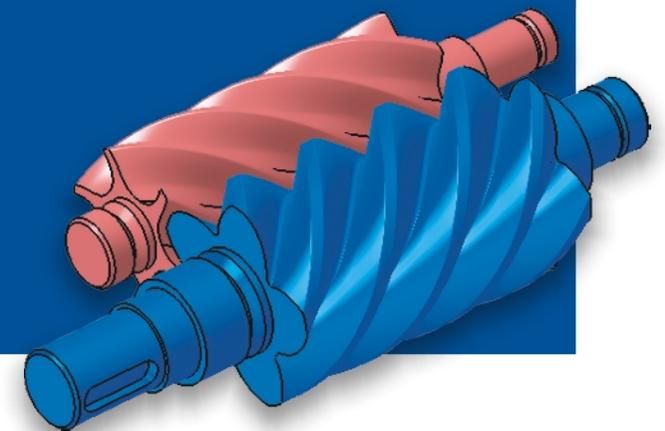
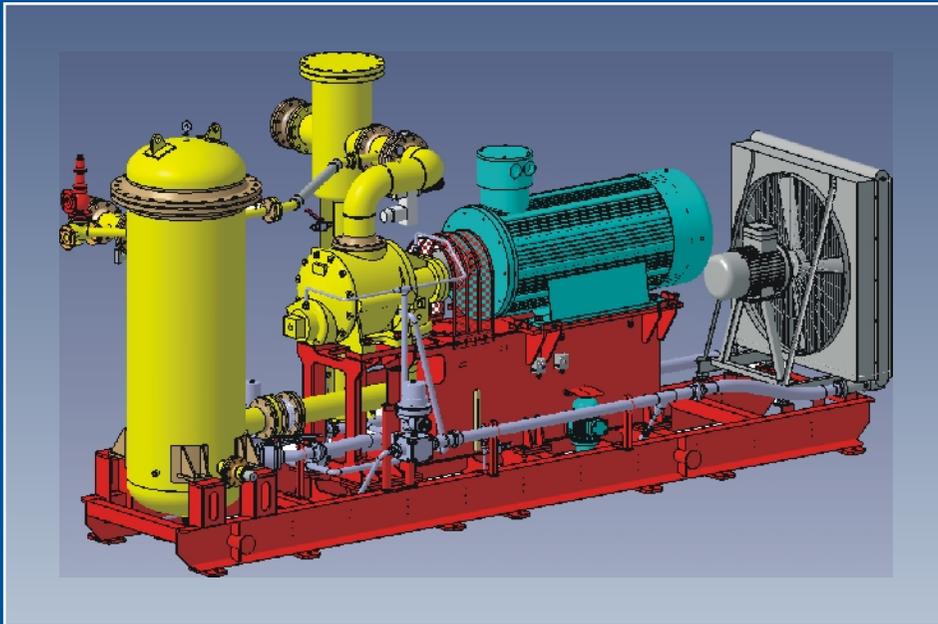




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# Natural Gas Screw Compressors package



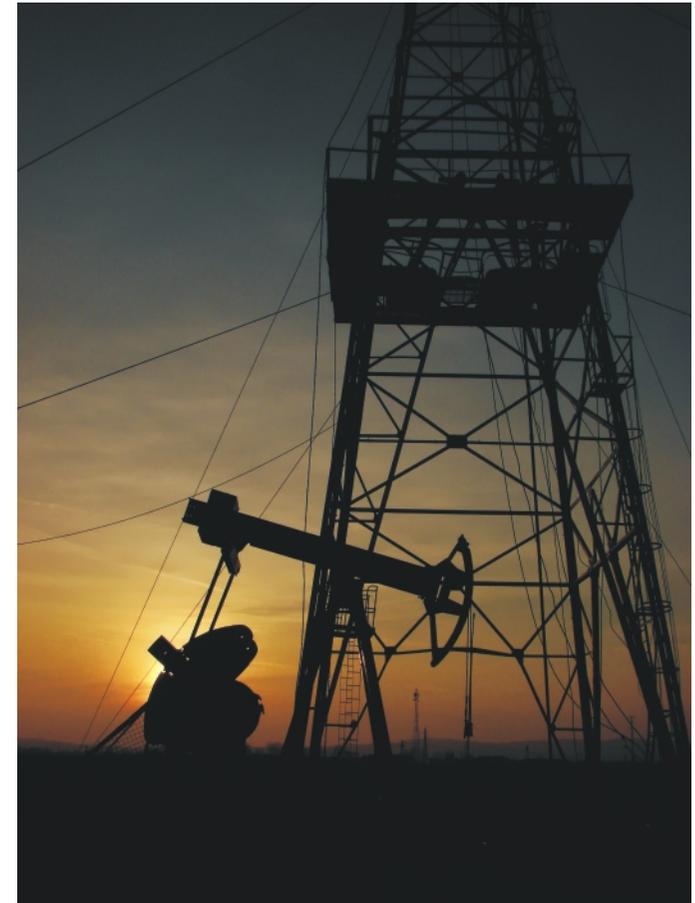
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# Natural Gas Screw Compressors



## Main Application Range

- Gas turbine power (Booster)
- Petrochemical and chemical processes
- Gas refinery for vent and flare applications
- Refrigeration
- Gas condensation
- Gas conveyance
- Corrosive gas compression
- Gas tank vapor recovery (Offshore)
- Oil well trapping gases



# Natural Gas Screw Compressors



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## Partnership with GHH - Rand

- Since 1999 GHH RAND and COMOTI cooperate in the gas compression business;
- GHH RAND's oil injected CU- and CF-series have been the heart of COMOTI's gas applications;
- Effective January 2009 COMOTI **exclusively manufactures and supplies the CU-series basis a license agreement;**
- Since then COMOTI is happily taking customer's requests on all kinds of compressed gas applications.



# Natural Gas Screw Compressors



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## Operating overview

- Compression of natural gas recovered by separation from crude oil;
- Applicable for gas compression including natural, landfill or mine gas;
- The screw compressor units allow efficient gas separation starting at 0.6 bar(a);
- The CU-series is known for its durability to withstand arduous environments and operating conditions.





## Objective of the work:

- An equipment to recover and compress natural gas (bradenhead gas) resulted after separation of crude oil from them, inside the separators located in the parks; to use, compress and transport them to the beneficiaries.
- An equipment to increase the pressure of natural gas, landfill gas or mine gas.

## The innovation:

- The natural gas compression equipment has a helical rotors compression unit (screw compressor) that allows gas suction from values of 0.6 bara. This leads to an efficient recovery of gas resulted after separation from crude oil. This is the first compression equipment with such compression unit (screw) that is used under very difficult conditions: aggressive corrosion action, advanced depression, high water content, reduced operating personnel.
- The equipment is made at the highest technical, technological and automation level in the field by Romanian specialists within COMOTI, based on the design and manufacture experience from aircraft industry.
- The technical achievement of the equipment required a large design effort, using the most advanced design and calculation software programs purchased by COMOTI, as well as elaborating an advanced production technology.
- The natural gas compression equipment is entirely automatic and it can fit into any technological process that requires alteration of any technological parameters on delivery.
- The value of the technological parameters for processed gas can be locally accounted, monitored and/or recorded in the control processor of the unit, or sent remotely.
- In co-operation with GHH-Rand and City University from London we are developing a new research project regarding natural gas compressors used for 45 bar outlet pressure and 5,000 Nm<sup>3</sup>/h flow.

## Results:

- The natural gas compressors manufactured by COMOTI are specific for each crude oil exploitation park or gas compression station according to each deposit's characteristics.

## Advantages in using Natural Gas Screw Compressors:



- Requires a reduce foundation because of constructive solution;
- Don't surging;
- It is unaffected by changes in the molecular weight of the suction gas;
- Due to the oil injection, discharge temperatures are fully controlled and operating pressure ratios over a wide range are possible and are limited only by economics;
- High discharge pressures are possible along with high pressure increases across the compressors;
- Operating speeds are normally suitable for direct coupling to standard electric motors;
- Highly efficient capacity control is available with the integral slide valve system;
- The compressors can be operated in multi-stages for higher overall efficiencies;
- Can be operated in parallel with other types of compressor without problem;
- Noise levels are sufficiently low as not to require either suction or discharge silencers;
- Mineral oils, semi- and fully synthetic lubricants are available in a wide range permitting the compression of a very large number of gases and gas mixtures including inert, toxic, flammable and contaminated mixtures;
- The compressors are fully sealed and they are no leakage of gas to atmosphere;
- Compressors can tolerate some liquid entering with the suction gas although excess can cause oil separation difficulties;
- The pressure range is higher than that of the oil free screw compressor type but would still be classed as in the medium range.

# Natural Gas Screw Compressors package



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| Type      | Volume flow [m <sup>3</sup> /h] |       | Min suction temperature [°C] | Max discharge temperature [°C] | Max suction pressure [bar abs.] | Max discharge pressure [bar abs.] |
|-----------|---------------------------------|-------|------------------------------|--------------------------------|---------------------------------|-----------------------------------|
|           | U <sub>mr</sub> =15m/s          | 40m/s |                              |                                |                                 |                                   |
| ECS 5/30  | 86                              | 230   | - 40                         | 120                            | 9                               | 30                                |
| ECS 5/10  | 142                             | 378   | - 40                         | 120                            | 1                               | 16                                |
| ECS 30/30 | 170                             | 455   | - 40                         | 120                            | 9                               | 30                                |
| ECS 35/30 | 345                             | 919   | - 40                         | 120                            | 9                               | 30                                |
| ECS 20/10 | 413                             | 1102  | - 40                         | 120                            | 1                               | 16                                |
| ECS 40/30 | 539                             | 1437  | - 40                         | 120                            | 9                               | 30                                |
| ECS 30/10 | 817                             | 2178  | - 40                         | 120                            | 1                               | 16                                |
| ECS 60/30 | 632                             | 1684  | - 40                         | 120                            | 9                               | 30                                |

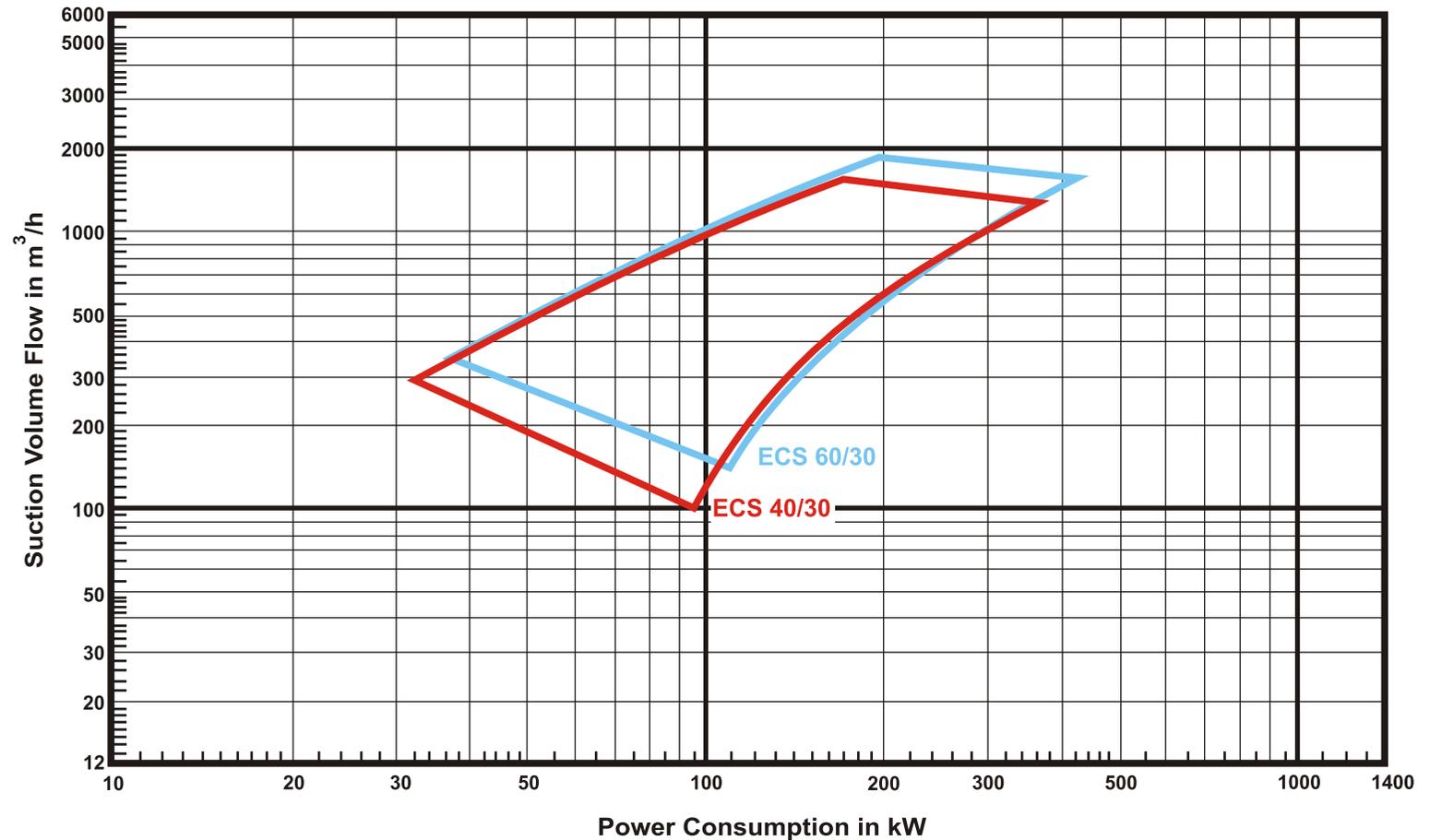
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# Series ECS

## Operating Range



Medium: natural gas, re. Humidity 0% • suction press.: 1 bar (abs.) • suction temp.: 20°C, built-in volume ratio: 4.8

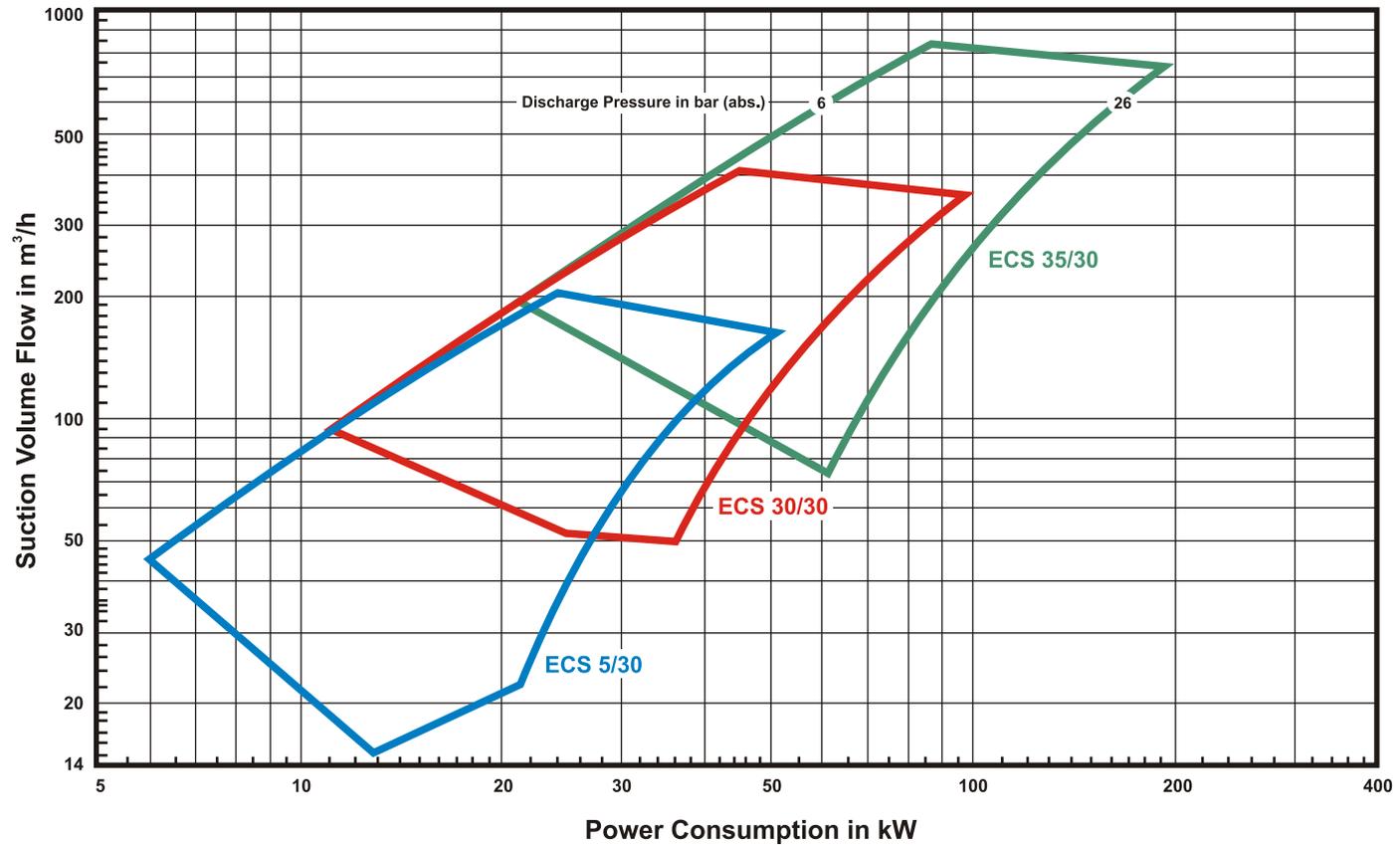


# Series ECS

## Operating Range



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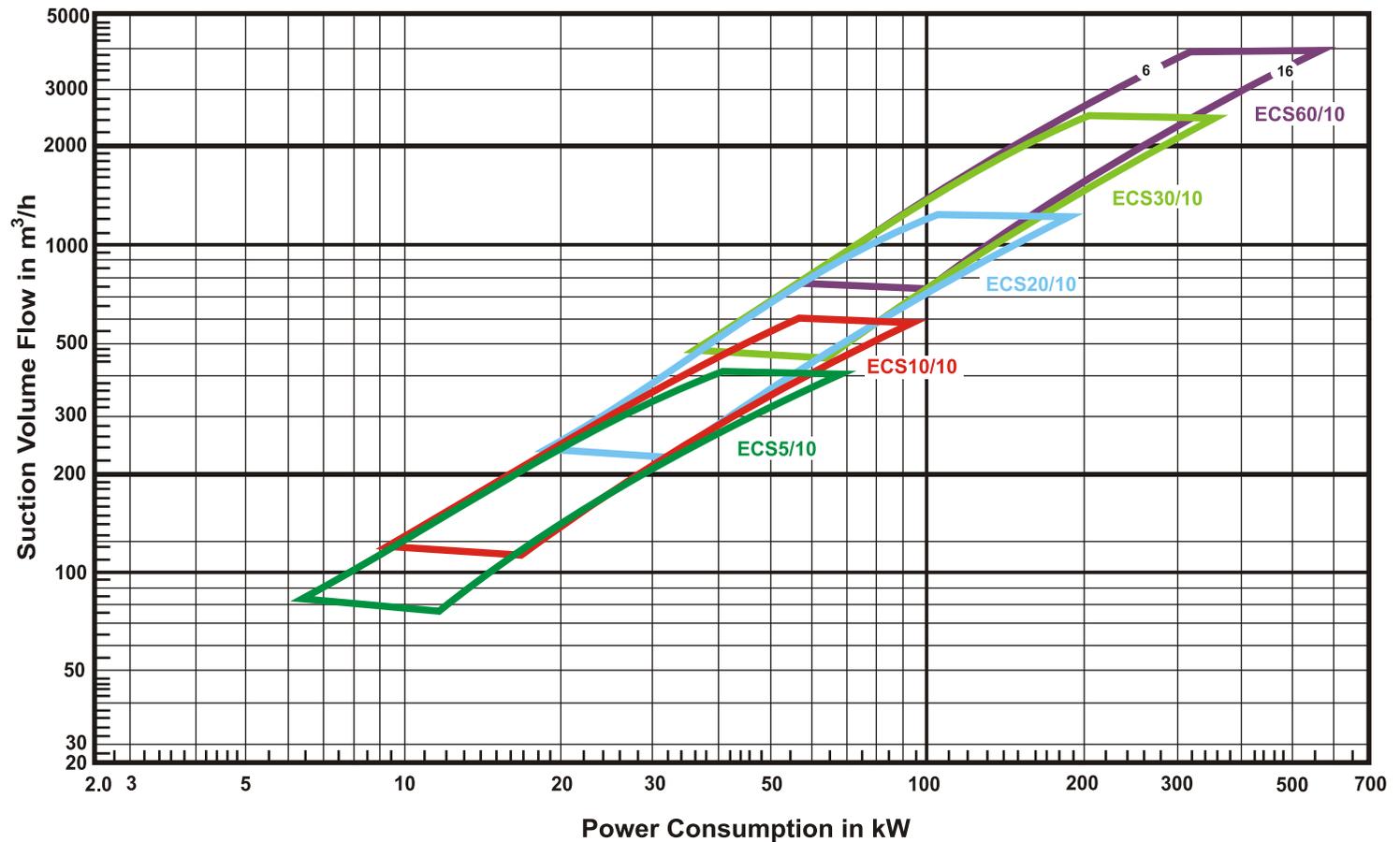


# Series ECS

## Operating Range



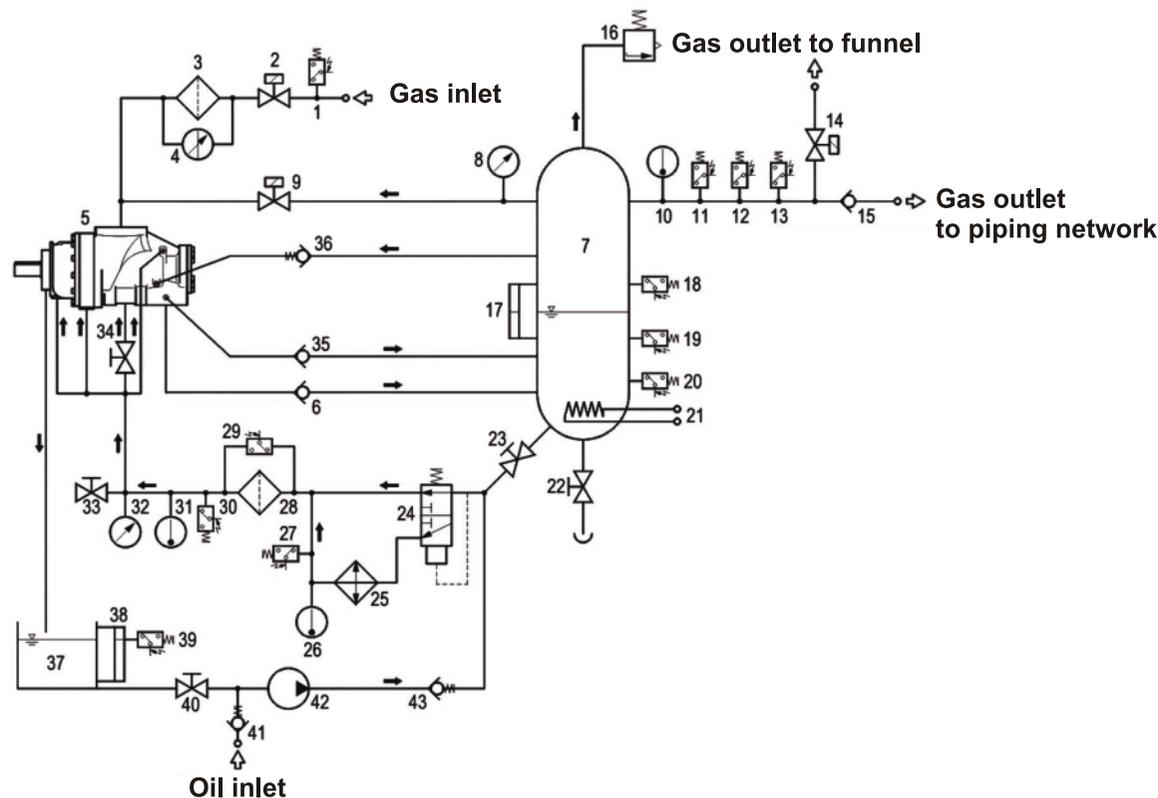
Medium: natural gas, re. Humidity 0% • suction press.: 1 bar (abs.) • suction temp.: 20°C, built-in volume ratio: 4.8



# The general drawing of the natural gas compression equipment



The general technological drawing of the equipment for recovery and compression of gas resulted after the crude oil-gas separation process in PETROM-OMV Parks.



- 1 - pressure controller
- 2 - admission electric valve
- 3 - admission filter
- 4 - differential manometer
- 5 - compressor
- 6 - way valve
- 7 - gas-oil separator
- 8 - manometer
- 9 - re-circulation electric valve
- 10 - thermometer
- 11 - pressure controller
- 12 - pressure controller
- 13 - thermal controller
- 14 - chimney delivery electric valve
- 15 - way valve
- 16 - safety valves
- 17 - level optic marker
- 18 - level marker
- 19 - level marker
- 20 - thermal controller
- 21 - heating resistance
- 22 - empty valve
- 23 - isolation valve
- 24 - mechanic thermal controller
- 25 - heat exchanger
- 26 - thermometer
- 27 - thermal controller
- 28 - oil filter
- 29 - differential pressure controller
- 30 - thermal controller
- 31 - thermometer
- 32 - manometer
- 33 - ventilation valve
- 34 - regulation valve
- 35 - way valve
- 36 - way valve
- 37 - oil tank included in the frame
- 38 - level optic marker
- 39 - level indicator
- 40 - isolation valve
- 41 - fast couple
- 42 - boiler over pump
- 43 - way valve



## Quality Assurance Management System and Licences



- AEROQ Quality System Certifying according to SR EN ISO 9001:2008, SR EN ISO 14001:2005 and OHSAS 18001:2008;
- Authorized Supplier for Minister of Defense (The Quality System Certifying according to Romanian Minister of Defense NG OMCAS - 02.01 and SR EN ISO 9001, by OMCAS);
- Certified as Petrom SA - member of OMV Group - Products and Services Supplier.

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