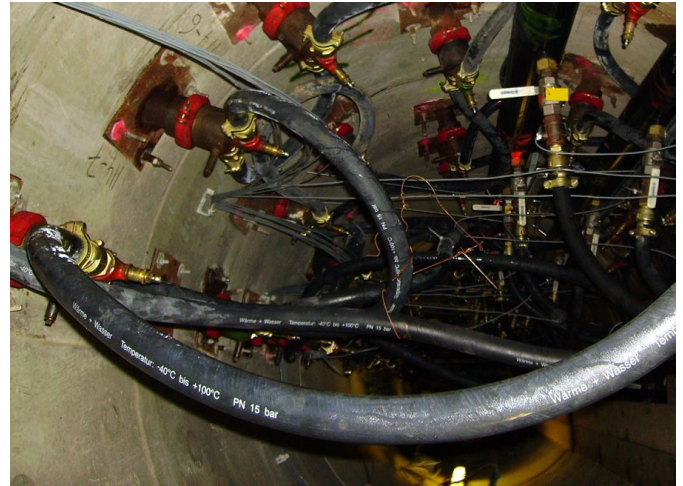


Ground Freezing Innovative Technology Enables New Construction Projects

NH₃ Ground Freezing Units with Screw Compressors

In underground construction activities, a common problem is that groundwater can impede or even prevent earthworks. Solutions need to be found that allow construction despite this issue. Ground freezing provides a safe and reliable solution.



Through ground freezing, the soil around or above the construction site (construction pit or tunnel) is frozen for the duration of the construction activities.

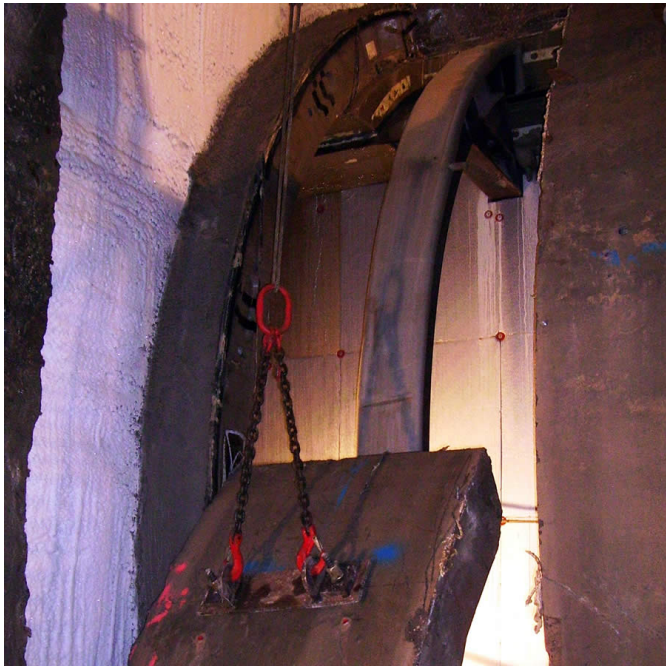
The frozen ground acts as a stabilizing and sealing barrier against groundwater. In its frozen state, the soil can be worked with special construction machinery.

After the completion of the construction work, the soil is thawed. From that point on, a selected lining method (e.g., steel segments, concrete shield, shotcrete) prevents groundwater from entering and provides structural security.

Ground freezing makes construction projects possible that could not be carried out in the past or were too costly due to the use of N₂ freezing over an extended period.

TECHNICAL DATA

Kältemittel:	NH ₃ (R717)
Kältemittelmenge:	max. 150 kg
Kälteleistung Q₀:	370 kW
Kälteträger:	CaCl ₂ , 30%
Soleeintritt S₁:	-30° C
Soleaustritt S₂:	-35° C
Solemenge V_s:	67 m ³ /h
Kühlmedium:	Water
Wassereintritt S₃:	+26° C
Wasseraustritt S₄:	+31° C
Verdichterfabrikat:	GEA Grasso
Verdichtertyp:	Screw Compressor
Maschinencontainer 30:	For housing: the brine cooling unit, pumps & control panel



Tunnel tube, which is opened surrounded by the protection of the frozen soil (white) and is later intended to establish the connection to a subway station.

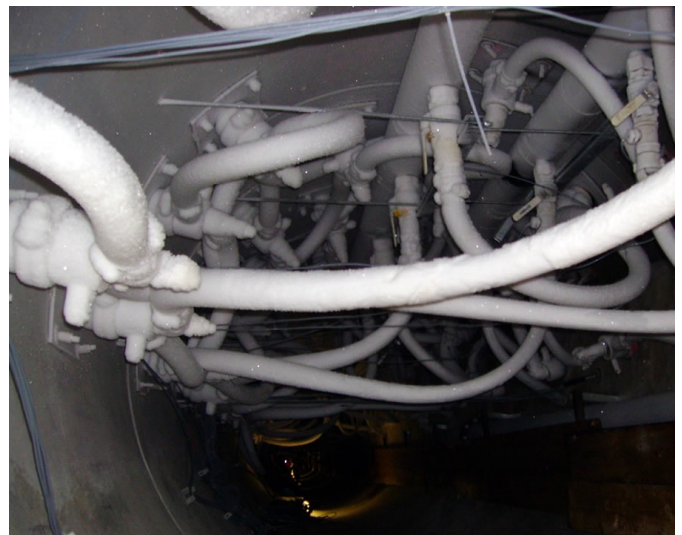
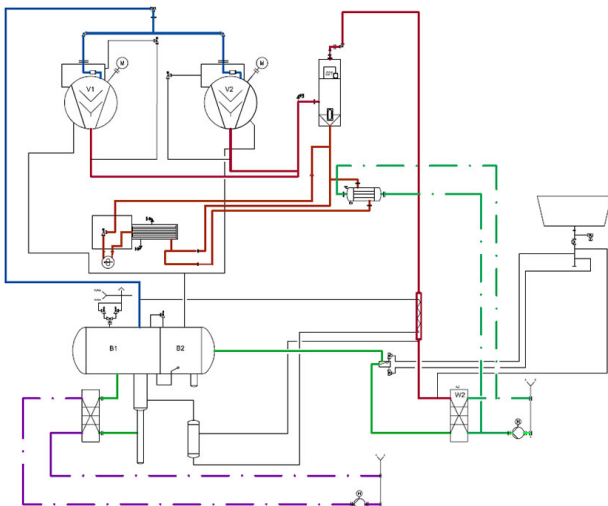
FREEZING PRINCIPLE

An above-ground refrigeration unit supplies brine or cooling medium to channels that are drilled deep into the soil to be frozen. Using these freezing lance systems, a specific area of the soil is frozen. Construction work can then be safely carried out without groundwater interference under or within this ice layer.

EXAMPLE OF NH₃ SOIL FREEZING UNITS WITH SCREW COMPRESSORS

NH₃ soil freezing units are used in the construction of subway tunnels, stations, shaft construction projects, and excavation protection. The above-ground NH₃ refrigeration units cool a brine (e.g., CaCl₂). This brine is used for freezing the soil to create crosscuts for tunnel tubes. The brine, for example, cooled to -30°C, freezes the soil around the drilled freezing lances. Construction can proceed without the risk of structural damage.

ARCTOS is capable of providing cooling medium temperatures down to -45°C.



Do you have any questions or comments? We are happy to assist you:

Location Flensburg / Sörup

ARCTOS Industriekälte AG

[Schulstraße 33](#) | D-24966 Sörup

Telefon: [+49 \(0\)4635 - 292 82-0](tel:+49(0)4635-29282-0)

E-Mail: arctos@arctos-ag.com

Internet: www.arctos-ag.com

Location Hamburg / Braak

ARCTOS Industriekälte AG

[Bergkoppel 2](#) | D-24966 Braak

Telefon: [+49 \(0\)40 - 309 978 7-0](tel:+49(0)40-3099787-0)

E-Mail: arctos@arctos-ag.com

Internet: www.arctos-ag.com