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The IceCube™ Family

of Controlled Rate Freezers

Cryoconservation using
dynamic freezing processes

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CRYOBIOLOGY

The IceCube™ Family

Process-controlled temperature developments are an established standard procedure in biomedical research and treatment for freezing biological material, and subsequent storing at low temperatures.

The IceCube™ family of Computer Controlled Freezers are used in veterinary medicine and in **Research and Development roles** without a therapeutic background, and also (with certification for the **Medical Device Directive**) for controlled freezing and thawing out again of skin and other tissues and organ parts, blood and blood components e.g. stem cells, umbilical cord blood, bone marrow, and including reproductive material such as oocytes and spermatozoa. Plant cells and microorganisms can also be cryopreserved. Cryobiological methods in future will also be developed in increasing numbers. The IceCube™ Series is already supplied with the devices ready to meet future challenges of low temperature conservation.

THE DESIGN

FUNCTION Liquid nitrogen from the supply dewar (Liquid Cylinder) is supplied through a metallic hose with a pulsating **magnetic valve** and is distributed by a fan into the **sample chamber.**

A control or **chamber sensor** compares the programmed temperature with the actual temperature and regulates the process for cooling. A **sample sensor** in a reference vessel or fitted to the outside of a blood bag records the sample temperature. The temperature developments of all the sensors, and also of additional ones (options), are recorded in the process diagram.

COMPUTER A normal **tablet computer** fitted on a connecting element with a touch-sensitive screen 10 to 11" in size provides the user interface. The operation of the devices as well as data output and data archiving is then controlled from the touchscreen monitor and is run under a MS Windows® operating system. A **micro-controller with data storage** inside the device is responsible for the actual **work process**. The process data not transmitted to the tablet/PC will be stored in the device up to 2 hours. All further additional functions which are available in Windows® can be used according to the tablet employed, for example such as network capacity for software updates, remote maintenance, and output to printers.

CHAMBER The devices are available with 3 sizes of chamber - 35, 16, and 1.6 l. The chamber is made of special steel and in Series 14 is fitted with transparent glass safety doors which open,

*Freezing and thawing of human life forms in accordance with local legal regulations is not allowed!

permitting unobstructed views of the items being frozen across a wide range of temperatures. When opening during the freezing process the operation is interrupted on safety grounds. Alongside the sensor for the chamber temperature there is also a sensor for the sample temperature.

Options with Series 14 include the connection of another 2 Pt-100 temperature sensors, liquid nitrogen supply pressure as an operating parameter can also be permanently displayed along with the other data. Several versions of racks are available for samples to be frozen inside the chamber and can usually be stacked on top of one another. In addition there are manual and automatic (Series 14) seeding appliances and more recently freezing racks for the SBS Modules.

The new **11XS** Compact Freezer recently introduced has the smallest freezing chamber of the IceCube™ family of devices. With a volume of 1.6 litres it can accept both vials and straws too if desired. The straws holders are removed individually during seeding. According to the application, vertical or horizontal operating positions are possible. The position of the display support upright can be easily changed in a few minutes by the user.

CHAMBER INSTALLATION According to the model options are available for individual **blood bags** or those in metal cassettes, **vials** and/or freezing tubes, **straws** or High Security Straws, **SBS** - Data Matrix Sample Tube racks/packed vial boxes, manual and automatic **seeding racks** for vials or straws.

THE SOFTWARE

Storage capacities for data are practically unlimited and are governed by the technical specification of the computer used. Both the versions of all the freezing/thawing programs, and the processing procedures, including graphics are deposited beforehand with interim storage. The following functions are available as standard: admin/user administration, simple choice of buttons for routine processes, macro-functions (Series 14), process editor, starting temperature input, readout of all the process data – in tables and graphically zoom/resolution in the up to one hundredth of a degree Celsius, automatic and manual scrolling function for the diagram, automatic optimisation of the freezing curve through calculating the latent heat to crystallisation point (only in Series 14). Software is delivered in a validatable copy. Additional functional options Series 14: external alarm forwarding of a number of signals and recording the LIN supply pressure.

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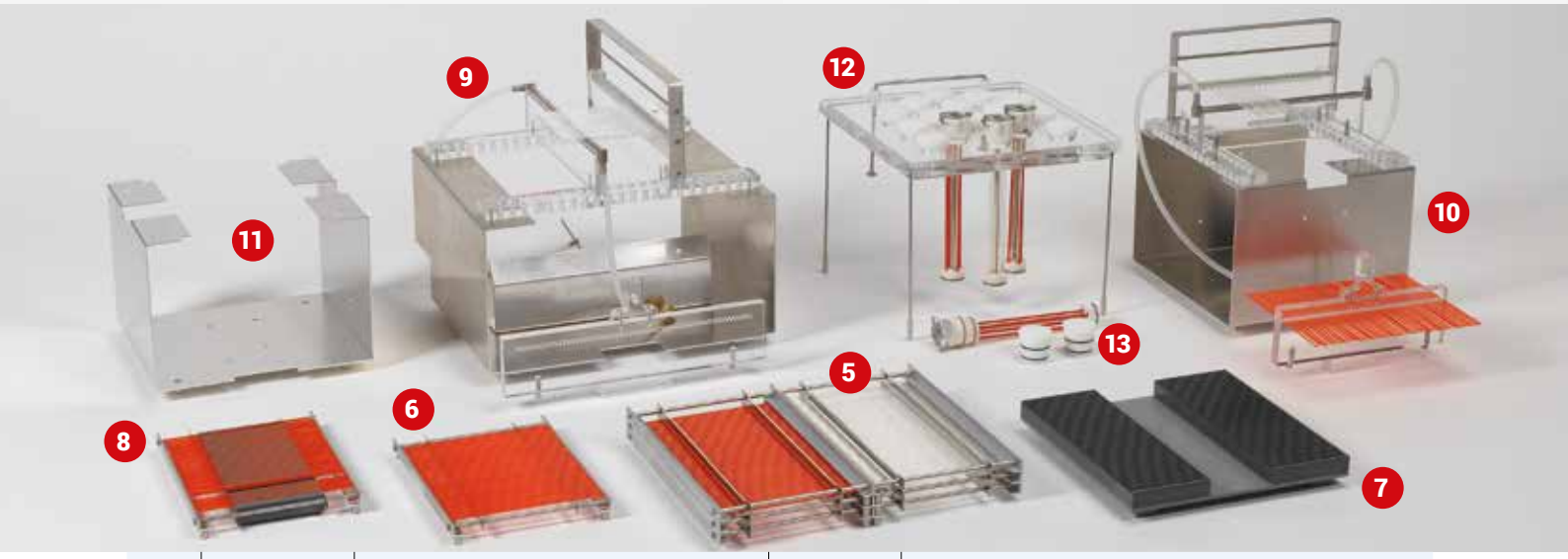
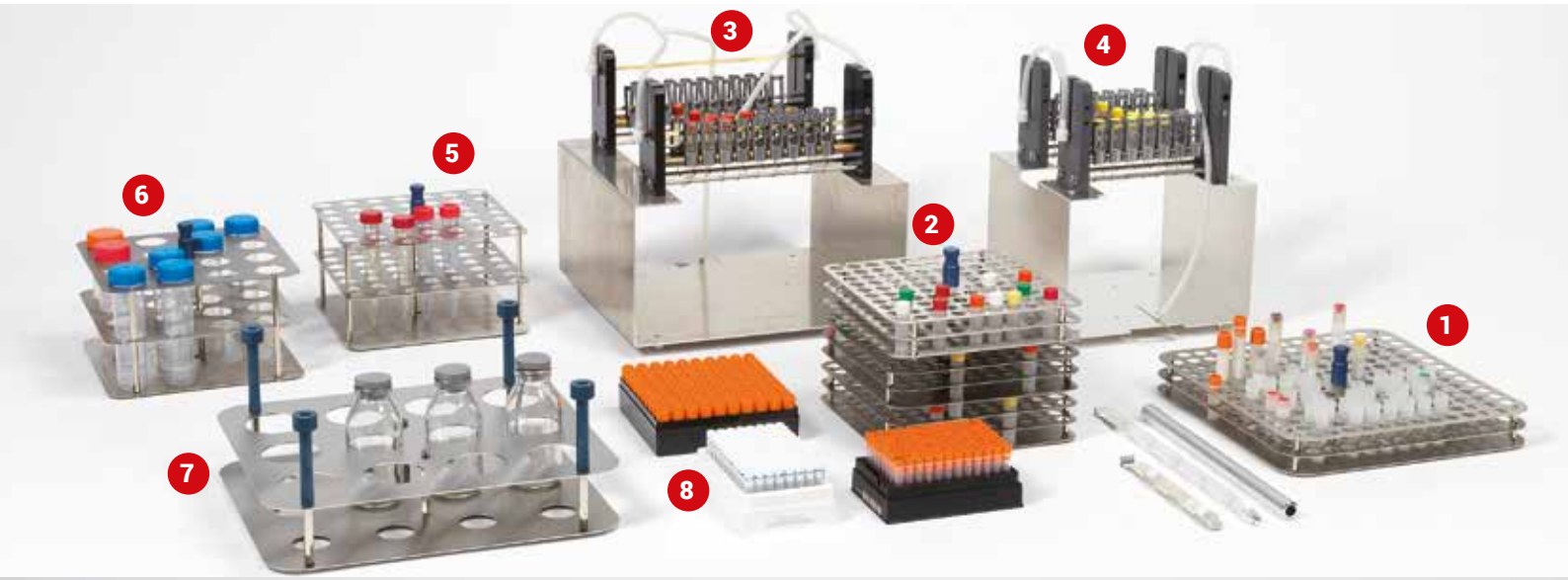


Item	Cat.No.	Description, Rack for	Amount	Total Chamber Capacity, Comments
1	11-105620	2ml/5ml Vials		36/18
2	11-101355	Straws-Holder, Twistlock	4	16
3	11-105091	Temp.-Sensor, Chamber, 65 x 1 mm		Sparepart
4	13-156880	Temp.-Sensor, Sample, 65 x 1 mm		Sparepart
5	10-167260	14M, Straws, 0.25-0.5ml	92	2760 in 30 racks
6	13-158510	14S, Straws, 0.25-0.5ml	36	1080 in 30 racks
7	10-167285	14M Straws Distribution Block	92	for 0.25 oder 0.5ml Straws
8	13-158515	14S Straws Distribution Block	36	for 0.25 oder 0.5ml Straws
9	10-187200 10-187220 13-187240	14M, Straws Autoseeding 0.25ml 14M, Straws Autoseeding 0.5ml 14M, High Security Str.AS 0.3-0.5ml	58 46 33	
10	13-158550 13-158551 13-158552	14S, Straws Autoseeding 0.25ml 14S, Straws Autoseeding 0.5ml 14S, High Security Str.AS 0.3-0.5ml	43 35 22	
11	10-187270	14M, Spacer		
	13-158571	14S, Spacer		
	13-158756	14M, Topplate with 31 Plugs for max. 31 Straws-Holders		for Manual Seeding
12	13-158755	14S, Topplate with 16 Plugs for max. 16 Straws-Holders		for Manual Seeding
13	13-158750	14S+M Straws-Holders	4	14S: 64 in 16 Holders 14M: 124 in 31 Holders

Racks for special sizes - please contact us.



Item	Cat.No.	Description, Rack for	Amount	Total Chamber Capacity, Comments
1	10-187500	14M, Vials 2ml, 5ml	188	1128 (2ml) in 6 racks, 564 (5ml) in 3 racks
2	13-158500	14S, Vials 2ml, 5ml	96	480 (2ml) in 5 racks, 288 (5ml) in 3 racks
3	13-158701	14M, Auto-Seeding, 2-5ml Vials	38	38
4	13-158706	14S, Auto-Seeding, 2-5ml Vials	26	26
5	13-158460	14S, Containers, 15ml	48	
6	13-158470	14S, Containers, 50ml	16	
7	13-158480	14S, Containers, 100ml	12	
8	13-158100 13-158110	14M, 96-Data Matrix Sample Tube racks		up zu 8 racks of different brands, pse advise product no.
	13-158200 13-158210	14S, 96-Data Matrix Sample Tube racks		up zu 4 racks of different brands, pse advise product no.
9	13-159019	14M, Bloodbags, in Metal Cassettes	15 max	Vertical positioning, adjustable interspaces for different cassette thickness.
10	13-158600	14S, Bloodbags, in Metal Cassettes	11 max	
11	13-158000	14M, 260 x **100mm**(h) Contact Area	11	
12	13-158610	14S, 260 x **100mm**(h) Contact Area	6	
13	13-158030	14M, 260 x **200mm**(h) Contact Area	11	
14	13-158630	14S, 260 x **200mm**(h) Contact Area	6	
	13-158050	14M, 280 x 251mm Contact Area	10	Horizontal positioning
	13-158650	14S, 182 x 182mm Contact Area	9	
15		Carton Cassettes for Bloodbags		please ask for data sheet

Racks for special sizes - please contact us.

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TECHNICAL DATA

IceCube™ Series 14 and Series 11

Computer controlled freezing devices with integrated micro-controller and a powerful standard tablet computer with touchscreen monitor. The use of all Windows® compatible printers is possible. Connect to liquid nitrogen (LIN) supply vessels with a pressure build-up to a maximum of 1.5 bar.

SERIES 14 FREEZING CHAMBER:

stainless steel, transparent safety glass doors, nitrogen distribution and gas circulation by a circulating fan, LIN magnetic valve, optional measurement of the supply pressure/recording of same, 2 to 4 (optionally) Pt-100 temperature sensors with shielded 4 wire technique, heating elements, thermal cut-off, safety shutdown with open chamber doors, automatic and manual crystal seeding facilities.

11XS FREEZING CHAMBER:

stainless steel, lockable cover plate with openings for straw holders, directed gas flow using a circulating fan, LIN magnetic valve, Pt-100 chamber and sample sensors in shielded 4 wire technique, heating element, thermal cut-off, safety shutdown with an open chamber lid.

	14M	14S	11XS
Model	T : with Tablet Computer MDD: with certification for the Medical Device Directive		
Temperature range	+40°C to -180°C (104F to -292F)		+40°C to -150°C (104F to -238F)
Cooling rates	0.01 to 60°C/min		0.01 to 40°C/min
Heating rates	0.01 to max. 15°C/min		0.01 to max 10°C/min
Temperature sensors	Pt-100, 1.5 mm Ø x 65 mm length, or (option)1 mm and 1.5 mm x 100/160/200 mm		Pt-100, 1 mm Ø x 65 mm length
Temp. display resolution	0.01°C		
Freezing chamber and capacity			
Chamber dimensions	mm: 297 x 317 x 378 (h) inch: 11.69 x 12.48 x 14.9	mm: 217 x 217 x 348 (h) inch: 8.54 x 8.54 x 13.70	mm: 125 Ø x 132 (h) inch: 4.9 Ø x 5.2
Volume (litre)	35.6	16.4	1.6
Straws 0.25 ml or 0.5 ml	2760	1080	16
Vials 1.8 – 2 ml	1128 in 6 racks	480 in 5 racks	36
Vials 5 ml	564 in 3 racks	288 in 3 racks	18
Vial Boxes	Well Format Cryo Tubes		
Bloodbags *)	11	6	-
Bloodbags in Metal Cassettes *)	16	11	-
Outer dimensions W x D x H (H with open lid)	mm: 630 x 510 x 550 (860) inch: 24.8 x 20.08 x 21.65 (33.86)	mm: 540 x 420 x 520 (820) inch: 21.26 x 16.54 x 20.47 (32.28)	mm: 300 x 480 x 520 inch: 11.81 x 18.89 x 20.47
Supply container, liquid cylinder	Container with pressure built up from 0.5 to max. 1.5 bar (7 - 22 psig), all freezer models are equipped with an internal pressure relief valve. Recommended fill volume 30 – 240 l.		
Pressure sensor (Option)	Pressure monitor recording in real-time		-
AutoSeeding preparation (Option)	Second LIN manifold with magnetic valve for automatic supply of a seeding rack.		-
Netweight without computer and accessories (kg/lb)	~ 39/86	~29/64	~ 16.5/36
Electric supply power consumption, data at 230V	115 or 230 VAC, please specify at order, 1265 VA	115 or 230 VAC, please specify at order, 1035 VA	115 or 230 VAC, please specify at order, 851 VA
Options: please note, accessories are not the same for all models!	a large selection of chamber furniture is available, 3.+4. temperature sensors, temp. sensor flat foil, potential free alarm outputs (Series 14 MDD standard), IQ/OQ protocols, uninterruptible power supply (UPS), insulated LIN metal hoses, vacuum insulated tubing, LIN supply vessels, LIN storage solutions for processed samples, inventory control software, shipping containers, protective wear/gloves, aprons, face shields. Medical products (MDD) means regular maintenance is essential.		

***) Depending on size and/or filling capacities**
Specifications are subject to change without notice.

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LIFE FROM COLD

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