BIOSAFE®-System

The Optimum in Sample Storage ... for safety, security and reliability
BIOSAFE® MDß – BIOSAFE® SCß ...

...now at -180 °C in gas phase storage!
Our product series BIOSAFE® MDß and BIOSAFE® SCß have been developed especially for cryogenic long-term storage of medicinal and biological material in laboratories and cryobanks.

BIOSAFE® by Cryotherm has been a synonym for quality and safety for a long time. Experience, the technology and our know-how make it easy for you to decide on BIOSAFE®.
Cryoconservation by means of deep cold liquid nitrogen is an established practice in science, research, medicine, environmental research and technology.
Safely cold down to -180 °C in the gas phase an inert atmosphere enables problem-free freezing and storage of valuable medicinal and biological samples and materials.

Our BIOSAFE® consists of:
• CHRONOS® deep temperature storage containers for preserving and storing
• BIOSAFE® CONTROL ß – the level controller and vessel monitoring system for a reliable supply of deep cold liquefied nitrogen.

BIOSAFE® MDß ...
... is approved as a medical product, class IIa, according to the Medical Device Directive 93/42/EECmedicine. With this medical product cell and tissue samples are preserved cryogenically long term for reintroduction to humans by using deeply cold liquefied nitrogen as a cooling agent.

BIOSAFE® SCß ...
... is the version for research, medicine and the environment when the samples to be preserved are not to be reintroduced to humans.

The BIOSAFE® advantages:
• full storage capacity in gas phase storage
• nitrogen reserve under the platform is sufficient – depending on the size of container – for up to 2 weeks
• redundant hardware for software independent monitoring of minimum-alarm and maximum-alarm
• deep temperatures of -180 °C whether small or large containers and whether wide-neck containers or carousel system
• service (commission only) for start ups and carrying out qualification (IQ/OQ)
• remote monitoring (optional) and remote diagnosis
• 24 hour hotline
BIOSAFE® with system

Systems customized to your requirements – meeting the demands of cryotechnology
A complete system – reliable and safe!

The various sizes and versions of BIOSAFE®, when augmented with the extensive range of accessories CRYOTHERM offers the complete solution for your cryoconservation tasks:
• controlled and programmed freezing of your samples in controlled rate freezers
• administration and security of your sample data by the sample management system
• supply system for deeply cold liquefied nitrogen by APOLLO® supply and storage containers optimized for your demands
• or directly supplied via a super-insulated transfer line

For you we will find the optimum solution!
For you we will construct the optimum Cryo-network!

Freezers by Planer

APOLLO®- Supply Containers

BIOSAFE®-sample organization system

Sample-Administration and Sample-Management System

Super-Insulated Transfer Lines

CRYO-MESSENGER® remote monitoring system
From Cryo-Preservation in laboratory...

BIOSAFE® 120/220/420 MDβ
BIOSAFE® 120/220/420 SCβ

BIOSAFE® systems 120 to 420 are optimized for a maximum in capacity at a minimum in dimensions. The large thermodynamically optimized and vacuum insulated lid in an attractive design allows access to the materials stored in a second. Loading of samples is facilitated via the wide-neck opening in the freely accessible storage space. Its robust construction of polished, corrosion-free stainless steel ensures a long service life and a very low evaporation rate. Further security is provided by a combined evacuation and safety valve.

BIOSAFE® 120, 220, 420 MDβ
BIOSAFE® 120, 220, 420 SCβ

for larger numbers of samples offer the following advantages at a glance:

- high storage capacity
- low evaporation rate
- integrated level controller and vessel monitoring system BIOSAFE® CONTROL β
- smooth surfaces – also on the lid – for easy disinfection
- low, easy to operate container height
- attractively designed vacuum insulated lid
- ergonomic lifting/swivel mechanism for the lid
- lockable lid
- stainless steel finish
- space saving positioning options
The BIOSAFE® systems 500 to 1400 are optimized for a maximum in capacity for a minimum of consumption. For BIOSAFE® systems of 500 liters to 1400 liters, the containers can be easily loaded via the container neck mounted at the side and the easily accessible carousel. The four smooth running rollers make BIOSAFE® storage containers mobile and even more flexible.

For the really large quantities of samples BIOSAFE® 500, 600, 1000, 1400 offer the following advantages:

- extremely high storage capacity
- extremely low evaporation rate
- level controller and vessel monitoring system BIOSAFE® CONTROL
- thermally insulated lid
- eccentrically mounted container neck
- easily accessible carousel for quick and easy access to samples
- 4 smooth running rollers, 2 can be locked
- control line for level regulation implemented in duplicate (option: redundant level monitoring system)
- stainless steel finish

On demand:

- fork lift pockets
- other container sizes
- redundant level and container monitoring system

BIOSAFE® 2000 – on request – larger models are of course possible. Just contact us!
BIOSAFE®-Overview

With the container types BIOSAFE® 40 SCß and BIOSAFE® 60 SCß Cryotherm offers small, highly efficient long term storage containers for small sample quantities. Both systems are fitted with the level controller and vessel monitoring system BIOSAFE® CONTROL ß.

Further equipment components are:
• insulated filling hose, 1.5 m
• solenoid valve
• safety valve
• holder for controller and instruments

BIOSAFE® 40 SCß and BIOSAFE® 60 SCß can be integrated into a network with all other types of container from the BIOSAFE® system by means of BIOSAFE® CONTROL ß.

<table>
<thead>
<tr>
<th>Description</th>
<th>BIOSAFE® 40</th>
<th>BIOSAFE® 60</th>
<th>BIOSAFE® 120</th>
<th>BIOSAFE® 220</th>
<th>BIOSAFE® 420</th>
<th>BIOSAFE® 500</th>
<th>BIOSAFE® 600</th>
<th>BIOSAFE® 1000</th>
<th>BIOSAFE® 1400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geometrical content total (l)</td>
<td>121</td>
<td>175</td>
<td>151</td>
<td>251</td>
<td>420</td>
<td>490</td>
<td>690</td>
<td>960</td>
<td>1394</td>
</tr>
<tr>
<td>Geometrical content under platform (LIN-reserve) (l)</td>
<td>approx. 10</td>
<td>approx. 10</td>
<td>21</td>
<td>35</td>
<td>57</td>
<td>50</td>
<td>84</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Weight empty (kg)</td>
<td>43</td>
<td>53</td>
<td>100</td>
<td>175</td>
<td>225</td>
<td>320</td>
<td>340</td>
<td>520</td>
<td>660</td>
</tr>
<tr>
<td>Outer diameter (mm)</td>
<td>559</td>
<td>665</td>
<td>560</td>
<td>710</td>
<td>900</td>
<td>890</td>
<td>1100</td>
<td>1300</td>
<td>1300</td>
</tr>
<tr>
<td>Inner diameter (mm)</td>
<td>n/a</td>
<td>n/a</td>
<td>514</td>
<td>664</td>
<td>854</td>
<td>795</td>
<td>970</td>
<td>1155</td>
<td>1155</td>
</tr>
<tr>
<td>Neck diameter (mm)</td>
<td>216</td>
<td>216</td>
<td>514</td>
<td>664</td>
<td>854</td>
<td>450</td>
<td>520</td>
<td>598</td>
<td>598</td>
</tr>
<tr>
<td>Total height (mm)</td>
<td>965</td>
<td>959</td>
<td>1140/1045 *2</td>
<td>1180/1070 *2</td>
<td>1190/1070 *2</td>
<td>1314/1014 *2</td>
<td>1370</td>
<td>1440</td>
<td>1820</td>
</tr>
<tr>
<td>Height (mm)</td>
<td>560</td>
<td>560</td>
<td>625</td>
<td>625</td>
<td>625</td>
<td>800</td>
<td>680</td>
<td>680</td>
<td>1100</td>
</tr>
<tr>
<td>Roller diameter (mm)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>125</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Static evaporation rate *1 (%/day)</td>
<td>1.19</td>
<td>1.19</td>
<td>2.3</td>
<td>2.0</td>
<td>1.5</td>
<td>1.2</td>
<td>1.3</td>
<td>0.7</td>
<td>0.6</td>
</tr>
</tbody>
</table>

*1: measured on gas phase storage, *2: operational height = upper limit of container with lid open

### Description

- **BIOSAFE®**
  - **40**
  - **60**
  - **120**
  - **220**
  - **420**
  - **500**
  - **600**
  - **1000**
  - **1400**

### Table of Dimensions

<table>
<thead>
<tr>
<th>Description</th>
<th>BIOSAFE® 40</th>
<th>BIOSAFE® 60</th>
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<th>BIOSAFE® 420</th>
<th>BIOSAFE® 500</th>
<th>BIOSAFE® 600</th>
<th>BIOSAFE® 1000</th>
<th>BIOSAFE® 1400</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 ml vials (Ø 12 mm) in drawers</td>
<td>-</td>
<td>-</td>
<td>6750</td>
<td>13000</td>
<td>23100</td>
<td>26260</td>
<td>32680</td>
<td>46880</td>
<td>72760</td>
</tr>
<tr>
<td>2 ml vials (Ø 12 mm) in cryoboxes</td>
<td>4000</td>
<td>6000</td>
<td>7000</td>
<td>13000</td>
<td>21750</td>
<td>22750</td>
<td>29700</td>
<td>41800</td>
<td>64600</td>
</tr>
<tr>
<td>5 ml vials (Ø 12 mm) in drawers</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3375</td>
<td>6500</td>
<td>11550</td>
<td>12120</td>
<td>17780</td>
<td>25480</td>
</tr>
<tr>
<td>Freezer bags (50 ml)* Baxter 4R9951/Miltenyi AND 2 ml vials (Ø 12 mm) in drawers</td>
<td>-</td>
<td>-</td>
<td>288</td>
<td>512</td>
<td>832</td>
<td>on request</td>
<td>768</td>
<td>1664</td>
<td>3120</td>
</tr>
<tr>
<td>Freezer bags (500 ml)* Baxter 4R9955/Miltenyi AND 2 ml vials (Ø 12 mm) in drawers</td>
<td>-</td>
<td>-</td>
<td>144</td>
<td>240</td>
<td>480</td>
<td>480</td>
<td>528</td>
<td>864</td>
<td>1512</td>
</tr>
<tr>
<td>Freezer bags (50 ml)* Hempfreeze/Gambo Z2003 AND 2 ml vials (Ø 12 mm) in drawers</td>
<td>-</td>
<td>-</td>
<td>75</td>
<td>150</td>
<td>270</td>
<td>on request</td>
<td>345</td>
<td>450</td>
<td>900</td>
</tr>
</tbody>
</table>

* Bags from other manufacturers and different types of bag are available on request.
BIOSAFE® CONTROL β ... 

... integrated level controller and vessel monitoring system for safe long term storage.

Advantages:

• certified reliability with proven measurement principle
• clear display of container status
• liquid level can be set from 0 (gas phase) – 100 % (liquid phase)
• easy operation at BIOSAFE® CONTROL β and at the PC
• flexible evaluation of logged temperatures and alarms
• central functions for controlling main valve (I/O box, optional)
• central alarm administration and transfer to the PC (E-Mail, SMS as option)
• including PC-software for wide-ranging documentation of data of a cryobank
• modern design coordinated with the new BIOSAFE® generation
• parameters: response delay of the solenoid valve, re-cooling function, Alarm ON/OFF adjustable

Technical Data

• display of container status
• level control via height-adjustable sensor with protection against manipulation
• temperature measurement sensor, range -200...+50 °C (+/-2 °C exact)
• overfill protection with open lid/ manual defogging possible
• alarm message when:
  - nitrogen shortage and level exceeded
  - container temperature exceeded
  - lid maximum opening time exceeded
  - maximum filling time exceeded
  - sensor failure or sensor short circuit
  - and many more
• display of alarm message in plain text
• software and processor independent, redundant monitoring of minimum and maximum alarms with separate software alarm
• potential-free alarm outputs for your building services
• analogue output of temperature measurement for your building services
• ethernet connection (optional)

Central Functions (per network)

• I/O box (option) with relay for main valve, appliance failure, combined alarm, to high temperature and 2 extra freely configurable reserve relays
• collection and buffering of all Cryobank data for transfer to a PC
• connection of up to 32 systems to one network
• combined filling
• free selection of database, thus fully network capable
• interface RS 232 to PC
• parameters can be set at Biosafe and at PC
• MODBUS-Software as interface (RS485) to monitoring system

BIOSAFE® CONTROL β-Software

• in German, English, French, Spanish and Italian language
• setting of all container parameters in clear and password protected pop-up windows
• logging and evaluation of all temperature graphs of individual and all containers
• logging and evaluation of the alarm messages and events of all containers
• visualization of the container status on the PC
• evaluations, lists and diagrams as protected pdf-files, csv-files (EXCEL)
Racks for Vials and Freezer Bags
The new modular structure brings an orderly nature to the BIOSAFE® system and makes safe storage easy and even clearer. With this you have the organization of your samples under control and at all times you can be sure that you can access your samples quickly and directly.
All storage racks for a BIOSAFE® system have the same size, no matter what is to be stored – that guarantees a universal application.
The storage rack variations for vials or bags are almost unlimited. Even the standard version of BIOSAFE® offers you a number of opportunities. And if that should not be sufficient then take a look at the wide range of BIOSAFE® accessories. Here you will surely find the solution you are looking for.
Of course, customized solutions are possible – contact us!
Our portfolio includes:
- racks for
  - vials in cryoboxes
  - vials in drawers
  - freezer bags in cassettes
  - SBS-Boxes (Microtiter)
- canisters for straws in goblets
- cryoboxes
- drawers
- cassettes for freezer bags
- and many more

Some convincing advantages:
- high storage capacity
- easy handling and high functionality
- safety due to various locking mechanisms
- even heat distribution within the racks by using aluminum
- low net weight due to stable aluminium light weight construction
- optimum height adjusted to BIOSAFE® systems
- ex warehouse: four standard heights (625, 680, 800 and 1100 mm)
- variable positioning plans for arrangement
- special designs for any desired sample
CRYO-MESSENGER® – Sample Management

... sample safety – when on the road and from home
... all your sample data safely under control!

CRYO-MESSENGER®
Remote monitoring via SMS, E-Mail and Co. – just a little more safety!
The remote monitoring system CRYO-MESSENGER® has your cryo-containers and cryobanks on site under permanent control: round the clock, 365 days per year.
CRYO-MESSENGER® transfers created data to the Global Data Center (www.cryomessenger.de) which in turn will transfer any messages to you: irrespective of whether as an SMS, E-Mail or Fax. Of course, you can also call up data on your containers at any time.
It is your choice!

Sample Administration: easy, flexible, systematic
Safe and efficient sample management is of essential significance in cryogenic long-term storage. Cryo-therm offers a graphic database for a computer controlled storage strategy of biological samples. With the hardware and software we offer you a system that
- provides a clear graphic layout to locate and identify samples
- is easy and intuitively operated
- guarantees a wide ranging protocol.
Sample management made easy!
Always well supplied ...

... APOLLO® and Super-insulated Transfer Lines

APOLLO®
Supply Containers
The super-insulated APOLLO® storage containers with a low evaporation rate ensure safe replenishment of deeply cold liquefied nitrogen. Optionally you can store 50-350 liters (larger systems on demand). The extensive basic configuration, as well as the proven reliability and the robust quality, comprise important elements of the BIOSAFE® system.

The container is equipped with a transfer siphon with transfer hose, level indicator, manual pressure build-up, pressure gauge and valves. Easy, safe handling due to smooth running, large rollers on the protective transport frame. The containers are manufactured from corrosion-free stainless steel.

Super-insulated Transfer Lines
In order that the gases get from the containers to the “point of use” with a low evaporation loss. Cryotherm offers vacuum Super-insulated Transfer Line systems as well as associated equipment such as phase separators, decanting equipment, filling stations and connection instruments.

Transfer Line advantages:
• available in rigid or flexible configurations
• made from anti-magnetic, highly corrosion-free stainless steel, thus also for use in sterile rooms and in the food industry
• easily expandable and combinable by means of plug-in connectors
• long vacuum stability time due to the use of adsorption material and special getters
• consequently, reduced gas consumption, maintenance intervals and costs
• quality control in every phase of manufacture
• available with quick release plug-in connectors or welded connections as a fixed installation
Cryobanks ...
... everything from a single source

The set up of a complete cryobank is possible and unproblematic with the BIOSAFE® system.

For this purpose we will gladly create a suitable concept for your assignments consisting of:

- **Nitrogen Supply Concepts** liquid nitrogen storage tank, super-insulated transfer lines, phase separator, gas phase separator, exhaust pipes and many more
- **Safety Concepts** oxygen deficiency monitoring, redundant systems, automatic central switching units and instruments, alarm detection and transfer, remote supervision
- **Measuring and Control Concepts** Data creation and management system, system visualization by means of control technology, data and alarm detection, data transmission, network creation, interfaces to other disciplines
- **GMP Concepts** Creation of design studies, execution of qualification measures (IQ/OQ)
- **Service Concepts** Installation/assembly, start up, spare parts service, repair/maintenance, maintenance agreements, instruction/introduction, 24 hour hotline

On request our specialist engineers will gladly advise you on matters of supply and use of liquid nitrogen.

**Turn-Key-Solutions of Cryotherm**

- **Planning**
  - Design and overall planning
  - Pipework design
  - Room planning
  - Electrical Planning
  - Building service
  - MSR planning
  - Safety Planning
- **Manufacturing / Documentation**
- **Commissioning / Installation**
- **Service / Maintenance**
- **Certified quality management**

**Cryotherm Piping Systems**
For almost loss-free transfer of low-temperature liquid gases
Ø DN 14 to 40 mm

**Cryotherm Storage Systems**
For long-term storage of biological, medical and chemical materials

**Cryotherm After-Sales-Service**
365/7/24

**Cryotherm Safety Systems**
Certified Quality Management System eg. Access control, Choking hazard recognition and many more

**Cryotherm Control Systems**
Cryo LC®
BIOSAFE® CONTROL β
NITROGEN VESSELS
- APOLLO® LIN-Supply Vessel (50 - 350 l) · JUNO® LIN-Supply Vessel (30 l)
- SIRIUS® LIN-Supply Vessel (1.000 - 2.000 l) · SATURN® LIN-Transport Vessel (50 - 300 l)
- MERKUR® LIN-Transport Tank (500 - 3.000 l) · STELLA®-Working Vessel (0,5 - 10.000 l) · LAB® Dewar Series (4 - 50 l)

BIOSAFE*-SYSTEMS / LIFE SCIENCE
- BIOSAFE® MD®-Sample Storage System (Medical Product) (120 - 1.400 l) · BIOSAFE® SC®-Sample Storage System (120 - 1.400 l)
- BIOSAFE-CONTROL® · CRYO-MESSENGER® Remote Monitoring System - SC Series - XC Series · Vapor Shipper
- STELLA®-Working Vessel (0,5 - 10.000 l) · Controlled Rate Freezers (3,3 - 16 l)

BIOSAFE*-RACK SYSTEMS
- Racks · Drawers and Cryoboxes for Vials · Canisters for Straws in Goblets · SBS-Boxes (Microtiter)
- Cassetttes for Freezing Bags

HELIO VESSELS
- HELIOS® LHe-Storage Vessel (100 - 15.000 l)
- STRATOS® LHe-Transport Vessel (100 - 1.000 l) · LHe Siphon

OTHER VESSELS
- HYDROS® LH, Transport Vessel (120 - 10.000 l) · STRATOS® Transport Vessel (100 - 1.000 l)
- APOLLO® Supply Vessel (50 - 350 l) · MERKUR® Transport Tank (500 - 3.000 l)

CRYO LINE SYSTEMS
- Rigid Line Systems (DN 14 - 100) · Flexible Line Systems (DN 20 - 32) · Phase Separator Stations (50 - 200 l)
- Gas Separator (5 l) · LHe Multirole

CONTROL AND MONITORING TECHNOLOGY FOR CRYOGENIC GASES
- BIOSAFE-CONTROL® · CRYO-MESSENGER® Remote Monitoring System · CRYO LC® Level Measurement and Control Device
- LHe Level Measurement and Control Device · Capacitive Level Measurement · Oxygen-Deficiency Warning System

TRANSPORT COOLING FOR VEHICLES
- CRYOGEN®-TRANS-SYSTEM

CUSTOMIZING / TURNKEY SOLUTIONS / CRYO COOLER / COOLING BATHS
- Do you have the right partner for your highly specific research tasks? Whether you work in microelectronics, analytics, environmental protection or one of the many other areas of research, we have the specialist staff who know your field and speak your language.

CRYO ACCESSORIES & AFTER-SALES SERVICE
- Accessories · Installation/Assembly · Start Up · Function Qualification IQ / OQ · Repair/Maintenance
- Spare Parts Service · Vessel Hire · Instructor/Training · Operating Manual · Service Hotline +49 (0)2741 958575

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