



# INTI

INSTITUTE FOR INITIATIVES  
IN OIL AND GAS TECHNOLOGIES



## INTI's DIGEST 3rd quarter 2021

English Version



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## TABLE OF CONTENTS

<b>ANO INTI has tested the first-ever industrial green building standard for oil and gas industry</b>	<b>3</b>
<b>The INTI`s expert delivered a presentation at the conference on Russian-Kazakh cooperation</b>	<b>5</b>
<b>The students of Gubkin University undertook their internship at INTI</b>	<b>6</b>
<b>Does oil and gas industry need industrial symbiosis?</b>	<b>7</b>
<b>INTI extends cooperation with international licensors and EPC companies</b>	<b>9</b>
<b>The testing of the first domestic reciprocating compressor for INTI`s standard</b>	<b>10</b>
<b>The first shipment to Serbia was delivered with participation of INTI</b>	<b>12</b>
<b>The mechanism of joint testing of innovative products was tested</b>	<b>13</b>
<b>Mobile technologies will be commonly used in oilfield construction</b>	<b>14</b>

# ANO INTI HAS TESTED THE FIRST-EVER INDUSTRIAL GREEN BUILDING STANDARD FOR OIL AND GAS INDUSTRY

In the past year, the Institute has researched international approaches to increasing the environmental friendliness of industrial facilities of oil and gas sector and also negotiated with foreign colleagues on the existing ways of enterprises decarbonization. During its analysis, the Institute came to the conclusion that there is no systematic approach to green building and industrial facilities operation abroad. For that reason, the INTI`s Green committee with the participation of the leading Russian engineers, environmentalists and sustainable development experts issued the first-ever industrial green building standard in oil and gas industry in July 2021. In September, the Institute began testing of the standard at real industrial sites.

The process of compliance assessment implies that a facility conducts a number of mandatory and advisory activities. In order to choose them one should take into account the project objectives or engage professional consultants who are able to identify those activities which are suitable for a project. A facility receives points for completing them.

Within the standard, you can find, for example, these proposed activities and the points which are given for conducting them:

Proposed activity	Activity`s area	Points
Preserving the natural environment of plants and ensuring biodiversity	Environmental sustainability of a development area	1 point
Reducing the drinking water consumption for household and technical needs, usage of grey water and rainwater for administrative buildings	Water efficiency	1 point
Determining the energy efficiency of a building using energy modeling procedures, ensuring a minimum value of energy efficiency	Energy efficiency	12 points
Using environmentally friendly materials	Environmentally sound choice of building materials	1 point
Omitting the unreasonable disposal of unused materials which can be sold	Waste management	1 point
Conducting acoustic estimate of in-plant noise and noise reduction when it is needed	Microclimate and ergonomics	1 point
Provision of recreational areas for staff	Social environment	1 point
Reducing CO2 emissions during the operational phase	Decarbonization	2 points
Creating a facility's digital model of greater level of detail which enables to describe with high accuracy facility`s behavior in all situations and at all stages of the life cycle	Management and innovativeness	4 points
Providing an ability to use cycling transport	Location of a built-up area and transport service organization	1 point

<p>The table contains 10 proposed activities, their total number in the standard is 73. In accordance with the number of given points a facility is rewarded with one of these certificates:</p>	Bronze		<b>35</b> points
	Silver		<b>45</b> points
	Gold		<b>55</b> points
	Platinum		<b>70</b> points

2 Gazprom Neft facilities at their design phase (a transport hub in Omsk and a rotational camp in Khantos) are now being tested in accordance with the green standard.

The INTI`s experts from Green Committee examined the project documents of facilities to determine whether they correlate with the activities described in the standard.

The project of a transport hub in Omsk scored 55 points preliminarily, which corresponds with a gold certificate. The project of a rotational camp in Khantos gained 35 points, which in turn corresponds with a bronze certificate. For this facility INTI will develop a list of recommendations the implementation of which would allow to gain extra points and to improve the level of the compliance certificate. While transiting from design phase to building phase, they will need to be tested again and then to confirm the implementation of the standard`s requirements described in the project documents.

The INTI`s green standard systematizes environmental criteria for design, construction and operation of capital construction facilities. Project implementation in accordance with checklist of the standard will allow oil and gas companies to reaffirm their commitment to ESG principles and to strengthen their influence at export market in the context of the world`s energy transition.



**DARYA SUSLOVA**

The manager of Institute for Initiatives in Oil and Gas Technologies



**Nowadays developers and planners demonstrate a great interest in increasing the operational characteristics of buildings. The government and investors are concerned for financial costs reduction and environmental improvement in the country. The standard enables companies to contribute to improving ecological stability and also to promote the welfare of employees of petrochemical facilities. We are confident that in the future the standard testing will be widespread.**

## THE INTI`s EXPERT DELIVERED A PRESENTATION AT THE CONFERENCE ON RUSSIAN-KAZAKH COOPERATION

In the framework of the St. Petersburg International Gas Forum, on November 6, the conference on the Russian-Kazakh cooperation in the gas sector was held.

Mikhail Kuznetsov, known as the head of Technology Partnerships and Engineering and Technology Import Substitution Department of Gazprom Neft and also as the INTI`s expert, delivered a presentation on the current status and prospects of development in the field of arranging for standardization within the industry and INTI`s compliance assessment.

Mikhail Kuznetsov noted that it was important for the Institute to implement this initiative not only at the Russian market but also in the OPEC+ countries. The cooperation agreements have already

been signed with six OPEC+ oil and gas companies. Among them, a Kazakhstan company KazMunayGas has joined the Institute as an Observer member. The relevant memorandum was signed on March 10, 2021. INTI is ready to provide such an opportunity to the other OPEC+ oil and gas companies.

In the six-month period since the agreement was signed, the KazMunayGas experts received twelve INTI`s draft standards. Five of them are approved and being updated according to the comments from new members. In the near future INTI plans to cooperate with KazMunayGas on the formation of a list of manufacturers which meet the standards of the Institute. It is also scheduled to develop norms and standards in the field of CO2 capture and pumping, hydrogen power engineering, joint testing of innovative products within the framework of the testing sites` network.



*The international conference on the Russian-Kazakh cooperation in the gas sector*

## THE STUDENTS OF GUBKIN UNIVERSITY UNDERTOOK THEIR INTERNSHIP AT INTI



From 26 June to 31 July, the students of National University of Oil and Gas "Gubkin University" undertook their remote internship at Institute for Initiatives in Oil and Gas Technologies. The beginning specialists of the University's Standardization, Certification and Quality Management of Oil and Gas Equipment Manufacture Department were tasked with addressing current objectives of the organization.

All the tasks of internship had important practical importance, in other words, they were related to the process of standards development and participation in committees. In the future, INTI plans to promote cooperation with universities and to get the students acquainted with the industry specifics in order to overcome the lack of human resource gaps in the area of standardization.

### WHAT KIND OF SKILLS DID STUDENTS ACQUIRE?

- ✓ New standards development
- ✓ Preparation of analytical overviews and benchmarkings for the organization
- ✓ Work with digital products
- ✓ Analysis of international, domestic and corporate standards



**IRINA KHALEEVA**  
Chief Executive Officer of Institute for Initiatives in Oil and Gas Technologies



The main partnership area in the cooperation between National University of Oil and Gas "Gubkin University" and INTI will be the development of human resources capacity and employees' skills in the field of industry standardization.



**DARYA MOZGOLOVA**  
Intern



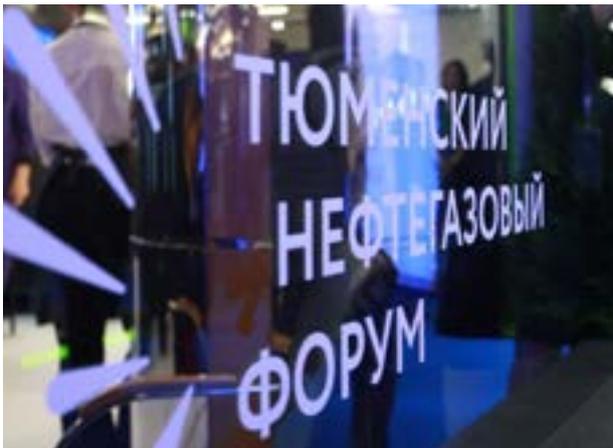
The internship at INTI has taught me to structure information and to outline the key moments. I have acquired technical translation skills and found out how the deliberative processes are conducted and how draft standards are designed. After having done my internship, I got job at INTI.



The Press Service of the 12th Tyumen Oil and Gas Forum/Alexey Kolchin/TASS



The Press Service of the 12th Tyumen Oil and Gas Forum/Donat Sorokin/TASS



The Press Service of the 12th Tyumen Oil and Gas Forum/Maxim Slutsky/TASS



The Press Service of the 12th Tyumen Oil and Gas Forum/Maxim Slutsky/TASS

## DOES OIL AND GAS INDUSTRY NEED INDUSTRIAL SYMBIOSIS?

In September, at Tyumen Oil and Gas Forum INTI and RUSEK provided a joint stand on industrial symbiosis and reported on how to implement that approach in the oil and gas industry. The INTI`s representatives provided information on the Institute plans to develop industrial symbiosis in the oil and gas industry.

As part of this initiative, INTI intends to find out how much and what kind of waste is generated by Russian oil and gas companies. Also, the Institute plans to determine what kinds of them are suitable for recycling and secondary use. Already, the relevant working groups within the INTI's Green committee have been set up.

### INDUSTRIAL SYMBIOSIS

*is a process when one enterprise`s waste is reused by another enterprise as a resource*

<sup>1</sup> Dorozhko S.V., Shushkevich A.M. Industrial symbiosis and new opportunities for energy and resource savings of enterprises [Electronic resource] // Scientific library Elibrary.ru URL: <https://elibrary.ru/item.asp?id=46639065>

## **A CASE OF HOW INDUSTRIAL SYMBIOSIS IS IMPLEMENTED IN THE OIL AND GAS INDUSTRY**

### **The Kalundborg Symbiosis case<sup>1</sup>**

This case is the most notable example of how industrial symbiosis functions. In Kalundborg (Denmark) eleven enterprises exchange more than twenty kinds of material, water and industrial resources. Thus, while coal is burned at a power plant, fly ash is produced which is used further in plasterboard manufacture. Water which was used at an oil refinery for cooling purposes is transported to a thermal power station in order to generate steam. The steam used at a thermal power station is transmitted to an insulin and ferments manufacturing plant.

With that system, Kalundborg enterprises manage to save more than 24 million Euros per year at expense of using of by-products of the production and unused secondary resources and reducing of the cost on products manufacture. They also reduce greenhouse gas emissions by 635,000 tons of CO2 equivalent.



**IGOR MATVEYCHUK**  
RUSEK's Executive Director



**In today's world, all manufacturing companies from oil and gas sector are developing in a similar way. These companies are concerned about resemble technological and organizational development projects. The only difference between them is a certain time lag.**

**Industrial symbiosis is a striking example of how this model of organization and production turned out to be successful in various parts of the world, especially in Western Europe, Canada and China within the concept of the circular economy. We are convinced that, the Russian oil and gas sector will not miss this trend. In the near future, we will see how this model inspires industry actors to implement significant industrial projects and intersectoral projects.**

# INTI EXTENDS COOPERATION WITH INTERNATIONAL LICENSORS AND EPC COMPANIES

Within the framework of the St. Petersburg International Gas Forum, INTI signed memoranda of cooperation with such international engineering companies as Petrofac International Limited (the United Kingdom) and Linde (Germany).

In accordance with the signed documents, the mentioned companies will nominate their experts to the INTI`s committees. Those experts will participate in negotiation and approval of industry standards. This may stimulate international licensors and EPC contractors to recognize the compliance assessment results provided by INTI.



*Sami Iskander, Group Chief Executive of Petrofac International Limited, and Vitaly Markelov at the time of signature*



*Juergen Nowicki, Executive Vice President of Linde Engineering, and Vitaly Markelov at the time of signature*



**IRINA KHALEEVA**

Chief Executive Officer of Institute for Initiatives in Oil and Gas Technologies



By signing such agreements, INTI makes an important step towards an international recognition of the compliance assessment results provided by the Institute. The high level of expertise of such international companies as Petrofac and Linde will allow to consider all necessary product requirements, while developing industry standards. Manufacturers will be able to undergo the INTI`s compliance assessment knowing that its results will be recognized by all organization members. This will let local manufactures gain access to local and foreign projects.

# THE TESTING OF THE FIRST DOMESTIC RECIPROCATING COMPRESSOR FOR INTI`S STANDARD

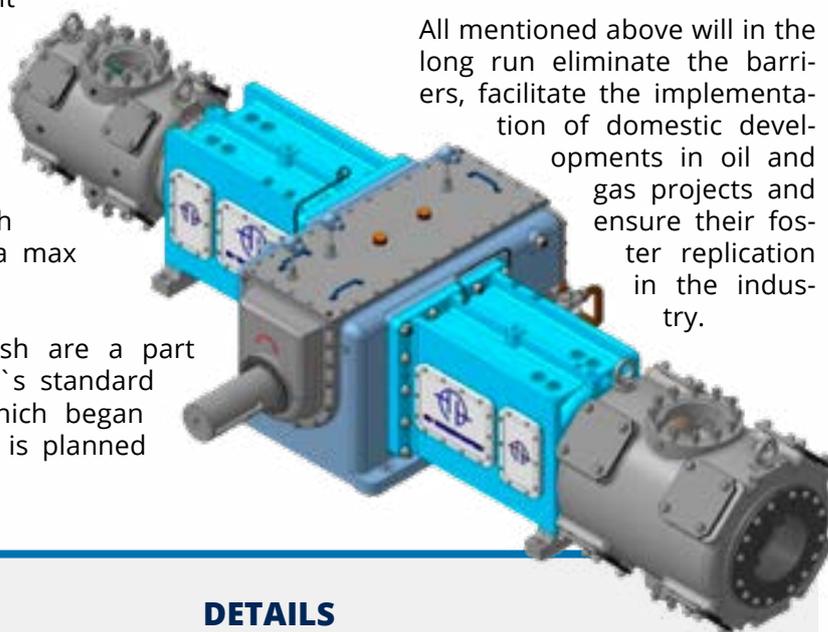
In September, the bench tests of reciprocating compressor on the basis of M18 (designed by Penzkompresormash) were successfully held. During the test, the compressor was subjected to a load comparable to a load in real conditions. Accordingly, its current capacities were identified. In the future, the compressor will be able to undergo the INTI`s compliance assessment.

The specialists of the plant began their work on the mentioned equipment back in 2016. They were tasked with developing a compressor which would be able to compete with imported ones. The result was a sample of the reciprocating compressor on the basis of M18 which was high-speed with a speed of 1000 rpm and with a max drive power of 4 MW.

The tests at Penzkompresormash are a part of a long-term work on the INTI`s standard on reciprocating compressors which began this year. Within the standard, it is planned

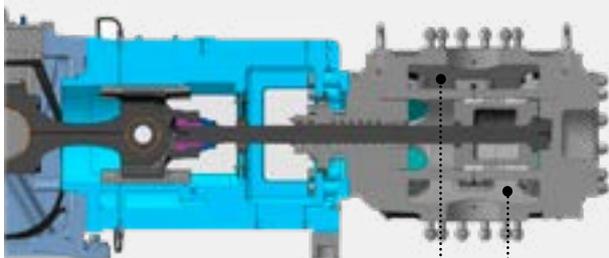
to harmonize the basic technical requirements of the API standards, which were previously used for manufacture of such a kind of equipment for domestic standards and corporate requirements on reciprocating compressor.

All mentioned above will in the long run eliminate the barriers, facilitate the implementation of domestic developments in oil and gas projects and ensure their foster replication in the industry.



## COMPRESSOR M18

*is a high-speed opposed compressor for gas compression at mining facilities and transport hubs*



DECREASING SPACE

INCREASING SPACE

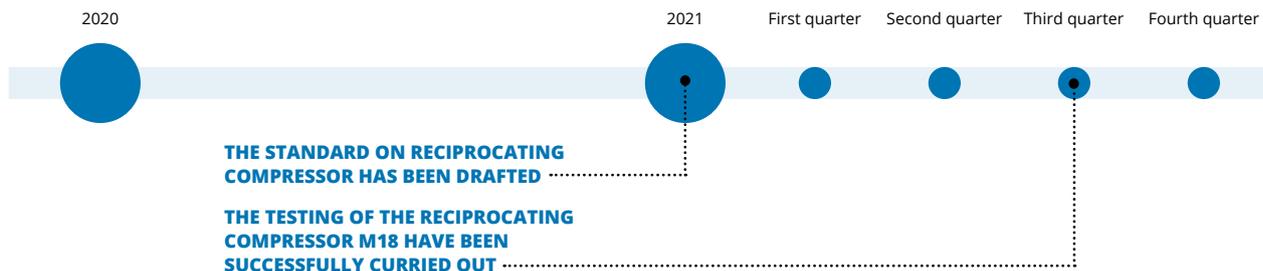
## DETAILS OF CONSTRUCTION

- ✓ Small size of the compressor
- ✓ Block Modular design
- ✓ Aggregation with a gas reciprocating engine
- ✓ Cooling of cylinders by pumped medium
- ✓ Use of domestic components

### TECHNICAL SPECIFICATIONS

<p>up to <b>4</b> MW</p> <p>maximum capacity (depending on specification 1500/3000/4000 kW)</p>	<p><b>40</b> MPa</p> <p>maximum discharge pressure</p>	<p><b>1000</b> rpm</p> <p>maximum power speed</p>	<p><b>160</b> mm</p> <p>piston stroke</p>
<p>up to <b>500</b> mm</p> <p>Piston diameter</p>	<p>Stationary or modular design</p>	<p>Can be aggregated with a gas reciprocating engine</p>	<p>Compressor drive may be of two types: electric or gas reciprocating</p>

### STAGES IN THE WORK ON THE STANDARD



**ALEXEI VOLODIN**

Head of Marketing and Sales Department of Penzkompresormash



The manufacturer trials are the outcome of the long-term work on production of the first domestic compressor with a max drive power up to 4 MW. This is the first successful experience in the field of development and manufacture of compressor equipment under the import substitution program. The compressor was designed in accordance with international standards and it complies with the INTI`s draft standard on the reciprocating compressors. We are planning to use this experience to broad the model row of equipment and to create new promising bases.

## THE FIRST SHIPMENT TO SERBIA WAS DELIVERED WITH PARTICIPATION OF INTI



In the middle of the year, NIS, the Serbian energy company, conducted procurement procedures to select a supplier of liner hanger systems and equipment for well completion without cementation. The procurement was proceeded on the platform of Isource. As a supplier was chosen ZERS, the Russian manufacture. INTI tested the purchased equipment`s conformity with the Institute`s standard and confirmed the production quality.

### ABOUT THE COMPANIES



**ZERS (Completion, Operation and Repair of Wells)** is a company, specializing in development, manufacture and maintenance of oil and gas equipment.



**NIS (The Serbian oil industry)** is a company, specializing in exploration, production and refining of oil and gas, petroleum products distribution and in implementing the projects in the field of power and petrochemistry.



**Isource** is an ecosystem which brings together the procurement services, logistics and education. The individualized decisions suggested by the platform are implemented on the basis of the forward-thinking digital tools and intellectual services.

## THE MECHANISM OF JOINT TESTING OF INNOVATIVE PRODUCTS WAS TESTED

In September 2021, the experimental-industrial trials of the rotary guided system (RSS) were held. RSS was developed by GERS Engineering. For the first time, the equipment testing was carried out with the participation of the experts from different oil and gas companies.

Previously, in order to confirm the product quality, a developer conducted separate trials almost for every oil and gas company. A developer also had constantly to adjust equipment in accordance with corporative requirements of potential customers.

The INTI`s specialist committee optimized this process, in other words, it gathered and approved common technical specifications for equipment and developed methods for conducting tests. One of INTI`s founders provided a well for testing. Experts from oil and gas companies were invited here in order to conduct a joint verification of the trials results.

During the first phase of testing, the system was tasked with drilling a horizontal section of a well with trajectory control in "manual" mode. Based on the test results, the manufacturer has already established key areas for improvement of the rotary steerable systems. The preparation for the next stage of equipment testing has begun.

### ROTARY GUIDED SYSTEMS

The RSS prototype is intended for directional and horizontal well drilling. This is the most technologically advanced domestic RSS prototype tested in downhole conditions. The rotary steerable system is equipped with sensors for measuring zenith and azimuth angles, gamma ray logging and annular pressure, giving a possibility to transmit data to the telemetry system via an acoustic communication channel and subsequent data transmission via a hydraulic channel to the surface.



**IRINA KHALEEVA**

Chief Executive Officer of Institute for Initiatives in Oil and Gas Technologies



**INTI became an industry platform for RSS developers, oilfield service and oil and gas producing companies. This platform enables all the participants to identify technical requirements for equipment and testing methodology. Such a joint activity within INTI`s platform allows the participating experts to standardize the common requirements, conduct joint trials of new technical solutions and to exchange recent developments**



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The Day of Technology "The block modular strategy of field development"



The Press Service of the 12th Tyumen Oil and Gas Forum/Alexey Kolchin/TASS

## MOBILE TECHNOLOGIES WILL BE COMMONLY USED IN OILFIELD CONSTRUCTION

Albert Atnagulov and Rinat Ismagilov, the leaders of the INTI’s Committee on the mobile processing units, spoke at Tyumen Oil and Gas Forum. The Experts noted that portable oil installations have been successfully implemented over the past seven years. They allow the reduction of construction period of oil infrastructure to eighteen months.

However, the existing legal basis cannot ensure a wide application of "mobile" solutions. That is why, a priority area of INTI’s work is development of a relevant standard. In 2020, Gazprom Neft suggested to draw up the common industry requirements on this equipment by bringing together all the interested par-

ties (design institutes, units’ manufacturers, licensors, oil and gas companies and their contractors). In October this year, INTI issued the standard in its first version for consideration by the Committee. Its testing is scheduled for 2022. The Institute plans to develop the standard on mobile installations for gas and condensate facilities.

## WHAT ARE THE PORTABLE INSTALLATIONS?

A portable installation is a technical device that comprises a group of processing units and equipment designed to prepare oil of a desired quality level. The compact constructions allow to organize at little cost pilot work at autonomous fields which characterized by geological difficulties. The technology is used in the first stages of projects in order to receive a product and to prepare it for ensuring an early monetization of a project.



### ABOUT THE STANDARD

The standard is expected to synchronize the preparation processes of design and budget documentation, facilities construction and engineering site preparation and also to optimize the launch period of facilities in the oil and gas industry.

### ADVANTAGES

- ✓ Mobility and compactness
- ✓ Risk reduction and cost control
- ✓ Cheaper than stationary technology
- ✓ Reuse at other facilities



**SERGEI AGRAFENIN**

Deputy Chief Engineer,  
chief technologist  
of "GiprovoStokneft"



**It's important that standards are developed at the same time by three key participants (designers, customers and manufacturers). Each of them contributes expertise from its side. Such an approach allows to avoid problems with the further adaptation of these solutions. We started our work a few years ago. And now, we see that it is possible to reach an understanding under negotiation.**



**ALBERT ATNAGULOV**

Executive Secretary of the INTI's  
Committee, Projects Programme  
Manager of Gazpromneft-Razvitie



**The number of gas projects in our portfolio is increasing. They are not less difficult than oil cases within which we implement portable installations. And, unlike oil ones, portable installations for gas preparation are still in the early stage of development. The journey on oil installations was passed in seven years — from the moment when the demand appeared to the moment when the regulatory documents were developed. Gas cases require such a journey to be shorter. We can do this only by working together, consolidating the competencies of all industry actors.**