Building the **GOLD standard** of service and quality
in cryogenic storage equipment.

MDR conformity certified
Class IIa medical device acc. EU 2017/745 Annex XI

Auguste Cryogenics
Instruction for use

AC Medical Family Aluminum Vessels

L, XL, 2XL, 3XL, DS and LIN series

Cryogenic vessels for the storage of material in liquid nitrogen

79 196,9665 Au Auguste Cryo

Auguste Cryogenics

Class IIa medical device according to EU 2017/745 Annex XI

Please read this instruction manual carefully before commissioning, servicing or repairing this vessel.

Do not allow untrained personnel to operate or maintain these vessels. If you have any questions about the operation and maintenance of these vessels, please contact your supplier.

This vessel is not intended for applications with patient contact!

Supervision is carried out by the certification body:
TÜV SÜD Product Service GmbH, Ridlerstrasse 65, D-80339 Munich
Notified Body CE 0123

Produced according to the definitions and standards of

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Operating instructions

for cryogenic vessels with liquid nitrogen of the Auguste Cryogenics Medical Family

CryoCE AC L2	CryoCE AC XL10	CryoCE AC 2XL10	CryoCE AC 3XL65	CryoCE AC LIN3	CryoCE AC DS3-S
CryoCE AC L2(1)	CryoCE AC XL+10	CryoCE AC 2XL15T	CryoCE AC 3XL95	CryoCE AC LIN6	CryoCE AC DS3-L
CryoCE AC L2(2)	CryoCE AC XL+10T	CryoCE AC 2XL30	CryoCE AC 3XL115	CryoCE AC LIN10	CryoCE AC DS6
CryoCE AC L3	CryoCE AC XL+11(6)	CryoCE AC 2XL35	CryoCE AC 3XL145	CryoCE AC LIN12T	CryoCE AC DS8
CryoCE AC L6	CryoCE AC XL+11(10)	CryoCE AC 2XL+35	CryoCE AC 3XL175	CryoCE AC LIN13	CryoCE AC DS10
CryoCE AC L10	CryoCE AC XL15	CryoCE AC 2XL+35T		CryoCE AC LIN20	CryoCE AC DS12
CryoCE AC L13	CryoCE AC XL+15	CryoCE AC 2XL47-L		CryoCE AC LIN20T	CryoCE AC DS15
CryoCE AC L15	CryoCE AC XL20	CryoCE AC 2XL47-B		CryoCE AC LIN25	CryoCE AC DS20
CryoCE AC L20	CryoCE AC XL+20	CryoCE AC 2XL47(10)		CryoCE AC LIN30	CryoCE AC DS25
CryoCE AC L20T	CryoCE AC XL+20T	CryoCE AC 2XL50		CryoCE AC LIN30T	
CryoCE AC L25	CryoCE AC XL25	CryoCE AC 2XL50T-L		CryoCE AC LIN35	
CryoCE AC L30	CryoCE AC XL30	CryoCE AC 2XL50T-B		CryoCE AC LIN35T	
CryoCE AC L30T	CryoCE AC XL30T			CryoCE AC LIN50	
CryoCE AC L35	CryoCE AC XL+30			CryoCE AC LIN50T	
CryoCE AC L35T	CryoCE AC XL+30T			CryoCE AC LIN60	
CryoCE AC L50T	CryoCE AC XL35			CryoCE AC LIN100L	
	CryoCE AC XL35T			CryoCE AC LIN100T	
	CryoCE AC XL+35			Cryo8	
	CryoCE AC XL+35T			Cryo10	
	CryoCE AC XL50T				

Depending on the equipment of the storage system, the vessels of the AC Medical Family are available and equipped with S (short canisters), L (long canisters) and B (racks).

Intended use: The vacuum-insulated vessels are designed for the storage of blood and other body fluids/tissues in liquid nitrogen or the storage of liquid nitrogen for medical applications (e.g. cryosurgery, cryoanalgesia, cooling of medical instruments, transport cooling, long-term cryopreservation as well as equipment for diagnostic equipment).

Indications (applications):

The cryogenic vessel is intended for the following medical and biotechnological applications:
Long-term storage and transport of cryopreserved biological samples, including:
Blood and tissue samples, stem cells, sperm, oocytes and embryos in reproductive medicine, vaccines or other temperature-sensitive drugs, organic materials for medical research and diagnostics.
Provision of liquid nitrogen for medical purposes, in particular:
Cryotherapy (e.g. freezing of warts or skin lesions), support of cryosurgical procedures, use in laboratories, hospitals, biobanks and research facilities.

Contraindications (limitations and risks)

The cryogenic vessel is not suitable for:
Storage or transport of substances not intended for cryopreservation (materials that are sensitive to extreme cold and can be damaged as a result), direct patient contact or invasive applications (vessel itself is not a therapeutic device and must not be used directly on the patient).
Improper handling:
Risk of cold burns due to direct skin contact with liquid nitrogen, risk of suffocation in poorly ventilated rooms due to evaporating nitrogen, improper transport can lead to leaks or damage to the vessel.
The cryogenic vessel is not a medical device used directly on the patient, but is used for indirect medical care. The affected patient group includes individuals whose biological material (e.g. stem cells, tissue, germ cells) must be cryopreserved for diagnosis, therapy or long-term storage purposes.

Typical patient groups:

Patients with fertility issues who have freeze their gametes; cancer patients who store stem cells before chemotherapy; patients whose blood/tissue samples are needed for diagnosis or personalized therapies.

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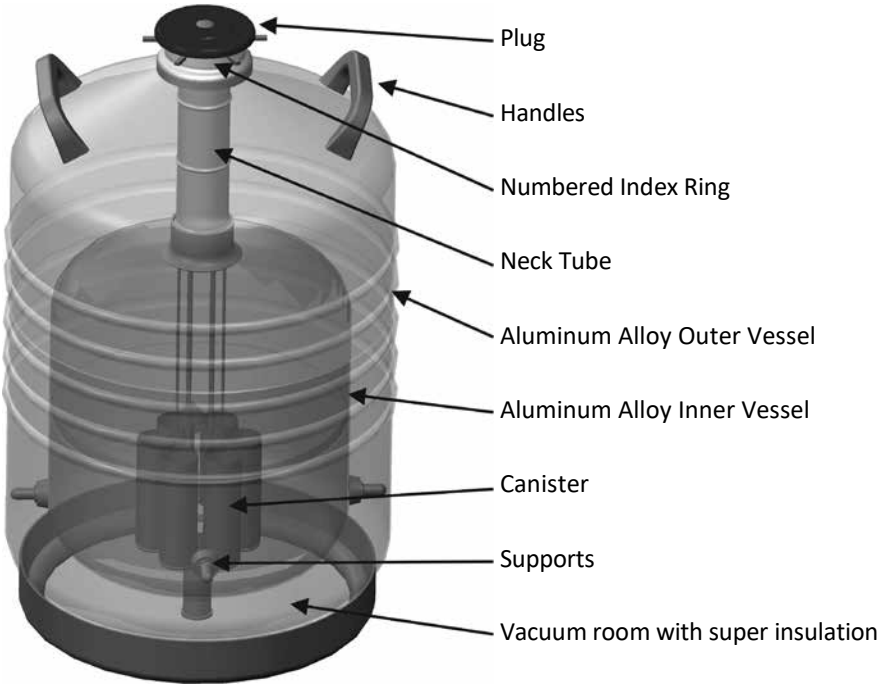
1. Construction principle



2. Explanation of the symbols used

Danger

The symbol indicates a possible risk of fire and explosion.

Danger

The symbol indicates a possible risk of injury or death.

Danger

The symbol indicates a particular risk of suffocation due to lack of oxygen
.

Danger

The symbol indicates a particular danger due to extreme cold.

Instruction

The symbol indicates that safety goggles should be worn.

Instruction

The symbol indicates that a protective face shield should be used.

Instruction

The symbol indicates that protective gloves should be worn.

Note

The symbol indicates useful additional information and application instructions and indicates that the operating instructions must be followed.

Warning

The symbol indicates a warning or an important note in the text.

3. Safety instructions

Danger of overpressure

The vessels described in this instruction manual may contain pressurized liquefied gases in the filling pipes. If this pressure suddenly escapes, injuries can occur due to leaking cryogenic gases or liquids. Do not carry out repairs and maintenance work on these vessels until the pressure has been completely released and the contents have evaporated from the pipes so that pressure cannot build up again. The vessels themselves are open to the atmosphere, i.e. unpressurized.

Extreme cold - protect eyes and skin

Contact with the eyes or skin with a cryogenic liquid or cryogenic gas can cause injuries that are similar to frostbite. Always wear safety clothing that protects your eyes and skin when working on a vessel or filling or removing liquid, or if there is a possibility that you could come into contact with liquid, cryogenic pipes/vessel walls or gas. When removing liquid or stored samples from the vessel, protective goggles or face shields must be worn. To protect the skin, long-sleeved clothing and gloves are recommended, which are easy to put on and take off. Liquid nitrogen is cryogenic, which means that the temperature is -196°C at normal atmospheric pressure.

Good ventilation - risk of suffocation due to lack of oxygen

Inert gases do not warn – the human senses do not recognize a lack of oxygen. Usually, air contains 21% oxygen. It becomes dangerous when the oxygen content falls below 15%.

Just two breaths of pure nitrogen or other inert gases cause loss of consciousness, which can quickly lead to death.

Accidents due to lack of oxygen are caused by:

- supply or service pipes that have not been properly closed,
- leaks from gas cylinders or hoses,
- overflowing liquid from dewar vessels,
- blow-off pipes that do not lead into a secure area.

Other activities with a risk of suffocation:

- filling of dewar vessels / transport in closed vehicles,
- use of gases in unventilated basements and lower-lying rooms.

Even though the gas (LN2) stored in these open dewar vessels is non-toxic and non-flammable, it can still cause suffocation in enclosed spaces without adequate ventilation. Air that does not contain enough oxygen to breathe causes drowsiness, loss of consciousness or even death. The gas is imperceptible to the human senses and is inhaled normally like breathing air. Always ensure adequate ventilation. Especially when starting up or restarting, a large amount of gaseous nitrogen can escape when the vessel cools down. Place vessels only in well-ventilated rooms. If necessary, indoor air monitoring must be installed.

The use of this equipment requires appropriate training in the safe handling of cryogenic gases (in this case, specifically liquid nitrogen) to minimize risks due to extreme cold + lack of oxygen. The operator is responsible for compliance with all applicable national regulations on occupational health and safety. Regular instruction of employees in accordance with the respective legal requirements must be ensured.

Safe handling

The aluminum vessels of the Auguste Cryogenics Medical Family are generally quite robust vessels. The space between the inner and outer vessel is insulated by vacuum and super insulation. Any accident (impact, tipping over, hard touchdown, dropping, etc.) can compromise the integrity of this vessel insulation system.

Depending on the volume and especially when filled with liquid nitrogen, the vessels can become considerably heavy. The staff should be aware of this and handle the load accordingly. While smaller vessels can be carried, larger aluminum vessels of the AC Medical Family can be carefully moved by hand over flat and even surfaces using the roller or square base (available as an accessory).
The sturdy handles on the AC Medical Family aluminum vessels allow you to use a hand truck or lifting device to properly handle these loads. Do not try to move these vessels in any other way.

The following safety precautions should be observed when handling AC Medical Family aluminum vessels:

1. Never lay the vessel on its side. Always ship, use and store the device in a vertical, upright position on a firm, flat surface and secure the vessel against tipping, falling and rolling away.
2. If you are moving a vessel that is too heavy to lift by hand on site, or loading or unloading such a vessel from a vehicle, use a tail lift, crane or loading dock.
3. To move the vessel over uneven surfaces or lift the vessel, attach a suitable sling to the lifting points and use a movable lifting device that can support the weight of the vessel.
4. Be sure to protect vessels and equipment containing liquid cryogenic gases from excessive heating and mechanical damage. Do not place the vessel near heat sources such as radiators or heating vents. Do not place the vessel in driveways or in places where it can be hit by falling objects (such as under shelves).

In general, liquid cylinders and aluminum vessels are not designed to be permanently mounted on a vehicle. Depending on the type of fastening, the vibrations and resonances put a lot of stress on the internal vessel supports, so Auguste Cryogenics cannot maintain the vacuum warranty. Please ask Auguste Cryogenics for suggestions for solutions.

Special requirements for the storage premises in terms of temperature, humidity or air purity do not have to be met. Only the packaging is susceptible to moisture and should therefore always be stored in a dry place to ensure protection during storage or transport. The vessels should be stored and shipped in the original packaging/cartons, as this provides the best protection against contamination and physical damage during transport.

Spare Parts & Accessories

Use only spare parts or accessories recommended by Auguste Cryogenics.

Integrated safety valves in pipes with cryogenic liquid

When installing pipes or filling hoses, ensure that a suitable safety valve is integrated in each pipe area between shut-off valves or solenoid valves.

Locked, liquefied gas expands when heated and can burst the hoses or pipes, which in turn leads to property damage and injuries.

Please note: For further information on handling cryogenic liquids, please refer to the applicable regulations or the safety information brochures. These are available from your gas supplier, the Industrial Gases Association or the respective professional association.

4. Product Description

The cryogenic aluminum vessels of the **Auguste Cryogenics Medical Family**

CryoCE AC L2	CryoCE AC XL10	CryoCE AC 2XL10	CryoCE AC 3XL65	CryoCE AC LIN3	CryoCE AC DS3-S
CryoCE AC L2(1)	CryoCE AC XL+10	CryoCE AC 2XL15T	CryoCE AC 3XL95	CryoCE AC LIN6	CryoCE AC DS3-L
CryoCE AC L2(2)	CryoCE AC XL+10T	CryoCE AC 2XL30	CryoCE AC 3XL115	CryoCE AC LIN10	CryoCE AC DS6
CryoCE AC L3	CryoCE AC XL+11(6)	CryoCE AC 2XL35	CryoCE AC 3XL145	CryoCE AC LIN12T	CryoCE AC DS8
CryoCE AC L6	CryoCE AC XL+11(10)	CryoCE AC 2XL+35	CryoCE AC 3XL175	CryoCE AC LIN13	CryoCE AC DS10
CryoCE AC L10	CryoCE AC XL15	CryoCE AC 2XL+35T		CryoCE AC LIN20	CryoCE AC DS12
CryoCE AC L13	CryoCE AC XL+15	CryoCE AC 2XL47-L		CryoCE AC LIN20T	CryoCE AC DS15
CryoCE AC L15	CryoCE AC XL20	CryoCE AC 2XL47-B		CryoCE AC LIN25	CryoCE AC DS20
CryoCE AC L20	CryoCE AC XL+20	CryoCE AC 2XL47(10)		CryoCE AC LIN30	CryoCE AC DS25
CryoCE AC L20T	CryoCE AC XL+20T	CryoCE AC 2XL50		CryoCE AC LIN30T	
CryoCE AC L25	CryoCE AC XL25	CryoCE AC 2XL50T-L		CryoCE AC LIN35	
CryoCE AC L30	CryoCE AC XL30	CryoCE AC 2XL50T-B		CryoCE AC LIN35T	
CryoCE AC L30T	CryoCE AC XL30T			CryoCE AC LIN50	
CryoCE AC L35	CryoCE AC XL+30			CryoCE AC LIN50T	
CryoCE AC L35T	CryoCE AC XL+30T			CryoCE AC LIN60	
CryoCE AC L50T	CryoCE AC XL35			CryoCE AC LIN100L	
	CryoCE AC XL35T			CryoCE AC LIN100T	
	CryoCE AC XL+35			Cryo8	
	CryoCE AC XL+35T			Cryo10	
	CryoCE AC XL50T				

Depending on the equipment of the storage system, the vessels of the AC Medical Family are available and equipped with S (short canisters), L (long canisters) and B (racks).

are vacuum-insulated (double-walled) aluminum vessels intended for cryopreservation, i.e. storage of cells and tissue pieces / storage of sample material in liquid nitrogen or for the storage of liquid nitrogen. The intended purposes include cryosurgery, cryoanalgesia, cooling of medical instruments, transport cooling, long-term cryopreservation and equipment for diagnostic equipment. The storage room is accessible via an insulated one-piece neck tube. Optionally, the vessels can be equipped with different storage systems for different samples.

The vessels are not intended for applications with patient or lay contact and may only be operated and maintained by trained personnel

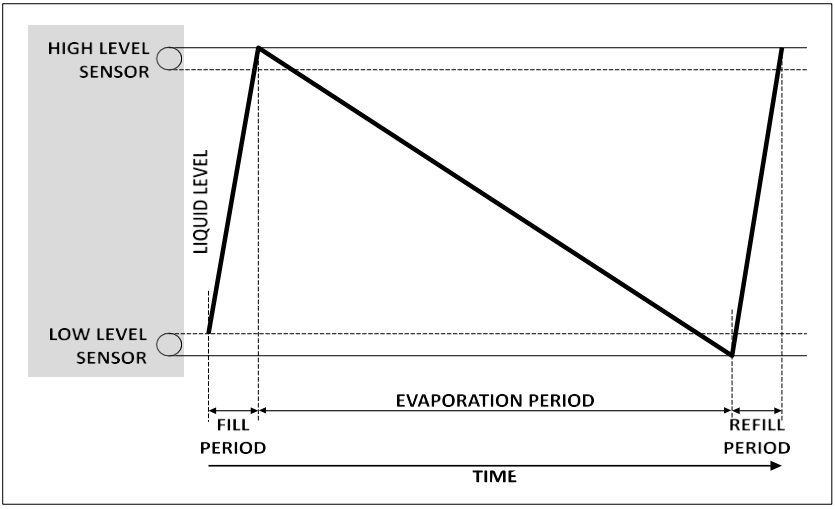
including: clinics and hospitals (e.g. reproductive medicine, oncology, transfusion medicine), laboratories and research institutions (e.g. biobanks, pharmaceutical companies), biotechnology companies (e.g. vaccine development, cell therapy) Its use requires appropriate training in the safe handling of cryogenic gases (in this case, specifically liquid nitrogen) in order to minimize the risks due to extreme cold. The operator is responsible for compliance with all applicable national regulations on occupational health and safety. Regular instruction of employees in accordance with the respective legal requirements must be ensured.
Since the vessels are open to the atmosphere, they are NOT pressure vessels according to the Pressure Equipment Directive 97/23 EC. The transport of the filled vessels on public roads and railways is **only permitted according to the requirements of the current GGVSEB / ADR / RID.**

Any serious incidents occurring in connection with the products must be reported to us as the manufacturer and to the competent authority of the Member State in which the user is established.

Functionality:

The cooling effect required for cryogenic sample storage is generated by the continuous evaporation of the liquid nitrogen refrigerant. The necessary heat of vaporization is extracted from the environment by heat transfer.

As a result, the liquid nitrogen level in the cryogenic storage vessels drops permanently. The regular refilling must be provided manually. This results in the level curve shown here.



In order to avoid unnecessary nitrogen losses and icing of the storage vessels, only liquid nitrogen should be topped up at pressures between 0.7 bar - 1.4 bar, max. 1.5 bar.

The insulating properties of the Auguste Cryogenics Medical Family are essentially based on the presence of a vacuum between the inner and outer vessels. Vacuum loss inevitably leads to a very high increase in nitrogen consumption and poses a risk to the stored samples if liquid nitrogen is not refilled.

At the same time, considerable amounts of gas can be released. **RISK OF SUFFOCATION, see above.**

Intended clinical benefit for patients:

- through the long-term preservation of cells, tissues, and organs at cryogenic temperatures, it is possible, for example, to extend life in the treatment of cancer through stem cell or blood therapy, to enable a previously unfulfilled pregnancy through in-vitro fertilization, or to provide a healing effect by storing medical-grade nitrogen for the cryotherapy of warts.

5. Technical Specifications

Model	LN2 capacity (l)	Curb weight (kg)	Outer diameter (mm)	Overall Height (mm)	Neck opening (mm)	stat. Evaporation rate (l/day)	stat. olding time (days)	Quantity Canisters / Boxes	Canister diameter (mm)	Available canister versions / boxes		
										S short	L long	B box
CryoCE AC L2	2	2,7	223	385	50	0,1	20	-	-	-	-	-
CryoCE AC L2 (1)	2	2,8	223	407	30	0,07	28	3	19	X	-	-
CryoCE AC L2 (2)	2	2,6	204	425	35	0,08	24	3	25	X	-	-
CryoCE AC L3	3,15	3,1	223	438	50	0,12	26	6	38	X	-	-
CryoCE AC L6	6	4,8	300	496	50	0,12	52	6	38	X	-	-
CryoCE AC L10	10	6,1	300	552	50	0,12	86	6	38	X	-	-
CryoCE AC L13	13	6,3	310	627	50	0,12	109	6	38	X	X	-
CryoCE AC L15	16	8,5	394	591	50	0,12	134	6	38	X	-	-
CryoCE AC L20	20	9,5	394	675	50	0,12	168	6	38	X	X	-
CryoCE AC L20T	20	10,2	394	677	50	0,2	101	6	38	X	X	-
CryoCE AC L25	25	10,7	705	700	50	0,14	180	6	38	X	X	-
CryoCE AC L30	31,5	12,9	462	712	50	0,12	254	6	38	X	X	-
CryoCE AC L30T	31,5	13	462	765	50	0,2	159	6	38	X	X	-
CryoCE AC L35	35,5	14,2	462	755	50	0,12	286	6	38	X	X	-
CryoCE AC L35T	35,5	14,9	462	757	50	0,2	179	6	38	X	X	-
CryoCE AC L50T	50	16,7	462	825	50	0,24	213	6	38	X	X	-
CryoCE AC XL10	10	6,2	300	562	80	0,21	48	6	63	X	-	-
CryoCE AC XL+10	10	6,2	300	623	91	0,23	44	6	63	X	-	-
CryoCE AC XL+10T	10	6,2	300	623	91	0,32	31	6	63	X	-	-
CryoCE AC XL+11	11	7,3	384	420	90	0,23	21	6 / 10	66 / 45	X	-	-
CryoCE AC XL15	15	8,6	394	593	80	0,21	71	6	63	X	-	-
CryoCE AC XL+15	15	8,6	394	593	91	0,23	60	6	70	X	-	-
CryoCE AC XL20	20	9,6	394	678	80	0,21	95	6	63	X	X	-
CryoCE AC XL+20	20	9,6	394	678	91	0,23	86	6	70	X	-	-
CryoCE AC XL+20T	20	9,6	394	678	91	0,33	61	6	70	X	-	-
CryoCE AC XL25	25	10,8	394	720	80	0,21	119	6	63	X	X	-
CryoCE AC XL30	31,5	13	462	717	80	0,21	147	6	63	X	X	-
CryoCE AC XL30T	31	13	462	777	80	0,3	106	6	63	X	-	-
CryoCE AC XL+30	31,5	13	462	717	91	0,23	136	6	70	-	X	-
CryoCE AC XL+30T	31,5	13,5	462	717	91	0,33	96	6	70	-	X	-
CryoCE AC XL35	35,5	14,5	462	763	80	0,22	159	6	63	X	X	-
CryoCE AC XL35T	35,5	15,2	462	763	80	0,3	119	6	63	X	X	-

Model	LN2 capacity (l)	Curb weight (kg)	Outer diameter (mm)	Overall Height (mm)	Neck opening (mm)	stat. Evaporation rate (l/day)	stat. Holding time (days)	Quantity Canisters / Boxes	Canister diameter (mm)	Available canister versions / boxes		
										S short	L long	B box
CryoCE AC XL+35	35,5	15,5	462	758	91	0,23	152	6	70	-	X	-
CryoCE AC XL+35T	35,5	16	462	758	91	0,33	108	6	70	-	X	-
CryoCE AC XL50T	50	17	462	830	80	0,34	147	6	63	X	X	-
CryoCE AC 2XL10	10	6,3	300	625	125	0,42	24	1	97	X	-	-
CryoCE AC 2XL15T	15	9,5	462	480	125	0,65	23	10	70	X	-	-
CryoCE AC 2XL30	31,5	13	462	725	125	0,35	90	6	97	X	-	-
CryoCE AC 2XL35	35,5	14,6	462	765	125	0,37	97	6	97	-	X	X
CryoCE AC 2XL+35	35,5	14,6	462	748	127	0,37	97	6 / 10	71	-	X	-
CryoCE AC 2XL+35T	35,5	16	462	748	127	0,41	86	10	-	-	X	-
CryoCE AC 2XL47	47	18,2	508	770	127	0,36	130	6 / 10	104 / 72	-	X	X
CryoCE AC 2XL50	50	16	462	830	125	0,45	110	6	97	-	X	X
CryoCE AC 2XL50T	50	16	462	830	125	0,45	110	6	97	-	X	X
CryoCE AC 3XL65	65	40	681	735	216	0,78	73	6	-	-	-	X
CryoCE AC 3XL95	95	43	681	800	216	0,94	98	6	-	-	-	X
CryoCE AC 3XL115	115	47	681	870	216	0,94	122	6	-	-	-	X
CryoCE AC 3XL145	145	52	681	970	216	0,94	151	6	-	-	-	X
CryoCE AC 3XL175	175	57	681	1085	216	0,95	184	6	-	-	-	X
CryoCE AC LIN3	3	3,1	223	435	50	0,12	26	-	-	-	-	-
CryoCE AC LIN6	6	4,8	300	482	50	0,12	52	-	-	-	-	-
CryoCE AC LIN10	10	6,1	300	545	50	0,12	86	-	-	-	-	-
CryoCE AC LIN12T	12	6,3	310	605	50	0,12	72	-	-	-	-	-
CryoCE AC LIN13	13	6,3	310	627	50	0,12	109	-	-	-	-	-
CryoCE AC LIN20	20	9,5	394	673	50	0,12	168	-	-	-	-	-
CryoCE AC LIN20T	20	10,9	394	673	50	0,2	101	-	-	-	-	-
CryoCE AC LIN25	25	10,7	394	705	50	0,14	180	-	-	-	-	-
CryoCE AC LIN30	30	12,9	462	705	50	0,12	254	-	-	-	-	-
CryoCE AC LIN30T	30	13,1	462	705	50	0,2	159	-	-	-	-	-
CryoCE AC LIN35	35	14,2	462	749	50	0,12	286	-	-	-	-	-
CryoCE AC LIN35T	35	14,2	462	749	50	0,2	179	-	-	-	-	-
CryoCE AC LIN50	50	17,2	462	810	50	0,22	213	-	-	-	-	-
CryoCE AC LIN50T	50	17,2	462	810	50	0,22	213	-	-	-	-	-
CryoCE AC LIN60	60	20	462	950	50	0,24	100	-	-	-	-	-
CryoCE AC LIN100L	100	37	508	1025	50	0,79	126	-	-	-	-	-
CryoCE AC LIN100T	100	37	508	1025	50	0,79	126	-	-	-	-	-

Model	LN2 capa-city (l)	Curb weigh t (kg)	Outer dia-meter (mm)	Overall Height (mm)	Neck opening (mm)	stat. Evapora-tion rate (l/day)	stat. Holding time (days)	Quantity Canisters / Boxes	Canis-ter dia-meter (mm)	Available canister versions / boxes		
										S short	L long	B box
Cryo8	8	6,9	260	635	50	0,17	48	-	-	-	-	-
Cryo10	10	7,9	260	700	50	0,17	60	-	-	-	-	-
CryoCE AC DS3-S	1,3	3,8	223	445	50	0,16	8	1	38	X	-	-
CryoCE AC DS3-L	3,8	4,4	223	485	50	0,17	22	1	38	-	X	-
CryoCE AC DS6	2,9	6,9	300	500	80	0,21	14	1	63	X	-	-
CryoCE AC DS8	3,8	7,3	300	513	80	0,23	14	1	38	X	X	-
CryoCE AC DS10	3,4	8,9	300	623	125	0,43	8	1	97	X	X	X
CryoCE AC DS12	6,8	8,5	300	630	80	0,27	25	1	70	X	X	-
CryoCE AC DS15	6	14,8	393	580	216	0,84	4	1	-	-	-	X
CryoCE AC DS20	9	9,7	394	660	216	0,84	10	1	-	-	-	X
CryoCE AC DS25	9	16,6	394	716	216	0,89	11	1	-	-	-	X

The values listed are nominal values, determined without a storage system and under precisely defined conditions. Depending on operating conditions and the storage system used, the actual values may vary significantly.
Since the vessels of the Auguste Cryogenics Medical Family Aluminum series are open to the atmosphere, they are not pressure vessels within the meaning of the Pressure Equipment Directive 97/23 EC. Therefore, the vessels may be transported on public roads and railways if they are appropriately marked. Please ensure that the requirements of the current GGVSEB/ADR/RID are always met. For recurring transport, Auguste Cryogenics offers specially reinforced versions with the addition of "T" in the name. These vessels are optimized for the stresses encountered during transport. These T-models as well as the 3-, 6- and 10-liter vessels are provided with the corresponding ADR-compliant marking by Auguste Cryogenics ex works.

We reserve the right to change the specifications at any time without notice.

6. Transport and installation

Carry out an incoming goods inspection. Vessels with externally visible damage must always be subjected to an NER test. (NVR = normal evaporation rate, see technical data)

The vessels should be placed in closed, heated and sufficiently large rooms. The surface must be horizontal. If necessary, access controls, indoor air monitoring, forced ventilation and similar measures should be provided. In any case, the safety instructions must be observed. We, your Auguste Cryogenics sales partner or gas supplier, are here to assist you with advice.

Supply of liquid nitrogen

The vessels may only be filled with a transfer hose with filter/phase separator (not included in the scope of delivery).

The nitrogen supply system must be equipped with a shut-off valve and a sufficiently dimensioned safety device against excessively high overpressure.

Any low-pressure storage and transport vessel can serve as a nitrogen source, for example the Auguste Cryogenics low-pressure liquid cylinders (AC Liquid Cylinders).

Ideally, the pressure of the nitrogen supply system should be in the range of 0.7 to 1.4 bar and must not exceed 1.5 bar.

Higher inlet pressures increase filling losses and cause severe turbulence inside the vessel. This can lead to increased gas formation (**RISK OF SUFFOCATION see above),** icing or splashing of cryogenic liquid. The vessels must not be transported horizontally or upside down.

7. Installation

The vessels can be filled in different ways:

Manual:

Nitrogen supply by means of a suitable hose by simply hooking the hose (with phase separator) into the open vessel. In the case of manual filling, the level must be checked regularly and refilled according to the required levels.

The maximum fill height must remain at least 2.5 cm below the bottom edge of the neck tube. The neck tube should not be exposed to permanent contact with liquid nitrogen. Overflowing of the vessel must be prevented in any case, otherwise the vessel may be damaged.

First start or restart:

Before filling with nitrogen, the intended classification system should be placed in the vessel. Fill the vessel to the desired level. Warm vessels must be conditioned before use.

During the initial filling or at room temperature, large amounts of gas are released by the low-cooling process. In these cases, special measures may need to be taken to ensure that there is no **RISK OF SUFFOCATION** during the final inspections for the installer/operator (ventilation, observers, etc.). We recommend storing sample material only after the vessel and classification system have completely cooled down and after at least 48 hours of trial operation. To do this, refill LN2 regularly.

In general, care must be taken to ensure that connection hoses are not loosened when cold and that they are placed with the opening facing down after detachment from the supply tank (e.g. AC Liquid Cylinders) to prevent the ingress of moisture.

8. Operation

The following must be avoided during the normal operation of the Auguste Cryogenics cryogenic storage vessels:

- Lid opening times are too long
- Introduction of several warm (room temperature) classification elements
- high humidity

The above circumstances can lead to increased ice formation and ice accumulation within the vessel.
When filling, please note that cold nitrogen gas may escape at the lid opening during this time. This leads to the formation of frost in the flooded areas. This is normal and will defrost a few minutes after the filling process is complete. During the initial filling, larger quantities of LN2 are consumed. Only after conditioning for at least 48 hours does evaporation settle down. Before storing the samples for the first time, refill the vessel completely for storage in liquid nitrogen. The information listed here can also lead to higher consumption. Placing the filling vessel down hard onto the vessel to be filled can damage the collar.

9. Spare Parts & Accessories

Lockable lid, neck tube core / plug, canisters, goblets and roller bases can only be supplied on request.
Combination with other products:
In principle, all accessories can be used as long as the intended use remains unchanged. We recommend using only MDR-approved accessories to avoid jeopardizing its qualification as a medical device.

10. Maintenance

In general, no special maintenance work is required on the vessels.

In general, ice forms in all cryogenic storage vessels. Therefore, the ice at the top of the vessel and lid must be removed regularly. The rhythm for this regular defrosting must be determined by the operator himself according with the usage habits and installation conditions. The ice should not get into the vessel, since icing in the vessel makes it difficult to access the classification systems. Depending on the installation and operating conditions, despite possible preventive measures, heavy ice formation in the vessel can occur over time, which can then only be removed by decommissioning and completely defrosting the vessel. The entire sample material must then be temporarily stored in a suitable vessel.

11. Cleaning, decommissioning, disposal

Use suitable, approved disinfectants for cleaning and disinfection. The assessment of suitability is the responsibility of the operator, Auguste Cryogenics cannot make a conclusive assessment of the effect of a disinfectant due to the wide range of possible applications or substances to be stored. Particular attention should be paid to the risk to uninvolved third parties, for example during disposal. Upon delivery, the vessels are only superficially free of dust and contaminants; thorough cleaning may be performed at the operator`s decision prior to use.

Cleaning instructions for vessels:

1. Remove the canisters/racks from the vessel, empty the remaining liquid nitrogen, allow the vessel to dry out for 2-3 days.
2. Allow the temperature in the vessel to rise to about 0°C. Pour warm water (> 40°C) into vessels, mix with a neutral detergent. Swirl the vessel in all directions, wipe with a cloth. Any dirt residues that have reached the bottom of the inner vessel and are stuck fast should be loosened very carefully with the help of a bottle brush and wash off or allow to soak for a longer time.

3. Drain the cleaning water, rinse several times with clean water if necessary.
4. Turn the vessel upside down and place it so that it cannot tip over. Natural air drying or hot air drying are suitable drying methods; if using hot air drying, limit the temperature to 40-50°C. Avoid hot air above 60°C, this could affect the performance of the liquid nitrogen vessel and shorten its service life. The entire cleaning process must be carried out carefully; the water temperature should not exceed 40°C and the total weight of the cleaning liquid should not exceed 2kg.
5. After cleaning, spray the vessel with a 70% alcohol/water solution for disinfection and leave it for 15 minutes. Then remove excess liquid from the vessel and wipe dry with a cloth or let it air dry.
6. DryShippers cannot be cleaned as described above due to their design with the absorbent. After complete defrosting, carefully remove dirt and contamination with a damp cloth and spray the vessel with a 70% alcohol/water solution, leave on for min. 15 minutes. Wipe DryShipper dry with a cloth or air dry.

Discarded products must be disposed of properly. The vessel must be mechanically dismantled into its individual parts. All materials made of stainless steel, aluminum and aluminum foil can be reused as recyclable materials. All plastic parts, epoxy tube, glass paper and the molecular sieve / coal must be disposed of as industrial waste or thermally recycled. Electronic components (controllers/sensor units) must be disposed of as special waste. Your local authority will give you information on disposal.

Caution

All vessels returned to the supplier or manufacturer must be cleaned and disinfected before shipping. This must be confirmed by a written statement.

Vessels for which a corresponding declaration is missing, are generally not accepted; but are returned to the sender (not prepaid).

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