



# Vibration

test chambers 



**Angelantoni Test Technologies**  
stay ahead to meet the needs  
of the Industry of the Future, where

**Internet Technology,**

**Remote Connections,**

**Communication & Networking**

are the keywords for success.



# Vibration test chambers

**ACS** is proud to announce the **new release** of its standard vibration test chambers.

Besides their well-known key features - **remarkable basic configuration, flexibility, easy adaptation to any shaker** - these chambers are now equipped with the new cutting-edge **MyKratos™** control system, which makes it possible to manage, monitor and assist the chamber, anywhere at any time, from mobile and desktop devices using Wi-Fi, Ethernet, or mobile network connections.

This line of chambers comes in both thermostatic (temperature only) and climatic (temperature and humidity) versions.

# To make your life easier!

**ACS** vibration test chambers can be interfaced with many various types of shakers for vertical, horizontal and tri-axial vibrations. They are the easiest solution for combining any kind of shaker with an environmental test chamber, thanks to:

1

## A very easy operating system

A worm screw type of lifting system allows the test cabinet to be adapted to the shaker's height. Adjustments can be set from the control panel on the chamber. It is also possible to add horizontal movement as needed. This is especially useful if your shaker allows both vertical and horizontal movement or if you want to use more shakers with the same chamber.

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## Greater flexibility

Different removable floors, for vertical and horizontal vibrations, can adapt the chamber to any existing standard shakers. If the chamber must be used without the shaker in place, a blind floor plug is available.

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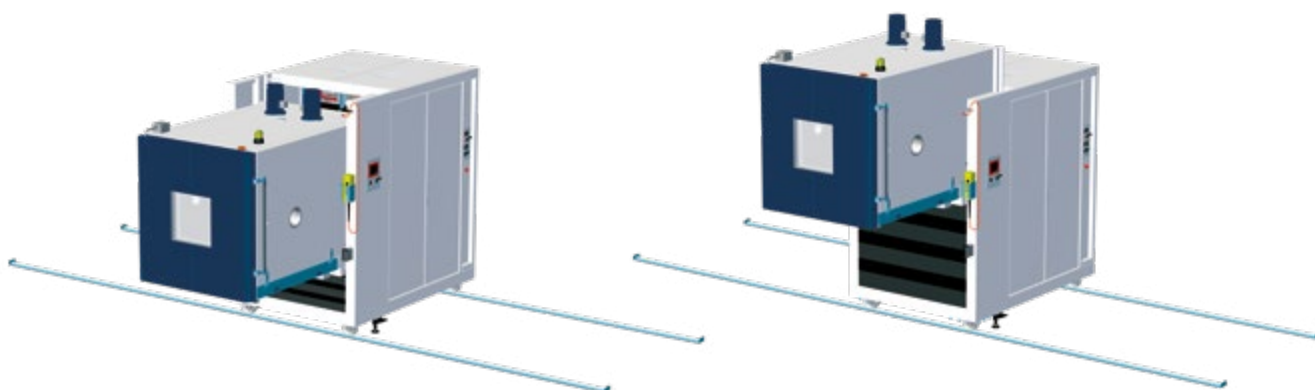
## A wide range of standard models

The available volumes in both thermostatic and climatic standard versions are 600, 1200 and 2200 l. Three choices of temperature change rate are available for the -70/+180°C models: 5, 10, or 15°C/min, while 5°C/min is the only available rate for the -40/+180°C models. For all the climatic models the humidity range is from 10% to 95% (in the temperature range of +10/+95°C).

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## Innovative Control System

Industry demands smart solutions for managing and maintaining distributed networks of people, machines, and processes. The ACS solution for the Internet of Things is the **unique-in-the-market MyKratos™ software**, making it possible to manage, monitor and assist a test chamber in any place at any time, from mobile and desktop devices, using any kind of connection (Wi-Fi, Ethernet or mobile networks).

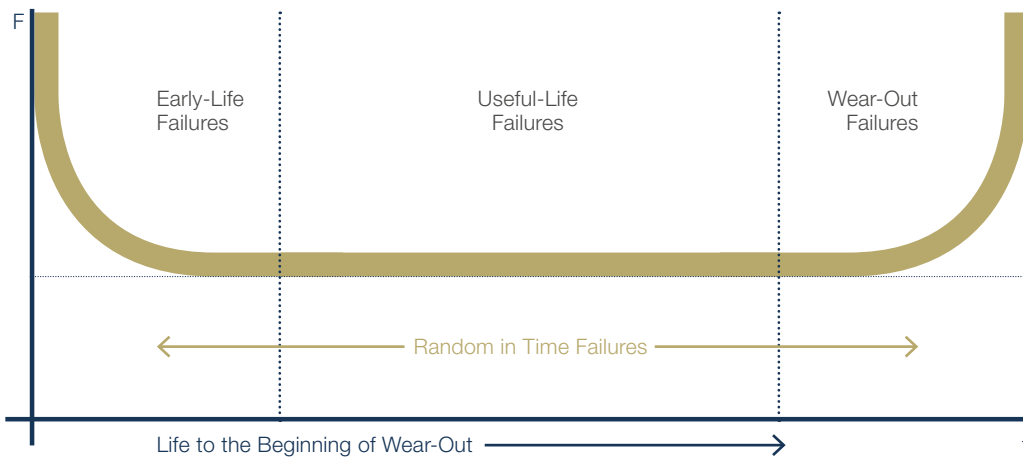


# Be strict with your product: **expect the best!**

Vibration, temperature, humidity: the right mix

**Environmental Stress Screening (ESS)** is a process of exposing a product to stresses such as thermal cycling and vibration in order to force latent defects to manifest themselves. Stress screening ensures that defects, which normally arise during the useful life of a product, are discovered during testing prior to the pre-production phase.

## Bathtub curve



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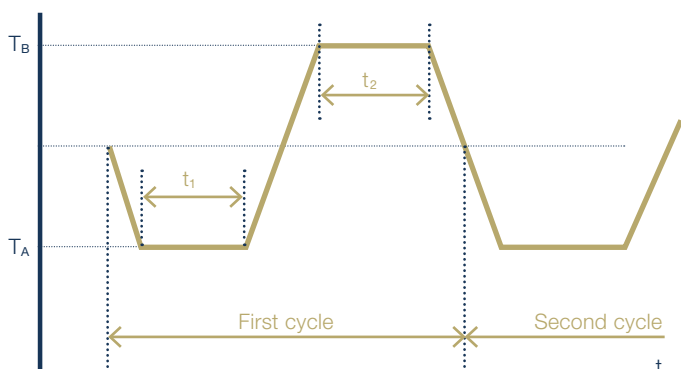
Improved quality and reliability by applying:

**Vibration stress**

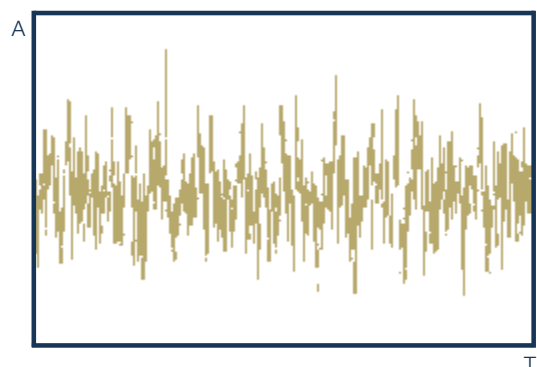
**Thermal stress with quickly changing rate**

**Humidity**

## Thermal cycle stress IEC 60068-2-14, test Nb



## Vibration stress



# A remarkable basic configuration

## Basic Configuration

- **MyKratos™** including **MyAngel24™**
- **Inspection window** multiple-crystal, with double heated transparent film, 450h X 450 mm size
- **Internal lighting**
- **Feet**
- **Lifting system** for a positioning in height of the chamber continuously and precisely on the shaker
- **Closing** mechanical, with large handle
- **Thermostat** max./min. digital thermostat with independent probe
- **Removable floor** the floor for vertical vibrations has a hole equipped with a plug to permit tests even without the shaker
- **Silicone portholes** 80 mm (left side) and 150 mm diameter (right side) fitted with rubber cap. They allow internal-external electrical, mechanical or hydraulic connections
- **Auxiliary contacts** (specimens, alarms, run shaker)
- **Interface** Ethernet port for remote control system connection
- **Water condenser**

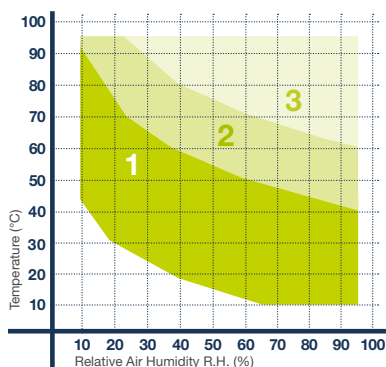
## Options

- **Additional portholes** 80 and 150 mm, see drawing for available positions
- **Handling port holes** no. 2 max, 125 mm of diameter, they are positioned on the door under the inspection window, allowing the handling of specimens inside the chamber
- **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. 8 auxiliary contacts** (no. 1 set max)
- **No break power unit for PLC**
- **Floor for horizontal vibrations** with fixed square opening depending on model (no closing plug provided)
- **Compressed air dehumidification** for continuous tests with low temperature
- **Manual or automatic horizontal movement** manual or automatic track translation system, to simplify the operations of positioning the chamber on the shaker
- **Door electro-magnetic closing system**
- **Specimen switching off in case of chamber alarm**
- **Remote air condenser**
- **MyKratos™ Multichamber software:** installed in a PC to monitor and control multiple chambers (to be supplied upon request)

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## Humidity diagram

**1+2+3 area:** from +4°C to +94°C for tests with blind floor and thermal insulated head extender.  
**1+2 area:** from +4°C to +59°C for tests with vertical vibration.  
**1 area:** from +4°C to +40°C for tests with slip table.



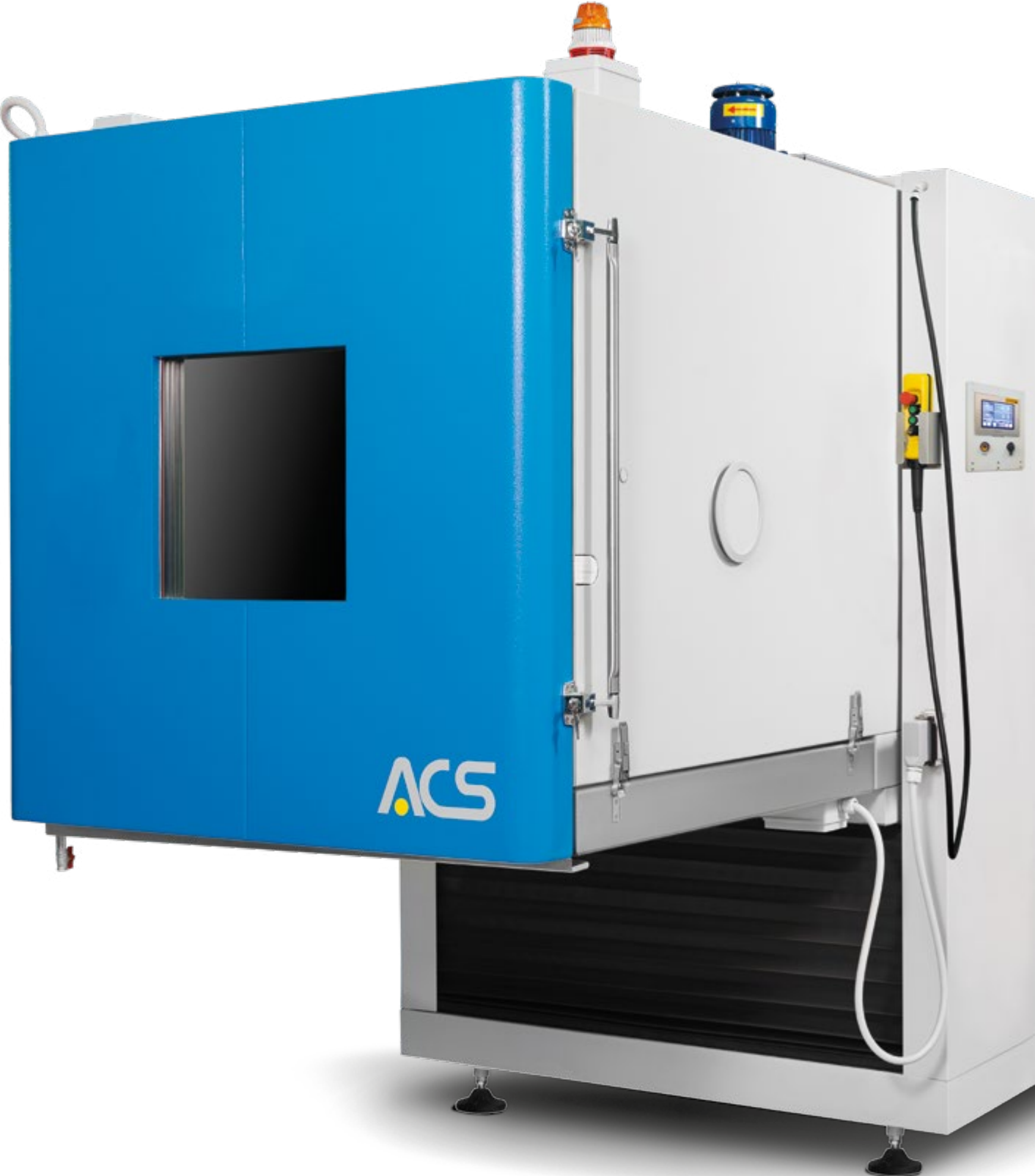


## Vibration test chambers / Technical features

	MODEL <sup>1</sup>	AV600 (C) 5	AV600 C 10	AV600 C 15	AV1200 (C) 5	AV1200 C 10	AV1200 C 15	AV2200 (C) 5	AV2200 C 10	AV2200 C 15
Useful capacity (l)		610	610	610	1220	1220	1220	2187	2187	2187
Internal dimensions approx. (mm)	WIDTH	850	850	850	1000	1000	1000	1350	1350	1350
	DEPTH	740	740	740	1130	1130	1130	1350	1350	1350
	HEIGHT	970	970	970	1080	1080	1080	1200	1200	1200
External dimensions approx. (mm)	WIDTH	1340	1340	1340	1490	1490	1490	2058	2058	2058
	DEPTH	3005	3005	3005	3580	3580	3580	3895	3895	4295
	HEIGHT	2274	2274	2274	2274	2274	2274	2392	2392	2392
Max external height (mm) <sup>7</sup>		2950	2950	2950	3050	3050	3050	3170	3170	3170
Distance between the bottom of the test space and the floor (mm)		650±1430	650...1430	650...1430	650...1430	650...1430	650...1430	680...1430	680...1430	680...1430
Temperature Range (°C)	Basic	-40...+180	NA	NA	-40...+180	NA	NA	-40...+180	NA	NA
	C model	-75...+180	-75...+180	-75...+180	-75...+180	-75...+180	-75...+180	-75...+180	-75...+180	-75...+180
Temperature fluctuation (K)		±0,1...±0,8	±0,1...±0,8	±0,1...±0,8	±0,1...±0,8	±0,1...±0,8	±0,1...±0,8	±0,1...±0,8	±0,1...±0,8	±0,1...±0,8
Temp. changing rate Heating <sup>4+5</sup> (K/min)	Basic -40/+180°C	5	NA	NA	5	NA	NA	5	NA	NA
	C model -70/+180°C	5	10	15	5	10	15	5	10	15
Temp. changing rate Cooling <sup>4+5</sup> (K/min)	BASIC +180/-40°C	5	NA	NA	5	NA	NA	5	NA	NA
	C MODEL +180/-70°C	5	10	15	5	10	15	5	10	15
Humidity range (%) (t=-3/+94°C) <sup>2</sup>		10...95	10...95	10...95	10...95	10...95	10...95	10...95	10...95	10...95
Temp. range for climatic test (°C)		10...95	10...95	10...95	10...95	10...95	10...95	10...95	10...95	10...95
Humidity fluctuation (%)		±3...±5	±3...±5	±3...±5	±3...±5	±3...±5	±3...±5	±3...±5	±3...±5	±3...±5
Maximum thermal Load (W) <sup>5</sup>	Basic T=+25°C	5500	NA	NA	5500	NA	NA	5500	NA	NA
	C model T=+25°C	5500	8500	8500	5500	8500	8500	5500	8500	8500
Rated power (kW)	Basic	16	NA	NA	21	NA	NA	28	NA	NA
	C model	19	27	34	33	33	47	34	48	68
Rated current absorption (A)	Basic	29	NA	NA	37	NA	NA	47	NA	NA
	C model	35	48	61	57	57	86	57	86	124
Weight (without packing) (kg)	Basic	1750	NA	NA	2250	NA	NA	2900	NA	NA
	C model	1950	2200	2200	2550	2550	2900	3300	3350	3740
Sound pressure level dB(A) <sup>3</sup>	Basic	68	NA	NA	72	NA	NA	72	NA	NA
	C model	70	74	74	74	74	80	74	80	84
Max water consumption (m3/h) <sup>6</sup>	Basic	2,6	NA	NA	4,7	NA	NA	4,7	NA	NA
	C model	3,2	6,7	6,7	5,8	5,8	8,7	5,8	8,7	12,8
Supply voltage (Vac)		400V ±10%/50Hz/3 + N + G								

1. For Temperature only version add T to the suffix - 2. t=+4°C/+94°C for continuous test - 3. Measured at 1 m distance in front of the unit in 1,6 m height, free field measurement - 4. According to IEC 60068-3-5 and IEC 60068-3-6 - 5. The performance data refer to +22°C ambient temperature, 400V nominal voltage, without specimen - 6. With water at T +29°C and temperature difference at 5°C (water temperature range +12÷+29°C) - 7. With test cabinet in the highest position.

# Vibration test chambers





# Customized vibration test chambers

A wide range of solutions are available for any customer requirements. Our company has extensive experience in supplying equipment for applications in such diverse fields as electronics, aerospace, aeronautics, automotive and defence.

**Walk in temperature, humidity and vibration test chamber (180 m<sup>3</sup>)**



**Vibration chamber (capacity 6000 lt approx.) to simulate combined stress (temperature, humidity, vertical and horizontal vibration) on vehicle devices**



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**ESS and vertical/horizontal vibration test chamber (two vibration systems) for big dimension specimens**



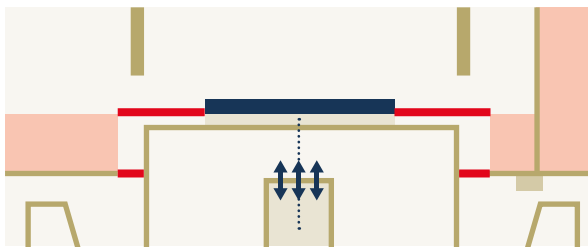
**Vibration, temperature humidity and altitude test chamber**



# Maximum flexibility

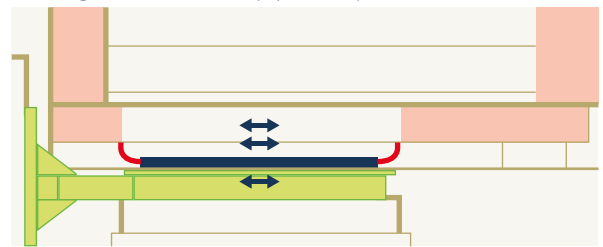
Thanks to the collaboration with different shaker manufacturers and to the realization of standard and customized project for first-class clients in every application field, ACS has acquired over the years an extensive experience in chamber-shaker coupling systems.

## Without Head Extender



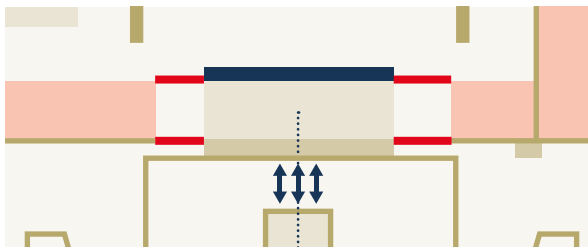
Thermal insulation is ensured thanks to the thermal barrier and two silicon gaskets, one fixed on the thermal barrier and the other around the shaker body

## Standard solution with the horizontal configuration floor (optional)



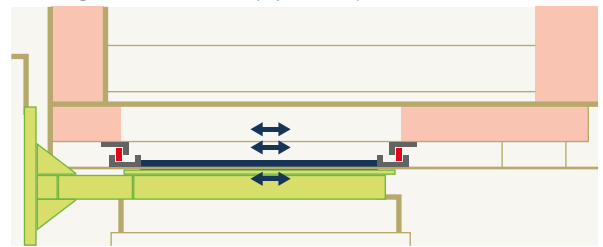
The optional floor is equipped with one silicon gasket fixed under the floor and the thermal barrier.

## With Head Extender



Two silicon gaskets fixed on the basis and on the top of the shaker head extender for full temperature range application,  $-75^{\circ}\text{C}/+180^{\circ}\text{C}$  (continuous test)

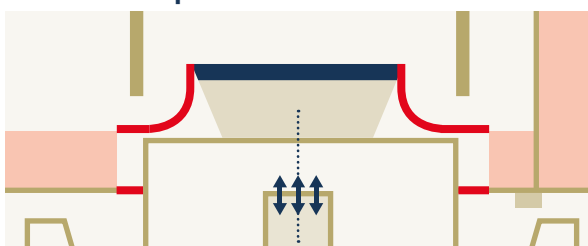
## Customized solution with the horizontal configuration floor (optional)



Quotations can be requested for:

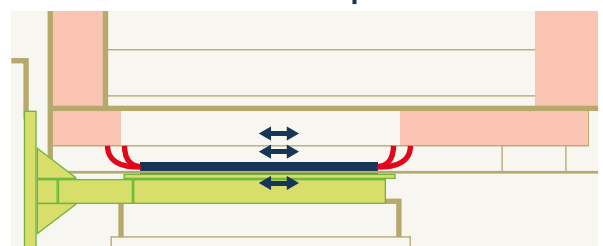
- Customized design
- Tray and gasket kit

## With Head Expander



Thermal insulation is ensured thanks to the thermal barrier and two silicon gaskets, one fixed on the thermal barrier and the other around the shaker body

## Customized solution with special floor



Quotations can be requested for:

- Customized design
- Set of two Kevlar gaskets
- Dry air system with dual function: isolation between gaskets and chamber drying (if any)

# mykratos

## an intelligent Control System ready for the Future

Thanks to their hyper-connectivity, ACS test chambers can match current and future needs related to the new demands of the Industrial Internet of Things and Industry 4.0 for integrated, interconnected and communicating machines.

**Available on the new 10 inch display**

**Free App**  
to fully manage the chamber via mobile devices (Google Play and Apple Store)

**Simple to use graphical interface**  
Clarity, consistency and efficiency of use

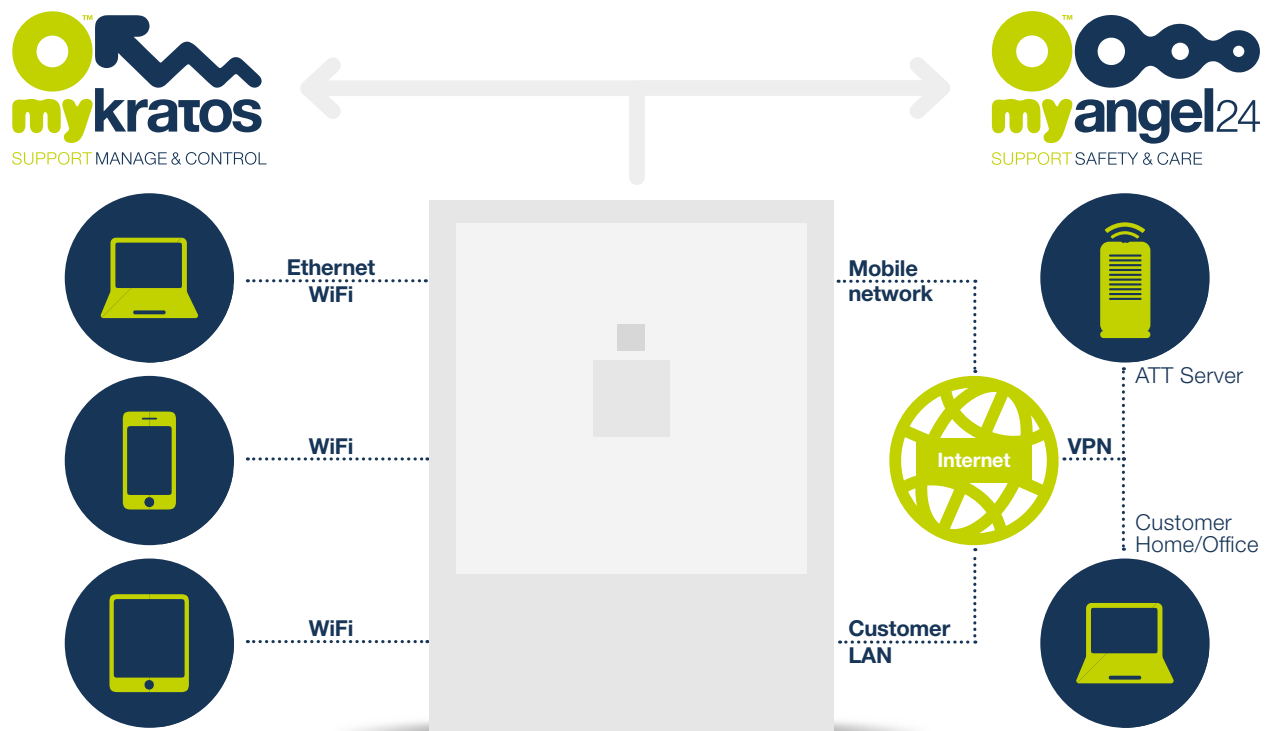
**Easy remote access and control**  
via integrated Wi-Fi / mobile network and Ethernet

**Embedded Control Software**  
**MyKratos™** inside, to control monitor and assist the chamber from any device. No additional hardware or software required

**Chamber Internal Cloud**  
for data storage

The interface consists of a powerful software accessible from the 10 inch on board display and from remote devices (PC, tablet, smartphone), **MyKratos™**, including the interactive assistance system **MyAngel24™**.

The chamber is equipped with a **PLC** (Programmable Logic Controller) for managing all the chamber's functions and safety interlocks. A special device controls the chamber via mobile devices, such as tablets and smartphones, or establishing a remote Internet connection.



# MyKratos™ control system

**MyKratos™** control software makes it possible to manage, monitor and assist the chamber anywhere, at any time, in multiple ways (Wi-Fi, Ethernet, mobile network) via mobile and desktop devices.

The chamber wireless (Wi-Fi) connection permits operation using tablets and smartphones (iOS or Android compatible).

The operator interface can also be remotely accessed through a chamber connection to the client's LAN or via mobile network (on activation of a SIM card data).

It includes the **MyAngel24™** remote-assistance system.

## Main features

- Wi-Fi or Ethernet connection to the chamber
- Visualization and graphical analysis of measures and recordings
- Synoptic charts of the entire system
- Multilanguage support
- High configurability of chamber parameters
- Unlimited measures recording possibilities
- Program and Manual chamber operation modes
- Delayed start of a program
- Possibility to select more than one chamber from a single Tablet:  
secure access by means of multiple password levels
- Automatic notifications of event and alarms
- Archive manager for easy access to the stored recordings
- Possibility to send email notification
- Possibility to send SMS notification (SIM card required)
- Multi-chamber management
- System available in several languages

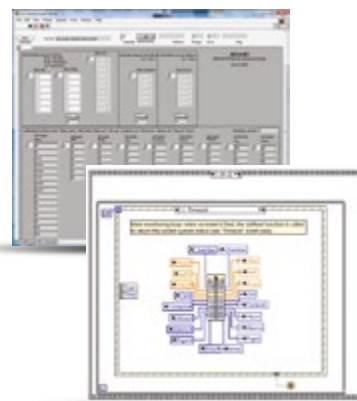
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## Additional S/W tools for an Easy Integration of ACS test chambers in Test Labs

Communication drivers for an easy integration into customer-developed Serial or Ethernet based applications, (LabVIEW, LabWindows CVI, Microsoft.NET, Visual Basic 6, etc...) can be supplied on request. The drivers come with a set of examples written in Visual Basic 6, LabView, LabWindows CVI, VB.NET, and permit total interaction with ACS test chambers, for both reading and writing.

Our communication protocol - ModBUS RTU for serial or Fetch/write for Ethernet communication, can be supplied to allow any chamber connection using the customer's own programming languages and operating systems.

### Example program LabVIEW User interface



Development environment



# MyAngel24™ interactive assistance system



**MyKratos™** software includes the innovative ACS interactive assistance system **MyAngel24™**, operating via mobile network wireless connection, complete with SIM card. This makes it possible to access the operator interface remotely via VPN and send **SMS notifications**. Cabled connection is also available, via customer's LAN. N.B.: MyAngel24™ activation on demand.



With **MyAngel24™**, the climatic chambers stay connected to the remote server 24 hours a day, monitoring running conditions in order to guarantee faster and more efficient service and maintenance activities.



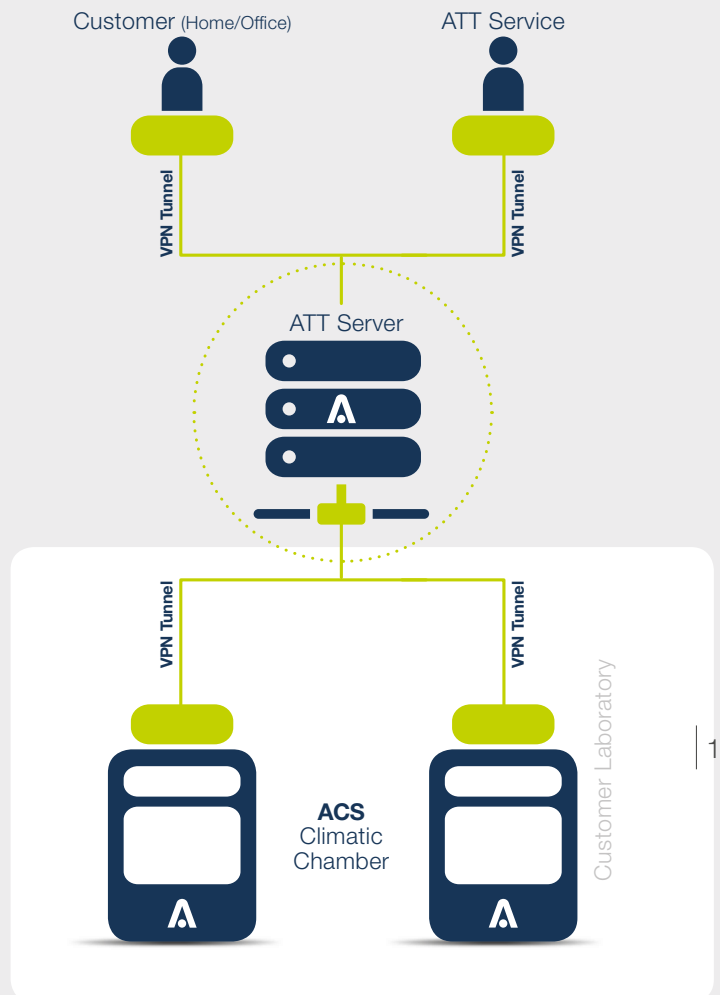
With **MyAngel24™**, you can stay in contact with the climatic chamber whenever you want and wherever you are, accessing its control panel from any web browser.



**MyAngel24™** uses the highest security standards available for authentication, secure connection, data encryption and storage. Moreover, you can suspend or limit the data sent to the central server for security reasons during one or more test sessions.

## New!

- ✓ Automatic Reporting
- ✓ Self Diagnosis
- ✓ Preventive Maintenance



## Maintenance Cost Reduction

- **Less on-site intervention**

- **MyAngel24™** permits the identification of problems with a remote test and an examination of the recorded data
- ACS can diagnose many problems remotely ensuring the service engineers know how to resolve the problem before visiting site and in some instances avoiding the need for a site visit.

- **Reduced chamber downtime**

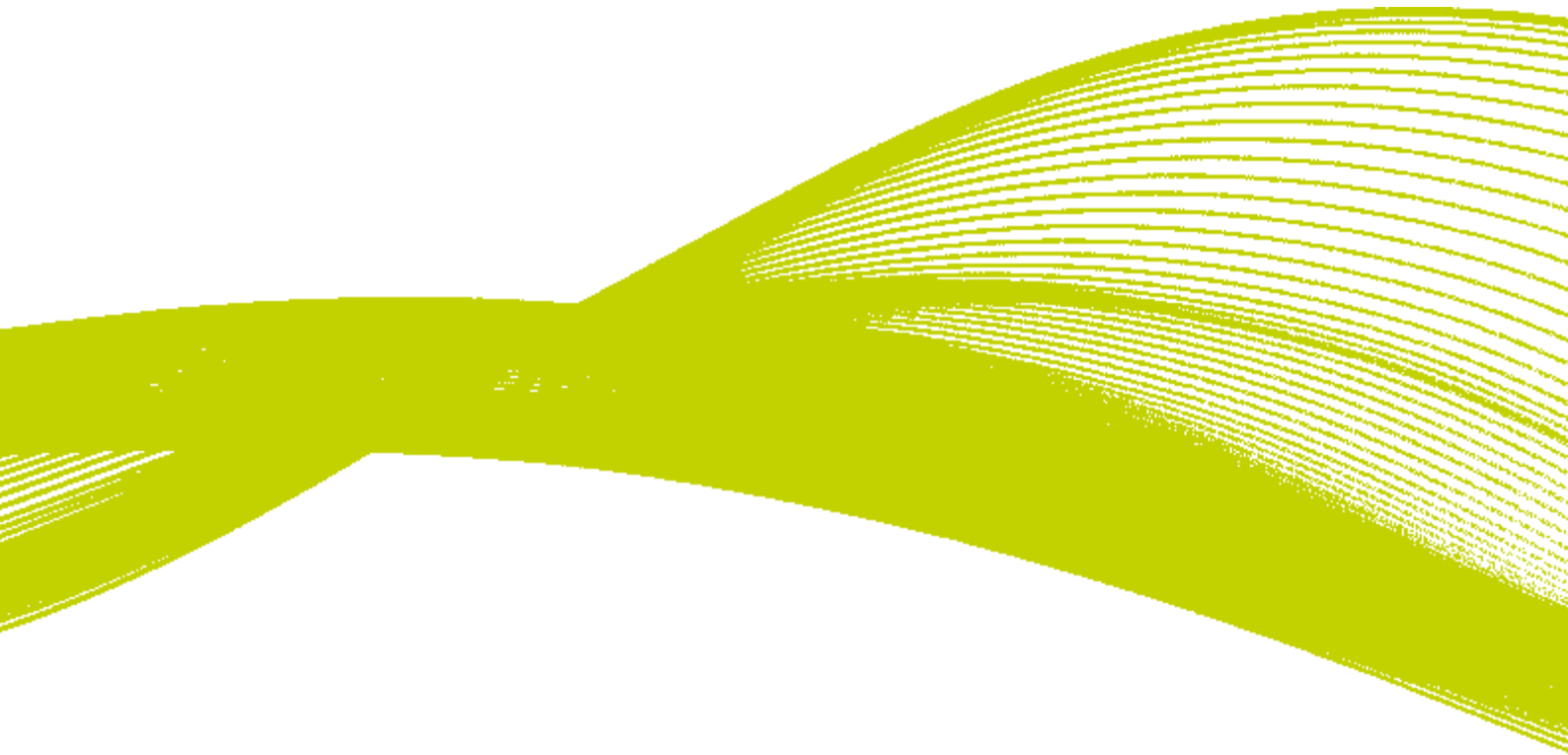
- ACS is able to schedule maintenance to chamber test plan and life cycle monitoring of the main components

- **Efficient on site intervention**

- Service staff know the problem and which parts may require replacing before attending site

- **Remote support**

- ACS can adjust PID parameters remotely
- ACS can make changes to PLC programs remotely for chamber optimisation.



**Angelantoni Test Technologies**, owned by the **Angelantoni Group**, is the only company capable of offering a comprehensive range of environmental test chambers - **ACS** branded - for a great variety of applications, thanks to the expertise and technical know-how of its teams of experts. Innovation, flexibility and organization have always been the keys to success for ACS, world-famous since 1952 also for its high-tech test equipment such as Thermal High Vacuum Chambers for Aerospace applications and Calorimeters.

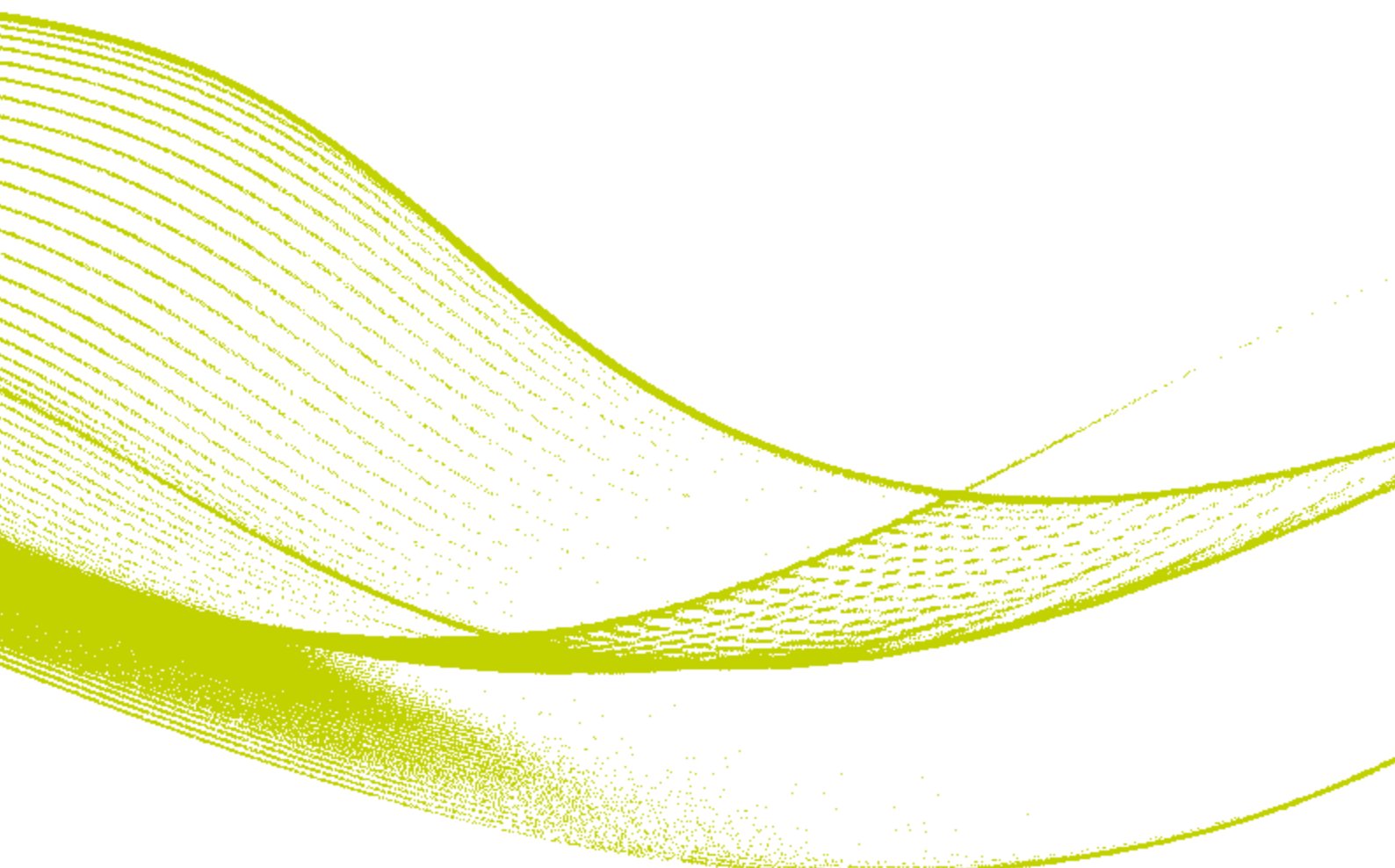


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TECHNOLOGY FOR LIFE



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