BASIC VERSION	E VERSION	ES VERSION	ESS VERSION	flower® VERSION
CLIMATIC AND THERMOSTATIC MODELS	CLIMATIC MODELS	CLIMATIC AND THERMOSTATIC MODELS	CLIMATIC AND THERMOSTATIC MODELS	CLIMATIC MODELS
T range -40/+180°C DM340 (T) DM600 (T) DM1200 (T) DM1600 (T) T range -75/+180°C DM340 C (T) DM600 C (T) DM1200 C (T) DM1600 C (T)	T range -20/+180°C DM340 E DM600 E DM1200 E DM1600 E	T range -40/+180°C DM340 (T) ES DM600 (T) ES DM1200 (T) ES T range -75/+180°C DM340 C (T) ES DM600 C (T) ES DM1200 C (T) ES	T range -75/+180°C 10 K/min DM250 C (T) 10 ESS DM500 C (T) 10 ESS DM1000 C (T) 10 ESS DM1400 C (T) 10 ESS 15 K/min DM250 C (T) 15 ESS DM500 C (T) 15 ESS DM1000 C (T) 15 ESS DM1400 C (T) 15 ESS	T range -40/+180°C FM340 FM600 FM1200 T range -75/+180°C FM340 C FM600 C FM1200 C

Álava Ingenieros
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Technical Overview

1. NEW Heated inspection window:
a fully transparent double heating system (dimensions: 550h X 450 mm) makes it easy to inspect the test compartment and prevents condensation from forming on the glass.

2. Double ceiling:
prevents condensation from dripping onto the specimen.

3. Axial fan:
allows better distribution of air and helps specimens adapt to temperature variations.

4. NEW feet together with wheels included in the basic configuration:
makes moving the chamber to its working position effortless, even on uneven floors.

5. Rounded corners:
allows better drainage of condensation and makes the chamber easier to clean.

6. NEW water tank:
this easy-to fill-tank for the humidification system is accessible by simply opening the lower door of the chamber.

7. NEW Double floor:
improves air distribution inside the chamber.

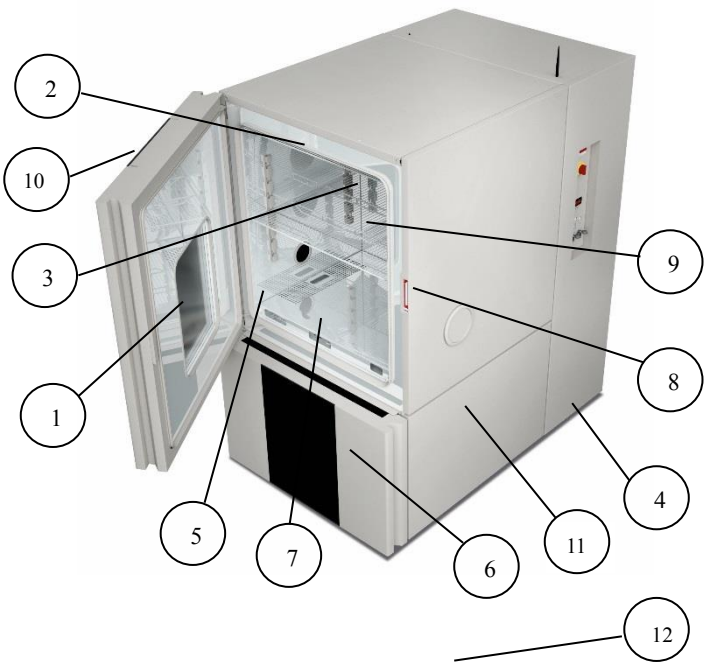
8. NEW Locking system:
this electromagnetic closing system ensures the security of environmental tests and is now managed by a login/logout system with passwords.

9. NEW easy-to-install Shelf:
the shelf supports have been completely redesigned for quick and easy installation. Moreover, the 600l and 1200l shelf has been redesigned for heavy duty operations.

10. NEW Advanced design

11. NEW optimized cooling and electrical system

12. New Control system:
MyKratosTM and MyAngel24TM inside for easy remote access (including Wi-Fi)



mykratos
SUPPORT MANAGE & CONTROL

myangel24
SUPPORT SAFETY & CARE

MAIN STANDARDS

TEMPERATURE TESTS	CLIMATIC TESTS
COLD ONLY	**CONSTANT CLIMATE**
DIN 40046 Page 3, Test A	DIN 40046
IEC 60068-2-1 Ed. 6.0	DIN 50014
BS 2011, Part 2, Test A	IEC 60068-2-78, Ed. 2.0
MIL-STD 810 G, Met. 502.6	MIL-STD 202 G, Met. 103 B
MIL-E 5272, Test 4.2	IEC 60068-2-78 Ed. 2.0
HOT ONLY	**VARIABLE CLIMATE**
DIN 40046, Page 4, Test 3	DIN/IEC 60068-2-30 Ed. 3.0
IEC 60068-2-2 Ed. 5.0	IEC 60068-2-38 Ed. 2.0
BS 2011, Part 2, Test B	MIL-STD 202 G, Met. 106 G
MIL-STD 810 G, Met. 501.6	MIL-STD 883 H, Met. 1004.7
MIL-STD 883 H, Met. 1008.2	DIN 40046 Page 6 and 31
MIL-E 5272, Test 4.1	BS EN 60068-2-75:1997
MIL-STD 202 G, Met. 108 A	IEC 60068-2-75:1997
	MIL-STD 750-1, Met. 1021.3
HOT/COLD	DIN 40046 Page 101
DIN 40046, Page 14, Test Nb	DIN 50016
IEC 60068-2-14 Ed. 6.0	MIL-STD 311 C, Test C11
MIL-STD 331 C, Test C6	MIL-STD 810 G, Met. 507.6 Proc. I-II

Chamber features in brief

Control and management system and interfaces
Controlled by PLC and Advanced HMI (see next section).

Remote access
There is a wide range of possibilities thanks to the built-in MyKratos™ and MyAngel24™ (see next section); multichamber control also available upon request.

Electromagnetic closing system
Ensures the security of environmental tests.

Complete product range
Including E versions (limited performances)

Versatility
A wide range of optional and custom features is available (sun simulation, LN2 cooling, Air treatment unit kit, Lithium-Ion Battery test, …) to fulfil most of environmental testing market requirements.
The modular design of the equipment makes it easy to service and easy to upgrade.

Ergonomics
The ergonomic design ensures easy access to the chamber wherever placed, even for maintenance; the control interface is mounted on the front door and the water tank is easily filled from the lower front panel.

Easy to move and position
Thanks to wheels and feet included as part of the basic configuration, the chamber is easy to move to its working position even on uneven floors

Air treatment system
Ensures a precise control of the climatic parameters inside the chamber with minimal thermal inertia; an axial fan allows rapid temperature variations of both air and specimen.

Humidification system (only climatic version)
The humidifier with a self contained heater and dedicated controlling S/W offers two great advantages:

- it does not require distilled or demineralised water to operate properly;
- it uses 'dry' vapour in order to avoid condensation on the specimens and to reproduce real environmental conditions.

Included in the Basic Configuration

❑ **MyKratos™ and MyAngel24™**: top of the line HMI for remote control

❑ **Inspection window**: multiple-crystal, with double heated transparent film, 550h X 450 mm size

❑ **Internal lighting**

❑ **Self feeding system (tap water through chamber embedded softener)**

❑ **Wheels and feet**

❑ **Electromagnetic closing system**

❑ **Silicone portholes**: 80 mm (left side) and 150 mm diameter (right side) fitted with silicone cap. They allow internal-external electrical, mechanical or hydraulic connections.

❑ **Digital min./max. thermostat**: with independent probe

❑ **No. 1 internal grid shelf**

❑ **Auxiliary contacts** (specimens, alarms)

❑ **Dehumidification system:** it's possible to activate during heating phase. Device included in the climatic basic configuration.

❑ **Ecological refrigerant gas charge for high stage with GWP<2500 (eu regulation 517/2014)** allows to respect refrigerant gas emissions limit imposed by the new European Regulation 517/2014. Starting from 2020 the emissions limit will be set to 2500 GWP (Global Warming Potential: global warming potential caused by a gas). The gas proposed by ACS guarantees to remain below this threshold.

Available upon request

❑ **Sun simulation equipment**: according main specific norms, i.e. DIN 75220

❑ **Air treatment unit kit**: includes additional fan and two connection pipes for external box temperature conditioning

❑ **Lithium-Ion Battery test**: a set of dedicated options are now available for this specific market

❑ **Dewing test kit:** kit to investigate the behavior of the specimen when subjected to dew.

❑ **Test PV1200**

❑ **Test PV2005 variant A**

Main Price list Options

All the images above are indicative

❑ **Additional portholes**: 80 and 150 mm, see attached drawing for available positions.

❑ **Water condenser**: for the chambers which are normally equipped with air condenser.

❑ **UV lamp**: for ageing tests on painted surfaces, plastic materials, rubber, etc.
Min. temperature of test: 0°C
Max temperature of test: +40°C
Not compatibility with Hydrofluoric acid

Radiometer next to the lamp	UV-A 430 W/m^2 UV-B 356 W/m^2 UV-C 224 W/m^2
Radiometer, distance 140mm from the the lamp	UV-A 23,7 W/m^2 UV-B 20,20 W/m^2 UV-C 10,60 W/m^2

❑ **Set of no. 4 analogic inputs** 0÷10V for user's data acquisition (no. 1 set max)

❑ **Set of no. 4 PT100 inputs** (no. 1 set max)

❑ **Set of no. 4 PT100**

❑ **Set of no. 8 auxiliary contacts** (no. 1 set max)

❑ **No break power unit for PLC**
DC UPS 24VDC module equipped with a battery in case of power failure. The devices under UPS supply are PLC and control panel.

❑ **UPS line supply, predisposition**
Terminals block predisposition for customer UPS. Below the UPS inlet and outlet characteristic: 230V-1ph + N + PE 50Hz. The devices under UPS supply predisposition are: PLC, control panel, Electromagnetic closing system.

❑ **Temperature cascade control by n° 1 PT100 probe**
Free PT100 probe. The temperature control on the specimen with this accessory reduces the temperature range of 10K for each extremity (valid for thermostatic test).

❑ **Remote air condenser:** refer to D0020546 document

❑ **Temperature and Humidity** (for climatic chambers) **analogic retransmission**

❑ **Temperature extension to +200°C**

❑ **Internal shelves**: AISI 304 stainless steel, adjustable in height, grid shelves to be added to the one supplied.

❑ **Reinforced floor:** max 500 kg distributed load

❑ **MyKratos™ Multichamber:** software, installed on a PC, for monitoring and control multiple chambers (to be supplied upon request)

❑ **Notch** 50x70mm

❑ **Door hinged on the right**
With this accessory the carter under the door maintain the standard configuration.

❑ **Handling port hole**: Ø125 mm, positioned on the door near the inspection window. It allows handling specimens inside the chamber (available for models from 500 litres up).

❑ **Specimen switching off in case of chamber alarm**

❑ **Air fan motor speed adjustment**
Reduces the internal fan speed by software

❑ **Air flow booster**
Increase the internal fan speed and setting by software

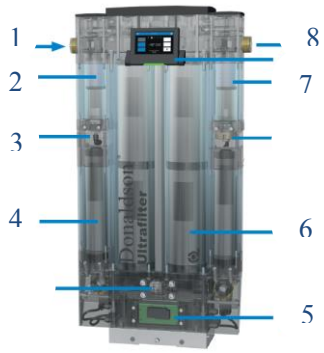
❑ **LN2 auxiliary cooling**

The injection of liquid nitrogen is controlled by 2 automatic valves in series for redundancy purposes: one valve is controlled with an on/off command, while the other valve opens simultaneously with the first and closes after a 30-second delay.
The compensation line for the nitrogen has a diameter of 120mm. The drain-off line is to be provided by the customer. The inlet connection is positioned vertically above the ceiling of the chamber.

WARNING: The use of LN2 makes it necessary for the safety manager to prepare a risk assessment document for the area where the chamber will be installed considering the possibility of a low oxygen level and the possible effects of low temperatures. The risk of asphyxiation is not only connected with the normal chamber operations (opening of the door at the end of the test), but also with possible leaks from the LN2 pipes and valves which may cause N2 saturation of the environment. As a minimum, a certified oxygen level detection system should be installed in the area where the chamber will be installed.

General Features	
Insulation performance	up to +30° C and 65% R.H.
Inlet LN2 Connection	½"G
Pressure system LN2	3-9 bar
Minimum Cooling Rate of Change according to IEC in the std. range	30° C/min
Dew Point, humidity range	+4° C – +78° C
LN2 max consumption, 2 bar inlet	23 l/min (Approx. 60 kW cooling power)
LN2 max consumption, 4 bar inlet	30 l/min (Approx. 80 kW cooling power)
LN2 max consumption, 6 bar inlet	40 l/min (Approx. 100 kW cooling power)

❑ **Compressed air dehumidification kit**
The purification system includes a pre-filter with automatic condensate drain, adsorption dryer and after filter.
The pre-filter retains solids and condensate (oil/water mixture).
The adsorption dryer next in line adsorbs the moisture in the compressed air. The dryer works with alternative phases of absorption and regeneration. In the two adsorption vessels the air it is alternately dried in the respective adsorber, while in the other adsorber is carried out the step of regeneration. This process ensures a continuous service.
The after filter retain the remaining particles from the drying agent.



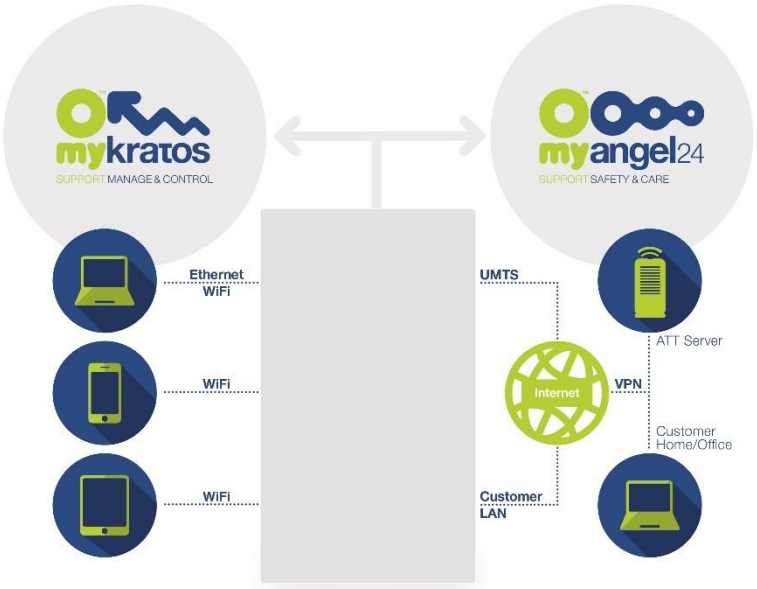
1. Air inlet
2. Pre-filter
3. Condensate drain
4. Silencer
5. Controller
6. Desiccant cartridge
7. Post-filter
8. Air outlet

❑ **Capacitive probe:** RH Controlling and monitoring (activated by control system

❑ **Dew point control down to -20°C**
Possibility to set the temperature and humidity value for dew point value down to -20°C

Control system and user interface

The chamber is equipped with a PLC (Programmable Logic Controller), used to manage all chamber's functions and safety interlocks.
A special device is used to manage the chamber via "mobile" devices, such as Tablets and Smartphones, or to establish a remote Internet connection. The HMI system consists of an on-board panel (MyKratos™ On-Board) and a Remote connection control (MyKratos™ and MyAngel™), linked to the chamber as in the figure below.



PLC features:

- 512 kB SRAM / Onboard flash 256 kB
- Data protection (1-3 years) with lithium battery
- N.1 USB Programming interface port
- N.1 Ethernet TCP/IP communication port
- N.1 RS 232 communication port
- Dedicated I/O onboard
- I/O bus extension (up to 64 module sockets)
- Expandable I/O modules (up to 1023 I/Os)

Features:

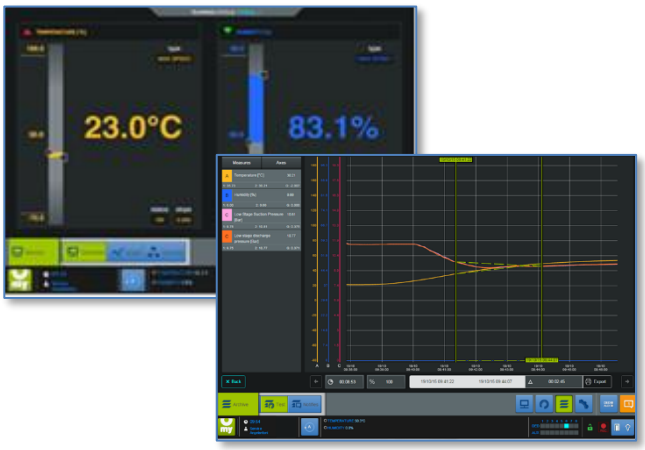
- Qseven® module I.MX6 Dual" ARM Cortex-A9 -1Ghz
- GPRS/UMTS (3G) module
- WiFi 802.11 b/g/n module
- 2GB RAM DDR3
- eMMC 4GB
- 1 MB L2 Cache
- RTC
- N.2 ethernet (1x Gigabit, 1x 10/100 Mbps) communication port
- N.1 RS232 communication port
- N.1 RS485. communication port
- N.3 Usb port
- mass storage SSD 8 GByte Conn S-ATA.

On-Board Panel (Mykratos™ On-Board):

<u>Hardware</u>
10.1 inch Analog Touch Panel 16 million color with TFT technology

<u>Software:</u>

- Allows access to all the features of the Mykratos ™, described in the paragraph "MyKratos ™ software".
- Allows the management of the switching on and off of the internal chamber light
- Allows the management of the electromagnetic opening door of the chamber (if present).



MyKratos™ software:

MyKratos™ is the Supervision and Management system operating on any mobile and desktop device. The wireless connection (WiFi) makes possible to use different kind of Tablets and Smartphones (iOS 8 and Android 4.2.1 or later compatible). The operator interface can also be remotely accessed via customer's LAN connections.

Main features

- WiFi or Ethernet connection to the chamber.
- Visualization and graphical analysis of measures and recordings.
- Synoptic graphs of the entire system.
- Multilanguage support.
- High configurability of chamber parameters.
- Unlimited possibilities of measures recording
- Program and Manual mode of chamber operation
- Delayed start of a program
- Ability to select more than one chamber from a single Tablet: the multiple password levels ensure secure access.
- Automatic notifications of event and alarms
- Archive manager for an easy access to the stored recordings
- Ability to send email notification to various recipients via customer's LAN connection.

Test program editor

- Unlimited possibilities of storing cycles of 350 segments delaying their execution.
- Internal repetitions of 10 groups of segments up to 999 times each
- Upload, edit, export, and delete existing cycles and recordings.
- Graphical and numerical profile's parameters data entry.

Graphic functions (Graphic viewer)

- Live data update of measures on the charts
- Graphic charts or numeric table representation views on the monitor
- Graphic cursor for in-chart data measurements and evaluations.
- Calculation of Measure Slopes and reports generation.
- Enable/disable of chart display.
- Zoom in, zoom out and scroll functions
- Export function to convert the MyKratos™ log file into ASCII format (usable in Excel or other applications)

MyAngel24™ tool:

MyAngel24™ is a remote-assistance system via GPRS/UMTS wireless connection, complete with SIM card. Cabled connection is also available , via customer's LAN.
This remote-assistance system via GPRS / UMTS wireless connection, complete with SIM card, allows you to remotely access the operator interface via VPN and to send SMS notifications.
N.B.: The activation of MyAngel24™ must be confirmed by the customer with the appropriate form attached to the offer, to be returned with the order.

MyKratos™ Multichamber S/W for multichamber remote control by PC (Price List option)

PC Software to monitor and control multiple and diverse environmental test chambers:

- Manages a variable number of chambers dependent on PC resources
- Monitors all the chambers at the same time and, if necessary, to have a full-screen view of a single chamber
- Personalizes the order of the chambers in the display grid
- Learns connectivity and run/stop status of the chambers
- Alerts operators when an alarm is present and indicates which chamber the alarm relates to
- Grid display can show any web-compatible application (i.e.: software for cameras or other equivalent tools)
- Compatible with the main operating system

More details about constructive design

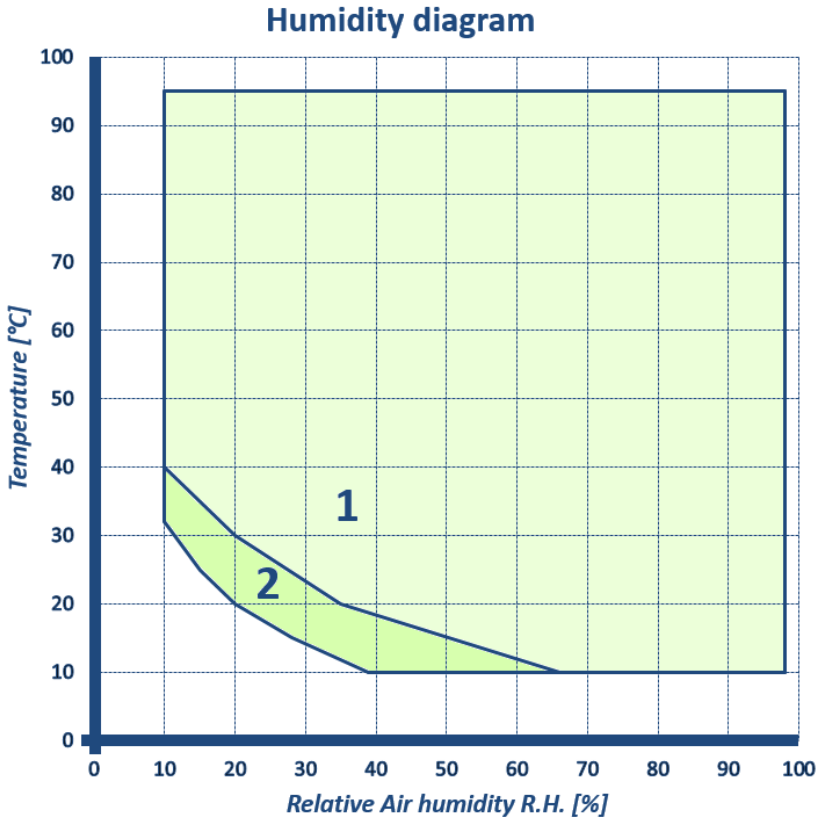
1. Temperature- and Humidity Control

Temperature Measurement with Pt100 thermal probe Class A, max precision 0,3K

Relative humidity measurement with Assmann psychrometric system complete with Pt100 thermal probes. The psychrometric principle (dry & wet bulbs) is used for the measures in the test chamber. This allows the set and measurement of relative humidity expressed directly in % R.H.

Relative Humidity range from 10% to 98% within the temperature range [+10°C; +95°C]
Dew Point range:
AREA 1, from +4°C to +94°C for continuous tests
AREA 2, down to -3°C for limited periods based on starting conditions and foreseen testing time

The values refer to the basic version at ambient temperature of +22°C, with temperature and humidity measurement made in the air inlet.



2. General features

- Optimized devices (control system/refrigeration system/Humidification system)
- Compact enclosure; excellent protection against corrosion is achieved by Powder coating (thermosetting powder polyester resin) Grey RAL 7044
- Insulation thickness 125 mm (mineral wool)
- Door system: stainless steel back, with 135 mm of insulation, electromagnetic closing system
- Choice of opening on the control panel after login or through a button. Opening temperature range is configurable; for safety reasons, the default setting is from 0°C to 60°C

3. Chamber floor loading and specification details

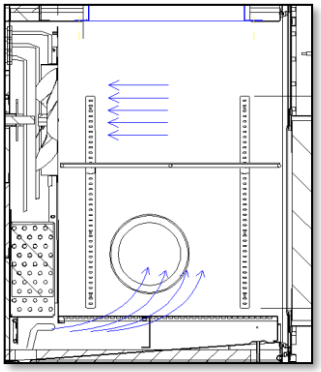
- Max. floor load 100 kg/m² approx. (equally distributed)
- Max. load of the shelf 50 kg approx. (equally distributed)
- The internal test space is made of stainless steel (material 1.4301, equivalent of AISI 304)
- All seams are TIG welded and vapour tight
- The internal surfaces have round corners for easy cleaning
- Internal rails for mounting the grid shelves at the requested height
- Internal lighting for easy loading operations

4. Air treatment system

Realized into an air treatment duct positioned on the end wall.
The following elements are included:

- cooling evaporator
- heating system
- dehumidification system (only climatic version)
- steam for humidification inlet (only climatic version)
- thermoregulation air circulation fan
- temperature and humidity probes

Thermo regulated air flows into the air treatment, passing through the above mentioned elements before entering the test chamber.
Air circulation is from the floor to the fan (see image).



5. Cooling

Mechanical cooling based on single stage system (-40°C) or cascade systems (–70°C).
The cooling system is realized with semi-hermetic alternative type compressors with an advanced and high quality design.
The main body is made of special cast iron; the cylinders and light metal alloy pistons are easy to dismount.

The cooling system is complete with an automatic injection-type protection system for the compressor. This protects the compressors when they are cooling down from high temperatures.
This system allows a self-regulating cooling of the compressors, in order to avoid high temperature (no damages to motor winding).

The compressors have the following advantages:

- Greater reliability by improved lubrication and lower cylinders temperatures
- Streamlined body to improve gas management, reduce pressure drop, increase efficiency
- Multi- port suction to provide uniform cylinders cooling for reducing wear
- Discharge valve in optimized position to provide durability minimizing discharge tube pulsation.

ACS Smart Cooling Kit (excluding for ES, FM and ESS models)

Developed by Angelantoni Test Technologies (patent pending), ACS Smart Cooling Kit* is a new concept of the compressor Stand-by mode, based on an innovative configuration of the refrigeration circuit managed through new, dedicated software algorithms.
The new system allows a more efficient management of pressures upstream and downstream of the compressor, producing a better control of the cooling capacity and a reduction of the mechanical effort.
The resulting benefits are:
- Up to 20% reduction of power consumption
- Up to 50% noise attenuation
- Increased system reliability
- Better temperature regulation inside the chamber

*Now available on «Universal Use» and «Stability Test» models

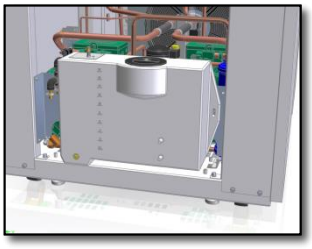
Stand-by mode: the compressor works in "reduced effort" conditions, during the phases in which cooling capacity is not required. Total stand-by times can even reach 70% of the total time of a humidity cycle.

6. Heating

The chamber is heated by means of electrical heaters, protected by safe thermostats that disconnect overall chamber main power components (such as compressors, fans and heaters) in case of accidental over-temperature.

7. Humidification and Dehumidification (only climatic version)

Direct humidification occurs through an electrical vapour humidifier with an orifice arranged in the airflow after the recirculating air fan. This ensures aerosol free humidification.
The humidifier is controlled by a dedicated algorithm for better reliability.



The chamber is equipped with a water storage tank (about 18l capacity) and a water connection on the back of the chamber for automatic refilling.
There are three ways to ensure the water supply needed for any kind of climatic tests:

1. Connecting the chamber to normal tap water network by means of suitable water connection[1];
2. Manually refilling the tank with demineralised water[2];
3. Connecting the chamber to demineralised network[3].

In order to reduce water consumption, water recycling can be activated through a button on the control panel (only possible when the specimen does not contaminate the water during the test).

Dehumidification is performed by the condensation cooler (dew point cooler) directly connected to the refrigeration circuit. This principle permits high stability of parameters in conjunction with energy-efficient dehumidification.

8. Electric equipment

The electrical equipment complies with the provisions on CE marking and the relevant product standards.
With particular regard to safety, the electrical equipment is made in accordance with the main harmonized IEC-EN regulations which are accepted worldwide.
The applicable guidelines and standards are:

- Directive 2006/42/EC - Machinery Directive - EC
- Directive 2014/35/UE - Low-voltage electrical equipment
- Directive 2014/30/UE - Electromagnetic Compatibility
- IEC 61000-6-1/2/3/4/5 – Basis standard of electromagnetic compatibility
- IEC 61439-1/2 - Distribution switchgear
- IEC-60204-1 - Electrical equipment of machines

ATT electrical engineering design focuses on personal safety, subjecting every machine or system to a careful risk assessment and strictly applying the following rules:

- UNI-ISO-13849-1/2
- EN 62061

The components meet the standards for maximum quality and environmental compatibility.

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[1] Tap water requirements: PH in the range 7,5…9,5; hardness less than 500 mgCaCO3/kg; oily substances less than 3 mg/kg

[2] Demineralized water requirements: Conductibility in the range 5 e 10 µS; PH in the range 7,5…9,5; hardness less than 5 mgCaCO3/kg; oily substances less than 3 mg/kg

[3] In this case, it is recommended to bypass the chamber built in water softener. Demineralized water requirements: as defined above

9. Incorporated safety

Configuration, constructive design and workmanship are in compliance with the currently valid EN and IEC codes.
The chamber is equipped with:

- a lockable master switch (according to IEC standards)
- safe thermostats that disconnect overall chamber main power components (such as compressors, fans and heaters) in case of accidental over-temperature.

Moreover, the control system is monitoring:

- excess and low temperatures for test compartment by means of digital undertemperature/overtemperature switch with independent probe
- recirculating air fan
- compressor (thermal protection, overpressure)
- condenser fan

In case of malfunctions or failure of individual components, the built-in safety devices will cause the system or individual groups to shutdown to prevent any consequential damage. Detailed fault alarms in plain text ensure the prompt detection of system malfunctions.

10. Environmental safety

We use environmental friendly R449A and R23 (for systems down to –70°C) refrigerants only. Asbestos-free mineral fibers are used for insulation purposes. The resistant powder coating will not release any solvents into the environment.

E-Energy saving series

The Discovery"E" series chambers have the essential environmental chamber performances and are specifically designed for general purpose applications where extremely high temperatures or fast ramp rates are not required.
The "E "series is ideal for climatic tests at steady states. It is ideal for a wide range of applications such as Tropical tests on pharmaceutical products, and for wide range of tests in the plastics, rubber, paper and semiconductor industries.

ES-Environmental Screening series

The Discovery "ES" chamber series now has even more environmental performance, whilst maintaining the same footprint and volume of the lower specification versions.
Discovery "ES" has been designed for Environmental Stress (ESS) and is ideal for reliability growth processes where temperature rate changes of 5 Degrees a minute are required.
All of the chambers in the "ES" range are equipped with air condensers, except for the 340 l model where water condensation is required to maintain a compact foot print.

ESS-"speedy" series

The Discovery ESS "speedy" chamber series was developed to help manufacturers detecting product defects and production flaws. Screening can force infancy board and component failures that would otherwise occur after final assembly and product delivery, and potentially during the warranty period.
Two versions are available, according to the temperature rate of change (10°C/min and 15°C/min).

ESS Improves	ESS Reduces
▪ Product quality	▪ Fields defect
▪ Product reliability	▪ Warranty costs
▪ Production throughput	▪ Time to market
▪ Profit margins	▪ Early failure on field
▪ Customer satisfaction	▪ Manufacturing costs

Protecting and preserving the environment is one of our company's highest priorities, which is why it is certified to ISO14001. In line with its sustainability policies, ACS has been conducting research and development to reduce energy consumption and to increase the use of ecological and recyclable materials in order to develop products that reduce environmental damages at all stages of the product lifecycles.
The new chamber, called **"flower®",** is the first result of this research, a truly innovative product in the field of climatic test chambers, thanks to its special design.

Reduced energy consumption
It consumes about 70% less energy during the stabilization phases due to the unique and "patented" system which includes:

- An inverter that controls compressor speed and allows the compressor power to adapt different working needs
- A "cold sink"***** to increase the cooling efficiency.

Reduced noise level
50% noise reduction is obtained due to:

- An inverter on the compressor which reduces the rotation speed to about 40% of its nominal value according to working conditions
- An automatic control system that reduces condenser blower rotating speed according to ambient temperature and cooling power

These advantages are combined with the use of "environmentally friendly" materials during the production phase:

- No polyurethane in the insulation process
- Recyclable or easily disposable packing materials.

***** The "cold sink" consists of a mixture of water and glycol having a solidification temperature of around -20°C. There are two heat exchangers inside the cold sink; one acts as an evaporator and the other as a super-cooler. When the cooling powers required are very low, the control system of **"flower®"** chamber keeps the rotation speed of the mechanical compressors at the minimum allowed values, and the excess coolant evaporates in the evaporator situated inside the cold sink; in this way the chamber accumulates a reserve of "cool" to be used at a later stage.

Álava Ingenieros
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