

Age - Old Wisdom | New - Age Technology

CST CRYO-SCIENCE TECHNOLOGIES

# Cryostorage Systems

for medical, scientific and industrial applications



**Taylor-Wharton**

## Contents

Taylor-Wharton Cryo-Science Technologies	3
K Series Cryogenic Systems	4/5
Laboratory Archival Biological Storage	6/7
Electronic Level Control	8/9
Preservation and Archiving	10
Inventory Control Systems for Vials	11
Inventory Control Systems for Bags	12/13
Liquid Cylinders for Storage and Transportation	14/15
XT Extended Time Refrigerators	16/17
HC High-Capacity Refrigerators	18/19
LD Liquid Nitrogen Dewars	20
CXR Shippers	21
CX Cryo Express Dry Shippers, Data Logger	22/23
LS Laboratory Systems	24/25
Accessories	26/27

Specifications are subject to change without notice

# Taylor-Wharton Cryo-Science Technologies

»Technology you can rely on «



Taylor-Wharton Cryogenics is a leading manufacturer with over 40 years of experience in the design and production of cryogenic storage vessels for liquefied gases.

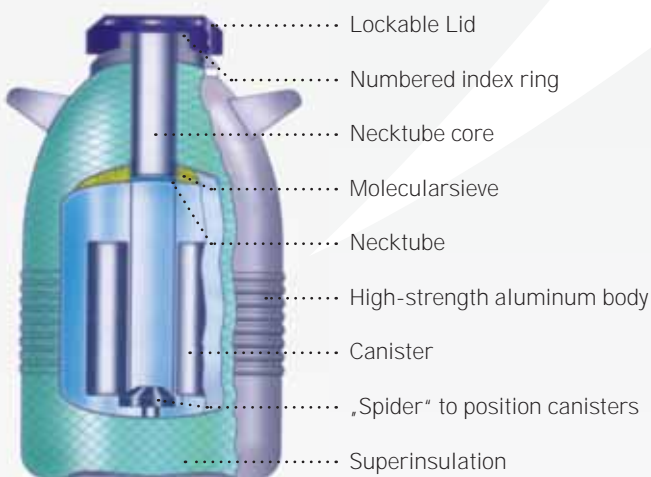
Facilities in the USA, Europe, Malaysia and China produce a wide range of equipment, including cryogenic vessels for transport and storage as well as containers for the storage of liquefied gases ranging in size from 3 to 500,000 liters.

Our customers can rely on the advice and service of a competent sales organization with a worldwide presence.

The number of applications for liquefied gases is constantly increasing. Special vessels are needed not only for cryogenic storage of biological material but also for many industrial applications. Examples include the production of semiconductors and microchips (high purity gases), laser welding, shock and dry freezing processes as well as large dispensing systems for carbonated beverages such as those found in stadiums and similar venues.

Taylor-Wharton cryogenic vessels are based on the principle of complete thermal insulation. They consist of an inner vessel and an outer body separated by a stable vacuum, which virtually precludes any transfer of heat from the ambient environment to the inner vessel. Additional layers provide what is referred to as superinsulation to protect the vessel against the warming effect of infrared radiation.

Taylor-Wharton cryogenic vessels are designed to hold either canisters or racks. Depending on the application the material can be stored in the liquid phase or in the vapour phase of the tank.



CST CRYO-SCIENCE TECHNOLOGIES

# K Series Cryogenic Storage Systems



K Series systems are used throughout the world wherever it is necessary to store biological specimens or larger objects such as organs for transplantation. Like all Taylor-Wharton vessels, the ultra high capacity refrigerators use nitrogen in liquid or vapor phase for cooling. This provides a series of important benefits as compared with mechanical refrigeration systems, especially in terms of environmental considerations:

- Greater reliability
- No heat output
- Silent operation
- Lower temperature
- Virtually maintenance-free
- Safety back up to power failures

Taylor-Wharton K Series systems are designed to accommodate various inventory control systems. The high capacity makes it possible to hold up to 38,350 2ml vials or up to 739,500 0,25ml straws. Normally 10 K and larger systems are connected

to a liquid nitrogen tank by means of a hose (see p. 14) equipped with a CryoCon unit, which is an electronic Taylor-Wharton automatic level controller that is available in various models (see p. 8/9).

In case it is necessary to make absolutely sure that specimens do not come into contact with liquid nitrogen (to avoid cross contamination), it is possible to place a gas phase frame inside the system. The liquid tight frame ensures a reliable separation of the specimen from the liquid nitrogen and at the same time functions as a guide for the individual racks (see p. 11).

10K and larger systems are available with the CE mark in compliance with the Medical Devices Directive MDD 93/42 EC.



» For the storage of large volumes of specimens and larger objects «



SPECIFICATIONS					
Models		3K	10K	24K	38K
LN <sub>2</sub> capacity	l	48	165	365	590
Overall diameter (width x depth)	mm	391	587 x 775	864 x 965	1067 x 1397
Overall height (with lid open)	mm	–	1753	1930	2286
Overall height	mm	754	1118	1118	1245
Internal diameter	mm	356	533	787	991
Useable height	mm	488	737	737	737
Evaporation rate <sup>(1)</sup>	1/24 h	2,5	5,0	7,0	8,0
Static holding time <sup>(1)</sup>	Days	19	33	52	74
Weight, empty	kg	19,1	111,0	184,0	256,0
Weight, full (without inventory control systems)	kg	56,7	243,0	474,0	733,0
Recommended LN <sub>2</sub> supply tank		XL Series	XL Series	XL Series	XL Series
Suitable for bag storage		•	•	•	•
Special remarks		Optional roller base recommended (see p. 26)	90 mm distance rear to wall required	270 mm distance rear to wall required	1155 mm door width required

<sup>(1)</sup> Evaporation rate and static holding time are nominal. Actual rate may be affected by the nature of the contents, atmospheric conditions, container history and manufacturing tolerances

STRAW CAPACITY					
Number of canisters 67 mm		21	46	107	174
Number of levels (goblets)		3	5	5	5
Number of goblets 65 mm		63	230	535	870
Number of straws 0,25 ml		50.400	184.000	428.000	696.000
Number of straws 0,50 ml		22.680	82.800	192.600	313.200

VIAL CAPACITY					
Liquid phase		3.726	10.400	24.050	38.350
Vapor phase		2.484	8.800	20.350	32.450
Vapor phase with sealed frame		–	9.100	21.775	–



# Laboratory Archival Biological Storage

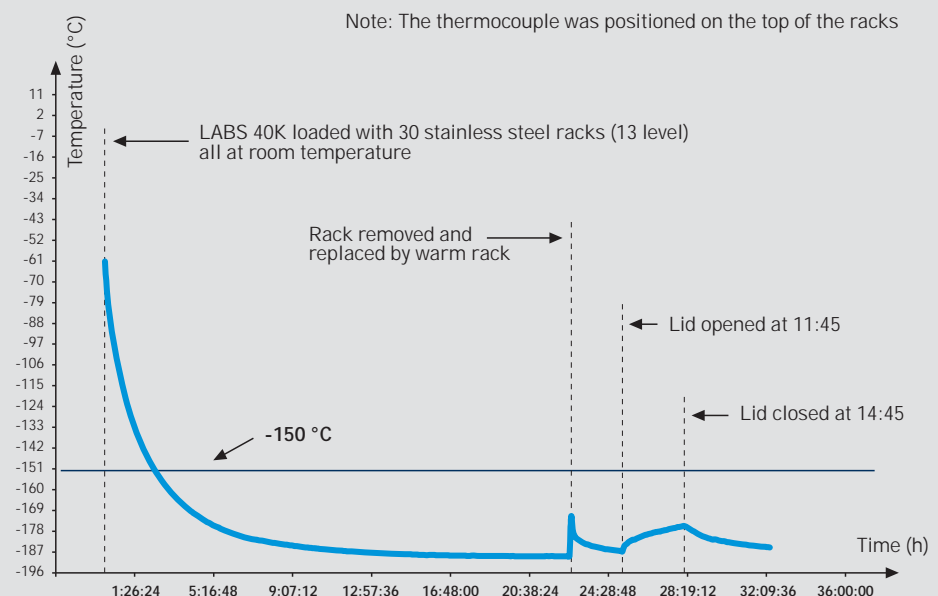


CST CRYO-SCIENCE TECHNOLOGIES

LABS Series freezers are designed for efficient long-term storage of larger volumes of specimens. With a capacity of up to 80,000 2ml vials, a storage temperature virtually at the level of the liquid nitrogen temperature even in the gas phase and low nitrogen consumption, the LABS Series sets new industry benchmarks. In addition to this exceptional performance, these freezers also feature ergonomic design. For example, the flat stainless-steel table-top makes a convenient working surface, and a folding step permits easier access to the stored material. The extremely easy-to-rotate turntable with aluminum dividers permits quick, convenient access to the inventory control system as well as easy sample location. Each compartment is colour coded.

All models are available with automatic level controllers and the CE mark in compliance with Medical Devices Directive MDD 93/42EC. The hinged booted lid is easy to operate and to clean. The lid switch provides signals to the optional controller for lid open alarm, auto defog and quick chill.

## LABS temperature profile with LN<sub>2</sub> at bottom tray (Refrigerator precooled for 1 week)



## »New benchmarks for long - term storage of larger volumes of specimens «



SPECIFICATIONS				
Models		LABS 20 K	UBS 40 K	LABS 80 K
LN <sub>2</sub> capacity	1	407	606	1350
LN <sub>2</sub> capacity below platform	1	46	76	140
Overall diameter	mm	864	1143	1511
Overall height	mm	1455	1455	1455
Working height from step to lid opening	mm	1080	1080	1080
Internal diameter	mm	750	1029	1397
Useable height	mm	762	762	762
Neck diameter	mm	330	457	622
Reference value evaporation rate <sup>(1)</sup>	1/24 h	4	4,5	8
Evaporation rate <sup>(2)</sup>	1/24 h	7	8,8	11
Static holding time <sup>(2)</sup>	Days	102	135	169
Weight, empty	kg	295	417	703
Weight, full (without inventory control systems)	kg	624	907	1794
Recommended LN <sub>2</sub> supply tank		XL-Series	XL-Series	XL-Series
Max. capacity 2ml vials in liquid/vapor phase		19.500	41.600	79.300
Suitable for bag storage		•	•	•

<sup>(1)</sup> Reference value without turntable

<sup>(2)</sup> Evaporation rate and static holding time are nominal. Actual rate may be affected by the nature of the contents, atmospheric conditions, container history and manufacturing tolerances

STRAW CAPACITY				
Number of canisters 67 mm		79	156	313
Number of levels (goblets)		5	5	5
Number of goblets 65 mm		395	780	1.565
Number of straws 0,25 ml		316.000	624.000	1.252.000
Number of straws 0,50 ml		142.200	280.800	563.400

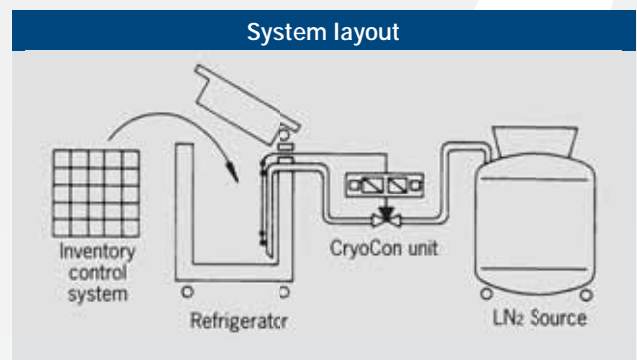
# Electronic Controllers



## Automatic Level Controllers

**CryoCon automatically monitors and controls the level of liquid nitrogen**

The CryoCon controller comes with an array of features and options for flexibility in the combination of vessels, in the choice of liquid nitrogen supply and controls and in the programming and documentation through a PC or a computer.



### CRYOCON AFT-3L

#### Features Datalog of Events, Temperature display

- Level display
- Level monitoring and automatic refilling
- Temperature display
- Temperature control
- Alarms for high temperature, level, sensor fault, low nitrogen supply, open lid, unauthorized access
- Manual filling
- Data logging with serial port for PC/printer for temperature, level, alarm, filling activity, etc.
- Simultaneous or sequential filling in the case of multiple installations
- Connection for centralized gas bypass control
- Automatic defogging when lid is open
- Quick chill when lid is closed
- Password-controlled access and programming
- Update of controller software through PC and Cable
- Updated software can be forwarded by e-mail or CD

#### Options

- RS 485 interface
- Gas bypass individual
- 4-20 mA, 0-2 and 0-10 V interface for temperature recording
- CryoData PC software
- PC/Printer cable
- Ethernet interface



## CRYOCON AF-1D

### Features Level control

- Level indication
- Alarms for level, lid open, low nitrogen supply and sensor fault
- Level monitoring and automatic refilling
- Automatic defogging when lid is opened
- Quick chill when lid is closed
- Manual filling

### Options

- Upgrade to AFT-3L

## CryoVent M360 Gas Bypass System

Typically cryogenic storage installations consist of one or more refrigerators connected by insulated pipework to a bulk liquid nitrogen supply vessel. When filling one or more refrigerators, the cooling down of the lines creates substantial volumes of gas. This gas, which is normally forced out through the liquid in the refrigerator and into the room, can cause various problems:

- Ice build up
- Warming up and evaporation of nitrogen inside the vessel
- Low oxygen concentration inside the room

The use of a Taylor-Wharton CryoVent M360 gas bypass system avoids these problems.

### Operation of the M360

- When one of the refrigerators begins to fill, the simultaneous fill signal from the controller signals to the M360 controller that liquid is required.
- The M360 controller sends out a signal to all controllers of the refrigerators disconnecting the fill valves and preventing the filling. At the same time a valve is opened to vent gas from the pipe-work.
- When all gas has been exhausted from the pipe-work the presence of liquid at the vent valve is detected by the thermocouple sensor. The M360 closes the vent valve and allows the fill valves to operate and fill the refrigerators.
- A second temperature sensor installed downstream of the first sensor triggers an alarm upon contact with LN<sub>2</sub> in order to avoid that liquid nitrogen passes through the ventline.



# Preservation and Archiving



## Computer-Controlled Freezers

for cryogenic preservation of biological specimens



Sy-Lab's new ICECUBE Series uses advanced computer technology to create, control and run freezing programs. The system features a touch screen user interface and is available with 16, 36 and 72 l chambers. It is designed to freeze straws, vials or blood bags and can be used for IVF, cell lines, umbilical cord blood, bone marrow/stem cells, skin, homo-grafts, etc.

Further highlights include the transparent chamber lid, permanent LN<sub>2</sub> supply pressure monitoring, crystallization through auto seeding or vibration and data archiving on a built-in advanced PC with LAN card.

Specifications available upon request.

## Sample Vision

for efficient data archiving and localization of samples

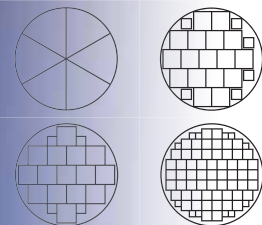
Sample Vision is one of the most advanced software programs available for controlling, archiving and documenting large volumes of data on cryostored biogenic materials and samples. The program permits accurate storage and localization of each individual sample and offers an array of options in combination with other important data. Access to data can be completely or partially restricted. With Sample Vision, it takes only seconds to search through thousands of samples for compliance with different combinations of data.

### Functions:

- Search for one or all samples from any group of samples
- Password-protected access for any or all samples
- Supports any browser
- Practice-based increase in the number of search areas
- Reports can be viewed on monitor
- Language same as that selected for PC
- Can be accessed and controlled through intranet or web-enabled

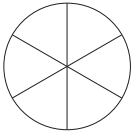


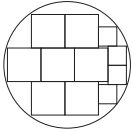
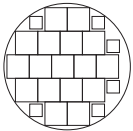
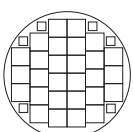
# Inventory Control Systems for Vials

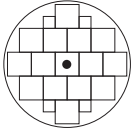
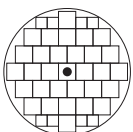
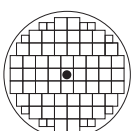


Taylor-Wharton inventory control systems are specifically designed for different types of vessels which are part of the cryo-science technology. They accommodate standard 2ml vials. Various material combinations are available for different vessels. Other systems are also available upon request.

- Aluminum racks with boxes of plastic or special cardboard
- Standard for 3K: aluminum racks and drawers, plastic vial dividers

Model	Rack Arrangement	Storage phase	Number of triangular aluminum racks	Shelves per rack	Number of plastic dividers	Total number of 2 ml vials
3K		Liquid	6	9	54	3.726
		Vapor	6	6	36	2.484

Model	Rack Arrangement	Storage phase	Number of aluminum racks		Shelves per rack	Number of cryoboxes		Total number of 2 ml vials
			5x5	10x10		5x5	10x10	
10K		Liquid	4	7	13	52	91	10.400
		Vapor	4	7	11	44	77	8.800
24K		Liquid	6	17	13	78	221	24.050
		Vapor	6	17	11	66	187	20.350
38K		Liquid	6	28	13	78	364	38.350
		Vapor	6	28	11	66	308	32.450

LABS 20K		Vapor/ Liquid	4	14	13	52	182	19.500
LABS 40K		Vapor/ Liquid	8	30	13	104	390	41.600
LABS 80K		Vapor/ Liquid	12	58	13	156	754	79.300

Racks: 10 x 10 for 100 vial boxes, 5 x 5 for 25 vial boxes

# Inventory Control Systems for Bags



Bag type ①
Cryocyte 50 (R9951)
Cryocyte 50 (R9951)
DF - 170
DF - 170
DF - 170
DF - 170
DF - 170
DF - 200
DF - 200
Cryocyte 250 (R9953)
Cryocyte 250 (R9953)
Cryocyte 250 (R9953)
Cryocyte 250 (R9953)
Cryocyte 500 (R9955) +
Cryocyte 500 (R9955) +
Cryocyte 500 (R9955) +
Cryocyte 500 (R9955) +
DF - 700
DF - 700
DF - 700
DF - 700
Cryocyte 750 (R9957)
Cryocyte 750 (R9957)
Cryocyte 750 (R9957)
Cryocyte 750 (R9957)
Cryocyte 750 (R9957)
Cryocyte 1000 (R9959)
Cryocyte 1000 (R9959)
Cryocyte 1000 (R9959)
Cryocyte 1000 (R9959)
DF - 1000/1200
DF - 1000/1200
DF - 1000/1200
DF - 1000/1200
DF - 1000/1200
DF - 1000/1200
Eppendorf vials

Systems for the storage of transplants such as stem cells/bone marrow, erythrocyte concentrates, homografts, skin, etc., must meet special requirements. Taylor-Wharton offers systems that permit convenient, reliable handling, labeling and retrieval.

The systems consist of three components:

- **Stainless steel frame to hold racks**
- **Aluminum racks that are inserted from above**
- **Boxes to hold the bags that are inserted into the racks from the side**

The boxes are made of special high-quality cardboard that retains all of its properties when immersed in liquid nitrogen.

Various inventory control systems are available for standard bags. The choice of a system is based on the type and number of existing bags and the storage phase (liquid or gaseous).



» For the cryostorage of transplants, stem cells, erythrocyte  
concentrates and other biogenic materials «



Bag capacity Vapor/Liquid ②	Vessel type ③	Storage phase Vapor/Liquid	Volume (ml)	Number of racks	Height units	Box size inside (mm)
(288/336) 384	10K	Vapor/Liquid	10 – 20	24	(6/7) 8	146 x 77 x 16
(672/784) 896	24K	Vapor/Liquid	10 – 20	56	(6/7) 8	146 x 77 x 16
48	3K	Vapor/Liquid	85	6	3/4	211 x 103 x 16
150/180	10K	Vapor/Liquid	85	30	5/6	211 x 103 x 16
160/192	10K	Vapor/Liquid	85	16	5/6	211 x 103 x 16
340/408	24K	Vapor/Liquid	85	68	5/6	211 x 103 x 16
400/480	24K	Vapor/Liquid	85	40	5/6	211 x 103 x 16
114/152	10K	Vapor/Liquid	100	19	3/4	190 x 155 x 16
252/336	24K	Vapor/Liquid	100	42	3/4	190 x 155 x 16
128/160	10K	Vapor/Liquid	30 – 70	16	4/5	173,5 x 133 x 16
144/180	10K	Vapor/Liquid	30 – 70	9	4/5	350 x 133 x 16
320/400	24K	Vapor/Liquid	30 – 70	40	4/5	173,5 x 133 x 16
352/440	24K	Vapor/Liquid	30 – 70	44	4/5	350 x 133 x 16
20/30	3K	Vapor/Liquid	55 – 100	5	2/3	235 x 133 x 16
108/135	10K	Vapor/Liquid	55 – 100	27	4/5	235 x 133 x 16
120/150	10K	Vapor/Liquid	55 – 100	15	4/5	235 x 133 x 16
260/325	24K	Vapor/Liquid	55 – 100	65	4/5	235 x 133 x 16
296/370	24K	Vapor/Liquid	55 – 100	37	4/5	235 x 133 x 16
72/96	10K	Vapor/Liquid	350	24	3/4	282 x 155 x 16
72/96	10K	Vapor/Liquid	350	12	3/4	282 x 155 x 16
156/208	24K	Vapor/Liquid	350	52	3/4	282 x 155 x 16
180/240	24K	Vapor/Liquid	350	30	3/4	282 x 155 x 16
16/24	3K	Vapor/Liquid	80 – 190	4	2/3	275 x 133 x 16
96/120	10K	Vapor/Liquid	80 – 190	24	4/5	275 x 133 x 16
104/130	10K	Vapor/Liquid	80 – 190	13	4/5	275 x 133 x 16
216/270	24K	Vapor/Liquid	80 – 190	60	4/5	275 x 133 x 16
240/300	24K	Vapor/Liquid	80 – 190	30	4/5	275 x 133 x 16
64/80	24K	Vapor/Liquid	125 – 270	16	4/5	350 x 133 x 16
72/90	10K	Vapor/Liquid	125 – 270	9	4/5	350 x 133 x 16
160/200	24K	Vapor/Liquid	125 – 270	40	4/5	350 x 133 x 16
176/220	24K	Vapor/Liquid	125 – 270	22	4/5	350 x 133 x 16
12	3K	Vapor	500 – 600	1	2	355 x 157 x 38
18	3K	Liquid	500 – 600	1	3	355 x 157 x 38
39/52	10K	Vapor/Liquid	500 – 600	13	3/4	355 x 157 x 38
42/56	10K	Vapor/Liquid	500 – 600	7	3/4	355 x 157 x 38
90/120	24K	Vapor/Liquid	500 – 600	30	3/4	355 x 157 x 38
96/128	24K	Vapor/Liquid	500 – 600	16	3/4	355 x 157 x 38
1050/1260	LS 750	Vapor/Liquid	–	6	4/5	holds 42 vials

① DF is a trade name of Hemofreeze™ of NPBI, NL. Cryocyte is a trade name of Nexell International.

② For storage in the gaseous phase, the bottom shelf remains empty and the liquid nitrogen must not be higher than the top of the bottom compartment.

③ The numbers identify the vessel type with which the bags can be used (3K, 10K, etc.). Important: These are recommendations only where bags can be used with. Please observe the instructions of the bag manufacturer, especially with respect to material specification and thickness. The storage systems are designed so that individual drawers can be transferred from the liquid phase to the gaseous phase. Intermediate storage is possible in some containers in the vertical position and under the lid of the vessel.



# Liquid Cylinders for Storage and Transportation

Three vessels from the wide range of XL liquid cylinders



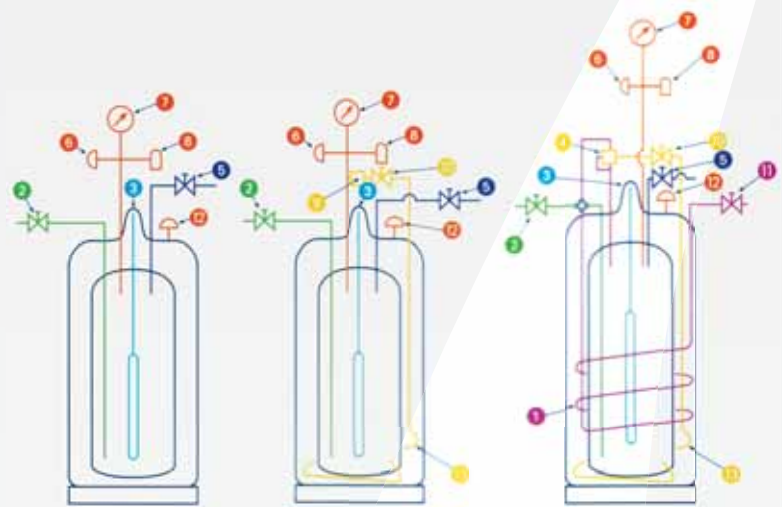
Storage and transport cylinders for liquefied gases represent important components of the Taylor-Wharton Cryo-Science Technology. The inner and outer vessels are made of stainless steel, and all vessels comply with the European Directive 1999/36/EC for transportable pressure equipment (TPED).

## Series XL 70 to XL 240

These cylinders are transportable units built to rugged construction standards. They are designed for the low-pressure requirements of liquid nitrogen filling, storing and dispensing and feature easy, quick liquid withdrawal.

## Series XL 45 to XL 65

These road-transportable cylinders feature automatic pressure-building and economizer circuits. Low-loss holding capabilities help conserve gas during low demand periods. These units set the standard for liquid cylinder performance in the gas industry.



XL 120 CE  
 XL 160 CE  
 XL 180/20 CE  
 XL 180/26 CE  
 XL 240 CE  
 without pressure-building system

XL 70 PB CE  
 XL 120 PB CE  
 XL 180/26 PB CE  
 XL 240 PB CE  
 with pressure-building (PB) system

XL 45 CE  
 XL 45 HP CE  
 XL 50 CE  
 XL 55 HP CE  
 XL 65 HP CE  
 with pressure-building and economizer system

- Safety
  - Venting
  - Liquid withdrawal
  - Liquid level
  - Vaporizer and gas withdrawal
  - Pressure building
- 1 Vaporizer
  - 2 Fill and withdrawal valve
  - 3 Liquid level gauge
  - 4 Dual regulator
  - 5 Vent valve
  - 6 Inner bursting disc
  - 7 Pressure gauge
  - 8 Pressure relief valve
  - 9 PB regulator
  - 10 Pressure building valve
  - 11 Gas withdrawal (use) valve
  - 12 Outer bursting disc
  - 13 Pressure building coil

## » Important components of the Taylor -Wharton Cryo-Science Technology «



SPECIFICATIONS										
Models		XL 70 PB CE	XL 120 CE	XL 120 PB CE	XL 160 CE	XL 180/20 CE	XL 180/26 CE	XL 180/26 PB CE	XL 240 CE	XL 240 PB CE
Gross capacity	l	70	126	126	163	186	189	189	250	250
Net capacity	l	67	120	120	160	180	181	181	240	240
Max. working pressure	bar	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5
Evaporation rate <sup>(1)</sup>	N <sub>2</sub> /%/Day	3,5	2,3	2,4	1,5	1,3	1,3	1,3	1,4	1,4
Liquid withdrawal rate	l/min	6	6	6	6	6	15	15	20	20
Weight, empty	kg	71	82	82	104	115	116	116	137	137
Weight, full N <sub>2</sub>	kg	125	179	179	234	260	263	263	332	332
Height	mm	1115	1350	1350	1464	1635	1280	1280	1510	1510
Diameter	mm	508	508	508	508	508	660	660	660	660
Casters <sup>(2)</sup>		5	5	5	–	–	5	5	5	5
Auto. pressure building		yes	no	yes	no	no	no	yes	no	yes
Part. No.		L070-0C03 TPED	L120-0C01 TPED	L120-0C03 TPED	L160-0C00 TPED	L180-0C00 TPED	L186-0C01 TPED	L186-0C03 TPED	L240-0C01 TPED	L240-0C03 TPED

SPECIFICATIONS						
Models		XL 45 CE	XL 45 HP CE	XL 50 CE	XL 55 HP CE	XL 65 HP CE
Gross capacity	l	180	176	188	208	247
Net capacity	l	169	165	176	198	240
Max. working pressure	bar	15,9	24	15,9	24	24
Evaporation rate <sup>(1)</sup>	O <sub>2</sub> /%/Day	1,2	1,4	1,1	1,2	1,5
Gas withdrawal rate	N <sub>2</sub> /m <sup>3</sup> /h	9,2	9,2	9,2	9,2	9,2
Weight, empty	kg	133	151	139	164	201
Weight, full N <sub>2</sub>	kg	269	284	281	324	395
Height	mm	1562	1559	1614	1764	1476
Diameter	mm	508	508	508	508	660
Casters <sup>(2)</sup>		–	–	–	–	5
Part. No.		GL45-0C12 TPED	HP45-0C12 TPED	GL50-0C12 TPED	HP55-0C12 TPED	HP65-0C12 TPED

<sup>(1)</sup> Vented NER, based on useable liquid capacity

<sup>(2)</sup> Non-magnetic casters for MRT applications available upon request

We can also deliver larger storage tanks for the supply of nitrogen to a multiple installation

### ACCESSORIES (see also p. 26)

Trolley	for XL 160, XL 180 XL 45, XL 50, XL 55
Withdrawal hose 1,2 m (N <sub>2</sub> )	1700-9C65W
Withdrawal hose 1,8 m (N <sub>2</sub> )	1600-9C66W
Phase separator	1193-8C80
Electronic level gauge	Information available upon request



### TROLLEY

This special trolley makes it easy to pick up and transport cylinders.

# XT Extended Time Refrigerators



XT Series refrigerators are cryogenic vessels designed for long-term storage of a variety of materials at cryogenic temperatures. XT vessels permit holding times of up to 340 days. These extremely long holding times ensure economic operation.

Typical users include research institutes and laboratories as well as pharmaceutical firms and artificial insemination centers.

XT vessels are used primarily to store straws but are also used to store vials when long holding times are important.

This series also offers a low profile model (XTL) for use in more confined workspaces.

» For long-term storage of biogenic material and many other laboratory and industrial applications «



SPECIFICATIONS						
Models		XTL 3	XTL 8	XT 10	XT 20	XT 34
Static holding time <sup>(1)</sup>	Days	27	80	100	230	340
Working time <sup>(2)</sup>	Days	17	50	62	140	212
Evaporation rate <sup>(1)</sup>	l/24 h	0,11	0,10	0,10	0,09	0,10
LN <sub>2</sub> capacity <sup>(3)</sup>	l	3	8	10	20,7	34
Weight, empty	kg	3,3	8,9	7,5	11,8	15,8
Weight, full <sup>(3)</sup>	kg	5,7	15,4	15,6	28,6	43,3
Neck diameter	mm	51	51	51	51	51
Overall height	mm	437	483	597	655	668
Overall diameter	mm	193	396	290	396	478
Number of canisters		6	6	6	6	6
Canister dimensions <sup>(4)</sup>	mm	38 x 127	38 x 127	38 x 279	38 x 279	38 x 279
Number of 1.2 and 2.0 ml vials (5 per cane)		–	–	150	150	150
Number of 1.2 and 2.0 ml vials (6 per cane)		–	–	180	180	180
Number of 0.5 ml straws (10 per cane)		–	–	540	540	540
Number of 0.5 ml straws (bulk, 1 layer)		750	750	750	750	750
Number of 0.5 ml straws (bulk, 2 layers)		–	–	1.500	1.500	1.500

<sup>(1)</sup> Evaporation rate and holding time are nominal. Actual rate may be affected by the nature of the contents, atmospheric conditions, container history and manufacturing tolerances

<sup>(2)</sup> Working time is an arbitrary, reference-only value to estimate container performance under the actual operating conditions

<sup>(3)</sup> Without canisters

<sup>(4)</sup> Canister also available in 127mm height for XT10, XT20 and XT34 models

#### ACCESSORIES (see also p. 26)

Roller base	–	R018-8C00W	–	R018-8C00W	R033-8C00W
Low liquid level alarm	–	–	–	R033-8C15	R033-8C15

The roller base increases the overall height of the vessel by 110 mm

# HC High-Capacity Refrigerators



HC Series refrigerators are designed to provide greater storage capacity in vessels with approximately the same dimensions as those of the XT Series.

HC Series refrigerators are used for essentially the same applications as those of the XT Series. The choice between the two series depends on the specific requirements of the user.

HC vessels are used primarily to store material in vials or for applications that involve larger quantities of straws.

The HCL vessel is especially compact, which makes it ideal wherever space is limited.



## » High-capacity vessels for many applications «



SPECIFICATIONS						
Models		HCL 12	HC 20	HC 34	HC 35	VHC 35
Static holding time <sup>(1)</sup>	Days	60	87	200	130	130
Working time <sup>(2)</sup>	Days	37	54	125	81	81
Evaporation rate <sup>(1)</sup>	l/24 h	0,20	0,23	0,17	0,27	0,27
LN <sub>2</sub> capacity <sup>(3)</sup>	l	12	20	34	35	35
Weight, empty	kg	9,8	12	16,1	17,7	17,2
Weight, full <sup>(3)</sup>	kg	19,5	28,2	43,6	46,0	45,5
Neck diameter	mm	91	91	91	119	119
Overall height	mm	482	615	668	681	681
Overall diameter	mm	396	396	478	478	478
Number of canisters		6	6	6	10	6 <sup>(4)</sup>
Canister dimensions	mm	70 x 127	70 x 279	70 x 279	67 x 279 <sup>(5)</sup>	94 x 279
Number of 1.2 and 2.0 ml vials (5 per cane)		–	570	570	850	1.050
Number of 1.2 and 2.0 ml vials (6 per cane)		–	684	684	1.020	1.260
Number of 0.5 ml straws (10 per cane)		–	1.850	1.850	2.800	3.000
Number of 0.5 ml straws (bulk, 1 layer)		2.940	2.940	2.940	4.900	4.950
Number of 0.5 ml straws (bulk, 2 layers)		–	5.880	5.880	9.800	9.900

<sup>(1)</sup> Evaporation rate and holding time are nominal. Actual rate may be affected by the nature of the contents, atmospheric conditions, container history and manufacturing tolerances

<sup>(2)</sup> Working time is an arbitrary, reference-only value to estimate container performance under the actual operating conditions

<sup>(3)</sup> Without canisters

<sup>(4)</sup> Optional a seventh canister is available for VHC 35 to increase storage capacity by 19%

<sup>(5)</sup> Canisters 70 x 279 mm available on request

### ACCESSORIES (see also p. 26)

Roller base	R018-8C00W	R018-8C00W	R033-8C00W	R033-8C00W	R033-8C00W
Low liquid level alarm	–	R034-8C15	R034-8C15	R037-8C15	R036-8C30

The roller base increases the overall height of the vessel by 110 mm

# LD Liquid Nitrogen Dewars

» For the storage and distribution of small quantities of liquid nitrogen «



LD Series dewars are used to store and distribute small amounts of liquid nitrogen. They are ideal for various applications that call for the use of this medium, for example, in the area of materials testing. This series includes models with capacities ranging from 4 to 50 liters. A pitcher-style model (LD4) is available for easy pouring, as well as a beaker style model (LD5) with a wide mouth to make it easier to immerse objects in the liq-

uid nitrogen. LD Series dewars feature extremely low evaporation rates and are convenient to use. Optional equipment includes – liquid withdrawal device, tipping stands, dippers and roller base. The „Classic 25“ is a model that has been found to be extremely practical. Because of its spherical shape and low center of gravity, it is easy to handle and is ideal for pouring liquid nitrogen.

## SPECIFICATIONS

Models		LD 4	LD 5	LD 10	LD 25	Classic 25	LD 35	LD 50
Static holding time <sup>(1)</sup>	Days	10	6	45	109	119	152	122
Evaporation rate <sup>(1)</sup>	l/24 h	0,40	0,77	0,22	0,23	0,21	0,23	0,41
LN <sub>2</sub> capacity	l	4	5	10	25	25	35	50
Weight, empty	kg	3,0	3,1	6,6	10,5	8,6	16,0	17,6
Weight, full	kg	6,2	7,2	14,7	30,8	28,9	44,3	58,0
Neck diameter	mm	30	142	51	64	51	64	64
Overall height	mm	432	445	597	655	582	668	823
Overall diameter	mm	193	193	290	396	394	475	475

<sup>(1)</sup> Evaporation rate and holding time are nominal. Actual rate may be affected by the nature of the contents, atmospheric conditions, container history and manufacturing tolerances

## ACCESSORIES (see also p. 26)

LN <sub>2</sub> capacity	-	-	-	R018-8C00W	D024-8C02	R033-8C00W	R033-8C00W
Weight, empty	-	-	-	D025-8C00	D025-8C00	upon request	upon request
Weight, full	-	-	-	D250-8C05	-	D250-8C05	D250-8C05
Neck diameter	-	-	-	1700-9C65W	-	1700-9C65W	1700-9C65W
Overall height	-	-	-	1600-9C66W	-	1600-9C66W	1600-9C66W
Overall diameter	-	-	upon request	upon request	upon request	upon request	upon request

# CXR Shippers



With the new CXR series Taylor-Wharton offers a design to overcome the problems of cleaning the dry shippers.

- Replaceable absorbent
- Cleanable
- Larger necktube diameter
- More robust
- Meets IATA requirements

SPECIFICATIONS			
Models		CXR 100	CXR 500
Static holding time <sup>(1)</sup>	Days	16	11
Working time <sup>(2)</sup>	Days	11	7
Evaporation rate <sup>(1)</sup>	l/24 h	0,23	0,6
LN <sub>2</sub> capacity/absorbed	l	3,7	7,7
Weight, empty	kg	5,3	13,6
Weight, full <sup>(3)</sup>	kg	8,3	19,8
Neck diameter	mm	91	216
Overall height	mm	493	683
Overall diameter	mm	234	391
Number of canisters/ Canister dimensions <sup>(4)</sup>	mm	1/67x 279	–
Number of 1.2 and 2.0 ml vials (5 per cane) (4)/(6 per cane) <sup>(4)</sup>		85/102	500
Number of 0.25 ml straws (bulk, 2 layer)		1.820	–
Number of 0.5 ml straws (10 per cane)		280	–
Number of 0.5 ml straws		490	–

<sup>(1)</sup> Evaporation rate and holding time are nominal. Actual rate may be affected by the nature of the contents, atmospheric conditions, container history and manufacturing tolerances

<sup>(2)</sup> Working time is an arbitrary, reference-only value to estimate container performance under the actual operating conditions

<sup>(3)</sup> Without canisters or racks

<sup>(4)</sup> CXR 500: cryogenic vials are stored in 100 cell boxes

ACCESSORIES			
Shipping case		CX10-8C00	CX50-8C00
Dimensions W x D x H /weight	mm/kg	400 x 400 x 620 / 8,8	480 x 480 x 760 / 14,0
Padded carton		3701-9277	–
Dimensions W x D x H /weight	mm/kg	370 x 370 x 710 / 3,25	
Rack for 9 cryogenic blood bags		–	CP70-9C44
Rack for 5 cryogenic vial boxes		–	RS30-9C44
Cryo-Box 100		–	5026-1010
Data logger		M382CE	M385CE
PC cable with software <sup>(1)</sup>		M381CE	M381CE

<sup>(1)</sup> Required for programming and downloading data

# CX Shippers



Padded carton

CX 100

Shipping case  
for CX 100

CX 500

Shipping case  
for CX 500

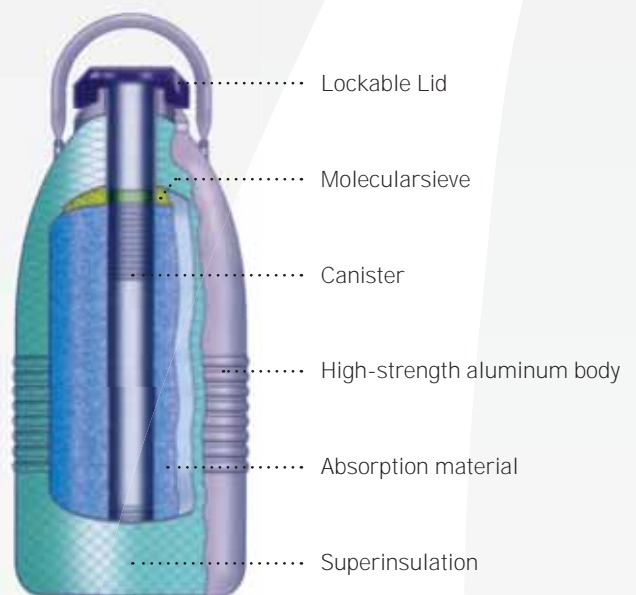
CST CRYO-SCIENCE TECHNOLOGIES

Cryo Express „dry shippers“ are designed to transport a variety of materials at cryogenic temperatures safely. The unique absorbent material prevents a liquid spill if the unit is tipped over. This eliminates the danger of spills and represents a significant improvement in the shipment of biogenic material.

Storage temperature inside the shipping cavity remains at approximately -150° C until the liquid nitrogen evaporates from the absorbent. This increases reliability, especially in the case of shipments involving long distances.

Due to the superior vacuum performance with super insulation these units provide maximum holding times. With these vessels and the shipping cases international shipment no longer represents a problem. The vessels comply with IATA regulations.

The optional available data logger records the storage temperature of biological material.



## » Containers for safe shipment of biogenic material «



SPECIFICATIONS			
Models		CX 100	CX 500
Static holding time <sup>(1)</sup>	Days	24	11
Working time <sup>(2)</sup>	Days	17	7
Evaporation rate <sup>(1)</sup>	l/24 h	0,18	0,6
LN <sub>2</sub> capacity/absorbed	l	4,4	6,4
Weight, empty	kg	5,3	13,6
Weight, full <sup>(3)</sup>	kg	8,9	18,8
Neck diameter	mm	71	216
Overall height	mm	467	683
Overall diameter	mm	234	391
Number of canisters/ Canister dimensions <sup>(4)</sup>	mm	1/67 x 279	–
Number of 1.2 and 2.0 ml vials (5 per cane) (4)/(6 per cane) <sup>(4)</sup>		85/102	500
Number of 0.25 ml straws (bulk, 2 layer)		1.820	–
Number of 0.5 ml straws (10 per cane)		280	–
Number of 0.5 ml straws		490	–

<sup>(1)</sup> Evaporation rate and holding time are nominal. Actual rate may be affected by the nature of the contents, atmospheric conditions, container history and manufacturing tolerances

<sup>(2)</sup> Working time is an arbitrary, reference-only value to estimate container performance under the actual operating conditions

<sup>(3)</sup> Without canisters or racks

<sup>(4)</sup> CXR 500: cryogenic vials are stored in 100 cell boxes

ACCESSORIES			
Shipping case			
Dimensions W x D x H /weight	mm/kg	CX10-8C00 400 x 400 x 620 / 8,8	CX50-8C00 480 x 480 x 760 / 14,0
Padded carton			
Dimensions W x D x H /weight	mm/kg	3701-9277 370 x 370 x 710 / 3,25	–
Rack for 9 cryogenic blood bags		–	CP70-9C44
Rack for 5 cryogenic vial boxes		–	RS30-9C44
Cryo-Box 100		–	5026-1010
Data logger		M382CE	M385CE
PC cable with software <sup>(1)</sup>		M381CE	M381CE

<sup>(1)</sup> Required for programming and downloading data



### Data Logger

The data logger permits uninterrupted monitoring and logging of the temperature inside the CX and CXR shippers. This is indispensable in the case of valuable samples. The logger and thermocouple temperature sensor are contained within a modified neck plug therefore avoiding trailing wires or extra boxes which could become damaged or detached in transit.

**The logger complies with the following standards:**

- EMC Directive 89/336/EEC
- RTCA DO-160D Sect. 21.4, Radiated Emission – Cat. B (for safe operation on board aircraft)

**Functions/Features:**

- Measuring range: - 199° C to + 40° C (accuracy +/- 3° C)
- Logging of up to 8192 temperature measurements in non-volatile memory
- Logging intervals can be set between 1 and 30 minutes
- Battery life of min. 5 years (non-rechargeable lithium battery)
- PC interface for setting up, collection and analysis of data
- LED status indication for recording (active/standby) and battery condition
- LED indication of too high temperature
- 'Tip Over' Switch – Detects if the shipper has been laid on its side during transport. The position is logged at the same time as the temperature. 'Tip Over' is indicated in the temperature log and by LED.



# LS Laboratory Systems



Roller base as option available

The LS Series refrigerators are uniquely designed for large vial capacity in convenient box-type storage racks and at the same time keep N<sub>2</sub> consumption to a minimum.

This results in low operating costs and fewer refills. The rectangular shape of the racks for 5 x 5 or 10 x 10 cryoboxes makes it easier to maintain an overview of and identify stored samples. As a result, samples can be located and removed more easily and faster.

The four vessels cover a range from 750 to 6,000 2 ml vials. The compact LS 750 can be used with either racks or with canisters.

The LS 3000, LS 4800 and LS 6000 models can be equipped with automatic level control (see pp. 8 and 9) and they can be supplied with CE mark in compliance with the Medical Devices Directive (MDD 93/42EC).

These models can also be used for storage in either the vapor or liquid phase. In case of storage in the vapor phase, the two bottom shelves must be left empty, which reduces the capacity (see table on p. 25). The use of level controller is recommended.

## » Large-capacity vessels for box- type storage with low nitrogen consumption «



SPECIFICATIONS					
Models		LS 750	LS 3000	LS 4800	LS 6000
Static holding time <sup>(1)</sup>	Days	130	106	162	194
Working time <sup>(2)</sup>	Days	80	66	102	120
Evaporation rate <sup>(1)</sup>	l/24 h	0,27	0,76	0,80	0,84
LN <sub>2</sub> capacity <sup>(3)</sup>	l	35	81	130	165
Weight, empty	kg	17,7	31,8	40,9	55,0
Weight, full <sup>(3)</sup>	kg	46,0	97,4	146,1	186,4
Neck diameter	mm	119	216	216	216
Overall height	mm	681	731	892	991
Overall diameter	mm	478	683	683	683
Number of 2 ml vials		750	3.000	4.800	6.000
Cryobox dimensions	mm	76 x 76	132 x132	132 x 132	132 x 132
Number of vials per cryobox		25	100	100	100
Capacity for vapor phase storage		–	1.800	3.600	4.800

<sup>(1)</sup> Evaporation rate and holding time are nominal. Actual rate may be affected by the nature of the contents, atmospheric conditions, container history and manufacturing tolerances

<sup>(2)</sup> Working time is an arbitrary, reference-only value to estimate container performance under the actual operating conditions

<sup>(3)</sup> Without canisters or racks

### ACCESSORIES (see pp. 8/9 + 26)

Roller base	R033-8C00W	R05K-8C00W	R05K-8C00W	R05K-8C00W
Low liquid level alarm	R036-8C30	RS30K-8C40	R05K-8C26	RS60-8C40
CryoCon AF-1D auto. level controller	–	M550KB-LS	M550KB-LS	M550KB-LS
CryoCon AFT-3L auto. level controller	–	M505K BOX-LS	M505K BOX-LS	M505K BOX-LS

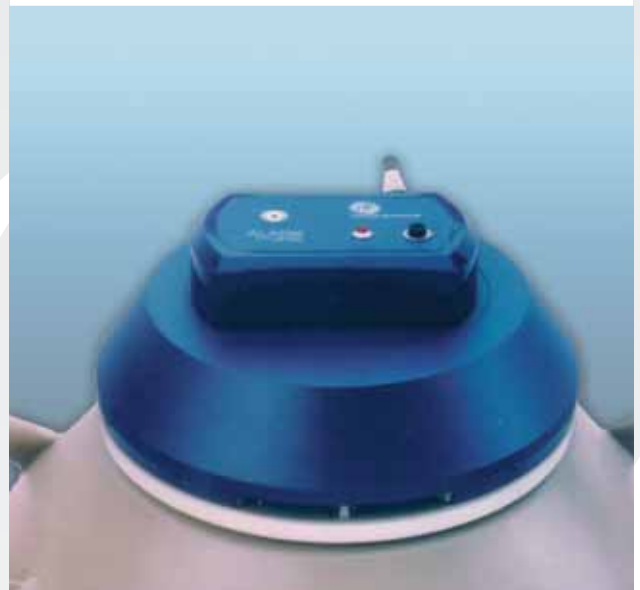
The roller base increases the overall height of the vessel by 110 mm  
Installation of a level controller adds an extra 200 mm to the overall height

# Accessories



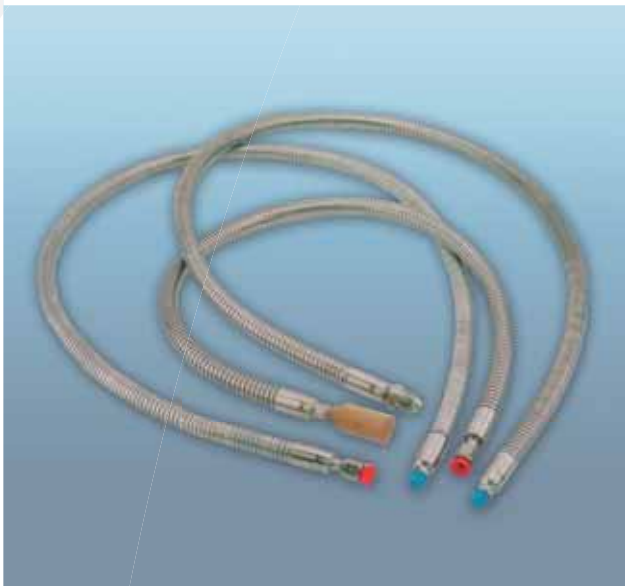
**ROLLER BASE**

This sturdy, cast-aluminum, five wheel dolly enables you to move refrigerators and dewars easily and safely. The plastic coated surface protects the vessel. Available in 3 sizes with diameters of 396, 478 and 683 mm.



**LOW LEVEL ALARM**

To protect valuable products, this audio/visual alarm with remote capability will sound promptly to alert you when more nitrogen is needed. It is best suited for infrequently used refrigerators and it is recommended for stored product protection. For use with XT, HC and LS vessels. Visual and acoustic alarms protect valuable material..



**WITHDRAWAL HOSES**

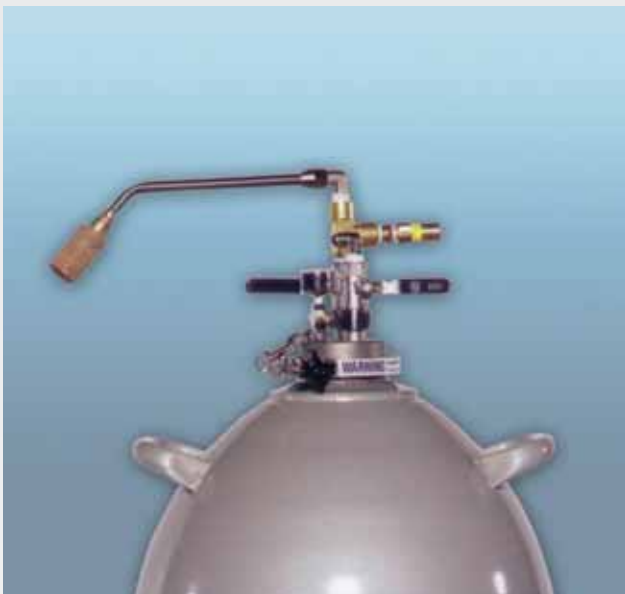
High-strength stainless steel withdrawal hoses with additional protective sheath for the transfer of liquid nitrogen. Available in various lengths and with or without phase separator.



**PROTECTIVE CRYOGENIC CLOTHING**

Your Taylor-Wharton dealer offers a wide range of safety accessories such as gloves, aprons and goggles.

» Original Taylor -Wharton accessories for the safe, efficient use of Cry-Science technology «



**WITHDRAWAL DEVICE**

For convenient and safe withdrawal of small quantities of liquid nitrogen from the LD 25, LD 35 and LD 50 dewars. Up to 8l/min can be withdrawn at max. 0.5 bar. The vessel can also be filled without removing the withdrawal device. Hoses available.



**TIPPINGS TAND**

Stable design with five casters permits convenient pouring from the LD 25 dewar (with padded vessel clamp) and the Classic 25 by simply tipping the stand.



**TIPPING STAND FOR LD 35**

Special stand for the LD 35 with four casters (brakes on two casters) to permit safe, easy tipping.



**LDHAND TRUCK**

This all-purpose hand truck permits safe transport of dewars with a capacity of up to 50 l. Tubular steel construction and balloon tires make this hand truck extremely rugged and easy to maneuver. Can be used with a range of dewars.

Age - Old Wisdom | New - Age Technology

CST CRYO-SCIENCE TECHNOLOGIES



**Taylor-Wharton**

**European primary facility**

Taylor Wharton Slovakia s.r.o  
Vstupny Areal U.S. Steel  
044 54 Kosice, Slovakia  
Tel.: +421 55 727 7127  
Fax: +421 55 727 7157  
Email: cs.eu@taylorwharton.com

**Technical Consultancy and Sales**

Taylor Wharton Germany GmbH  
Mildstedter Landstraße 1  
25866 Mildstedt, Germany  
Tel.: +49 4841 985-0  
Fax: +49 4841 985-130  
Email: info@taylorwharton.com

Taylor-Wharton is a member of the:

