Sauer Compressors

Introduction Sauer Compressors Group

Sauer Compressors Group

is an international mid size group of companies with headquarter in Kiel, Germany

4000 compressors produced in 2022

Founded in **1884**, family-owned in 3rd generation

Over **1000** employees worldwide

Consolidated Turnover of

€ 190 Mio.

Sauer Compressors

Marine Navy

30%

(80% share of the world market)

Commercial Shipping

30%

(55% share of the world market)

Industry

30%

Offshore

10%

Sauer Compressors

Product lines of the worldwide Sauer Compressors Group:

SAUER

SAUER
high-pressure
compressors

HAUG

HAUG
high-pressure
oil-free
and gas-tight
compressors

EK

Compact
high-pressure
naval
compressors

GIRODIN

GIRODIN
high-pressure
naval
compressors

OIL FREE

ZERO LEAKAGE

zero emission

OIL FREE

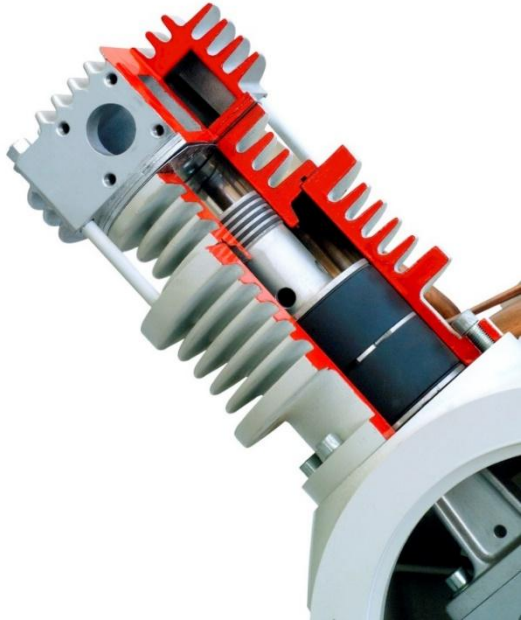
There is entirely

no oil

in our compressor =>

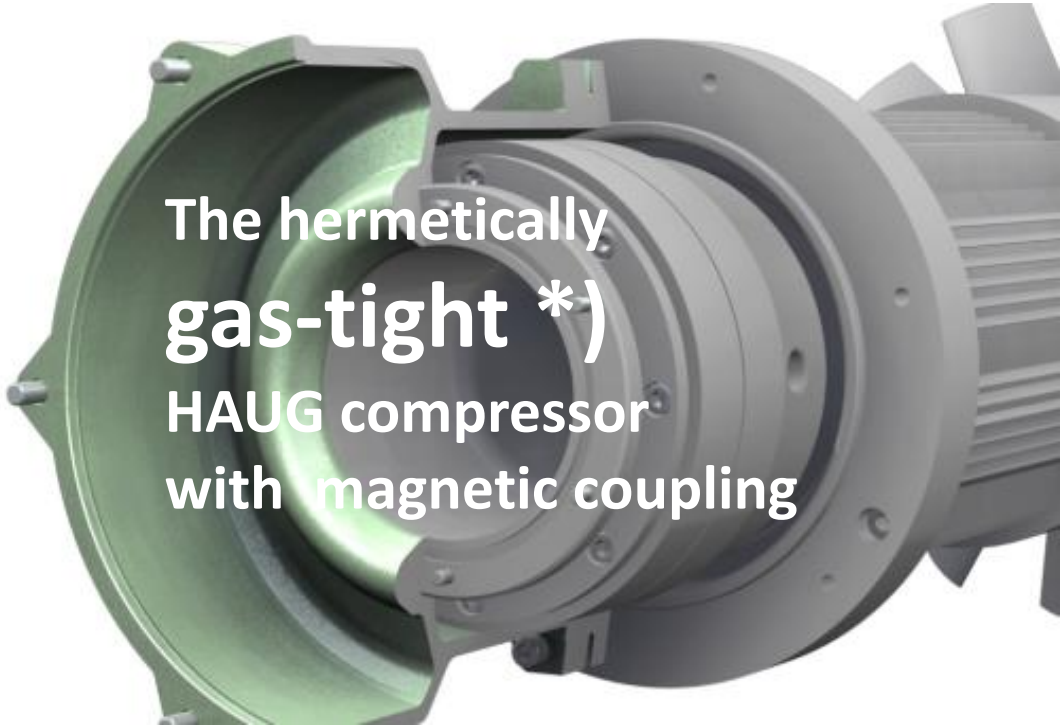
completely **oil-free**

and **dry-running** machine.



ZERO LEAKAGE

***) guaranteed leakage from 0.001 up to 0.0001 mbar*l/s**
measure leakage test of 0.00001 mbar*l/s
in accordance with DIN EN 1779



Dependable up to 500 bar – anywhere, anytime, anygas.

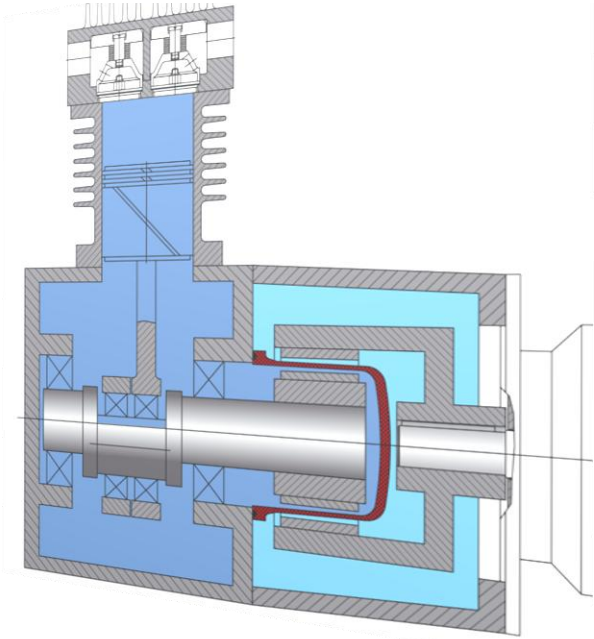
OIL FREE

ZERO LEAKAGE

zero emission

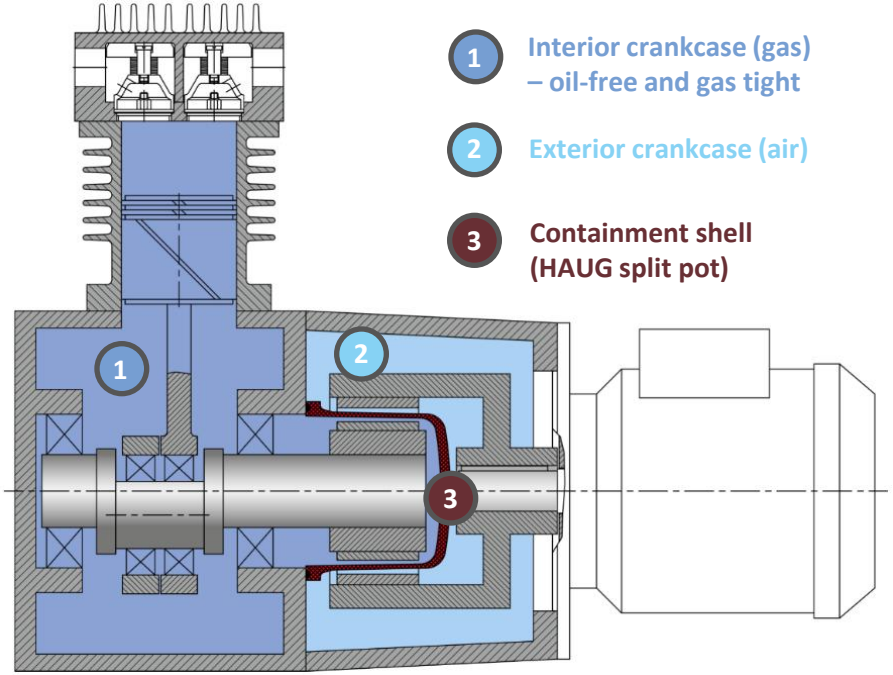
zero emission

HAUG compressors have zero emission and are environmental friendly



Magnetic Coupling

ZERO LEAKAGE



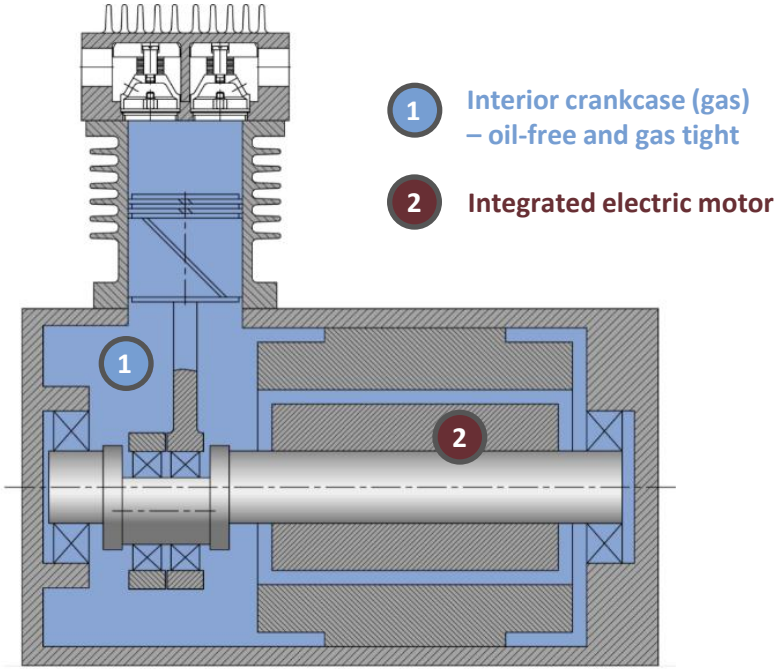
1 Interior crankcase (gas) – oil-free and gas tight

2 Exterior crankcase (air)

3 Containment shell (HAUG split pot)

Integrated Electric Motor

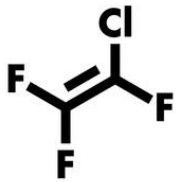
ZERO LEAKAGE



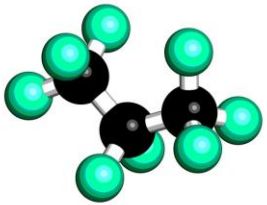
1 Interior crankcase (gas) – oil-free and gas tight

2 Integrated electric motor

REFRIGERATION & SPECIAL GASES



CTFE



C3F8

SiH_4

C2ClF3

You name the gas – we provide the solution!

Air	Chlorotrifluoromethane	Helium	Nitrous oxide	R407C
Ammonia	Coke oven gas	Heptafluoropropane	Octafluoropropane	R410A
Argon	Deuterium	Hexafluoropropene	Oxygen	Silicon tetraflouride
Biomethane	Dichlorodifluoromethane	Hexafluoroethane	Ozone	Sulfur dioxide
Butadiene	Dichloroethane	Hexane	Pentafluoroethane	Sulfur hexafluoride
i-Butane	Dichlorofluoromethane	Hydrogen	Pentafluoropropane	Tetrafluoroethane
n-Butane	Dichloromethane	Hydrogen sulphide	n-Pentane	Tetrafluoroethylene
1-Butene	Dichlorotetrafluoroethane	Krypton	Perfluorobutane	Tetrahydrothiophene
Carbon dioxide	Diflourethane	Methane	Propane	Trifluoroethane
Carbon monoxide	Difluoromethane	Methaneethiol	Propene	Trichlorofluoromethane
Chlorine	Dimethyl ether	Molybdenum fluoride	Propylene oxide	Trifluoromethane
Chlorodifluoromethane	Ethane	Neon	R113	Vinyl chloride
Chloromethane	Ethylene	Nitrogen	R245fa	Water vapour
Chlorotrifluoroethene	Fluorine	Nitrogen monoxide	R404	Xenon

An extract of gases that we have already compressed as pure gas or as gas mixtures.

Inner Detector of ATLAS Experiment

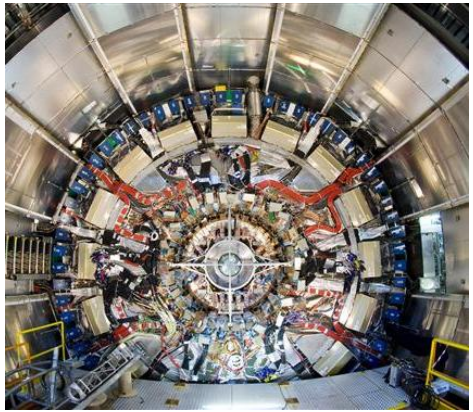
CERN (Switzerland)
The Inner Detector measures the direction, momentum, and charge of electrically-charged particles produced in each proton-proton collision.
The Inner Detector needs to be cooled at -20°C.

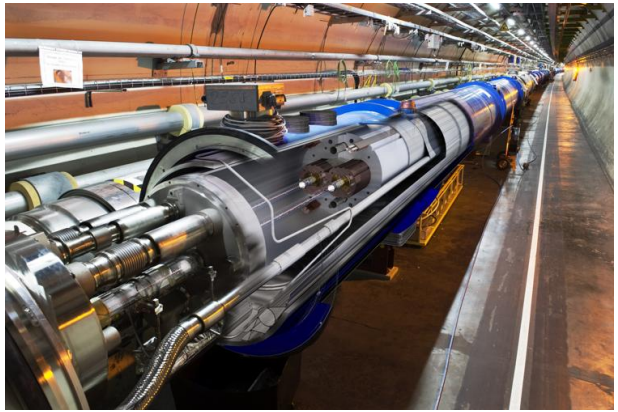
Seven HAUG compressors assure the compression of the Per-Fluor-Propane (C3F8) in the refrigeration circuit providing the cooling of the detector. More than 200m far from the HAUG compression station the fluid evaporates inside the detector structures to remove about 60 kW produced by the detector electronics.

HAUG Solution

HAUG.Sirius 42G 160-80 LM (hot discharge)

Gas	C3F8 = Per-Fluor-Propane
Suction pressure	1,2 bara
Final pressure	17 bara
Compressor motor power	11 kW
Flow rate	100 Nm3/h





Production of a New Refrigerant Gas

Koura & Star Refrigeration (UK)

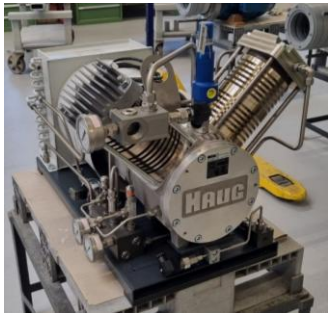
Development of a new type of r-gas which is being used for production at scale of refrigerant R-473A for use in high-value very-low temperature refrigeration systems such as food transport and vaccine storage, and it delivers about 90% reduction in global warming potential of refrigerant compared to the existing R-23 refrigerant.

There was a big challenge with the right choice of material of gas wetted compressor parts.

HAUG Solution

3 x HAUG.Mercure 22E 30-20 LM (hot discharge)

Gas	R473A
Suction pressure	10 – 16 bara
Final pressure	96 bara
Compressor motor power	5,5 kW
Flow rate	10 – 18 Nm3/h



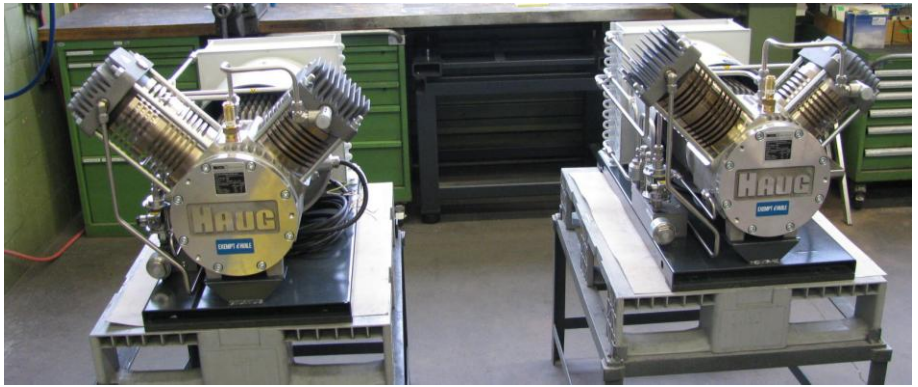
Compressor for Service

HAUG compressors are used by service of refrigeration systems.
Evacuation and compression of R404a or SF6 gas.

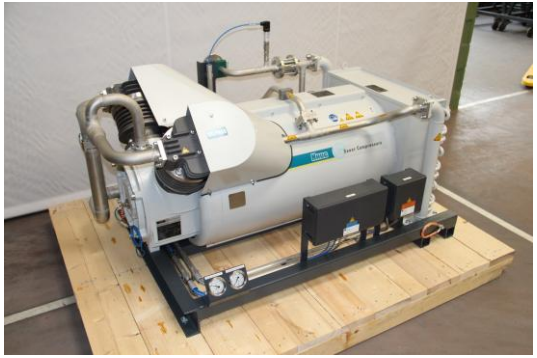
HAUG Solution

2 x HAUG.Mercure 22E 60-30 LM-L

Gas	R404a or SF6
Suction pressure	1,6 bara
Final pressure	51 bara
Compressor motor power	4 kW
Flow rate	1,6 – 8,7 Nm3/h



Production of Refrigerant Gas for Microelectronics



Astor (Russia)

Main target of the research and production company Astor is development of the state-of-the-art technologies for production of ozone-friendly refrigerants and unique technologies of synthesis of high purity fluorine-containing gases for the semiconductor industry.

Production of the gas through 4 reactors. After these reactors, the gas goes through two double filter systems and pressure regulation. The gas is passing a 35 m spiral from a special material and is changing its molecular structure.
After the compression, the gas is going to a condensation tower, where C2F3Cl is being created by temperatures of approx. 270°C.
C2F3Cl is extremely flammable and toxic gas, so an oil-free and gas-tight compressor is necessary.

HAUG Solution

HAUG.Sirius 21G 120 LM-L	
Gas	CTFE (R1113) – C_2F_3Cl (Chlortrifluorethylene)
Suction pressure	1 bara
Final pressure	3 bara
Compressor motor power	7,5 kW
Flow rate	26 – 69 Nm3/h

Production of Special Gas for Microelectronics and Photovoltaic Cells

Klydon (ZA)

Aerodynamic separation process (ASP) – mass separation via centrifugal forces. Highly enriched Silicon-28 may increase the conductivity of photovoltaic cells for use in generation of solar energy.
Other use of Silane are quantum computer processors and fibre optics.

Silane is extremely flammable gas, so an oil-free and gas-tight compressor is necessary.
The whole ASP system with our compressors is installed in a chamber filled with N2 to avoid any leak of Silane to the ambient.

HAUG Solution

Special execution – each cylinder works separately => each cylinder has its gas inlet and gas outlet.

HAUG.Sirius 41G 140 WM

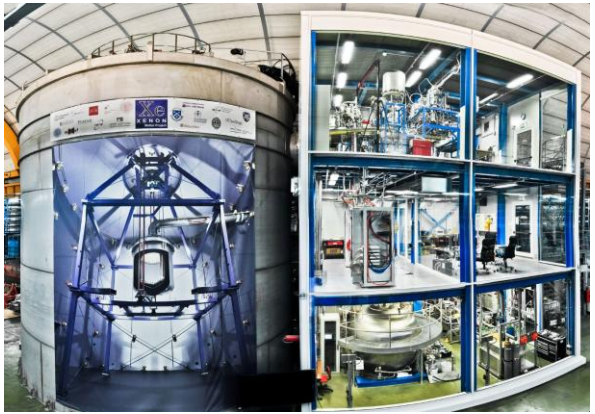
Gas	95% He, 5 % Silane
Suction pressure	0,9 – 1,0 bara
Final pressure	3,5 bara
Compressor motor power	22 kW
Flow rate	46 Nm3/h

Xenon recovery

Westfälische Wilhelms University (Germany) & Gran Sasso National Laboratory (Italy)

Measurement of the most protracted radioactive decay ever.
Radioactive waste from nuclear power plants can take a long time to decay. For plutonium-239 the half-life. That is the time until half of the atoms of a sample have decayed – is no less than 24'000 years. But this is nothing compared to the half-life of the noble gas xenon-124, as an international research team with collaborators from the University of Zurich has shown.

HAUG compressor is being used to recover the xenon gas from the system.



HAUG Solution

HAUG.Mercure 22E 60-40 LM-L + HAUG.Mercure 22E 26-16 LM-L	
Gas	100% Xe
Suction pressure	2 – 3 bara
Final pressure	61 bara
Compressor motor power	2 x 4 kW
Flow rate	10 – 16 Nm3/h

Customers


G S
S I
GRAN SASSO
SCIENCE INSTITUTE


STAR
REFRIGERATION


JÜLICH
Forschungszentrum


PAUL SCHERRER INSTITUT
PSI


CERN


ASTOR


CLARIANT


Empa
Materials Science and Technology


SINTEF


WWU
MÜNSTER


Koura