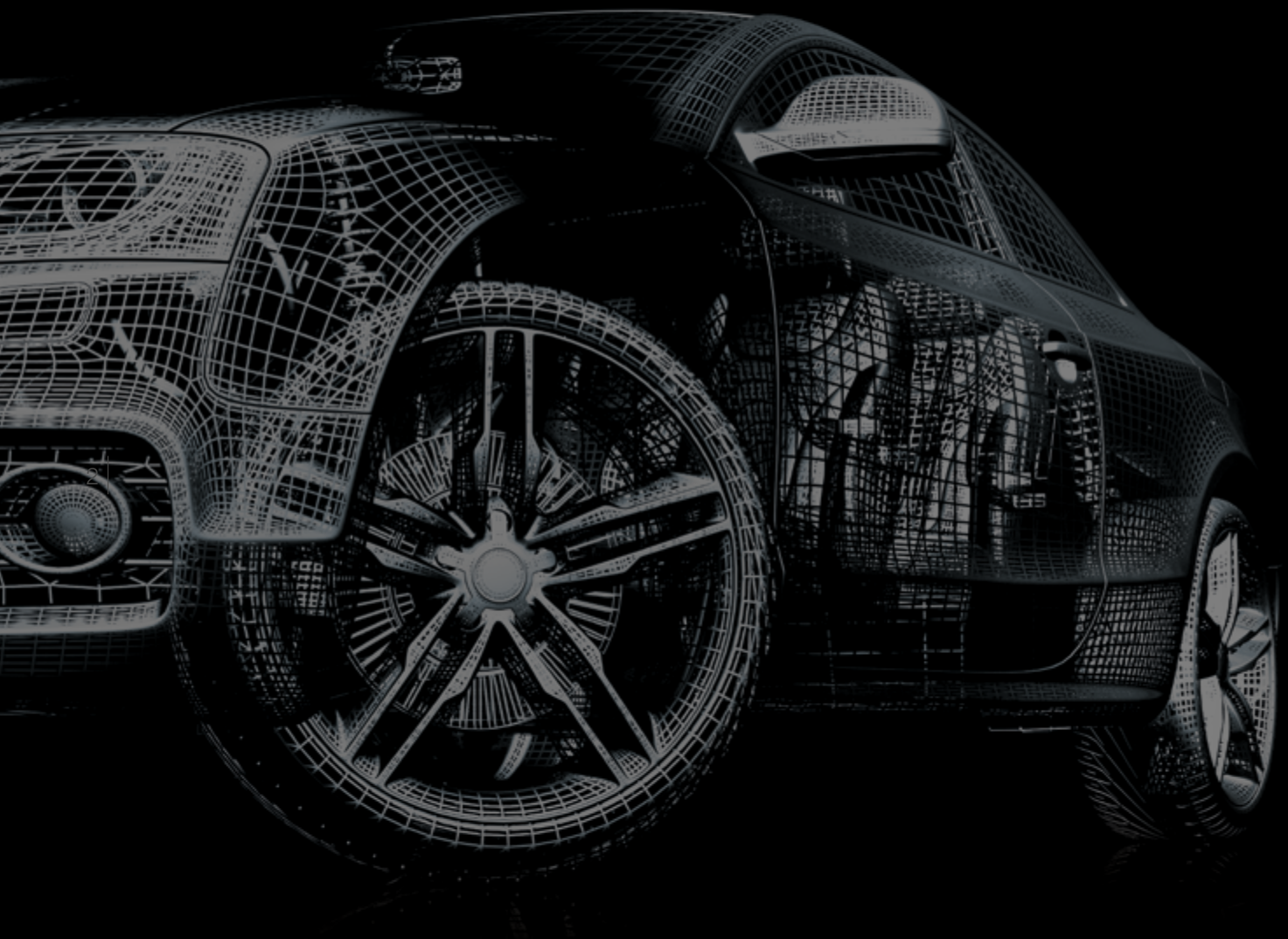
ACS

Angelantoni
MORE THAN YOU THINK

Automotive
test solutions

acstestchambers.com



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.

Automotive test solutions

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.
ACS offers a complete line of test equipment for the automotive industry, featuring advanced technical solutions to test and simulate all relevant climate, road and testing conditions, both for R&D applications and for the production & quality control of components and complete vehicles.

In the automotive industry standards are constantly being set higher and higher (reviewed and adjusted), all for the benefit of the consumer and the public at large, in order to meet the demands of new technological developments. ACS standard and customized products allow the simulation of the most diverse environmental test conditions for test repeatability, while providing the highest degree of accuracy.For over 50 years ACS has designed and manufactured test equipment for a variety of testing applications:

- Standard and Customized environmental test chambers for temperature, humidity, thermal shock, corrosion, vibrations, sand & dust, solar light testing
- Climatic Dyno chambers
- Engine Test benches
- 4 Poster Test chambers
- VT shed
- Climatic Wind Tunnels
- Airbag Test chambers
- Corrosion Test chambers
- Rain Test chambers
- Sand and Dust Test chambers
- Solar Test chambers
- Altitude chambers
- Calorimeters to test the efficiency of air conditioning systems
- Battery Test chambers
- Noxious Gas Test chambers
- Pedal Test chambers
- Vibration Test chambers
- Air Conditioning Units
- ATEX Test chambers
- Continuous ovens
- Fluid Dynamic Simulations
- Special Thermoregulation Units

Climatic Dyno Chambers

Climatic chambers coupled with rolling road dynamometers are manufactured by ACS in partnership with companies that are leaders in the technology of chassis dynamometers. This kind of climatic chambers allows testing of the efficiency of the engine compartment under climatic stress during typical cycles of a vehicle's working life according to international automotive standards. If an appropriate gas collection and analysis system is installed, the equipment can be used to perform emission tests according to standardized worldwide guidelines.
Dry air is blown into the chamber for the engine combustion. An air pressure regulation system provides the pressure balance of the exhaust gas in order to ensure the correct working of the engine. A wind simulation system following international standards for emission tests can be installed by ACS. Also a Sun Simulation system can be installed should combined tests have to be performed.

Engine Test Benches

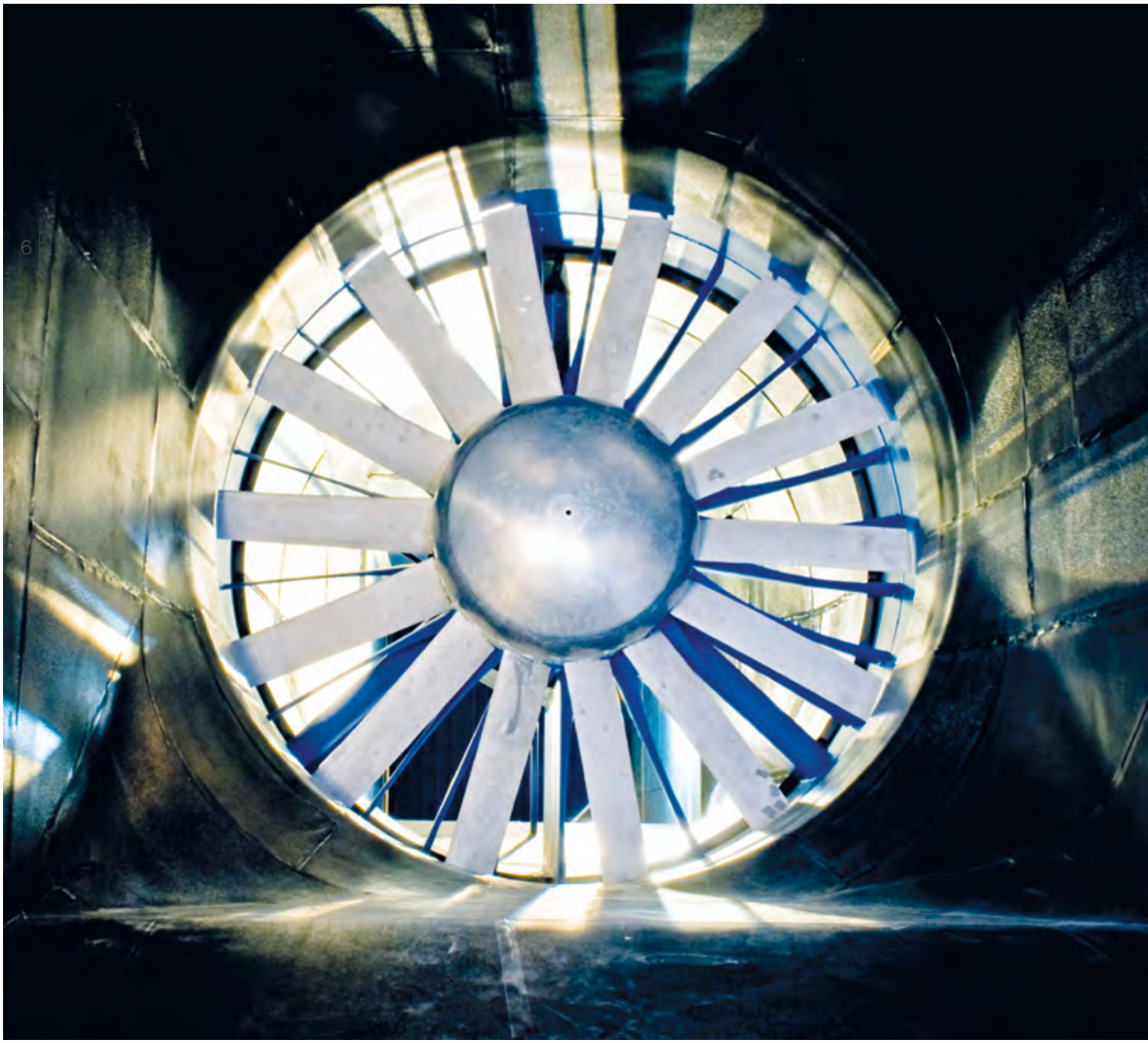
Testing engines under different temperature and humidity conditions is an important step for ensuring good performances of the complete vehicle.
The climatic chambers surrounding the device being tested accurately simulate the environmental conditions experienced around the world. With the ACS climatic chamber dedicated to this application, it is possible to run full dynamic and real-world testing under a wide range of climatic conditions. Altitude simulation can be combined on request.

4 Poster Test Chambers

ACS works in partnership with leading road simulation actuators manufacturers. The goal is to offer integrated systems for testing in a wide range of environmental conditions. Reliability and sturdiness characterize this product.
In case of challenging acoustic performances, technologically advanced noise absorption shells are applied inside the climatic chamber and special solutions are studied to reduce the noise of air circulation. Special solutions have also been engineered for the interface between the climatic chamber floor and the actuators to avoid the formation of condensation or ice. ACS also offers the possibility to install a Sun Simulation system inside the climatic road simulation chamber.

Climatic Wind Tunnels

Improving environmental sustainability, driver safety and comfort, fuel consumption. A Climatic Wind Tunnel is essential to accelerate the development phase and increase the vehicle's performances.
ACS Wind Tunnels can subject test vehicles to the most challenging weather conditions, simulating extreme temperatures, humidity, ice, rain, snow and sun radiation. Every part of the vehicle can be tested and stressed in a controlled environment to check its performance.
The use of a Climatic Wind Tunnel can shorten the lead time from the engineering of a product to its launch on the market.



VT Shed

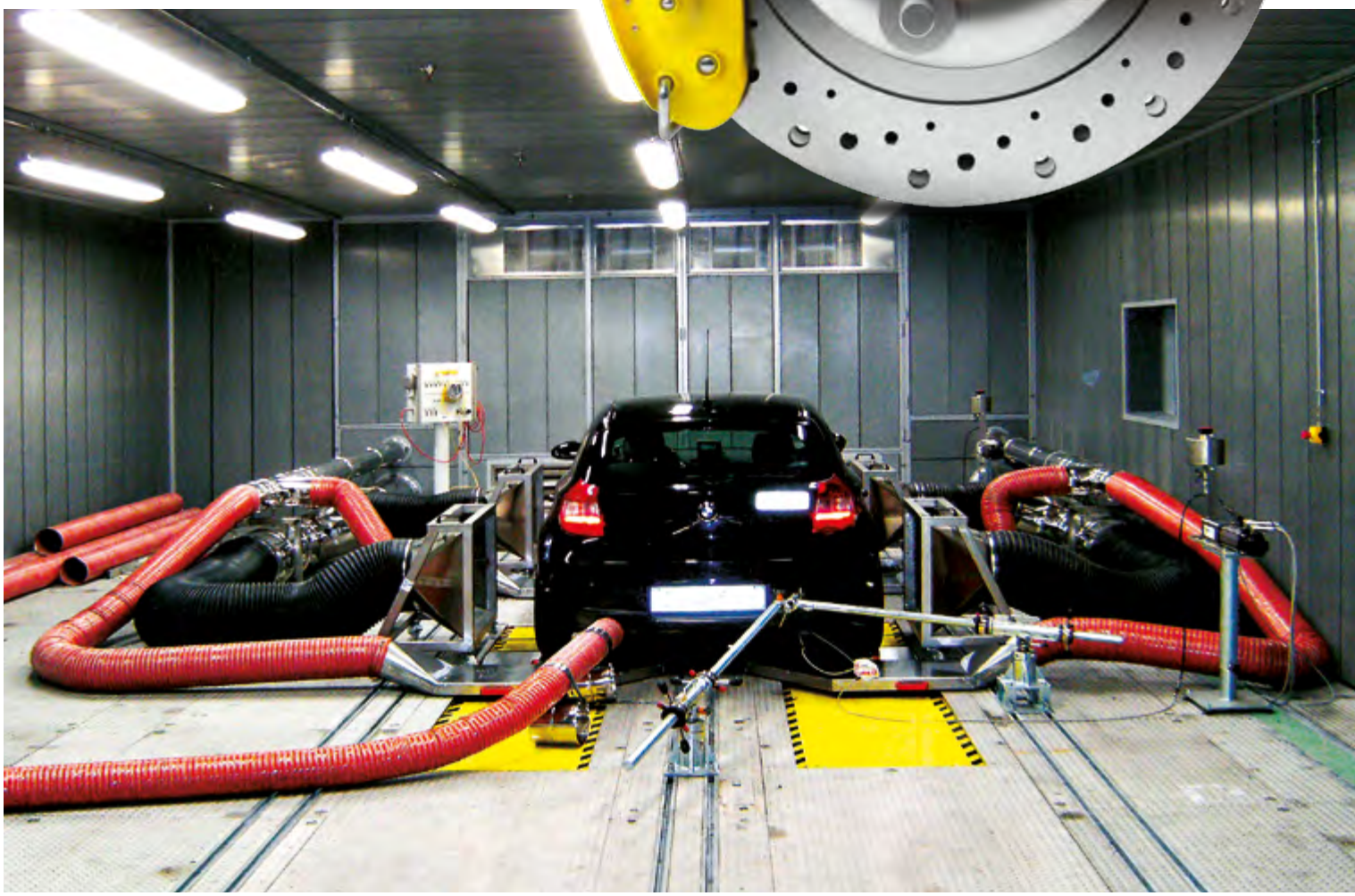
ACS VT Shed chambers are manufactured in partnership with specialized companies. They can be used for HC emission tests in vehicle tanks filled with fuel or other components in compliance with EPA, ECE regulations and others. Analyzers are certified by the producers. A special device for volume compensation is installed in the machine. High quality material is used inside the chamber to allow long term durability of the equipment without any corrosion issues.

Airbag Test Chamber

ACS chambers to test airbag systems are designed to carry out standard tests required by major regulations. By means of high speed cameras, every instant of the airbag deployment can be recorded.
The chamber can be equipped with a high speed opening and closing door system for quick deployment of the specimen on a dedicated frame. As an alternative, several windows can be installed on one side of the chamber and the high speed cameras can be installed right in front of them. Parameters of temperature and humidity are set inside the chamber to obtain the desired conditions.

Brake Test Chambers

Test chambers with chassis dyno can also be used to test brake noise and performance. In this case a special architecture must be realized in order to allow appropriate cooling of the braking system.
The temperature can be monitored in promixity to each wheel and dedicated filters are installed inside the air treatment unit to capture particles released from the brakes. A shell of sound adsorbing panels is installed inside the chamber to bring the noise to a very low level for appropriate measuring of noise made by the brakes.



Corrosion Test chambers

Corrosion tests are becoming increasingly more important in the characterization and approval of materials as well as in the investigation of damage causes.
ACS corrosion test chambers are designed to meet the requirements of all major international standard tests. The chamber is manufactured using materials that ensure a highly reliable and strong system. Quality, design and ergonomics make this a top class product in the market.
These chambers create a saline fog in the test volume so that parts exposed to it are subjected to severely corrosive conditions. It is possible to set testing parameters such as the pressure of the sprayed solution, concentration of the spraying solution, pH, air temperature, etc.
ACS has also designed a series of standard corrosion test chambers, named DCTC™ (Dry Corrosion Test Cabinets) able to highlight the corrosion processes on painted metallic surfaces in a fast and easily reproducible manner. The main technical features of DCTC chambers are: short time required for test execution, simulated corrosion exactly corresponding to the real corrosion observed “in the field”, repeatibility of tests conditions.
The DCTC™ systems can also perform standard continuous salt spray tests (according to ASTM and DIN) or alternate salt spray tests (DIN) and have also been customized to suit the specific needs of companies such as FIAT, FORD, NISSAN, RENAULT, GM. In addition, DCTC™ systems can be used to perform “wetting test”, SAE J2334 and VDA. Customized chambers can be designed to cover every testing requirement such as continuous salt spray or mist, test with condensation, humidity and modified tests.

Rain Test chambers

ACS designs and produces standard and customized equipment to carry out rain tests. Rain chambers are usually manufactured in AISI304 stainless steel or other corrosion resistant materials. The construction is strong to ensure high durability. These systems may be used to test properties of vehicle's parts in in terms of anti-wet and water resistance, following automaker's tests or electrical-enclosure tests. Design of the chamber can be customized based on the test required by customers, to include:

- Nozzle quantity and position
- Chamber dimensions
- Door size
- Rain or spray test

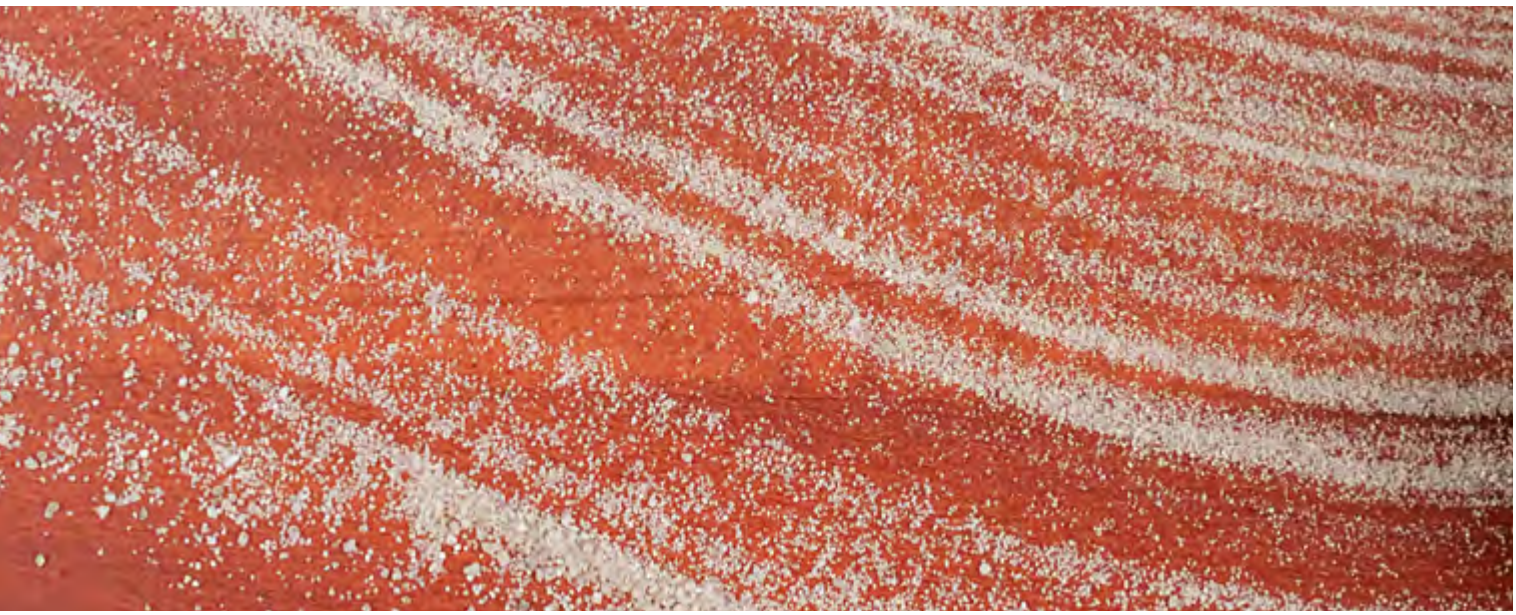
The water content inside the holding tank can be prepared to the desired temperature before starting the test.

ACS has designed also a standard rain test chamber of 1000 l capacity for testing the degree of protection against rain and sprays according to CEI EN 60529 STANDARD and CEI EN 60068-2-18 - IPX3 AND IPX4 protection classes. Options are available to comply also with IPX5-IPX6, IPX7 and IPX8 protection classes.

Sand and Dust Test chambers

To meet market needs, ACS designs and produces standard and customized equipment for conducting Sand and Dust tests which comply with all the principal international standards. ACS chambers can reproduce all the conditions specified in the standards requiring continuous ventilation (DIN 40046, MIL-STD 331 and MIL-STD 810 C), dust drop tests (DIN 40052), and tests with irregular whiff of compressed air (SAE J 575).
Standard Sand and Dust chambers are available in different 1000 l capacity models for conducting tests in compliance with:

- SAE J575, EN 60529 FIG. 2
- IEC/CEI EN 60068-2-68 (La2) NORMS – IP5X class of protection
- EN 60529 FIG. 2 – IEC/CEI EN 60068-2-68 (La2) NORMS – IP5X class of protection equipped with vacuum system for IP6X tests



Solar Test chambers

ACS standard and customized test chambers can be equipped with sun or IR simulation system for tests on materials, aging, air conditioning systems, emission test benches, etc.
The control software of the lighting system can be integrated in the control software of the climatic chamber.
Standard T & RH test chambers Discovery My can be equipped with lamps to perform a sun simulation test. The lamp structure is made of anodized aluminum, while the assembly components are of stainless steel.
The percentage of the lamp intensity can be changed using the touchscreen control panel. It takes approximately 3 minutes from the moment the lamp is turned on for it to reach the requested output.
A plug is provided for the inside of the chamber, which can be easily removed and/or installed so as to use the chamber in its standard configuration without the lamp.
The device is positioned on top of the chamber.
International standards such as DIN 75220 and others can be performed.

Altitude chambers

Climatic walk-in chambers can be combined with altitude simulation and fresh air introduction to allow the engine to be switched on. Combustion air can be regulated in humidity and temperature in order to have it at the same ambient conditions as the vehicle. The capacity of the fresh air and vacuum/exhaust system can be adjusted in order to be adapted to a wide range of engine sizes.

Battery Test chambers

By means of partnership with other companies, ACS can integrate battery life cycle testing and environmental chambers into complete and high efficiency systems that will support the entire battery development and testing process.
The climatic chamber can be equipped with a set of specific options depending on the kind of test and specimen.

Noxious Gas Test chambers

Creating an environment containing noxious gas (such as H2S, SO2, NO2…) inside a closed space is a significant challenge. ACS does this with the ADF GI series. A removable container with an airtight door is installed inside the test compartment, to be used exclusively for testing noxious gases.
The noxious gas system consists of:

- two-stage pressure reducer;
- gas flow meters;
- polluting atmosphere suction pump;
- asameter;
- pneumatic noxious gas intake valve;
- noxious gas abatement system with Drechsel bottles (supplied by the client).

Pedal Test chambers

Integration of a climatic chamber with an automatic moving system for pedals is possible. Special safety measurements are integrated to avoid risks related to the operator's exposure to moving parts and extreme temperatures.

Air Conditioning Units

Heating or cooling of independent boxes can be necessary in a laboratory for testing components that need to be fixed in a particular way or that cannot be moved inside a climatic chamber. ACS Air Conditioning Units can supply a flow of air with precisely regulated temperature and humidity in order to run such tests.

Vibration Test chambers

Climatic chambers can be interfaced with a wide range of shakers to obtain vertical or horizontal vibrations. These kind of chambers can provide useful volumes ranging from few liters to several cubic meters. Design can be fully customized in order to meet customer needs.
ACS has also developed a standard line of vibration test chambers characterized by a remarkable basic configuration, flexibility and easy adaptation to any shaker (lifting system). They are available in both thermostatic (T only) and climatic (T and RH) version, capacity of 600, 1200 and 2200 l.

ATEX Test chambers

The testing of devices that could create explosions must be carried out taking all precautions. ACS can produce chambers in which the useable space is created in an ambient classified following ATEX regulations. After accurate risk analysis, additional safety equipment can be installed in the chamber, such as internal emergency pushbutton, fire detection and suppression system, etc.

Calorimeters

Calorimetric test are important to certify the performance of a vehicle's air conditioning systems. This kind of machine is highly customized since the type of test depends on the kind of specimen and performance to be checked.
Extreme transient operating conditions to which conditioners are subjected can be tested by means of special customized tools.
The vast experience and know how acquired by ACS over the years allows these complex needs to be met, resulting in test benches that are in strict compliance with existing standards and regulations, including prototype equipment for cutting-edge experimentation.

Continuous ovens

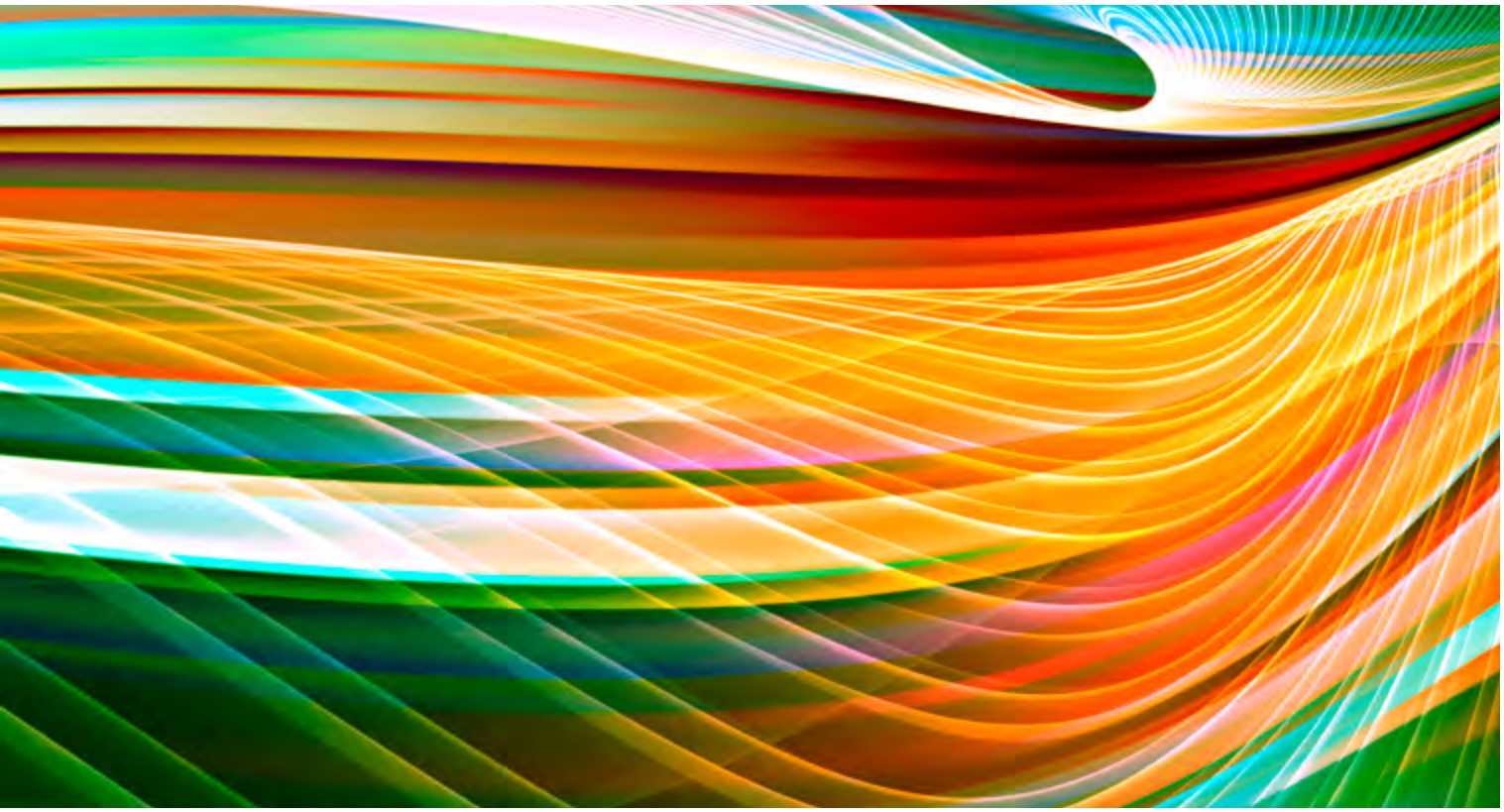
Continuous oven are used in quality assurance and testing, as is the case for some automotive sensors. ACS can provide a range of customized solutions and integrate them with a production or testing line.
These ovens allow an extremely uniform heating of the specimen and accurate temperature control. Fluidic simulation can be realized during the engineering phase in order to optimize air flows and temperature distribution.
Several cold and heat zones can be created inside the oven. Also transportation and loading/unloading systems can be integrated in the ACS solution.

Special Thermoregulation Units

ATT temperature control systems provide highly accurate and reproducible results. By means of a flow control valve and a flow meter, it is possible to regulate the flow rate value in a very precise way. A pressurized circuit up to 3 bar allows to reach temperatures up to 120°C. The unit is equipped with an automatic pressure system that keeps pressure almost steadily on the setpoint.

Fluid Dynamic Simulations

Fluid Dynamic Simulations can be realized in order to obtain the best air flow configuration inside the chambers.



Angelantoni Group.
Innovation to excel.

Angelantoni Group has always been a hub of innovation thanks to its collaboration with research institutes and universities, which has led to the design, manufacture, and marketing of state-of-the-art products in diverse application fields and the registration of a significant number of patents.

Since its beginning in 1932, numerous challenges have been met and won, with a focus on offering innovative solutions, providing customers with ingenious products and tailored services, and assisting them in the best way possible.

www.angelantoni.com

ENVIRONMENTAL TESTING

Since its launch on the market in 1952, the ACS brand has had a mission: to be at the forefront of environmental testing technology.

Flower®: the ecological environmental test chamber.

Energy savings of up to 70% without affecting performance.
An energy consumption reduction of around 70% is possible during the stabilization phases thanks to a unique patented system consisting of an inverter, which controls the compressor speed and allows the adaptation of the compressor power to different working needs, and a “cold sink” that increases the cooling efficiency.

MyKratos™ Control System

ACS was the first to launch on the market an environmental test chamber capable of meeting the new demands of the Industrial Internet of Things and Industry 4.0 for integrated, interconnected, and communicating machines. Thanks to the embedded MyKratos™ software, test chambers can be managed, monitored, and serviced from any place at any time, using mobile or desktop devices, via Wi-Fi, Ethernet, or mobile networks.
MyKratos™ is the first control system based on a new philosophy: it is an all-in-one software package, combining all functions within a single application. No additional hardware or software is required.
MyKratos™ is the first control system allowing customers to fully manage the chamber via mobile devices using a free app (available from Google Play and Apple Store). MyKratos™ includes the MyAngel24™ remote assistance system - activated on demand - enabling remote access of the operator interface via PIN and the sending of SMS notifications. Thanks to MyAngel24™, the chamber stays connected to the remote server round the clock, 24/7, monitoring running conditions in order to guarantee faster and more efficient service and maintenance activities.

Also worthy of note are a number of other innovative ACS products of outstanding technological complexity, such as:

- calorimeters for testing the energy efficiency of air conditioners in the household appliance and automobile sectors;
- high-vacuum chambers for tests on satellites and satellite parts;
- HALT/HASS test chambers for the accelerated stress test to verify component reliability.

BIOMEDICAL FIELD

Angelantoni Life Science (ALS) research has led to the development of unique, high-tech biomedical equipment such as Hemosafe®, a computerized refrigerated blood bank for storing and distributing bags of packed red blood cells, and Smartfreezer®, a robotized biorepository with storage in liquid nitrogen vapor at -180°C.

CLEAN TECHNOLOGIES

Angelantoni CleanTech (ACT)’s most important achievement is the development of a patented, technologically advanced system, called Turboalgor®, whose aim is to improve the efficiency of old and new compression refrigeration systems by introducing an energy recovery heat exchanger and and a turbocharger, derived from the automotive industry, into a conventional refrigeration plant. Turboalgor® produces energy savings up to 23% in comparison with existing systems and cooling power increase up to more than 50%, depending on the operating conditions of the plant.

RENEWABLE ENERGIES

Archimede Solar Energy (ASE) is the world’s sole producer of patented molten salt solar receiver tubes, developed in collaboration with ENEA (Italy’s National Research Center for Renewable Energies) after 6 years of joint R&D.

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.

ENVIROMENTAL SYSTEM CERTIFICATION DNV·GL ISO 14001

QUALITY SYSTEM CERTIFICATION DNV·GL ISO 9001

Angelantoni Test Technologies
Località Cimacolle, 464
06056 Massa Martana (Pg) - Italy
Tel. +39 075.89551 (a.r.)
Fax +39 075 8955200
info@acstestchambers.it

EN

Angelantoni
MORE THAN YOU THINK

Subsidiaries
Ofterdingen, GERMANY
info@att-umweltsimulation.de

Noida, INDIA
info@attindia.in

Beijing, P.R. CHINA
info@attasiapacific.com

ACS

Angelantoni Test Technologies
Loc. Cimacolle, 464 - 06056 Massa Martana (Pg) - Italy
Tel. +39 075.89551 (a.r.) - Fax +39 075 8955200
info@acstestchambers.it

www.att-testing.com
www.acstestchambers.com