

Cryo-Systems



LIN

LHe

LH₂

LNe

LAR

LOX

LNG

LKr

LXe

LIN

Nitrogen Vessels

LIN

Life Science

BIOSAFE®-Systems

BIOSAFE®-Rack-Systems

LHe

Helium Vessels

LH₂ LNe LOX LAR

LNG LKr LXe

Further Vessels

LIN LHe LH₂ LNe

LOX LAR LNG LKr LXe

Cryo Line Systems

Control and Monitoring Technology
for Cryogenic Gases

Transport Refrigeration
for Vehicles

Customising / Turn-Key-Solutions
Cryo-Cooler / Cooling Baths

Accessories

Service

About Us

Nitrogen Vessels

LIN Liquid Nitrogen
-196 °C



APOLLO® Vacuum Super-Insulated Storage and Transport Vessel (50 - 350 l)	6 - 7
JUNO® Vacuum Super-Insulated Storage and Transport Vessel (25 l)	8 - 9
SIRIUS® Vacuum Super-Insulated Storage Vessel (1,000 - 2,000 l)	10 - 11
SATURN® Vacuum Super-Insulated Storage and Transport Vessel with π Label (50 - 300 l)	12 - 13
MERKUR® Tank for Truck Transport of Cryogenic Liquid Gases on Public Roads (500 - 3,000 l)	14 - 15
STELLA® The Robust Working Dewar for Use with Liquid Nitrogen (0.5 - 10,000 l)	16 - 17
LAB Easy to Handle Storage and Transport Dewars for Laboratory Use (4 - 50 l)	18 - 19
CRYO LC® Level Control Device	20 - 21

LIN **LAR** **LOX**

Reliable, Safe and Durable

Rapid Cold at the Point of Use



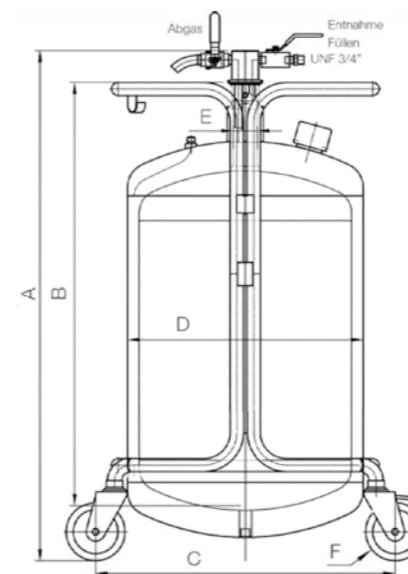
Convincing advantages:

- efficient exhaust cooling system
- low evaporation rate (only 0.6%/day with APOLLO® 200)
- robust transport frame
- compact dimensions
- integrated vacuum seal-off and safety device
- long-term vacuum protection by means of high-grade adsorption and getter materials
- optimised super-insulation by means of multi-layered vacuum insulation and computer optimised thermodynamic construction
- inner and outer vessels tested separately by helium leak test
- robust construction made of highly corrosion-resistant cryogenic stainless steel
- smooth-running, sturdy castors
- low maintenance requirements
- wide range of accessories

Storage and transport vessel for cryogenic liquid nitrogen. With vacuum super-insulation and long-term vacuum protection. Approved according to European Pressure Equipment Directive PED. Transport in unpressurised condition with inserted transport plug.

Standard Features:

- integrated safety device at the vessel neck
- vacuum seal-off and safety device
- smooth-running, sturdy castors and transport frame
- pressure indicator
- level indicator
- EK-siphon with exhaust and overflow valve
- integrated pressure build-up
- decanting hose (1.5 m) with phase separator
- transport plug
- cold-protection gloves and safety glasses with side protection



Options:

- pressure build-up regulator
- pressure reduction regulator
- double extraction liquid side
- double extraction gas side
- triple extraction liquid side
- triple extraction gas side
- level indicator, capacitive, battery
- level indicator, capacitive, 4-20 mA
- forklift pockets
- set of castors anti-magnetic
- cryo-protective equipment, full set

Further special options on request

Vessel Name	Technical Data				
	APOLLO® 50 1.3 bar	APOLLO® 100 1.3 bar	APOLLO® 150 1.3 bar	APOLLO® 200 2.0 bar	APOLLO® 350 2.0 bar
vessel material	stainless steel	stainless steel	stainless steel	stainless steel	stainless steel
approval mark	CE	CE	CE	CE0035	CE0035
geometrical capacity	[l]	49.5	99.2	149.5	198.5
operating overpressure, max.	[bar]	1.3	1.3	1.3	2.0
weight empty	[kg]	44	62	79	100
weight full LIN	[kg]	85	145	204	266
stat. evaporation rate LIN	[%/day]	2	1.2	1	0.6
total height	A [cm]	80	114	146	117
diameter outer	D [cm]	50	50	50	70
total width	C [cm]	65	65	65	80
depth of immersion	B [mm]	58.5	92	122	91
castor diameter	F [mm]	125	125	125	160
neck diameter	E [mm]	50	50	50	50
siphon connection		KF 50	KF 50	KF 50	KF 50
article-no. LIN		78202700	78202701	78202702	78202748
article-no. LAR		78202700/AR	78202701/AR	-	-
article-no. LOX		78200520	78202701/02	78202702/02	-



Simple, Robust, Efficient

Rapid Cold on Demand



Convincing advantages:

- efficient exhaust cooling system
- compact dimensions
- integrated vacuum seal-off and safety device
- robust construction made of highly corrosion-resistant cryogenic stainless steel
- long-term vacuum protection by means of high-grade adsorption and getter materials
- optimised super-insulation by means of multi-layered vacuum insulation and computer optimised thermodynamic construction
- inner and outer vessels tested separately by helium leak test
- wide range of accessories



Options:

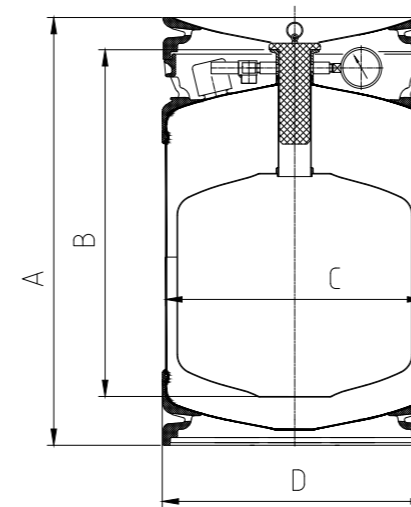
- roller base
- EK-siphon with exhaust and overflow valve
- decanting hose (1.5 m)
- phase separator

Further special options on request

Supply vessel for cryogenic liquid nitrogen with vacuum super-insulation and long-term vacuum protection.

Standard Features:

- integrated safety device at the vessel neck
- vacuum seal-off and safety device
- pressure indicator
- cold-protection gloves and safety glasses with side protection
- rubber foot rim and instrument protection
- transport plug



Technical Data		
geometrical capacity	[l]	30
operating overpressure, max.	[bar]	1.3
weight empty	[kg]	18
weight full	[kg]	41
neck connection		KF 50
total height	A [mm]	660
depth of immersion	B [mm]	533
outer width	C [mm]	396
total width	D [mm]	407
stat. evaporation rate	[l/day]	0.75
stat. evaporation rate	[%/day]	2.5
article-no.		78220205



LIN-Storage Vessel in Horizontal Model

Ideal for Storing Cryogenic Liquid Gases



Convincing advantages:

- robust construction made of highly corrosion-resistant cryogenic stainless steel
- robust finish of great durability due to careful choice of material and high-grade manufacture
- long-term vacuum protection by means of high-grade adsorption and getter materials
- optimised super-insulation by means of multi-layered vacuum insulation and computer optimised thermodynamic construction
- inner and outer vessels tested separately by helium leak test
- integrated vacuum seal-off and safety device
- quality assurance in every phase of production, eg. using x-ray and helium leak tests

Standard Features:

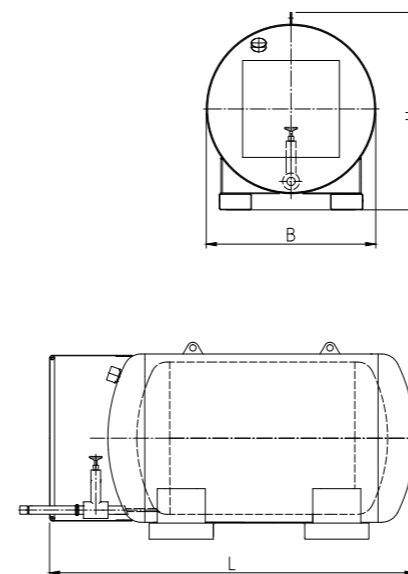
- integrated level indicator
- vacuum super-insulated liquid extraction valve with plug-in coupling DN14 male for connection to a fixed transfer line
- automatic pressure build-up with adjustable pressure control valve
- adjustable overflow valve for maximum pressure regulator
- separate filling port with shut-off valve
- MG97 safety device against pressure excess during filling
- pressure gauge and safety valve
- level indicator with limit switch for connection to alarm system
- large exhaust/overflow line for fast filling via LIN-service
- crane eyes and forklift pockets lengthwise and crosswise for easy transport to installation position
- material: highly corrosion-resistant cryogenic stainless steel

Vacuum Super-Insulated Cryo-Supply Vessel for Cryogenic Liquid Nitrogen.

Suitable for installation in outdoor areas – with closed and lockable instrument cabinet. Manufacture according to European Pressure Equipment Directive with CE-mark.

Fully Equipped and Ready for Operation:

- for the supply of cryogenic liquid gases up to 2,000 litres
- for applications limited in time such as a series of tests, temporary increases in production, special duties and interim solutions
- suitable for short and long-term supply
- use of the vessel as a phase separator (also unpressurised) is possible (outlet underneath)



Technical Data			
Vessel Name		SIRIUS® 1000	SIRIUS® 2000
vessel material		stainless steel	stainless steel
geometrical capacity	[l]	995	2,224
operating overpressure, max.	[bar]	3	3
weight empty	[kg]	570	1,100
weight full	[kg]	1,330	2,700
stat. evaporation rate	[%/day]	1	0.9
total length	L [mm]	2,400	3,100
total width	B [mm]	1,050	1,300
total height	H [mm]	1,250	1,500
article-no.		78201810	78200837

Further vessels on demand



Safe, Robust, Easy to Handle,
Low Evaporation

Safe Transport Vessel
for Transport under Pressure on the Roads



Convincing advantages:

- efficient exhaust cooling system
- low evaporation rate (only 1.2%/day with SATURN® 150)
- robust transport frame
- compact dimensions
- integrated vacuum seal-off and safety device
- long-term vacuum protection by means of high-grade adsorption and getter materials
- optimised super-insulation by means of multi-layered vacuum insulation and computer optimised thermodynamic construction
- inner and outer vessels tested separately by helium leak test
- robust construction made of highly corrosion-resistant cryogenic stainless steel
- smooth-running, sturdy castors
- low maintenance requirements
- wide range of accessories

Standard Features:

- integrated safety device at the vessel neck
- vacuum seal-off and safety device
- smooth-running, sturdy castors and transport frame
- pressure indicator
- level indicator
- EK-siphon with exhaust and overflow valve
- integrated pressure build-up
- decanting hose (1.5 m) with phase separator
- cold-protection gloves and safety glasses with side protection

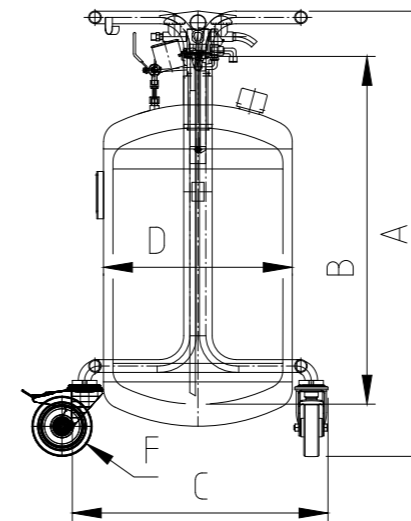
Transport vessels for demanding transport of cryogenic liquid nitrogen (and argon) with vacuum super-insulation and long-term vacuum protection. Approved as: Transportable Pressure Equipment Directive TPED (cryo-vessel) in accordance to Directive 2010/35/EU ADR/RID.



Options:

- pressure build-up regulator
- pressure reduction regulator
- forklift pockets
- level indicator, capacitive, battery
- level indicator, capacitive, 4-20 mA
- set of castors anti-magnetic
- cryo-protective equipments, full set

Further special options on request



Technical Data				
Vessel Name		SATURN® 50	SATURN® 100	SATURN® 150
vessel material		stainless steel	stainless steel	stainless steel
approval mark		π	π	π
geometrical capacity	[l]	52	104	157
operating overpressure, max.	[bar]	3.0	3.0	3.0
weight empty	[kg]	58	86	93
weight full	[kg]	98	156	214
stat. evaporation rate LIN	[%/day]	2.4	1.5	1.2
total height	A [mm]	845	1,180	1,520
diameter outer	D [mm]	500	500	500
total width	C [mm]	680	680	680
immersion depth	B [mm]	585	920	1,260
castor diameter	F [mm]	160	160	160
neck pipe diameter	E [mm]	50	50	50
siphon connection		KF 50	KF 50	KF 50
article-no.		78207805	78207806	78207807

LIN **LOX** **LAR**

Truck Transport of Cryogenic Liquid Gases

Ideal for Transporting Cryogenic Gases for the Most Varied Applications in Research, Medicine and Industry



Convincing advantages:

- robust construction made of highly corrosion-resistant cryogenic stainless steel
- robust finish of great durability due to careful choice of material and high-grade manufacture
- long-term vacuum protection by means of high-grade adsorption and getter materials
- optimised super-insulation by means of multi-layered vacuum insulation and computer optimised thermodynamic construction
- integrated vacuum seal-off and safety device
- quality assurance in every phase of production, eg. using x-ray and helium leak test
- easily and safely mountable on transport vehicles by means of optional mounting kit and condensate drip tray
- swagelok analysis connection

Super-Insulated Cryogenic-Supply Vessel for the Transport of

- liquid nitrogen
- liquid oxygen
- liquid argon

Standard Features:

- integrated level and pressure indicator
- pressure build-up
- filling, liquid extraction valve
- analysis valve
- purge valve
- vacuum seal-off and safety device
- trycock
- crane eyes and forklift pockets lengthwise for easy transport to installation position
- material: highly corrosion-resistant cryogenic stainless steel

Approved according to the directive on Transportable Pressure Equipment (TPED) and the European Agreement concerning the International Carriage of Dangerous Goods by Road and Rail (ADR/RID) with test certificate of the German Inspection (TÜV).

Fully Equipped and Ready for Operation:

- for the supply of cryogenic liquid gases up to 3,000 litres
- for applications limited in time such as a series of tests, temporary increases in production, special duties and interim solutions
- suitable for short and long-term supply

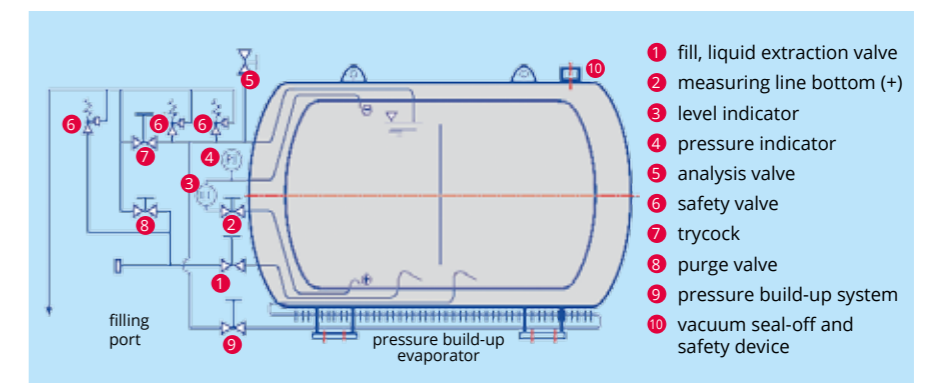
		Technical Data					
Vessel Name		MERKUR® 500	MERKUR® 600	MERKUR® 850	MERKUR® 1000	MERKUR® 2000	MERKUR® 3000
geometrical capacity	[l]	512	632	851	995	2,100	2,938
operating overpressure, max.	[bar]	6	6	6	6	6	6
weight empty	[kg]	340	401	590	570	1,200	1,520
weight full LIN	[kg]	730	886	1,243	1,300	2,810	3,770
total height	[mm]	1,075	1,075	1,175	1,175	1,450	1,660
total length	[mm]	1,640	1,865	1,950	2,165	2,900	3,080
diameter	[mm]	950	950	1,050	1,050	1,300	1,500
stat. evaporation rate	[%/day]	1.5	1.4	1.3	1.2	1.0	0.9
LIN, LAR	article-no.	78200206	78204064	-	7800208	7802119	78200210
LOX	article-no.	78200207	78204094	78206640	78200209	78202118	78200211

further special options on demand

Options:

- pressure build-up regulator (1-6 bar)
- maximum pressure regulator (1-4 bar)
- mounting kit for service vehicle
- condensate drip tray

Further accessories on request





Working Dewar for Liquid Nitrogen



For Frosting Components and Biological Materials



The STELLA®-Series is a robust range of vacuum insulated dewars for using liquid nitrogen.

Standard Features:

- with a flat bottom
- stable and edge protected
- also available with flange (Model STELLA® F)

Models in Different Sizes and Variations:

- STELLA® – for open work in the laboratory
- STELLA® D – with a lid especially for research and industry
- special design, for example with gas-tight welded-on stainless steel flange for connection to e. g. keeping-cold systems or detectors

Convincing advantages:

- integrated vacuum seal-off and safety device
- long-term vacuum protection by means of high-grade adsorption and getter materials
- optimised super-insulation by means of multi-layered vacuum insulation and computer optimised thermodynamic construction
- robust construction made of stainless steel
- low maintenance requirement
- wide range of accessories



Options:

We will gladly manufacture your individually designed dewar to the exact dimensions you require.

Accessories, for example,

- roller base
- outlet below
- level indicator
- etc.

Simply get in touch with us

Dewar Name		Technical Data						
		STELLA®				STELLA® D		
		65/180	85/205	100/285	185/270	250/450	300/750	400/500
geometrical capacity	[l]	0.6	1.16	2.23	7.25	22.1	53	62.8
outer height	[mm]	203	231	312	300	570	870	620
inner height	[mm]	180	206	285	270	450	750	500
diameter outer	[mm]	87	107	122	200	305	355	455
diameter inner	[mm]	65	85	100	185	250	300	400
thickness of lid	[mm]	-	-	-	-	55	55	55
weight empty	[kg]	0.52	0.86	1.23	2.12	12.5	25.3	30.0
weight full	[kg]	0.92	1.66	2.83	6.92	27.0	65.3	72.2
operating overpressure, max.	[bar]	0	0	0	0	0	0	0
article-no.		0791308	0791309	79408223	0791311	0791081	0791085	0791087
lid		○	○	○	○	●	●	●
grip, fixed		-	-	-	-	●	●	●
roller base		-	-	-	-	○	○	○

● standard feature ○ optional - not available



Easy to Handle Dewar for Laboratory Use



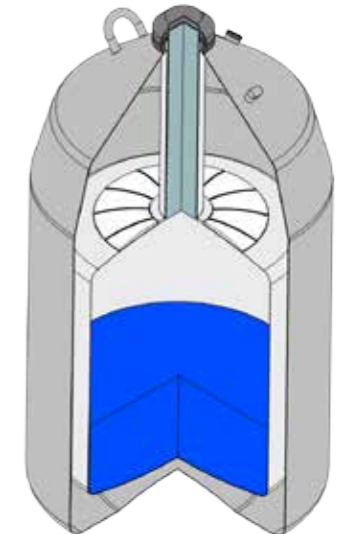
Convincing advantages:

- simple, sturdy design
- reinforced neck opening reduces nitrogen loss by evaporation
- progressive chemical technology for long-term retention of the vacuum
- multi-layered vacuum insulation by means of computer optimised thermodynamic construction
- inner and outer dewars tested separately by helium leak test
- robust construction made of stainless steel
- high-performance insulation for the lowest possible loss due to evaporation



Options:

- filling / extraction hose
- phase separator
- dipper
- manual discharge device
- pouring spout
- substitute pipe plug
- castors



The dewars of the LAB-series for liquid nitrogen with a good reputation for many years in laboratories and in the medical field. These highly efficient, super-insulated dewars offer a convenient and economical way to store and supply nitrogen. A pouring spout, dipper can be used for extracting content or the LAB-dewars can be equipped with a manual discharge device.

		Technical Data					
Dewar Name		LAB 4	LAB 5	LAB 10	LAB 20	LAB 30	LAB 50
geometrical capacity	[l]	4	5	10	21	32	50
stat. evaporation rate	[l/day]	0.19	0.15	0.18	0.18	0.22	0.49
neck opening	[mm]	35.5	56	56	51	64	64
usable height	[mm]	195	266	343	348	378	559
total height	[mm]	426	462	546	627	611	779
diameter outer	[mm]	185	222	260	368	432	432
diameter inner	[mm]	139	165	210	289	356	356
weight empty	[kg]	2.7	4	6	9	12	15
weight full	[kg]	6	8	14	26	38	56
article-no.		78210024	78400442	78210025	78210026	78210027	78400236



Level Detection and Control Device



Monitor Reliably and Control Levels



CRYO LC[®]

Device for level detection and level control in vessels and systems. CRYO LC[®] operates independent of pressure.

System

CRYO LC[®] consists of the basic module as a built-in device for C-tracks with a level sensor manufactured to customer requirements, the display and operation unit (optional components) as well as the cabinet.

Functions

Level detection: detection of 4 levels (LEVEL 1 to LEVEL 4), display and signal output (= potential free change-over contact) plus level control: automatic control of the level between LEVEL 2 and LEVEL 3.

In both functions there is an alarm if LEVEL 1 is underrun. Also on exceeding of LEVEL 4 or sensor short circuit as well as sensor wire breakage.

Convincing advantages:

- modular design
- quick assembly
- easy operation
- individually customised level control and level sensor, dependent on application and customer requirements
- for installation in control cabinet or as a separate, independent device
- measurement and control are independent of pressure as measurements are taken against a reference sensor
- basic module can be operated at the same time with at least two display and operation units (local and remote control)
- trigger guard against manipulation and operator error / device only runs in automatic mode if the reference sensor is colder than approximately -100 °C
- level monitors itself as the sensors are monitored for wire breakage and short circuit
- each signal (LEVEL 1-4, filling, alarm) is duplicated by means of a change-over contact
- potential-free change-over contact: high performance switch (230/VAC/3A), thus external devices can be directly controlled via this feature
- SPS-compatible interface
- flexible current supply in wide ranges (85-264 VAC and 24V DC)

Application Examples:

- phase separator
- dewars/cryostats
- cooling baths

Application

CRYO LC[®] can be used in vessels and systems of all sizes in which the level sensor can be equipped.

The device can be installed in various ways:

- compact devices, ready for operation, in cabinet with display and operation unit
- installation in cabinets, modular, CRYO LC[®] basic module for assembly on C-tracks, display and operation unit with flat ribbon cable ready for installation in the switch cabinet door
- installation in cabinets, modular, CRYO LC[®] basic module for assembly on C-tracks, without display and operation unit, control and signal retrieval can be carried out directly by means of SPS
- two display and operation units attached to one CRYO LC[®] basic module (local and remote control)

Level Detection:

Level detection is effected by four sensors.

At the lowest point of the level sensor there is a fifth PT sensor as a reference sensor. Only when this sensor registers a temperature of under approx. -100 °C will the level detection be activated.

The conditions LEVEL 1 to LEVEL 4 are displayed on the panel and operation unit and are retrievable via the potential free change-over contact. An exceeding of LEVEL 4 or fall below LEVEL 1 result in an alarm (optically and acoustically at the display and operating unit or via the potential free change-over contact at the basic module).

Level Control:

The level is automatically controlled between LEVEL 2 and LEVEL 3. Fall below of LEVEL 2 a potential free change-over contact will trigger on the basic module and solenoid valve will be opened. If the level reaches LEVEL 3 the change-over contact will be triggered again and the solenoid valve will be closed. The filling process shown on the display and operating unit as "FILL". The function can be switched on and off using the buttons "AUTOFILL ON" and "AUTOFILL OFF".



Further Functions:

- collective filling
- "MANUAL FILL"
- "START AUTOFILL"
- "AUTO FILL ON/OFF"
- monitoring of the sensors for wire breakage and short circuiting



Various sensors

BIOSAFE®-Systems

Life Science

LIN Liquid Nitrogen
-196 °C



BIOSAFE®-Systems Long-Term Storage of Biological and Medicinal Samples (120 - 1,400 l)	24 - 29
BIOSAFE-CONTROL® B Level Regulation and Vessel Monitoring	
CRYO MESSENGER® Remote Superordinate Control System	30 - 31
BIOSAFE® CRYOSHIPPER-SERIES	32 - 33
BIOSAFE® X/S-SERIES Vessels for Storage of Biological Samples	34 - 35
STELLA® The Robust Dewar Vessels for Using Liquid Nitrogen (0.5 - 10,000 l)	36 - 37
CONTROLLED RATE FREEZERS Programmable Systems for Cryopreservation of Biological Samples and Materials (3.3 - 16 l)	38 - 43



Optimal Storage of Samples Safety Needs a System



Systems Tailor-Made to Your Needs –
for Needs-Based Cryo-Technology.
A Complete System – Safety for Certain

BIOSAFE® MD β –
BIOSAFE® SC β – now with
-180 °C during gas phase
storage! Our product
range BIOSAFE® MD β
and BIOSAFE® SC β were
developed especially
for cryogenic long-term
storage of medical and
biological material in
laboratories

BIOSAFE® by Cryotherm has
been associated with quality
and safety for quite some time.
Experience, the technology
and our know-how make it an
easy decision for you to go with
BIOSAFE®.

Cryoconservation by means of
cryogenic liquid nitrogen has
become a proven and reliable
practice in science, research,
medicine, ecological research
and technology. Safe cold down
to -180°C in the gas phase and
the inert atmosphere enable
unproblematic freezing and
storage of valuable medical and
biological samples and material.

Our BIOSAFE® Range consists of:

- CHRONOS® cryogenic stor-
age vessels for freezing and
storing
- BIOSAFE-CONTROL® β the
level controller device and
vessel superordinate control
system for reliable supply of
cryogenic liquid nitrogen.

BIOSAFE® MD β

is approved according to
directive 93/42/EEC on medical
product as medical products
class IIa. With this medical
product cell and tissue samples
stored long-term cryogenically
for return to the human body
by using cryogenic liquid nitro-
gen as the cooling agent.

Convincing advantages:

- full storage capacity on gas phase storage
- the nitrogen reserve under the platform
is sufficient for up to two weeks
dependent on the size of vessel
- redundant hardware for software
independent monitoring of mini-
mum and maximum alarm
- low temperatures of -180 °C
whether in small or large vessels
and whether in wide-necked vessels
or vessels with a carousel system
- service for commissioning and
execution of qualification (IQ/OQ)
- remote diagnosis and remote
monitoring (optional)

BIOSAFE® SC β

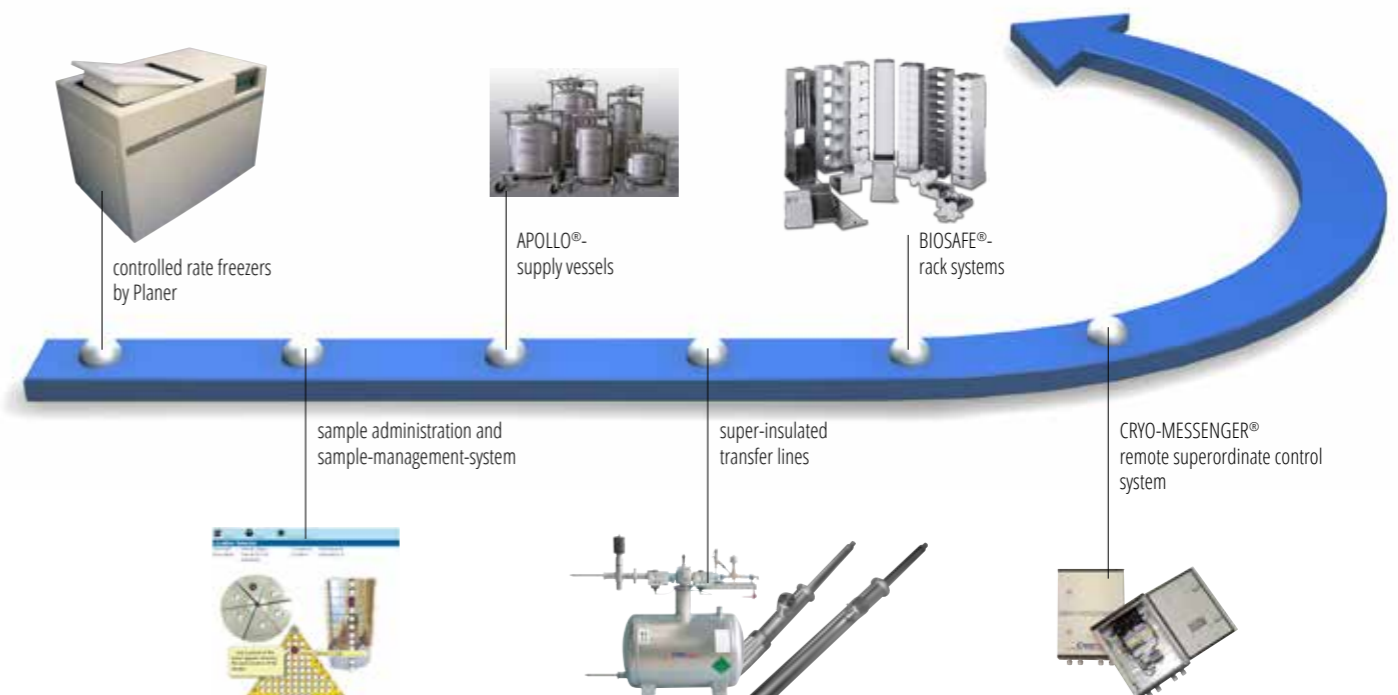
is the model for research, medi-
cine and the environment when
the samples stored are not to
be returned to the human body.

Cryotherm offers you a com-
plete solution for your cryo-
conservation requirements with
various sizes and models of
BIOSAFE®, supplemented with a
wide range of accessories:

- controlled and programmed
cooling down of your
samples in controlled rate
freezers
- administration and security
of your sample data by
means of the sample
management system
- a supply system optimised
for your requirements of
cryogenic liquid nitrogen via
the APOLLO® supply vessel.
- or directly supplied via a
super-insulated transfer line

- the orderly, safe packing
and filing of samples by
means of the BIOSAFE® rack
system
- remote monitoring of your
samples by means of the re-
mote control system CRYO-
MESSENGER®

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



LIN

BIOSAFE® 120/220/420 MD ß
 BIOSAFE® 120/220/420 SC ß

Up to a Large Area Cryobank:
 BIOSAFE® 500/600/1000/1400 MD ß
 BIOSAFE® 500/600/1000/1400 SC ß



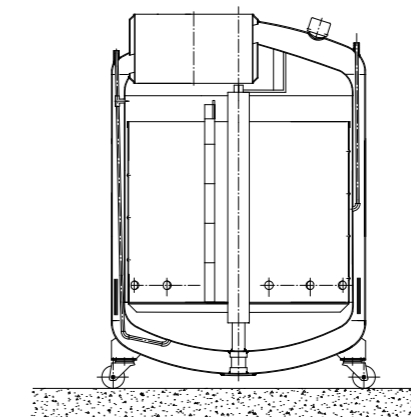
Convincing advantages:

- high storage capacity
- low evaporation rate
- integrated level controller device and vessel superordinate control system BIOSAFE-CONTROL® ß
- smooth surfaces – also on the lid – for easy disinfection
- low, easy to operate vessel height
- attractively designed vacuum insulated lid
- ergonomic lifting/swivel mechanism for the lid
- lockable lid
- stainless steel model
- space saving positioning options

The BIOSAFE®-systems 120 to 420 are optimised to give you a maximum capacity at a minimum outer dimension. The large, thermodynamically optimised lid in appealing design gives you access in seconds to the material in store. Loading with samples takes place via the wide neck opening to the freely-accessible storage space.



The sturdy construction of finely polished, corrosion-free stainless steel provides for a maximum lifelong duration and for an absolutely low evaporation rate. A combined vacuum seal-off and safety device for the vacuum area adds to the safety.



The BIOSAFE®-systems 500 to 1400 are optimised to give you a maximum capacity at a minimum outer dimension.

In the area of 500 litres to 1400 litres and more the dewars can be loaded via the vessel neck attached at the side and the smooth carousel system.

The four smooth-running castors make the BIOSAFE® storage vessel mobile and now even more flexible.

Convincing advantages:

- extremely high storage capacity
- extremely low evaporation rate
- integrated level controller device and vessel superordinate control system BIOSAFE-CONTROL® ß
- thermic insulated lid
- exocentric attached vessel neck
- smooth carousel for quick and easy access to samples
- four smooth-running castors, two of which can be locked
- measuring line for level control is duplicated (option: redundant level monitoring)
- stainless steel model

On request:

- forklift pockets
- other vessel sizes
- redundant level and vessel superordinate control system



BIOSAFE® 2000 – on request of course you can get even larger models. Call us and inquire!



With BIOSAFE® 40 SC β and BIOSAFE® 60 SC β Cryotherm Offers Small, Highly Efficient Long-Term Storage Vessels for Small Sample Quantities. Both Systems are Equipped with the Level Controller and Vessel Superordinate Control System BIOSAFE-CONTROL® β



Further features components are:

- insulated decanting hose (1.5 m)
- solenoid valve
- safety valve on T-piece
- device and instrument fitting

BIOSAFE® 40 SC β and BIOSAFE® 60 SC β can be integrated into a network with all other vessel

types of the BIOSAFE®-system via BIOSAFE-CONTROL® β.



Vessel Name		BIOSAFE® 40	BIOSAFE® 60	BIOSAFE® 120	BIOSAFE® 220	BIOSAFE® 420	BIOSAFE® 500	BIOSAFE® 600	BIOSAFE® 1000	BIOSAFE® 1400
geometrical capacity	[l]	121	175	151	251	420	490	690	960	1394
total geometric content under platform (LIN-Reserve)	[l]	approx. 10	approx. 10	21	35	57	50	84	100	100
weight empty	[kg]	43	53	100	175	225	320	340	520	660
diameter outer	[mm]	559	665	560	710	900	890	1,100	1,300	1,300
diameter inner	[mm]	no spec.	no spec.	514	664	854	795	970	1,155	1,155
neck diameter	[mm]	216	216	514	664	854	450	520	598	598
outer height	[mm]	965	959	1,140/1,045 *2	1,180/1,070 *2	1,190/1,070 *2	1,314/1,014 *2	1,370	1,440	1,820
inner height	[mm]	560	560	625	625	625	800	680	680	1,100
castor diameter	[mm]	-	-	-	80	80	80	125	150	150
stat. evaporation rate *1	[%/day]	1.19	1.19	2.3	2.0	1.5	1.2	1.3	0.7	0.6

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

Vessel Name	BIOSAFE® 40	BIOSAFE® 60	BIOSAFE® 120	BIOSAFE® 220	BIOSAFE® 420	BIOSAFE® 500	BIOSAFE® 600	BIOSAFE® 1000	BIOSAFE® 1400
2 ml vials (Ø 12 mm) in drawer	-	-	6750	13000	23100	26260	35660	51160	77040
2 ml vials (Ø 12 mm) in cryoboxes	4000	6000	7000	13000	21750	22750	32100	46700	70200
5 ml vials (Ø 12 mm) in drawer	-	-	3375	6500	11550	14140	17880	28680	42800
freezer bags (50 ml)* Baxter 4R9951/Miltenyi AND 2 ml vials (Ø 12 mm) in drawer	-	-	288	512	832	1080	1440	2080	3120
freezer bag (500 ml)* Baxter 4R9955/Miltenyi AND 2 ml vials (Ø 12 mm) in drawer	-	-	144	240	480	480	576	864	1512
freezer bag (500 ml)* Hemofreeze/Gambro Z2003 AND 2 ml vials (Ø 12 mm) in drawer	-	-	75	150	270	288	432	612	918
2 ml vials (Ø 12 mm) in drawer	-	-	750	500	500	1300	1100	2200	3600

*: other bag manufacturers and types on request

Integrated Level Control and Vessel Monitoring for Safe Long-Term Storage

Technical Data

- display of the vessel status
- level control via height adjustable sensor with manipulation protection
- temperature measurement sensor, measurement range -200 +50 °C (accurate to +/- 2 °C)
- filling stop when lid open / manual defogging possible
- alarm signal when:
 - nitrogen shortage and level exceeding
 - exceeding of vessel temperature
 - exceeding of maximum time for lid open
 - exceeding of maximum filling time sensor breakage or sensor short circuit
 - and lots more
- display of alarm signal in plain text
- software and processor independent redundant monitoring of minimum and maximum alarm with separate software alarm
- potential-free alarm outputs for your building technology (I/O box optional)
- analogue output of temperature measurement for your building technology
- connection via Ethernet (optional)



Central Functions (per network)

- I/O box (option) with relay for main valve, device error, collective alarm, over-temperature and 2 extra freely-assignable relays
- collection and buffering of all cryobank data for transfer to a PC
- connection of up to 32 systems to one network
- collective filling
- free selection of database, thus fully network capable
- interface RS 232 to PC
- parameter can be set on BIOSAFE® and PC
- MODBUS software as interface (RS485) to a superordinate control system



Convincing advantages:

- certified reliability with proven measuring principle
- clear presentation of vessel status
- liquid level adjustable from 0 (gas phase) – 100%
- easy operation at BIOSAFE-CONTROL® β and at PC
- flexible evaluation of logged temperatures and alarms
- central functions for control of main valve (I/O-box optional)
- central alarm administration and transfer to PC (by e-mail, SMS or Fax as option)
- including PC software for extensive documentation of the data of a cryobank
- modern matched design with the new BIOSAFE® generation
- parameter: response delay magnetic valve, reverse cooling function, alarm on/off switching adjustable

BIOSAFE-CONTROL® β Software

- in the German, English, French, Spanish and Italian languages
- setting of all vessel parameters in clear and password protected pop-up windows
- logging and evaluation of temperature curves of individual and all vessels
- logging and evaluation of alarm signals and events in individual and all vessels
- visualisation of vessel status on PC
- evaluation, lists and diagrams as protected PDF-files, CSV-files (EXCEL)

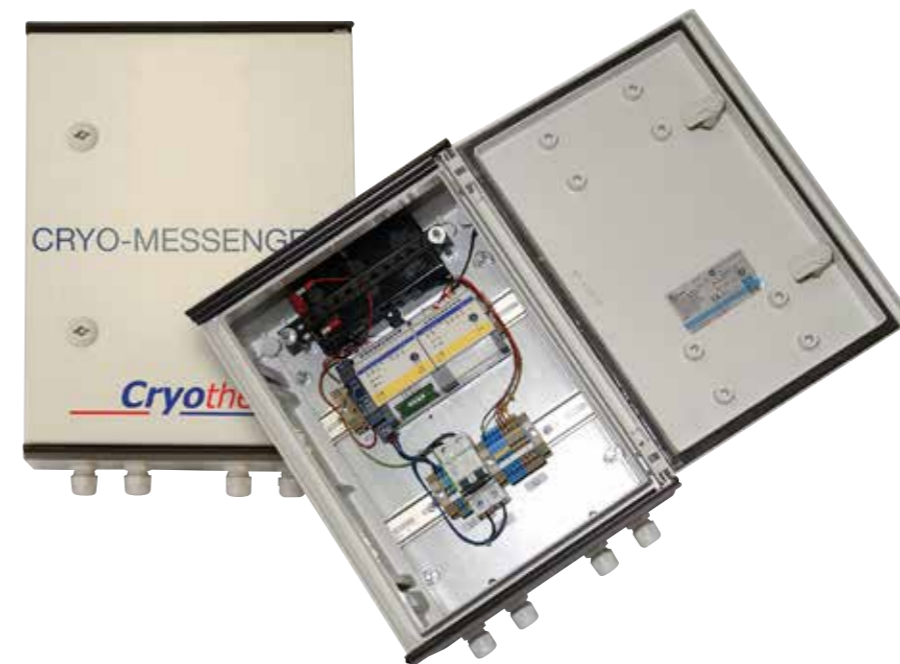
Remote Monitoring via SMS, E-MAIL & Co.

www.cryo-messenger.de



Convincing advantages:

- redundant cryobank monitoring
- easiest operation via www.cryo-messenger.de
- transfer of alarm signals and logged temperatures via e-mail, SMS or FAX
- quick assembly
- can be expanded due to modular assembly structure
- analogue input sockets for logging of eg. temperatures
- flexible current supply in wide ranges (100-240 V AC)



The Individual Components

- CRYO-MESSENGER® (Article-no. 78207280)
For remote monitoring of cryo-vessels and transfer of alarm signals by SMS, E-Mail or FAX. Data transfer via GSM-Dualband-Modem. Daily routine call to Global Data Center.
Technical Data:
Dimensions: 400 x 300 x 200 mm
Current Supply: 100-240 V AC/47-63 Hz/8 VA
2 analogue inputs: 0-10 V DC
2 report inputs: for potential-free contacts
- CRYO-MESSENGER® with rechargeable battery (Article-no. 78207281) CRYO-MESSENGER® in addition with lead rechargeable battery (12 V/7.2 Ah) so that alarm signals will still work in case of power failure.
- Extension module E-M8 (Article-no. 78207284) for extension to 8 report inputs for potential-free contacts
- Extension module E-A4/1 (Article-no. 78207285) for extension to 4 analogue inputs (0-10 V DC)

Further information can be found under: www.cryo-messenger.de

Remote Monitoring via SMS, E-MAIL & Co. – A Bit More Security!

The remote superordinate control system CRYO-MESSENGER® has its cryo-vessels and cryobanks on site under permanent control: around the clock, 365 days a year.

CRYO-MESSENGER® transfers all logged data to the Global Data Center (www.cryo-messenger.de) which in turn transfers any reports to you, irrespective whether by SMS, E-Mail or FAX. Of course, you can call up data on your vessels at any time. It's your choice!

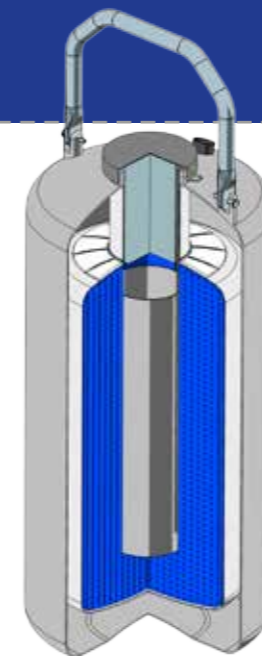


Sample Transport in Liquid Nitrogen at -150 °C



Convincing advantages:

- simple, sturdy design
- GFK neck pipe for reduction of nitrogen loss through evaporation
- secure against leakage by means of hydrophobic absorbent
- progressive technology for long-term vacuum protection
- robust aluminium construction
- high-performance insulation for the lowest possible losses due to evaporation
- all models have been approved for non-infectious material in air transport use



Options:

- transport protective packaging
- canister
- substitute neck pipe plug
- cryoshipper VSS has been independently tested of other models of the UN and IATA and has been independently approved. When using the appropriate accessories you are allowed to ship infectious material.



- cryoshipper blood bag frame

The BIOSAFE® Cryoshipper-Series has been conceived to ensure safe transport of biological samples at cryogenic temperatures (-150 °C). They are manufactured of long-life, lightweight aluminium, contain a hydrophobic absorbent inside which absorbs the liquid nitrogen. The absorbent repels damp during the whole life cycle of the vessel. Protective packaging for transport is available for all models. The protective packaging ensures against damage during transport. Using these vessels you can send your samples anywhere in the world declared and classified as “non-hazardous”.

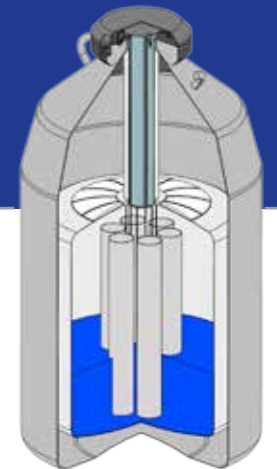
Technical Data								
Vessel Name		SC 2/1 V	Mini-Moover	SC 4/2 V	SC 4/3 V	Cryoshipper	Cryo-Moover	Cryoshipper VSS
no. of canisters		1	1	1	1	1 rack	7	1 rack
geometrical capacity	[l]	1.5	2.9	3.6	4.3	8.5	4.2	11.8
stat. evaporation rate	[l/d]	0.19	0.20	0.26	0.20	0.85	0.35	0.8
normal time span	[day]	8	14	14	21	10	12	14
neck opening	[mm]	35	35	70	51	216	97	14
height	[mm]	343	495	468	492	546	558	610
diameter outer	[mm]	184	184	222	222	369	464	381
canister height	[mm]	127	278	278	278	-	278	-
canister diameter	[mm]	31	31	67	46	-	79	-
fixture with cladding pipe for vials (article-no. 0791004)		1	1	10	4	-	91	-
vials 2 ml		5	5	50	20	5 cryoboxes*	455	-
vials 5 ml		3	3	30	12	4 bags	273	-
weight empty	[kg]	2.7	4	5	5.9	10.9	13.8	13.1
weight full	[kg]	4	5	8.1	9.3	17	17.2	22.9
article-no.		78400240	78210017	78400241	78400271	78210018 vial, 78400636 blood bags	78400242	78400465

*Cryobox for 2 ml vials, 100 vials



Storage Vessels for Biological Samples

Easy-To-Handle Storage Vessels for Use in Laboratories



Convincing advantages:

- simple, sturdy design
- GFK neck pipe for reduction of nitrogen loss through evaporation
- progressive technology for long-term vacuum protection
- inner and outer vessel each separately by helium leak test
- robust aluminium construction
- high-performance insulation for the lowest possible losses due to evaporation

Options:

- filling hose
- phase separator
- dipper
- manual discharge device
- substitute neck pipe plug
- rollers

Technical Data BIOSAFE® X

Vessel Name	X 20/20	X 21/6	X 22/5	X 32/8	X 33/22	X 34/18	X 35/12	X 43/28	X 47/11-6SQ	X 41/11-6	X 47/11-10
no. of canisters	6	9	6	9	6	6	10	6	6	6	10
geometrical capacity [l]	20.5	21	22.4	32	33.4	34.8	34.8	42.2	47.4	47.4	47.4
stat. evaporation rate [l/d]	0.09	0.25	0.35	0.35	0.14	0.18	0.24	0.14	0.39	0.39	0.39
normal time span [day]	140	53	40	57	154	123	90	193	75	75	75
neck opening [mm]	55.4	89	97	97	70	89	102	70	127	127	127
total height [mm]	652	438	559	546	660	675	635	670	673	673	673
diameter outer [mm]	368	484	368	464	464	464	456	508	508	508	508
canister height [mm]	279	127	279	279	279	279	279	279	279	279	279
canister diameter [mm]	41.9	70	79	67	56	71	66	56	102	102	71
fixture with cladding pipe for vials (art-no. 0791004)	18	storage of straws	78	90	48	72	90	48	30 cryoboxes*	114	120
vials 2 ml	90	-	390	450	240	360	450	240	750	570	600
vials 5 ml	54	-	234	270	144	216	270	144	-	342	360
weight empty [kg]	11.8	26.9	11.6	13.6	15.4	15.4	15.4	16.4	16.4	16.4	16.4
weight full [kg]	28.3	28.3	30	39.5	42.5	43.5	43.1	50.5	54.6	54.6	54.6
article-no.	78210021	78400458	78400417	78400418	78400224	78210022	-	78400411	78400680	78400065	78400407

* cryobox for 2 ml vials, diameter 12 mm, 25 vials, article-no. 78400062

The small capacity of the BIOSAFE® S-Series and the large capacity of the BIOSAFE® X-Series for biological samples have had a good name in laboratories and in the medical field for many years. These highly-efficient super-insulated vessels offer a convenient and economical way of storing biological samples. For removal the BIOSAFE® X/S-SERIES has been equipped with canisters.

Technical Data BIOSAFE® S

Vessel Name	S 3/3	S 8/5	S 11/7	S 16/11	S 20	S 20/20	S 36/32	S 33/26
no. of canisters	6	6	6	9	6	6	6	6
geometrical capacity [l]	3.6	8.4	11.0	16.4	20.5	20.5	36.5	33
stat. evaporation rate [l/d]	0.12	0.15	0.15	0.14	0.10	0.09	0.10	0.13
normal time span [day]	19	35	46	74	126	142	224	182
neck opening [mm]	51	51	51	51	51	51	51	51
total height [mm]	406	470	549	444	652	652	657	657
diameter outer [mm]	222	260	260	438	368	366	464	464
canister height [mm]	127	127	279	127	279	279	279	279
canister diameter [mm]	38	38	38	38	38	38	38	38
fixture with cladding pipe for vials (Art-No. 0791004)	storage of straws	storage of straws	18	storage of straws	18	18	18	18
vials 2 ml	-	-	90	-	90	90	90	90
vials 5 ml	-	-	54	-	54	54	54	54
weight empty [kg]	3.6	5.3	7.7	6.4	11.8	11.8	15.4	15.4
weight full [kg]	6.5	12.1	16.6	19.6	28.3	28.3	42.4	42.4
article-no.	78210019	78400272	78210020	78400273	78400457	78400456	78400410	78400490



Working Dewar for Liquid Nitrogen



For Frosting Components and Biological Materials



Convincing advantages:

- integrated vacuum seal-off and safety device
- long-term vacuum protection by means of high-grade adsorption and getter materials
- optimised super-insulation by means of multi-layered vacuum insulation and computer optimised thermodynamic construction
- robust construction made of stainless steel
- low maintenance requirement
- wide range of accessories



Options:

We will gladly manufacture your individually designed dewar to the exact dimensions you require.

Accessories, for example,

- roller base
- outlet below
- level indicator
- etc.

Simply get in touch with us

The STELLA®-Series is a robust range of vacuum insulated dewars for using liquid nitrogen.

Standard Features:

- with a flat bottom
- stable and edge protected
- also available with flange (Model STELLA® F)

Models in Different Sizes and Variations:

- STELLA® – for open work in the laboratory
- STELLA® D – with a lid especially for research and industry
- special design, for example with gas-tight welded-on stainless steel flange for connection to e. g. keeping-cold systems or detectors

Dewar Name		Technical Data						
		STELLA®				STELLA® D		
		65/180	85/205	100/285	185/270	250/450	300/750	400/500
geometrical capacity	[l]	0.6	1.16	2.23	7.25	22.1	53	62.8
outer height	[mm]	203	231	312	300	570	870	620
inner height	[mm]	180	206	285	270	450	750	500
diameter outer	[mm]	87	107	122	200	305	355	455
diameter inner	[mm]	65	85	100	185	250	300	400
thickness of lid	[mm]	-	-	-	-	55	55	55
weight empty	[kg]	0.52	0.86	1.23	2.12	12.5	25.3	30.0
weight full	[kg]	0.92	1.66	2.83	6.92	27.0	65.3	72.2
operating overpressure, max.	[bar]	0	0	0	0	0	0	0
article-no.		0791308	0791309	79408223	0791311	0791081	0791085	0791087
lid		○	○	○	○	●	●	●
grip, fixed		-	-	-	-	●	●	●
roller base		-	-	-	-	○	○	○

● standard feature ○ optional - not available



Programmable Complete Systems for Cryopreservation



For a Safe System

Kryo 360-3.3, Kryo 560-16 and Kryo 750-30

The controlled rate freezers Kryo 360-3.3, Kryo 560-16 and Kryo 750-30 unify all the important characteristics which are expected of a first-class freezing equipments for biological materials. The final temperature of -180 °C ensures physical integrity during transport to the storage location. Due to its flexibility the system is ideal for the complex and demanding protocols that are found in the newest techniques of cryopreservation. The sample capacity of the system also fulfils the requirements of laboratories that are working to full capacity and the compact as well as highly up-to-date form adds an increase in efficiency to even the most modern facility.

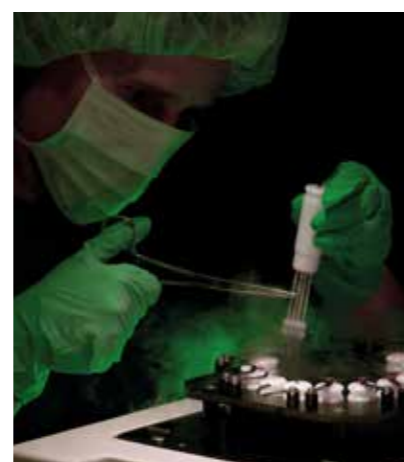


Convincing advantages:

- High-level of reliability
- horizontal or vertical freezing
- validation – stable results
- safety by means of extended preservation period
- diverse protocols - flexible
- space saving through compact design
- user friendly through simple menu structure
- freezing of vials and straws (Kryo 360-3.3)
- freezing of vials, straws and bags (Kryo 560-16)
- directed laminar flow for efficient and even cooling down (Kryo 560-16)

The controlled rate freezer fulfill the directive 93/42/EU on medical products.

They are delivered with the software DeltaT®.



Article-no.	Controlled Rate Freezer
78213715	Kryo 360-3.3 MD
78213716	Kryo 560-16 MD
78213717	Kryo 750-30 MD

MRV-Programmer for Kryo 360-3.3 and Kryo 560-16

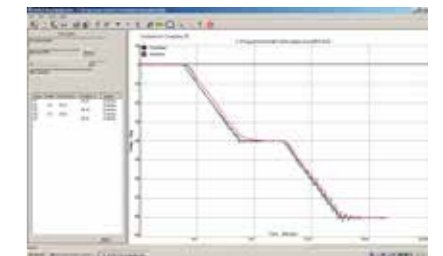
The MRV-Programmer enables varied protocols and is still easy to programme and to operate. During and after a run an extensive range of information is displayed which is available in alphanumeric or graphic form on the clearly structured screen or the data can be printed out on the integrated full screen printer.

The validation was given high priority. The MRV-Programmer offers a password controlled access to several operating levels, date and time stamps, programme preview and check before a run and storage of data for the last 5 runs for subsequent printing. User calibration and creation of the appropriate paper printouts belong to the functional scope. A PC-connection which is compatible with the comprehensive DeltaT® Software belongs to the standard package.

	DeltaT®
create profiles	yes
run profiles	yes
view Kryo-data	yes
print Kryo-data	yes
export Kryo-data	yes

The system has been equipped with numerous safety elements that protect the device from power loss or PC crash during operation. Processor and system problems are monitored and independently the system carries out an automatic re-start to protect the samples.

For example all control and data systems are separate from each other and the controller can be removed from the freezing chamber in operation without any loss of programme integrity. Storage of data and processing of the programme are executed in isolated electronic systems which are completely independent of each other.



Convincing advantages:

- unlimited freezing profiles
- graphic data in real-time
- graphic data after processing of the programme
- traceability
- password protection
- commentary before and after processing of the programme

DeltaT® PC Software for Controlled Rate Freezers

DeltaT® supports the PC-interface on the controlled rate freezers. This enables quick development and maintenance of profiles (freezing curves) on your PC and observation of the freezing process in real-time on the PC.

DeltaT® can be used to store data on your PC (the possible scope depends solely on the size of your hard drive) as well as to print the data on a standard printer for your manual documentation.

For Programme Regulated Cryopreservation

Technical Data



Features of Kryo 360-3.3

- the controller displays the desired temperature, sample and chamber temperature, programme level and the current temperature graph
- menu controlled controller which is easy to programme and to operate
- horizontal and vertical operation
- compact form
- standard functions:
 - start above ambient temperature
 - controlled thawing
 - data printout (integrated printer)



	Kryo 360-3.3
chamber volume	3.3 litres
straw capacity	60x0.25 ml or 45x0.5 ml on 15 radial positions
vials capacity	60x 2ml on 15 radial positions
bag capacity	-
temperature lower limit	-180 °C
cooling rates	-0.01 bis -50 °C/min
controlled heating rates	0.01 bis 10 °C/min
system controller	MRV

- serial interface (RS232) for connection to a PC
- fast cooling rates
- many safety features



Features of Kryo 560-16

The chamber which is opened from the top ensures a stable and exact temperature in all protocol phases due to a combination of the unique directed laminar flow of the cooling agent and the cryogenic insulation which prevents the lid from freezing closed at cryogenic temperatures.

	Kryo 560-16
chamber volume	16 litres
straw capacity	2904 x 0.25 ml (in goblets), 968 x 0.5 ml (in goblets) or 456 x 0.25-0.5 ml (on freezing racks)
vials capacity	784 x 1.0-2.0 ml or 588 x 1.0-5.0 ml in baskets
bag capacity	11 x 250/500 ml-bags or 48 x PALL-bags
temperature lowest	-180 °C
cooling rates	-0.01 to -50 °C/min
controlled heating rates	0.01 to 10 °C/min
system controller	MRV



System Specification	Kryo 360-3.3	Kryo 560-16
temperature range	+40 °C to -180 °C	+30 °C to -180 °C
heating rate	0.01 °C/min to 10 °C/min	0,01 °C/min to 10 °C/min
cooling rate	-0.01 °C/min to -50 °C/min	-0,01 °C/min to -50 °C/min
controller precision	±0.3 °C measured at storage at 0 °C	±(0.3 + 0.005 x TM)°C (where TM is the temperature level)
storage temperature	-10 °C to +50 °C	-10 °C to +50 °C
storage humidity	5 % to 95 % relative humidity not condensing	5 % bis 95 % relative humidity not condensing
operating temperature	5 °C to 40 °C	5 °C bis 40 °C
operating humidity	5 % to 90 % relative humidity not condensing	5 % bis 90 % relative humidity not condensing

Controller Specification	Kryo 360-3.3	Kryo 560-16
dimensions	80 mm x 220 mm x 350 mm (H x W x D)	80 mm x 220 mm x 350 mm (H x W x D)
weight (approx.)	2.6 kg	2.6 kg
display	240 x 64 LCD with CCFL backlight	240 x 64 LCD with CCFL backlight
printer	320/640 dot thermal printer	320/640 dot thermal printer
keyboard	membrane keyboard with 20 keys	membrane keyboard with 20 keys
programmable cooling rate range	-0.01 °C/min to -99.9 °C/min	-0.01 °C/min bis -99.9 °C/min
number of profiles	10	10
level per profile	32	32
number of runs that can be stored	5	5

Chamber Specification	Kryo 360-3.3	Kryo 560-16
weight	14.7 kg (3.3 l chambers)	23 kg
capacity	3.3 litres	16 litres
chamber dimensions	3.3 l-chamber: inner: 400 mm x 150 mm Ø outer: 450 mm x 300 mm x 420 mm (H x W x D)	inner: 350 mm x 230 mm x 230 mm (H x W x D) outer: 460 mm x 640 mm x 405 mm (H x W x D)
0.25 ml straws	60	2.904 in goblets or 456 on freezing racks
0.5 ml straws	45	968 in goblets or 456 on freezing racks
2 ml vials	60	yes
cryo tubes (vials)	-	784 x 1.0-2.0 ml oder 588 x 1.0-5.0 ml
50 ml blood bags	-	22
250 ml - 750 ml-blood bags	-	11
power requirement (incl. MRV controller)	115 V _~ 50/60 Hz 600 VA/230 V _~ 50/60 Hz 600 VA	115 V _~ 50/60 Hz 1500 VA/230 V _~ 50/60 Hz 1500 VA
nitrogen supply cryogenic liquid	0.5 - 1.5 bar	0.5 - 1.5 bar

PC software: the controlled rate freezers are delivered with PC software DeltaT®



For Programme Regulated Cryopreservation

The controlled rate freezer Kryo 750-30 is a unique integrated freezing equipment for cryo-preservation of large samples or for a large number of samples.

The easily accessible front loading door is locked by means of a 3-point locking system which ensures an airtight seal. In this fashion freezing up of the door is prevented at low temperatures. Heated door seals offer extra protection.

The built-in control system is operated via a unique two button procedure. Thus we can ensure that a user cannot inadvertent execution of the wrong protocol, usage can be learned quickly and execution can be checked precisely. The device can be operated optionally by the PC-application DeltaT® by the planner. This enables varied protocols and online data access as well as creation and storage of the data for validation.

The software commands multi-level password protection so that only authorized users can work. The user calibration enables use of external standards. The large, easily accessible chamber can be used flexibly and offers high capacity so that even sophisticated laboratory

demands can be fulfilled. Protocols can be triggered based on "event sample temperature" which ensures high cooling performance at thawing temperatures in connection with the fast cooling rates along with the directed laminar flow of the system. This enables efficient elimination of latent warmth and ensures an optimal survival rate of samples after thawing.

Specification Overview:

- chamber volume: 29 litres
- capacity: 20 x 250-1000 ml blood bags, or 40 PALL blood bags, horizontal/ vertical in the chamber
- capacity for cryo-tubes: 1452 x 2 ml
- capacity for straws: 5808 x 0.25 ml (in goblets), 1936 x 0.5 ml (in goblets) or 836 x 0.25 ml (on freezer racks)
- temperature lower limit: -160 °C
- cooling rates: 0.1-10 °C/min
- controlled heating rates: 0.1 to 10 °C/min
- system controller: integrated
- PC software DeltaT® included in package

Convincing advantages:

- top or front loader for easy loading
- inner chamber removable for sterilisation
- directed laminar flow for efficient and even cooling down
- protocol triggered by sample, time or temperature
- designed for freezing samples in bags, vials or straws
- unique 2-button operation
- standard PC software enables password protected varied protocols
- protocol level can be triggered by sample or chamber temperature or time
- unique directed laminar flow of the cooling system ensures an absolutely efficient, even cooling down
- heated door seal prevents freezing up at cryogenic temperatures
- standard features:
 - controlled thawing
 - serial interface (RS232) for PC connection
 - fast cooling rates

Technical Data

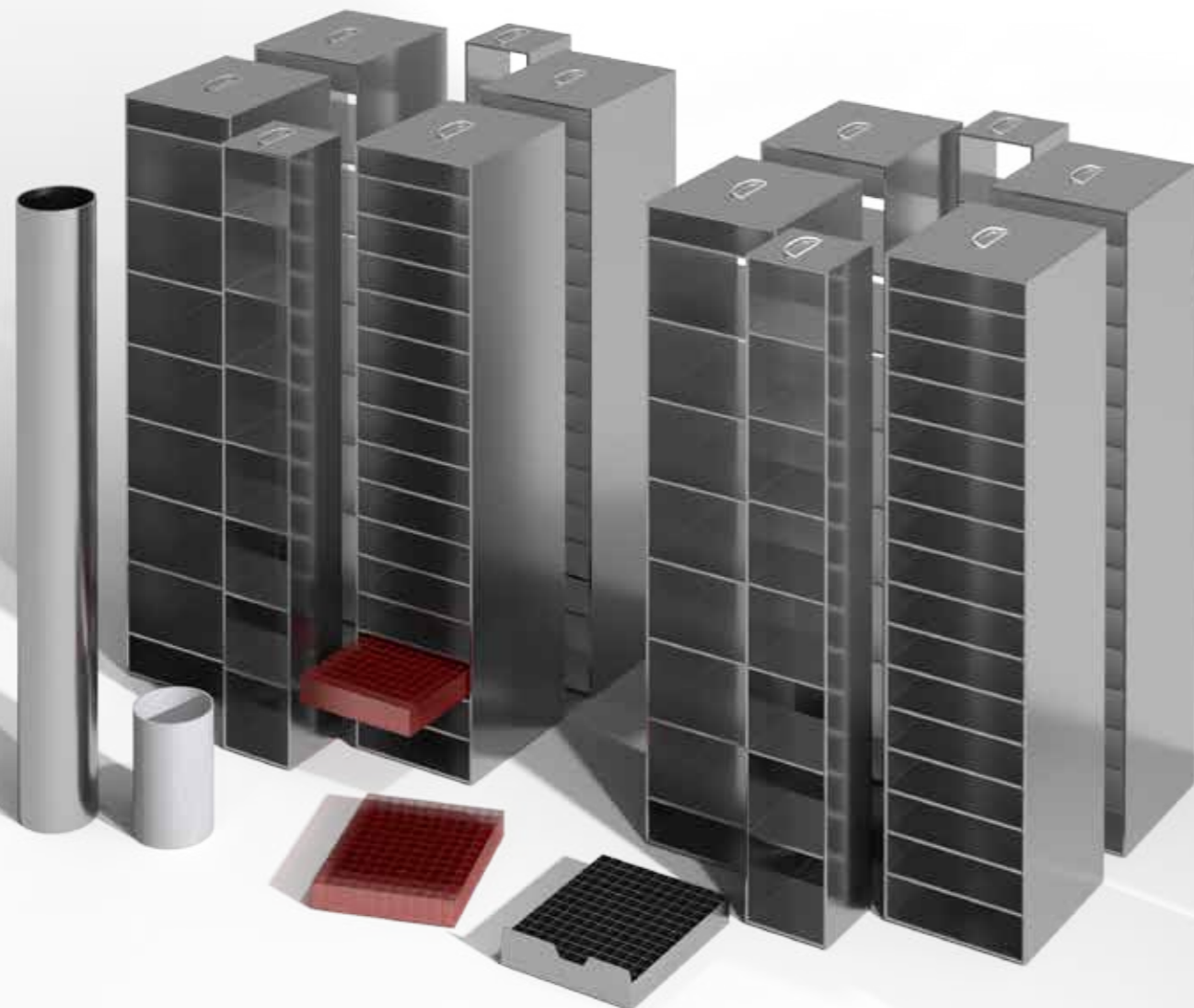
Specifications		Outer	Inner
Front Loader	height	55 cm	26 cm
	width	79 cm	46.5 cm
	depth	48 cm	25 cm
Top Loader	height	48 cm	25 cm
	width	79 cm	44.5 cm
	depth	55 cm	26 cm

PC Software: the controlled rate freezers are supplied with the Software DeltaT®.

weight	approx. 45 kg (delivery weight including packaging)
2 ml cryo-tubes	1,452
straws	5,808 x 0.25 ml (in goblets), 1,936 x 0.5 ml (in goblets) or 836 x 0.25-0.5 ml (on freezer racks)
PALL blood bags	40
250 - 1,000 ml blood bags	20
air circulation	horizontal laminar flow
temperature range	+100.0 °C bis -160 °C
cooling agent	liquid nitrogen 22 ±2 psi
heating	1,000 W
sensors: control and sample sensor	4 wire-platinum resistor thermometers. The sensors are linearised in the software according to international standards that use a 4096-dot-lookup-table based on BS1904-1984, table I. Calibration option included.
precision	±0.5 °C at a holding temperature of 0 °C (The dynamic accuracy depends on the respective program, for example on the rate of temperature change.)
heating rate	0.01 °C/min to 10 °C/min
cooling rate	-0.01 °C/min to -10 °C/min
programmable cooling rate range	-0.01 °C/min to -99.9 °C/min
operating positions	vertical or horizontal
temperature safety	deactivation at 120 °C
power requirement	103-126 VAC 50/60 Hz 1200 VA (max.) (470 VA freezing only, when operating seal and storage heating/seal heating and holding current). The device can be damaged by excess voltage if the nominal levels are superseded by more than 15%.
sensitivity	1.7 mV/°C, nominal impedance > 10 K
recorder scale	0 V = -200 °C, +5 V = +100 °C
standards	The device fulfils the safety regulations of BSEN 61010, CSA22.2 No.125-M1984, CSA22.2No.151-M1986, EN50082-2, EN50081-2
storage temperature	-10 °C to +70 °C
storage humidity	up to 95 % not condensing
operating temperature	5 °C to 40 °C
operating humidity	up to 95 % not condensing
cryogenic LIN supply	0.5-1.5 bar

BIOSAFE® Rack-Systems

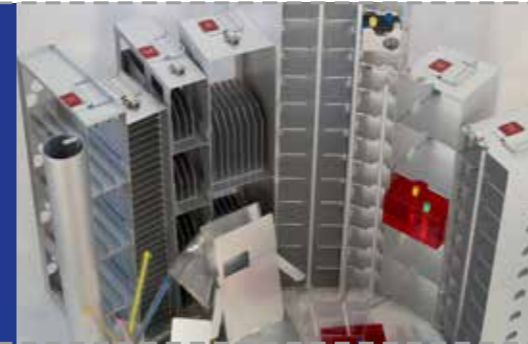
LIN Liquid Nitrogen
-196 °C



Introduction Rack Systems for Every Area of Use	46 - 49
Handling and Safety	50 - 51
Racks BIOSAFE® 120-220-420 for Drawers, Cryoboxes, Cassettes, Goblets	52 - 57
Racks BIOSAFE® 500-600-1000-1400 for Drawers, Cryoboxes, Cassettes, Goblets	58 - 65
Rack-Number Sets	66
Customisation	67



For Every Type of Usage



Highly Compact Storage for Vials, Freezing Bags and Straws

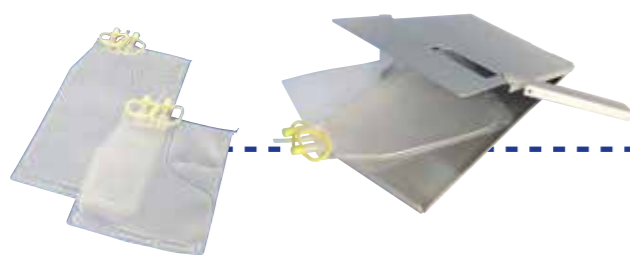
Drawers and Cryoboxes for Vials / Cryotubes



- various sizes (1.0 – 5 ml) in drawers made of aluminium with separator grids or in cryoboxes
- drawers with openings for quick liquid draining and front with extraction opening for easy handling
- cryoboxes made of special plastic with circulation function and crystal clear lid



Cassettes for Bags



- aluminium to create a definite layer thickness for controlled freezing
- **foldable** with hinge on the underside and lock with two **locking leaves** opposite each other
- **window** for label
- with ingenious stage to protect the ports

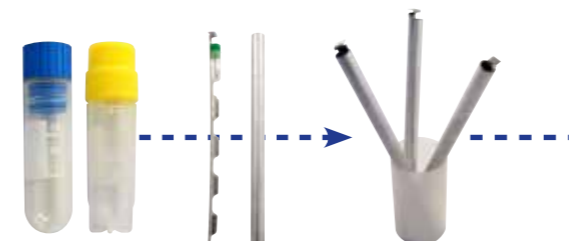


SBS Racks (SBS Boxes) for Vials / Cryotubes



- storage of cryotubes in racks / boxes in SBS format
- suitable for all common manufacturers
- value-for-money, highly compact storage without locking at the individual levels
- highly compact and safe storage with spring clip at every individual level
- highly compact and doubly safe through retaining lip in every individual level and extra pivoting drawer bar for central locking
- maximum capacity as adjustable to every type and height

Cane Holder with Cryosleeve in Goblets for Vials / Cryotubes



- for highly compact storage in canisters
- easy-to-handle due to lifter in the canisters
- various sizes: 1.0 – 5 ml

Goblets for Straws



- cryo-conservation of semen samples for insemination
- colour coding

Biological Samples Optimally Stored:

- Vials / Cryotubes
- Freezing Bags
- Straws



Simple, Flexible and with a System



Convincing advantages:

- high storage capacity
- simple operation
- maximum protection for your samples
- safety through various locking points
- various set heights for flexible use and compatibility with all vessels
- variable arrangements for setting your own order system
- low tare weight due to sturdy aluminium construction
- clarity in the system
- transparency by means of sample management system
- high functionality
- customisation for any sample dimensions in request

For the storage of biological samples in the liquid phase or in the gas phase of liquid nitrogen. There are a large number of diverse sample packages by various manufacturers.

In order to ensure an even distribution of heat within the storage racks they are made of aluminium. Another strong point of this material is its low weight and easier handling.

The Cryotherm-Module-System structures your vessels and makes safe storage easy and even more clear. All the storage racks ensure universal application.

Of course, customer specific solutions are possible – please ask for details!

BIOSAFE® Vessels

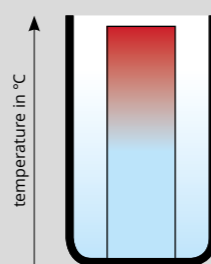
were developed especially for cryogenic long-term preserving in laboratories and cryobanks.

Safe cold down to -180°C in the gas phase and the inert atmosphere enable unproblematic freezing and storage of valuable medical and biological samples and materials.

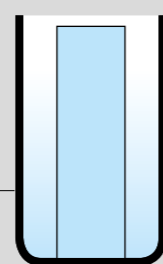
- full storage capacity for gas phase storage
- nitrogen reserve under the platform suffices dependent on size of vessel for up to two weeks
- redundant hardware for software-independent monitoring of minimum- and maximum-alarm
- low temperatures of -180°C whether in small or large vessels and whether in wide-neck vessels or vessels with a carousel
- service for initial start-up and execution of qualification (IQ/OQ)
- service hotline



Rack of **stainless steel** with **uneven** heat distribution:



Cryotherm rack of **aluminium** with **even** heat distribution:



temperature in $^{\circ}\text{C}$

Cryo vessels

Stored Safely

With Cryo-Storage Handling Safety of the Samples is the Highest Priority

The Various Cryotherm Safety Systems Protect Your Material



Foldable handle for easy operation

Sealable safety locking system for foldable front door

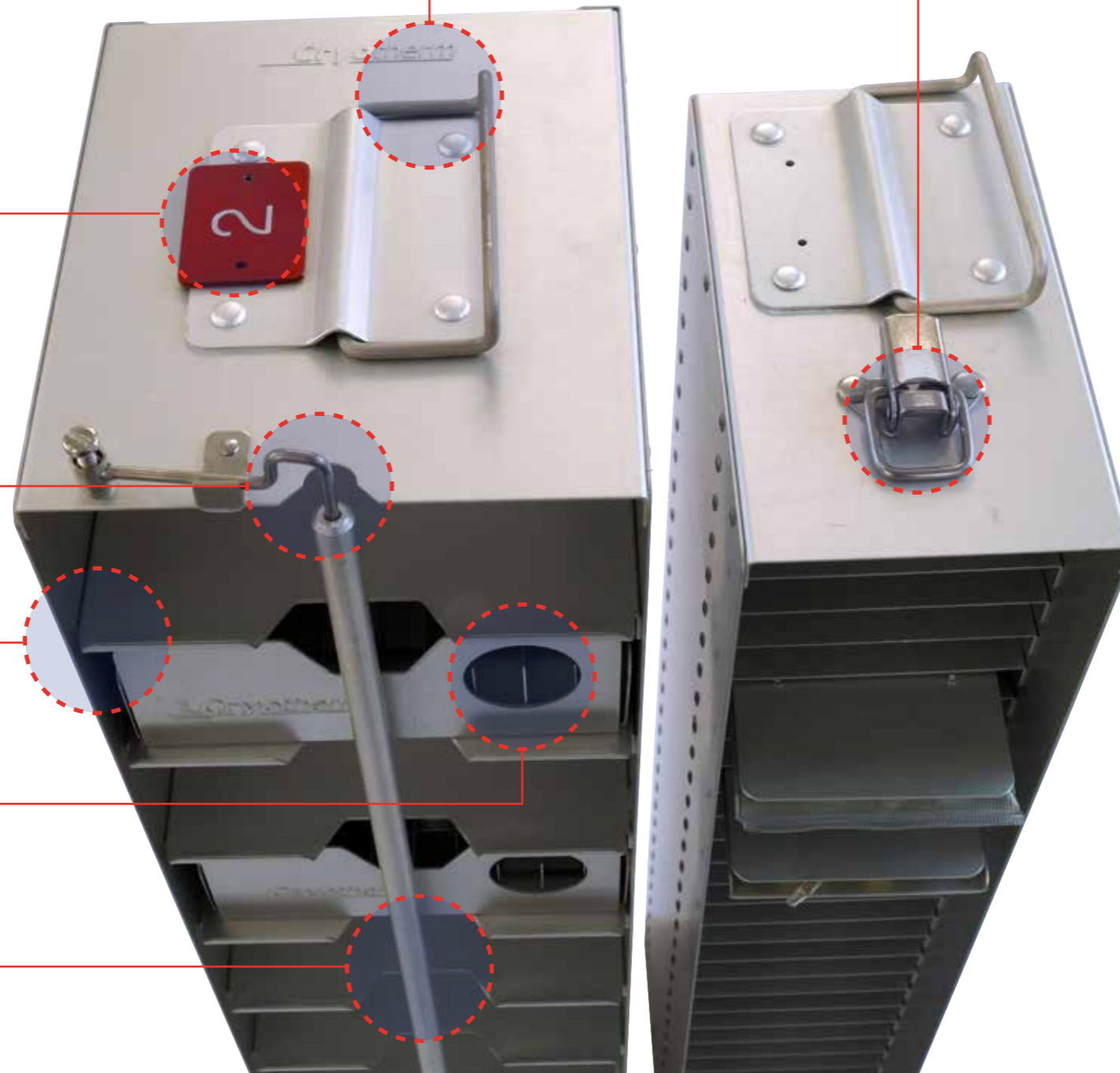
Rack numbers individually attachable for clarity of storage

Pivoting drawer bar locks all drawers, cryoboxes and SBS racks during operation

Even when the clamp is open a 3 mm front retaining lip in every section floor secures the drawer, cryobox or SBS rack against inadvertent slippage

Drawer front view is optimised for easy handling

Double locking of the drawers, cryoboxes and SBS racks against inadvertent falling out



Storage Capacity BIOSAFE® 120-220-420

Storage in Drawers

Inside Height = 625 mm

Vials / Cryotubes of 2 ml: Racks with 10 Levels

Vials / Cryotubes of 5 ml: Racks with 5 Levels

Storage in Cryoboxes

Inside Height = 625 mm

Vials / Cryotubes of 2 ml: Racks with 10 Levels

Vials / Cryotubes of 5 ml: Racks with 5 Levels



Rack of aluminium with 10 levels for vials

and pivoting drawer bar for the storage of

a) 2 ml vials in drawers with grid

dimensions (HxWxD): 620 x 140 x 166 mm

b) 2 ml vials in drawers with grid

dimensions (HxWxD): 620 x 85 x 85 mm



Rack of aluminium with 5 levels for vials

and pivoting drawer bar for the storage of

c) 5 ml vials in drawers with grid

dimensions (HxWxD): 620 x 140 x 166 mm

d) 5 ml vials in drawers with grid

dimensions (HxWxD): 620 x 85 x 85 mm



Rack of aluminium with 10 levels for vials

and pivoting drawer bar for the storage of

e) 2 ml vials in cryoboxes

dimensions (HxWxD): 620 x 140 x 145 mm

f) 2 ml vials in cryoboxes

dimensions (HxWxD): 620 x 85 x 85 mm



Rack of aluminium with 5 levels for vials

and pivoting drawer bar for the storage of

g) 5 ml vials in cryoboxes

dimensions (HxWxD): 620 x 140 x 145 mm

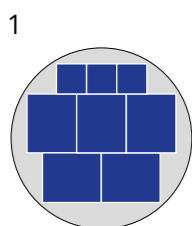
h) 5 ml vials in drawers with grid

dimensions (HxWxD): 620 x 85 x 85 mm

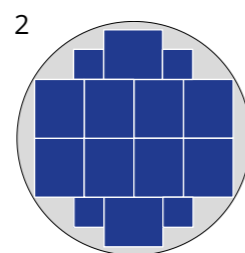
Vials / Cryotubes in Drawers Description	Dimensions (H x W x D) [mm]	Article-No.	Layout	BIOSAFE® 120 Capacity	BIOSAFE® 220 Capacity	BIOSAFE® 420 Capacity
a) rack for 2 ml vials in drawers, 10 levels	620 x 140 x 166	78202837	1, 2, 3	5	10	18
plus: drawer with grid for 2 ml vials, 120 pcs, Ø 12 mm	50 x 132 x 157	77031481		50	100	180
or drawer with grid for 2 ml vials, 80 pcs, Ø 14 mm	50 x 132 x 157	77031482		50	100	180
b) rack for 2 ml vials, 25 per level, 10 levels	620 x 85 x 85	78202835	1, 2, 3	3	4	6
plus: drawer with grid for 25 pcs 2 ml- / 5 ml vials	50 x 75 x 75	78202839		30	40	60
or cryobox, grid 5x5, for 25 pcs 2 ml vials	52 x 75 x 75	78212860		30	40	60
maximum storage capacity for 2 ml vials, Ø 12 mm				6,750	13,000	23,100
c) rack for 5 ml vials in drawers, 5 levels	620 x 140 x 166	78202838	1, 2, 3	5	10	18
plus: drawer with grid for 5 ml vials, 120 pcs, Ø 12 mm	100 x 132 x 157	77031483		25	50	90
or drawer with grid for 5 ml vials, 80 pcs, Ø 12 mm	100 x 132 x 157	77031484		25	50	90
d) rack for 5 ml vials, 25 per level, 5 levels	620 x 85 x 85	78202836	1, 2, 3	3	4	6
plus: drawer with grid for 25 pcs 2 ml- / 5 ml vials	50 x 75 x 75	78202839		15	20	30
maximum storage capacity for 5 ml vials, Ø 12 mm				3,375	6,500	11,550

Vials / Cryotubes in Cryoboxes Description	Dimensions (H x W x D) [mm]	Article-No.	Layout	BIOSAFE® 120 Capacity	BIOSAFE® 220 Capacity	BIOSAFE® 420 Capacity
e) rack for 2 ml vials in cryoboxes, 81/100, 10 levels	620 x 140 x 145	78202833	4, 5, 6	6	12	20
plus: cryobox grid 10x10 for 100 pcs 2 ml vials	53 x 132 x 132	78212859		60	120	200
or cryobox grid 9x9 for 81 pcs for 2 ml vials	53 x 132 x 132	78214364		60	120	200
f) rack for 2 ml vials, 25 per level, 10 levels	620 x 85 x 85	78202835	4, 5, 6	4	4	7
plus: cryobox grid 5x5 for 25 pcs 2 ml vials	52 x 75 x 75	78212860		40	40	70
maximum storage capacity for 2 ml vials Ø 12 mm				7,000	13,000	21,750
g) rack for 5 ml vials in cryoboxes 81, 5 levels	620 x 140 x 145	78202834	4, 5, 6	6	12	20
plus: cryobox grid 9x9 for 81 pcs 5 ml vials	95 x 132 x 132	78215707		30	60	100
h) rack for 5ml vials, 25 per level, 5 levels	620 x 85 x 85	78202836	4, 5, 6	4	4	7
plus: drawer with grid for 25 pcs 2 ml- / 5 ml vials	50 x 75 x 75	78202839		20	20	35
maximum storage capacity for 5ml vials Ø 12 mm				2,930	5,360	8,875

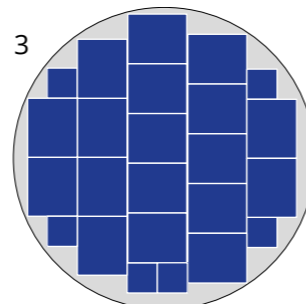
BIOSAFE® 120



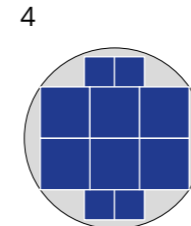
BIOSAFE® 220



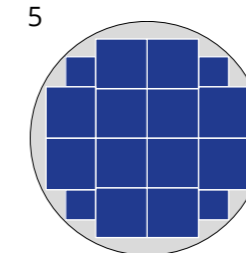
BIOSAFE® 420



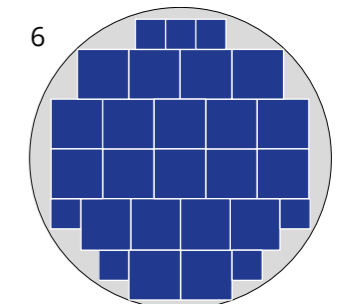
BIOSAFE® 120



BIOSAFE® 220



BIOSAFE® 420



Storage Capacity BIOSAFE® 120-220-420

Storage of Freezing Bags in Cassettes

Inside Height = 625 mm
with 32 Levels

Freezing bag rack of aluminium with 32 levels

dimensions (HxWxD):
575 x 95 x 165 mm



Freezing bag rack of aluminium with 10 levels and pivoting drawer bar for the storage of

2 ml vials in drawers with grid

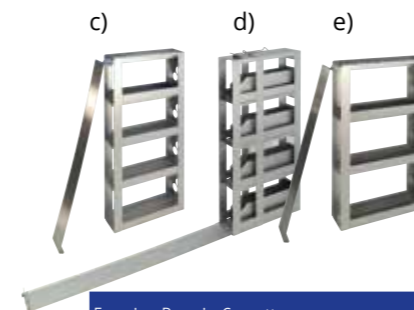
2 ml vials in drawers with grid

dimensions (HxWxD):
620 x 85 x 85 mm

Freezing Bags in Cassettes Description	Dimensions (H x W x D) [mm]	Article-No.	Layout	BIOSAFE® 120 Capacity	BIOSAFE® 220 Capacity	BIOSAFE® 420 Capacity
a) rack freezing bags in 32 levels	575 x 95 x 165	77031511	7, 8, 9	9	16	26
plus: cassette for freezing bags 4R9951, CryoMACS 50	161 x 85 x 12	77031514		288	512	832
b) rack for 2 ml vials, 25 per level, 10 levels	620 x 85 x 85	78202835	9	---	---	6
or: rack for 5 ml vials, 25 per level, 5 levels	620 x 85 x 85	78202836	9	---	---	6
maximum storage capacity for freezing bags 4R9951, CryoMACS 50				288	512	832
plus: maximum storage capacity for 2 ml vials Ø 12 mm				---	---	1,500

Storage of Freezing Bags in Cassettes

Inside Height = 625 mm
in 3 and 4 Levels



Freezing bag rack of aluminium

c) **with 4 levels** 620 x 80 x 280 mm

d) **with 4 levels** 620 x 80 x 285 mm

e) **with 3 levels** 580 x 80 x 305 mm



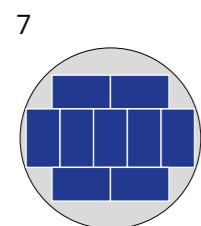
Freezing bag rack of aluminium with pivoting drawer bar

f) **with 10 levels**, 2 ml vials in drawers with grid
620 x 85 x 85 mm

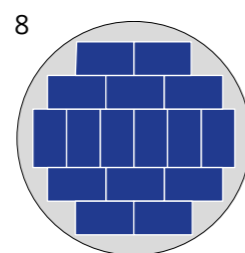
g) **with 5 levels**, 5 ml vials in drawers with grid
620 x 85 x 85 mm

Freezing Bags in Cassettes Description	Dimensions (H x W x D) [mm]	Article-No.	Layout	BIOSAFE® 120 Capacity	BIOSAFE® 220 Capacity	BIOSAFE® 420 Capacity
c) rack freezing bags in 4 levels, 4 x 3 double sections	620 x 80 x 280	78202831	10, 11, 12	6	10	20
plus: cassette for freezing bags 4R9955, 4R9953, CryoMACS 500	270 x 140 x 12	77031488		144	240	480
d) rack freezing bags in 4 levels, 4 x 5 single sections	620 x 80 x 285	78213389	10, 11, 12	6	10	20
plus: cassette for freezing bags 4R9955, 4R9953, CryoMACS 500	270 x 140 x 12	77031488		120	200	400
f) rack for 2 ml vials 25 per level, 10 levels	620 x 85 x 85	78202835	10, 11, 12	2	4	2
g) rack for 5 ml vials 25 per level, 5 levels	620 x 85 x 85	78202836	10, 11, 12	2	4	2
maximum storage capacity for freezing bags 4R9955, 4R9953, CryoMACS 500				144	240	480
plus: maximum storage capacity for 2 ml vials Ø 12 mm				500	1,500	500
e) rack freezing bags in 3 levels, for 15 pcs Hemofreeze type Z 2003 / DF 700	580 x 80 x 305	78202832	13, 14, 15	5	10	18
plus: cassette for freezing bags Hemofreeze type Z 2003 / DF 700	300 x 160 x 12	77031509		75	150	270
f) rack for 2ml vials 25 per level 10 levels	620 x 85 x 85	78202835	13, 14, 15	3	2	2
g) rack for 5ml vials 25 per level 5 levels	620 x 85 x 85	78202836	13, 14, 15	3	2	2
maximum storage capacity for freezing bags Hemofreeze type Z 2003 / DF 700				75	150	270
plus: maximum storage capacity for 2 ml vials Ø 12 mm				750	500	500

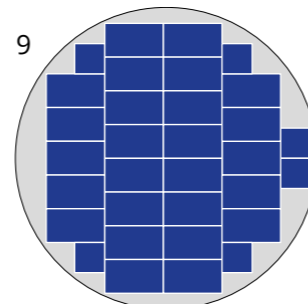
BIOSAFE® 120



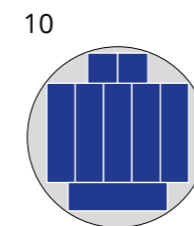
BIOSAFE® 220



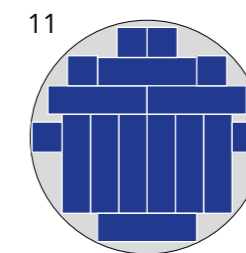
BIOSAFE® 420



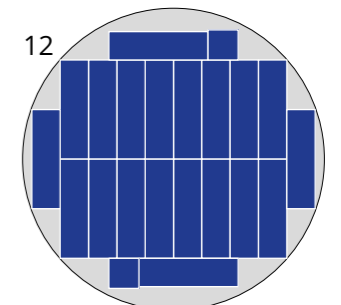
BIOSAFE® 120



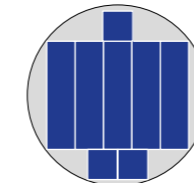
BIOSAFE® 220



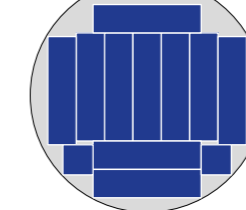
BIOSAFE® 420



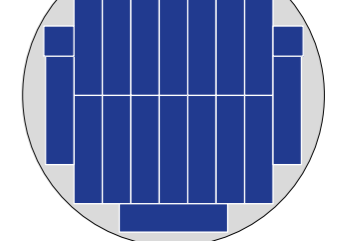
13



14



15



Storage Capacity BIOSAFE® 120-220-420

Storage of Vials / Cryotubes in Boxes / Racks in SBS Format
(Description: Matrixbox / Wellplate / Microtiterplates)
with the Basic Dimensions 127.76 x 85.48 mm

For the Storage of Straws (0.25 ml / 0.5 ml)
in Flat Cassettes / Goblets



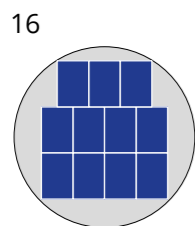
Racks of aluminium for SBS racks

- a) with 19/14/9 levels without pivoting drawer bar
620 x 89 x 130 mm
- b) with 19/14/9 levels with spring clips
620 x 89 x 130 mm
- c) with 16/13/9 levels with pivoting drawer bar
620 x 89 x 145 mm

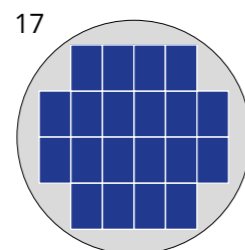
SBS Racks (127.76x85.48) in Racks Without Pivoting Drawer Bars or Spring Clips in Each Level or Level and Pivoting Drawer Bars	Dimensions (H x W x D) [mm]	Article-No.	Layout	BIOSAFE® 120 Capacity	BIOSAFE® 220 Capacity	BIOSAFE® 420 Capacity
a) rack for SBS racks (20-30 mm high), 19 levels without locking	620 x 89 x 130	*	16, 17, 18	11	20	40
rack for SBS racks (30-40 mm high), 14 levels without locking	620 x 89 x 130	*	16, 17, 18	11	20	40
rack for SBS racks (40-62 mm high), 9 levels without locking	620 x 89 x 130	*	16, 17, 18	11	20	40
b) rack for SBS racks (20-30 mm high), 19 levels with spring clips	620 x 89 x 130	*	16, 17, 18	11	20	40
rack for SBS racks (30-40 mm high), 14 levels with spring clips	620 x 89 x 130	*	16, 17, 18	11	20	40
rack for SBS racks (40-62 mm high), 9 levels with spring clips	620 x 89 x 130	*	16, 17, 18	11	20	40
c) rack for SBS racks (20-30 mm high), 16 levels with pivoting drawer bar	620 x 89 x 145	*	19, 20, 21	10	18	34
rack for SBS racks (30-40 mm high), 13 levels with pivoting drawer bar	620 x 89 x 145	*	19, 20, 21	10	18	34
rack for SBS racks (40-62 mm high), 9 levels with pivoting drawer bar	620 x 89 x 145	*	19, 20, 21	10	18	34

* on request

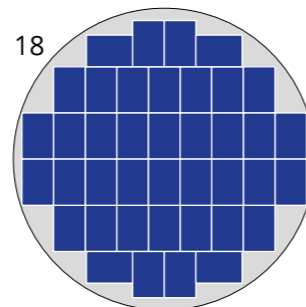
BIOSAFE® 120



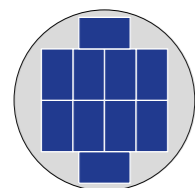
BIOSAFE® 220



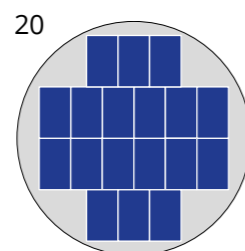
BIOSAFE® 420



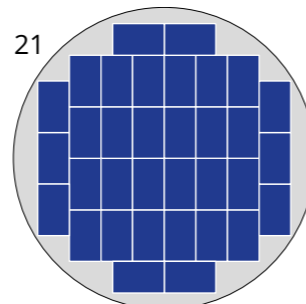
19



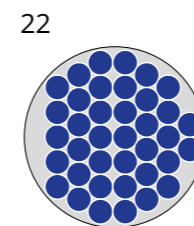
20



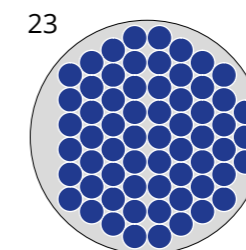
21



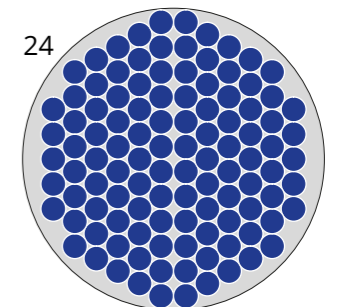
BIOSAFE® 120



BIOSAFE® 220



BIOSAFE® 420



Canister of aluminium for goblets
with lifter
Ø 70 x 620 mm



Goblets
Ø 65 x 120 mm

Straws in Canisters	Dimensions (Ø x H) [mm]	Article-No.	Layout	BIOSAFE® 120 Capacity	BIOSAFE® 220 Capacity	BIOSAFE® 420 Capacity
a) canister for goblets with lifter, 620 mm high, max. 4 goblets	Ø 70 x 620	78213016	22, 23, 24	38	63	110
plus: b) goblet diameter 65 mm, 120 mm high	Ø 65 x 120	78212792		152	252	440
maximum storage capacity for straws 0.25 ml				85,120	141,120	246,400
maximum storage capacity for straws 0.5 ml				31,920	52,920	92,400

Explanatory note: 1 goblet (Ø 65 x 120 mm) contains max. 560 pieces 0.25 ml straws or max. 210 pieces 0.5 ml straws

Storage Capacity BIOSAFE® 500-600-1000-1400

Storage in Drawers

Inside Height = 680, 800, 1100 mm

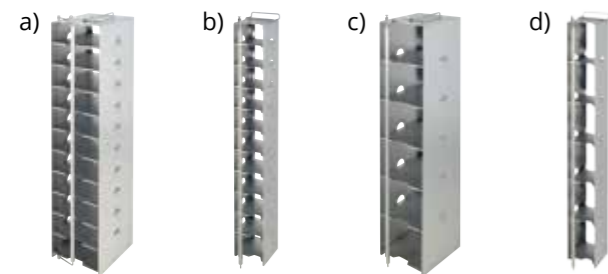
Vials / Cryotubes with 2 ml: Racks with 12, 13, 18 Levels

Vials / Cryotubes with 5 ml: Racks with 6, 7, 10 Levels

Storage in Cryoboxes

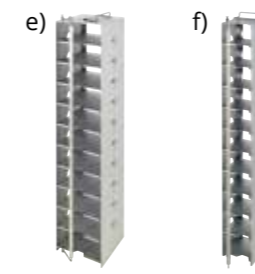
Inside Height = 680, 800, 1100 mm

Vials / Cryotubes with 2 ml: Racks with 12, 13, 18 Levels



Rack of aluminium for vials

- a) for 2 ml vials with 12/13/18 levels in drawers
- b) for 2 ml vials with 11/13/18 levels, 25 per level
- c) for 5 ml vials with 6/7/10 levels in drawers
- d) for 5 ml vials with 6/7/10 levels, 25 per level



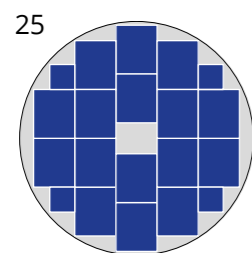
Rack of aluminium for vials

- e) for 2 ml vials with 12/13/18 levels in cryoboxes
- f) for 2 ml vials with 11/13/18 levels, 25 per level

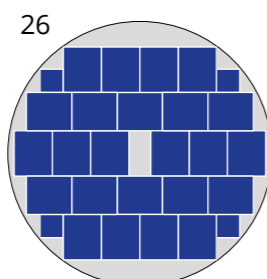
Vials / Cryotubes in Drawers	Dimensions (H x W x D) [mm]	Article-No.	Layout	BIOSAFE® 500 Capacity	BIOSAFE® 600 Capacity	BIOSAFE® 1000 Capacity	BIOSAFE® 1400 Capacity
a) rack for 2 ml vials in drawers, 12 levels	727 x 140 x 166	78220222	26, 27	---	24	34	---
rack for 2 ml vials in drawers, 13 levels	800 x 140 x 166	78214754	25	16	---	---	---
rack for 2 ml vials in drawers, 18 levels	1100 x 140 x 166	78221089	27	---	---	---	34
plus: drawer with grid for 2 ml vials, 120 pcs, Ø 12 mm	50 x 132 x 157	77031481		208	288	408	612
plus: drawer with grid for 2 ml vials, 80 pcs, Ø 14 mm	50 x 132 x 157	77031482		208	288	408	612
b) rack for 2 ml vials 25 per level, 11 levels	680 x 85 x 85	78213481	26, 27	---	4	8	---
rack for 2 ml vials 25 per level, 13 levels	800 x 85 x 85	78214755	25	4	---	---	---
rack for 2 ml vials 25 per level, 18 levels	1100 x 85 x 85	78221090	27	---	---	---	8
plus: drawer with grid for 25 pcs, 2 ml / 5 ml vials	50 x 75 x 75	78202839		52	44	88	144
or cryobox, grid 5x5 for 25 pcs, 2 ml vials	52 x 75 x 75	78212860		52	44	88	144
maximum storage capacity for 2 ml vials Ø 12 mm				26,260	35,660	51,160	77,040
c) rack for 5 ml vials in drawers 6 levels	680 x 140 x 166	77031480	26, 27	---	24	34	---
rack for 5 ml vials in drawers 7 levels	800 x 140 x 166	78215713	25	16	---	---	---
rack for 5 ml vials in drawers 10 levels	1100 x 140 x 166	78209913	27	---	---	---	34
plus: drawer with grid for 5 ml vials 120 pcs, Ø 12 mm	100 x 132 x 157	77031483		112	144	204	340
or drawer with grid for 5 ml vials 80 pcs Ø 14 mm	100 x 132 x 157	77031484		112	144	204	340
d) rack for 5 ml vials 25 per level, 6 levels	680 x 85 x 85	78215714	26, 27	---	4	8	---
rack for 5 ml vials 25 per level, 7 levels	800 x 85 x 85	78215715	25	4	---	---	---
rack for 5 ml vials 25 per level, 10 levels	1100 x 85 x 85	78215716	27	---	---	---	8
plus: drawer with grid for 25 pcs 2 ml / 5 ml vials	50 x 75 x 75	78202839		28	24	48	80
maximum storage capacity for 5 ml vials Ø 12 mm				14,140	17,880	25,680	42,800

Vials / Cryotubes in Cryoboxes	Dimensions (H x W x D) [mm]	Article-No.	Layout	BIOSAFE® 500 Capacity	BIOSAFE® 600 Capacity	BIOSAFE® 1000 Capacity	BIOSAFE® 1400 Capacity
e) rack for 2 ml vials in cryoboxes, 81/100, 12 levels	727 x 140 x 145	78215717	29, 30	---	26	38	---
rack for 2 ml vials in cryoboxes, 81/100, 13 levels	800 x 140 x 145	78213935	28	16	---	---	---
rack for 2 ml vials in cryoboxes, 81/100, 18 levels	1100 x 140 x 145	78215718	30	---	---	---	38
plus: cryobox grid 10x10 for 100 pcs 2 ml vials	53 x 132 x 132	78212859		208	312	456	684
or cryobox grid 9x9 for 81 pcs 2 ml vials	53 x 132 x 132	78214364		208	312	456	684
f) rack for 2 ml vials 25 per level, 11 levels	680 x 85 x 85	78213481	29, 30	---	12	4	---
rack for 2 ml vials 25 per level, 13 levels	800 x 85 x 85	78214755	28	6	---	---	---
rack for 2 ml vials 25 per level, 18 levels	1100 x 85 x 85	78221090	30	---	---	---	4
plus: drawer with grid for 25 pcs 2 ml / 5 ml vials	50 x 75 x 75	78202839		78	132	44	72
or cryobox grid 5x5 for 25 pcs, 2 ml vials	52 x 75 x 75	78212860		78	132	44	72
maximum storage capacity for 2 ml vials Ø 12 mm				22,750	32,100	46,700	70,200

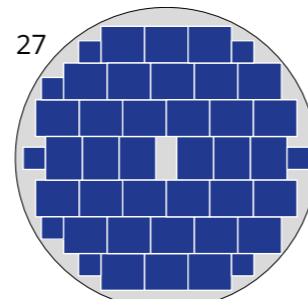
BIOSAFE® 500



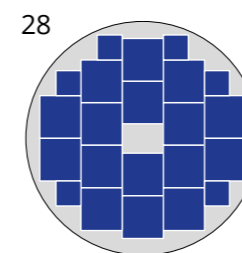
BIOSAFE® 600



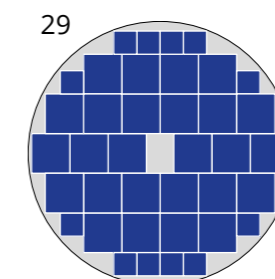
BIOSAFE® 1000/1400



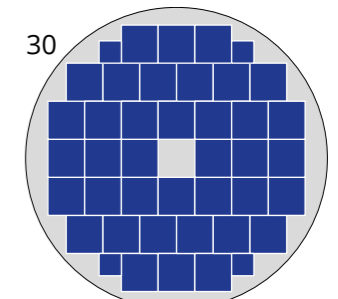
BIOSAFE® 500



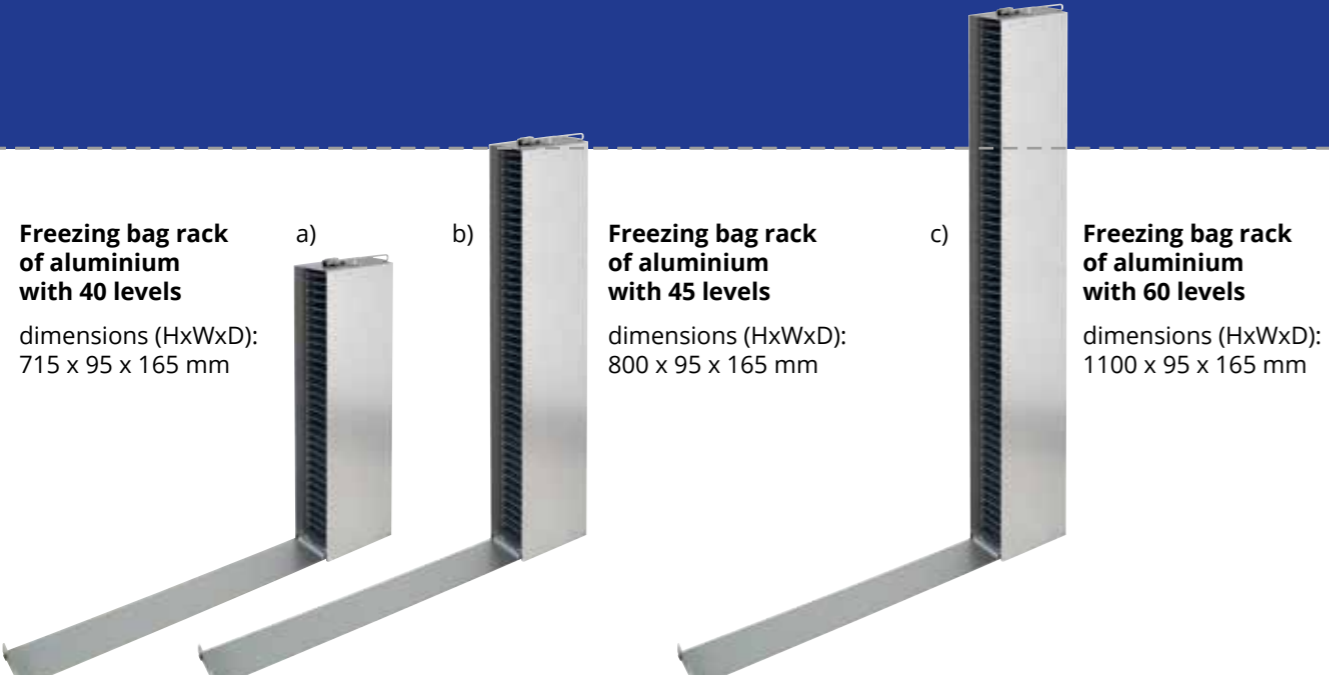
BIOSAFE® 600



BIOSAFE® 1000/1400



Racks for Freezing Bags in Cassettes



Freezing bag rack of aluminium with 40 levels

dimensions (HxWxD):
715 x 95 x 165 mm

Freezing bag rack of aluminium with 45 levels

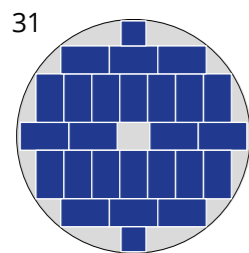
dimensions (HxWxD):
800 x 95 x 165 mm

Freezing bag rack of aluminium with 60 levels

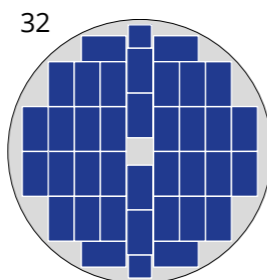
dimensions (HxWxD):
1100 x 95 x 165 mm

Freezing Bags in Cassettes	Dimensions (H x W x D) [mm]	Article-No.	Layout	BIOSAFE® 500 Capacity	BIOSAFE® 600 Capacity	BIOSAFE® 1000 Capacity	BIOSAFE® 1400 Capacity
a) rack for freezing bags in 40 levels	715 x 95 x 165	78215708	32, 33	---	36	52	---
b) rack for freezing bags in 45 levels	800 x 95 x 165	78215709	31	24	---	---	---
c) rack for freezing bags in 60 levels	1100 x 95 x 165	78215710	33	---	---	---	52
plus: cassette for freezing bags 4R9951, CryoMACS 50	161 x 85 x 12	77031514		1,080	1,440	2,080	3,120
rack for 2 ml vials 25 per level, 11 levels	680 x 85 x 85	78213481		---	2	---	---
rack for 2 ml vials 25 per level, 13 levels	800 x 85 x 85	78214755		2	---	---	---
rack for 2 ml vials 25 per level, 18 levels	1100 x 85 x 85	78221090		---	---	---	---
plus: drawer with grid for 25 pcs 2 ml / 5 ml vials	50 x 75 x 75	78202839		26	22	---	---
or cryobox grid 5x5 for 25 pcs, 2 ml vials	52 x 75 x 75	78212860		26	22	---	---
maximum storage capacity for freezing bags 4R9951, CryoMACS 50		77031514		1,080	1,440	2,080	3,120
plus: maximum storage capacity for 2 ml vials Ø 12 mm				650	550	---	---

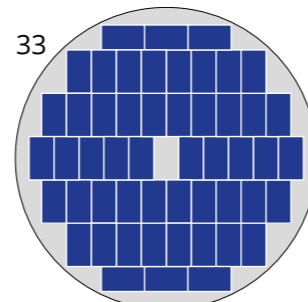
BIOSAFE® 500



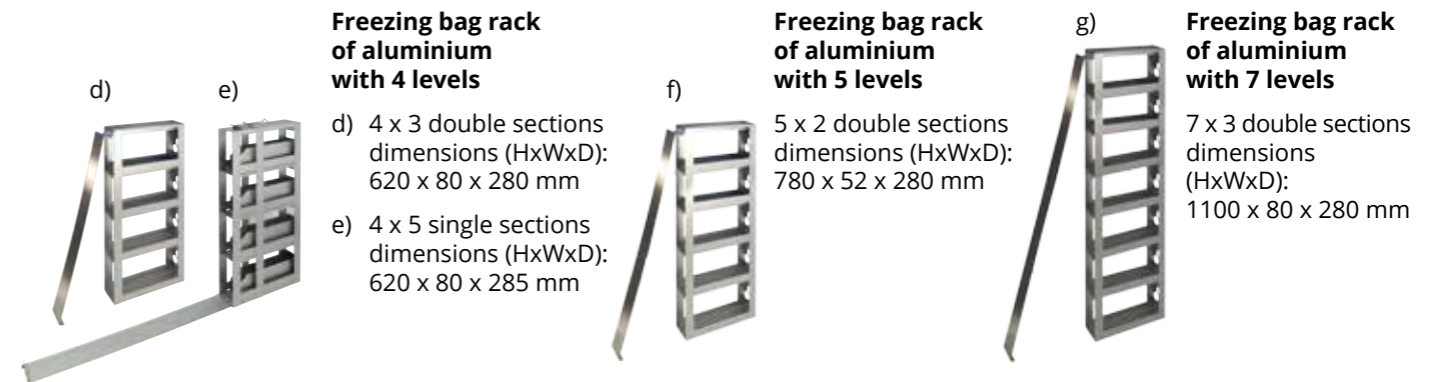
BIOSAFE® 600



BIOSAFE® 1000/1400



Racks for Freezing Bags in Cassettes



Freezing bag rack of aluminium with 4 levels

d) 4 x 3 double sections
dimensions (HxWxD):
620 x 80 x 280 mm

e) 4 x 5 single sections
dimensions (HxWxD):
620 x 80 x 285 mm

Freezing bag rack of aluminium with 5 levels

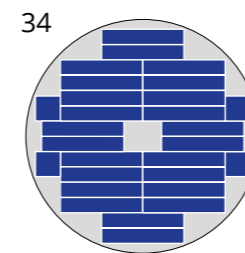
f) 5 x 2 double sections
dimensions (HxWxD):
780 x 52 x 280 mm

Freezing bag rack of aluminium with 7 levels

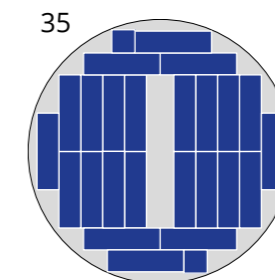
g) 7 x 3 double sections
dimensions (HxWxD):
1100 x 80 x 280 mm

Freezing Bags in Cassettes	Dimensions (H x W x D) [mm]	Article-No.	Layout	BIOSAFE® 500 Capacity	BIOSAFE® 600 Capacity	BIOSAFE® 1000 Capacity	BIOSAFE® 1400 Capacity
d) rack for freezing bags in 4 levels 4 x 3 double sections	620 x 80 x 280	78202831	35, 36	---	24	36	---
plus: cassette for freezing bags 4R9955, 4R9953, CryoMACS 500	270 x 140 x 12	77031488		---	576	864	---
e) rack for freezing bags in 4 levels 4 x 5 single sections	620 x 80 x 285	78213389		---	24	36	---
plus: cassette for freezing bags 4R9955, 4R9953, CryoMACS 500	270 x 140 x 12	77031488		---	480	720	---
f) rack for freezing bags in 5 levels 5 x 2 double sections	780 x 52 x 280	78214757	34	24	---	---	---
plus: cassette for freezing bags 4R9955, 4R9953, CryoMACS 500	270 x 140 x 12	77031488		480	---	---	---
g) rack for freezing bags in 7 levels 7 x 3 double sections	1100 x 80 x 280	78215711	36	---	---	---	36
plus: cassette for freezing bags 4R9955, 4R9953, CryoMACS 500	270 x 140 x 12	77031488		---	---	---	1,512
rack for 2 ml vials 25 per level, 11 levels	680 x 85 x 85	78213481	35, 36	---	2	4	---
rack for 2 ml vials 25 per level, 13 levels	800 x 85 x 85	78214755		4	---	---	---
rack for 2 ml vials 25 per level, 18 levels	1100 x 85 x 85	78221090	36	---	---	---	4
plus: drawer with grid for 25 pcs 2 ml / 5 ml vials	50 x 75 x 75	78202839		52	22	44	72
or cryobox grid 5x5 for 25 pcs, 2 ml vials	52 x 75 x 75	78212860		52	22	44	72
max. storage capacity f. freezing p. 4R9955, 4R9953, CryoMACS 500		77031488		480	576	864	1,512
plus: maximum storage capacity for 2 ml vials Ø 12 mm				1,300	550	1,100	1,800

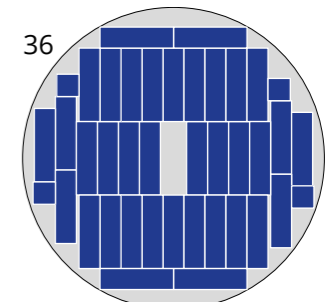
BIOSAFE® 500



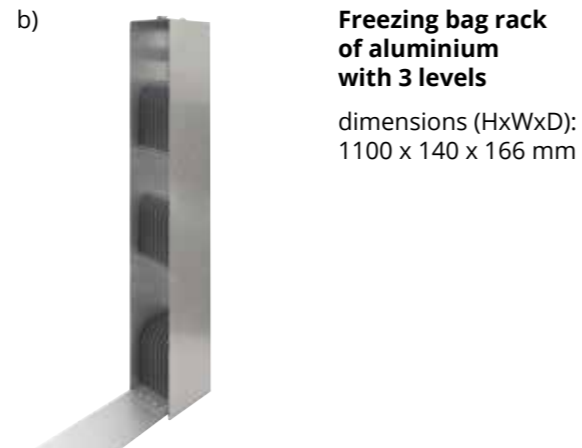
BIOSAFE® 600



BIOSAFE® 1000/1400

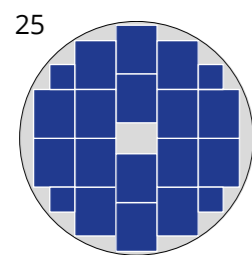


Racks for Freezing Bags in Cassettes

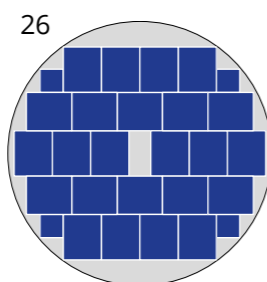


Freezing Bags in Cassettes	Dimensions (H x W x D) [mm]	Article-No.	Layout	BIOSAFE® 500 Capacity	BIOSAFE® 600 Capacity	BIOSAFE® 1000 Capacity	BIOSAFE® 1400 Capacity
a) rack for freezing bags in 2 levels, for 18 pcs Hemofreeze type Z 2003	680 x 140 x 166	77031508	25, 26, 27	16	24	34	---
b) rack for freezing bags in 3 levels, for 27 pcs Hemofreeze type Z 2003	1100 x 140 x 166	78215712	27	---	---	---	34
plus: cassette for freezing bags Hemofreeze type Z 2003	300 x 160 x 12	77031509		288	432	612	918
rack for 2 ml vials 25 per level, 11 levels	680 x 85 x 85	78213481	26	--	4	8	--
rack for 2 ml vials 25 per level, 13 levels	800 x 85 x 85	78214755	25	4	--	--	--
rack for 2 ml vials 25 per level, 17 levels	1100 x 85 x 85	78213385	27	--	--	--	8
plus: drawer with grid for 25 pcs 2 ml / 5ml vials	50 x 75 x 75	78202839		52	44	88	144
or cryobox grid 5x5 for 25 pcs, 2 ml vials	52 x 75 x 75	78212860		52	44	88	144
maximum storage capacity f. freezing p. Hemofreeze type Z 2003		77031509		288	432	612	918
plus: maximum storage capacity for 2 ml vials Ø 12 mm				1,300	1,100	2,200	3,600

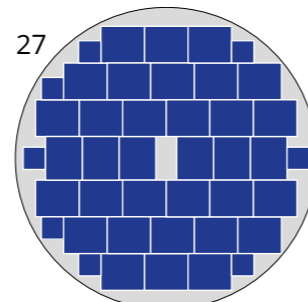
BIOSAFE® 500



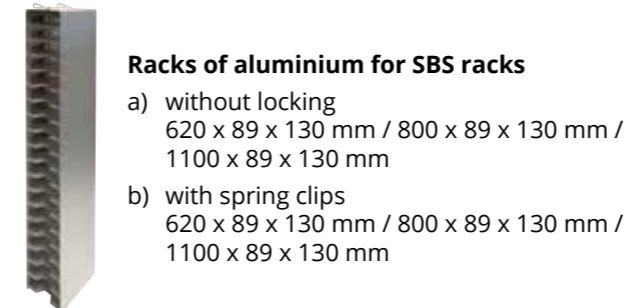
BIOSAFE® 600



BIOSAFE® 1000/1400



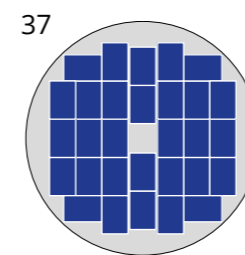
For Storage of Vials / Cryotubes in Boxes / Racks in SBS Format (Description: Maxtrixbox / Wellplate / Microtiterplates) with the Basic Dimensions = 127.76 x 85.48 mm



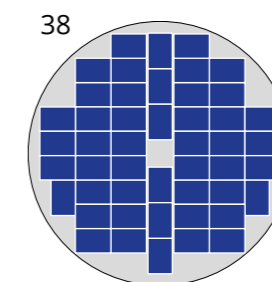
SBS Racks (127.76 x 85.48) in Racks Without Locking or with Spring Clips in Each Level or with Levels and Clamps	Dimensions (H x W x D) [mm]	Article-No.	Layout	BIOSAFE® 500 Capacity	BIOSAFE® 600 Capacity	BIOSAFE® 1000 Capacity	BIOSAFE® 1400 Capacity
a) rack for SBS racks (20-30 mm high) 21 levels, without locking	680 x 89 x 130	*	38, 39	---	48	72	---
rack for SBS racks (30-40 mm high) 16 levels, without locking	680 x 89 x 130	*	38, 39	---	48	72	---
rack for SBS racks (40-62 mm high) 10 levels, without locking	680 x 89 x 130	*	38, 39	---	48	72	---
rack for SBS racks (20-30 mm high) 24 levels, without locking	800 x 89 x 130	*	37	30	---	---	---
rack for SBS racks (30-40 mm high) 18 levels, without locking	800 x 89 x 130	*	37	30	---	---	---
rack for SBS racks (40-62 mm high) 12 levels, without locking	800 x 89 x 130	*	37	30	---	---	---
rack for SBS racks (20-30 mm high) 12 levels, without locking	1100 x 89 x 130	*	39	---	---	---	72
rack for SBS racks (30-40 mm high) 26 levels, without locking	1100 x 89 x 130	*	39	---	---	---	72
rack for SBS racks (40-62 mm high) 17 levels, without locking	1100 x 89 x 130	*	39	---	---	---	72
b) rack for SBS racks (20-30 mm high) 21 levels, with spring clips	680 x 89 x 130	*	38, 39	---	48	72	---
rack for SBS racks (30-40 mm high) 16 levels, with spring clips	680 x 89 x 130	*	38, 39	---	48	72	---
rack for SBS racks (40-62 mm high) 10 levels, with spring clips	680 x 89 x 130	*	38, 39	---	48	72	---
rack for SBS racks (20-30 mm high) 24 levels, with spring clips	800 x 89 x 130	*	37	30	---	---	---
rack for SBS racks (30-40 mm high) 18 levels, with spring clips	800 x 89 x 130	*	37	30	---	---	---
rack for SBS racks (40-62 mm high) 12 levels, with spring clips	800 x 89 x 130	*	37	30	---	---	---
rack for SBS racks (20-30 mm high) 12 levels, with spring clips	1100 x 89 x 130	*	39	---	---	---	72
rack for SBS racks (30-40 mm high) 26 levels, with spring clips	1100 x 89 x 130	*	39	---	---	---	72
rack for SBS racks (40-62 mm high) 17 levels, with spring clips	1100 x 89 x 130	*	39	---	---	---	72

* on request

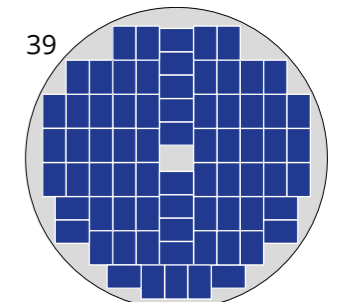
BIOSAFE® 500



BIOSAFE® 600



BIOSAFE® 1000/1400



Storage Capacity BIOSAFE® 500-600-1000-1400

For Storage of Vials / Cryotubes in Boxes / Racks in SBS Format
(Description: Maxtribox / Wellplate / Microtiterplates)
with the Basic Dimensions = 127.76 x 85.48 mm

For Storage of Straws (0.25 ml / 0.5 ml)
in Flat Cassettes / Goblets

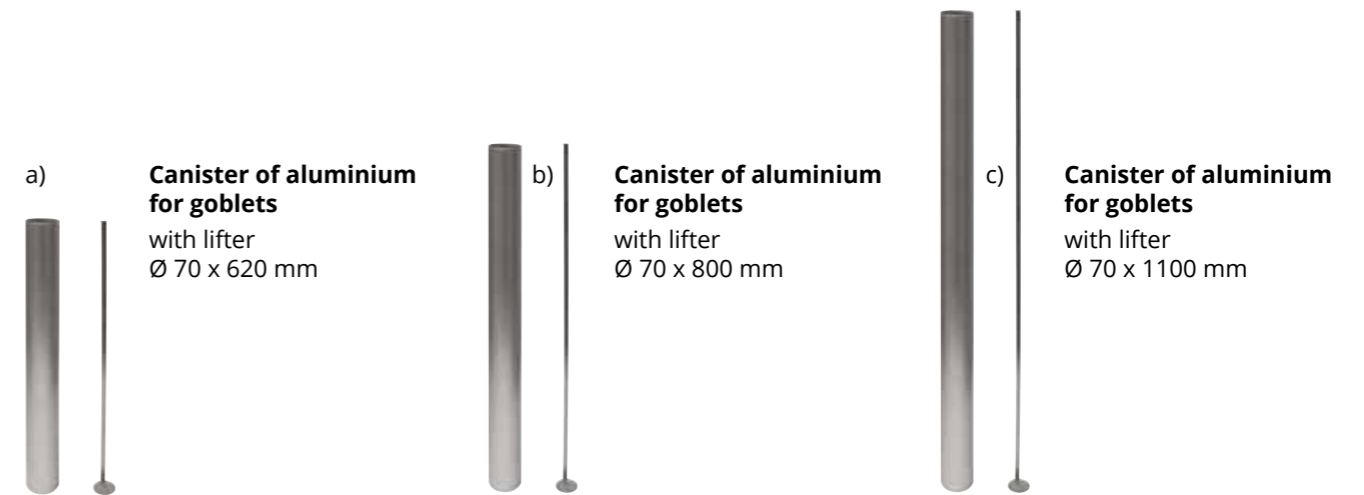


Racks of aluminium for SBS racks

- c) with pivoting drawer bar
 - 620 x 89 x 145 mm
 - 800 x 89 x 145 mm
 - 1100 x 89 x 145 mm

SBS Racks (127.76 x 85.48) in Racks Without Locking or with Spring Clips in Each Level or with Levels and Clamps	Dimensions (H x W x D) [mm]	Article-No.	Layout	BIOSAFE® 500 Capacity	BIOSAFE® 600 Capacity	BIOSAFE® 1000 Capacity	BIOSAFE® 1400 Capacity
c) rack for SBS racks (20-30 mm high), 18 levels, with pivoting drawer bar	680 x 89 x 145	*	41, 42	---	42	64	---
rack for SBS racks (30-40 mm high), 14 levels, with pivoting drawer bar	680 x 89 x 145	*	41, 42	---	42	64	---
rack for SBS racks (40-62 mm high), 9 levels, with pivoting drawer bar	680 x 89 x 145	*	41, 42	---	42	64	---
rack for SBS racks (20-30 mm high), 21 levels, with pivoting drawer bar	800 x 89 x 145	*	40	28	---	---	---
rack for SBS racks (30-40 mm high), 17 levels, with pivoting drawer bar	800 x 89 x 145	*	40	28	---	---	---
rack for SBS racks (40-62 mm high), 11 levels, with pivoting drawer bar	800 x 89 x 145	*	40	28	---	---	---
rack for SBS racks (20-30 mm high), 30 levels, with pivoting drawer bar	1100 x 89 x 145	*	42	---	---	---	64
rack for SBS racks (30-40 mm high), 23 levels, with pivoting drawer bar	1100 x 89 x 145	*	42	---	---	---	64
rack for SBS racks (40-62 mm high), 16 levels, with pivoting drawer bar	1100 x 89 x 145	*	42	---	---	---	64

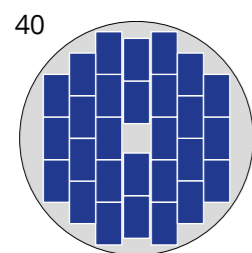
* on request



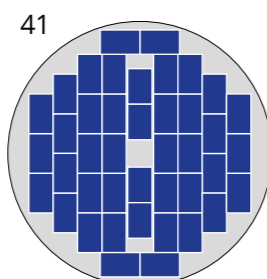
Straws in Canisters	Dimensions (Ø x H) [mm]	Article-No.	Layout	BIOSAFE® 500 Capacity	BIOSAFE® 600 Capacity	BIOSAFE® 1000 Capacity	BIOSAFE® 1400 Capacity
a) canister for goblets with lifter 620 mm high, max. 4 goblets	Ø 70 x 620	78213016	44, 45	---	120	212	---
b) canister for goblets with lifter 800 mm high, max. 5 goblets	Ø 70 x 800	78215719	43	100	---	---	---
c) canister for goblets with lifter 1100 mm high, max. 7 goblets	Ø 70 x 1100	78215720	45	---	---	---	212
plus: goblets diameter 65 mm, 120 mm high	Ø 65 x 120	78212792		500	480	848	1,484
maximum storage capacity for straws 0.25 ml				280,000	268,800	474,880	831,040
maximum storage capacity for straws 0.5 ml				105,000	100,800	178,080	311,640

Explanatory note: 1 goblet (Ø 65 x 120 mm) contains max. 560 pcs 0.25 ml straws or max. 210 pcs 0.5 ml straws

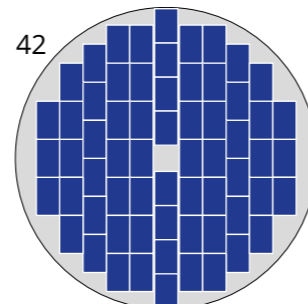
BIOSAFE® 500



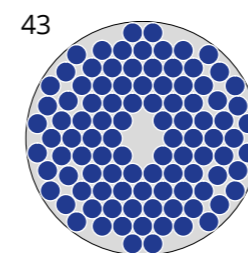
BIOSAFE® 600



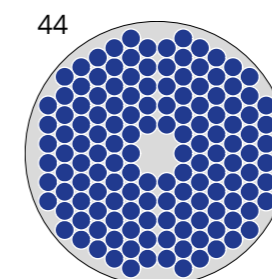
BIOSAFE® 1000/1400



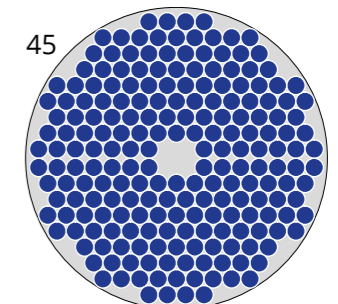
BIOSAFE® 500



BIOSAFE® 600



BIOSAFE® 1000/1400





Cassettes with various locks

Frame for cryotubes and cassettes

Rack-Numbers (Set) 35 x 25 mm incl. Screws	Article-No.	Colour
1-5	78211733	red
6-10	78211732	blue
11-15	78211731	black
16-20	78211730	red
21-25	78311729	blue
26-30	78202816	black
31-35	78202817	red
36-40	78212510	blue
41-45	78213671	black
46-50	78215212	red
51-55	78215213	blue
56-60	78215214	black
61-65	78215215	Rot

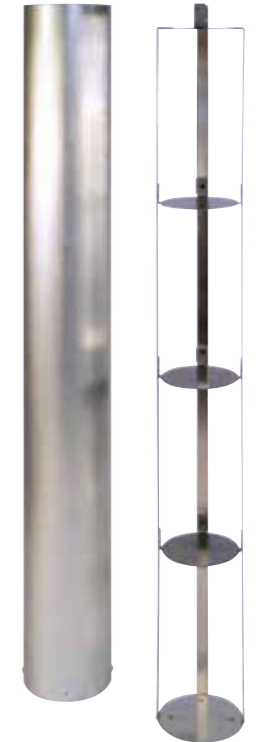
Rack-Numbers (Set) as Chips	Article-No.	Colour
1-4	77031486	black
1-8	77031515	black
1-16	77031487	black
1-24	77031517	black



Racks for packages and boxes



Rack with swing door

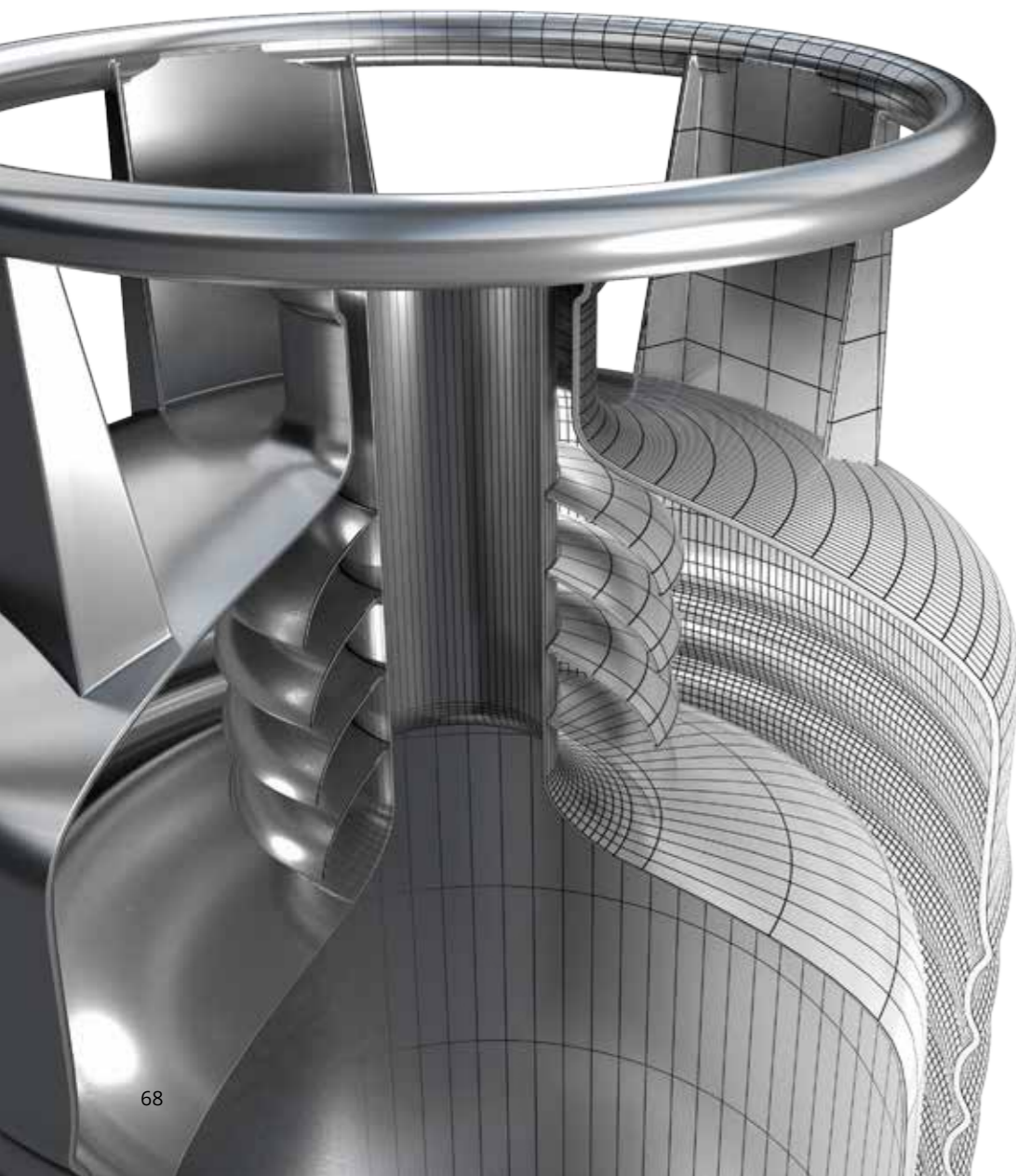


Canister with lifter (4 floors)

Further variations are possible. Please contact us to discuss your requirements.

Helium Vessels

LHe Liquid Helium
-269°C



<p>HELIOS® Vacuum Super-Insulated Storage Vessels for Stationary Use (100 - 10,000 l)</p>	70 - 71
<p>STRATOS® SL-Serie Vacuum Super-Insulated Transport Vessel for Stationary and and Mobile Use (100 - 1,000 l)</p>	72 - 75
<p>STRATOS® 110 Vacuum Super-Insulated Transport Vessel for Stationary and and Mobile Use</p>	76 - 77
<p>Helium-Siphon For Easy Extraction of Liquid Helium</p>	78 - 83

LHe

Efficiency Coupled with Minimal Loss due to Evaporation



The vacuum super-insulation vessels of the HELIOS®-Series provide for the storage of cryogenic liquid helium. Due to a robust model, best choice of materials and perfect manufacturing HELIOS®-vessels ensure the lowest possible loss due to evaporation available on the market.

Standard Features:

- 4 smooth-running castors, 2 with brakes
- hand ring
- pressure gauge
- power excess valve device 70 mbar, lockable
- vacuum lock safety valve DN 40

Convincing advantages:

- efficient helium-exhaust cooling system
- low evaporation rate (only 0.9%/day with HELIOS® 100 A)
- compact dimensions
- robust construction made of highly corrosion-resistant cryogenic stainless steel and high-strength aluminium
- optimised super-insulation by means of multi-layered vacuum insulation and computer optimised thermodynamic construction with shields
- inner and outer vessels tested separately by helium leak test
- by means of high-grade adsorption and getter materials
- safety neck pipe
- integrated vacuum seal-off and safety device and integrated safety device on the safety head
- smooth-running, sturdy castors
- low maintenance requirements
- wide range of accessories

Options:

- safety head HESA DN 32 with exhaust, pressure build-up and evacuation connection
 - exhaust ball valve
 - safety neck pipe
 - KF 32 centring and clamping ring
 - safety valve 1 bar, component tested to -269 °C
- siphon connection Ø 9.6 / 10 / 12 / 12.7 / 16 mm (only in connection with safety head)
- clamping ring KF 25
- centring ring with O-ring (KF 25)
- hose nozzle with KF 25 for pressure build-up
- PVC-hose for pressure build-up
- level sensor, rod form 12 mm
- level sensor, KF 32 intermediate piece
- digital level indicator

Technical Data				
Vessel Name		HELIOS® 50A	HELIOS® 100A	HELIOS® 100
vessel material		Aluminium	Aluminium	Aluminium
approval mark		CE	CE	CE
geometrical capacity	[l]	52	103	103
operating overpressure, max.	[bar]	1.0	1.0	1.0
weight empty	[kg]	46	74	125
weight full	[kg]	52	86	137
stat. evaporation rate	[%/day]	1.3	0.9	0.9
total height	[mm]	1,150	1,210	1,325
total width	[mm]	550	700	700
castor diameter	[mm]	100	125	125
neck pipe diameter	[mm]	32	32	32
connection		KF 32	KF 32	KF 32
article-no.		0791183	0791185	0791184

We would be happy to to manufacture vessels up to a geometrical capacity of 10,000 litres also to your specified dimensions according to your specific requirements. Please contact us.

STRATOS® SL-Series (Super Light)

LHe LNe

Transport Vessels for Liquid Helium:
Light, Economical and Practical



Convincing advantages:

- efficient helium-exhaust cooling system
- low evaporation rate (only 0.9%/day with STRATOS® 100 SL)
- robust transport frame
- compact dimensions
- safety neck pipe
- integrated vacuum seal-off and safety device and integrated safety device on the safety head
- smooth-running, sturdy castors
- safety head with exhaust, pressure build-up and evacuation connection
- lockable power excess voltage device (70 mbar)
- various extraction devices possible
- transfer-pressure 0-500 mbar
- optimised super insulation by means of multi-layered vacuum insulation and computer optimised thermodynamic construction with shields
- low maintenance requirements
- wide range of accessories

Of course, cryo-vessels have been approved according to the directive on Transportable Pressure Equipment (TPED) and the European Agreement concerning the International Carriage of Dangerous Goods by Road and Rail (ADR/RID) with the π label.

The high level economical standard of the systems is augmented by the highly efficient use of exhaust gas for cooling the neck pipe, the radiation shields and the insulation.



Vacuum super-insulated transport and supply vessels for stationary and mobile use. Exploit the many advantages of the STRATOS®-Series for your applications with cryogenic, liquid helium. Easy-to-handle and high safety standards are the distinguishing features of this lightweight. With lots of experience, technical know-how and highly qualified manufacturing we can produce these high-tech vessels.

Convincing Option:

Highly Efficient, Electric Pressure Build-Up Control Device for STRATOS® 250SL, 380SL and 1000SL

An economical and also space saving solution of the integrated heating system. It enables a controlled pressure build-up for easy extraction of helium without external helium-pressure gas.

An optimised heating system evaporates liquid helium and overheats the helium gas in order to achieve good pressure efficiency.

STRATOS® SL-Series (Super Light)

LHe LNe

So that You have it Easy



Options:

Integrated, Patented LHe Extraction Siphon with Anti-Oscillating Device and Filling Adapters

This extraction system can be employed with STRATOS® 250, 380 and 1000 in order to prevent thermo-acoustic vibration when there is a standstill.

To fill the STRATOS® vessels and extraction from the STRATOS® vessels adapters are available with various dimensions suitable for the user.



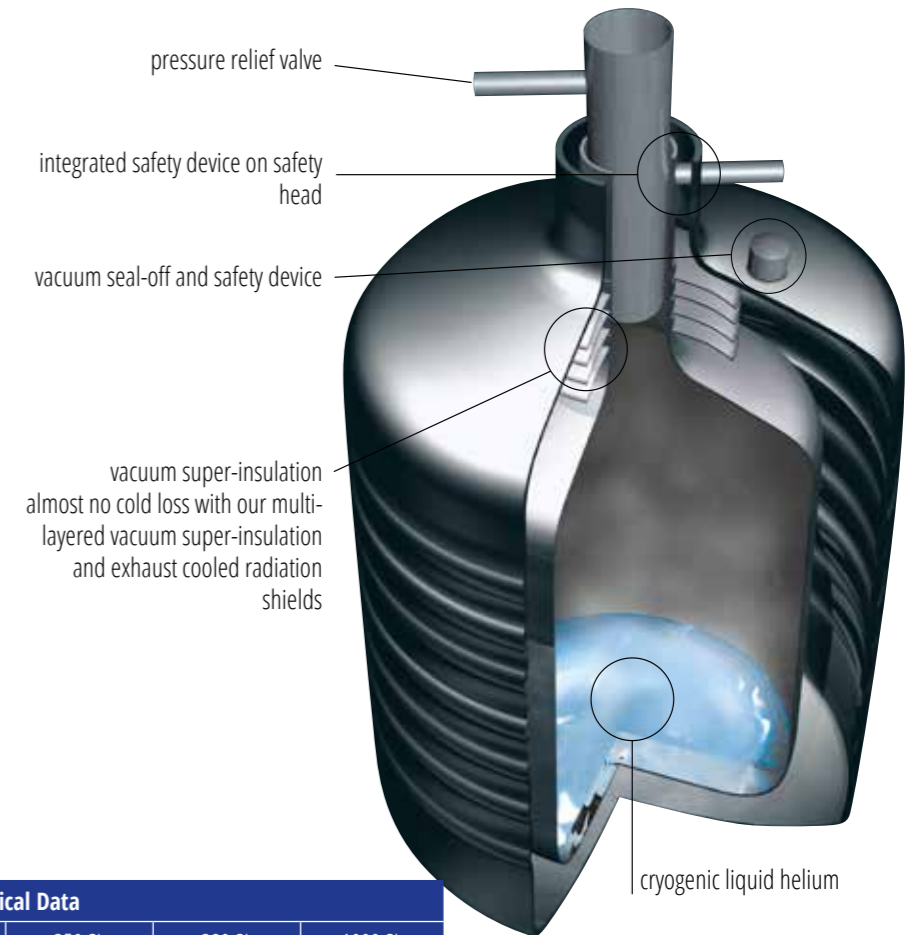
level control devices



Beside the functions as transport and supply vessels the smaller STRATOS® are also ideal for execution of Cryo-experiments. STRATOS® 250-1000SL serve as liquid helium suppliers to MR-tomographs and large cryostats.

As Accessories to STRATOS® Vessels we Offer:

- an anti-oscillation device
- integrated siphon
- level indicator
- adapter set for MRT-filling
- anti-magnetic castors
- adjustable electric pressure build-up
- and lots more



Convincing advantages:

- simple and safe: no more siphon installation
- extraction tube always remains cold
- no helium loss from siphon installation
- ideal for rooms with low height
- low investment costs for siphon and adapter systems to fill by various users
- low wear of siphon due to installation into the vessel
- patented anti-oscillation system ensures low evaporation rates

Technical Data					
Vessel Name		100 SL	250 SL	380 SL	1000 SL
vessel material		aluminium	aluminium	aluminium	aluminium
approval mark		Π	Π	Π	Π
geometrical capacity	[l]	103	263	380	999
operating overpressure, max.	[bar]	1.5	1.5	1.5	1.5
weight empty	[kg] ¹⁾	56	90	106	300
weight full	[kg] ¹⁾	68	121	151	420
stat. evaporation rate	[%/day]	0.9	1.8	1.4	0.5
total height	[mm]	1,405	1,550	1,900	2,020
total width	[mm]	700	750	750	1,200
diameter outer	[mm]	700	740	740	1,220
diameter castor	[mm]	100	125	125	160
neck pipe diameter	[mm]	55	80	80	80
connection		KF 50	KF 25	KF 25	KF 25
article-no.		79421109	78200868	78200900	78200904

¹⁾ The actual weight of the vessels can fluctuate depending on the exact features

STRATOS® vessels are also available in stainless steel

LHe LNe

Transport Vessel for Liquid Helium

Robust, Economical and Practical



Convincing advantages:

- helium-exhaust cooling system
- low evaporation rate (only 0.9%)
- long-term vacuum protection by means of high-grade adsorption and getter materials
- optimised super-insulation by means of multi-layered vacuum insulation and computer optimised thermodynamic construction use of shields
- inner and outer vessels tested separately by helium leak test
- integrated vacuum seal-off and safety device and integrated safety devices on the safety head
- robust construction made of highly corrosion-resistant cryogenic stainless steel
- low maintenance requirements
- wide range of accessories

Storage and transport vessel for cryogenic liquid helium with vacuum super-insulation and long-term vacuum protection approved according to European Pressure Equipment Directive (TPED).

Contributing factors to the high level of economic efficiency of the systems are the highly efficient usage of exhaust gases to cool the neck pipe, the radiation shields and the insulation.

Standard Features:

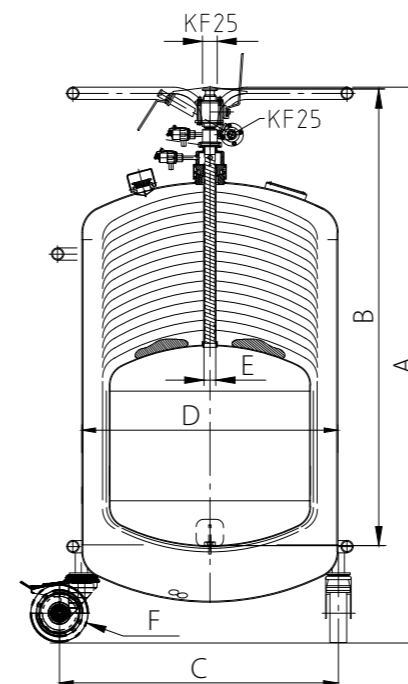
- safety neck pipe
- vacuum seal-off and safety device and integrated safety devices on safety head
- smooth-running, sturdy castors
- Safety head with exhaust, pressure build-up and evacuation connection
- overflow device can be shut off (70 m bar)



Options:

- vacuum insulated transfer siphons
- various siphon connections (Ø 9.6 / 10 / 12 / 12.7 / 16 mm)
- level sensor
- level indicator
- anti-magnetic castors
- cryo-protective features
- IATA features

Further special options on request



Technical Data		
Vessel Name		STRATOS® 110
vessel material		stainless steel
approval mark		π
geometrical capacity	[l]	111
operating overpressure, max.	[bar]	1.5
weight empty	[kg]	145
weight full	[kg]	158
stat. evaporation rate	[%/day]	0.9
total height	A [mm]	1,520
diameter outer	D [mm]	700
total width	C [mm]	784
depth of immersion	B [mm]	1,249
diameter castor	F [mm]	160
diameter neck	E [mm]	32
siphon connection		KF 25
article-no.		78220309

Vacuum Insulated Transfer Siphon

LHe

Super-Insulated and Highly Flexible



Permanently Installed Siphon in STRATOS® Vessel with Patented Anti-Oscillation Device:

- Low Evaporation Rate
- No Helium Loss During Siphon Installation
- Ideal for Room with Low Height
- Low Wear of Siphon due to Installation into the Vessel

The liquid helium is withdrawn from a vessel using a siphon, which is available in various models:

- Angle siphon
- Siphon with flexible line
- Siphon with rigid line

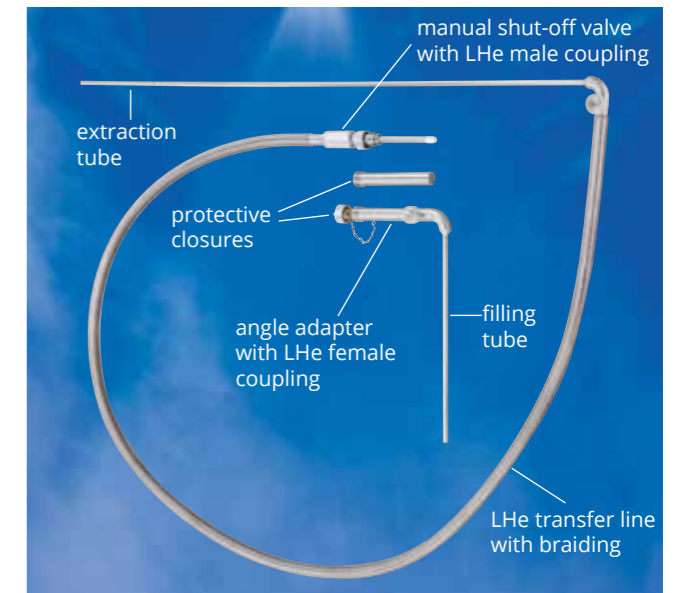
Cryotherm siphons are made from super-insulated lines and provided a permanent vacuum. These features guarantee the lowest transfer losses at all times.

Convincing advantages:

- highly flexible hoses for easy handling and versatile applications
- improved insulation with workmanship using thin-walled pipes and spacers
- low heat transfer through optimised super-insulation
- easy handling
- high functionality
- extendable filling and extraction pipes
- bend protection for high mechanical utilisation
- manufactured from robust stainless steel
- outer jacket variable (from pressure-resistant and robust to super-light and highly flexible)
- individually customised products
- valves and connections installed according to customer requirements

Possibilities:

- manual shut-off valve DN9, O-ring sealed
 - short transfer times
 - flexible use with add-on adapter set
 - standard for STRATOS® vessels
 - combined with anti-oscillation device
- manual shut-off valve DN5/DN7, bellows sealed
 - installed in the filling tube to save space
 - low maintenance
 - valve seat at the end of the filling tube (minimising the evaporation rate and contamination by air)
- solenoid valve DN4
 - electrically controllable
 - for automatic filling operations



Example: LHe-siphon, 2-piece with coupling and extraction valve (model: super-light and highly flexible)

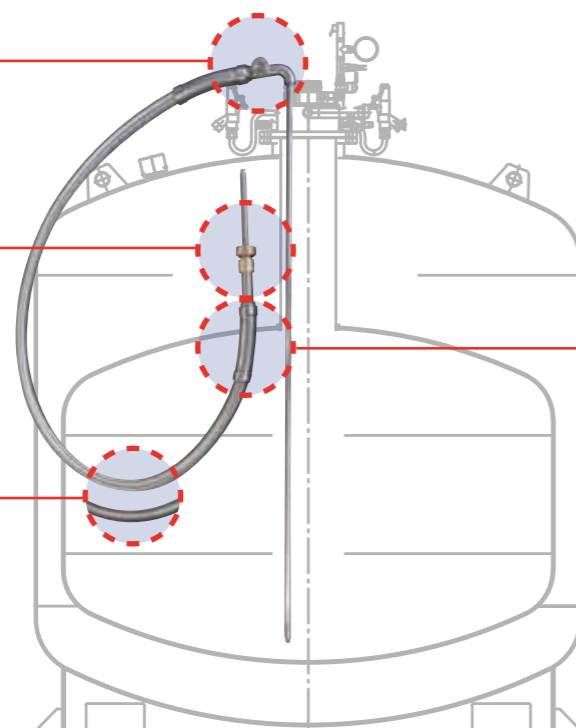
Vacuum seal-off and safety device

Plug-in coupling with integrated manual shut-off valve

- various models
- easy coupling
- easy opening and closing

Outer jacket

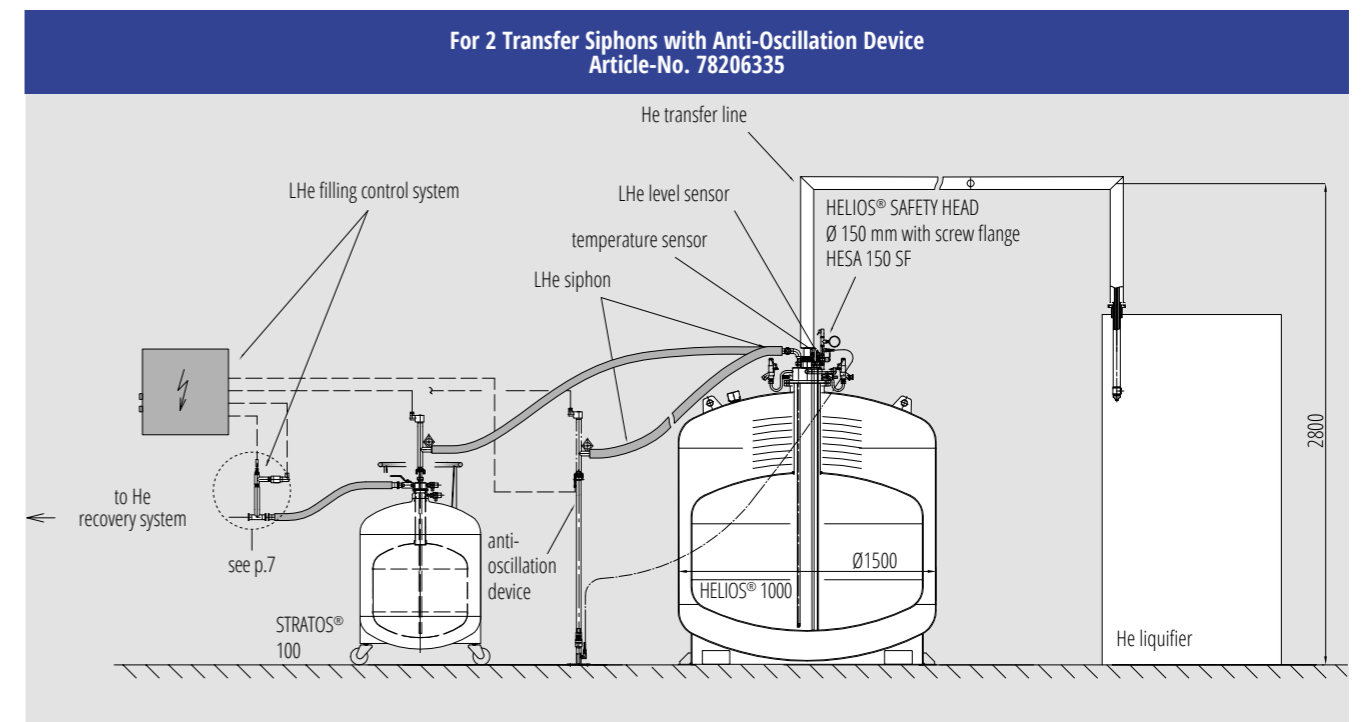
- various models
- from pressure-resistant and robust to super-light and highly flexible

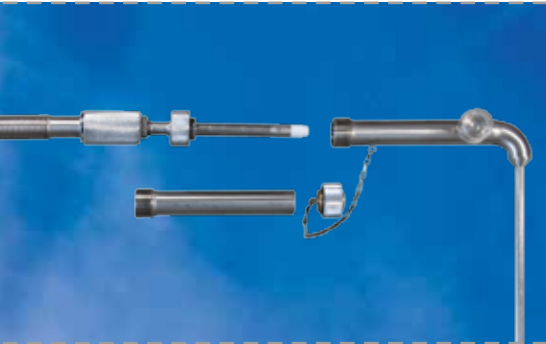


Bend protection

- optional
- robustness and longevity

LHe Transfer from Storage Vessel (HELIOS®) to Transport Vessel (STRATOS®)

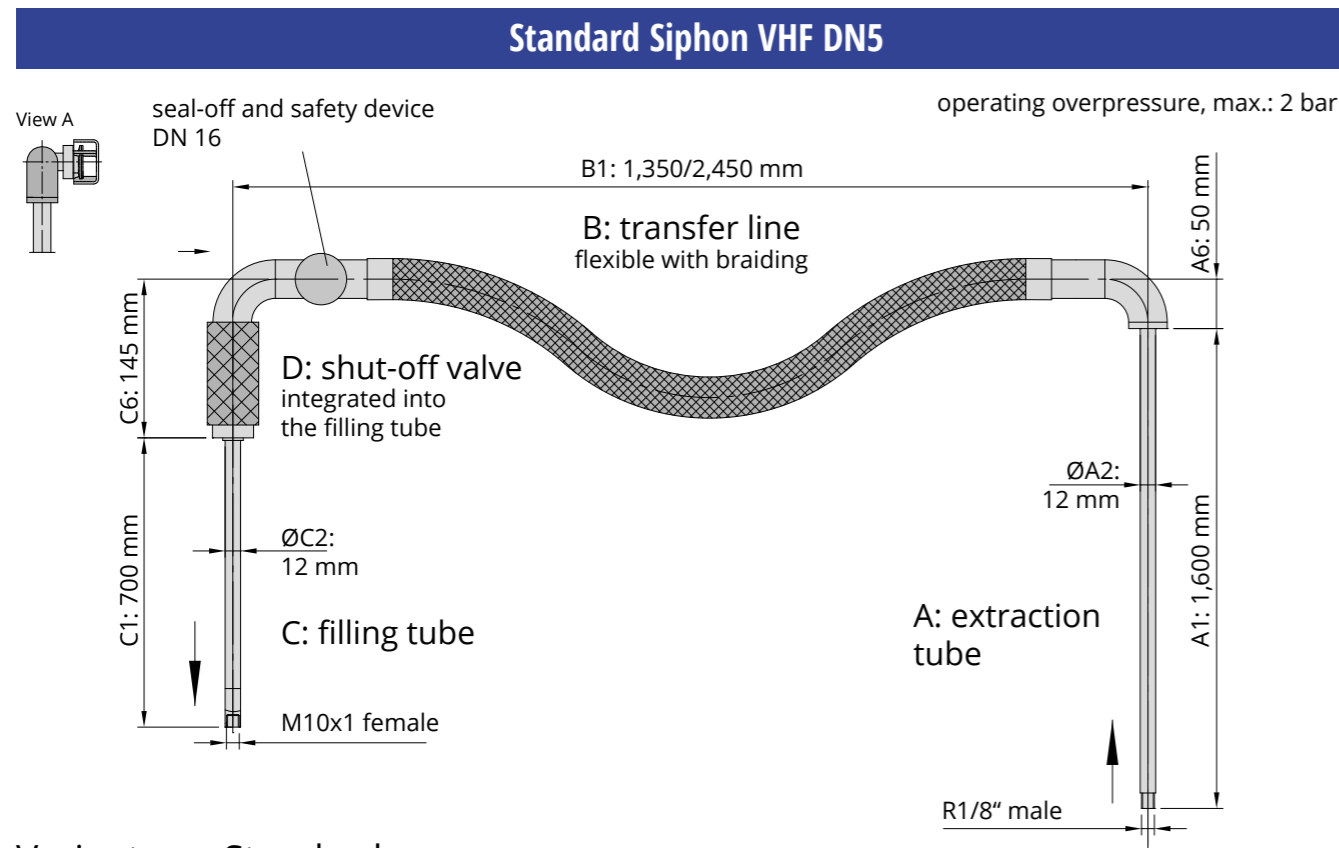




The Appropriate Siphon for Every Application

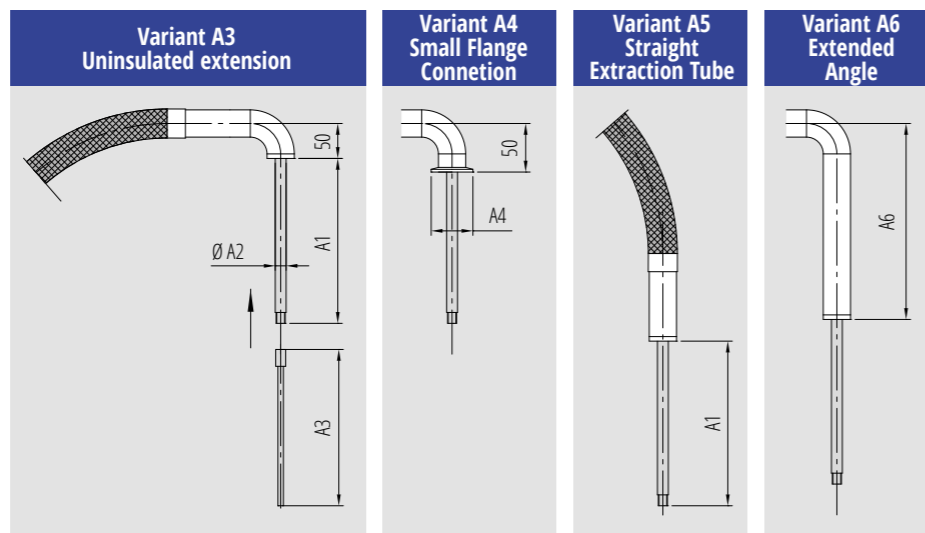


Easy Extraction from Helium Vessels

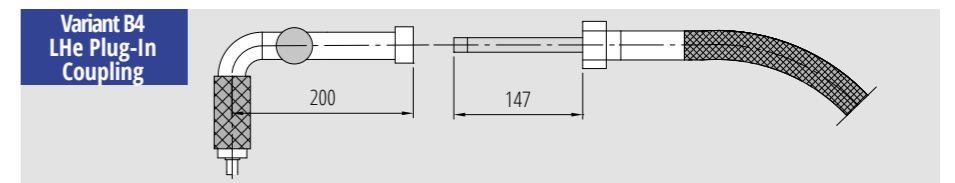
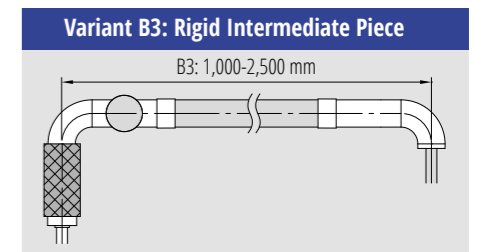
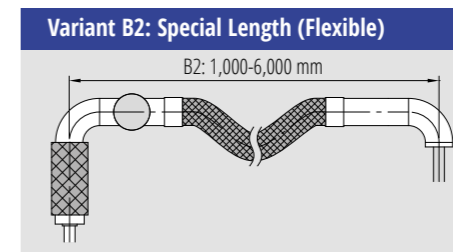


Variants on Standard

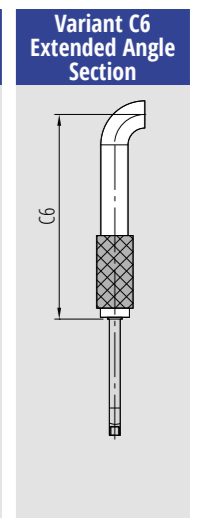
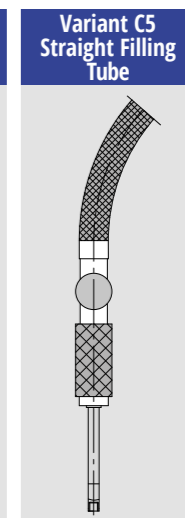
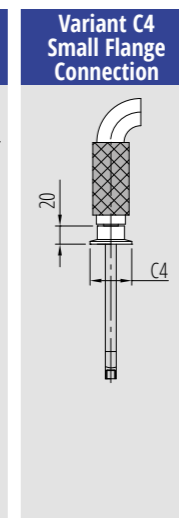
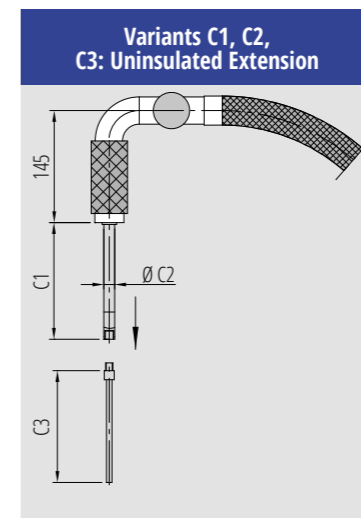
A	Extraction Tube	Standard
A1	length A1 (mm)	1,600
A2	diameter A2 (mm)	12
A3	extension A3 (mm)	-
A4	small flange connection A4 DN	-
A5	straight extraction tube	-
A6	angle section length (mm)	-
A7	without extraction tube (with variant B4)	-



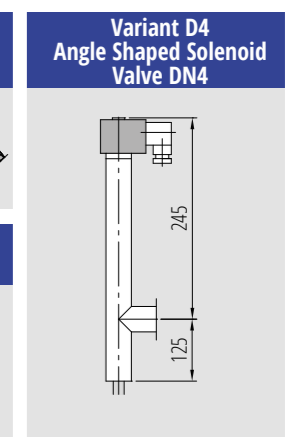
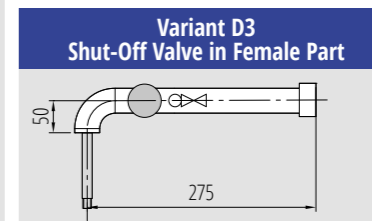
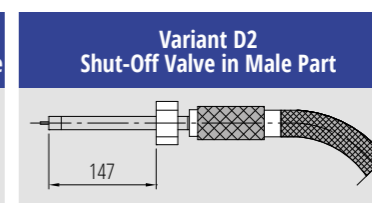
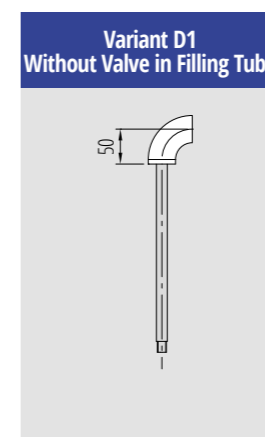
B	Transfer Line	Standard
B1	length B (flexible) (mm)	1,350/2,450
B2	special length (flexible) B=1,000-6,000 mm	-
B3	length B=1,000-2,500 mm (rigid)	-
B4	plug-in coupling	-



C	Filling Tube	Standard
C1	length C1 (mm)	700
C2	diameter C2 (mm)	12
C3	extension C3 (mm)	-
C4	small flange connection C4 DN	-
C5	straight filling tube	-
C6	angle section length C6 (mm)	145
C7	without filling tube (with variant B4)	-



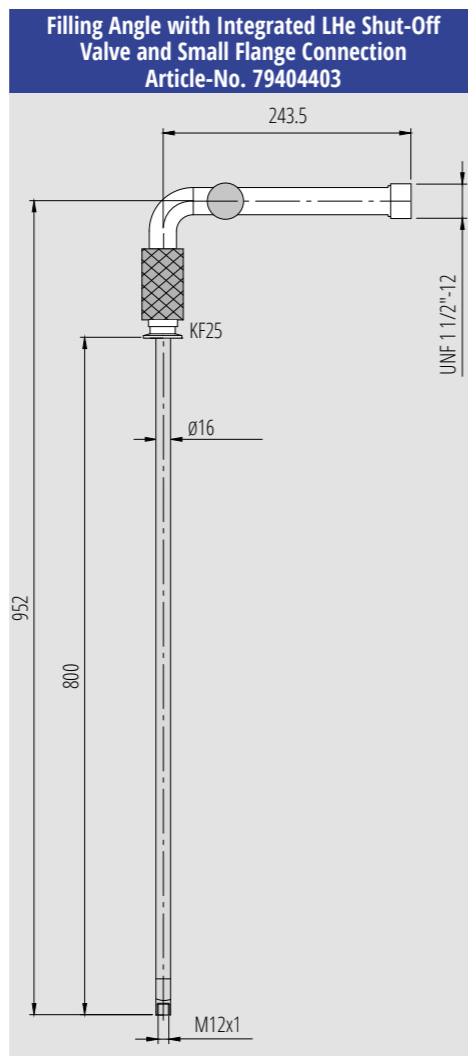
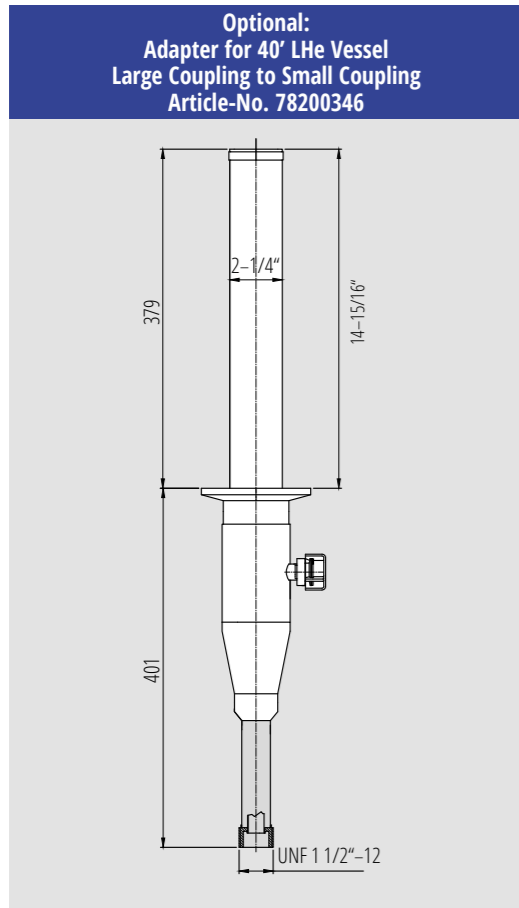
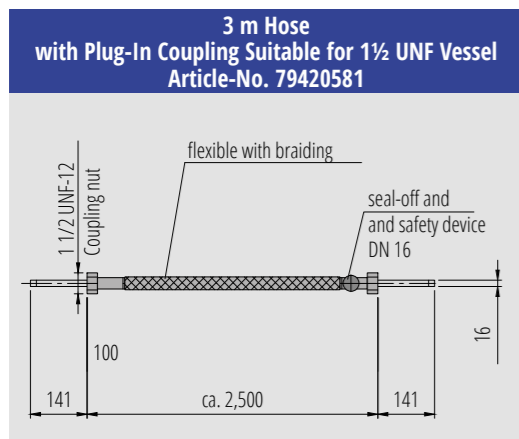
D	Integrated Valve in Filling Tube	Standard
D1	without valve in filling tube	-
D2	valve in male plug-in coupling	-
D3	valve in female plug-in coupling	-
D4	angle shaped solenoid valve	-



Caution: valve combination can produce shut-off areas, which must be secured with a safety valve. Combination of variants D3 and D4 without a safety valve is possible.

Various Applications

LHe Extraction System from a 40' LHe Vessel to LHe Transport Vessel

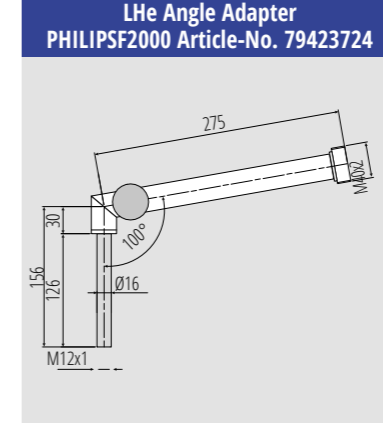
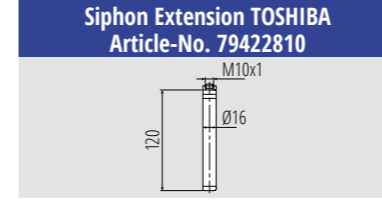
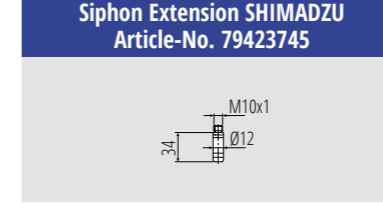
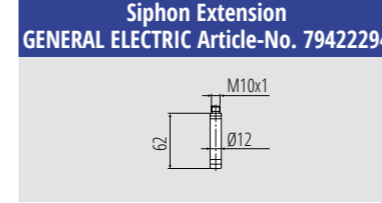
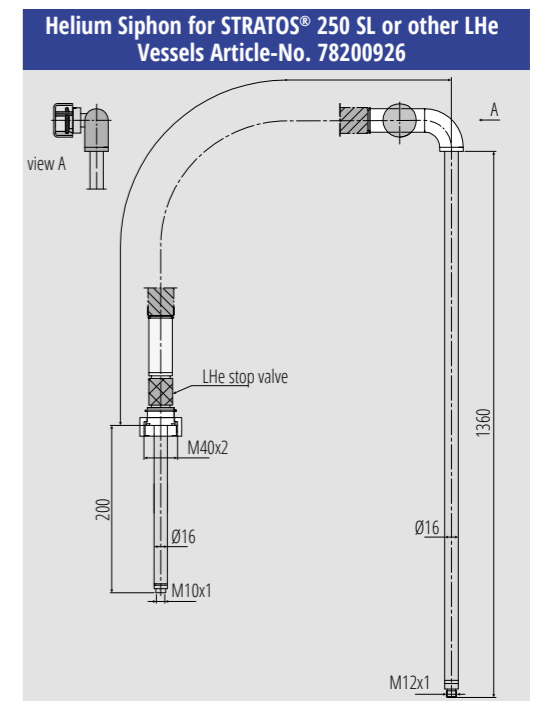
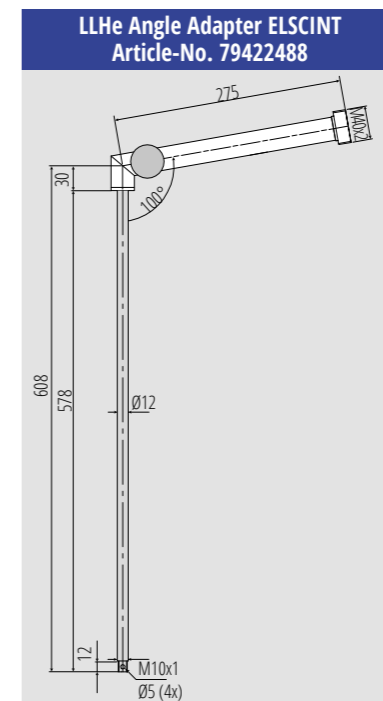
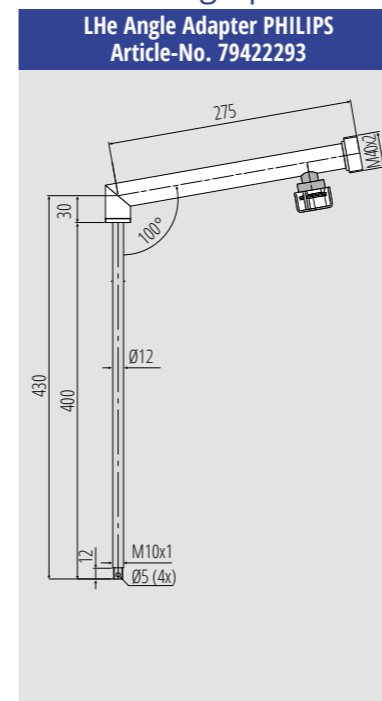


Other Available Diameters

valve DN4		valve DN5		valve DN7	
9.6	10	12	12.7	16	



LHe Transfer System from Transport Vessels (STRATOS®) to MR Tomographs or Cryostats



Further Vessels

LH₂ Liquid Hydrogen -253 °C	LOX Liquid Oxygen -183 °C	LNG Liquid Natural Gas -162 °C
LNe Liquid Neon -246 °C	LAR Liquid Argon -186 °C	LKr Liquid Krypton -153 °C
		LXe Liquid Xenon -108 °C



HYDROS® Super-Insulated Vessels for Storage and for the Transport of Liquid Hydrogen in Research and Industry (120 – 10,000 l)	86 - 87
STRATOS® SL-Series Vacuum Super-Insulated Transport Vessel for Stationary and Mobile Use (100 – 1,000 l)	88 - 91
STRATOS® 110 Vacuum Super-Insulated Transport Vessel for Stationary and Mobile Use	92 - 93
APOLLO® Vacuum Super-Insulated Storage and Transport Vessel (50 - 350 l)	94 - 95
MERKUR® Tank for Truck Transport of Cryogenic Liquid Gases on Public Roads (500 - 3,000 l)	96 - 97

LH₂

Storage of Liquid Hydrogen



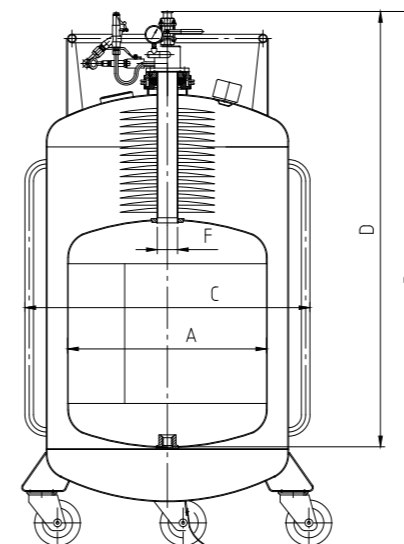
The vacuum super-insulated vessels of the HYDROS® series have been designed for the storage and transport of cryogenic liquid hydrogen for research and industry.

Standard Features:

- safety head
- vacuum seal-off and safety device
- protective ring for the instruments
- pressure gauge
- four smooth-running castors, (two with brakes) or skirt support
- feature to avoid electrostatic loading
- special earth feature

Convincing advantages:

- efficient hydrogen exhaust cooling system
- low evaporation rate (only 0.9% with HYDROS® 250)
- compact dimensions
- robust construction made of highly corrosion-resistant cryogenic stainless steel
- optimised super-insulation by means of multi-layered vacuum insulation and computer optimised thermodynamic construction
- inner and outer vessels tested separately by helium leak test
- long-term vacuum protection by means of high-grade adsorption and getter materials
- safety neck pipe
- integrated vacuum seal-off and integrated safety devices on safety head
- smooth-running, sturdy castors or skirt support
- low maintenance
- wide range of accessories



Options:

- forklift pockets
- handles on the side
- skirt support
- siphon connection:
Ø 9.6 / 10 / 12 / 12.7 / 16 mm

Transport Vessel HYDROS® Technical Data		
vessel material		stainless steel
approval mark		CE
geometrical capacity, max.	[l]	266
operating overpressure, max.	[bar]	6.0
weight empty	[kg]	240
weight full	[kg]	254.4
max. fill quantity	[l]	202
net weight	[kg]	14.4
stat. evaporation rate	[%/day]	0.9
diameter outer	A [mm]	850
total height	B [mm]	1,895
depth of immersion	D [mm]	1,318
total width	[mm]	960
neck diameter	F [mm]	71
castor diameter	G [mm]	160
article-no.		78206835

STRATOS® SL-Series (Super Light)

LHe LNe

Transport Vessels for Liquid Helium:
Light, Economical and Practical



Convincing advantages:

- efficient helium-exhaust cooling system
- low evaporation rate (only 0.9%/day with STRATOS® 100 SL)
- robust transport frame
- compact dimensions
- safety neck pipe
- integrated vacuum seal-off and safety device and integrated safety device on the safety head
- smooth-running, sturdy castors
- safety head with exhaust, pressure build-up and evacuation connection
- lockable power excess voltage device (70 mbar)
- various extraction devices possible
- transfer-pressure 0-500 mbar
- optimised super insulation by means of multi-layered vacuum insulation and computer optimised thermodynamic construction with shields
- low maintenance requirements
- wide range of accessories

Of course, cryo-vessels have been approved according to the directive on Transportable Pressure Equipment (TPED) and the European Agreement concerning the International Carriage of Dangerous Goods by Road and Rail (ADR/RID) with the π label.

The high level economical standard of the systems is augmented by the highly efficient use of exhaust gas for cooling the neck pipe, the radiation shields and the insulation.



Vacuum super-insulated transport and supply vessels for stationary and mobile use. Exploit the many advantages of the STRATOS®-Series for your applications with cryogenic, liquid helium. Easy-to-handle and high safety standards are the distinguishing features of this lightweight. With lots of experience, technical know-how and highly qualified manufacturing we can produce these high-tech vessels.

Convincing Option:

Highly Efficient, Electric Pressure Build-Up Control Device for STRATOS® 250SL, 380SL and 1000SL

An economical and also space saving solution of the integrated heating system. It enables a controlled pressure build-up for easy extraction of helium without external helium-pressure gas.

An optimised heating system evaporates liquid helium and overheats the helium gas in order to achieve good pressure efficiency.

STRATOS® SL-Series (Super Light)

LHe LNe

So that You have it Easy



Options:

Integrated, Patented LHe Extraction Siphon with Anti-Oscillating Device and Filling Adapters

This extraction system can be employed with STRATOS® 250, 380 and 1000 in order to prevent thermo-acoustic vibration when there is a standstill.

To fill the STRATOS® vessels and extraction from the STRATOS® vessels adapters are available with various dimensions suitable for the user.



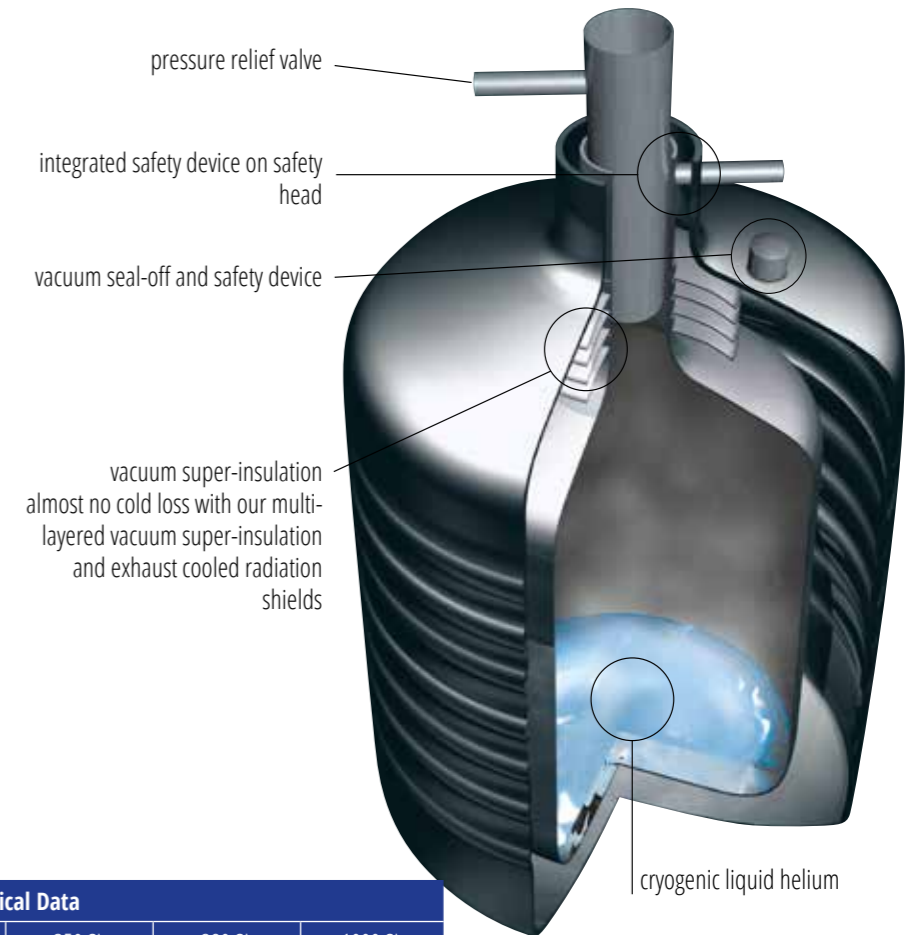
level control devices



Beside the functions as transport and supply vessels the smaller STRATOS® are also ideal for execution of Cryo-experiments. STRATOS® 250-1000SL serve as liquid helium suppliers to MR-tomographs and large cryostats.

As Accessories to STRATOS® Vessels we Offer:

- an anti-oscillation device
- integrated siphon
- level indicator
- adapter set for MRT-filling
- anti-magnetic castors
- adjustable electric pressure build-up
- and lots more



Convincing advantages:

- simple and safe: no more siphon installation
- extraction tube always remains cold
- no helium loss from siphon installation
- ideal for rooms with low height
- low investment costs for siphon and adapter systems to fill by various users
- low wear of siphon due to installation into the vessel
- patented anti-oscillation system ensures low evaporation rates

Technical Data					
Vessel Name		100 SL	250 SL	380 SL	1000 SL
vessel material		aluminium	aluminium	aluminium	aluminium
approval mark		Π	Π	Π	Π
geometrical capacity	[l]	103	263	380	999
operating overpressure, max.	[bar]	1.5	1.5	1.5	1.5
weight empty	[kg] ¹⁾	56	90	106	300
weight full	[kg] ¹⁾	68	121	151	420
stat. evaporation rate	[%/day]	0.9	1.8	1.4	0.5
total height	[mm]	1,405	1,550	1,900	2,020
total width	[mm]	700	750	750	1,200
diameter outer	[mm]	700	740	740	1,220
diameter castor	[mm]	100	125	125	160
neck pipe diameter	[mm]	55	80	80	80
connection		KF 50	KF 25	KF 25	KF 25
article-no.		79421109	78200868	78200900	78200904

¹⁾ The actual weight of the vessels can fluctuate depending on the exact features

STRATOS® vessels are also available in stainless steel

LHe LNe

Transport Vessel for Liquid Helium

Robust, Economical and Practical



Convincing advantages:

- helium-exhaust cooling system
- low evaporation rate (only 0.9%)
- long-term vacuum protection by means of high-grade adsorption and getter materials
- optimised super-insulation by means of multi-layered vacuum insulation and computer optimised thermodynamic construction use of shields
- inner and outer vessels tested separately by helium leak test
- integrated vacuum seal-off and safety device and integrated safety devices on the safety head
- robust construction made of highly corrosion-resistant cryogenic stainless steel
- low maintenance requirements
- wide range of accessories



Options:

- vacuum insulated transfer siphons
- various siphon connections (Ø 9.6 / 10 / 12 / 12.7 / 16 mm)
- level sensor
- level indicator
- anti-magnetic castors
- cryo-protective features
- IATA features

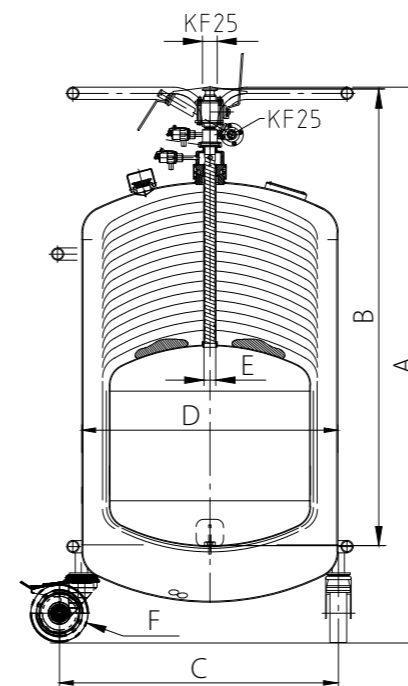
Further special options on request

Storage and transport vessel for cryogenic liquid helium with vacuum super-insulation and long-term vacuum protection approved according to European Pressure Equipment Directive (TPED).

Contributing factors to the high level of economic efficiency of the systems are the highly efficient usage of exhaust gases to cool the neck pipe, the radiation shields and the insulation.

Standard Features:

- safety neck pipe
- vacuum seal-off and safety device and integrated safety devices on safety head
- smooth-running, sturdy castors
- Safety head with exhaust, pressure build-up and evacuation connection
- overflow device can be shut off (70 m bar)



Technical Data		
Vessel Name	STRATOS® 110	
vessel material	stainless steel	
approval mark	π	
geometrical capacity	[l]	111
operating overpressure, max.	[bar]	1.5
weight empty	[kg]	145
weight full	[kg]	158
stat. evaporation rate	[%/day]	0.9
total height	A [mm]	1,520
diameter outer	D [mm]	700
total width	C [mm]	784
depth of immersion	B [mm]	1,249
diameter castor	F [mm]	160
diameter neck	E [mm]	32
siphon connection	KF 25	
article-no.	78220309	

LIN **LAR** **LOX**

Reliable, Safe and Durable

Rapid Cold at the Point of Use



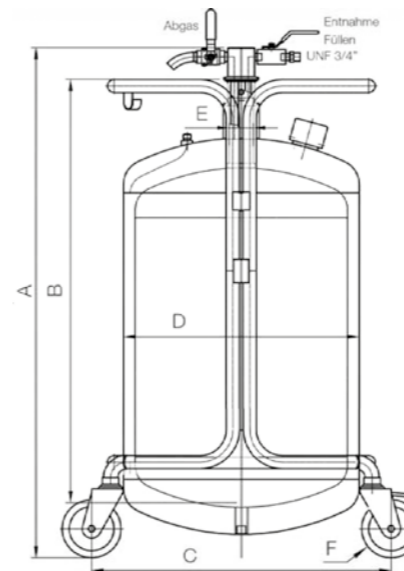
Convincing advantages:

- efficient exhaust cooling system
- low evaporation rate (only 0.6%/day with APOLLO® 200)
- robust transport frame
- compact dimensions
- integrated vacuum seal-off and safety device
- long-term vacuum protection by means of high-grade adsorption and getter materials
- optimised super-insulation by means of multi-layered vacuum insulation and computer optimised thermodynamic construction
- inner and outer vessels tested separately by helium leak test
- robust construction made of highly corrosion-resistant cryogenic stainless steel
- smooth-running, sturdy castors
- low maintenance requirements
- wide range of accessories

Storage and transport vessel for cryogenic liquid nitrogen. With vacuum super-insulation and long-term vacuum protection. Approved according to European Pressure Equipment Directive PED. Transport in unpressurised condition with inserted transport plug.

Standard Features:

- integrated safety device at the vessel neck
- vacuum seal-off and safety device
- smooth-running, sturdy castors and transport frame
- pressure indicator
- level indicator
- EK-siphon with exhaust and overflow valve
- integrated pressure build-up
- decanting hose (1.5 m) with phase separator
- transport plug
- cold-protection gloves and safety glasses with side protection



Options:

- pressure build-up regulator
- pressure reduction regulator
- double extraction liquid side
- double extraction gas side
- triple extraction liquid side
- triple extraction gas side
- level indicator, capacitive, battery
- level indicator, capacitive, 4-20 mA
- forklift pockets
- set of castors anti-magnetic
- cryo-protective equipment, full set

Further special options on request

Vessel Name	Technical Data				
	APOLLO® 50 1.3 bar	APOLLO® 100 1.3 bar	APOLLO® 150 1.3 bar	APOLLO® 200 2.0 bar	APOLLO® 350 2.0 bar
vessel material	stainless steel	stainless steel	stainless steel	stainless steel	stainless steel
approval mark	CE	CE	CE	CE0035	CE0035
geometrical capacity	[l]	49.5	99.2	149.5	198.5
operating overpressure, max.	[bar]	1.3	1.3	1.3	2.0
weight empty	[kg]	44	62	79	100
weight full LIN	[kg]	85	145	204	266
stat. evaporation rate LIN	[%/day]	2	1.2	1	0.6
total height	A [cm]	80	114	146	117
diameter outer	D [cm]	50	50	50	70
total width	C [cm]	65	65	65	80
depth of immersion	B [mm]	58.5	92	122	91
castor diameter	F [mm]	125	125	125	160
neck diameter	E [mm]	50	50	50	50
siphon connection		KF 50	KF 50	KF 50	KF 50
article-no. LIN		78202700	78202701	78202702	78202748
article-no. LAR		78202700/AR	78202701/AR	-	-
article-no. LOX		78200520	78202701/02	78202702/02	-

LIN **LOX** **LAR**

Truck Transport of Cryogenic Liquid Gases

Ideal for Transporting Cryogenic Gases for the Most Varied Applications in Research, Medicine and Industry



Convincing advantages:

- robust construction made of highly corrosion-resistant cryogenic stainless steel
- robust finish of great durability due to careful choice of material and high-grade manufacture
- long-term vacuum protection by means of high-grade adsorption and getter materials
- optimised super-insulation by means of multi-layered vacuum insulation and computer optimised thermodynamic construction
- integrated vacuum seal-off and safety device
- quality assurance in every phase of production, eg. using x-ray and helium leak test
- easily and safely mountable on transport vehicles by means of optional mounting kit and condensate drip tray
- swagelok analysis connection

Super-Insulated Cryogenic-Supply Vessel for the Transport of

- liquid nitrogen
- liquid oxygen
- liquid argon

Standard Features:

- integrated level and pressure indicator
- pressure build-up
- filling, liquid extraction valve
- analysis valve
- purge valve
- vacuum seal-off and safety device
- trycock
- crane eyes and forklift pockets lengthwise for easy transport to installation position
- material: highly corrosion-resistant cryogenic stainless steel

Approved according to the directive on Transportable Pressure Equipment (TPED) and the European Agreement concerning the International Carriage of Dangerous Goods by Road and Rail (ADR/RID) with test certificate of the German Inspection (TÜV).

Fully Equipped and Ready for Operation:

- for the supply of cryogenic liquid gases up to 3,000 litres
- for applications limited in time such as a series of tests, temporary increases in production, special duties and interim solutions
- suitable for short and long-term supply

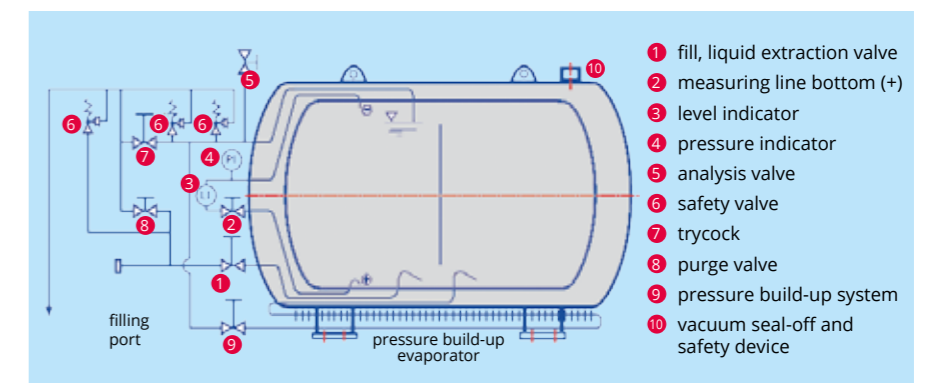
		Technical Data					
Vessel Name		MERKUR® 500	MERKUR® 600	MERKUR® 850	MERKUR® 1000	MERKUR® 2000	MERKUR® 3000
geometrical capacity	[l]	512	632	851	995	2,100	2,938
operating overpressure, max.	[bar]	6	6	6	6	6	6
weight empty	[kg]	340	401	590	570	1,200	1,520
weight full LIN	[kg]	730	886	1,243	1,300	2,810	3,770
total height	[mm]	1,075	1,075	1,175	1,175	1,450	1,660
total length	[mm]	1,640	1,865	1,950	2,165	2,900	3,080
diameter	[mm]	950	950	1,050	1,050	1,300	1,500
stat. evaporation rate	[%/day]	1.5	1.4	1.3	1.2	1.0	0.9
LIN, LAR	article-no.	78200206	78204064	-	7800208	7802119	78200210
LOX	article-no.	78200207	78204094	78206640	78200209	78202118	78200211

further special options on demand

Options:

- pressure build-up regulator (1-6 bar)
- maximum pressure regulator (1-4 bar)
- mounting kit for service vehicle
- condensate drip tray

Further accessories on request



CRYO-LINE SYSTEMS

LIN	Liquid Nitrogen -196 °C	LNe	Liquid Neon -246 °C	LNG	Liquid Natural Gas -162 °C
LHe	Liquid Helium -269 °C	LOX	Liquid Oxygen -183 °C	LKr	Liquid Krypton -153 °C
LH₂	Liquid Hydrogen -253 °C	LAR	Liquid Argon -186 °C	LXe	Liquid Xenon -108 °C



Super-Insulated Transfer Lines In Flexible and Rigid Form	100 - 103
Gas Phase Separators Vacuum Super-Insulated	104
Phase Separator Stations Vacuum Super-Insulated	105
Multiline Cryogenic Cooling with Liquid Helium	106 - 107



Cold Stays Cold –
Wherever You want it!

Cryogenic Liquid Gases such as Nitrogen, Oxygen and Argon Flow Through Special Cryo Line Systems



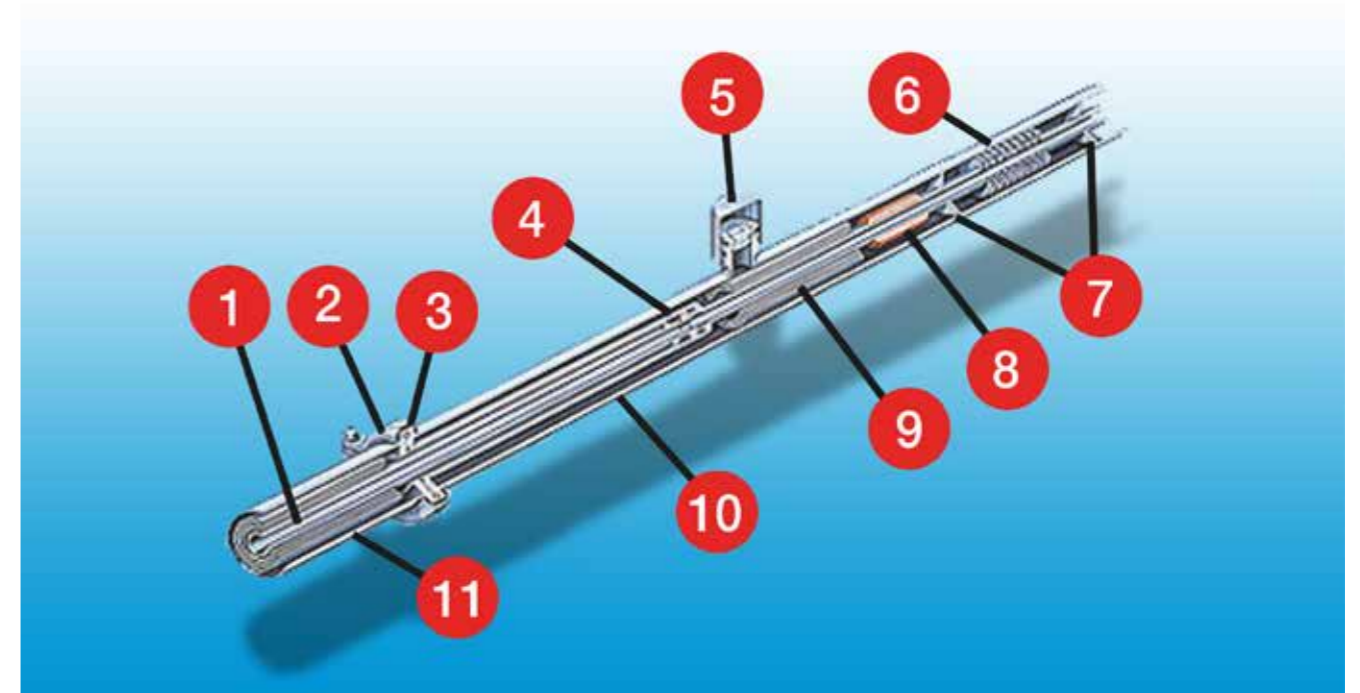
Convincing advantages:

- welded construction of anti-magnetic highly corrosion-resistant stainless steel
- in rigid or flexible model
- super-insulated connections for flexible extension and combination options
- fast detachable plug-in coupling and permanently installed welded connections
- immense durability of the insulation vacuum due to use of adsorption materials and special getter
- quality assurance at every stage of the manufacturing process
- leak test of the inner and outer line

So that the gases get from the vessels to their "Point-of-use" with low evaporation loss Cryotherm offers vacuum super-insulated transfer line systems as well as the associated features.

So that your project can be realised in an extremely short time and you can utilise the economic advantages immediately we will be at your side from the beginning. Together with you we carry out the planning, design and assembly stages of the cryo-line system tailored to your requirements.

A building brick system specially developed for the values DN 14 and DN 25 is suitable for the most varied assignments and can be delivered directly ex stock in the standard lengths of 3, 6 and 12 m.



Significant Construction Features

- 1** inner pipe made of high corrosion-resistant cryogenic stainless steel (1.4301), completely welded
- 2** flange connection of clamping ring and fastening screws
- 3** O-Ring-seal
- 4** cryogenic seal
- 5** combined vacuum seal-off and safety device ensures the vacuum area against inadmissible pressure
- 6** Expansion compensator for the compensation of the linear expansion due to heat
- 7** spacers between inner and outer line
- 8** adsorption material
- 9** multi-layers of vacuum insulation due to computer optimised thermodynamic construction
- 10** } line sections 1 and 2, super-insulated,
- 11** } self-contained vacuum system

Flexible and Rigid Line Systems

LIN LHe LH₂ LNe
LOX LAR LNG LKr LXe

Advantages of Flexible and Rigid Line Systems

Flexible Line Systems

Vacuum super-insulated flexible line section 3 m long, DN 20 with plug-in coupling DN 14



High Thermic Quality

Due to computer-aided, optimised thermic construction and multi-layered vacuum super-insulation between inner and outer lines



Rigid Line Systems

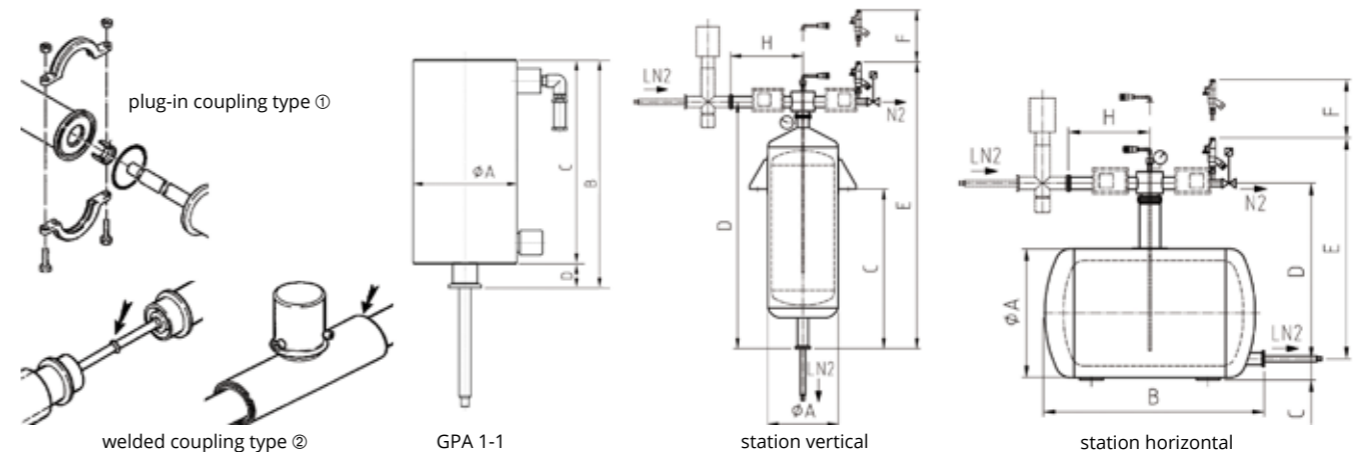
Vacuum super-insulated solenoid valve with plug-in coupling DN 14



Convincing advantages:

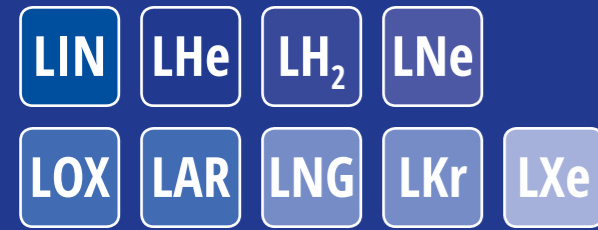
- optically appealing
- made of anti-magnetic highly corrosion-resistant durable stainless steel, consequently can be used in clean rooms and in the food industry
- can be extended without any trouble and can be combined using plug-in coupling
- immense durability of the vacuum due to use of adsorption material and special getters. Thus, you reduce your gas consumption and extend your maintenance intervals.

Model	Gas Separator GPA 1-1	Phase Separator Stations with Pressure-Maintaining System					
		Vertical			Horizontal		
geometrical capacity [l]	5	50	100	50	100	200	200
operating overpressure, max. [bar]	18	1.5/3	1.5/3	1.5/3	1.5/3	1.5	3
weight empty/full [kg]	17/21	50/95	68/158	50/95	68/158	90/270	90/270
diameter outer A [mm]	219	340	450	450	550	650	650
B [mm]	480	-	-	740	940	1,100	1,100
C [mm]	430	772	837	90	90	90	90
D [mm]	50	1,192	1,312	650	750	772	772
E [mm]	-	1,360	1,480	830	930	1,280	1,280
F [mm]	-	270	270	350	350	270	270
H [mm]	-	350	350	350	350	450	450
filling port	DN 14 M	DN 14 F	DN 14 F	DN 14 F	DN 14 F	DN 14 F	DN 14 F
extraction connection	DN 14 M	DN 14 M	DN 14 M	DN 14 M	DN 14 M	DN 14 M	DN 14 M
exhaust connection	1/4" NPT	DN 25	DN 25	DN 25	DN 25	DN 25	DN 25
pressure control	mechanical	electric	electric	electric	electric	electric	electric
article-no.	78203542	78206619	78206617	78200335	78200285	78208010	78203475



Transfer Line / System	Nominal ϕ	Rigid Construction				Flexible Models		
		DN 14	DN 25	DN 40	DN 50	DN 100	DN 20	DN 32
coupling type: ①=plug-in; ②=welded		①/②	①/②	①/②	①/②	②	①-DN14	①-DN25
diameter outer of line [mm]		52	46.1	84	104	159	68	86
diameter outer welded coupling [mm]		76.1	88.9	104	129	204	-	-
diameter wall breakthrough [mm]		150	200	250	250	300	150	200
smallest installation radius [mm]		-	-	-	-	-	400	500
assembly needs plug-in coupling		300	400	400	450	-	300	400
operating overpressure, max. [bar]		8	8	8	8	8	8	8
design pressure [bar]		18	18	18	18	18	18	18
weight empty [kg/m]		2.4	5.3	6	7.5	14	3.5	6.6
weight full [kg/m]		2.6	5.7	6.65	9	20.3	3.8	6.6
cold-down quantity LIN [l/m]		0.21	0.42	0.70	1.20	2.95	0.38	0.58
Heat Flow Rates								
line without fittings [W/m]		0.45	0.50	0.60	0.70	1.30	1.10	1.30
or based on LIN [l/m * h]		0.010	0.012	0.014	0.016	0.030	0.025	0.029
per coupling LIN [W]		2.8	4.5	5.5	7.1	15.5	2.8	4.5
or related to LIN [l/h]		0.06	0.10	0.14	0.22	0.45	0.06	0.10

Gas Separators



Super-Insulated Gas Phase Separators

Phase Separators and Gas Separators

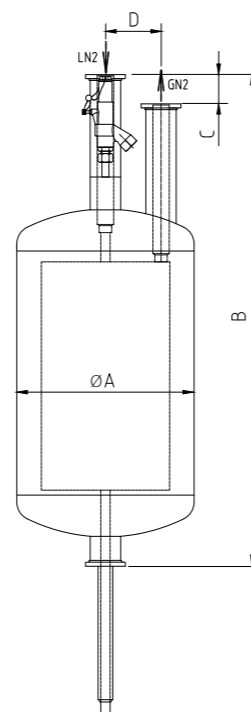
This feature is designed to separate developing gas from the liquid phase which results during transfer of cryogenic liquid gases even with the best insulation and to remove these gases from the line system. For reason of expedience they are arranged in direct proximity at the point of extraction.



Super-Insulated Gas Separators

- economical at constant extraction
- continuously maintained cold of the complete line between point of input (eg. liquide storage tank) and point of extraction
- input (eg. liquide storage tank) pressure is constant up to point of extraction
- arranged at the highest point of the line system
- ideal for mass-consumers
- control mechanical

Technical Data		
Model	10 V GPA 2.2	
geometrical capacity	[l]	10
operating overpressure, max.	[bar]	8
weight empty/full	[kg]	23/32
ø A	[mm]	303
B	[mm]	840
C	[mm]	50
D	[mm]	95
filling port	DN14 female	
extraction connection	DN14 male	
exhaust connection	DN14 female	
pressure control	mechanical	
article-no.	79404837	



Phase Separators



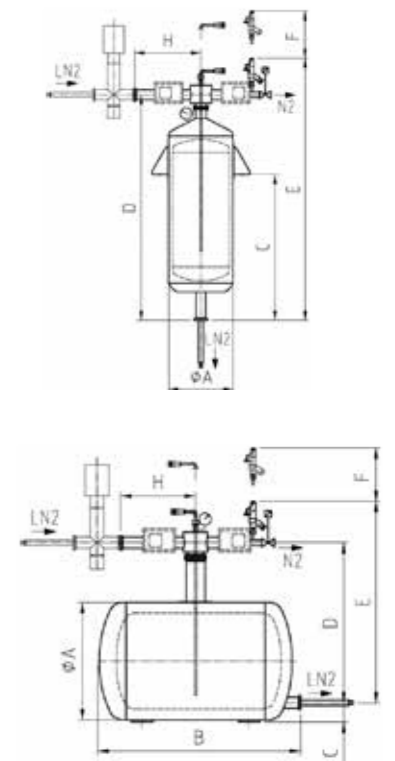
Super-Insulated Phase Separator Stations



Super-Insulated Phase Separator Stations

- economical at discontinued extraction
- continuously maintained cold of the (short as possible) line section between phase separator and point of extraction
- low pressure at the point of extraction (= geodetical height of the liquid column)
- arranged at any point in the line system
- ideal for small consumers and/or numerous points of extraction
- emergency supply function
- most popular separator system
- control electrical

Model	Technical Data					
	Vertical		Horizontal			
geometrical capacity	[l]	50	100	50	100	200
operating overpressure, max.	[bar]	1.5 / 3	1.5 / 3	1.5 / 3	1.5 / 3	1.5 / 3
weight empty/full	[kg]	50/95	68/158	50/95	68/158	90/270
ø A	[mm]	340	450	450	550	650
B	[mm]	-	-	740	940	1,100
C	[mm]	772	837	90	90	90
D	[mm]	1,192	1,312	650	750	772
E	[mm]	1,360	1,480	830	930	1380
F	[mm]	270	270	350	350	450
H	[mm]	350	350	350	350	450
filling port		DN14 female	DN14 female	DN14 female	DN14 female	DN25 female
extraction connection		DN14 male	DN14 male	DN14 male	DN14 male	DN25 male
exhaust connection		DN25 / 1"	DN25 / 1"	DN25 / 1"	DN25 / 1"	DN25 / 1"
pressure control		electrical	electrical	electrical	electrical	electrical
article-no.		78200316	78200284	78200335	78200285	3 bar: 78203475 1.5 bar: 78208010





Cryogenic Cooling with Liquid Helium



The transfer of cryogenic liquid helium demands high standards of insulation.

The low level of temperature (-269 °C / 4 K) in connection with the low evaporation enthalpy of liquid helium results in a high level of requirements for the construction of transfer lines. A heat input of only 0.7 W leads to evaporation of one litre of liquid helium per hour.

For this reason it is necessary to keep the radiation on the liquid helium lines as low as possible.

The Cryotherm multi-transfer lines almost completely prevent radiation of heat due to their ingenious structure.

The medium lines, like helium forward flow, helium return flow and liquid nitrogen forward flow are first coated with a number of layers of highly reflective foil (super-insulation). The return flow of nitrogen is connected to a surrounding thermic shield. The thermic shield is covered by multilayer super-insulation. Finally, this structure is surrounded by a vacuum enclosure which will be evacuated to high vacuum level.

Convincing advantages:

- low heat flow rates
- multi-layered vacuum insulation and computer-optimised thermodynamic construction
- compact dimensions
- robust construction made of highly corrosion-resistant cryogenic stainless steel for a longer life
- long-term vacuum protection by means of high-grade adsorption and getter materials
- integrated vacuum seal-off and safety device
- quality assurance in every phase of production, eg. using x-ray and helium leak tests
- effective protection against warmth influx by means of integrated thermally cooled shields

The vacuum protects against heat influx by convection where as the thermic shield, cooled actively with liquid nitrogen, efficiently prevent heat transfer by radiation from the outer pipe to the helium lines inside.

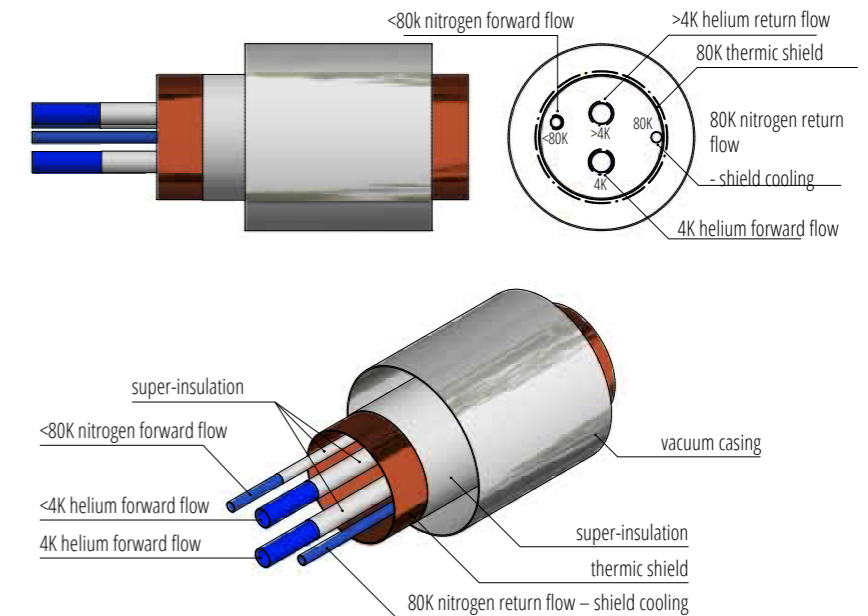
Also the fixing of the inner lines requires high demands with regard to flexibility and low heat influx and the highest care has to be taken during manufacturing.

Cryotechnical Concept:

With these multilines as a rule 4 inner pipes are included in a large outer pipe.

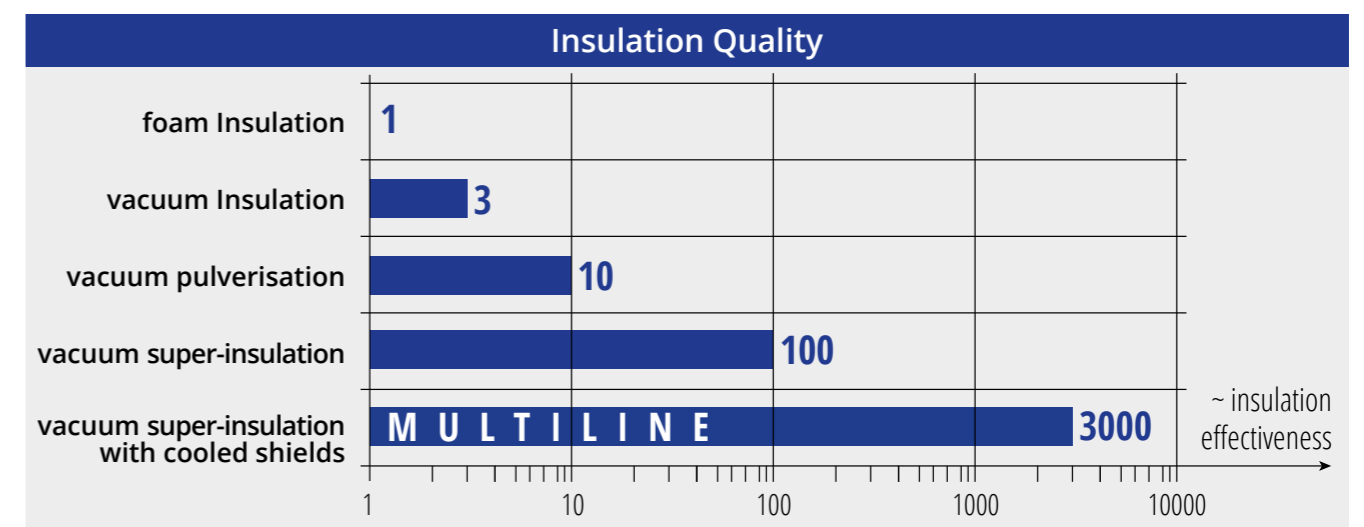
- helium forward flow at 4K
- helium return flow at >4K
- liquid nitrogen forward flow at <80K
- nitrogen return flow at 80K

The multiline described here with four inner lines running process gas is only one of the design concepts of Cryotherm multilines.



Experienced Cryotherm engineers will design the insulation and size of the required process lines according to each customer application.

According to the customer requirements further medium lines can be integrated (for example a 2K pumping line).



CONTROL AND MONITORING TECHNOLOGY For Cryogenic Gases



BIOSAFE-CONTROL[®] B
Level Control and Vessel Monitoring

110

CRYO MESSENGER[®]
Remote Superordinate Control System

111

CRYO LC[®]
Level Control Device

112 - 113

LHe Level Measurement Device

114 - 115

Integrated Level Control and Vessel Monitoring for Safe Long-Term Storage.

Remote Monitoring via SMS, E-MAIL & Co. www.cryo-messenger.de

Technical Data

- display of the vessel status
- level control via height adjustable sensor with manipulation protection
- temperature measurement sensor, measurement range -200 +50 °C (accurate to +/- 2 °C)
- filling stop when lid open / manual defogging possible
- alarm signal when:
 - nitrogen shortage and level exceeding
 - exceeding of vessel temperature
 - exceeding of maximum time for lid open
 - exceeding of maximum filling time sensor breakage or sensor short circuit
 - and lots more
- display of alarm signal in plain text
- software and processor independent redundant monitoring of minimum and maximum alarm with separate software alarm
- potential-free alarm outputs for your building technology (I/O box optional)
- analogue output of temperature measurement for your building technology
- connection via Ethernet (optional)



Central Functions (per network)

- I/O box (option) with relay for main valve, device error, collective alarm, over-temperature and 2 extra freely-assignable relays
- collection and buffering of all cryobank data for transfer to a PC
- connection of up to 32 systems to one network
- collective filling
- free selection of database, thus fully network capable
- interface RS 232 to PC
- parameter can be set on BIOSAFE® and PC
- MODBUS software as interface (RS485) to a superordinate control system



Convincing advantages:

- certified reliability with proven measuring principle
- clear presentation of vessel status
- liquid level adjustable from 0 (gas phase) – 100%
- easy operation at BIOSAFE-CONTROL® B and at PC
- flexible evaluation of logged temperatures and alarms
- central functions for control of main valve (I/O-box optional)
- central alarm administration and transfer to PC (by e-mail, SMS or Fax as option)
- including PC software for extensive documentation of the data of a cryobank
- modern matched design with the new BIOSAFE® generation
- parameter: response delay magnetic valve, reverse cooling function, alarm on/off switching adjustable

BIOSAFE-CONTROL® B Software

- in the German, English, French, Spanish and Italian languages
- setting of all vessel parameters in clear and password protected pop-up windows
- logging and evaluation of temperature curves of individual and all vessels
- logging and evaluation of alarm signals and events in individual and all vessels
- visualisation of vessel status on PC
- evaluation, lists and diagrams as protected PDF-files, CSV-files (EXCEL)



Convincing advantages:

- redundant cryobank monitoring
- easiest operation via www.cryo-messenger.de
- transfer of alarm signals and logged temperatures via e-mail, SMS or FAX
- quick assembly
- can be extended due to modular design
- analogue input sockets for logging of eg. temperatures
- flexible current supply in wide ranges (100-240 VAC)



A Bit More security!

The remote superordinate control system CRYO-MESSENGER® has its cryo-vessels and cryo-banks on site under permanent control: around the clock, 365 days a year. CRYO-MESSENGER® transfers all logged data to the Global Data Center (www.cryo-messenger.de) which in turn transfers any reports to you, irrespective whether by SMS, E-Mail or FAX. Of course, you can call up data on your vessels at any time. It's your choice! Further information can be found under: www.cryo-messenger.de

The Individual Components

- CRYO-MESSENGER® (Article no. 78207280) For remote monitoring of cryo-vessels and transfer of alarm signals by SMS, E-Mail or FAX. Data transfer via GSM-Dualband-Modem. Daily routine call to the Global Data Center
 Technical Data:
 Dimensions: 400 x 300 x 200 mm
 Power supply: 100-240 VAC/47-63 Hz/8 VA
 2 analogue inputs: 0-10 VDC
 2 signal inputs: for potential-free contacts
- CRYO-MESSENGER® with rechargeable battery (Article no. 78207281) CRYO-MESSENGER® with an added lead-gel rechargeable battery (12 V/7.2 Ah), so that even in case of a power failure an alarm signal can still be raised.
- Extension module E-M8 (Article no 78207284) for extension to 8 signal inputs for potential-free contacts
- Extension module E-A4/1 (Article no. 78207285) for extension of 4 extra analogue inputs (0-10 VDC).



Level Detection and Control Device



Monitor Reliably and Control Levels



CRYO LC[®]

Device for level detection and level control in vessels and systems. CRYO LC[®] operates independent of pressure.

System

CRYO LC[®] consists of the basic module as a built-in device for C-tracks with a level sensor manufactured to customer requirements, the display and operation unit (optional components) as well as the cabinet.

Functions

Level detection: detection of 4 levels (LEVEL 1 to LEVEL 4), display and signal output (= potential free change-over contact) plus level control: automatic control of the level between LEVEL 2 and LEVEL 3.

In both functions there is an alarm if LEVEL 1 is underrun. Also on exceeding of LEVEL 4 or sensor short circuit as well as sensor wire breakage.

Convincing advantages:

- modular design
- quick assembly
- easy operation
- individually customised level control and level sensor, dependent on application and customer requirements
- for installation in control cabinet or as a separate, independent device
- measurement and control are independent of pressure as measurements are taken against a reference sensor
- basic module can be operated at the same time with at least two display and operation units (local and remote control)
- trigger guard against manipulation and operator error / device only runs in automatic mode if the reference sensor is colder than approximately -100 °C
- level monitors itself as the sensors are monitored for wire breakage and short circuit
- each signal (LEVEL 1-4, filling, alarm) is duplicated by means of a change-over contact
- potential-free change-over contact: high performance switch (230/VAC/3A), thus external devices can be directly controlled via this feature
- SPS-compatible interface
- flexible current supply in wide ranges (85-264 VAC and 24V DC)

Application Examples:

- phase separator
- dewars/cryostats
- cooling baths

Application

CRYO LC[®] can be used in vessels and systems of all sizes in which the level sensor can be equipped.

The device can be installed in various ways:

- compact devices, ready for operation, in cabinet with display and operation unit
- installation in cabinets, modular, CRYO LC[®] basic module for assembly on C-tracks, display and operation unit with flat ribbon cable ready for installation in the switch cabinet door
- installation in cabinets, modular, CRYO LC[®] basic module for assembly on C-tracks, without display and operation unit, control and signal retrieval can be carried out directly by means of SPS
- two display and operation units attached to one CRYO LC[®] basic module (local and remote control)

Level Detection:

Level detection is effected by four sensors.

At the lowest point of the level sensor there is a fifth PT sensor as a reference sensor. Only when this sensor registers a temperature of under approx. -100 °C will the level detection be activated.

The conditions LEVEL 1 to LEVEL 4 are displayed on the panel and operation unit and are retrievable via the potential free change-over contact. An exceeding of LEVEL 4 or fall below LEVEL 1 result in an alarm (optically and acoustically at the display and operating unit or via the potential free change-over contact at the basic module).

Level Control:

The level is automatically controlled between LEVEL 2 and LEVEL 3. Fall below of LEVEL 2 a potential free change-over contact will trigger on the basic module and solenoid valve will be opened. If the level reaches LEVEL 3 the change-over contact will be triggered again and the solenoid valve will be closed. The filling process shown on the display and operating unit as "FILL". The function can be switched on and off using the buttons "AUTOFILL ON" and "AUTOFILL OFF".



Further Functions:

- collective filling
- "MANUAL FILL"
- "START AUTOFILL"
- "AUTO FILL ON/OFF"
- monitoring of the sensors for wire breakage and short circuiting



Various sensors



Exact Level Measurement for Liquid Helium



Convincing advantages:

- modular design
- most easy operation
- individually customised sensors
- integrated rechargeable battery monitoring
- Level monitors itself as the sensors are monitored as to wire breakage and short circuit

With this device liquid helium levels in cryo-vessels up to 1,370 mm are displayed in linear form. Several sensors are available with various measurement length. The measurement device is factory-synchronised to the desired measurement range.

Due to a built-in rechargeable battery the levels can be measured at any time within remote applications. A charging device which can also be used as a power supply unit is part of the package.

Connection opportunities for remote display and a plotter round off the package.

The device switches itself off automatically after maximum 60 seconds.

The Principle of Measurement

The superconductor of the sensor shows a so-called transition temperature in the boiling range of helium in which its electrical resistance becomes infinitely small. A constant current causes a loss of voltage via the remaining resistance appropriate to the part of the sensor not dipped in the cryo-liquid. This voltage is sent to the display via a measuring bridge which results in the measurement of the level.



Technical Data	
Display device	Sensor
digital display	rod sensor with connection Ø 12 mm for installation by means of pinch screwing
1 measurement area synchronized with related sensor	KF32 or KF50 intermediate section between vessel and safety head
function Selection via 2 Keys (on, heat)	sensor current 80 mA / 100 mA
function display for "sensor not locked" and "low battery"	sensor length from 500 to 2,000 mm
connection sockets for power supply, sensor, plotter output voltage (0-1 V), plotter output current (0-10 mA)	active measuring length 450 to 1,370 mm
power supply via built-in rechargeable battery 12 V / 1.1 Ah or external power supply 12 V / 400 mA	
power input approx. 4 W	
plastic cabinet (H x W x D) 67 x 148 x 190 mm	

For stationary vessels a 19" version is also available

Complete Packages with Mount, Sensor, Display	
Type	Article-No.
STRATOS® 250SL	78200882
STRATOS® 380SL	78200913
STRATOS® 1000SL	78200927

Combination Options	
Type	Article-No.
level measurement device with charger	78200194
rod sensors 12 mm for:	
HELIOS® 100A	79243593
STRATOS® 100SL	79243593
STRATOS® 50	79243584
alternative to STRATOS® 50: KF32- intermediate section with sensor	79248661
alternative to STRATOS® 100 SL: KF50-intermediate section with sensor	79248662

Custom-made models on request

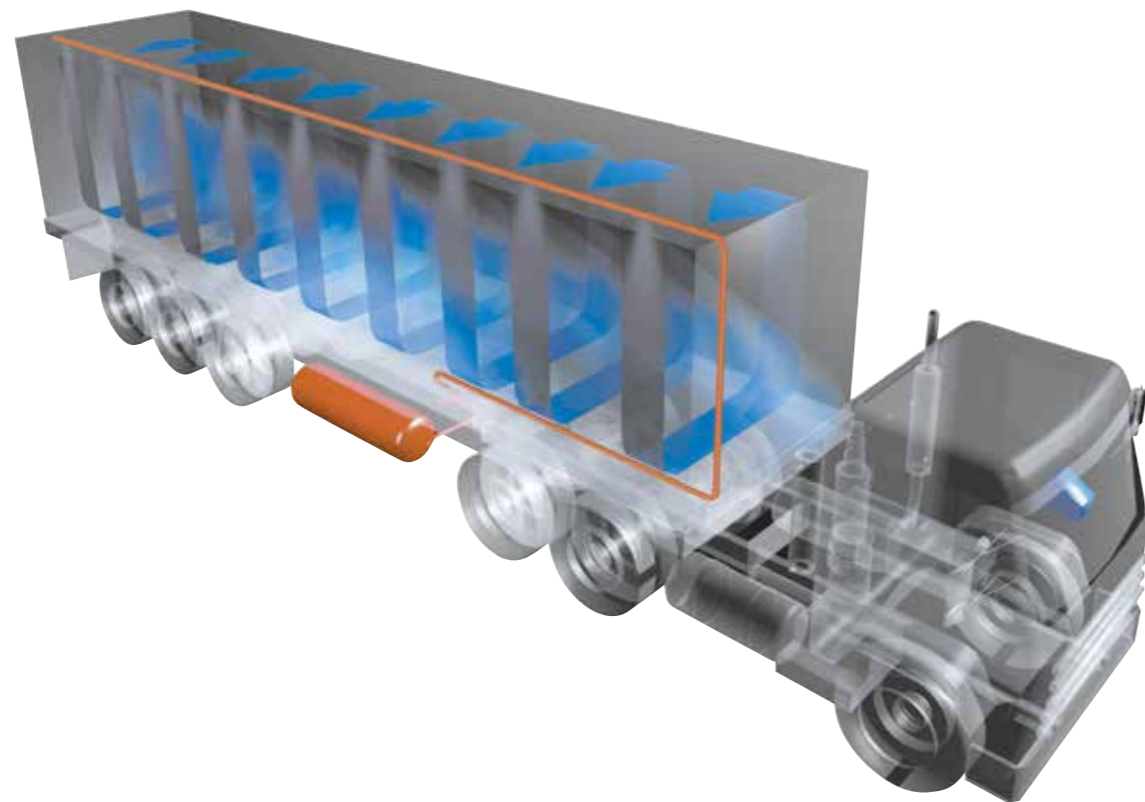
TRANSPORT COOLING

For Vehicles

LIN Liquid Nitrogen
-196 °C

CRYOGEN® Trans-Serie
Transport Cooling Features for Transport Vehicles

118 - 119





Transport Cooling with Liquid Nitrogen Without Local Emission

Economical Technology for Nature and the Environment



Convincing advantages:

- extremely low operating material costs on long distances
- investment comparable with conventional system performance
- high cooling power in distribution traffic
- optimal distribution of cold
- redundant cooling
- noiseless
- life expectancy 30 years
- robust construction made of highly corrosion-resistant cryogenic stainless steel or high-strength aluminium
- multi-layered vacuum insulation and computer optimised thermodynamic construction
- inner and outer vessels tested separately by helium leak test
- long-term vacuum protection due to high-grade adsorption and getter materials

Are you looking for suitable transport cold to safeguard your chain of cold? Even in extreme summer heat the temperatures have to be maintained? When you unload parts of your cargo the recooling of your truck loading area needs to be quicker? Are you looking for a robust and low maintenance solution for cooling your trucks?

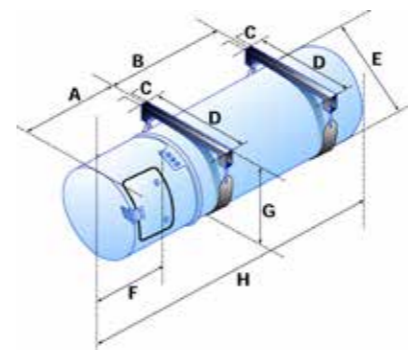
In distribution transport the cooling system needs to recreate the required temperatures immediately after the door is opened each time. Our system "CRYOGEN® Trans" ensures quick cold and cools your truck with cryogenic liquid nitrogen. In this fashion after the door has been opened the cargo area is brought rapidly back to the required temperature.

Standard Features:

- vacuum super-insulated CT-vessel with instruments and instrument protection case

Accessories:

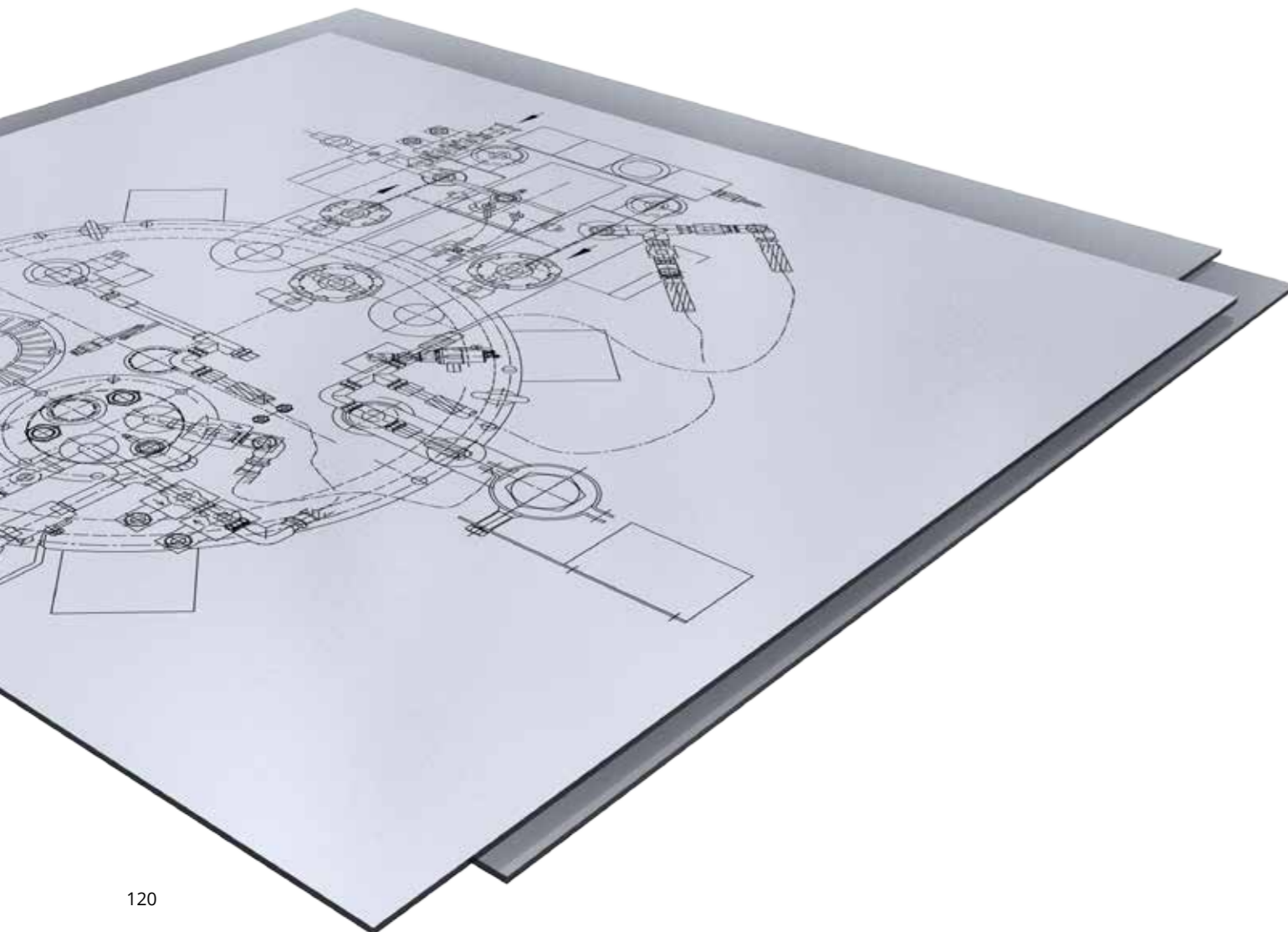
- installation material for one compartment or multi-compartment vehicles whether trailers, semi-trailers, swap bodies or vessels.
- weather protection hood
- temperature control. In the case of multi-compartment vehicles the number of control units and temperature sensors is dependent on the number of compartments
- junction box
- door switch or door switch combined with tail-lift control
- safety switch



		Technical Data			
Vessel Name		CT 200	CT 300	CT 430	CT 550
geometrical capacity, max.	[l]	200	300	409	523
operating overpressure, max.	[bar]	5	5	5	5
weight empty	[kg]	140	186	300	380
weight full	[kg]	300	427	630	800
total length	H [mm]	1,580	2,040	2,290	2,720
diameter	E [mm]	600	600	650	650
distance mount (± 100 mm)	B [mm]	800	1,000	1,200	1,400
distance mount	A [mm]	525	625	700	800
length mount	D [mm]	620	630	716	716
width mount	C [mm]	80	80	100	100
height mount	G [mm]	624	624	700	700
article-no.		792.45090	794.17880	794.08059	782.05134

Other models on request

Customising / Turnkey Solutions Cryo-Cooler / Cooling Baths



Cooling Baths Shrinking with Cryo-Cold	122 - 123
Reference Cryobanks	124
Reference BIOSAFE® XXL BIOSAFE® 8,800	125
Reference Cryotherm® Cryo-Coolers	126
Reference Complex Transfer Lines and Phase Separators	127
Reference Multiline	128 - 129

LIN

Shrinking with Cryo-Cold A Perfect Fit in Metal Processing with Liquid Nitrogen



For the Highest Quality



Cryotherm cooperates with companies in the field of machine engineering who count reputable automotive manufacturers at home and abroad to the customers and produce cooling baths with various geometry, features parts and transport systems. Through cooling with liquid nitrogen metal processing components can be joined together quickly and positively. The quality of the components remains unchanged and extra work is not required

Applications

- metal processing
- residual austenite conversion
- automatic operating systems
 - assembly of valve seat rings
 - assembly of valve guides
 - manufacture of gear boxes

Models

- horizontal stepping wheel system
- vertical stepping wheel system
- guide rails
- register to "pick"

Convincing advantages:

- horizontal or vertical model
- clear model conception
- customised complete solutions
- reproducible quality
- automatic re-fill regulation
- electronic control
- can be automated
- easy operation
- low investment and operating costs
- high shrinkage effect
- low maintenance requirements
- robust construction made of highly corrosion-resistant cryogenic stainless steel
- multi-layered vacuum insulation and computer optimised thermodynamic construction
- inner and outer vessels separately tested by helium leak test
- long-term vacuum protection due to high grade adsorption and getter materials

Dewar Design

- low evaporation rate
- variable component diameter
- horizontal stepping wheel, drilling according to customer-spec.
- separate inflow and discharge
- heated lid
- condensate drip tray
- level sensor

Cooling the Parts

The parts run through the cooling bath in the so-called guide rails are lying on the stepping wheel plate and are load and unloaded by the robot or portal system. The robots and their supply and interlinking is taken care of by the machine engineers.

The guide rails, the form of the bath, the shaft and the lid are optimised in cooperation with the customer so that the dwell times in the bath meet with the optimal assembly tact times.

Modular Structured Assembly Machines

In most modular structured assembly machines there are several cooling baths in operation which are supplied with liquid nitrogen from a common supply vessel, phase separator. An electronic control system controls all the vessel levels automatically and thus without any input from the operator.

The optimal filling pressure of the phase separator amounts to 0.5 to 0.8 bar and is controlled by the automatic filling-level regulation



Guide rails



Cooling bath without fittings



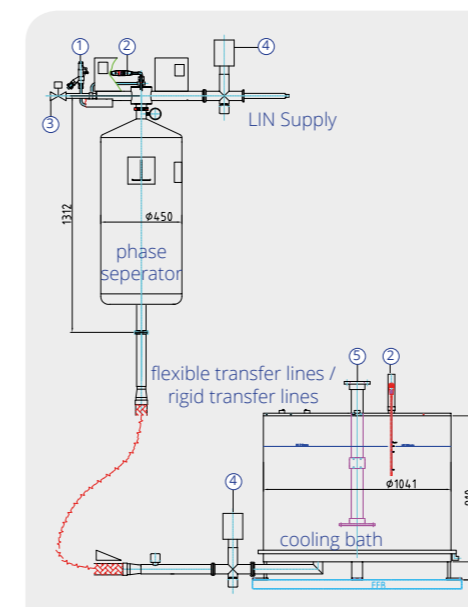
Cooling bath system



Horizontal stepping wheel system



Vertical stepping wheel system



Nitrogen Supply

- comes from a standing tank
- on site connection of the phase separator to the tank is carried out with a rigid super-insulated transfer line and an accessory shoe or flexibly
- connection of the phase separator with the cooling bath is carried out according to how the machine has been installed (flexible or accessory shoe)

- 1 safety valve
- 2 sensor CRYO LC®, control device CRYO LC® for cabinet installation 230 V AC
- 3 exhaust solenoid valve 24 V DC or 230 V AC
- 4 solenoid valve 24 V DC or 230 V AC
- 5 flange drive, control and mount of the drive and the stepping wheel



Project: Long-Term Storage for Biological Samples (Germany)

Cryopreservation is currently the only way to store viably animal, botanical and above all human samples and cell bonds over almost any lengths of time and to reanimate them at a certain time.

The structure of a complete cryobank is possible with a BIOSAFE® system without any problems. Cryotherm realised a Bio-Cryo-Bank with ~100 Cryotherm vessels operated with liquid nitrogen.



© Copyright: Fraunhofer IBMT, Aufnahmen: Dr. Frank Obergriebner, 2012



© Copyright: Fraunhofer IBMT, Aufnahmen: Dr. Frank Obergriebner, 2012



Project: NAKO (Germany)

Areas of Use:

- worldwide largest Cryo-Biovessel, 8,800 l content per vessel
- number of samples: 20,000,000
- storage time; at least 30 years
- gas phase storage at -180 °C
- maximum operating safety
- economically, ecologically and technically optimised
- space saving
- 30% saving in storage costs per sample as against traditional vessels
- better cooling quality (consistency)
- defined interfaces for the automation of inflow and output systems
- high demands on manufacturing tolerance
- pressure lifting bag instead of rollers for easier handling



LIN

Project: Liquid Nitrogen Cooling Systems also for Super-Conducting Cables



Highest Performance also under the Toughest Operating Conditions Round the Clock

Extremely Low Vibration

- closed loop system with up to 10 bar pressure to increase the boiling point of the liquid nitrogen and reduce vibration of the components to be cooled
- variable frequency minimises resonance on the mechanical system to be cooled

Ease of Use

- continuous operation
- fully automatic operation and re-fill routines
- optional remote control
- smooth running, sturdy castors with locking function

Low Maintenance and Cost-Effective Operation

- extremely reliable industrial components
- low consumption of liquid nitrogen
- short reaction times in case of service needs with a secured supply of spare parts
- vacuum super-insulated transfer lines
- phase separator
- customer-specific types of operation
- integrated interruption-free power supply

LIN

Project: Vacuum Super-Insulated Transfer Lines for Research Institute (Germany)

Vacuum super-insulated supply line from a 50,000 l tank to a total of 25 experimental chambers

- total length 300 m of vacuum super-insulated transfer lines
- ten vacuum super-insulated phase separator stations integrated into the transfer line system; the models used 100 l, 200 l and 2,500 l model
- vacuum super-insulated buffer vessel 2,000 l
- system designed for 2,000 l/h maximum through-put
- emergency deactivation function by means of an oxygen deficiency warning system and vacuum super-insulation shut-off valve
- safe, reliable and application-oriented!



LHe

Project: Cryogenic Distribution System 2K Valve Box and Multichannel Transferline (USA)



2K Valve Box

- compact construction due to the geometrical limitations
- large number of required instruments (safety valves, through-put meters, manual and pneumatic valves)
- integrated vacuum stops built-in to the line system



Multi-Transferline

- various cryogenic media (LHe and LIN)
- several temperatures (2K, 5K, 40K and 80K)
- varying pressures and conditions
- cooling and heating independently of each other with differing rates and sequences
- minimised contact between inflow and return flow lines
- extremely low heat inflow rate

LHe

Project: XFEL Cryomodule Test Facility with 2K Valve Box (Germany)



XFEL Cryomodule Test Facility with 2K Valve Box

- 4.5K and 80K shield
- feed-in module
- closing module
- valve box
- transfer line
- pipe diameter DM10-DN50

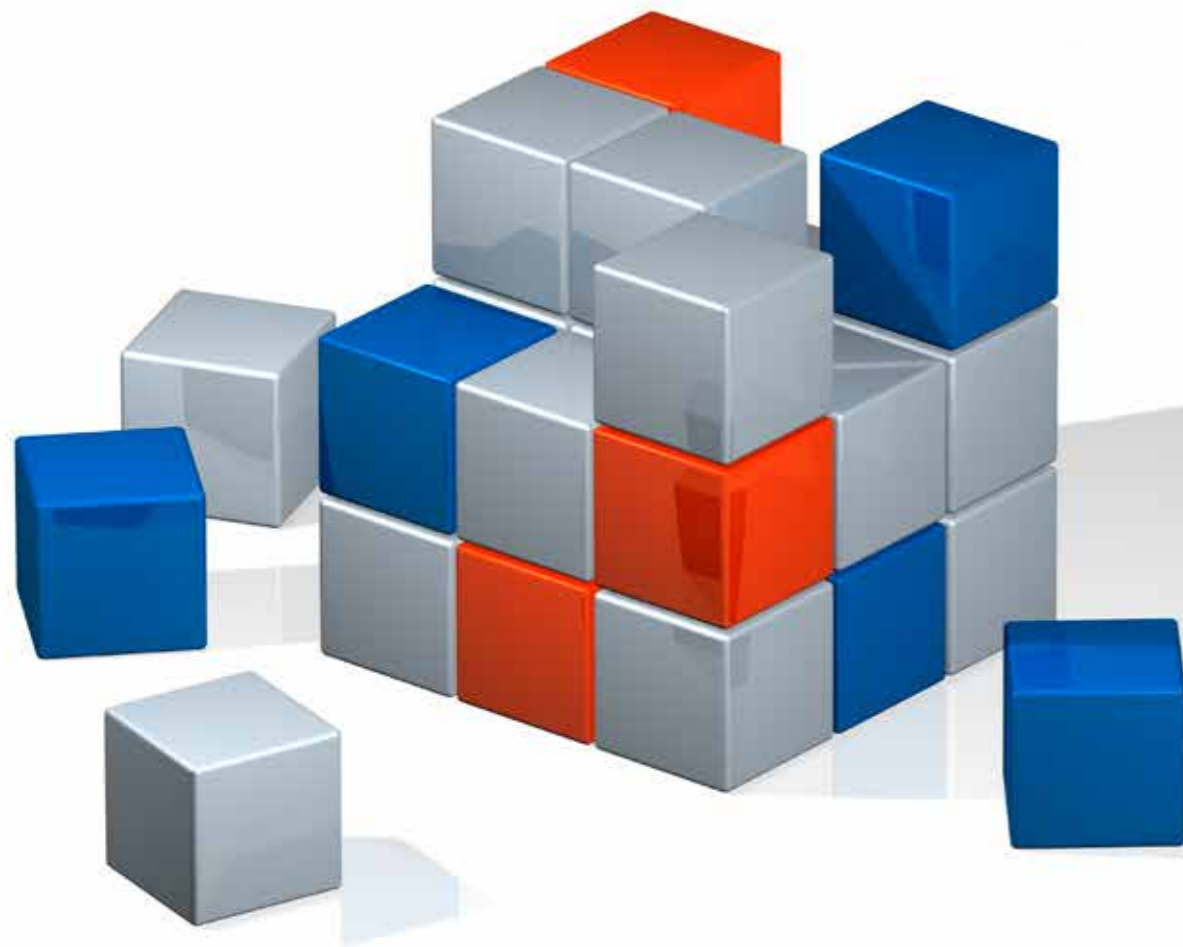


2K valve box



Multi-transferline

Cryo ACCESSORIES



Gloves

132

Protective Goggles

132

Aprons

132

Online-Shop

133

Best Protected!

www.cryotherm.de

Hand Protection: Cryo-Gloves, Watertight

Description	Length	Size	Article-No.
length: approx. 300 mm, 5 fingers for temperature range to -160 °C	wrist	S	78400613
length: approx. 300 mm, 5 fingers for temperature range to -160 °C	wrist	M	78213086
length: approx. 300 mm, 5 fingers for temperature range to -160 °C	wrist	L	77031450
length: approx. 300 mm, 5 fingers for temperature range to -160 °C	wrist	XL	78400823
length: approx. 400 mm, 5 fingers for temperature range to -160 °C	forearm	S	78400843
length: approx. 400 mm, 5 fingers for temperature range to -160 °C	forearm	M	78400180
length: approx. 400 mm, 5 fingers for temperature range to -160 °C	forearm	L	78400887
length: approx. 400 mm, 5 fingers for temperature range to -160 °C	forearm	XL	78400856
length: approx. 500 mm, 5 fingers for temperature range to -160 °C	elbow	M	78400899
length: approx. 500 mm, 5 fingers for temperature range to -160 °C	elbow	L	77031451
length: approx. 500 mm, 5 fingers for temperature range to -160 °C	elbow	XL	78211327



Safety Instructions: Cryo-Signs

Sign	Description	Article-No.
"Wear Eye Protection"	adhesive film sign Ø 20 cm symbol	78210204
"Wear Hand Protection"	adhesive film sign Ø 20 cm symbol	78210205



Cryo-Protective Features Full Set

Description	Article-No.
includes cryo-gloves, cryo-apron, cryo-protective shield and 2 warning signs	78400851

Body Protection: Cryo-Aprons

Description	Article-No.
length: approx. 920 mm, for protection from cryogenic fumes and splashes for temperature range to -160 °C	77031519
length: approx. 1380 mm, for protection from cryogenic fumes and splashes for temperature range to -160 °C	77031520



Eye and Face Protection: Cryo-Protective Shield and Goggles

Product	Description	Article-No.
cryo-protective shield and inspection Glass	head protection shield of vulcanized fibre foam padded dimensions: (WxH) 460 x 190 mm	77031519
protective goggles with side protection	for protection against fumes and splashes	77031520



shop.cryotherm.de

... round the clock easily within reach for you!

- Nitrogen Vessels •
- Helium Vessels •
- Rack Systems •
- Spare Parts •
- Offers •

SERVICE



Installation / Assembly / Commissioning	136
Instruction / Briefing	137
Service / Maintenance / Service Contracts	138
Error Analysis / Troubleshooting	139
Spare Part Service / Vessels for Rent	140
Vessel Repair / Retest (Every 5 or 10 Years)	141
Operational Qualification IQ and OQ	142
Service Hotline Europe 24/7	143

Installation / Assembly / Commissioning



- We support you with:
- Commissioning and assembly work
 - instruction of users and operators
 - repair work on site
 - maintenance
 - installation qualification and operational qualification
 - spare parts service
- Contact us!

This all belongs to all-round care after sales: delivery including commissioning by the service technicians and instruction of the customer, an offer of regular maintenance and courses of instruction according to agreement as well as a service hotline for emergencies. Cryogenic gases are effective sources of cold that are used for numerous processes as well as for safe (long-term) storage of materials that are often valuable.

The storage and supply and storage vessels developed by Cryotherm, the phase separators, the line systems and freezing appliances are used in industry as well as in research and medicine. Therefore, the cryo-features by Cryotherm has high-grade, specially developed vacuum super-insulation to keep heat losses at a minimum. The dewars can be used in a stationary manner eg. in laboratories and also in a mobile fashion eg. In air and overseas transport.

They are manufactured according to the regulations of the Pressure Equipment Directive (PED) and the transport device guidelines and tested by experts and approved. The relevant certificates belong to the scope of delivery in each case. For cryobiology the storage systems on offer by Cryotherm have been classified and approved as medical products.

Instruction / Briefing



Service begins so to speak with the delivery: this is often carried out with assembly, commissioning and operational qualification by our Cryotherm-Service technicians and a comprehensive briefing of the users. Apart from that intensive courses of instruction are on offer that are available at the customer's location or in the Cryotherm factory.

The former has the advantage that the instruction takes place on the actual features used under practical conditions. The latter is distinguished by simulation of failures on equivalent apparatus without the danger of any interruption of operations.

Service / Maintenance / Service Contracts



Cryotherm further offers their customers contracts on regular maintenance so that the long life of your system remains safeguarded.

Routine maintenance work amounts to a large part of the jobs of any service technician.

Our responsible staff are all qualified electrical specialists having passed their examinations as medical product consultants and continuously schooled in Cryotherm products.

Error Analysis / Troubleshooting

Our trained service specialists will gladly help you on the telephone and on site with error analysis and the removal of failures.



Spare Parts Service / Vessels for Rent



Safety for Your System Thanks to Availability of Parts

A wide-ranging spare parts store ensures that spare parts are available to you for years to come.

And if you should have any urgent requirement and you order before 14:00 hrs. (2 pm) then our Express-Delivery-Service will send you your required spare parts by by express delivery by the next morning.

That way your cryo-facility will be back up and running as soon as possible and your samples will not suffer.

Covering Peaks in Demand and Fast Availability in Case of Repairs

You need a vessel for liquid nitrogen for a project limited in time or you have to cryogenically transport your samples from A to B and are looking for a suitable transport vessel.

We have a wide-ranging rental pool and therefore we can react flexibly and speedily to your needs.

In case of repairs to your cryo-system we can offer you a system tailored to your application at short notice (24 hours).

If you would like to found out more on the subject of renting, please contact us.

Vessel Repair / Retest (Every 5 or 10 Years)



Add to all this our repair service on site or in the factory, refurbishing of used vessels that are then back in operation for many years, a spare parts service as well as rental of equivalent substitute system from our well-equipped rental pool of systems as a temporary solution for longer periods of repairs.

Our full-time service technicians are supported in their work by the staff from the whole chain of manufacture – including the electrical specialists and engineering staff. As Cryotherm products are also delivered abroad service can be called from there.

Operational Qualification IQ and OQ



Execution of IQ and OQ
(Installation qualification and operational qualification)
Documentation results according to GMP (Good Manufacturing Practice) guidelines and protocols

Service Hotline Europe 24/7



The service hotline number can be found on every device delivered by us. Callers are given advice on the telephone immediately through which often many a problem can be cleared up. If that is not possible an appointment is made for a service technician dependent on the urgency of the situation.

Service Hotline Europe 24/7
+49 2741 95 85 75

About Us CRYO-SPECIALISTS



Origins and History	146
Numbers and Facts	147
Locations	148 - 149
Production	150 - 151
Turn-Key-Solutions	152
Quality Management	153



The Cryo-Specialists

Numbers and Facts



Cryotherm has been occupied since 1964 with the

- development,
- manufacture,
- sales,
- service and maintenance

of:

- vacuum super-insulated vessels (geometrical capacity 5 – 15,000 l),
- super-insulated “plug and play” line systems (DN14-300 mm),
- rack systems for storage of wide-ranging samples,
- regulation and control devices,
- accessories and
- turn-key-solutions for the most varied applications of cryogenic, liquid gases
 - helium,
 - nitrogen
 - oxygen,
 - hydrogen,
 - argon and
 - liquid natural gas (LNG).

Convincing advantages:

- 44,000 m² company premises
- of that 5,000 m² production area
- market leader in Germany
- supplier of turn-key-solutions
- certified (ISO 9001, QS Guideline 2014/68/ EU, EN ISO 13485, 93/42/EEC Appendix V-ASME)
- development & engineering
- production
- individual and serial manufacture
- after sales service, maintenance, upkeep and service hotline europe 24/7
- > 50 years of experience

2016	second space project (Ariane 6)
2015	restructuring of the machine shop = extension of production by 1,000 m ²
2014	Cryotherm GmbH & Co. KG is now a company independent of gas producers
2014	50 years of Cryotherm – delivery of the largest bio vessel in the world 8,800
2012	vessel no. 60,000 leaves the factory
2004	first space project (Ariane 5) supply of hydrogen and oxygen
1979	transfer of the Gewerkschaft Siegtal to Siegtal Cryotherm GmbH
1964	first manufacture of liquid nitrogen vessels as Gewerkschaft Siegtal
1950	construction of the new office building (Villa)
1941	opening of the new machine shop
1923	foundation of the company as an oxygen plant

So that the deep cold remains available for as long as possible our vessels and transfer line systems possess a special, sophisticated insulation technology developed especially by our research: high-grade multi-layered vacuum super-insulation between the inner and outer vessels, highly active adsorption material and a computer-aided, optimised thermal design which reduces heat influx and thus evaporation of liquid gas to a minimum. We manufacture the right vessel for every job. Whether small or large, whether stationary or mobile, for short or long-term storage, for the laboratory or air and overseas transport.

As a certified manufacturer of pressure equipment we produce for the fields of

- industry,
- chemistry,
- medicine,
- food,
- space travel
- and research

in Kirchen (Sieg), Germany annually over 1,000 vessels that for the most part carry the attribute “Medical Product”.

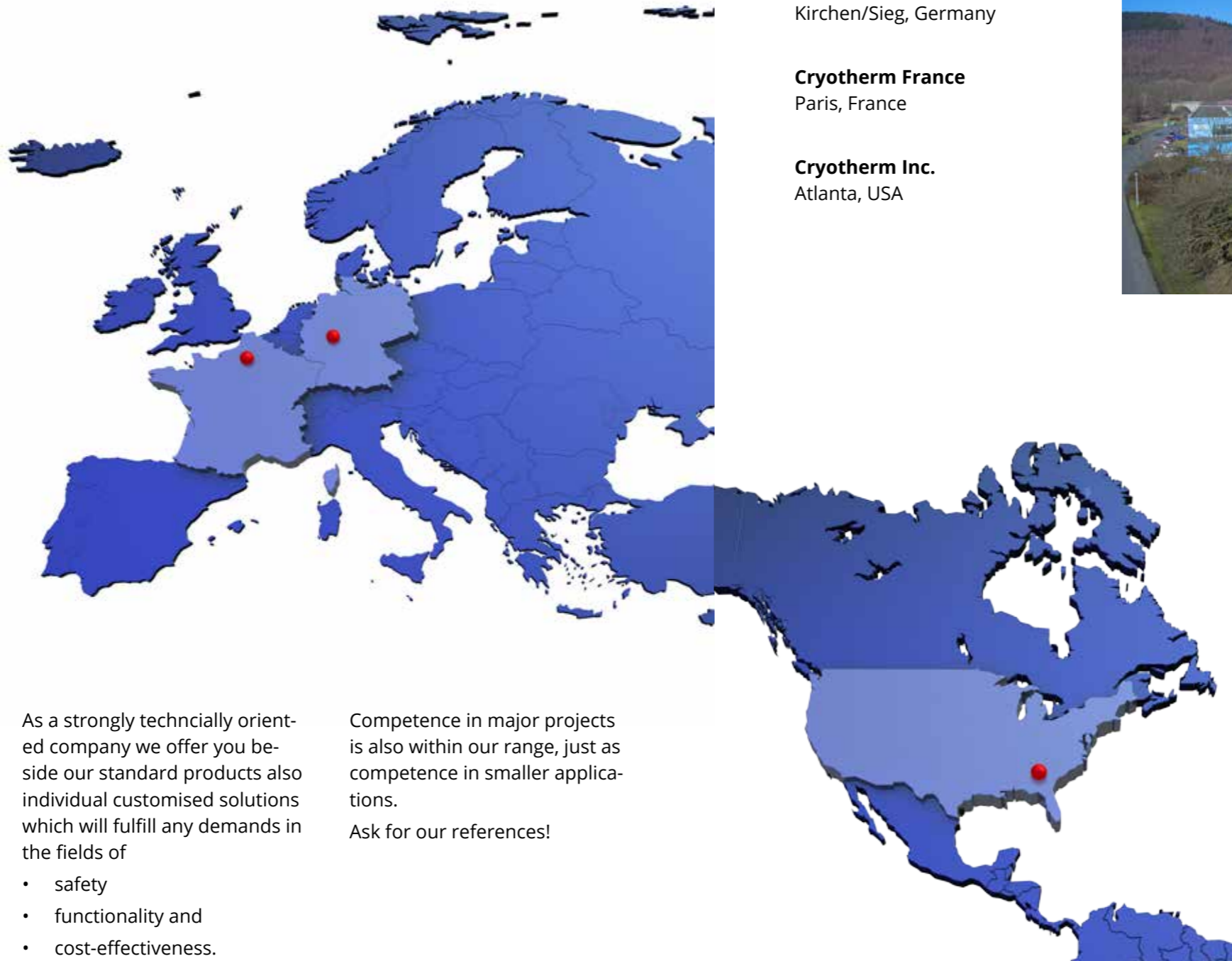
On the Spot for You

With our closely located sales and service network we are available for you at any time. Just get in touch with the contact in your region. We will take care of your wishes.

Our own locations in France and the USA as well as partners in Australia, Denmark, United Kingdom, Italy, the Netherlands and Russia offer competent consultation and support outside Germany.

Further representatives in Europe will support you on questions concerning cryogenic liquid gases and their

- storage
- transport and
- transfer.



As a strongly technically oriented company we offer you beside our standard products also individual customised solutions which will fulfill any demands in the fields of

- safety
- functionality and
- cost-effectiveness.

Competence in major projects is also within our range, just as competence in smaller applications.

Ask for our references!

We are at your service:
Cryotherm GmbH & Co. KG
Kirchen/Sieg, Germany

Cryotherm France
Paris, France

Cryotherm Inc.
Atlanta, USA



Further partners in Germany, Europe and the world will gladly advise you according to your requirements.

You can find our contacts on our homepage.

www.cryotherm.de



We produce vessels and line systems for cryogenic liquid gases on more than 5,000 m² with highly qualified staff. Certified welders (DIN EN ISO 9606-2) and certified solderers (DIN EN ISO 13585) prove the quality on a daily basis. Durability, reliability and functionality are the attributes for our production. In the meantime we also fulfill the US-norm ASME. The certified production procedures ensure consistent high quality for you.



Extension of production area by 1,000 m²



WIG welding
wolfram (tungsten)-inert gas
welding



Acceptance area



By Cryotherm

Quality Management System

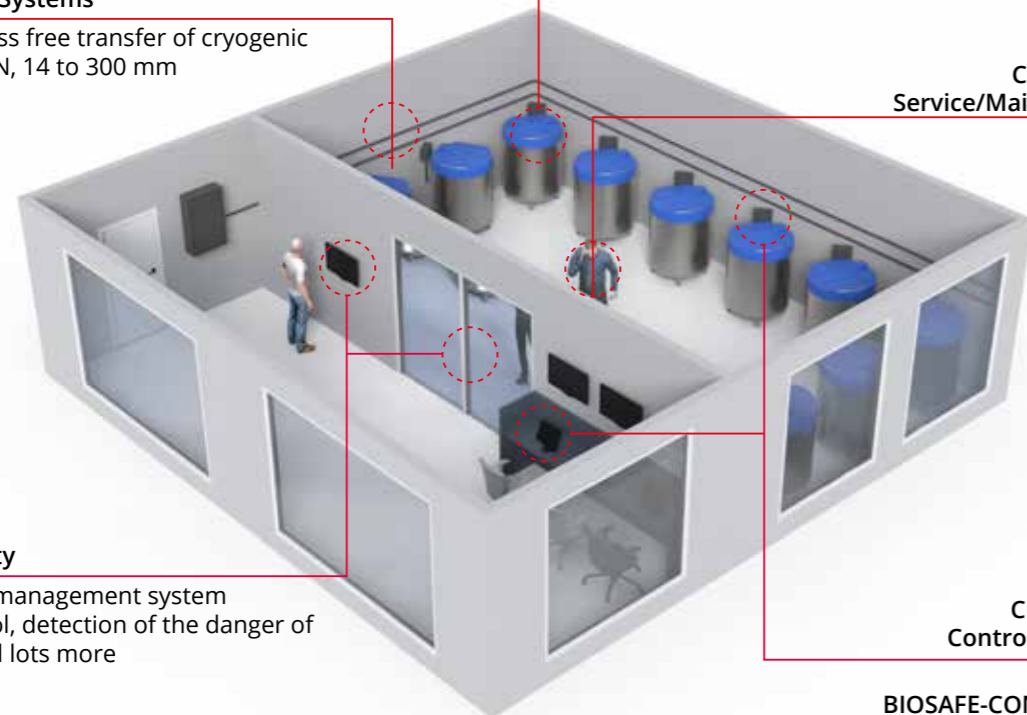
Turn-Key-Solutions

- planning
 - conceptual design and overall planning
 - planning of the pipe
 - spatial planning
 - electrics planning
 - building technology
 - MSR-planning
 - safety planning
- manufacture / Documentation
- commissioning / Installation
- service / Maintenance
- Certified Quality Management



Cryotherm Line Systems

for the almost loss free transfer of cryogenic liquid gases Ø DN, 14 to 300 mm



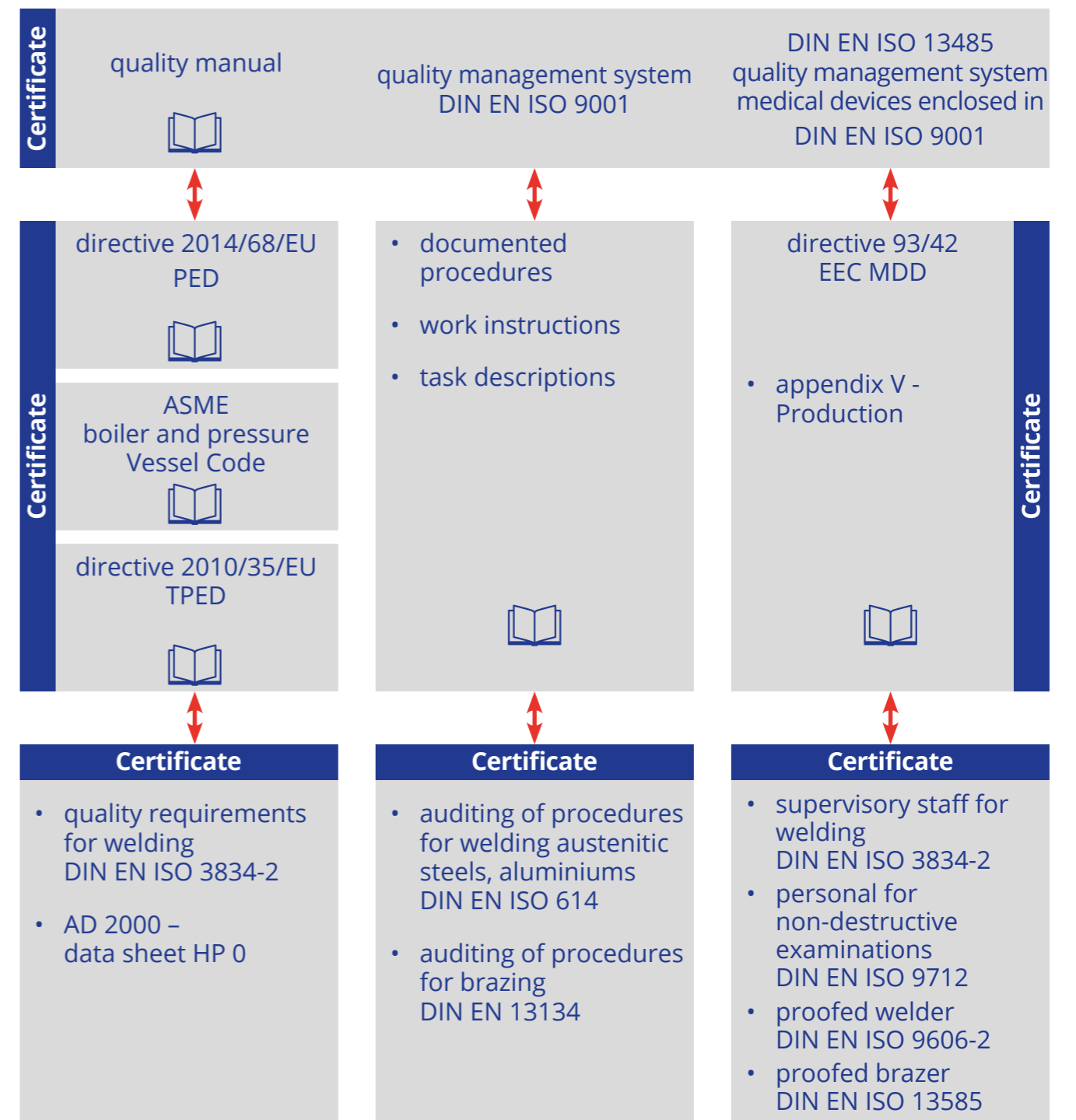
Cryotherm Vessel Storage Systems
for the long-term storage of biological, medical and chemical material

Cryotherm Service/Maintenance
24/7

Cryotherm Safety

certified quality management system
eg. access control, detection of the danger of asphyxiation and lots more

Cryotherm Control Systems
Cryo LC®
BIOSAFE-CONTROL® B



Cryotherm® Genealogie®

	LHe -269 °C	LH ₂ -253 °C	LNe -246 °C	LIN -196 °C	LAR -186 °C LOX -183 °C	LNG -162 °C	LKr -153 °C LXe -108 °C
LIN Storage Vessels				APOLLO® JUNO® SIRIUS® STELLA® LAB®			
LIN Transport Vessels				SATURN® MERKUR®			
Life Science BIOSAFE®-Systems				BIOSAFE® STELLA® BIOSAFE® X/S-Serie BIOSAFE® Cryoshipper Freezing Devices			
BIOSAFE® Rack-Systems				BIOSAFE® Rack-Systems			
LHe Storage Systems	HELIOS®						
LHe Transport Vessels	STRATOS®						
Further Storage Vessels		HYDROS®			APOLLO®		APOLLO®
Further Transport Vessels		HYDROS®	STRATOS®		MERKUR® MERKUR®		
Cryo Line Systems	Cryo-Line Helium Siphon Multiline	Cryo-Line	Cryo-Line Phase Separator Gas Phase Separator	Cryo-Line Phase Separator Gas Phase Separator	Cryo-Line Phase Separator Gas Phase Separator	Cryo-Line Phase Separator Gas Phase Separator	Cryo-Line Phase Separator Gas Phase Separator
Control and Monitoring Technology	LHe Level Measurement Devices			BIOSAFE-CONTROL® β CRYO MESSENGER® CRYO LC®			
Transport Cooling for Vehicles				CRYOGEN® Trans	CRYOGEN® Trans	CRYOGEN® Trans	
Customising / Turnkey Solutions / Cryo-Cooler / Cooling Baths				BIOSAFE® 8,800 Cooling Baths Cryo-Cooler			



NITROGEN VESSELS

APOLLO® LIN Supply and Storage Vessel (50 - 350 l) · JUNO® LIN Supply and Storage Vessel (30 l)
SIRIUS® LIN Supply and Storage Vessel (1,000 - 2,000 l) · SATURN® LIN Transport Vessel (50 - 300 l)
MERKUR® LIN Transport Tank (500 - 3,000 l) · STELLA® Working Dewar (0.5 - 10,000 l) · LAB® Dewar Series (4 - 50 l)



BIOSAFE® SYSTEMS / LIFE SCIENCE

BIOSAFE® MD B Sample Storage System (Medical Product) (120 - 1,400 l) · BIOSAFE® SC B Sample Storage System (120 - 1,400 l)
BIOSAFE-CONTROL® B · CRYO-MESSENGER® Remote Monitoring System · BIOSAFE® X/S-Series · Vapor Shipper
STELLA® Working Dewar (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)
Cassettes for Freezing Bags



HELIUM VESSELS

HELIOS® LHe Storage Vessel (100 - 15,000 l)
STRATOS® LHe Transport Vessel (100 - 1,000 l) · LHe Siphon



OTHER VESSELS

HYDROS® LH₂ Transport Vessel (1,000 - 15,000 l) · STRATOS® Transport Vessel (100-1,000 l)
APOLLO® Supply and Storage Vessel (50 - 350 l) · MERKUR® Transport Tank (500-3,000 l)



CRYO LINE SYSTEMS

Rigid Line Systems (DN 14-300) · Flexible Line Systems (DN 20-150) · Phase Separator Stations (50 - 200 l)
Gas Separator (5 l) · LHe Multiline



CONTROL AND MONITORING TECHNOLOGY FOR CRYOGENIC GASES

BIOSAFE-CONTROL® B · 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



CUSTOMISING / 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 · Instruction/Training · Operating Manual · Service Hotline



Contact

Cryotherm GmbH & Co. KG
Euteneuen 4
57548 Kirchen/Sieg
Germany
☎: +49 27 41 95 85-0
☎: +49 27 41 69 00
✉: info@cryotherm.de
🌐: www.cryotherm.de



Cryotherm Inc.
5126 South Royal Atlanta Drive
Tucker, GA 30084
USA
☎: +1 770-274-2410
☎: +1 770-934-3384
✉: info@cryotherminc.com
🌐: www.cryotherminc.com

