Burckhardt Compression

Creating Fluid Solutions

A MEMBER OF NIKKISO LEWA pumps + systems

Improving efficiency of CO_2 compression for CCS and EOR with reciprocating compressors and diaphragm pumps

Case study for 30 t/h CO_2 vs. 200 bar

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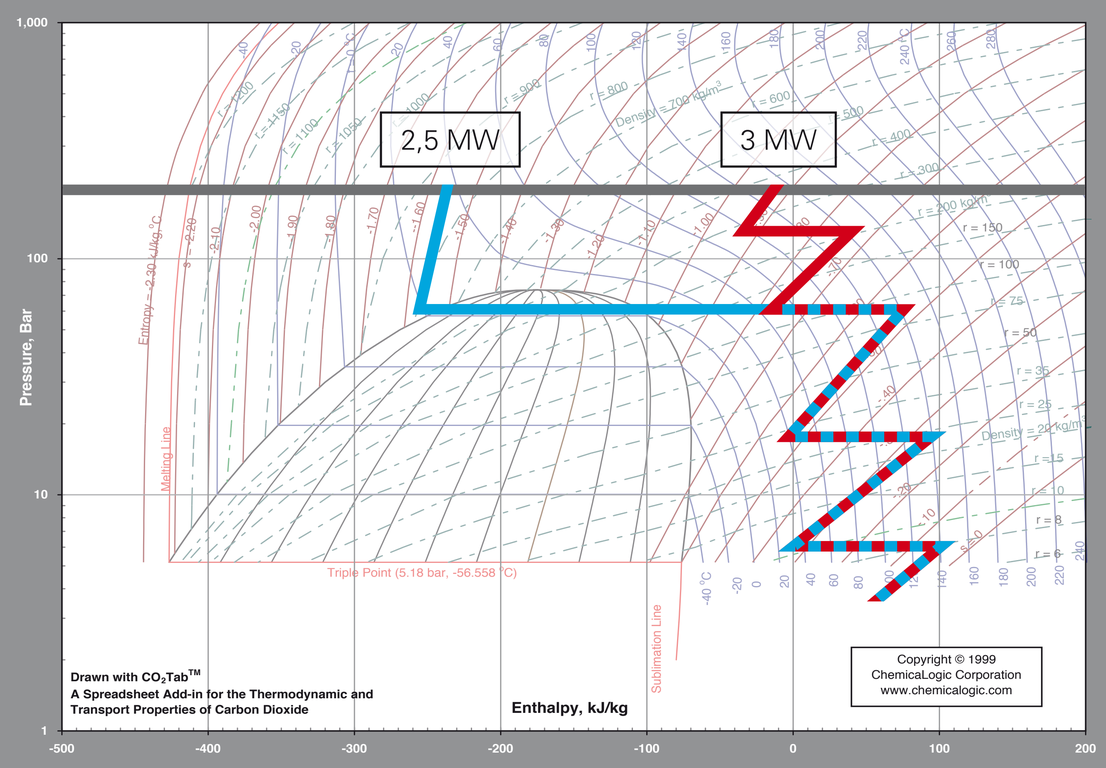
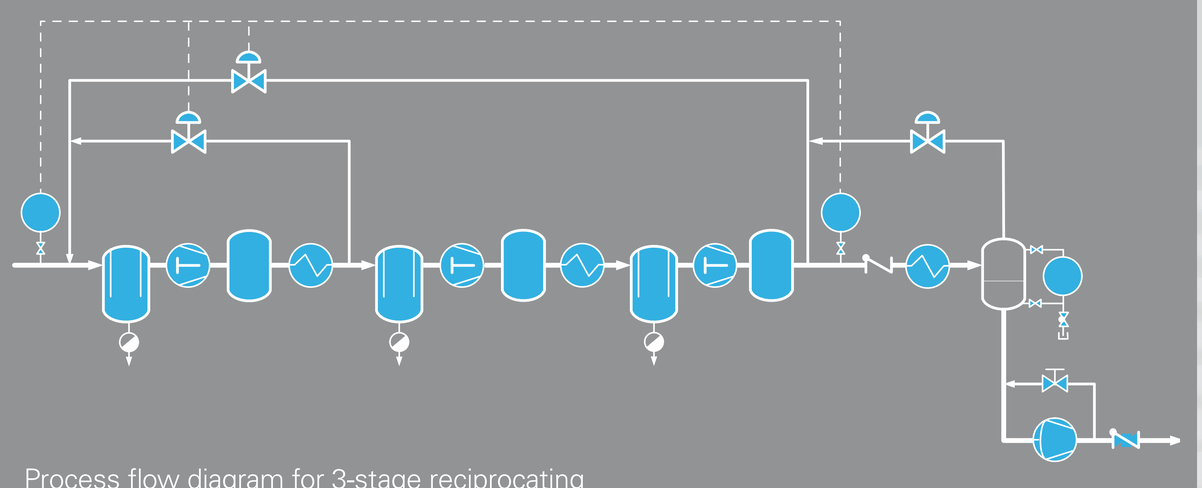
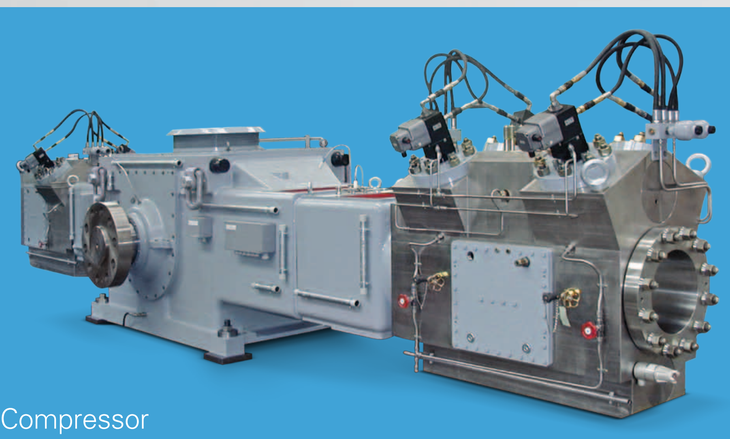


Carbon Dioxide Pressure-Enthalpy Diagram
Power consumption for 30t/h CO_2, Ps 2bara / Pd 200 bara



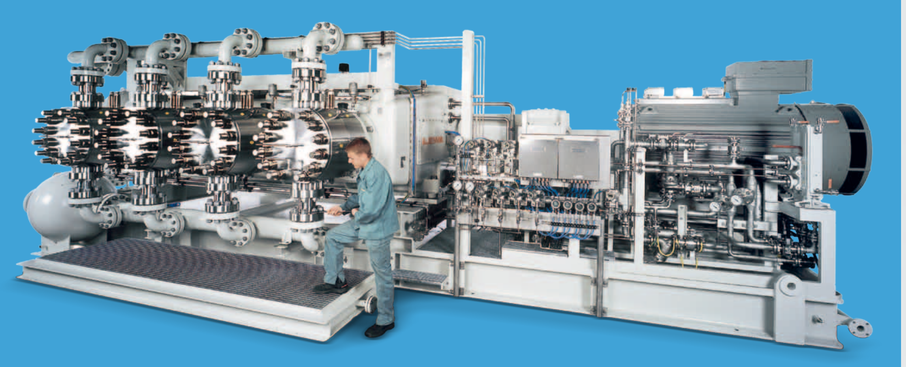
Process flow diagram for 3-stage reciprocating compressor and triplex diaphragm pump

- 33 t/h CO_2 wet
- Suction pressure 27 bara
- Discharge pressure 235 bara
- Shaft power 3800 kW



Burckhardt Compression BA Compressor
CO_2 compression at BASF

- 100 t/h CO_2
- Suction pressure 61 bara
- Discharge pressure 216 bara
- Hydraulic power 650 kW



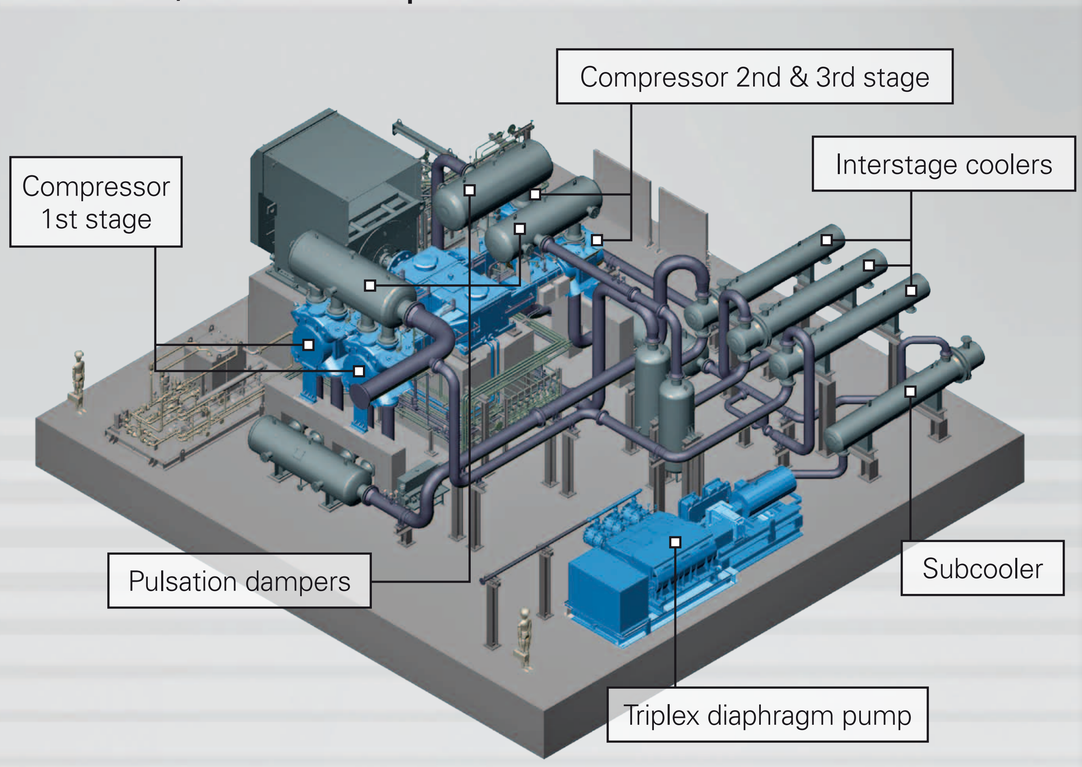
LEWA Diaphragm Pump G4T
CCS at Snøhvit Gas Field

– Conventional way of compression

- 5 compressor stages
- Corrosion due to decompression in packing and sealing elements (stage 4 + 5)
- Increase on electrical power demand and stages due to high suction temperature
- 3 MW shaft power

+ Combined way of compression

- 3 compressor stages + triplex diaphragm pump
- Subcooling to liquid phase
- 2,5 MW shaft power



Plant layout for compressing 30t/h CO_2

Advantages

- Electrical power saving ~15%
- Flexible operation
  - Part load
  - Energy efficiency in part load
  - Gas composition
  - Discharge pressure
- Combined solution offered in cooperation by Burckhardt Compression and LEWA

Limitations

- Mass flow ≤ 150 t/h
- Suction pressure: ≥ ambient pressure
- Discharge pressure: ≤ 500 bar
- Cooling requirement depending on mixture (~25°C pure CO_2)