

# BOS SYSTEM LINE Biological Organisation Systems



#### **The Power of Liquid Nitrogen**



# Air **Air separation** through fractionation of liquid air N<sub>2</sub> Nitrogen **O**<sub>2</sub> Oxygen He, Ne, Ar, Kr, Xe, noble gases N<sub>2</sub> Nitrogen

LN<sub>2</sub>

Liquid-Nitrogen

-196°C / -320°F

#### Cascading

Using and reusing the  $LN_2$  at different temperatures in a series of applications makes sure that less energy is wasted.

Systems with the highest rate of consumption are at the beginning. The "used"  $LN_2$  gets warmer and will turn into the gaseous state  $N_2$ . It is cascading from one system to the next, each needing less energy to reach the desired temperature.



# About us



We, the **NNC Group**, deal with the question of how to cool system components such as storage systems (manual/automated), rooms, e.g. refrigerated warehouses such as operating rooms - regardless of size - safely, efficiently and without the conventional compressor technology. Our many years of 28 years of knowhow are an advantage here. The demand for this knowledge can be seen, among other things, in the implementation of ever newer customer requests, for which NNC-Group is the leading technology partner.

Stem cells, blood and other biological materials are highly sensitive and must be handled and stored accordingly. We, NNC-Group, determine for each of our customers individually how this can be done optimally and in a climate-friendly manner using the latest technology.

Exhaust gas utilisation, the modification of insulation through the use of VIP (vacuum-insulated panels), double-wall cells with interstitial cooling, holistic energy concepts and fire protection in combination are new milestones of the NNC Group.

The focus of our work is the evaluation of existing installations, the development of suggestions for improvement and the implementation of complex facilities. Here we make use of all the technical equipment available on the market, taking suitability and quality into account.

#### or we create new solutions!



# System News

The current installation



Pharma - full cascade +35 to -80 C



BOS S – 800/80 – Semi-automated Storage System for Biomaterials



The new Project, BOS S - 150 Automatic "The Crown" in Development





# Akelop

# Automated cryogenic facility for the storage of organic samples



- Energy-efficient cooling and insulation
- High level of automation
- Flexible and secure storage
- High Level of competence in Biobanking
- Modular design
- User-friendly, cross-process Data Management



# Storage – Small system













#### Flexibility has a name: **B O S System Line**

- Blood/Plasma Bags in various sizes, with or without packaging
- Tubes
- Storage plates, modules and trays
- metal, glass, plastic









## Storage – Small system from +10°C to -150°C





#### Akelop Semi automated 800

#### Storagesystem University Düsseldorf



#### **High-bay Warehouse**



## Akelop Fully automated





## Storage – Large system from +10°C to -150°C

#### **Room Overview**



#### **Cold Room**



#### Storage Complex







#### Accumulation Room





# **BOS Thermo-Block**

(Trademark protected (IPC: F16L 5/02 - Nr.20 2020 101 452)

#### for pipes, electrical and data cables through insulated walls in cold rooms. "Highly efficient thermal protection passage"



Our standard models have dimensions of 200x400 mm or 200x800 mm and are produced with the openings you require.



If you need other dimensions, talk to us and we will find a way.



The damage caused by unsuitable bushings in cold rooms is enormous.

In addition, the effort for maintenance, replacement and expansion is very high. The most common problems are:

- Attenuation of the walls by condensation
- This results in a loss of insulation
  efficiency
- Corrosion from condensation
- Subsequent installation of lines is not possible
- Subsequent laying of pipelines is not possible

With one component, all these problems are a thing of the past. **Contact us!** 



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# Special parts Individual Customisation

#### **Cryo Distributor**







The construction of cryogenic distributors can be realised in any size according to individual customer requests

#### **Temperature Sensor Attachment**



BOS T-Holder, the professional for flexible mounting of temperature probes. 3-10mm, standard +10°C to -200°C

#### **Thermo-Block**









Most cryogenic systems include one or more cryogenic valves; these valves effectively manage the flow and quality of liquid gases. These valves are integrated into the piping system, cryogenic dewars, or quality-enhancing products to stop, pass or drain liquid or gaseous agents. Demaco offers three standard valves:

- Demaco Cryogenic Valve Manual on/off
- Demaco Cryogenic Valve Pneumatic on/off
- Demaco Cryogenic Valve Control valve

All these valves are vacuum insulated. This significantly reduces both heat inleak and ice accumulation. Together with the customer, Demaco chooses one or more of the above types of valves, depending on the specifications of a project, system, or application. When installed in a pipeline system or on a storage tank, the cryogenic valves are used to manage cryogenic gases.





Vaccum Insulated Transfer Lines (VIP)

Flexible Vaccum Insulated Transfer Lines

Vacuum Insulated Piping forms the basis of almost every cryogenic infrastructure. The doublewalled pipes ensure that cold liquid gases can be safely transported without excessive warming and lose their liquid state, which causes a quality reduction. Transfer lines connect, for example, a vessel to an application or an ASU (Air Separation Unit) and a transportation vehicle.







A valve box is a large vacuum insulated box with an outer wall made of stainless steel (304 (L), 321 or 316 (L)). For additional insulation, there is a copper shield on the inside of the box, which is actively cooled with return gas or liquid nitrogen. Multi-layered insulation made of glass and aluminium or Mylar is also used.



With the Demaco loading station, liquid hydrogen can be easily and safely loaded into a transport vehicle. The cryogenic liquid is transferred through vacuum-insulated pipelines from an on-site storage container to a ship or truck for long-distance transport.

A loading station contains valves, pressure relief mechanisms and monitoring and control technology. If required, all components can be mounted in a vacuum-insulated box, creating a safe and efficient unit. This reduces the overall cost of the system and increases efficiency.

We are the official contact for IDEMACO





Air Liquide is the global market leader in gases, technologies and services for industry and healthcare. Air Liquide in Germany supplies more than 100,000 customers and patients, including international companies in the steel production, chemical, automotive, food, research, pharmaceutical and semiconductor technology industries; as well as medium-sized companies and craft businesses.

#### **Common Gas Applications**















# Industrial Use

#### Cascading

Using and reusing the  $LN_2$  at different temperatures in a range of applications ensures that less energy is wasted.

Systems with the highest consumption are at the beginning. The "consumed"  $LN_2$  heats up and changes to the gaseous state  $N_2$ . It moves from one system to the next, each requiring less energy to reach the desired temperature.



Depending on requirements, data centres can be cooled with a customised  $LN_2$  solution or combined with water cooling.

In conjunction with heat and smoke sensors, the  $N_2$  gas outlets can be used to detect and eliminate possible fires.

# Cooling of food and other products

 $LN_{2}\xspace$  can be used to cool a storage room for various products including food.

In addition, the developing  $N_2$  can be used to keep the oxygen content around the root and vegetables low, slowing down the ripening process.





# Liquid Nitrogen LN<sub>2</sub> Green

#### **Energy Base Green**



#### **Production LN<sub>2</sub> Green**



# **Transports LN<sub>2</sub> Green**





# Air Liquide

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#### **Application LN<sub>2</sub> Green**

- ✓ Healthcare
- ✓ Pharm. Industry
- ✓ Forensics
- ✓ Research / Development
- ✓ Industry
- ✓ Agriculture
- ✓ Energy Industry

## **NNC-LIN MS GmbH**



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