

## Job Report

### Compact refrigeration systems in containers

#### ARCTOS container systems with machines in unit design

Frequently the plant room for refrigeration systems in factory buildings is restricted, or for safety reasons, the plant should not be in the building.

ARCTOS has already built a large number of containerised systems including among other things, prefabricated refrigeration units. The dimensions of a container offer many advantages to the customer:

- flexibility of installation
- for outdoor installation no space is needed inside the buildings
- the system is weather-proof
- construction work is done in the manufacturer's works in Sörup (reduction of costs on site)
- in case of an accident, the refrigerant cannot enter the buildings. Should a leak occur, the refrigerant is held back in the container. Optionally an NH<sub>3</sub>-absorber can be installed.

Normally, we select containers with standard maritime dimensions. Where necessary, we can supply special constructions whereby the external dimensions 12.2 m x 3.0 m x 3.2 m (l x w x h) should not be exceeded, otherwise additional transport permits are needed possibly with escorting vehicles for transport to site. The maximum permissible weight for road haulage must also be considered.

	length (m)	width (m)	height (m)	max. total weight (kg)
Standard container	6,058 / 12,192	2,438	2,591	24.000 / 30.480
	20' 4" / 40'	8'	8' 6"	
High Cube (HC, HQ)	6,058 / 12,192	2,438	2,90	Subject to project
	20' / 40'	8'	9' 6"	
Special container	12,2	3,0	3,2	Subject to project

#### Prefabricated units – compressor unit base frames

After assembly every refrigeration system in container design makes at least one journey. Therefore ARCTOS prefers to employ prefabricated compressor units on base frames. They have high stability and rigidity and are supplied ready to install.



Prefabricated compressor base frame units from GEA Grasso: DUO ND 5A (left), Single SB 2A (right)

## Examples

### CO<sub>2</sub> / propene cascade refrigeration system



CO<sub>2</sub> / propene cascade refrigeration system in a container

A 40 ft special container houses a complete CO<sub>2</sub> / propene cascade refrigeration system which cools a re-condensing system in the chemical industry.

The unit has a total maximum cooling capacity of 2 x 124 kW at -50°C. As the unit is in a Zone 1 area, an adequate compensation vessel is provided. This vessel is to avoid excess pressure in the low temperature stage during standstill.

The unit is constructed according to ATEX and meets the Ex-classification II 2 G / IIC T3.

Dimensions: ca. 12.2 m x 3.0 m x 3.2 m (l x w x h)

Weight: 24 t (without charge):

### Dual purpose air cooled refrigeration system R404



Ten production and storage rooms are maintained at different temperatures using an air-cooled R404A dual purpose refrigeration system.

The temperature ranges from -20°C to +10°C.

In separate rooms shrimp meat is sorted, packed, stored and shipped.

The refrigeration system is also used for continuous air conditioning.

Dimensions: approx. 12.2 m x 2.4 m x 2.6 m (l x w x h)

### NH<sub>3</sub> mobile refrigeration system



Constructed as a 30 ft container, this special unit houses the chiller, the supply and return brine distributors, water pump, brine pump and the control panel. The air-cooled condenser is integrated into the open section of the container.

This mobile refrigeration unit for hire can be installed by ARCTOS at short notice. Depending on the heat transfer medium and temperature, the cooling capacity ranges from 120 kW to 500 kW.

Dimensions: ca. 9.3 m x 3.0 m x 3.2 m (l x w x h)

Weight: 14 500 kg (excluding brine charge)

### CO<sub>2</sub> / NH<sub>3</sub> cascade refrigeration system



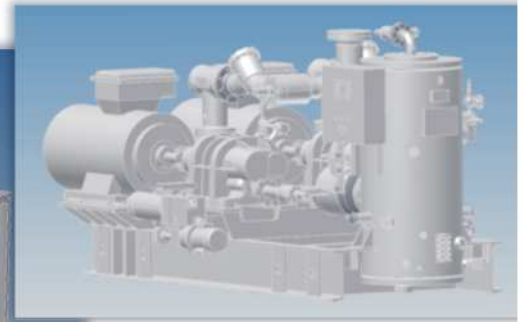
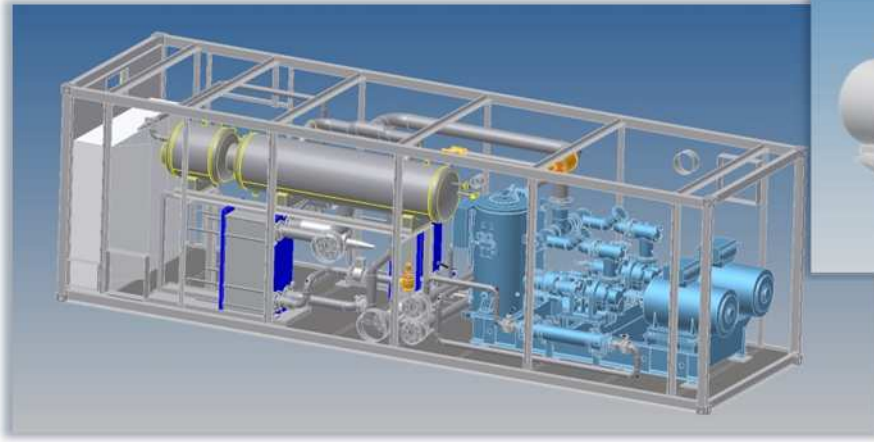
This CO<sub>2</sub> / NH<sub>3</sub> cascade refrigeration system cools brine (CaCl<sub>2</sub>) down to -45°C and freezes the soil for excavating cross connections between tunnel arms.

After construction work has been completed, the system is easy to remove and transport to another location.

This cascade refrigeration system option was chosen for cooling down to -50°C. There are virtually no limits to the possible applications.

Dimensions: ca. 12.20 m x 2.44 m x 2.90 m (l x w x h)

## NH<sub>3</sub> refrigeration system



Container including NH<sub>3</sub>-Duo compressor set as unit

The over ground NH<sub>3</sub> refrigeration system cools the brine needed for freezing the soil. Deep pilot tunnels (freezing lances) are drilled into the soil to be frozen and the brine is pumped in. The -38°C brine freezes the soil around the drilled freezing lances. Construction work can be done without risk of static damage. When construction work is finished, the refrigeration system can easily be relocated to another site.

Dimensions: ca. 10.4 m x 3.0 m x 3.2 m (l x w x h)

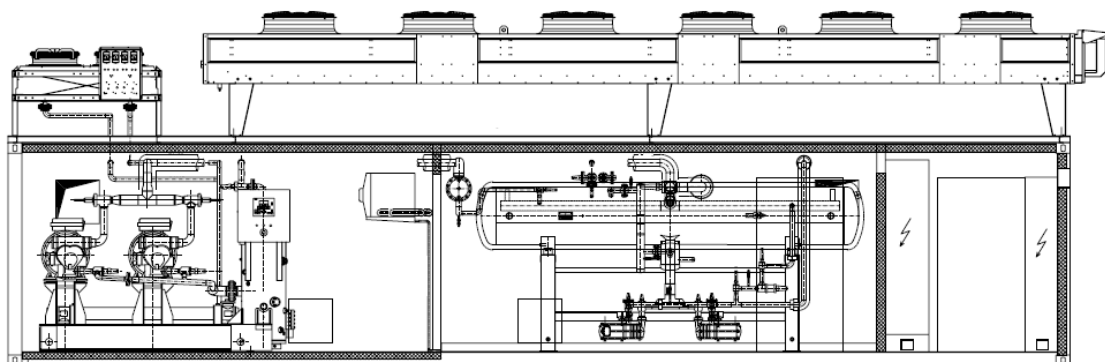
Certification for import and operation in the Russian Federation has been applied for this refrigeration system.



The following has been confirmed:

- GOST-R certification (conformity of the exported product with Russian quality standards and regulations)
- RosTechNadsor certification (operating licence to use technical equipment in Russia).

## NH<sub>3</sub> refrigeration system with ice bank



This NH<sub>3</sub> refrigeration system cools icewater which is needed for the process. A noise-insulated 40 ft maritime container houses the entire system which has a cooling capacity of 280 kW at an evaporating temperature of -10°C.

At the construction site the condenser was installed on the container roof.

Dimensions: ca. 12.2 m x 2.44 m x 2.6 m (l x w x h)