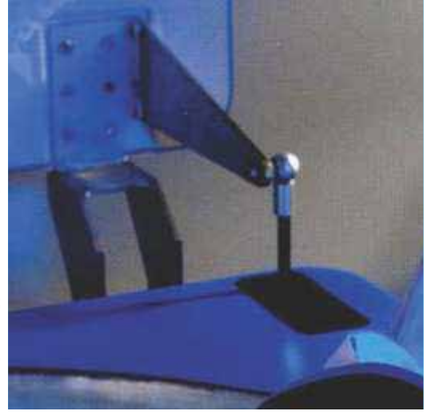
CBB - Edition May 2014

Cryobiology brochure - May 2014



Performance, reliability and safety in Cryostorage

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CRYO DIFFUSION

A member of the VRV Group

CRYO DIFFUSION


Azote liquide
CRYO DIFFUSION
BF 2350 M
BS 2004
BR 220
BR 200-S

About us

Established in 1965, Cryo Diffusion has its primary manufacturing facility in Léry in France. With more than half of its products exported across the globe, Cryo Diffusion has extensive experience in manufacturing high quality transportable cryogenic tanks for laboratories and industries, as well as highly engineered products for cryogenic applications in oil and gas offshore services and scientific research. Cryo Diffusion offers a complete range of cryobiological storage vessels, liquid nitrogen dewars and pressure vessels – all the equipment is manufactured with the most advanced vacuum technology available today.

Since 2001 Cryo Diffusion has been a part of the VRV Group. The VRV Group is a diversified multinational corporation established in 1956, headquartered in Ornago, near Milan and is one of the leading global manufacturers in the design and manufacture of state-of-the-art pressure equipment for the cryogenic, petrochemical, refining, energy and fertilizer industries.

Cryobiological Storage Technology and Innovation

Storage at cryogenic temperatures is the unique solution to guarantee unlimited lifetime and viability of biological samples. With more than 50 years' experience Cryo Diffusion has developed the most complete range of products which outclass other manufacturers' products in terms of quality, reliability and performance. The Dry Storage vessels combine all the advantages of the liquid phase providing very cold and constant temperature and of the gas phase, in which both samples and the operator have no contact with liquid nitrogen.

Cryobank Management and Monitoring

Cryo Diffusion offers the best experience and unique capability to provide a complete software solution for managing cryobanks (from a small lab to complete storage facility) and offers temperature, level control, measurement, degassing and pre-cooling of vacuum insulated transfer lines and sequential auto-filling of all cryogenic storage vessels. For the safety of End-Users the system monitors real time environmental conditions within the lab (oxygen concentration and ventilation). Additional features can also be added to include remote reporting and responding to alarm events.

Turnkey Solutions for Cryobanks

Cryo Diffusion offers turnkey solutions for complete cryobanks. Cryo Diffusion can provide all the required components and integrate them into a fully automatic working cryobank comprising liquid nitrogen bulk tanks vacuum insulated transfer lines and valves, oxygen monitoring and ventilation, secure access control and anti-intrusion systems, automating filling of cryo vessels and complete traceability of all cryogenic storage vessels and operating conditions. Cryo Diffusion provides the largest Single Source Solution, to assist customers with the right choice of equipment to meet specific requirements.

Products and Services that match customers' expectations:

- Worldwide network of experienced, qualified and certified distributors
- Each distributor is factory-trained to provide expert assistance

Small Cryogenic containers for biological samples

Large Cryogenic containers

Dermatology

Dewars, Liquid cylinders and Tanks

Electronic Devices for Monitoring, Control and Alarms

Software and Turnkey Solutions for Cryobanks

Small Cryogenic containers for biological samples

For biological samples, Cryo Diffusion provides a large range of sample storage containers designed for use in cryobiology, research, pharmaceutical and medical fields.

In order to respond to our customers' requirements, we provide a variety of different solutions for storage, including racks and canisters for straws, cryovials and blood bags. Cryo Diffusion also offers customers the option to store their samples in liquid or vapour phase or even dry storage depending on the type of container selected.

Our storage containers can be supplied with state-of-the-art electronic modules in order to manage automatic filling, temperature control and storage of data. Additionally, these control modules ensure the security of the samples and protect the End-User.

All the units are made in France and manufactured according to the highest quality control standards in aluminium with fiberglass/epoxy neck or in stainless steel. All the devices are designed, manufactured and certified in accordance with the Medical Device Directive 93/42/EEC.

B Series

Long holding time and Large capacity

Aluminium containers
for storage in canisters

1

This generation of "long holding time" and "large capacity" containers are designed for use in biology, research, pharmaceutical and medical fields, livestock breeding. These containers can be used for the storage of straws or cryovials. The tanks are manufactured in aluminium with very narrow fiberglass/epoxy neck. The high vacuum multilayered super-insulation from the inner space limits nitrogen evaporation. The samples are placed in round stainless steel canisters (included) directly inside the vessel. For the user's safety and to avoid spillage, the container has a lid latching device that can also be padlocked.

A low level alarm unit (DEN) may be used to warn users of low nitrogen level.

The units are made in Europe and manufactured according to the highest quality levels.

All units of the B 2000 Series are CE-marked and comply with the Medical Device Directive 93/42/EEC, class IIa.

1. B 2020 Open with canister
2. B 2000 Series (long holding time)

2

SPECIFICATIONS	B 2002 M	B 2003 M	B 2009 M	B 2011 M	B 2016 M	B 2020 M (1 level) (2 levels)	B 2036 M (1 level) (2 levels)
Net capacity (liters)	2	4.1	10.5	12	16.4	21.7	35.9
Empty weight without canisters (kg)	2.1	4.2	6.4	8.1	9.2	9.8	16
Full weight without canisters (kg)	3.7	7.5	16.5	17.8	22.4	27.2	45
Overall height (mm)	407	433	455	623	449	673	652
Outer diameter (mm)	190	245	368	310	450	395	480
Neck diameter (mm)	35	51	51	51	51	51	51
Static loss rate (1) (l/day)	0.09	0.1	0.11	0.11	0.11	0.11	0.12
Static holding time (1) (day)	22	41	95	109	149	197	299

STORAGE SYSTEMS	B 2002 M	B 2003 M	B 2009 M	B 2011 M	B 2016 M	B 2020 M	B 2036 M
Number of canisters	3	6	6	6	9	6	6
Number of goblet levels	1	1	1	2	1	1 2	1 2
Canister height mm	110	110	110	270	110	110 270	110 270
Canister diameter (inner) mm	26	37	37	37	37	37	37
Classical French straws 0.25ml	474(1)	1560(1)	1560(1)	2700(2)	2025(2)	1560(1) 2700(2)	1560(1) 2700(2)
Classical French straws 0.50ml	210(1)	720(1)	720(1)	1200(2)	900(2)	720(1) 1200(2)	720(1) 1200(2)
High Security straws CBS 0.5ml	–	390(2)	390(2)	780(2)	585(2)	390(2) 780(2)	390(2) 780(2)
Cryovials Diam: 12mm H: 48mm (6 per cane)	–	–	–	216(3)	–	– 216(3)	– 216(3)
Cryovials Diam: 12mm H: 55mm (5 per cane	–	–	–	180	–	– 180	– 180
Cryovials ø12mm – H: 45mm (6 cryovials per cane)	–	–	–	252	–	–	–
Cryovials ø12mm – H: 75mm (2 cryovials per mini cane)	12	–	72	72	108	72 72	72 72

(1) In bulk in the canisters **(2)** In bulk in the goblets **(3)** only possible in high canisters

Note: Evaporation rate and static holding time are nominal. Actual rate may be affected by the nature of the content, atmospheric conditions, container history, use and manufacturing tolerances.

3. Low level alarm
4. Roller base (strongly recommended for safe manutention)
5. Goblets, canisters and canes for vials (optional)

3

4

5

Small Cryogenic containers for biological samples

B 2000 Series
Large capacity

Aluminium containers
for storage in canisters

1. B2026 open with canister
2. B 2000 Series (large capacity)

SPECIFICATIONS	B 2013 M (10 canisters) (6 canisters)	B 2015 M	B 2026 M	B 2034 M (10 canisters) (6 canisters)	B 2035 M	B 2048 M (10 canisters) (6 canisters)
Net capacity (liters)	13	15.8	26	35	35.9	48.5
Empty weight without canisters (kg)	8.7	8.9	11.2	14	14.7	17.1
Full weight without canisters (kg)	19.2	21.7	32.2	42.3	43.7	56.3
Overall height (mm)	450	623	482	552	688	707
Outer diameter (mm)	380	310	480	480	480	500
Neck diameter (mm)	89	89	89	89	89	119
Static loss rate (1) (l/day)	0.25	0.25	0.26	0.286	0.27	0.27
Static holding time (1) (day)	52	63	100	135	133	180

STORAGE SYSTEMS	B 2013 M		B 2015 M	B 2026 M	B 2034 M		B 2035 M	B 2048 M	
Number of canisters	10	6	6	10	10	12	6	10	6
Number of goblet level	1		2	1	1		2	2	
Canister height mm	110		270	110	110		270	280	
Canister diameter (inner) mm	44	66	66	66	66	66	69	73	94
Classical French straws 0.25ml	4248 (1)	4920 (2)	9840 (2)	8200 (2)	8200 (2)	9840 (2)	9840 (2)	16400 (2)	9840 (2)
Classical French straws 0.50ml	1890 (1)	2190 (2)	4380 (2)	3650 (2)	3650 (2)	4380 (2)	4380 (2)	7300 (2)	4800 (2)
High Security straws CBS 0.5ml	1350 (2)		2700 (2)	2250 (2)	2250 (2)	2700 (2)	2700 (2)	4500 (2)	2700 (2)
Cryovials ø12mm – H: 48mm\ (6 cryovials per cane)	– / –		684	–	– / –		684	1320	1320
Cryovials ø12mm – H: 55mm (5 cryovials per cane)	– / –		570	–	– / –		570	1100	
Cryovials ø12mm – H: 45mm (6 cryovials per cane)	– / –		864	–	– / –		864	1500	1548
Cryovials ø12mm – H: 75mm (2 cryovials per mini cane)	–	228	228	380	360	456	228	440	444

(1) In bulk in the canisters **(2)** In bulk in the goblets

Note: Evaporation rate and static holding time are nominal. Actual rate may be affected by the nature of the content, atmospheric conditions, container history, use and manufacturing tolerances.

3. Low level alarm
4. Roller base (strongly recommended for safe manutention)
5. Goblets, canisters and canes for vials (Optional)
6. S170 electronic device for automatic control and filling

Small Cryogenic containers for biological samples

BS Series

For safe transportation of samples at cryogenic temperatures

This family of “dry shipper” containers is designed for use in biology, livestock breeding, research and medical fields and enables shipping of samples, straws or cryovials for transport in dry and safe conditions.

Risk of an outflow of liquid nitrogen is restricted by the presence of an absorber placed in the inner vessel, which also ensures the integrity of biological samples in straws, cryovials and blood bags even if the tank is badly handled or accidentally overturned.

The units are manufactured according to the highest European quality levels (IATA conformed), to protect your valuable samples during the transport, in safe conditions for the users and transporters.

1. BS Series
2. DS Data Logger

1

2

CHARACTERISTICS	BS 2002 M	BS 2004 m	BS 2024 M 2 cartridges (60-120 mm)	BS 2024 M 1 cartridge (120 mm)	BS 2024 M 1 cartridge (60 mm)	BS 2024 M
Total volume (l)	2	5.2	24	24	24	24
Absorbed LN_2 capacity (lilters / kg)	1.6 / 1.3	4.5 / 3.6	14 / 11.3	12.1 / 9.8	10.3 / 8.3	8.4 / 6.8
Empty weight (kg)	2.7	6.1	18.4	17.6	16.9	16.2
Absorbed LN_2 full weight (kg)	4	9.7	29.6	27.4	25.2	23
Total height (mm)	407	497	664	664	664	664
Outer diameter (mm)	190	251	400	400	400	400
Internal height (mm)	180	280	266	288	348	416
Neck diameter (mm)	35	70	215	215	215	215
Static loss (l/day)	0.075	0.23	0.95	0.90	0.85	0.8
Static holding time (day)	21.3	19,6	14.7	13.4	12.1	10.5
INVENTORY SYSTEMS & STORAGE CAPACITY						
Canisters quantity	1	1	7 **	7	7	7
Canister dimensions (mm)	32 x120	66 x 270	–	70 x 245	70 x 245	70 x 380
Number of goblets level	1	2	1	2	2	3
Number of straws 0.25 ml	190	1640	5740	11480	11480	17220
Number of straws 0.50 ml	86	730	2555	5110	5110	7665
Racks cryovials 2/5ml quantity	–	–	1/1	1/1	1/1	1/1
Number of levels	–	–	3/2	4/2	5/3	7/3
Number of cryovials 2/5ml	9 *	80 / 16 *	400 / 162	400 / 162	500 / 243	700 / 243
Number of cryoboxes (133x133x53mm)	–	–	4	4	5	7
Blood bag: DF200 (14mm thickness)	–	–	9	9	18	18
DF700 (14mm thickness)	–	–	–	9	9	9
DF1000 (14mm thickness)	–	–	–	–	9	9
DF1200 (14mm thickness)	–	–	–	–	–	9

Note: Evaporation rate and static holding time are nominal. Actual rate may be affected by the nature of the content, atmospheric conditions, container history, use and manufacturing tolerances.

***with mini-cryocanes, 3 vials per canes**

****gobelets in vrac in the dewar**

DS Data Logger

It is a very compact and robust data logger that can store, thanks to a memory saving system, up to one year tracking period.

The sampling period can be configured and temperature is recorded only if there is a modification compared to the previous acquisition period.

Data can be exported to Excel or easily visualised thanks to EasyLINK software.

It is possible to set a threshold that, when overstepped, can generate a visual alarm.

EasyLINK Software allows to configure the DS Data Logger main parameters and to download all recorded data on a PC. The graphic user interface is easy to use and is multilingual.

Small Cryogenic containers for biological samples

BR Series
Rack Storage System

Aluminium containers for storage in racks

The BR 2000 Series is a set of cryobiological containers conceived for storage of biological samples specifically in racks. Cryotubes, cryovials and straws can be stored in liquid or vapour phase.

All containers are equipped with racks in stainless steel and are compatible with standard cryoboxes (for 25, 81 or 100 cryotubes). Racks for 5ml tubes or racks with drawers for goblets are also available. All racks have individual locking springs to keep the boxes or drawers in position, to prevent samples from accidentally falling out.

The containers are made of aluminium with afiberglass / epoxy neck. These materials offer excellent thermal performance and guarantee a long holding time and low nitrogen consumption. The containers can also be equipped with an automatic electronic level detection (DEN unit) or with a more sophisticated electronic controller (S170 or S170-10) which is capable of managing automatic filling, temperature monitoring and offers fully traceability. The container is compliant with EU Medical Device Directive 93/42/EEC.

1

1. BR 2048 open with racks
2. BR 2000 Series

2

SPECIFICATIONS	BR2048 M	BR2100 M	BR2150 M	BR2200 M
Useful capacity (l)	48.5	100	148	197
Empty weight (kg) (without racks)	20.5	45	56	62
Full weight (kg) (without racks)	62	126.5	174.5	221
Total height (mm)	707	748	920	1076
Outer diameter (mm)	500	680	680	680
Neck diameter (mm)	120	215	215	215
Static loss (l/day) (without racks)	0.27	0.65	0.65	0.65
Static autonomy in vapour phase storage (days) (without racks)	180	154	228	303

STORAGE CAPACITY	BR2048 M	BR2100 M	BR2150 M	BR2200 M
Racks quantity	6	6	6	6
Cryovials ø12mm				
Number of levels – H: 52mm	5 (25 vials/levels)	6 (100 vials/levels)	9 (100 vials/levels)	11 (100 vials/levels)
Cryovials 2ml	750	3600	5400	6600
Number of levels – H: 95mm	–	3	4	5
Cryovials 5ml	–	1450	1944	2430
Storage Capacity Goblets ø65 x 135mm				
Number of levels	2	2	4	4
	1 by level	4 by level	4 by level	4 by level

Note: Evaporation rate and static holding time are nominal. Actual rate may be affected by the nature of the content, atmospheric conditions, container history, use and manufacturing tolerances.

3. Low level alarm
4. Roller base (strongly recommended for safe transport)
5. Individual locking springs hold the boxes
6. Cryocontainer equipped with S170 Cryo Controller for automatic filling and temperature monitoring

3

4

5

6

Small Cryogenic containers for biological samples

Large Cryogenic containers

Cryo Diffusion has developed a full range of dry storage solutions.

Through our smallest dry shippers which are IATA compliant, our customers can safely transport their samples in nitrogen vapour (inside the container), without any risk of liquid nitrogen spilling from the container, the temperature can also be recorded and the sample transport conditions validated, using a self-contained data logger to give 100% traceability of the sample during storage and transport.

For storage in Dry phase, Cryo Diffusion has developed the MDS series (Medical Dry Storage) which combines the advantages of Liquid and Vapour phase storage inside the same container. Dry phase storage eliminates the risk of any possible cross contamination and ensures that the samples never approach the critical temperature. The system is also much safer and easier to use during manipulation of the samples, as there is no liquid nitrogen inside the sample storage compartment and the unit also uses far less liquid nitrogen.

All the units are made in France and manufactured according to the highest quality control standards in aluminium with fiberglass/epoxy neck or in stainless steel. All devices are designed, manufactured and certified in accordance with the Medical Device Directive 93/42/EEC.

MDS Series
Dry Storage Solutions

For contamination free
storage at -190°C

Cryo Diffusion has a patented solution to combine the advantages of vapour and liquid phase storage:

The MDS Series, dry storage phase containers, fully compliant with EU Medical Device Directive 93/42/EEC.

The advantages of dry phase storage systems:

- No risk of cross contamination as samples are not in contact with liquid nitrogen.
- No risk of approaching the critical temperature (Tg. -135°C) thanks to thermal security of using liquid phase as refrigerating source. This solution is able to maintain the upper shelf of a rack below -180°C, even 10 minutes after the lid has been opened.
- No risk of cryogenic burns by splashing liquid nitrogen when taking out the racks.
- Less loss of liquid nitrogen when taking out racks (otherwise filled with liquid nitrogen).

The continuous low cryogenic storage temperature, below -180°C can be obtained by a combination of several components:

- Liquid-tight compartments with liquid nitrogen all around, up to the top level of the racks offer a wide surface at -196°C able to contain the samples by thermal conductivity at cryogenic temperature.
- A reliable S170 CryoController, controlling the sample storage temperature, liquid nitrogen level and fully automatic refilling (when connected to a pressurized liquid nitrogen source).
- Liquid-tight compartments with liquid nitrogen all around, upto the top level of the racks.
- A reliable S170 CryoController, controlling the sample storage temperature, liquid nitrogen level and fully automatic refilling (when connected to a pressurized liquid nitrogen source).

The principle of dry storage can be applied to larger models of Cryo Diffusion.

The Dry storage solution is available for the complete range of Cryobiological Freezers manufactured by Cryo Diffusion:

LO Series

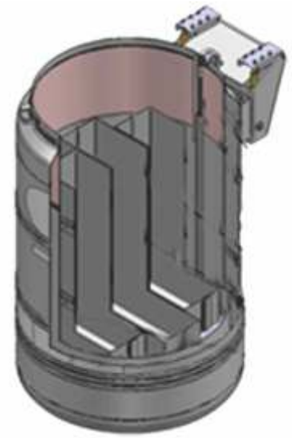
BF Series

CF Series

SD Series

1. Dry storage system principle
2. BF 2350 dry storage version
3. Sample graph showing temperature in dry storage when the lid is open

1



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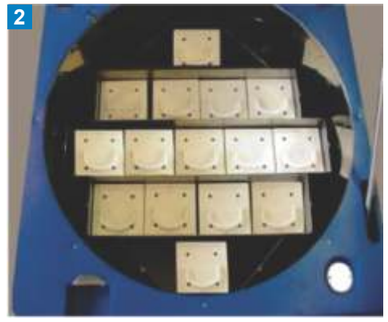
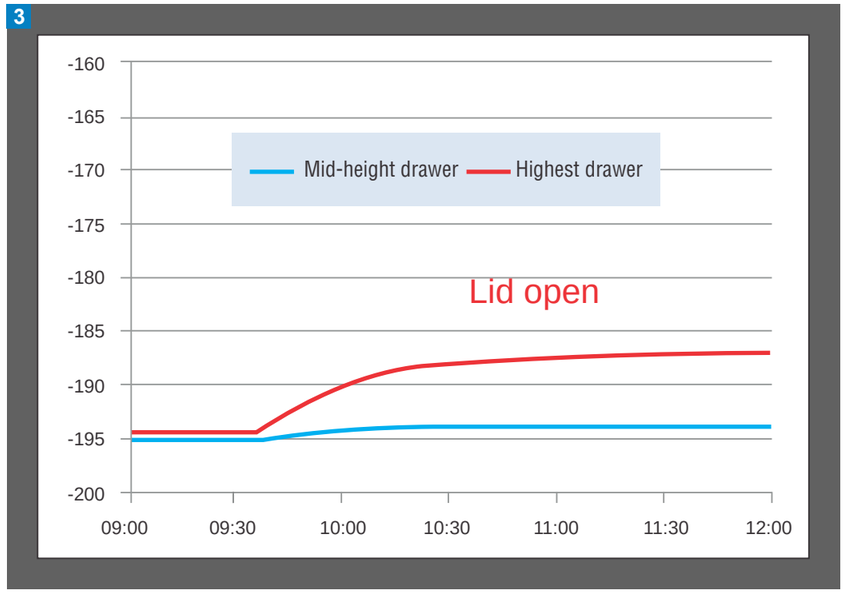


Even after opening the lid several times, the temperature remains lower that -180°C

3



LO Series
Rack and Canister Storage System

Light weight aluminium freezers with large neck for easy access

1. LO 2000 Series

The LO 2000 Series is a unique range of aluminium cryobiological storage freezers, characterized by high quality / low weight, excellent ergonomics, large sample storage capacity and a low cost / per sample stored. All the cryogenic storage containers belonging to LO Series allow direct and easy access to the samples, as each container has a large neck and gas spring assisted lid opening lid (except LO 2075). These freezers suit all storage applications that demand frequent access and manipulation of the sample and can be equipped with any kind of storage system for straws, cryo-tubes, vials or blood bags.

LO Series containers are built in aluminium and have a fiber glass neck, which guarantees very low nitrogen consumption and a lower cost per sample stored (compared to a traditional stainless steel cryogenic container).

The LO Series are equipped with 5 standard castors (2 with brakes) They can also be equipped with an electronic CryoController model S170 or S170-10, which is capable of monitoring temperature, liquid level, alarm status and automatic filling. The LO Series can be used for storage of samples in liquid, gas or dry phase and is compliant with European Medical Device Directive 93/42/EEC.

SPECIFICATIONS	LO 2075 M	LO 2200 M	LO 2250 M
LN_2 capacity (l)	74	180	218
Empty weight (kg) (without racks)	37	70	72
Full weight (kg) (without racks)	97	215	248
Total height (mm) (without electronic)	1115	1240	1380
Outer diameter (mm)	480	680	680
Neck diameter (mm)	410	590	590
Inner height max (mm)	Liquid: 560 Gas: 460 Dry: 610	Liquid: 600 Gas: 545 Dry: 640	Liquid: 740 Gas: 685 Dry: 780
Useful inner height (mm)	685	700	840
Static loss (l/d) (liquid phase, without racks)	2.5	5	5
Static autonomy – liquid phase (d) (without racks)	30	36	43,6

Note: Actual static loss rate and holding time will be affected by the nature of container use, atmospheric conditions and standard manufacturing tolerances.

SPECIFICATIONS	LO 2075 M			LO 2200 M			LO 2250 M		
Storage Capacity	**Liquid**	**Vapour**	**Dry**	**Liquid**	**Vapour**	**Dry**	**Liquid**	**Vapour**	**Dry**
Straws in ø65x135 mm Goblets									
Number of canisters / levels	26 / 4	26 / 3	20 / 4	56 / 4	56 / 4	46 / 4	56 / 5	56 / 5	46 /5
0.25cc straws quantity (820/goblet)	85280	63960	65600	183680	183680	150880	229600	229600	188600
0.50cc straws quantity (365/goblet)	37960	28470	29200	81760	81760	67160	102200	102200	83950
HS 0.5cc straws quantity (225/goblet)	23400	17550	18000	50400	50400	41400	63000	63000	51750
1.8-2ml Cryovials in square boxes									
Number of racks / levels (Rack size: 140x140xH)	4 / 10	4 / 8	3 / 10	8 / 10	8 / 9	7 / 10	8 / 13	8 / 12	7 / 13
1.8-2ml tubes quantity (100/box)	4000	3200	3000	8000	7200	7000	10400	9600	9100
Additional number of racks / levels (Rack size: 80x80xH)	–	–	–	4 / 10	4 / 9	–	4 / 13	4 / 11	–
1.8-2ml tubes quantity (25/box)	–	–	–	1000	900	–	1300	1100	–
5ml Cryovials in square boxes									
Number of racks / levels (Rack size: 140x140xH)	4 /5	4 /4	3 / 5	8 / 5	8 / 5	7 / 5	8 / 7	8 / 6	7 /7
5ml tubes quantity (81/box)	1620	1296	1215	3240	3240	2835	4536	3888	3969
Df700 Gambro blood bag									
Number of racks / levels	5 / 1	5 / 1	4 / 1	12 / 2	12 / 1	10 / 2	12 / 2	12 / 2	10 / 2
Df700 quantity (6/levels)	30	30	24	144	72	120	144	144	120

Note: Evaporation rate and static holding time are nominal. Actual rate may be affected by the nature of the content, atmospheric conditions, container history, use and manufacturing tolerances.

2. LO 2200 equipped with S170 Cryocontroller

Large Cryogenic containers

BF Series
Rack and Canister Storage System

Stainless steel freezers
with wide neck for easy access

1. BF 2000 Series
2. BF 2600 open with the S170

The BF Series of cryogenic storage freezers offers a very high storage capacity for all types of biological samples. They are designed with high efficiency multilayer super-insulation and provide a reliable and efficient cryopreservation for samples stored in straws, cryovials or blood bags. Several features of design improve the ergonomics and bio-security for the sample and safety of the operator: large neck opening to offer easy access to all samples, the S170 CryoController for automatic filling, temperature and liquid nitrogen level measurement, alarm status and a data transfer supervision management system (optional), gas spring assisted lid opening with locking device, (except BF 2110). Protective cover on the lid to allow easy cleaning and avoid contamination, with the option of a rotating platform on BF 2350 PM and BF 2600 PM. The units are offered with a wide range of polycarbonate, aluminium and stainless steel racks and all BF series can be used for storage of samples in liquid, gas or dry phase. The BF Series is compliant with European Medical Device Directive 93/42/EEC.

SPECIFICATIONS	BF 2110 M	BF 2350 M	BF 2350 PM*	BF 2600 M	BF 2600 PM*
Useful capacity (l)	131	402	402	640	640
Empty weight (kg) (without racks)	80	380	400	315	315
Full weight (kg) (without racks)	186	705	725	832	832
H x L x P (mm)	1027x564x704	1095x872x1052	1095x872x1052	1100x1024x1100	1204x1100x1100
Neck diameter (mm)	480	800	764	1047	1047
Static loss (l/day) (without racks)	3	7	7	10	10
Static holding time (without rack, liquid phase)	43	57	57	64	64

* Rotary Tray

STORAGE CAPACITY	BF 2110 M			BF 2350 M			BF 2350 PM*			BF 2600 M			BF 2600 PM*		
Storage Capacity	**Liquid**	**Vapour**	**Dry**	**Liquid**	**Vapour**	**Dry**	**Liquid**	**Vapour**	**Dry**	**Liquid**	**Vapour**	**Dry**	**Liquid**	**Vapour**	**Dry**
Useful height (mm)	617	517	617	803	790	803	762	703	762	840	740	840	800	740	800
Straws in 65x135 mm Goblets															
Number of canisters / levels	37 / 4	37 /3	30/4	104 / 5	104 / 5	91/5	93 / 5	93 / 5	93 / 5	176 / 5	176 / 5	163/5	164/5	164/5	164/5
0.25cc straws quantity (820/goblet)	121360	91020	98400	426400	426400	373100	381300	381300	381300	721600	721600	668300	672400	672400	672400
0.50cc straws quantity (365/goblet)	54020	40515	43800	189800	189800	166075	169725	169725	169725	321200	321200	299300	299300	299300	299300
HS 0,5cc straws quantity (225/goblet)	33300	24975	27000	117000	117000	102375	104625	104625	104625	198000	198000	183375	184500	184500	184500
1.8-2ml Cryovials in square boxes															
Number of racks / levels (Rack size: 142x142xH)	5 /11	5 / 9	4 /11	17 /13	17 /12	15 /13	15 /12	15 /12	15/12	31 / 14	31/ 12	28/14	28/13	28 /12	28/13
1.8-2ml tubes quantity (100/box)	5500	4500	4400	22100	20400	19500	18000	18000	18000	43400	37200	39200	36400	33600	36400
Additional number of racks / levels (Rack size: 80x80xH)	3 / 11	3/ 9	–	4 / 13	4/ 12	–	4 / 12	4 / 12	4/12	10 / 14	10 / 12	–	9/13	9/12	9/13
1.8-2ml tubes quantity (25/box)	825	675	–	1300	1200	–	1200	1200	1200	3500	3000	–	2925	2700	2925
5ml Cryovials in square boxes															
Number of racks / levels (Rack size: 140x140xH)	5 / 5	5 / 4	4 / 5	17 / 7	17 / 6	15 / 7	15/ 6	15/ 6	15/ 6	31 / 7	31 / 6	28 / 7	28 / 7	28 / 6	28 / 7
5ml tubes quantity (81/box)	2025	1620	1620	9639	8262	8505	7290	7290	7290	17577	15066	15876	15876	13608	15876
Df700 Gambro blood bag															
Number of racks / levels	6 / 2	6/1	6 / 2	24 / 2	24 / 2	22 / 2	22 / 2	22 / 2	22 / 2	44 / 2	44 / 2	34 / 2	38 / 2	38 / 2	38 / 2
Df700 quantity (6/level)	72	36	72	288	288	264	264	264	264	528	528	408	456	456	456

Note: Evaporation rate and static holding time are nominal. Actual rate may be affected by the nature of the content, atmospheric conditions, container history, use and manufacturing tolerances. Other sizes are available on request

Large Cryogenic containers

CD Series

Working tank and Quarantine tank
Stainless steel freezers
with wide neck for easy access

1. CD 45
2. CD 60

The CD Series was designed to satisfy the request for a small stainless steel liquid nitrogen container, suitable for the storage of biological samples requiring frequent manipulation. This type of container has high efficiency multilayer super-insulation. CD 45 is versatile and can be used as a working tank to hold samples in LN_2 during manipulation or to place samples in quarantine. This container can be fitted with different types of racking system in polycarbonate, aluminium and stainless steel and can also be equipped with an electronic CryoController model S170 which is capable of monitoring temperature, liquid level, alarm status and automatic filling. A data transfer supervision management system is also available (optional) The CD Series can be used for storage of samples in liquid, gas or dry phase and is compliant with European Medical Device Directive 93/42/EEC.

SPECIFICATIONS	CD 45 M	CD 60 M	CD 90 M
Total capacity (liters)	37	73	92
Outer dimensions (ØxH) (mm)	460 x 545	460 x 866	460 x 1014
Usable dimensions (ØxH) (mm)	410 x 282	410 x 554	410 x 702
Static evaporation (l/day)	4.5	4	4
Autonomy in liquid phase	8	18	23

SPECIFICATIONS	CD 45 M			CD 60 M			CD 90 M		
Storage capacity and Inventory systems	**Liquid**	**Vapour**	**Dry**	**Liquid**	**Vapour**	**Dry**	**Liquid**	**Vapour**	**Dry**
1.8ml cryovials in 10x10 cryobox	1.600	800	1200	3600	2800	2700	4.400	3600	3300
# standard racks / # levels	4/4	4/2	3/4	4/9	4/7	3/9	4/11	4/9	3/11
5ml cryovials in 9x9 cryobox	648	324	486	1296	972	972	1944	1620	1458
# racks / # levels	4/2	4/1	3/2	4/4	4/3	3/4	4/6	4/5	3/6
Df700 blood bags	–	–	–	30	30	24	60	30	48
# racks / # levels (6 blood bags per level)	–	–	–	5/1	5/1	4/1	5/2	5/1	4/2
goblets (Ø66 x 135mm) **for straws**	52	26	40	78	52	60	130	104	100
# canisters / # levels	26 / 2	26/1	20/2	26 / 3	26/2	20/3	26 / 5	26/4	20/5
0.25cc straws quantity (820/goblets)	42640	21320	32800	63960	42640	49200	106600	85280	82000
0.50cc straws quantity (365/goblets)	18980	9460	14600	28470	18980	21900	47450	37960	36500
HS 0.5cc straws quantity (225/goblets)	11700	5850	9000	17550	11700	13500	29250	23400	22500

Note: Evaporation rate and static holding time are nominal. Actual rate may be affected by the nature of the content, atmospheric conditions, container history, use and manufacturing tolerances.

3. CD 45 Open

Large Cryogenic containers

CF Series

Modular Storage System

Stainless steel freezers with wide neck for easy access

The CF Series cryogenic storage containers of Cryo Diffusion offers a very high storage capacity for all type of biological samples. They are designed with high efficiency multi-layer insulation, providing reliable and efficient cryopreservation for samples collected in straws, cryovials or blood bags.

The outside is completely made of stainless steel and is thus perfectly suited for clean rooms or pharmaceutical environment.

Several features improve ergonomics and security:

- Large neck opening of the container offers easy access to all samples.
- Large models have a lid in 2 sections for easy opening and better temperature stability.
- S170 CryoController for automatic filling of cryocontainer, temperature and liquid nitrogen level measurement, alarm transmission and data transfer towards a supervision system (optional).
- Gas spring assisted opening lid with locking device (optional).
- Possibility of storing in liquid, gas or dry phase.
- Wide range of polycarbonate, aluminium and stainless steel racks available.
- Compliant with European Medical Device Directive 93/42/EEC.

1. CF Series

SPECIFICATIONS	CF 170 M	CF 230 M	CF 320 M	CF 350 M	CF 400 M
Total capacity (liters)	188	289	370	444	400
Outer dimensions (ØxH)(mm)	650 x 1237	786 x 1230	890 x 1190	890 x 1327	1067 x 1122
High with open lid	1707	1975	2075	2211	1500
Useable int. dimensions (ØxH)(mm)	455 x 700	635 x 700	770 x 595	770 x 730	895 x 410
Static evaporation (l/day)	4.7	6.3	6.5	6.8	9
Static autonomy (liquid phase) (days)	40	46	57	65	44

Liquid phase storage

SPECIFICATIONS	CF 170 M			CF 230 M			CF 320 M			CF 350 M			CF 400 M		
Storage Capacity	**Liquid**	**Vapour**	**Dry**	**Liquid**	**Vapour**	**Dry**	**Liquid**	**Vapour**	**Dry**	**Liquid**	**Vapour**	**Dry**	**Liquid**	**Vapour**	**Dry**
Useful height (mm)	700	600	700	700	600	700	595	495	595	730	630	730	410	360	410
Straws in 65x135 mm Goblets															
Number of canisters / levels	33/5	33/4	33/5	62/5	62/4	62/5	93/4	93/3	93/4	93/5	93/4	93/5	123/3	123/2	123/3
0.25cc straws quantity (820/goblet)	135300	108240	135300	254200	203360	254200	305040	228780	305040	381300	305040	381300	302580	201720	302580
0.50cc straws quantity (365/goblet)	60225	48180	60225	113150	90520	113150	135780	101835	135780	169725	135780	169725	134685	89790	134685
HS 0.5cc straws quantity (225/goblet)	37125	29700	37125	69750	55800	69750	83700	62775	83700	104625	83700	104625	83025	55350	83025
1.8-2ml Cryovials in square boxes															
Number of racks / levels (Rack size: 142x142xH)	5/12	5/10	5/12	10/12	10/10	10/12	15/10	15/8	15/10	15/12	15/10	15/12	22/6	22/5	22/6
1.8-2ml tubes quantity (100/box)	6000	5000	6000	12000	10000	12000	15000	12000	15000	18000	15000	18000	13200	11000	13200
Additional number of racks / levels (Rack size: 85x85xH)	4/12	4/10	–	4/12	4/10	4/12	4/10	4/8	4/10	4/12	4/10	4/12	4/6	4/5	4/6
1.8-2ml tubes quantity (25/box)	1200	1000	–	1200	1000	1200	1000	800	1000	1200	1000	1200	600	500	600
5ml Cryovials in square boxes															
Number of racks / levels (Rack size: 140x140xH)	5/6	5/5	5/6	10/6	10/5	10/6	15/5	15/4	15/5	15/6	15/5	15/6	22/3	22/3	22/3
5ml tubes quantity (81/box)	2430	2025	2430	4860	4050	4860	6075	4860	6075	7290	6075	7290	5346	5346	5346
Df700 Gambro blood bag															
Number of racks / levels	6/2	6/1	6/2	14/2	14/1	14/2	22/2	22/1	22/2	22/2	22/2	22/2	32/1	32/1	32/1
Df700 quantity (6/levels)	72	36	72	168	84	168	264	132	264	264	264	264	192	192	192

Note: Evaporation rate and static holding time are nominal. Actual rate may be affected by the nature of the content, atmospheric conditions, container history, use and manufacturing tolerances.

Large Cryogenic containers

SD Series

Large Storage System

Stainless steel freezer with narrow neck for highest temperature stability

The SD Series are designed for long-term storage at extreme low and stable temperatures. The cryogenic containers are designed with high efficiency multi-layer super-insulation, narrow neck opening to limit nitrogen evaporation and temperature fluctuations, providing a reliable and efficient cryopreservation for samples collected in straws, cryovials or blood bags. Our unique turning system of the inner basket with a turning handle positioned on the outside, ensures that the user does not need to insert his/her hands in the cryovessel.

Several features improve ergonomics and security:

- Narrow neck opening of the container offers lowest possible evaporation rate and extreme low storage temperatures, even in gas phase.
- Turning table with rotating handle on the outside of the vessel.
- S170 CryoController for automatic filling of cryocontainer, temperature and liquid nitrogen level measurement, alarm transmission and data transfer towards a supervision system (optional).
- Gas spring assisted opening lid with locking device (optional).
- Possibility of storing in liquid, gas or dry phase.
- Wide range of polycarbonate, aluminium and stainless steel racks available.
- Compliant with European Medical Device Directive 93/42/EEC.

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1. SD Series with assisted lid

SPECIFICATIONS	SD 600 M	SD 1000 M	SD 1200 M	SD 1500 M	SD 1850 M
Total capacity (liters)	716	928	1127	1513	1724
Outer dimensions (ØxH)(mm)	1100 x 1435	1400 x 1370	1400 x 1530	1500 x 1535	1600 x 1545
Total hight (lid open)	1724	1905	2065	2160	2210
Lid opening diameter (mm)	420	520	520	600	650
Ø Useable internal (mm)	970	1260	1260	1360	1450
High Useable internal (mm)	Liquid: 750 Gas: 693 Dry: 750	Liquid: 620 Gas: 560 Dry: 620	Liquid: 780 Gas: 720 Dry: 780	Liquid: 836 Gas: 776 Dry: 836	Liquid: 860 Gas: 810 Dry: 860
Static evaporation (liquid phase, l/day)	6	8,5	9	9	10
Static autonomy (liquid phase) (days)	119	109	125	168	172

SPECIFICATIONS	SD 600			SD 1000			SD 1200			SD 1500			SD 1850		
Storage Capacity	**Liquid**	**Gas**	**Dry**	**Liquid**	**Gas**	**Dry**	**Liquid**	**Gas**	**Dry**	**Liquid**	**Gas**	**Dry**	**Liquid**	**Gas**	**Dry**
Useful height (mm)	750	693	750	620	560	620	780	720	780	836	776	836	860	810	860
Straws in ø65x135 mm Goblets															
Number of canisters / levels	152/5	152/4	152/5	256/4	256/3	256/4	256/5	256/4	256/5	294/5	294/5	294/5	333/5	333/5	333/5
0.25cc straws quantity (820/goblet)	623200	498560	623200	839680	629760	839680	1049600	839680	1049600	1205400	1205400	1205400	1365300	1365300	1365300
0.50cc straws quantity (365/goblet)	277400	221920	277400	373760	280320	373760	467200	373760	467200	536550	536550	536550	607725	607725	607725
HS 0.5cc straws quantity (225/goblet)	171000	136800	171000	230400	172800	230400	288000	230400	288000	330750	330750	330750	374625	374625	374625
1.8-2ml Cryovials in square boxes															
Number of racks / levels (Rack size:142x142xH)	24/12	24/11	24/12	44/10	44/9	44/10	44/13	44/12	44/13	52/14	52/13	52/14	60/15	60/14	60/15
1.8-2ml tubes quantity (100/box)	28800	26400	28800	44000	39600	44000	57200	52800	57200	72800	67600	72800	90000	84000	90000
Additional number of racks / levels (Rack size: 85x85xH)	14/12	14/11	14/12	16/10	16/9	16/10	16/13	16/12	16/13	12/14	12/13	12/4	20/15	20/14	20/15
1.8-2ml tubes quantity (25/box)	4200	3850	4200	4000	3600	4000	5200	4800	5200	4200	3900	4200	7500	7000	7500
5ml Cryovials in square boxes															
Number of racks / levels (Rack size:142x142xH)	24/6	24/6	24/6	44/5	44/4	44/5	44/6	44/6	44/6	52/7	52/6	52/7	60/7	60/7	60/7
5ml tubes quantity (81/box)	11664	11664	11664	17820	14256	17820	21384	21384	21384	29484	25272	29484	11340	11340	11340
Df700 Gambro blood bag															
Number of racks / levels	34/2	34/2	34/2	62/2	62/1	62/2	62/2	62/2	62/2	72/2	72/2	72/2	84/2	84/2	84/2
Df700 quantity (6/level)	408	408	408	744	372	744	744	744	744	864	864	864	1008	1008	1008

Note: Evaporation rate and static holding time are nominal. Actual rate may be affected by the nature of the content, atmospheric conditions, container history, use and manufacturing tolerances. Other sizes are available on request

Large Cryogenic containers

Dermatology

With the Cryoskin II and DermaCryo range, Cryo Diffusion has the products and expertise to service the Dermacryo doctor, dermatologist and podiatrist.

These easy-to-use hand held devices required for successful skin treatments like warts, skin tag and verrucae removal. The CryoSkin II can be used to spray liquid nitrogen directly onto the skin or a contact probe can be used to bring about effective cryogenic cauterization of the common benign skin lesion.

All the units are made in France and manufactured according to the highest quality control standards and all devices are designed, manufactured and certified in accordance with the Medical Device Directive 93/42/EEC.

CryoSkin II and DermaCryo Vessels

The CryoSkin II is a cryogenic container specially designed for applications in dermatology. The pressurized stainless steel container enables spraying liquid nitrogen directly on the area to be treated by means of a tip. Spraying is controlled by means of an “easy-to-use” lever.

6 different kinds of tips are supplied with the CryoSkin II. This device may also be used with contact-cooling probes or a flat probe, which enables the production of cold gas.

The CryoSkin II is compliant with European Medical Device Directive 93/42/EEC.

For safe and easy filling of the CryoSkin II, we advise using a L 2025 dewar with Derma-head. A special support can be mounted on the handle of the dewar to hold the CryoSkin II while filling.

For dermatologists who need small amounts of liquid nitrogen, we have conceived a range of storage vessels with small spoons (canisters) to dip from the dewar.

Due to the low evaporation rate of liquid nitrogen, the vessels have an autonomy from one to several months.

To easily move the vessels, we advise the use of a roller base for the 2 largest models.

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1. CryoSkin II

CHARACTERISTICS	CryoSkin II
Net capacity (litres)	0.500
Static holding time (without head) (hours)	10
(with head mounted)	0.4
Weight, filled with LN_2 (kg)	0.750
External dimensions (ØxH) (mm)	50 x 280

CHARACTERISTICS	B 2002 M DermaCryo	B 2009 M DermaCryo	B 2020 M DermaCryo	B 2036 M DermaCryo
Net capacity (litres)	2	10.5	21.7	35.9
Static holding time (days)	25	93	238	365
Weight, filled with LN_2 (kg)	3.7	16.5	27.2	45
External dimensions (ØxH) (mm)	190 x 407	368 x 455	395 x 673	480 x 652
Canisters supplied with vessel	4.5 ml	7.5 ml + 15 ml	7.5 ml + 15 ml	7.5 ml + 15 ml

Note: Evaporation rate and static holding time are nominal. Actual rate may be affected by the nature of the content, atmospheric conditions, container history, use and manufacturing tolerances.

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2. DermaCryo Vessels

3. Needles for CryoSkin II

4. Accessories for CryoSkin II

5. Refilling station for the CryoSkin II

Dewars, Liquid cylinders and Tanks

Cryo Diffusion offers a large range of tanks which are lightweight, reliable and robust, they are also very easy to handle and ideal for the storage and transport and suitable for most laboratory and industrial applications.

Cryo Diffusion provides different options in order to give his customers the choice, so they can match the type of dewar with their exact storage and transport requirements – depending on needs, application and budget. They can be offered with specially developed liquid withdrawal devices and pumps and it is possible to switch from one dewar to another easily and safely, with minimum intervention from the End-User.

All the units are made in France and manufactured according to the highest quality control standards and all devices are designed, manufactured and certified in accordance with PED/TPED 99/36 and the Medical Device Directive 93/42/EEC.

L 2000 Series

Aluminium dewars for storage and transport of liquid nitrogen

The L 2000 Series aluminium dewars are designed for storage and transport of liquid nitrogen and are very easy to handle.

Lightweight, reliable and robust, the L 2000 Series dewars are suitable for most laboratory and industrial applications.

Containers that have a capacity above 12 liters are equipped with a NW50 Pneurop flange to allow the installation of a withdrawal head.

Different models and options of withdrawal head are available, either mechanical or electrical.

The LB 2002 is fitted with a pouring device.

Compliant with European Medical Device Directive 93/42/EEC, Class I.

1. L 2000 Series

SPECIFICATIONS	LB 2002 M	L 2002 M	L 2005 M	L 2012 M	L 2025 M	L 2035 M	L 2050 M	L 2100 M
Useful capacity (l)	2	2	5.5	12.4	25	35	50	100
Neck diameter (mm)	35	35	50	50	50	50	50	50
Total Height (mm)	465	402	494	600	684	591	675	1035
Inner height (mm)	330	330	395	526	611	526	605	922
Outer diameter (mm)	190	190	245	310	395	480	500	500
Empty weight (kg)	2.7	2.7	4.4	8.1	10	13	17	32
Full weight (kg)	4.3	4.3	8.8	18.1	31	41.5	57.5	113
Static consumption (l/day)	0.09	0.09	0.16	0.14	0.18	0.19	0.23	0.61
Nw50 flange	–	No	No	No	Yes	Yes	Yes	Yes
Max. working pressure (bar)	–	0.5	0.5	0.5	0.5	0.5	0.5	0.5

For filling of the sample storage containers Cryo Diffusion offers a range of dewars with withdrawal heads or electrical pumps.

Note: Evaporation rate and static holding time are nominal. Actual rate may be affected by the nature of the content, atmospheric conditions, container history, use and manufacturing tolerances.

2. Roller base (strongly recommended for safe transport)

3. Flange MW50

4. Mobile Head TN

5. Mobile Head TS

6. Electrical Pump

Dewars, Liquid cylinders and Tanks

L 2000 Series

Pumps and Withdrawal System

For safe transfer of liquid nitrogen into other dewars, we offer a range of specially developed withdrawal heads and electrical pumps. The use of these systems avoid the lifting and tilting of dewars filled with liquid nitrogen and avoid the risk of cryogenic burns by splashing while pouring the liquid nitrogen in the traditional way.

All systems work on the principle of increasing the pressure inside the vessel till max. 0.5 bar overpressure, so the liquid nitrogen is pushed through a plunger tube and then through the withdrawal tube or hose.

To move the dewars around easily, we recommend a stable roller base.

1. Electrical MP pump
2. Electrical CP pump

The electrical MP pump increases the pressure inside the dewar by heating a small amount of liquid inside the tank. With only up to 150 mbar of overpressure, the liquid will gently flow out of the withdrawal pipe with phase separator.

The pumping is activated by manually pressing the pump head on the dewar. When the pressure is released, the LN_2 flow stops immediately.

Because this electrical pump evaporates some liquid nitrogen to build pressure, there is no risk of introducing humidity, as it may happen with other manual systems using air from the environment.

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The electrical CP pump works on the same principle as the MP model, but is clipped on the NW50 flange. The pumping is activated by a turning knob. When the knob is opened again, the liquid nitrogen flow stops immediately.

The withdrawal line is insulated with a sturdy foam hose and supplied with a phase separator.

2

The TS withdrawal head is equipped with a PNEUROP NW50 flange, a filling/withdrawal valve, a venting valve and a pressure build up valve (used with external pump or pressure cylinder). The relief valve is set at 0.5 bar and a pressure gauge indicates the internal pressure.

A stainless steel flexible with diameter 10 mm can be connected to the filling/withdrawal valve (¾" BSW).

For safe filling of other dewars, we offer a filling pipe with holding handle, phase separator and anti-splash deflector.

3

The TN withdrawal head fits on each dewar with a PNEUROP NW50 flange. It is supplied with a clamp, a centring ring, a relief valve of 0.5 bar, a quick coupling for a tube diameter 12 mm and a pressure gauge.

The withdrawal tube must be ordered separately and can be equipped with a manual or a solenoid valve.

4

The DERMA withdrawal head fits on a 25 litre dewar with a PNEUROP NW50 flange. It is supplied with a clamp, a centring ring, a relief valve of 0.5 bar and pressure gauge.

The withdrawal elbow with phase separator is included in the delivery and allows safe withdrawal of small quantities of liquid nitrogen

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3. TS withdrawal head
4. TN withdrawal head
5. DERMA withdrawal head

Dewars, Liquid cylinders and Tanks

XRP Series

Liquid cylinders with mobile head

The withdrawal device TAP mobile head fits on the NW50 flange of the XRP vessels and is equipped with centring ring, fixation clamp, liquid withdrawing valve, vent valve and relief valve.

A flexible or rigid elbow for LN_2 withdrawal can be mounted on the head.

When an accurate indication of the remaining liquid nitrogen is needed, a digital level indicator can be mounted on the mobile head. It is battery operated and the analogue 4/20mA signal can be remoted.

For the XRP 30 and 200 we offer a separate roller base and transport cart.

Different solutions for storage and transfer of liquid nitrogen in laboratories.

Cryo Diffusion offers a range of vertical storage tanks, built in non-magnetic stainless steel mounted on castors (except XRP 30 S and XRP 200 S) and comply with the PED 97/23 EEC regulations.

These containers are particularly adapted for liquid nitrogen and argon applications. XRP containers are equipped with a pressure regulator and a relief valve for a maximum work pressure till 1.5 bar.

They are fitted with an NW 50 flange on which can be fixed a TAP withdrawing head. Standard tanks are provided with an insulator plug.

Other capacities or horizontal versions upon request.

Compliant with European Medical Device Directive 93/42/EEC, Class I.

1. XRP Series

SPECIFICATIONS	XRP 30 S	XRP 60 S	XRP 120 S	XRP 200 S
Useful capacity (l)	28.5	58	120	203
Total capacity (l)	30	60	127	210
Total Height (mm)	735	915	1045	1411
Inner height (mm)	627	698	853	1292
Outer diameter (mm)	360	460	570	570
Empty weight (kg)	21	38	62	95
Full weight (kg)	45	86.5	159	259
Static consumption (%/day)	3	1.8	1.3	1.2
Nw50 flange	Yes	Yes	Yes	Yes
Max. working pressure (bar)	1.5	1.5	1.5	1.5

Note: Evaporation rate and static holding time are nominal. Actual rate may be affected by the nature of the content, atmospheric conditions, container history, use and manufacturing tolerances.

2. TAP mobile head

3. Capacitive Gauge INJC1

4. Roller base (strongly recommended for safe transport)

5. Connecting pipe for a liquid withdrawal device

6. Handle pipe

7. Insulated flexible hose

8. Flexible hose

Dewars, Liquid cylinders and Tanks

CryoRoll, CryoStoc and RBP VLN

Liquid cylinders 3.9b

Cryo Diffusion offers a range of vertical storage tanks (RBP-VLN).

The CryoRoll 230 and Cryostoc series built in stainless steel are designed for the road transport of cryogenic fluids in tough conditions. CRYOSTOC 450 and 600 are equipped with forklift pockets for an easier handling by means of a forklift truck. These tanks are compliant with TPED99/36 for transport on public road.

RBP-VLN Series is designed to store liquefied gas for static use. For the RBP 200 we offer a separate transport cart. They are made in a magnetic stainless and are compliant with European Directive PED 97/23.

All these tanks are equipped with a pressure regulator and a relief valve for a maximum work pressure till 3.9 bar. Filling/withdrawal and venting valves and a float level indicator are standard mounted on the vessels. For safety and easy transport, a handrail is also provided. Other capacities or horizontal versions upon request. When an accurate indication of the remaining liquid nitrogen is needed, a digital level indicator can be mounted instead of the float level gauge. It is battery operated and the analogue 4/20mA signal can be remoted. A flexible or rigid elbow for LN_2 withdrawal can be mounted on the filling/withdrawal valve.

All these tanks could be provided with a ASME certification on demand.

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1/2. RBP VLN Series / CryoStock (same design)

3. CryoRoll 230

Dewars, Liquid cylinders and Tanks

Static Use: RBP VLN Series

SPECIFICATIONS	RBP 120 VLN	RBP 200 VLN	RBP 450 VLN	RBP 600 VLN
Useful capacity (l)	120	200	442	600
Total capacity (l)	127	210	465	632
Total Height (mm)	1205	1640	1580	1593
Outer diameter (mm)	570	570	850	1050
Empty weight (kg)	92	112	280	368
Full weight (kg) **- LN_2** **- LAr**	 189 260	 273 390	 637 898	 853 1208
Static consumption (%/day) **- LN_2** **- LAr**	 1.7 1.25	 1.5 1.05	 1 0.75	 1 0.7
Connector type	¾ BSW	¾ BSW	¾ BSW	¾ BSW
Handling	5 castors	Roller base	Forklift passage	Forklift passage
Max. working pressure (bar)	3.9	3.9	3.9	3.9

For transport: CryoStock & Cryoroll

SPECIFICATIONS	Cryostoc 120	Cryostoc 200	Cryoroll 230	Cryostoc 450	Cryostoc 600
Useful capacity (l)	120	200	222	422	600
Total capacity (l)	127	210	234	449	632
Total Height (mm)	1270	1640	1390	1546	1593
Outer diameter (mm)	570	570	670	875	1050
Empty weight (kg)	110	151	146	300	368
Full weight (kg) **- LIN** **- LO_2** **- LAr**	 207 247 278	 317 384 431	 326 400 457	 641 782 891	 853 1052 1208
Static consumption (%/day) **- LIN** **- LO_2** **- LAr**	 2.2 1.5 1.5	 2 1.4 1.4	 1.6 1.2 1.2	 1.5 0.7 0.7	 1 0.7 0.7
Handling	5 castors	Roller base	Handle + 4 castors (Fork lift, and truck fixation on demand)	Forklift passage	Forklift passage
Max. working pressure (bar)	3.9	3.9	3.9	3.9	3.9

4. Level capacitive gauge INJC1

5. Handled pipe and flexible hose

6. Connecting pipe for a liquid withdrawal device

4

5

6

CryoTrans and RBP HLR

Transportable cryogenic tanks and delivery units

1. CryoTrans 600
2. RBP-HLR 1000
3. RBP HLR 850

SPECIFICATIONS	CRYOSTOC 200	CRYOTRANS 600	RBP 450 HLR	RBP 850 HLR	RBP 1000 HLR	RMP 1000 HLR	RMP 2000 HLR
Useful capacity (l)	200	600	427	828	945	912	1900
Total capacity (l)	210	632	450	871	995	960	2000
Total Height (mm)	1540	1472	995	1195	1195	1195	1375
Outer diameter (mm)	570	1050	850	1100	1100	1100	1250
Total length (mm)	735	1250	1650	1750	1930	1930	2764
Empty weight (kg)	165	395	360	508	540	600	1150
Full weight (kg) **- LIN** **- LOX** **- LAR**	 326 393 554	 888 1076 1235	 708 850 NA	 1177 1453 NA	 1305 1618 NA	 1337 1640 NA	 2689 3322 3802
Static consumption (%/day) **- LIN** **- LOX** **- LAR**	 2 1.4 1.4	 1 0.7 0.7	 2.5 1.7 NA	 1.7 1.2 NA	 1.5 1 NA	 1.5 1 NA	 1.3 0.85 0.85
Handling	–	Forklift pockets	Forklift pockets	Forklift pockets	Forklift pockets	Forklift pockets	Forklift pockets
Max. working pressure (bar)	3.9	3.9	3.9	3.9	3.9	13	16

Note: Evaporation rate and static holding time are nominal. Actual rate may be affected by the nature of the content, atmospheric conditions, container history, use and manufacturing tolerances.

CryoTrans, RBP & RMP Series are super-insulated tanks designed to be installed in a van or a truck to transport and deliver liquefied gas. The inner shell of these vacuum super-insulated tanks is made of stainless steel, the outer shell of painted carbon steel (or could be made of stainless steel in option).

CryoTrans and RBP-HLR Series have a working pressure of 3.9 bar. For CryoTrans, the access to the plumbing is set on the front side of the tank, which is very practical, particularly when the tank is transported in a van.

The RMP-HLR Series is the high pressure version (13bar or 16 bar) of the RBP-HLR, for a faster transfer of liquid gas.

All these units are in conformity with TPED 99/36 for road transport and could be provided with ASME certification on demand.

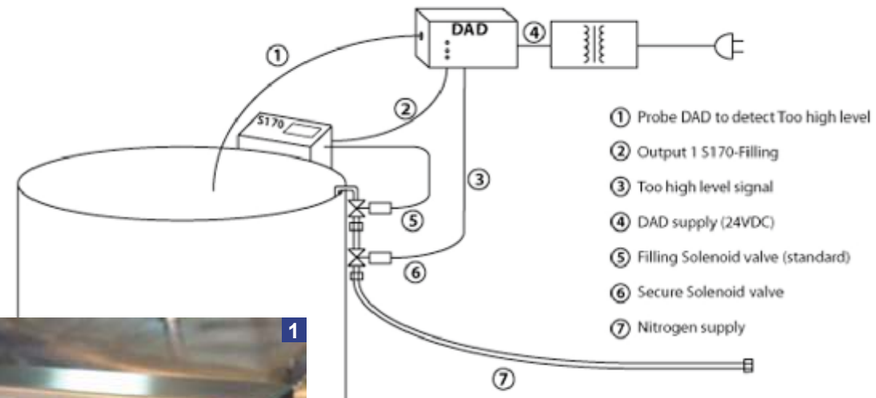
Dewars, Liquid cylinders and Tanks

To facilitate the use of the cryogenic dewar, Cryo Diffusion provides a range of state-of-the-art electronic modules, which can be used to control the level of liquid nitrogen or temperature inside the storage dewar. The cryobiology storage containers themselves can also be equipped with a fully automatic cryo-controller (the S170), which is a complete module which controls and manages automatic filling, data storage, remote alarm and many other useful functions for a fully automated system and secure sample storage.

Electronic Devices for Monitoring, Control and Alarms

DAD Anti Overflow device

Independent system to avoid overflow



1. Anti Overflow (DAD)

Cryo Diffusion developed a system to avoid overflow and ensure a double security during the automatic filling of your dewars.

The anti-overflow system is independent of the automatic filling system and permits a redundancy of the security during the filling cryo-vessels.

The system increases the safety of your installation, avoiding an overflow when the solenoid valve of the dewar is blocked, or in case of a troubleshoot of your automatic filling device (Cryo Diffusion S170 or other).

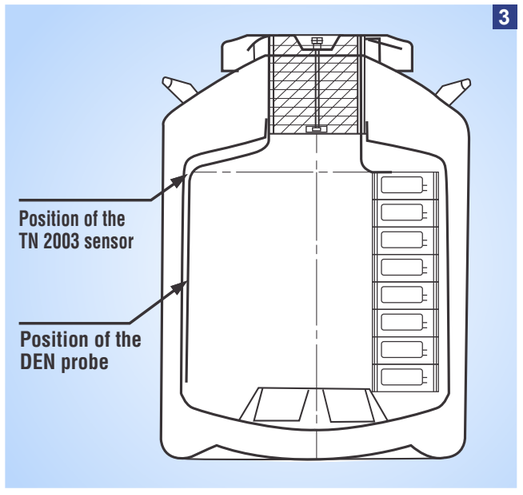
DEN and ITN Low level alarm and temperature indicator

Early warning system for refilling need with liquid nitrogen and temperature indication inside cryo storage containers

2. Low level alarm

3. Basic layout

4. ITN Temperature Indicator



All containers can be equipped with an electronic level detection sensor (DEN) and/or a temperature indicator of the samples stored in the vapour phase. Both systems can be used together.

The probe tip of the level alarm can be placed at any desired level, but generally it is positioned at half height of the rack or canisters when storing in liquid phase.

In case of vapour phase storage, it will be positioned at 5 cm from the bottom.

When the probe tip is immersed in liquid nitrogen, the light is green. When the probe tip is no longer immersed, the red LED will blink and an audible alarm will sound. The alarm can be remoted via a potential free contact A power adaptor 230/12V is included.

The probe tip of the temperature indicator is positioned at the level of the highest sample in the vessel. Typically it is positioned at the top curve of the inner vessel.

Electronic Devices for Monitoring, Control and Alarms

S170 Real Monitor

Control & Supervision Software for S170 CryoControllers

1. S170 Real Monitor

The S170 REAL MONITOR software has been specifically designed to provide full control and supervision of the S170 CryoControllers.

A single PC can control up to one, two or three S170 cryo-container controllers via a licence on a USB key.

The S170 Real Monitor not only makes you analyze the current state of the controlled cryo-containers, but also displays in real time the temperatures the biological samples are stored. As time passes all the values are stored in the PC hard disk to allow further analysis in datasheet or graphical format.

Multilanguage support: Italian, French, English and German.

Electronic Devices for Monitoring, Control and Alarms

S170 CryoControllers

The S170 CryoController is designed to manage the automatic filling and control the liquid nitrogen level of a cryogenic vessel and read its temperature using state-of-the-art electronic technologies.

In case of low/high level of liquid nitrogen or low/high temperature the S170 alerts the personnel by an acoustic alarm and a blinking LED which can be managed by the LCD screen.

The main functions are:

- Monitoring of liquid nitrogen level.
- Monitoring and storage of temperatures (optional 2nd temperature probe).
- Display of temperatures, level and alarms on a clear back-lit LCD screen.
- Automatic filling procedure: on low level or high temperature.
- Manual filling procedure + daily filling process (programmable).
- Alarms detection and control.
- Internal memory with 4000 records of temperature and more than 400 records of levels and events.
- LID status (with optional automatic defog and fast freeze procedure).
- Gas-bypass function (option).
- Battery back up (option) for up to 24 hours autonomy.
- Remoting of all the device functions by using the RS485 (RS422).
- Comprehensive function keypad in English, French and Italian (other languages optional).

The three alarm outputs can be programmed with a specific function. All can be selected as Normally Open or Normally Closed voltage free contacts (NO / NC) through a switch of an internal relay.

The input/output interface simplifies the connection with a remote PLC, making the S170 CryoController the perfect candidate to build a true automated system in cryogenic storage applications.

For the less demanding application, a S170-10 (light version) is available. This unit offers the same control an safety features, but has no RS interface, and no gas bypass or back up battery option.

2. S170 electronic device for automatic control and filling (B2048)

SPECIFICATIONS	S170	S170-10 (light)
Language	ENG, FR, IT	ENG, FR, IT
Temperature Unit	C / F	C / F
Clock	Date & hour	–
Temp. Probe A	✓	✓
Temp. Probe B	Optional	–
Temp. A HI / LOW Alarm	✓	✓
Temp. B HI / LOW Alarm	Optional	–
Low level alarm	✓	✓
Output; Choice of 16 Alarms	✓	✓
Gas-Bypass	Optional	(general alarm)
Battery-Backup	Optional	–
Open Lid Alarm	With lid switch option	–
Defog Function	With lid switch option	–
Fast Freeze Function	With lid switch option	–
Automatic filling	✓	✓
Daily Filling	✓	–
Filling Sequential/Parellel	✓	–
Internal Memory	✓	–
RS485 Interface	✓	–

Note: Evaporation rate and static holding time are nominal. Actual rate may be affected by the nature of the content, atmospheric conditions, container history, use and manufacturing tolerances.

Software and Turnkey Solutions for Cryobanks

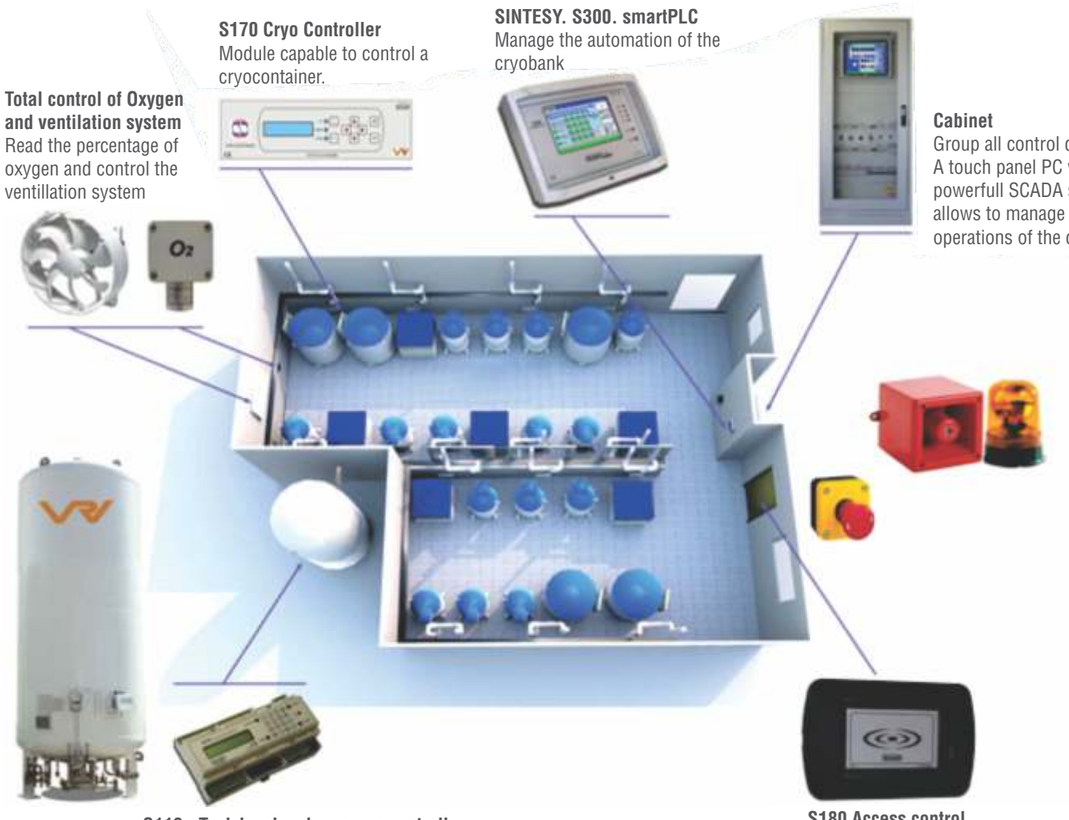
Cryo Diffusion's turnkey cryobank solution offers the customer a complete system that is fully optimized and fully automated for long term, high capacity sample storage and gives complete traceability of the sample storage conditions. The system is also very flexible and modular and can be designed specifically for the application. It offers complete security for the sample being stored, the End-User and the facility. This complete package of equipment and services can be specifically configured for a small laboratory or very large multi-vessel bio-bank.

Cryo Diffusion's turnkey service can include development of the premises, manufacturing and installation of all the components, (including the bulk tank and vacuum insulated line), acceptance testing, on-site training, phone support and ongoing maintenance. We can assist by helping the customer develop the specifications of the installation and give the benefit of more than fifty years' experience of cryogenic vessel design and construction.

Our turnkey solutions for cryobank are considered Medical Devices and as such are designed to be compliant with Medical Device Directive 93/42/EEC.

Cryobank turnkey project solution

As a manufacturer of cryogenic tanks, vacuum insulated equipment and cryocontainers, Cryo Diffusion undertakes complete manufacturing, design, construction, installation, commissioning and complete management of a cryoroom.



A cryobank monitoring system is a facility conceived to gather data and control multiple cryogenic vessels containing liquid nitrogen. In these vessels, biological samples are stored at very low temperatures (up to -196°C). Cryo Diffusion has developed a complete electronic package to manage all the functions related to the control of the cryobank.

The monitoring system CRYO DIFFUSION EAGLE ensures total safety for both the staff operating the vessels and the samples. This is the right solution for all hospitals and laboratories that require the GMP (Good Manufacturing Practice), GAMP (Good Automated Manufacturing Practice) and/or Medical Devices accreditation.

The CRYO DIFFUSION EAGLE ensures:

- The safety of users.
- Security of samples.
- Traceability of data.
- Safety of the facility.

Ease of use of the cryogenic room with:

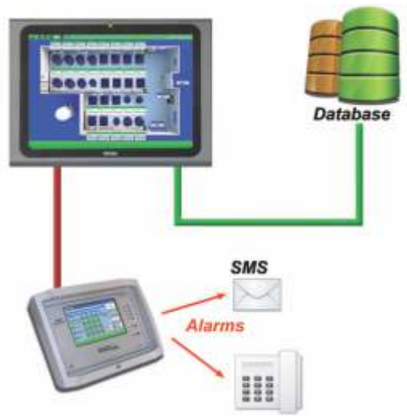
- Full Automation / Programmable filling.
- Simple to use interface with remote connection.
- Remote monitoring and remote maintenance.

Safety and Serenity: Work in partnership with Cryo Diffusion and benefit from:

- An experienced and responsive team at your disposal.
- A completety flexible and scalable system for each lab.
- A response tailored exactly to the needs / facilities of each customer.

Software and Turnkey Solutions for Cryobanks

Supervision and traceability software for Cryobanks



The system goes beyond the regulations and ensures safety on 4 levels:

- The safety of the user.
- The safety of the samples.
- The safety of data.
- The safety of the installation.

The safety of the user

Install a system to measure, display and control the rate of oxygen. Cryo Diffusion installs the necessary oxygen sensors. We offer solutions to display the level of oxygen in the cryogenic room. If the level of oxygen dips, the alarm system is activated and forced ventilation is initiated in the lab.

The safety of the samples

Ensure the supply of liquid nitrogen to your tanks constantly. The system allows the user to control the entire nitrogen supply chain, from the external bulk tank, through the transfer line and then to the smaller tank for biological sample storage.

All alarms of the cryovessels are reported to the supervision system. The nitrogen levels are controlled inside the tanks, the temperature alarm thresholds can be set, as well as the opening time and duration of filling your vessels.

In addition, the filling of the cryobank can be set and synchronised for simultanuous or sequential filling,

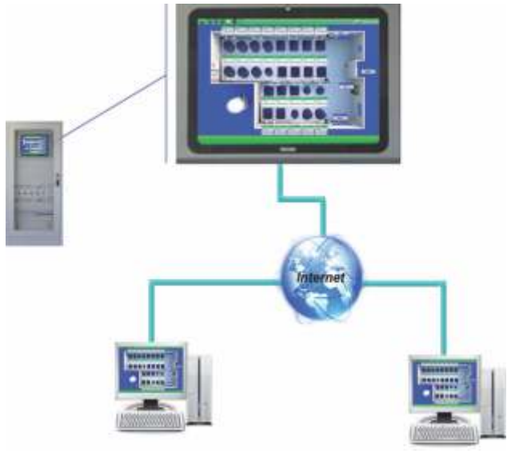
which significantly reduces the nitrogen consumption in the tank and the losses during filling inside the transfer line.

The safety of data

All data of the bank is stored in an industrial PC. Systems and automatic backups can be scheduled to USB stick or hard drive. In addition, it is possible to send scheduled backups to the customers server. The use, analysis and data extraction is simple and intuitive. Traceability and data analysis of the cryobank becomes easy thanks to the "Eagle Cryo" software.

The safety of the installation

Thanks to options like access control, anti-theft and video surveillance, it is possible to increase the level of safety and provide total supervision of the cryorooms. The personal data of users entering the lab is recorded and at any time, the cryobank can be surveyed remotely through the connection via the Internet.



System Architecture

To ensure maximum security, the system is built on 3 levels,

RTUs collect all information related to your lab (oxygen level in the room, temperature and cryovessels nitrogen levels) and are able to send alarms independently. All the RTUs are connected together with a RS485 bus.

A controller "smart.PLC S300" collects, displays and analyzes information received by the RTU. It provides a harmonious supply of liquid for the tanks. All the different manufacturers of cryovessels can be effectively managed by the PLC CRYO DIFFUSION smart. PLC S300.

An industrial PC constantly communicates with the controller S300 providing a double check and offering a friendly, simple and intuitive interface, allowing remote access, even at home.The computer displays in real time all the information of the facility, including history of events, levels and temperature of each tank and vessel.

The automation of the cryobank (cryocontainers control, ventilation control, line cooling control, access control, etc.) is completely handled by the interactive PLC system. The main goal of the automation system is the management of the automatic fill of the cryocontainers and the safety of the cryobank operators.

In case of alarm, the PLC goes through different steps in order to alert the personnel in charge. Alarms are of different types: acoustic, visual, vocal, through SMS and as an option, using e-mail.

Cryo Diffusion dewars are equipped with a S170 device. The dewar can be completely managed through this device. The S170 touchscreen panel schematically displays all the components of the installation and their status. This offers the first level of supervision and can be viewed from a remote site as well. S170 is able to:

- Measure and display the level of liquid nitrogen inside the cryocontainer.
- Measure and display the level temperature.
- Manage the alarms.
- Manage the automatic filling.

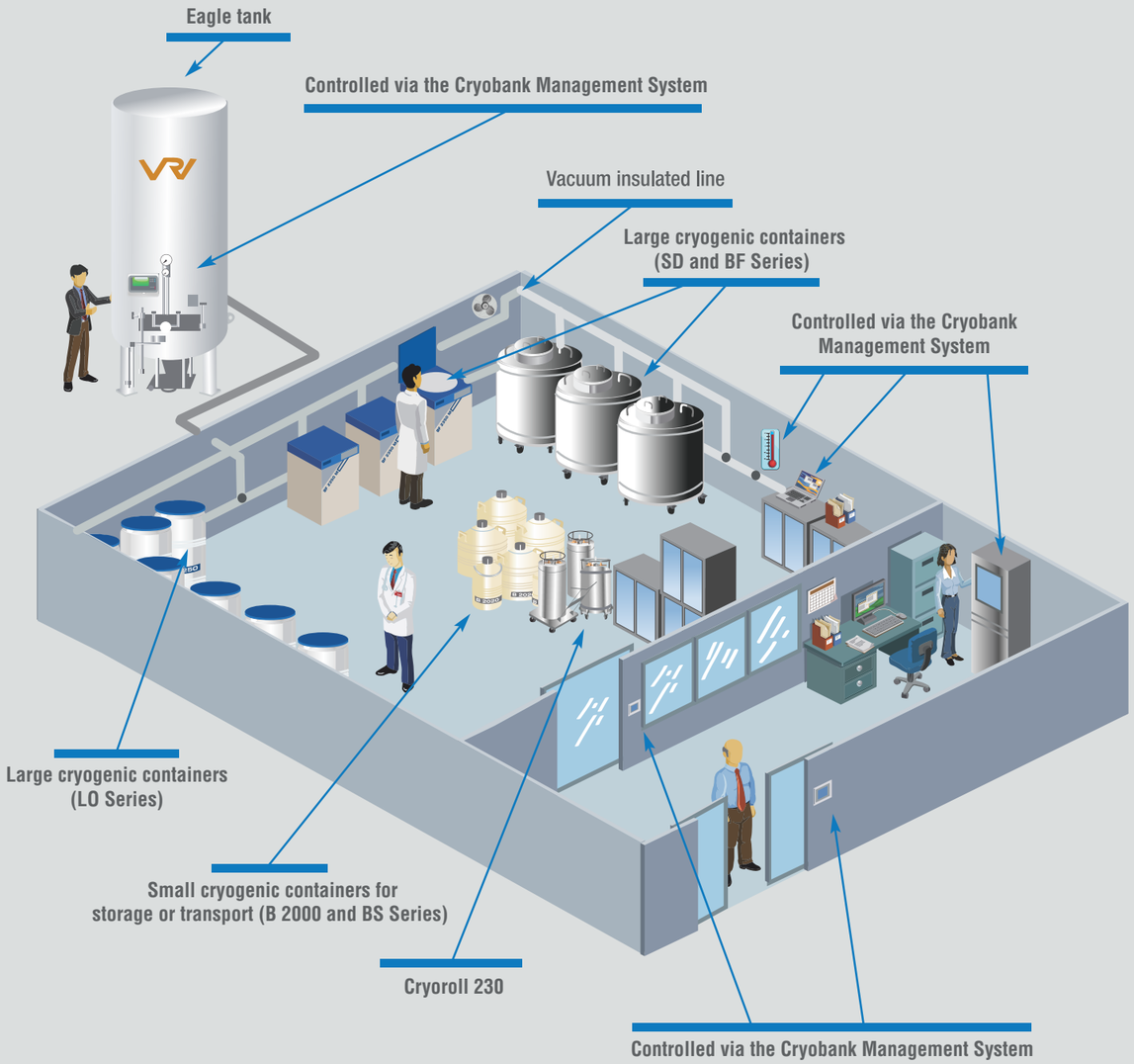
Cryocontainers of other brands connected to the S170-20, will be able to read the level, temperature, alarm status and convert them into data. Through S170 and S170-20, every dewar can be connected to a Bus RS485 network and PLC S300.

The data record of the installation is supervised and managed by the software running on an industrial computer connected to the S300.The software is multi-user and multi-host. It comprises different modules which provide the users the following features:

- Show the map of the rooms.
- Show the information of each dewar (level, temperatures, alarms, fill status, lid status, oxygen values.
- Display the status of the fill solenoid valve of each dewar.
- Show the temperature of the liquid nitrogen inside the insulated supply line.
- Display the level and the pressure of the liquid nitrogen in the tank.
- Display the percentage of oxygen probes in the rooms of the cryobank.
- Show the status of the ventilation system.
- Manage the physical presence of the operator into the cryobank.

Software and Turnkey Solutions for Cryobanks

Software and Turnkey Solutions for Cryobanks



Delivery units

Liquid nitrogen delivery units