

SMC 100 Mk 5



Engineered to perfection

SMC 100 Mk 5 reciprocating compressor

Through comprehensive development, we are introducing SMC Mk 5



Meets customer demands for

- Performance
- Extended service life (12,500 hours at -10/35°C)
- Load-based service intervals (optional)
- Skip-free design
- Maximum 35 ppm oil carry-over
- Reduced oil carry-over: using an oil separator, less than 10 ppm is guaranteed
- Small footprint.

Developed for variable speed

- Skip-free speed regulation **500-1800 rpm**
- **From 100% to 27% capacity** without mechanical unloading

Configuration without oil separator

Crankcase Ventilation System (CVS) for R717

With the CVS system (Crankcase Ventilation System), the oil carry-over from the compressor is minimised.

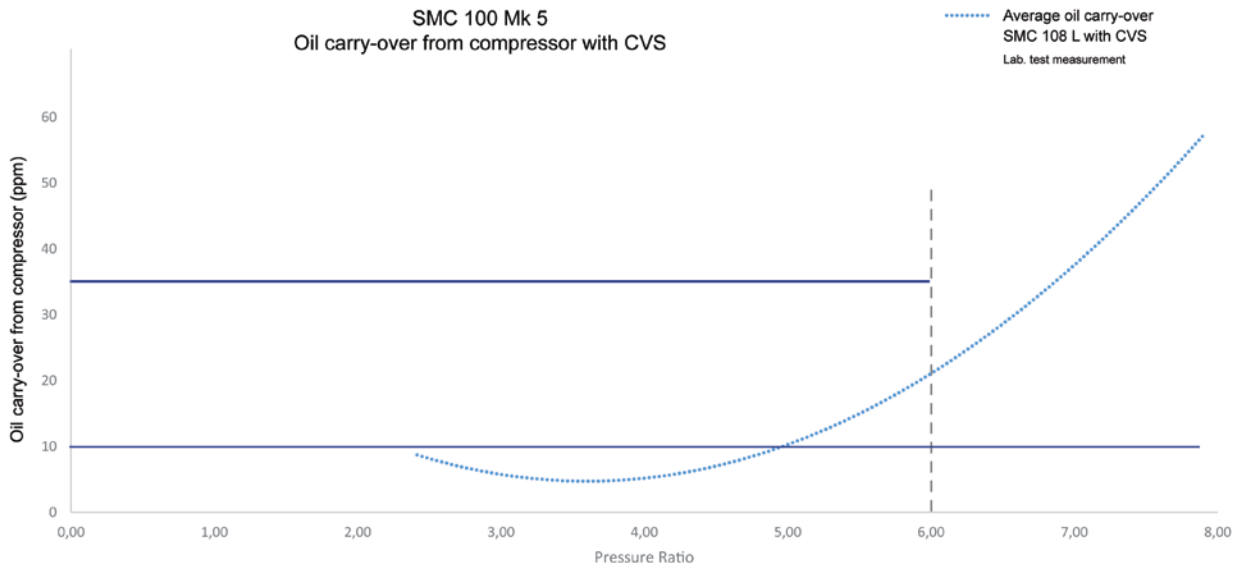
The CVS system also features an improved drainage system of the suction chamber, which is useful if liquid ammonia enters the compressor, making the SMC Mk 5 very robust against liquid slugging.

The CVS system is service and maintenance free.

Benefits of the CVS:

- Allows configuration **without oil separator** for R717
- Pressure ratio < 6.0: oil carry-over of **max. 35 ppm** guaranteed
- More robust against liquid slugging
- Service and maintenance free
- Reduced unit footprint.

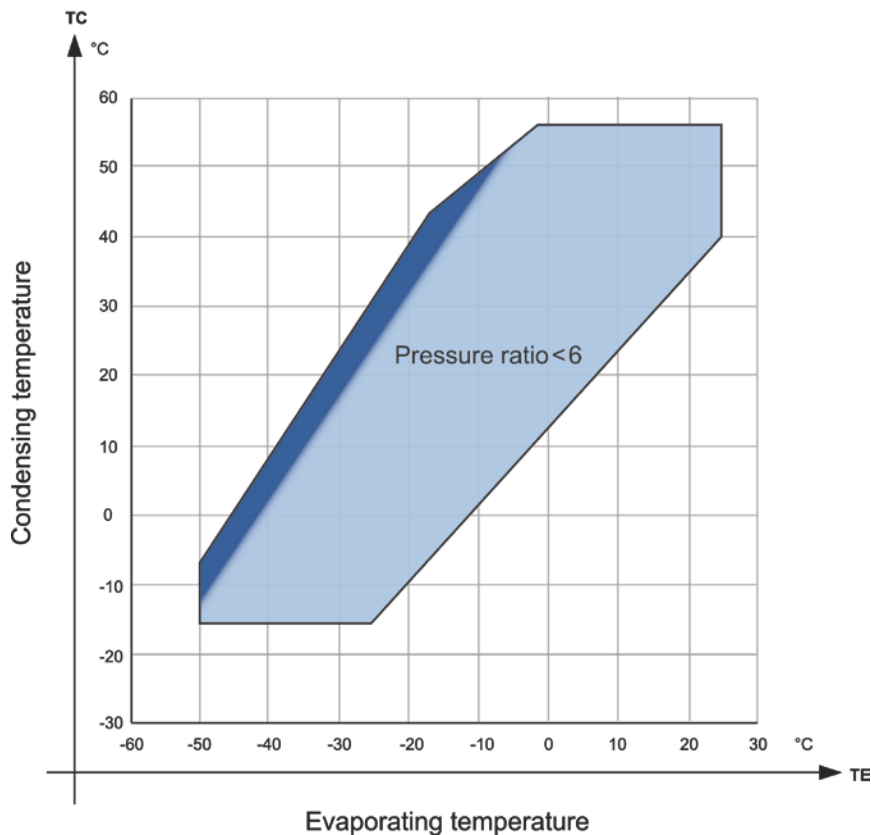
When using an oil separator, oil carry-over of **less than 10 ppm** is guaranteed.



Configuration without oil separator

Available for the most common conditions

R717 Single-stage compressor



The oil separator is optional in most of the operating range for SMC Mk 5.

Consider your plant solution with or without an oil separator depending on your specifications and system layout.

Use your local support for guidance and instructions.



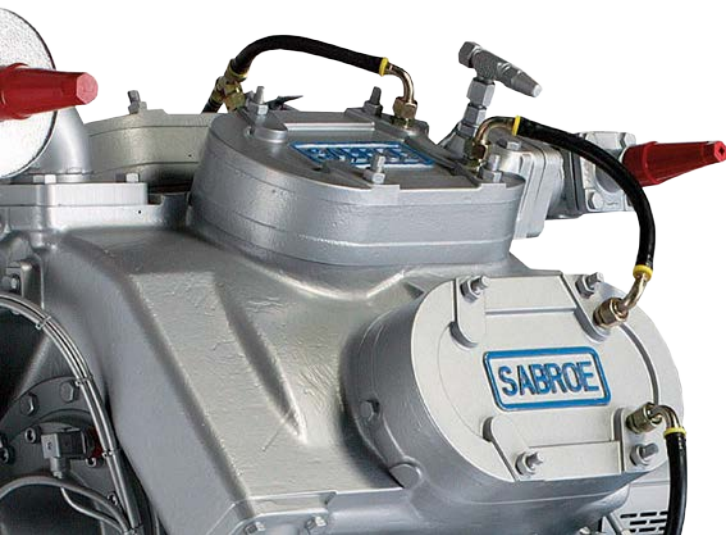
Reduced need for top-cover cooling

The SMC Mk 5 can operate without any top-cover cooling in most of the operating range

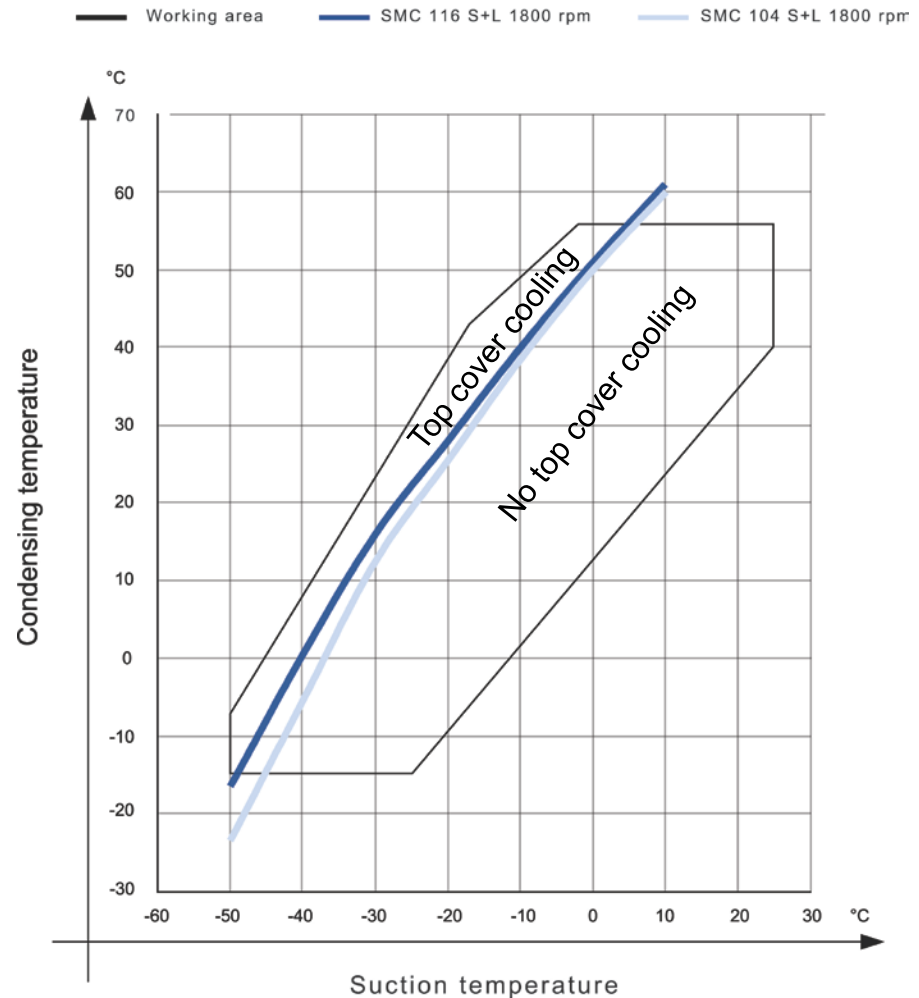
Benefits:

- Reduced installation costs
- Simple installation if no cooling water is accessible.

Oil cooling is mandatory



Limits for water top cooling for SMC100 S & L models, R717



Reduced need for top-cover cooling

SABROE computation tools will support your selection

File Configure Info Help Special

Project Common Data HS Comp. LS Comp. Evaporator Condenser Subcooler Disch. superheater

Comp1
COMP
Comp. Select
EVAP
Evap. Select
COND
Cond. Select
CHILL
Chiller Select
Ordersys

General high stage compressor specification:

drive shaft speed (RPM): 1800 (list) VSD

extended unload ☐ select int. cooler ☐ Sound ☐

common separator ☐ keep separator ☐ top cooling ☐ air ☐

High stage screw compressor specification:

volume ratio: Vt:

Start-up conditions:

☐ input ☐ compute

equal temp. (deg.C):

Economiser:

☐ none ☐ open ☐ closed

eco. leaving temp. diff. (K):

eco. to port pres. loss (K):

eco temperature fixed ☐

common economiser ☐

☐ no selection ☐ standard range

☐ total range ☐ keep current

Oil cooler:

oil number: oil data

Oil cooler selection:

☐ no selection ☐ built into plate cond. cassette

☐ standard range ☐ keep current

☐ total range common oil cooler ☐

Oil cooling type: ☐ use condenser data

☐ water/brine ☐ inlet temp. (deg.C):

☐ refrigerant ☐ outlet temp. (deg.C):

☐ injection ☐ flow (m3/h):

☐ fouling (m2.K/W):

☐ serial oil coolers max. oil coolers:

secondary refrigerant: tralala (000)

select int. cooler ☐ Sound ☐

top cooling ☐

☐ air ☐ water ☐ thermo pump

There will be a warning in your Comp1 computation tool if air cooling is not sufficient

HS Compr. LS Compr. Evaporator Condenser Subcooler Disch

recip compressor type: SMC 108 L VSD
refrigerant designation: R 717

no. of compressor(s): 1.00
load percentage: 100.0 %
no. of working cylinders: 8
drive shaft speed: 1800. RPM (list)
drive type(direct/belt): direct

cooling capacity: 223.6 kW
shaft power requirement: 83.8 kW
drive shaft torque: 444.5 Nm
heating capacity: 307.4 kW
capacity/shaft power ratio: 2.67
capacity/line power ratio: 0.00
ext. interstage load: 0.0 kW

evaporating temperature: -20.0 deg.C
condensing temperature: 35.0 deg.C
suction line loss: 0.5 K
discharge line loss: 0.0 K
liquid subcooling: 2.0 K
useful suction superheat: 0.0 K
non-useful superheat: 0.0 K

cooling - cylinder heads: air
oil cooling - crankcase: refrigerant or water

WARNING - discharge temp. high! (> 150 deg.C) - please consult Sabroe!
WARNING - discharge temperature too high (max. 140.0) Choose water cooling
NB: no starting torque check - motor data not available!

HS Compr. LS Compr. Evaporator Condenser Subcooler Disch. desuperh. Plant

recip compressor type: SMC 108 L VSD
refrigerant designation: R 717

no. of compressor(s): 1.00
load percentage: 100.0 %
no. of working cylinders: 8
drive shaft speed: 1800. RPM (list)
drive type(direct/belt): direct

cooling capacity: 386.7 kW
shaft power requirement: 103.5 kW
drive shaft torque: 549.1 Nm
heating capacity: 490.1 kW
capacity/shaft power ratio: 3.74
capacity/line power ratio: 0.00
ext. interstage load: 0.0 kW

evaporating temperature: -10.0 deg.C
condensing temperature: 35.0 deg.C
suction line loss: 0.5 K
discharge line loss: 0.0 K
liquid subcooling: 2.0 K
useful suction superheat: 0.0 K
non-useful superheat: 0.0 K

cooling - cylinder heads: air
oil cooling - crankcase: refrigerant or water

NB: no starting torque check - motor data not available!
NB: please notice min. load discharge temperature (max 150 deg.C)
NB: Compressor weight incorrect - data missing.

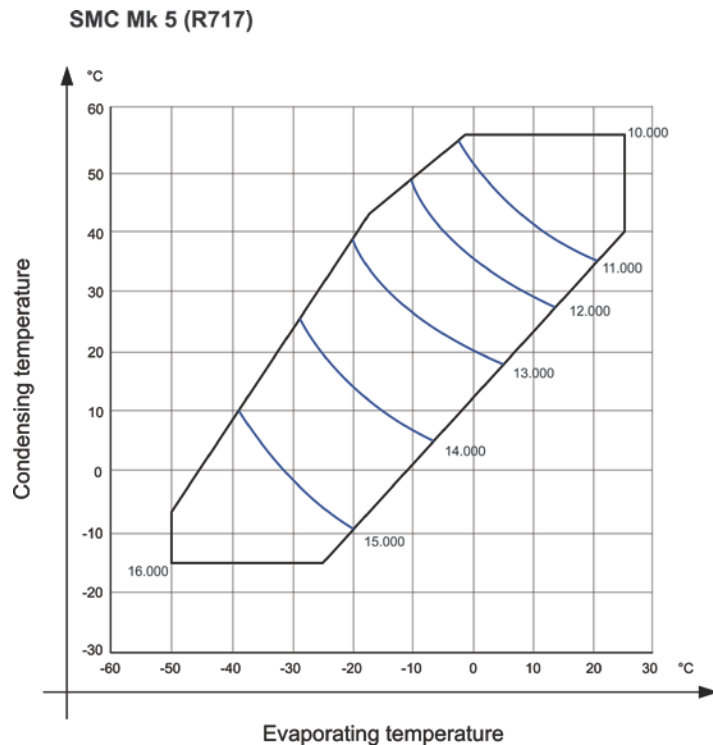
☐ Motor

Extended service intervals

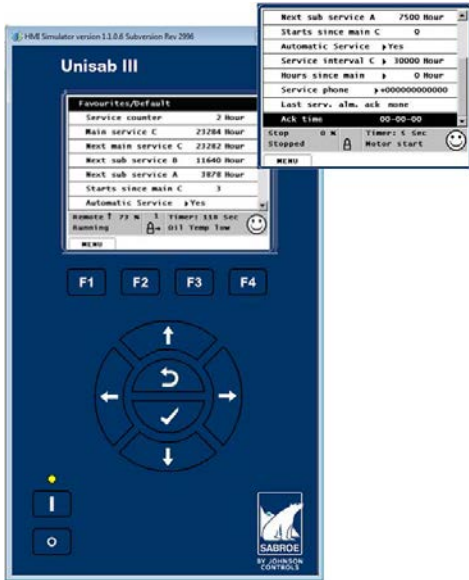
SMC Mk 5 sets the market standards

SMC Mk 5 sets the market standards for reciprocating compressors in terms of durability, reliability and service intervals. The advantages are not limited to the SMC models but apply to the rest of the SABROE reciprocating compressors as well.

Mk 5 adds +25% service life to the entire SMC family.



Extended service intervals



SMC Mk 5 and Unisab III – A perfect match

Along with SMC Mk 5, Unisab III offers the possibility of using the integrated load-based service module to optimise the cost of ownership.

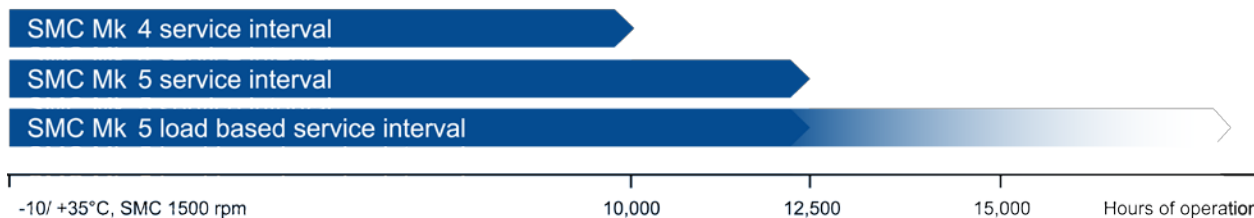
The idea is to optimise the length of the service intervals, respecting that wear patterns depend on the average load on the compressor.

Depending on load and speed, the compressor unit will offer tailored service intervals accordingly.



Combine SMC Mk 5 and Unisab III to achieve extremely long service intervals

Extended service life



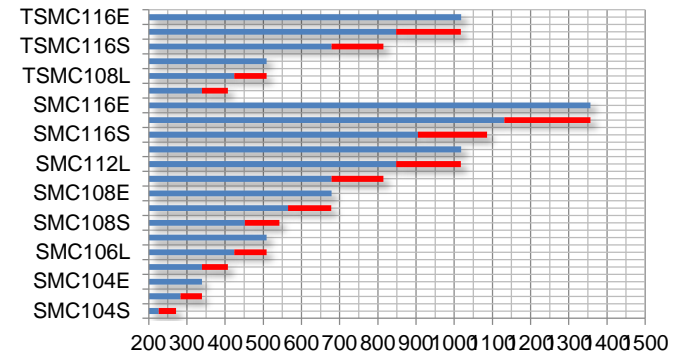
New base frame – single-beam design

Rigid design suppresses vibrations

The new SMC design incorporates a coupling, which is specially engineered to eliminate torsional oscillations. The new single-beam design is extremely rigid and effectively suppresses vibrations.

Skip-free capacity output

SMC Mk 5 is uniquely capable of providing a completely skip-free and stepless output. In return, it is possible to improve both capacity and performance.



SMC E models are limited to 1500 rpm

Major advantages in operating economics

A 20% capacity boost is available with variable-speed. SMC Mk 5 runs up to 1800 rpm offering a capacity boost of 20% and providing major advantages in operating economics and much better return on investment.

Superior regulation capabilities

SMC Mk 5 is developed for variable speed, offering skip-free speed regulation from 500 rpm to 1800 rpm.

This has the great benefit of enabling **capacity regulation from 100% to 27% without mechanical unloading.**

