

Polar

FREEZERS

– 43°C/– 45°C

– 86°C/– 90°C



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INDUSTRIE SpA

MORE THAN TECHNOLOGY

Foreword

You are about to choose a freezer that will surely meet your research and laboratory requirements. Technically perfect, equipped with long-life silent compressors, it guarantees years of trouble-free, reliable performance.

Perhaps you already possess one or several freezers that are working fine, but probably you also complain about excessive noise, ice formation, unbalanced air distribution inside the freezer, high operating costs due to frequent repairs. These can be the results of a hurried, superficial choice.

So now take your time and let us introduce to you our **Polar** Series freezers. Engineered to provide efficient performance, they will help you to safeguard your valuable stored products ... and show that we care about your tranquillity.

How to choose a freezer

There are several factors that usually influence the choice of a good freezer:

- ☐ the experience and the name of the manufacturer
- ☐ standardized manufacturing processes
- ☐ the use of hermetically-sealed, silent compressors using ecological refrigerants
- ☐ reduced encumbrance and energy consumption
- ☐ innovative design, more and more important in modern laboratories
- ☐ reduced and easily-available spare parts, thanks to smart engineering.

Polar Series freezers

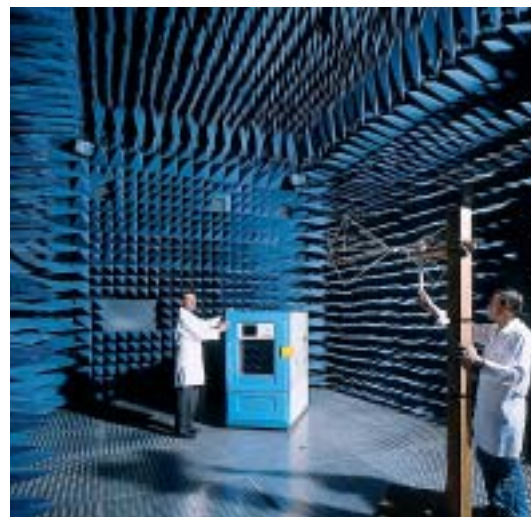
After analyzing which are the factors determining the choice of a good freezer, try and identify among the **Polar** Series freezers

the one that best suits your research and laboratory needs. **Polar** Series freezers have been designed and manufactured to fulfil all your expectations ... and possibly more.

Why **Angelantoni** Industrie

We have been manufacturing cooling equipment since 1932. We have been producing environmental test chambers since 1952 and our export - more than 60% of our total production - places us among the largest manufacturers in Europe. Moreover, we are one of the three world leading companies of space simulators (working up to 20°K, that is down to -253°C!).

The acquired 'know-how' has helped us to achieve important goals throughout the years and today our staff and ideas are perfectly tuned to customers' needs. More than 250 employees working in 4 production and commercial units are constantly studying the right solutions, developing new ecological, smart cooling equipment for you. With the future in mind.



Anechoic chamber for EMC tests in Massa Martana factory

Our Quality System



Our systems are manufactured according to safety European standards. They also conform to the European standards for electromagnetic compliance (EMC). EMC tests are conducted in our laboratories inside an anechoic chamber (350 m³).

SINCERT



DNV

ISO9001

Since 1995 **Angelantoni** Industrie... hold the ISO9001 Quality System certification. In 1989, Angelantoni Industrie had already achieved the military AQAP4 certification.

Environmental protection

Our refrigeration systems utilize only those refrigerants that have not been forbidden by the Convention of Montreal and by the London and Copenhagen amendments.

These are the refrigerants used: R404A and an R23 gas mixture. As an alternative, a version using natural refrigerant is available.

New-concept CFC-free polyurethane foam has been used for thermal insulation.

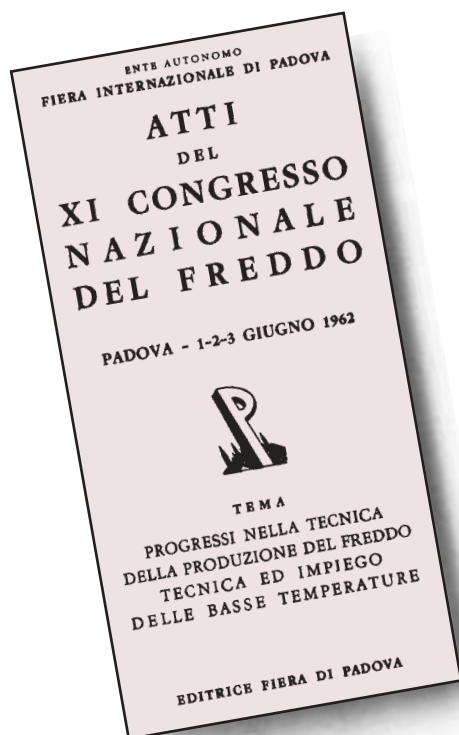
All connections and welding in the refrigeration systems have been carefully checked by means of a helium leak detector (mass spectrometer) to ensure long life.

Our experience

It could be now useful to spend a few words on quality, reliability and assistance. All important words that are often misused. That is why we prefer to use simpler but more concrete terms to describe our products: the following pictures show you an 'ancestor' of your freezer which could reach temperatures down to -104°C in 1961 already.

It took several years, however, before **Angelantoni Industrie** could achieve such goals. Years of study, research and continuous improvement to satisfy technicians and researchers needs and give them safe, long-life, quality-performance equipment.

A professional challenge for us, a good reason for you to trust our products.



UN'INTERESSANTE REALIZZAZIONE DELLA DITTA ANGELANTONI DI MILANO. RAGGIUNTA LA TEMPERATURA DI -104°C

Dott. Ing. ANTONIO MARINO (*)

La Ditta «Frigoriferi Angelantoni» di Milano, nel 1961 è riuscita a realizzare un apparecchio che nella pratica ha lavorato per giorni interi, mantenendo la temperatura di -104°C , perfettamente controllati con scrupolosi registratori scriventi. La bassissima temperatura venne raggiunta nello spazio di qualche ora, in temperatura ambiente, e perfettamente mantenuta. La realizzazione è stata fatta in una capacità di 80 litri, opportunamente coibentata, ed utilizzando i due fluidi R22 ed R13.

(*) Nato a Bergamo il 3-4-1889, laureato al Politecnico di Milano nel 1912 in Ingegneria Industriale. Si dedicò agli Impianti di riscaldamento, e successivamente dopo la guerra e fin dal 1920 alla Tecnica del freddo alle dipendenze della Ditta Dell'Orto, della Ditta Ing. Guido Mairuri, quindi della Electrolux. Dal 1925 ha iniziato la sua attività di scrittore di libri che trattano della tecnica della refrigerazione e di pubblicista in riviste tecniche per trattazione di problemi sul predetto ramo. Dedicatosi all'insegnamento della tecnica del calore e del freddo, a Milano, dal 1928 al 1935 con Scuola propria. Insegnante di Tecnica del freddo dal 1946 al 1950 presso la Stazione Sperimentale del Freddo, a Milano. Esercita la libera professione. Consulente per le installazioni frigorifere ai Marchetti di Novara, Busto Arsizio, Casale Monferrato e altri minori impianti. È autore di otto varie pubblicazioni presso la Editrice Hoepli, tutte sulla Tecnica del freddo, con carattere divulgativo e professionale. Collaboratore di riviste tecniche sempre sulla applicazione delle basse temperature; relatore di questioni frigorifere nei Congressi Nazionali del Freddo ed altri, quali Trasporti, Pesca, Agrumi ecc.

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Il fluido R 22 venne utilizzato in un solo stadio, con gruppo raffreddato ad aria, mentre la sua espansione raffreddava il fluido R 13 in fase di condensazione.

Per il fluido R 22 venne adoperato un normale gruppo ad aria, mentre per il fluido R 13 venne impiegato uno speciale compressore a 4 cilindri verticali, riuniti in un blocco. Di essi cilindri, 3 erano usati per il primo stadio della compressione del fluido R 13 ed il quarto cilindro per il secondo stadio della compressione stessa.

Particolare accorgimento si dovette usare perchè la bassa temperatura del fluido R 13 non è possibile raggiungerla se dapprima tale gas non ha a sua volta raggiunto una determinata temperatura di espansione.

L'impianto era completato di tutti gli strumenti di misura e di controllo. Sopra un apposito piano erano fissati i termometri, i manometri e tutti gli altri normali strumenti di sicurezza per la buona marcia dei compressori, in maniera assolutamente automatica. La lettura delle temperature era fatta con sonde elettriche. Dal quadro pertanto era possibile potere seguire e controllare, in ogni momento, l'andamento delle temperature nell'interno del vano refrigerato. Su un foglio scrivente si aveva la segnalazione delle temperature e le fasi di marcia della macchina.

L'apparecchio realizzato si presta pertanto a molte applicazioni nel campo scientifico: per i virus, per le reazioni chimiche dei metalli alle basse temperature, per le reazioni chimiche degli esplosivi, per la stabilizzazione dei calibri a bassissima temperatura, per la cementazione a freddo dei metalli, ecc.

Se non andiamo errati, la predetta realizzazione è stata la prima in Italia nel 1961 a raggiungere la temperatura di -104°C .

Di tali apparecchi taluni sono già in uso per lo studio dei virus a Milano.

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TECHNICAL FEATURES

Frame

Fully metallic in heavy-gauge phosphate-coated, powder-painted steel plate. Available in two colours: white (RAL 9011) and light blue (RAL 5012). Mounted on rollers for easy moving.

Service door

Manufactured with the same features as the frame. Complete with anti-shock polystyrene inner door. Magnetic silicone rubber gaskets. Self-balancing hinges for chest models. Spring lock with key for all models.

Polar S50 V is equipped with two doors.

Inner doors

Upright freezers are complete with insulated, anti-shock polystyrene inner doors to reduce cold air loss during door opening. Chest freezers are complete with aluminium-coated polyurethane sub-lids.

Internal chamber

Made of 18/8 AISI 304 stainless steel with rounded corners for easy cleaning. The evaporator consists of a copper tube wound around the internal chamber and fixed to it using a patented technique which ensures maximum temperature uniformity inside the freezer.

Thermal insulation

Obtained by means of the so-called 'sand-

wich technique', using CFC-free foamed polyurethane. 140 mm average thickness of the insulating layer.

Refrigeration system

Completely sealed and based on a special cascade cycle, our exclusive design (single stage for -40°C freezers), this system features two hermetically-sealed compressors using CFC-free and HCFC-free ecological refrigerants (ODP, *Ozone Destruction Power* = 0).

R404A is used for the first stage whereas an R23 gas mixture is used in the second stage. As an alternative, it is possible to use natural, non-synthetic refrigerants. Air-cooled condensers need no water connection.

This hermetically-sealed system ensures low-noise operation (max. 55 db) and long life without any particular servicing operation.

Control instruments

Control panel with membrane keyboard mounted on an aluminium fitting. The control panel consists of a microprocessor card divided into two sections: one for temperature regulation, the other for the audible and visual alarm system control.

It is equipped with an automatically-rechargeable buffer battery.

The alarm system is already fitted with a non galvanic contact for remote connection; it detects any rise in temperature as well as power failures. Special alarm for air condenser obstruction included.

Model	Version	Capacity lts.	Working temperatur.	Minimum temperatur.	Shelves included	External dim. cm (LxPxH)	Internal dim. cm (LxPxH)	Voltage (V)	Absorbed power (kW)	Weight Kg
POLAR 110 H	chest	113	-85°C^*	-88°C	=	73x96x108	45x56x45	230/1/50	0,66	200
POLAR 110 SH	chest	113	-40°C^*	-45°C	=	73x96x108	45x56x45	230/1/50	0,33	180
POLAR 180 H	chest	180	-85°C^*	-88°C	=	85x98x108	57x70x45	230/1/50	0,66	220
POLAR 180 SH	chest	180	-40°C^*	-45°C	=	85x98x108	57x70x45	230/1/50	0,33	200
POLAR 370 H	chest	366	-85°C^*	-88°C	=	178x91x102	105x52x67	230/1/50	0,66	260
POLAR 370 SH	chest	366	-40°C^*	-45°C	=	178x91x102	105x52x67	230/1/50	0,33	240
POLAR 550 H	chest	550	-85°C^*	-88°C	=	232x91x102	159x52x67	230/1/50	0,66	280
POLAR 550 SH	chest	550	-40°C^*	-45°C	=	232x91x102	159x52x67	230/1/50	0,33	260
POLAR 340 V	upright	322	-85°C^*	-87°C	2	75x92x200	45x53x135	230/1/50	0,66	240
POLAR 340 SV	upright	322	-40°C^*	-43°C	2	75x92x200	45x53x135	230/1/50	0,33	220
POLAR 530 V	upright	500	-85°C^*	-87°C	2	100x92x200	70x53x135	230/1/50	1	270
POLAR 530 SV	upright	500	-40°C^*	-43°C	2	100x92x200	70x53x135	230/1/50	0,33	250
POLAR 850 V	upright	870	-80°C^*	-85°C	4	1490x92x200	1200x53x135	230/1/50	1,25	450

H and V versions: temperature range from -40°C to -90°C / "SH" and "SV" versions: temperature range from -20°C to -45°C

* Guaranteed values at $+25^{\circ}\text{C}$ ambient temperature / $+30^{\circ}\text{C}$ max suggested external temperature



- 1 Adjustable height stainless steel internal shelves
- 2 Special execution internal evaporator to ensure temperature stability inside the freezer ($\pm 2^{\circ}\text{C}$ thermal gradient)
- 3 Microprocessor-controlled regulation system with door fitting
- 4 Enhanced-brilliance, easily-readable, ergonomic display for temperature control
- 5 Audible and visual alarm system, independent from the control and regulation system

- 6 Low-noise refrigeration system (52 db noise max.)
- 7 Air condenser filter with front grid and magnetic grip
- 8 Cascade refrigeration system using either natural or synthetic ecological refrigerants
- 9 Service door complete with key lock
- 10 Innovative-design front door with rounded corners

- 11 Insulated inner doors in thermoformat. Spring lock with different keys (upon request) to have independent compartments
- 12 Rounded corners for easy cleaning
- 13 Stainless steel internal tank

Equipment designed and manufactured according to ISO9001 International Quality System standards. Tested inside anechoic chamber to conform with European safety standards (CE mark)





AS



- 1 Special execution internal evaporator to ensure temperature stability inside the freezer ($\pm 1^{\circ}\text{C}$ thermal gradient)
- 2 Stainless steel internal tank
- 3 Rounded corners for easy cleaning
- 4 Low-noise refrigeration system (52 db max.)
- 5 Cascade refrigeration system using either natural or synthetic ecological refrigerants

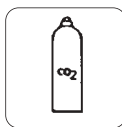
- 6 Audible and visual alarm system, independent from the control and regulation system
- 7 Air condenser filter with front grid and magnetic grip
- 8 Microprocessor-controlled regulation system
- 9 Enhanced-brilliance, easily-readable display for temperature control
- 10 Innovative-design front door with rounded corners

- 11 Insulated, aluminium-coated sub-lids in thermoformat
- 12 Service door complete with key lock

Equipment designed and manufactured according to ISO9001 International Quality System standards. Tested inside anechoic chamber to conform with European safety standards (CE mark).

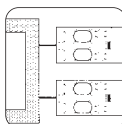
OPTIONAL ACCESSORIES

7-day battery-operated,
temperature chart recorder.
60-day, strip-chart recorder also
available upon request



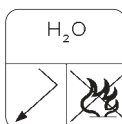
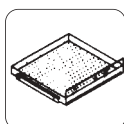
Auxiliary CO₂ cooling system
(LN₂ cooling system also available
upon request) complete with
connection hose to bottles (1 mt)

Measurement probe port holes
(23 mm diameter)
fitted with rubber caps



Back-up cooling system for safe
dependable operation

Additional internal shelves
or stainless steel sliding
drawers (upright freezers)



Water condenser unit
Special frequency and voltage
Explosion-proof execution

STORAGE RACKS

Configuration for each freezer and storage capacity.

model	Polar 110	Polar 180	Polar 370	Polar 550	Polar 340	Polar 530	Polar 850
380/7/50	9	15					
380/5/75	9	15					
600/10/50			21	33			
600/7/75			21	33			
171/12/50					18	30	36
171/9/50							12
161/8/75					18	30	36
161/6/75							12
401/28/50					9	15	
401/20/75					9	15	

Each rack is supplied with
internal water-repellent
cardboard boxes.

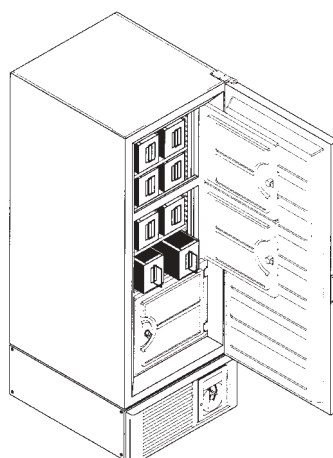
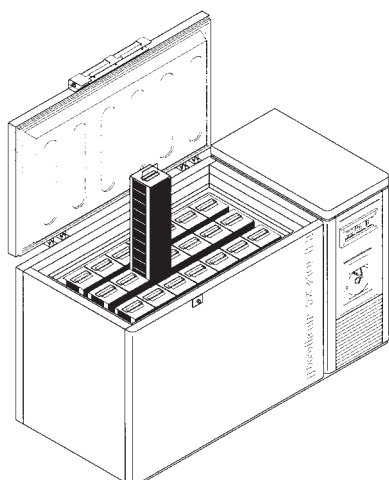
The "WB" rack code means that the
rack code is without internal water
repellent cardboard boxes

The number of boxes varies
according to the height
of the rack.

Composition example: 380/ 5 / 75

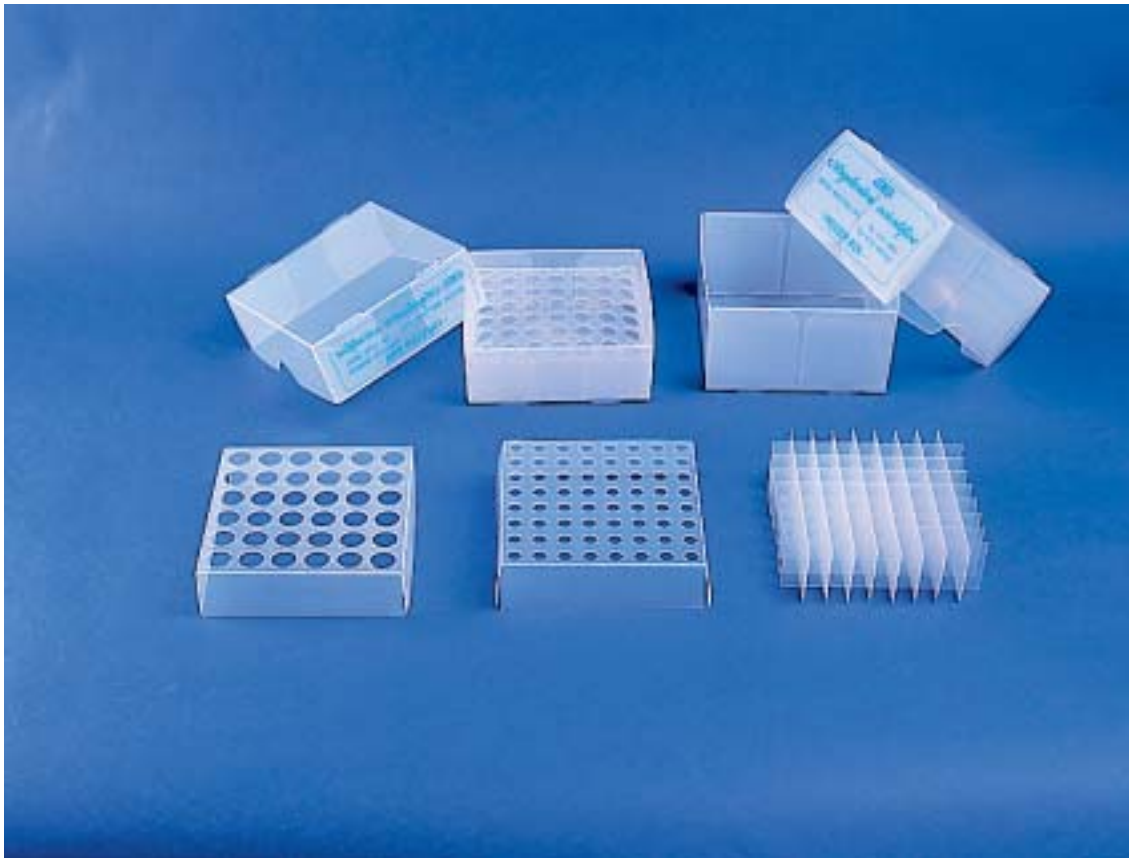
380: rack height
5: number of boxes inside each rack
75: box height

Internal dividers are not included.



STORAGE BOXES





To store biological material, **Angeloni Industrie** have developed and produced unique copolymer polypropylene sectional boxes allowing storage space to be optimized.

The special construction of the boxes allow them to be easily flattened after use, thus saving precious laboratory space.

Extremely resistant and easy to sterilize inside autoclaves, they represent a valuable alternative to expensive stainless steel containers.

Ideal for use inside freezers down to -90°C temperature, their surface allow easy writing

with marking pens.

As an alternative, water-repellent cardboard boxes and dividers are available; they withstand temperatures down to -180°C .

Both cardboard and copolymer polypropylene boxes are available in different models, varying in height only. All boxes may be completed with special dividers, available both cardboard and polypropylene in several sizes (please refer to the table hereinafter). Both cardboard and polypropylene boxes may be put inside stainless steel racks for easy handling inside chest and upright freezers.

STORAGE BOXES

CODE	MODEL	DIMENSIONS (mm)	MATERIAL
10212	133/50	130x130x50	Cardboard
10213	133/75	130x130x75	Cardboard

DIVIDERS

CODE	MODEL	CELLS	HOLE DIAMETER	MATERIAL
10208	49/50	49	15	Cardboard
10209	100/50	100	12	Cardboard
11122	81/50	81	13	Cardboard

Angelantoni Industrie in Massa Martana (Perugia, Italy) extend over an area of 80,000 square meters (more than 15,000 square meters are covered by factories and offices). Massa Martana is situated in Umbria, a region rich in art, history and traditions. No location could be more appropriate, **Angelantoni** look back to the past to better understand and anticipate the future.

That is why **Angelantoni** are the most complete and diversified European group for advanced cold technology in the research.



biomedical division also produces:

- ☐ reach-in refrigerators (+4°C and -20°C)
- ☐ blood bank refrigerators
- ☐ **H e M / s a f e** PC-controlled blood bank refrigerator
- ☐ mortuary refrigerators and autopsy tables
- ☐ chambers for pharmaceutical stability tests and plant growth chambers (sun light)
- ☐ -152°C freezers (with compressors) and -180°C freezers (with LN₂ system)
- ☐ plasma shock freezers
- ☐ prefabricated cold and hot chambers
- ☐ automatic ice flakers and ice cube makers



environmental chambers division produces:

- ☐ chambers for temperature, humidity, vacuum, sun light, thermal shock, vibration, corrosion tests



industrial cold plants division produces:

- ☐ cooling plants for industrial processes in the pharmaceutical, chemical and petrochemical industries
- ☐ cold stores for perishables preservation



Angelantoni
INDUSTRIE S.p.A

AS laboratory and biomedical division

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M O R E T H A N T E C H N O L O G Y