screw compressors can be used both in oil/gas extraction stations, offshore stations due to relatively small dimensions, relatively low weight and low operating noise, petrochemical industry or applications industrial piping, gas pumping in pipelines or storage tanks, the gas booster system, marine platforms, but also the replacement of old compressors already in the locations of the beneficiaries.

An algorithm materialized in a modern software product specializing in Visual Studio/C # programming environment has been developed to perform computational performance analysis to calculate the performance of the analyzed machines and to represent the thermodynamic cycles in professional diagrams.

Thermodynamic cycles for oil-free screw compressor, oil injection screw compressor, and piston volumetric compressor were built.

Comparative analyzes were made on the basis of the results obtained assuming that all the analyzed machines compressed the same amount of gas, the initial state and hypotheses being similar for all analyzes.

The results showed the superiority of the oil injection screw compressor. Injected oil in addition to reducing friction has an important role in the thermodynamic process by cooling the compressed gas during the compression process. This makes the operation of the oil injection screw compressor very close to the behavior of an isothermal compressor. We recall that the ideal compression process, which is done with minimal energy consumption, is the isothermal process.

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NOMENCLATURE

$\dot{m}$	Masic flow rate
m_v	mass of gas trapped in the working volume
Z_1	the number of lobes of the leading rotor
n	the rotational speed of the rotor, rot/minute
$\dot{V}$	Volumetric flow rate
$\dot{m}_t$	Theoretical mass flow rate
A_{1N}	frontal area of the lobe 1 in a section perpendicular to their axis
A_{2N}	frontal area of the lobe 2 in a section perpendicular to their axis
L	length of the lobes
P_{ind}	indicated power
p	Pressure, bar
t	Temperature, ^oC

Greek symbols

ρ_0	Standard density, kg/Sm^3
ρ_N	Normal density, kg/Nm^3
η_V	Volumetric efficiency

Subscripts

1	Entry point
2	Exit point