

CRYO XPERT

Dohmeyer NV is a company specialized in the development, design and construction of cryogenic equipment. Dohmeyer offers you a complete package of research, engineering, construction, implementation and after-sales service. It is this integrated approach that makes Dohmeyer different and successful.

DOHMEYER

Dohmeyer was established in Ninove (Belgium) in 2003. Building on that storied history, today we are one of the most experienced and respected cryogenic equipment constructors in Europe. With two locations in

Belgium and Poland, we continue to build on our reputation of providing quality engineering services and total cryogenic solutions. In 2008, the government has approved Dohmeyer as an official Research Centre. Along with a reputation for providing advanced products of the highest quality, Dohmeyer's integrated and certified R&D organization together with its manufacturing system, has also earned a strong reputation for reliability. Diversification is important in the international business environment. The establishment of a separate division with the main focus on life sciences applications proves to be a move in the right direction.

Cryoxpert The division of Dohmeyer which is responsible for the biomedical and pharmaceutical applications.

These applications can be seen as follows:

Biomedical

- Preservation and storage of stem cells
- Freezing of semen and embryos

- Cryogenic long term storage
- Storage vessels and Dewars
- Super insulating piping
- Plasma freezing

Pharmaceutical

- Sterile liquefied gases
- Encapsulated enzymes
- Reactor blanketing
- Vaccines

- O.D.T.
- Cryobiological
- Probiotics
- LaB



For long term storage, enzymes must be kept in ideal conditions and in cryogenic temperatures, either in freezers or in liquid nitrogen.

To avoid protein denaturation, it is critical that samples are frozen in a controlled way.



DEDICATED PEOPLE
TO PROVIDE EFFECTIVE SOLUTIONS

CRYOXPERT

Technology

Cryogenic focus

Quality Our equipment and components are home to many of the industry's leading companies that share our commitment to meet the challenges of ever-changing demands.

With an eye on all the latest technologies, our aim is to consistently offer the highest quality equipment on an exclusive basis.

References Cryogenics is a hot topic for our employees, each with an average of more than 15 years of experience. Although their cryogenic knowledge is unsurpassed, they continually train to use the latest technology, ensuring that our job is done

properly and on time. Our customer base includes hospitals, military bases and industrial process plants, with more than 2000 installations of cryogenic components, cryogenic machinery and applications.

QUALITY CRYOGENIC SOLUTIONS FOR ANY APPLICATIONS

Companies which enjoy our confidence:



CRYOXPRT

Research

and Development

Dohmeyer is a certified R&D organisation and a valued partner of universities, medical and research institutes for development, design and manufacturing. Government subsidies can be obtained for research projects.

Customers can benefit from various financial incentives. Intensive collaboration with universities and research institutes in several countries complements our own expertise in the field of cryogenics.

QUALITY EQUIPMENT DUE TO INTENSIVE
CRYOGENIC TRAINING & KNOWLEDGE

 We use computational fluid dynamics and proprietary software for simulation of cryogenic processes. We calculate and visualize speed of cooling, flow characteristics of liquids and gases

as well as energy and gas consumption. Finite element analysis helps us design apparatus that can withstand extremely low and high temperatures, exposed to pressure or to vacuum.

 At Dohmeyer's facilities in Belgium and Poland manufacturing and R&D take place in the same environment, drawing from but also contributing to a vast database. Considering this, gives Dohmeyer the opportunity to respond more accurately to market needs with technically advanced products. The market for cryogenic applications and ultra low temperatures has undergone

tremendous diversification in recent years, with new demands on precision and performance. In response, Dohmeyer constantly seeks new materials and technologies to improve the quality of its equipment and components. The maintenance and improvement of quality control systems at each stage is of equal importance.

CRYOXPERT

Products

for large capacity (plasma, blood, etc.)

Plasma is an important source for the fractionation of therapeutic proteins. These therapies are used by millions of people worldwide to treat a variety of diseases and serious medical conditions.

The higher efficiency of freezing using liquid nitrogen results both in a higher fractionation yield and have a positive influence on economic factors.

FREEZING CABINET

- Hygienic
- Large capacity
- Highest efficiency
- Plug & Work
- Great usability
- Custom dimensions
- Programmable functions
- User friendly interface



MULTIPLICITY OF APPLIANCES (DEVICES)
TO FULFIL YOUR NEEDS

i

The use of plasma and its products has evolved over a period of four decades. The use of Fresh Frozen Plasma has increased tenfold since the years 2000-2010 and has reached almost 4 million units in the world annually. This trend may be attributed to various factors, possibly including the decreased availability of whole blood due to widespread acceptance of the concept of component therapy.

FFP contains the labile as well as stable components of the coagulation, fibrinolytic and complement systems. It also supplies the proteins which maintain oncotic pressure and modulate immunity, as well as other proteins which have diverse functions. In addition, fats, carbohydrates and minerals are present in concentrations similar to those in circulation.

CRYOEXPERT

Products

for organs, cord-blood, stem cells, etc.

Controlled-rate and slow freezing, also known as slow programmable freezing, is a set of well established techniques developed during the early 1970s, which enabled Zoe Leyland to become the first human to be born from frozen embryo in 1984. Since then, machines which freeze biological samples, using programmable sequences or controlled rates, have been used all over the globe

in human, animal and cell biology. "Freezing down" a sample is done to better preserve it from possible thawing. Therefore it is frozen or cryopreserved in liquid nitrogen. Such machines are used for freezing oocytes, skin, blood products, embryo, sperm, stem cells and general tissue preservation in hospitals, veterinary practices and research laboratories around the world.

CONTROLLED RATE FREEZER

PRODUCT NAME	VOLUME
nanoCOOL	12 L
microCOOL	25 L
miniCOOL	50 L
midiCOOL	100 L
maxiCOOL	150 L

Recipients can vary: straws, racks, goblets, etc.



i Several independent studies have provided evidence that frozen embryos stored using slow-freezing techniques may in some ways be 'better' than fresh ones in IVF. Studies, presented at the American Society for

Reproductive Medicine conference in San Francisco, USA in 2008, indicate that using frozen embryos rather than fresh embryos reduced the risk of stillbirth and premature delivery, though the exact reasons remain unknown.

MULTIPICITY OF APPLIANCES (DEVICES)
TO FULFIL YOUR NEEDS

CRYOXPRT



Products

ODT Tunnel

The processes used to manufacture orally disintegrating tablets include loose compression tableting, a process which is not very different from the manufacturing method used for traditional tablets and lyophilization processes. In loose compression, ODTs are compressed at much lower forces (4 - 20 kN) than traditional tablets. However, since ODTs are compressed at very low forces due to the need of them to be soft enough to disintegrate rapidly in the mouth, issues of material sticking to the die walls can be challenging. Typically, as in most tablet blends, lubricants such as magnesium stearate are added to the blend in order to reduce the amount of

material that may stick to the die wall. Differences may be in the use of disintegrating aids, such as croscopolidone, and binding agents which aid in mouth feel, such as microcrystalline cellulose. Primarily, ODTs contain some form of sugar such as mannitol, which typically serves as the major diluent of the ODTs, and is also the primary contributor to the smooth and creamy mouth feel of most ODTs. Lyophilized ODT formulations may use proprietary technologies but can produce a tablet which has a faster disintegration rate, for example the Zydys ODT typically dissolves in the mouth in less than 5 seconds without water.

ODT TUNNEL

- Hygienic
- Large capacity
- Highest efficiency
- Plug & Work
- Great usability
- Custom dimensions
- Programmable functions
- User friendly interface



MULTIPLICITY OF APPLIANCES (DEVICES)
TO FULFIL YOUR NEEDS



CRYOXPRT

Support

for all industries

SERVICES AND SOLUTIONS
THAT YOU CAN RELY ON

Services Refurbishment of your existing production line can improve your productivity and reduce your consumption by applying state-of-the-art technologies. Dohmeyer can both save you money and help implement the current safety standards (CE, UL, PED). Dohmeyer can repair and refurbish all cryogenic tanks and vessels for storage of liquefied gases. Repairs at customer's

location are possible, for example restoring of vacuum and replacing of obsolete instrumentation. Dohmeyer has extensive experience with installation and start-up of cryogenic storage vessels. Piping and safety equipment complies with the applicable law and regulations. Approval from certification bodies can also be coordinated by Dohmeyer.

After sales Dohmeyer provides you preventive and 24/7 repair services. A team of engineers is on emergency standby at our bases in Belgium, Italy and Poland.

Support Dohmeyer also carries a wide selection of (cryogenic) spare parts both for its own equipment and from other key vendors.

Worldwide sales Dohmeyer has representatives worldwide ready to answer any of your questions related to our products and applications. We welcome you to contact our representatives. In some cases,

these representatives support customers from a regional office located in another country. If you do not see your country listed, please choose the country closest to your geographical location.



Dohmeyer

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Human Plasma Freezer

The **CryoXpert Human Plasma Freezer** is specially-designed to meet the most demanding requirements for the freezing of even the most demanding processes. It is especially successful for the freezing of human plasma to recover factor VIII from it.

CryoXpert Human Plasma Freezers: Freezing technology capable of saving human lives

In world class companies specialized in human plasma fractioning, the **CryoXpert Human Plasma Freezers** are typically used for the quick and deep freezing of human plasma, according to the most optimal findings by the World Health Organisation (WHO)¹. CryoXpert Human Plasma Freezers are ideal for fast freezing human plasma bags, deep into the core with a freezing front way above the 26mm/hour advised by the WHO.

Factor VIII is a key component in the intrinsic blood clotting cascade in humans. Humans who suffer from Haemophilia A lack this factor in their blood and therefore depends even for small injuries on the extracted Factor VIII from donors.

Next to chronic treatment with Factor VIII, this protein is used in many highly traumatic events, ranging from car accidents or to rescue people after military accidents. In these severe accidents with massive blood loss, a rapid blood coagulation of the wound is required. Also in surgery, bandage impregnated with factor VIII is used for really fast coagulation when a blood vessel is ruptured during an operation.

Therefore the extraction of Factor VIII is a lifesaving business, which needs to be carried out with the best technology available in the market.

Technology where Dohmeyer has already earned his stripes!



The CryoXpert Human Plasma Cabinet is the most advanced cabinet on the market available for all kinds of pharmaceutical freezing.

This cabinet is especially well suited to freeze down big volumes of biological active fluids like Human Plasma (hence the name). The mayor concern in these fluids are the key molecules that tend to degrade rapidly, but can be preserved over longer periods of time by freezing the product rapidly. CryoXpert achieved with his Cryogenic freezing cabinet results that are cleaner, faster and homogeneous within the whole batch.

CryoXpert Human Plasma Freezers has proven to be able to freeze all kinds of plasma bags, well in between the international norms dictated by the world health organisation (WHO). A fully installed plasma freezer is capable of freezing a batch of 100 litre of human plasma within less than one hour to storage temperatures of -40°C.

The CryoXpert cabinet is currently capable of surpassing the requirements of the WHO concerning the preservation of blood biomolecules, because of handleability and the easy to program PLC, the CryoXpert offers a future proof solution for all your freezing processes independent from future requirements in the industry.

CryoXpert also offers a clean, contact free freezing solution which offers rapid

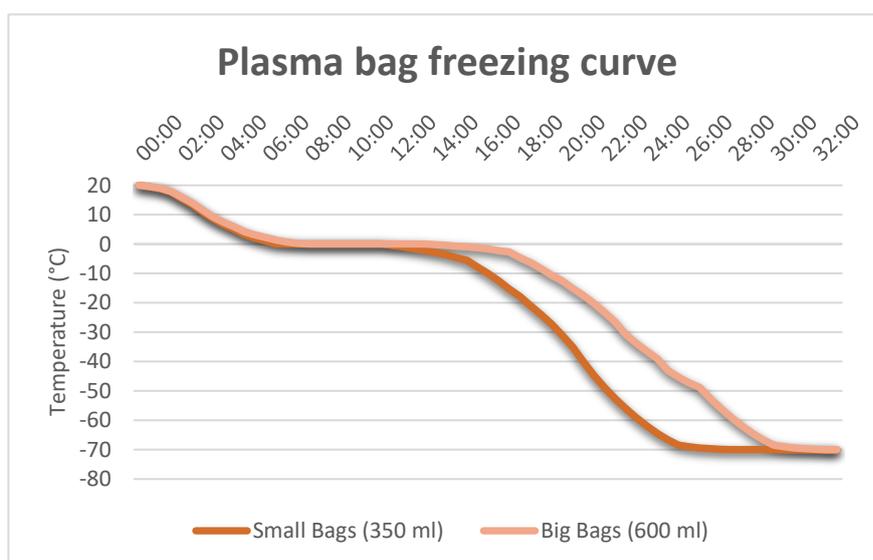
freezing independently from the quantities of the product to be frozen. Therefor the CryoXpert offers with the Human Plasma Freezer a robust system that is top of the class today, but also can handle changes in standards of the production process and the requested quality alike.

Every CryoXpert Human Plasma Freezer is equipped with liquid nitrogen injection. Depending upon the product and process requirements, the freezing actions happen right inside the cabinet where the cryogenic gases are injected inside an insulated cold box, in direct contact with the biopharmaceutical products that have been manually loaded into removable trays and trolleys. CryoXpert Cabinets are equipped with complementary fans to improve a uniform freezing front in the whole batch.

Liquid nitrogen delivers the ultimate in cryogenic freezing power. Because these cryogenic gases are inert they also provide a protective atmosphere inside the freezer and prevents any oxidation.

196°C which allows an extremely fast freeze through of the products inside the Cabinet. As a result of this freezing speed, the quality attributes of cryogenically frozen products are far superior to those same products frozen in a mechanical system, in terms of protein content, protein conservation and quality during further processing.

CryoXpert Human Plasma Freezers use only nitrogen to freeze down their content, as a result, no toxic gasses are used and extraction of the cooling gas can be done to the environment without any harm or treatment.



Liquid nitrogen is injected inside the cabinet freezer at a temperature of -



Control Rate Freezer

The **CryoXpert Control Rate Freezer** is specially-designed to meet the most demanding freezing processes, cooling living cells down to hibernation temperatures, safeguarding the potential of those cells until they are required. It is especially successful for research purposes and the freezing of human and livestock sperm samples.

CryoXpert control rate Freezers: Freezing technology to safeguard high quality of living cells

The **CryoXpert Control Rate Freezer** is a highly efficient and economic answer on the use of liquid nitrogen in the medical, bio-pharmaceutical and pharmaceutical industries. CryoXpert Control Rate Freezers are designed to supply a controlled amount of cryogenic cooling power to the product, offering ultra-low temperatures without damaging the products nor important physiologic structures during the freezing process.

CryoXpert Control Rate Freezers are ideal for fast freezing of all kinds of pharmaceutical and bio-pharmaceutical products, deep into the core with a freezing capacity and power exceeding what is currently available on the traditional freezing market.

The **CryoXpert Control Rate Freezer** has already a proven track record for a wide range of products, ranging from human plasma, safeguarding vaccines and freezing down live human organs for safe transplantation before implantation. CryoXpert Control Rate Freezers also offer a **viable alternative for heavy consuming nitrogen immersion baths**, making this solution an good cryogenic alternative and less costly solution, without losing any of the advantages an inert, cold environment offers.

CryoXpert Control Rate Freezers offer a **solid solution** for all kinds of delicate freezing processes, conform the most stringent demands and norms requested in the industry.



CryoXpert Control Rate Freezers achieve these results in a cleaner, faster and more homogenous way within a whole batch, compared to more traditional freezing systems, increasing the quality of the final product, thus offering it a better chance on success and raising the quality standards in an

The **CryoXpert Control Rate Freezer** is the most advanced cryogenic freezer on the market available for all kinds of delicate pharmaceutical freezing processes.

This freezer is especially well suited to instantly freeze large volumes of delicate biological active fluids like human or mammal sperm samples, vaccines with active components or even whole donor organs before transport and transplantation. The mayor concern in these kind of freezing processes is to preserve the viability of the key functions of the biological material involved. As these living biological components tend to degrade rapidly under room temperatures, but they can be preserved over longer periods of time by offering the right freezing conditions as soon as possible after extraction.

already demanding industries. Every CryoXpert Control Rate Freezer is equipped with liquid nitrogen injection. Depending upon the product and process requirements, the liquid nitrogen is dosed and the freezing actions happen right inside the cabinet where the cryogenic gases are injected inside an insulated cold box, in direct contact with the biopharmaceutical products that have been manually loaded into removable trays or containers.

Control rate freezers offer a wide range of advantages. First of all, Liquid Nitrogen Cryogenic freezers offer **more freezing power** compared to similar mechanical systems. Next to that, liquid nitrogen offers an **inert environment** as all the oxygen in the

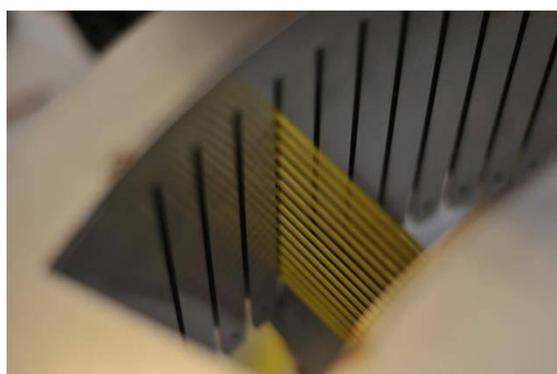
oxygen is replaced by nitrogen during the freezing process.

Control rate freezers offer a **controlled and homogenous cooling or freezing process**, allowing you to have the exact right environment throughout your process to freeze or cool your products to the desired temperatures and increase the shelf life by keeping the critical processes stable.

We are proud that our CryoXpert control rate freezer is able to achieved with his freezer results that are **cleaner, faster and homogenous** within the whole batch.

As a result the quality attributes of cryogenically frozen products are far superior to those same products frozen in a mechanical system, in terms of bio-active content, protein conservation and quality during further processing steps.

CryoXpert Control Rate Freezers come in several sizes and . Please get in touch to find the right solution for your process.



CRX-CTR model	CTR 320	CTR 990	CTR 2290	CTR 3790	CTR 4350
Nickname	S	M	L	XL	XXL
Internal (WxDxH) [mm]	700x700x660	1050x1150x820	1150x2050x970	1350x2050x1370	1550x2050x1370
Volume inside [litres]	320	990	2290	3790	4350
Outer (WxDxH) [mm]	1280x980x1090	1695x1318x1250	1795x2218x1400	1995x2218x1800	2195x2218x1800
Advised maximum volume of the product (WxDxH)[mm]	300 x300x260	650 x750x620	750 x1650x770	950 x1650x1170	1150 x1650x1170
Maximum Load (kg)	150 kg	360kg	700kg	850kg	950kg