

LIQUID NITROGEN

dosing





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Ceiling penetrating Aseptic Nitrodoser

Vacuum Barrier Systems

Vacuum Barrier Systems (VBS) is the exclusive distributor of Vacuum Barrier Corporation (VBC), the leading American manufacturer of liquid nitrogen transfer systems.

As a supplier of liquid nitrogen transfer systems since 1978, we have an in depth knowledge on a number of specialized cryogenic processes.

Vacuum Barrier Systems offers a unique range of vacuum jacketed lines and cryogenic transfer systems. From short flexible hoses to large plant distribution systems, from "do it yourself" mail order sales to complete turnkey systems, Vacuum Barrier Systems will provide the most cost effective solution.

With over 30 years of experience serving various industries, strong links with installation companies and gas suppliers in different countries and technical support from world leaders in their fields, we can handle both small and big projects.

In addition to transfer lines, we also specialize in specific cryogenic process equipment such as LN2 dosing systems for the food and beverage industry, LN2 circulation systems for MBE (Molecular Beam Epitaxy), spraying systems for halogen lights manufacturing..

Our activities cover all European countries, the Middle East, Africa, Russia and India. In many geographical areas, our presence is supported locally by trained professionals.



SERVICE

VBS will assist you all along your project and help you to develop it from A to Z.

Whether you plan to install a liquid nitrogen dosing system on your filling line or you want to install cryogenic lines, we will help you choosing the right system for your application.

VBS can also advise you in terms of the liquid nitrogen supply line. If required, an on site visit can be organised.

VBS will analyze your data, calculate your needs and propose the most efficient configuration.

In case you are not sure about the compatibility of your process with our LN2 equipment, we can put a **test unit** at your disposal on site, so that you can proceed with trials on your filling line.

Our technicians can assist you during the tests on site. If you would like to evaluate our liquid nitrogen dosing system for a longer period of time, we can propose you a **rental contract**.

Once our equipment has arrived on site, our engineering team is available for the start-up of the liquid nitrogen dosing system and for the installation of the cryogenic supply line. Together with our local partners, our multilingual technicians are available to answer your questions and to help you in preventing or solving technical issues. They will also advise you with reference to spare parts.

Please feel free to contact us.

Why dosing liquid nitrogen (LN₂)?

PRESSURIZATION

- 📍 non carbonated drinks
- 📍 PET and PP bottles - aluminium cans



Lightweighting containers

Cost saving by reducing PET weight

Avoiding of deformation and stabilisation

- Damage free transportation of containers
- Enhanced labelling
- Improved palletizing in factory warehouse
- Use in vending machines
- Compensation for atmospheric pressure differences (eg. mountain – sea level)
- Preservation of bottle/can shape at the supermarket

Avoiding of deformation and stabilisation

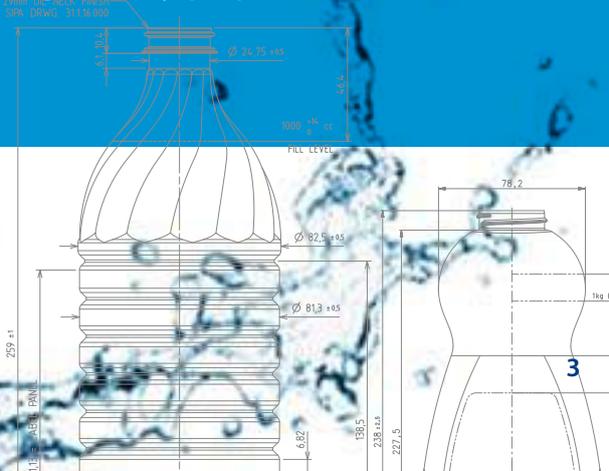
- Damage free transportation of containers
- Enhanced labelling

NEW

NITRO-INFUSED DRINKS

Nitro-infused beverages enjoy a lot of attention. Experimentation has given rise to new products being presented every day. Nitro-infusion is compatible with a wider variety of drinks than the well-known nitro-beer. Reimagining familiar drinks, nitrogen emulsifications create rich, creamy, visual intriguing drinks based on coffee, tea, chocolate, energy drinks and cocktails. Combined with ice, sugar, cream and natural flavors.

The mouthfeel and enrichment of the flavor is appealing to many people's palates. Liquid nitrogen is dosed in ready-to-drink cans.





INERTING

- vegetable oils
- dairy products
- wine
- fruit juices
- energy drinks
- snacks
- vegetables
- sauces
- powders and solids



Delicate products filled into bottles/cans/jars should have very little contact with oxygen for the following reasons:

- Prevention of product oxidation
- Avoiding the need to add oxidation inhibitors
- Avoiding collapse of the package (paneling)
- Preserving taste, colour and freshness of the product
- Increasing the shelf life of the product

THE ADVANTAGES

- Drastically reduced oxygen content inside the container (e.g. 2 %)
- Product stays fresh for a longer time, increased shelf life
- Steady overpressure in the container => no deformation of containers
- Reduction of packaging weight
- Reduction of ecological footprint
- Nitrogen is odor- and tasteless, it is inert and approved for use in the food and beverage industry.

LN₂ dosing equipment

Vacuum Barrier's NITRODOSE® liquid nitrogen injection systems provide the most precise liquid nitrogen dosing to add strength to non-carbonated beverage bottles and cans for light-weight packaging and to displace oxygen to extend the shelf life of the product.

Precise, discrete liquid nitrogen dosing



STANDARD SYSTEMS

MINIDOSE

Liquid nitrogen dosing system named for its size and cost. Precisely delivers low pressure liquid nitrogen at line speeds up to 200 containers per minute and single dose capability for lab testing. The system is accurate to $\pm 5\%$ dose weight.

EASYDOSE

The Easydose family, named for its simplicity of installation and operation, delivers accurately low pressure liquid nitrogen (with an accuracy of $\pm 3\%$ dose weight).

📍 Easydose G2 Lite

For line speeds up to 450 containers per minute. Controls by means of a basic touchscreen panel with user-friendly universal language symbols. Optional CIP protection available.

📍 Easydose G2

For line speeds up to 450 containers per minute, continuous stream thereafter. Optional CIP protection and optional directional dose dispersion available.

📍 Easydose G2 Plus

For line speeds up to 2000 containers per minute, continuous stream thereafter. Optional CIP protection and optional directional dose dispersion available.





NITRODOSE

The Nitrodose G2 is one of the latest advancements in liquid nitrogen dosing, performance and durability with new powerful control systems. It is continuously self-monitored with alarm outputs and beacon. Optional CIP protection and optional directional dose dispersion are available.

The Nitrodose G2 can be fed with a pressure up to **7bar** from a dewar or directly from an outside bulk tank.

See further on page 10 for the possible configurations.

NEW

📍 Nitrodose G2

For line speeds up to 450 containers per minute, continuous stream thereafter.

Accuracy on dose weight: +/- 3%.

📍 Nitrodose G2 Pro

For line speeds up to 2000 containers per minute, continuous stream thereafter.

Accuracy on dose weight: +/- 3%.

📍 **NEW** Nitrodose G2 SERVODOSE

**The highest level of control in liquid nitrogen dosing.
Virtually maintenance free liquid nitrogen dosing equipment.**

Discrete dosing speeds up to 2000 containers per minute;
Precision metering during steady stream without nozzle changes.

Accuracy on dose weight: **+/- 1%**



INERTING LARGER VOLUMES



LINERTER III

Low cost liquid nitrogen dosing system (discrete dosing up to 500 containers per minute) designed to greatly reduce oxygen levels in large volume containers to extend shelf life.



LN₂ dosing equipment

CUSTOMIZATION OF NITRODOSE AND EASYDOSE SYSTEMS

Hotfill

- [*] Precise delivery of liquid nitrogen to pressurize hot fill beverages in PET and lightweight aluminum cans
- [*] Precise gentle discrete dosing with any size container opening
- [*] Problems associated with shallow headspace are avoided
- [*] Sole liquid nitrogen injection system able to discretely dose at all hot fill beverage line speeds
- [*] Rugged, hygienic design that can be used with automatic CIP protection available on all NITRODOSE® models



Automatic CIP protection

- [*] Immediate closure after dosing stops
- [*] Hands free operation
- [*] Withstands high pressure wash down and aggressive chemical clean up
- [*] Eliminates human error during CIP

Multiheads

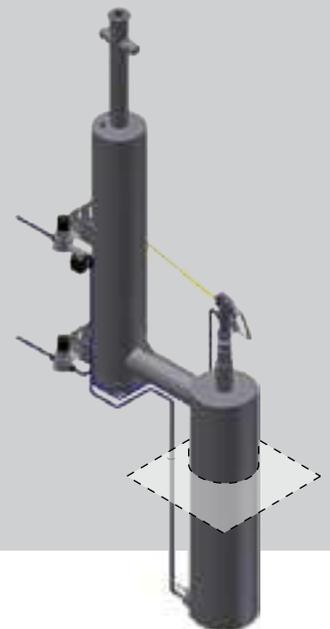
For filling lines that require simultaneous dosing into multiple packages, like for example in linear filling lines, our multihead dosers are the best solution. Several dosing heads are installed side by side and each container is dosed equally and simultaneously.

Ultraclean versions

Our dosers can be adapted to operate in clean room environments and can be integrated in ultra clean bottling lines. Various solutions can be proposed depending on the design of the filling line.

Special dimensions

When access to the filling line proves to be difficult, we can propose alternative lay-outs to the standard dimensions as such that the dosing head can be positioned at the ideal location.





ASEPTIC SYSTEMS

All Vacuum Barrier's aseptic liquid nitrogen dosing systems feature:

- [*] Soft impact dose
- [*] Accurate dosing
- [*] Modular design
- [*] Discrete dosing at all filler speeds. Continuous dosing available
- [*] **LN2 and GN2 sourced from a single bulk tank**
- [*] Smooth outer shell
- [*] Non-corrosive 316L stainless steel
- [*] Free from cracks and crevices
- [*] Complete absence of non vacuum insulated sections



HS ASEPTIC G2 - Dry heat sterilization

- Ideal for new and retrofitting existing rotary fillers
- Different filler penetration set-ups possible



HS ASEPTIC G3 - Steam sterilization

- Compact size for easy installation on smaller filler enclosures
- Rapid sterilization with clean steam
- Both linear and rotary filler compatible

G2

Dry heat
sterilization



G3

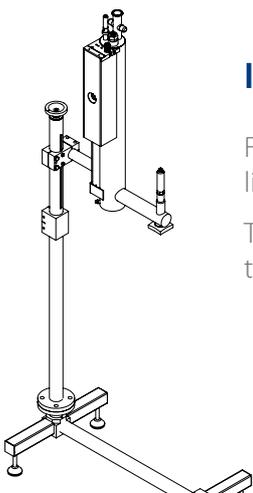
Steam
sterilization



INSTALLATION OF THE DOSER

For easy installation of the liquid nitrogen doser on the filling line, adjustable supports in various designs are available.

They allow to install the doser in the required position above the package.



Liquid nitrogen transfer systems



The right choice of LN2 supply to your doser

LN2 PIPING SYSTEMS

The limitations of rigid piping and the increasingly sophisticated demands of the industry led to the development of both dynamic and sealed bendable vacuum insulated piping available in OHFC copper and in stainless steel.

SEMIFLEX® systems are characterized by the lowest cool down and steady state heat loss of any flexible liquid nitrogen piping system available. The outside of the copper SEMIFLEX® line is plastic coated for protection against the environment. The outside of stainless steel SEMIFLEX® is protected by a flexible stainless steel interlocking armour.

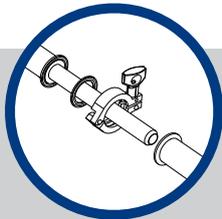
📍 Semiflex

- Bendable pipe;
- Different sizes available;
- Long individual sections;
- Continuously pumped or sealed vacuum;
- Fast cool down;
- Low thermal losses;
- Easy to assemble and modify;
- Wide range of terminations available;
- Available in stainless steel.

📍 Triax

Triax consists of SEMIFLEX® with a third coaxial flexible tube added internally. The inner tube and surrounding annulus carry liquid nitrogen. This annulus allows gaseous nitrogen to be spontaneously and automatically removed from the system. Pure, bubble free liquid nitrogen is supplied to the doser.

For use with phase separators only.



Bayonet couplings for quick connection of sub-assemblies create an overlapping vacuum joint to minimize heat loss. As a result, a completely ice and condensation free liquid nitrogen supply system is guaranteed.

SEALED VACUUM VERSUS DYNAMIC VACUUM

SEMIFLEX® consists of two concentric, corrugated copper or stainless steel tubes, separated by a Teflon spacer and wrapped in multi-layer reflective thermal insulation. The space between the tubes is evacuated to a high vacuum level, virtually eliminating all heat conduction between the inner and outer tubes.

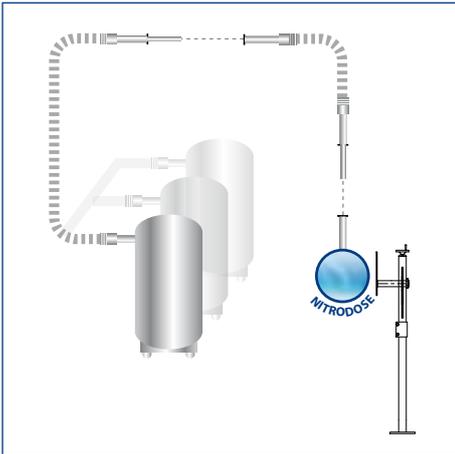
There are two types of SEMIFLEX® transfer systems. "Dynamic vacuum" systems include a vacuum pump that continuously maintains and improves the vacuum insulation. "Sealed" systems do not include a vacuum pump since the vacuum is created during manufacturing and is permanently sealed into each component.

Warranty is 10 years on the vacuum integrity of dynamic systems. 3 years warranty for sealed vacuum systems.

📍 Cobraflex

- Stainless steel highly bendable pipe;
- Sealed vacuum;
- Fast cool down;
- Easy to assemble;
- Wide range of terminations available;





A CORRECT SET-UP FOR EVERY APPLICATION

The LN2 doser can be directly fed from a dewar (vacuum insulated cryogenic mobile reservoir) at low pressure via a Cobraflex hose and/or Semiflex® pipeline.

A three meter long flexible Cobraflex hose equipped with a CGA295 connection (swivel nut) is standard included in our supply. Longer length flexibles are available on request.

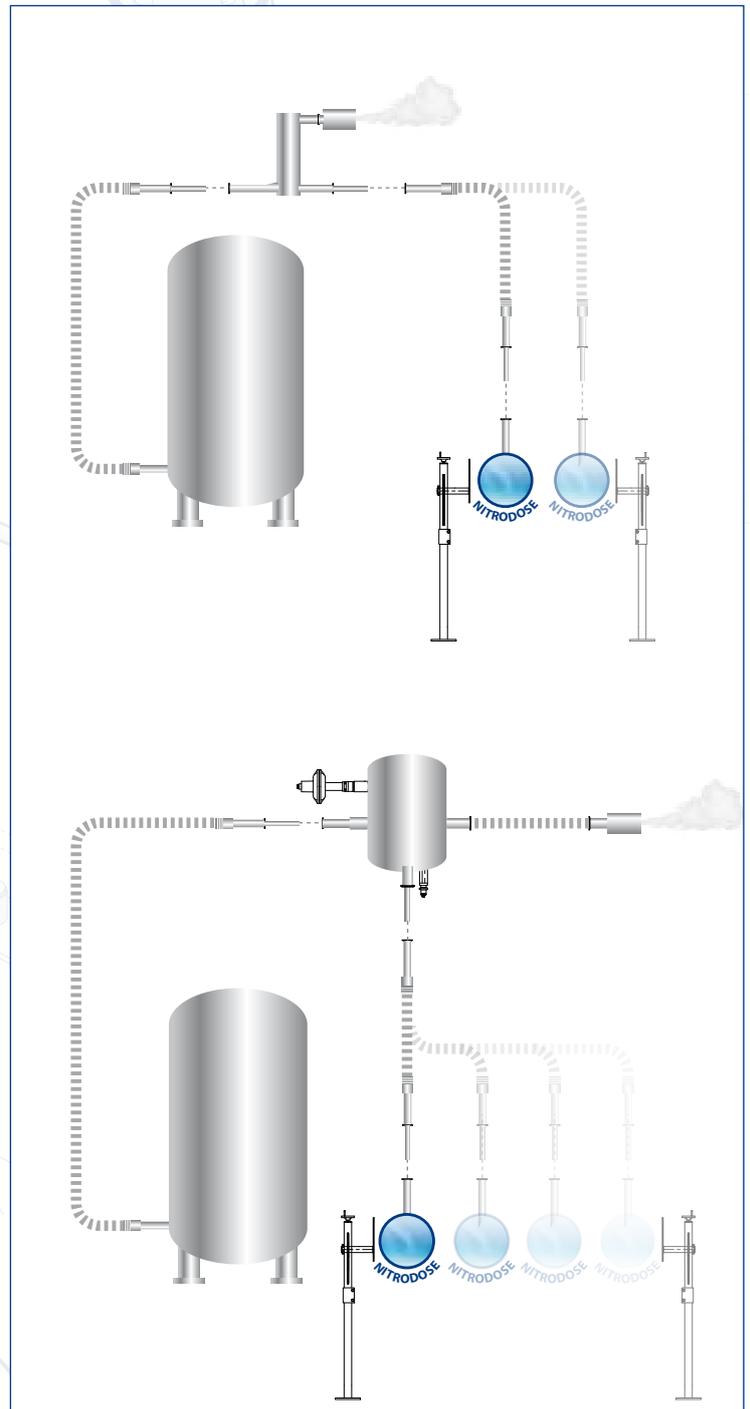
For uninterrupted production, the customer needs to switch an empty for a full dewar. This is greatly facilitated by the installation of a vacuum insulated manifold. Optionally our Nitromatic automatic dewar fill station allows the customer to safely re-fill an empty dewar at an on site bulk tank.

Valuable time and costs can often be saved if the customer feeds the liquid nitrogen doser directly from a bulk tank.

VBS can offer all the necessary accessories, such as vacuum insulated pipeline, vapor vents and Triax liquid/vapor separator, that allow to deliver liquid nitrogen to the doser at low pressure and in pure liquid phase.

Configuration SEMIFLEX® with vapor vent

A vapor vent is needed when supply lines are long. The vapor vent is equipped with a mechanical float that minimizes two phase flow, while maintaining the liquid nitrogen inside the SEMIFLEX® pipeline at bulk tank pressure.



Cobraflex® LN₂ Pipe

Configuration SEMIFLEX® with Triax liquid/vapor phase separator

Triax systems are needed when the supply pressure is higher than the maximum allowable operating pressure of the doser.

The addition of Triax pipe and liquid/vapor separators completely eliminates two phase flow to the doser. Hence, pure, low pressure liquid nitrogen is delivered on demand by gravity to each doser.





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