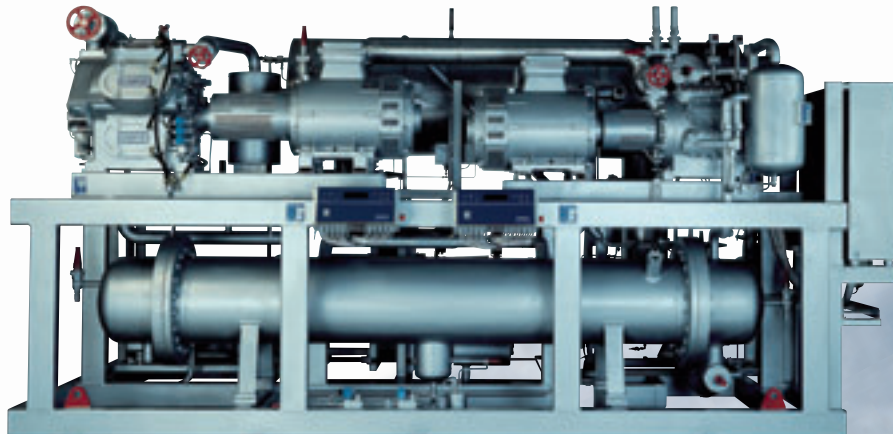


CO₂/Ammonia Freeze Package (CAFP)



The innovative Sabroe CO₂/Ammonia Freeze Package (CAFP) concept is based on a cascade system that combines the advantages of CO₂ on the low-temperature side and ammonia on the high-temperature side.

This remarkably efficient package is inexpensive, extremely compact and has a very small ammonia charge. It is also both environmentally friendly and future-compatible due to the use of natural refrigerants.

Compact solution

A compressor that uses CO₂ has a capacity 8–12 times greater than its counterpart using ammonia. This makes the low-temperature compressor much smaller, and the whole unit significantly more compact than a traditional solution.

CO₂/Ammonia Freeze Package (CAFP) equipment with capacities of 80–400 kW at -50°C or 140–650 kW at -40°C only takes up as much space as a standard 20-foot container. Such compactness makes it easy to move a CAFP system from one site to another.

Low operating costs at low temperatures

Compared with conventional two-stage or single-stage systems with economisers, a CO₂/Ammonia Freeze Package (CAFP) unit uses significantly less power in the temperature range from -35°C to -55°C.

Depending on configuration, this means that savings of 5–15% are possible, compared with a conventional two-stage system and of up to 45% compared with single-stage systems with economisers.

Significant advantages

The advantages of the Sabroe CAFP package include

- Extremely low power consumption, even at part load.
- Compact design, and the unit can relatively easily be moved to other locations.
- Very small ammonia charge.
- Entire ammonia charge is located on the unit itself, restricting ammonia use to the machine room.
- Clear separation of ammonia and CO₂.
- Automatic oil recovery system in both CO₂ and ammonia circuits.

Customer benefits

For the customer, the benefits of the Sabroe CAFP package include

- • Low operating costs.
- • Saves space, and gives greater flexibility in production.
- • Makes it possible to install large-capacity, low-temperature plants with only limited refrigerant restrictions.
- • No risk of ammonia leaks in production areas, cold stores and working areas. Less risk of product damage.
- • Eliminates risk of panic or damage in production and working area in case of leaks, and can also save on insurance rates.
- • Only minimum maintenance required.



Standard equipment

The standard Sabroe CO₂/Ammonia Freeze Package (CAFP) includes the following equipment

- CO₂ and ammonia compressors complete with oil separators, motors and Unisab II control panels
- CO₂ pump separator including two pumps (one standby)
- shell-and-tube type cascade cooler with double tube sheet to minimise risk of mixing CO₂ and ammonia
- standstill cooling unit to limit CO₂ pressure, including separate control panel and separate power supply
- automatic oil recovery system in both circuits
- water-cooled condenser (plate heat exchanger type) on ammonia side
- motor control panel with starters and controls for compressors and pumps (two supply cables necessary)

- piping, valves and wiring
- insulation of cold parts (polyurethane with aluminium covers)
- factory-tested prior to dispatch
- first charge of oil for compressors.

Options

Options available for the Sabroe CO₂/Ammonia Freeze Package (CAFP) include

- version for use with remote condenser
- titanium plates in condenser
- oversized CO₂ pump separator for high CO₂ evaporator volume
- oversized CO₂ pumps for higher circulation rate
- oversized ammonia condenser for higher cooling water temperature
- fully welded cascade cooler (Shell & Tube).

Technical data

Model	Tevaporation °C	Capacity at Tevaporation ¹⁾ kW	Power consumption ²⁾ kW	Compressors R744/R717	NH ₃ charge approx. kg	Max. CO ₂ charge l	Dimensions approx. L x W x H mm	Weight ³⁾ kg	Sound pressure level dB(A)
CAFP 80	-50	87	64	HPO24 / SMC104S	45	800	5200 x 2600 x 2800	8000	78
CAFP 80	-45	112	74	HPO24 / SMC104L	45	800	5200 x 2600 x 2800	8500	80
CAFP 80	-40	144	84	HPO24 / SMC104E	45	800	5200 x 2600 x 2800	9000	79
CAFP 80	-35	144	82	HPO24 / SMC106S	45	800	5200 x 2600 x 2800	9000	79
CAFP 120	-50	131	94	HPO26 / SMC106S	55	800	5200 x 2600 x 2800	9500	80
CAFP 120	-45	169	110	HPO26 / SMC106L	55	800	5200 x 2600 x 2800	9500	80
CAFP 120	-40	217	126	HPO26 / SMC106E	55	800	5200 x 2600 x 2800	9500	80
CAFP 120	-35	264	137	HPO26 / SMC108L	55	800	5200 x 2600 x 2800	10000	82
CAFP 160	-50	174	125	HPO28 / SMC108S	60	800	5200 x 2600 x 2800	10500	80
CAFP 160	-45	223	147	HPO28 / SMC108L	60	800	5200 x 2600 x 2800	11000	82
CAFP 160	-40	288	167	HPO28 / SMC108E	60	800	5200 x 2600 x 2800	11000	82
CAFP 160	-35	363	188	HPO28 / SMC112L	60	800	5900 x 2800 x 3000	12000	83
CAFP 200	-50	211	150	HPC104 / SMC106E	80	800	5200 x 2600 x 2800	12000	80
CAFP 200	-45	277	177	HPC104 / SMC108E	80	800	5200 x 2600 x 2800	12000	82
CAFP 200	-40	353	200	HPC104 / SMC112L	80	800	5900 x 2800 x 3000	13500	82
CAFP 200	-35	415	214	HPC104 / SMC112L	80	800	5900 x 2800 x 3000	13500	83
CAFP 300	-50	324	228	HPC106 / SMC112L	120	1650	6300 x 3200 x 3100	14000	82
CAFP 300	-45	416	263	HPC106 / SMC112E	120	1650	6300 x 3200 x 3100	14000	82
CAFP 300	-40	511	290	HPC106 / SMC116L	120	1650	6300 x 3200 x 3100	15000	83
CAFP 300	-35	599	310	HPC106 / SMC116L	120	1650	6300 x 3200 x 3100	15500	83
CAFP 400	-50	421	296	HPC108 / SMC112E	155	1650	6300 x 3200 x 3100	16000	82
CAFP 400	-45	520	332	HPC108 / SMC116L	155	1650	6300 x 3200 x 3100	17000	83
CAFP 400	-40	667	375	HPC108 / SMC116E	155	1650	6700 x 3200 x 3200	17000	83
CAFP 400	-35	793	398	HPC108 / SMC116E	155	1650	6700 x 3200 x 3200	18000	83

1) Capacity is based on 50 Hz. In addition, 25°C/30°C cooling water to/from condenser

2) Power consumption applies to compressors only

3) Dry weight (approx.)

All information is subject to change without previous notice.

