕРТ
РОСС RU.30214M.000

ОБЯЗАН ПО СЕРТИФИКАЦИИ
системы менеджмента качества «Русский Регистр» ГОФ001.8215
Аккредитация на сертификацию «Русский Регистр» (ГОСТ Р ИСО 9001)
Российская Федерация, Санкт-Петербург, Литейный пр., д. 65Б, лит. А, пом. III
(т/ф) 609-11-67, 608-11-45, факс: 609-11-40, e-mail: rg-cert@rusregister.ru

СЕРТИФИКАТ СООТВЕТСТВИЯ

№ ГОФ001.1415.0304354
№ ГОССОМАНД.0400464 К 1169

Срок действия с 09.11.2016 по 09.11.2019

СЕРТИФИКАТ ВЫДАН

Обществу с ограниченной ответственностью
«Научно-Исследовательский Проектный Институт
нефти и газа «Ефeson»

Адрес:

Российская Федерация, 450071, Республика Башкортостан,
г. Уфа, пр. Заводской Юсупова, д.60, к.1
т/ф: (347) 240-87-60; факс: (347) 246-87-61; e-mail: rejon@efeson.ru

ПОСТОЯЩИЙ СЕРТИФИКАЦИОННЫЙ
Система менеджмента качества применяется и работает по классическим принципам,
по методике принятой документации, по управлению и осуществлению сертификации,
рецензированию и контролю результатов сертификации и аккредитации, обслуживанию
предприятий-членов-наблюдателей работ; осуществлению стратегического контроля,
обслуживанию клиентов и сопровождению; осуществлению промышленной безопасности

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ
СТО Газпром 9001-2012

Разъяснения, касающиеся области распространения
сертификации соответствия, могут быть
получены в ОС или ЦОС ГАЗПРОМЦЕРТ

 Российская Федерация по сертификации
М.П.
М.П.
М.П.

 _____
И.П. _____
И.П. _____

А.В. Владимиров
технический специалист
И.И. Прилинов
технический специалист

NIPI NG PETON SURVEY CERTIFICATE

РАИ
Российский Альянс Инициатив

Самостоятельные организации,
входящие на членство в, создаваемые структуры
и объединения не являются Самостоятельными организациями
"Российский альянс инициатив"

Адрес: метрополитенская (119375, г. Москва, Софийская набережная, д. 30, стр. 3).
Регистрационный номер в государственном реестре самостоятельных
организаций: СРО-33-044-202224.
www.rai-ai.ru

г. Москва: «16 марта 2015 г.

СОВЕЩАТЕЛЬСТВО

и решение о предоставлении услуг по оказанию работ, которые
оказываются в форме на Компоненты объектов капитального строительства
№ 041-041-2015-02790451-11-040

Выставлено Самостоятельной организацией:
Общество с ограниченной ответственностью
«Научно Исследовательский Проектный Институт
теплоты и газа «Ните»»

ИНН 77-0786451 ОГРН 10204414974
Адрес: 450077, Республика Башкортостан, г. Уфа, ул. Панкратова, д. 287

Описание работы: Ремонт Систем Самостоятельной
организации (Помощники по ремонту: "Система Самостоятельной
организации" № 041-041-2015-02790451-11-040)

Наименование Самостоятельной организации: Теплоты и газа «Ните»
и решение: Самостоятельная организация, которая оказывает услуги по безопасности объектов
самостоятельной организации.

Исполнитель: «16 марта 2015 г.
Самостоятельная организация, которая оказывает услуги по безопасности объектов
самостоятельной организации по адресу: г. Москва, ул. Панкратова, д. 287

Самостоятельная организация, которая оказывает услуги по безопасности объектов
самостоятельной организации по адресу: г. Москва, ул. Панкратова, д. 287

Президент СРО ИИ
Российский Альянс
Инициативы:

Д.В. Хруцкий.

Стор. АИ № 0001012 8

CERTIFICATE OF SRO PIR NIPI NG PETON

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ON THE COMPANY'S ORGANISATIONAL AND TECHNICAL READINESS TO CARRY OUT WORK AT GAZPROM'S FACILITIES

ОТГ. Л. 048291

MSS CERTIFICATE OF ADMISSION TO A PARTICULAR TYPE OF WORK ON SAFETY OF THE OKS

Содержит текст документа, оформленного в виде копии с официального бланка. В бланке присутствуют:

- Логотип и название организации: "Содружество организаций, действующих в интересах общества строительных организаций".
- Адрес: "Ассоциация Строительств организаций, Монгольский строительный союз, 100000, Улусбаян-Батталан, 1-й этаж, ул. 10-й Октября, д. 24, мн.эт. 10-1".
- Регистрационный номер и государственное агентство: "Регистрационный номер и государственное агентство управления организаций СРО-С-094-02122809".
- Дата: "22-ноябрь 2018 г.". (в оригинале: 2018.11.22)
- Заголовок документа: "СВИДЕТЕЛЬСТВО".
- Тема документа: "о присуждении почетного звания работ, которые оказывают влияние на безопасность объектов капитального строительства".
- Номер документа: "№ СР-094-02-0917-02-21116".
- Получатель документа: "Обществу с ограниченной ответственностью «Национал Исследовательский Проектный Институт нефти и газа «Ветина» СЭПН КОСХААХУУ, ИДН 87104443, 100070, Республика Баянхонгор, пер. 7-й, проспект Сиванга Кюлюн, д. 60, этаж 1».
- Основание выдачи: "Одобрение выдано Свидетельством: Решение Совета Административ, протокол № 34 от «22-ноябрь 2018 г.". (в оригинале: 2018.11.22)
- Назначение Свидетельства: "назначается материалу доверия к работам, выполняемым и проектируемым к настоящему Свидетельству, которые оказывают влияние на безопасность объектов капитального строительства".
- Время действия: "с «22» ноября 2018 г.". (в оригинале: 2018.11.22)
- Срок действия: "Срок действия до прекращения действительности: Свидетельство имеет срок с ограничением срока и пересмотру его действия".
- Подпись: "Свидетельство выдано министром промышленности". (в оригинале: 2018.11.22)
- Подпись и печать: "Присужден: [Подпись] [Печать: АРХИВАРИУС, 100000, Улусбаян-Батталан, 1-й этаж, ул. 10-й Октября, д. 24, мн.эт. 10-1]".
- Подпись: "Р. Холдсворт".
- Номер документа: "0018471".

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