ENERGAS: small compressors are ready for grand actions

IN THE FUEL AND ENERGY COMPLEX, A TRADITION HAS BEEN ESTABLISHED: THE SOLUTION OF NON-STANDARD TECHNOLOGICAL TASKS TO TRUST ENGINEERING TEAMS THAT HAVE BEEN REPEATEDLY TESTED IN THE ACTION. THE EXPERIENCE OF IMPLEMENTING SPECIAL PROJECTS FOR THE TREATMENT AND COMPRESSION OF VARIOUS TYPES OF GAS IS CONCENTRATED AND IS CONSTANTLY GROWING IN THE ENERGAS COMPANIES GROUP

Keywords: *gas preparation, company, gas cleaning equipment, design, modular installation, Engineering team.*

M.A. Belov,
LLC "ENERGAS"

They passed check in action

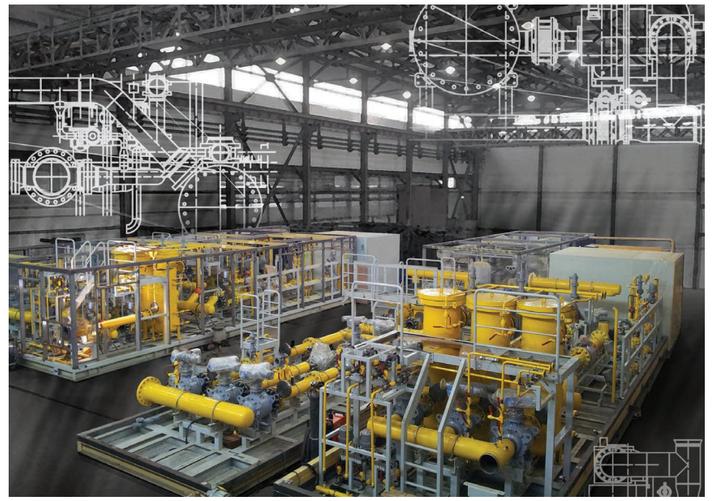
For 10 years of work in the segment of process gas treatment equipment, ENERGAS has declared and established itself as a highly professional engineering corporation. Now it is a group of companies that, under a single brand, consistently carry out design, production, supply, commissioning and servicing of modular gas treatment and compression units for the oil and gas complex, electric power industry, machine building, chemical, construction and other industries.

Deep knowledge of production and engineering responsibility for the quality of its projects have become, over the years, everyday principles – the life norm of the whole team.

There is accumulated a set of unique engineering solutions for the effective use of process equipment of the latest generation at large power plants, small-scale power plants, autonomous power supply centers for industrial enterprises, APG gathering and transportation facilities, auxiliaries power supply complexes of the fields, special purpose facilities (gas turbine test benches and training centers).

ENERGAS Group continues to actively build up unique organizational and engineering experience accumulated in the implementation of 139 projects in 35 regions of Russia and CIS countries. Since 2007, 235 gas compressor stations and gas treatment units have been delivered and put into operation (40 more units are being prepared for launch).

In the electric power industry, they operate at 171 power generating units with a total capacity of 6,290 MW, in the oil and gas industry – they treat associated petroleum and natural gas at 43 fields.



PICTURE 1. Assembling plant of the ENERGAS Companies Group in Belgorod

ENERGAS Group has commissioned (or is preparing to launch) 275 gas treatment and compression units

"ENERGAS" units operate in conjunction with power units of the leading domestic and world manufacturers: "UEC-Gas Turbines" and "UEC-Saturn", "UEC-Perm Motors" and "UEC-Aviadvigatel", Kazan and Ufa Engine Industrial Associations, "Nevsky Zavod", "Russian Gas Turbines", "Power Machines", Alstom, Turbomach, Centrax, Solar, Pratt & Whitney, Rolls-Royce, Kawasaki, Wartsila, Siemens, General Electric.

Small gas compressor units (sgcu) – series of compact "small" compressors

It should be noted that the range of equipment produced and supplied by us is constantly expanding. For example, for today in the ENERGAS Group a transition has been made from the production of prototypes to the serial production of small gas compressor units – SGCU. This new current offer is already in demand.

Purpose of SGCU "ENERGAS":

- Gathering and transportation of associated petroleum gas in fields with small hydrocarbon reserves;
- Treatment of fuel for small-capacity turbines at small power facilities;
- Supply of fuel to the generating equipment of autonomous power supply centers for industrial enterprises;
- Provision for process needs of oil and gas chemical and other industries.

The SGCU is produced at the GC ENERGAS assembling plant in Belgorod (picture 1). The units are designed on special projects and have a set of advantages in their operating segment:

- Transportation by standard trucks;
- Low pre-start costs;
- Minimum commissioning period;
- Low operating and maintenance costs;
- Affordable price.

One SGCU can successively work at different operation sites without re-adjustment

The implemented engineering solution makes it possible not only to operate the units in a stationary mode, but also to consistently use one SGCU at different sites. I'll add that when you move the unit to another facility, you do not need to re-commissioning.

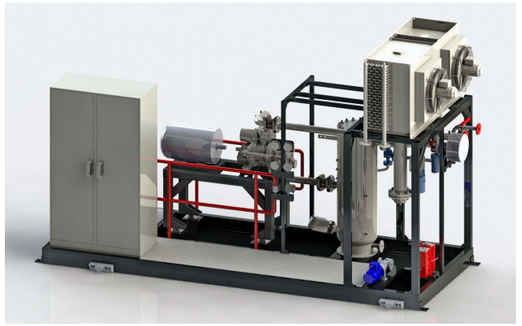
Our "small" compressors can operate at facilities without complex infrastructure. There is provided the way for connecting supply lines with flexible pipelines, which makes it possible to integrate SGCU without retrofitting the existing gas pipeline system. In this case, the compressor units are designed for long-term intensive operation and fully automated.

Design features of SGCU

Main design features of compact units are the following:

- Simplicity and reliability of design;
- Small dimensions and compactness of the elements;
- Ability to operate with minimal capacity;
- Simplified control and monitoring algorithm;
- Optimized oil system.

Small gas CUs are manufactured and supplied, as a rule, in two versions: 1) intra-shop version on an open frame (picture 2, 3); 2) packaged (block-modular) version (picture 4, 5).



PICTURE 2. 3D model of small gas compressor unit on open frame

PICTURE 3. SGCU of ENERGAS in intra-shop version is a compact and reliable unit

Let us consider in more detail the second version, more common in practice.

The packaged SGCU is the unit of maximum prefabrication level (availability factor on delivery > 98%), mounted in a shelter to protect against precipitation.

CU has the minimum necessary configuration and is equipped only with equipment that provides high reliability and long trouble-free operation. This makes it possible to keep the dimensions of the shelter equal to a standard twenty-foot sea container (6100 x 2440 x 2590 mm) with a total weight of about 4,000 kg.

This advantage makes the SGCU easy to transport with standard trucks and allows quick installation and start-up of the unit at operation site.

Compressor unit. The main element of the unit is a screw oil-filled compressor; the motor is used as a drive. The engine also performs the function of regulating the capacity of the CU by means of a frequency converter, which significantly reduces electricity costs.

Compressor unit – compressor and drive – is located inside its own casing, equipped with an electric air heater. This provides the necessary operating parameters in the shelter and reduces operating costs.

The special design of the unit makes it suitable for operation in severe climatic conditions, without the provision of additional safety and life support systems.

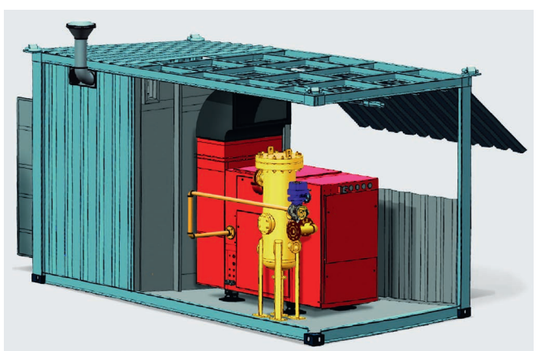
Filtration system. In addition to the compressor unit, a highly effective input scrubber is placed in the shelter; it is equipped with the necessary measuring and monitoring equipment, as well as a condensate drainage subassembly.

A two-stage coalescing filter is designed to remove solid particles and liquid fractions from the gas stream. The degree of gas purification reaches 100% for contamination of more than 20 microns and 99.98% for impurities of 10...20 micron size.

It is possible to quickly replace filter elements. As a result, the system ensures gas compliance with the established design parameters.

Control system. To control the compressor unit, there is a compartment that is integrated into the CU module and separated from the process part by a gas-tight fire-resistant partition. Inside the compartment there is a cabinet with a local control panel, as well as all electrical and control components and safety equipment of the control system. Monitoring and control is carried out from the local panel or from upper level ACS of the facility (if any).

Thus, the SGCU does not require specially dedicated personnel and is completely controlled by its own logic controller located in the control cabinet. The frequency converter of the main motor is also mounted in the control cabinet.



PICTURE 4. Layout drawing of the block-module SGCU in shelter

PICTURE 5. Small gas compressor unit of ENERGAS operates at the Konitlor field (West Siberia)

Oil system. The design of the compressor requires feeding of lubricating oil (to ensure proper sealing, lubrication and cooling of the working cavity) with discharge pressure. This feature eliminates the use of an oil pump and ensures a long service life of the oil system.

Due to the small size of the compressor unit and the use of special cartridges in oil filters, oil charging and its consumption are so small that they allow the CU to operate literally on one barrel of oil for 10 years.

PICTURE 6. Maintenance of the gas treatment equipment

Small compressor units can operate at facilities without complex infrastructure

Drives and cooling. The use of electric actuators in small CU for the provision of process procedures makes it possible to do without connecting an additional external source of compressed air.

Air cooling of the compressor unit elements eliminates the closed cooling circuit, and this, in turn, greatly simplifies and facilitates the design of the unit.

Pre-start preparation and maintenance

The units pass mandatory preliminary (factory) tests with the participation of representatives of the customer, which checked the operability of all the main elements – process, compressor, electrical equipment. There are tested automated control system, oil system, valve actuation, integrity of cable lines, density and tightness of compressor units.

In general, each SGCU is a completely autonomous system, ready for use, and requires only the supply of electricity, the installation of a cooling unit and connection of gas communications.

Small CUs do not require a special foundation – only an even concrete pavement and external connections are needed. Unique designs used in the design significantly reduce the amount of erection and commissioning works.

In the period between adjustment and a 72-hour comprehensive operability check as a part of the facility, ENERGAS specialists conduct their own (individual) testing of equipment lasting from 8 to 24 hours.

At the stage of preparation for launch, our service engineers carry out training of operating personnel, and in the course of work – maintenance of the units (picture 6) in accordance with the schedule agreed with the customer. The simplified design of the SGCU reduces the number of serviced elements and the duration of maintenance.

If necessary, specialists carry out upgrade of CU, as well as current repairs or overhaul.

In Moscow, Belgorod and Surgut mobile engineering and technical groups of ENERGAS are based, there are also warehouses of original spare parts. This makes it possible to conduct timely planned activities at the facilities, promptly respond to requests in case of emergencies, promptly and in full supply components and consumables.

Lifetime and reliability

Compressor units are designed and manufactured for intensive use. Experience shows that with proper operation and timely maintenance, the lifetime and reliability of the units exceed the values given in the table.

Lifetime and indices of reliability of the SGCU	
CU failure interval	14 000 hours
ACS CU failure interval	25 000 hours
Overhaul interval	40 000 hours
Assigned lifetime (operational life)	20 years
Operating reliability	99 %

In general, the small gas compressor units "ENERGAS" are guaranteed to meet the existing and prospective process needs of various facilities of the fuel and energy complex and other industries.

ENERGAS
GAS TECHNOLOGY

105082, Moscow, B.Pochtovaya 55/59, bldg. 1
Tel .: +7 (495) 589-36-61
Fax: +7 (495) 589-36-60
info@energas.ru
www.energas.ru