Turbine-driven compressor units (TDCU) with electric and gas-turbine drives rated at 6.3-25 MW in the modular-container version are the basic form of production delivered by the M. V. Frunze Sumy Machine Construction Scientific-Production Association (SMNPO) Joint-Stock Company (AO) for the gas, gas-refining, and petroleum-refining industry. The list of TDCU with terminal pressures $p_t$ ranging from 1.2 to 49 MPa makes it possible to manufacture compressor units (CU) and equipment for compressor plants (CP), which support the implementation of basic production processes in the gas and petroleum industry: the transport of natural and oil gases through arterial gas lines, reverse pumping of gas into underground gas-storage depots (UGSD), the cycling process for gas-condensate deposits, the assembly, transport, and refining of oil gas at gas-refining plants (GRP), etc.

This equipment is built with an electric drive, and is also run off types of aircraft and naval gas-turbine engines (GTE) designed by the M. V. Frunze SMNPO AO, the A. Lyul'ka-Saturn AO (Moscow), the Progress Zaporozh'ye Machine Design Office, and the Mashproekt NPP (Nikolaev).

To satisfy the demands of the national economy for compressor equipment, the company has mastered the production of the following units with 6.3-, 16-, and 25-MW gas-turbine drives:

- thirty modifications of the GPA-Ts-6.3 unit for booster and linear CP; 23 modifications of the GPA-Ts-16 unit, as well as the GPA-Ts-25 unit with $p_t = 7.47$ MPa;
- five modifications of the GPA-Ts-6.3 and seven modifications of the GPA-Ts-16 unit for UGSD with a $p_t$ of from 9.8 to 20 MPa;
- four modifications of the TKA-Ts-6.3A unit with $p_t = 1.2$-5.4 MPa for recovery and transport, as well as the refining of oil gas; two modifications of the TKA-Ts-16 unit with $p_t = 7.49$-11.2 MPa for the transport of oil gas and the gas lifting of crude.

The production of a broad line of ÉGPA-Ts-6.3 GPA electric drives intended for different purposes has also been mastered: nine modifications for booster and linear CP; three modifications for UGSD, and two modifications with a centrifugal compressor (CC) in a corrosion-resistant version for the refinement of gas.

As comparative analysis indicates, the electrical and gas-turbine drives are essentially equivalent in terms of thermodynamic efficiency (see the paper on page 493 of this issue of the journal). Due to a lack of orders, however, production of the ÉGPA-Ts-6.3 units has been essentially curtailed today. At the same time, it should be considered that use of the electrically driven units holds promise. This is associated with the fact that the fundamental possibility of constructing a lubrication-free unit exists for the development of a high-rpm electric drive; this possibility is essentially excluded when a gas turbine is used. Moreover, the development of an ecologically pure unit is possible on the basis of an electric drive; in certain cases, this may be the principal advantage of this type of TDCU.

The layout diagrams and component parts of the basic modular blocks of the latest generation of 6.3-25-MW units with aircraft and naval drives for gas production are presented in Figs. 1-4.

The basic assets of the units are as follows: rather high drive efficiency; a more improved design of the cleaning system for recycled air; modular CC housings, which make it possible to use a different type of interchangeable settings with a pressure ratio $\pi = 1.25$-2.2; a more improved design of automated-control system (ACS); and a higher level of modularization as compared with previously manufactured unit constructions.

Translated from Khimicheskoe i Neftegazovoe Mashinostroenie, No. 5, pp. 5-10, September-October, 1997.
Fig. 1. Layout diagram of GPA-Ts-6.3A unit with 6.3-MW D-336-2 aircraft drive: 1) air cleaner; 2) recorder; 3) noise suppressor for exhaust; 4) adaptor; 5) ventilation unit; 6) exhaust unit; 7) turbine unit; 8) oil-cooling unit; 9) automation unit; 10) systems-support unit.

The efficiency of the aircraft drive for units built in recent years is 30-36.4% under a power of 6.3-25-MW, while that of the naval drive is 30.5-36% under a power of from 6.3 to 16 MW.

The following equipment can be classed with unique models.

**6.3-MW Gas-transfer units with CC in a corrosion-resistant version** and an HK-12-ST-02 (GPA-Ts-6.3V/67K-1.7) aircraft drive, and also an electric drive for natural gas containing hydrogen sulfide (ÉGPA-Ts-6.3V/67K-2.2; ÉGPA-Ts-6.3V/32K-1.7; ÉGPA-Ts-6.3V/32K-2.2).

The plants are intended for helium production.

**Modular equipment set based on GPA-Ts-6.3A units** with an D-336-2 aircraft drive developed by the Progress Zaporozh’ye Machine Design Office for the reconstruction of GRP using an outdated design of piston compressor.

**The world’s largest modular-set compressor unit (MSCU)** in a GPA-Ts-25/76-1.5 container version with an NK-36ST aircraft drive designed by the N. D. Kuznetsov Samara Scientific-Technical Combine AO.

The unit is intended for linear CP of large arterial gas lines. Owing to its advantages, this unit will ensure the development and mastering of new production potentials for the gas industry in the shortest time.

**GPU-16K gas-transfer plant** with a basically new type of 16-MW gas-turbine drive. The efficiency of the plant’s drive is 43-45%, the level of environmental pollution by nitrogen oxides is 50-76 mg/m³, and the temperature of the exhaust gases is 313-323 K. The plant is outfitted with a water-regeneration system in the working cycle; the latter was designed by Mashproekt NPP.

A characteristic feature of the plant is the production of service water (more than 1 ton/h at $p_a = 0.101$ MPa, $t = 15^\circ C$, and an average atmospheric humidity in the region where the unit is placed) for CP and other consumers.

**Modular-set CP equipment** for the recovery and transport of oil gas at a pressure of 7.49 MPa on the basis of 16-MW TKA-Ts-16/6-76 turbine-driven compressor units with an NK-16ST aircraft drive.

To raise the technical level and competitiveness of the equipment under production, it is necessary to implement a number of principal solutions, which will make it possible to improve the economy, reliability, and ecological safety of MSCU and to lower operating costs, based on generalization of experience gained with its operation, the utilization of new advance-