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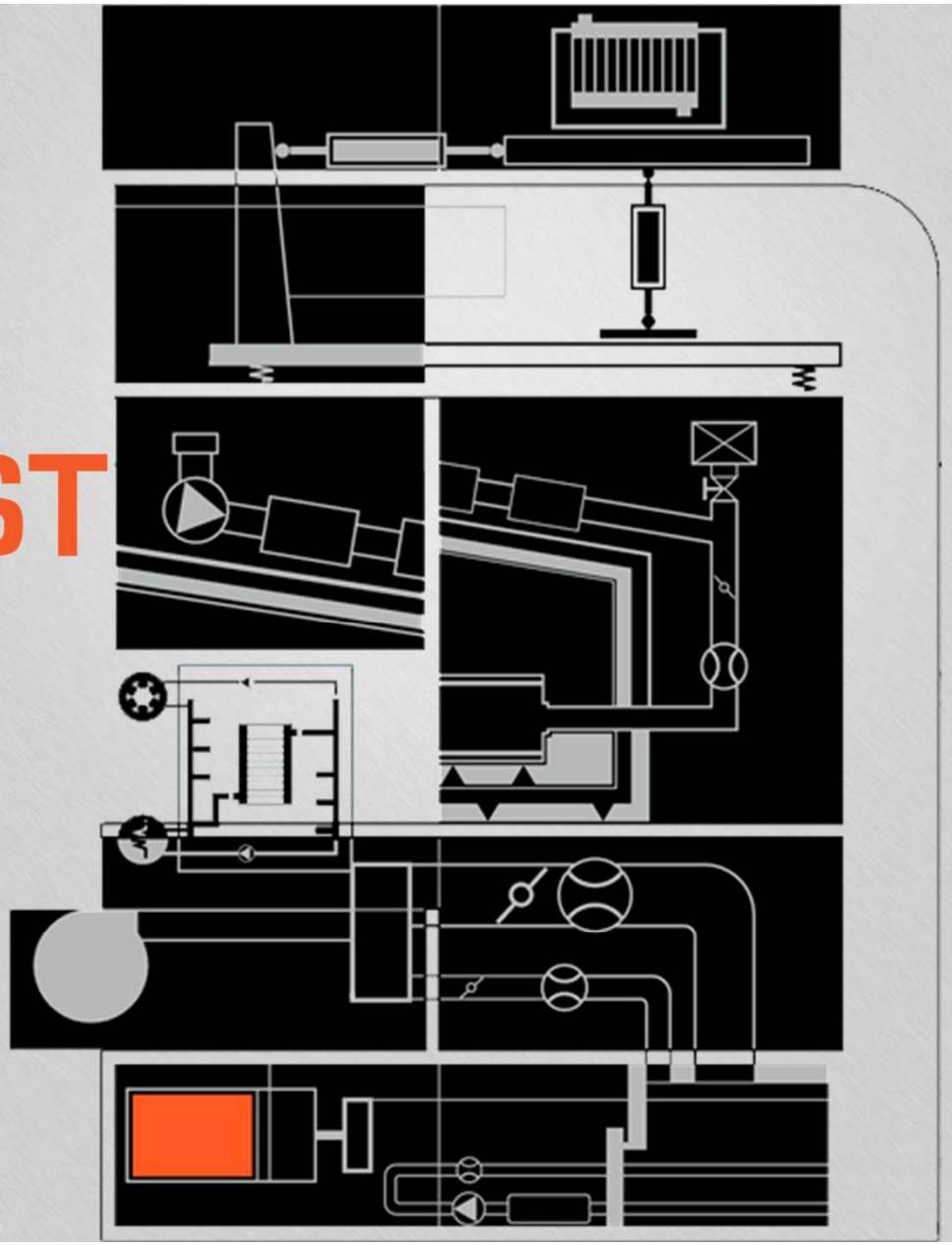

Catalogue 2014

SCOPE

- Why we are different
- Testing in samarTEST
- Test bench technical data briefing
- Test Bench
- External collaborations
- Working with International Standards
- Location and contact information

WHY WE ARE DIFFERENT

samarTEST is an independent Testing Laboratory for the integrate support to the clients in Quality and Testing areas. We do not limit to the standard tests and can offer a high-level personalized assistance, involving the last scientific advances due to our collaborations with University of Barcelona (UB), Polytechnic University of Catalunya (UPC) and independent highly-qualified professionals.

We dispose of the qualified human team and the advanced facilities with capability to perform:

1) **Functional tests for** automotive **air-conditioning products and motor-cooling** in the same way as industrial applications where thermal exchanges between fluids occurs (exchangers, radiators, charge air cooler, condenser, evaporator, heater core…)
2) **Functional tests for pipes and hoses** used in automotive, railways and aeronautics.
3) **Climatic tests** (temperature, humidity). For some range, the combination with pressure it is possible.
4) **Thermal shock testing**.
5) **Pulsating pressure**.
6) **Mechanical testing** like compression, tracking, bounding, etc.

WHY WE ARE DIFFERENT

9) **Corrosion,** corrosion chambers with NaCl and personalized atmosphere, and study of corrosion.

10) **Insulation resistance testing** till 25 kV.

11) **Chemical testing** according to AEC-Q200 Rev D: Resistance to solvents and more.

12) **Material testing**: Scanning Electronic Microscopy, Transmission Electronic Microscopy, Infrared Microscopy, XRAY studies (Fluorescence of X-Rays and X-ray Diffraction, ICP., and many others). Identification of materials.

13) **Special tests used in automotive industry**: pressure cooking test and more.

14) **Electrical measurements and testing in charge** (Operational life, Biased Humidity in charge, etc.)

15) **Programs of investigation** to resolve a quality problems of real products.

16) **Consultancy facilities**: elaboration of product qualification program, searching of related standards for product or related with some quality problems, etc.

17) **Quality System Management assistance**: elaboration of normalized work procedures, of Quality Manual, internal/external audits, quality statistics etc.

18) **Assistance in Environmental Audit and Certification**: identification of environmental vectors, management of recourses, management of wastes, Audits (internal and external), registers of data, Environmental Manual, elaboration of procedures etc.)

Testing of devices as fans, engine covers, electromotors and commands is also available.

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WHY WE ARE DIFFERENT

samarTEST works according to the **ISO-17025 Standard: General requirements for the competence of testing and calibration laboratories**

TESTING IN samarTEST

VALIDATION PLAN REQUIREMENT

COMPLETE COMPONENT VALIDATION

CHEMICAL

- Internal cleanliness
- Dryness
- Appraisals
- SEM
- TEM
- FTIR
- Identification of substance
- X-RAY: diffraction, fluorescence, transmissions
- Chemical resistance
- Personalized test

PERFORMANCE

- Radiator
- CAC
- Fan
- Condenser
- HVAC
- Evaporator

CORROSION

- SWAAT
- Salt spray
- Personalized corrosion atmosphere
- OY Test
- Internal corrosion

DURABILITY

- Pressure cycle
- Thermal cycle
- Climatic Test
- Combined Tests (P, T, RH)
- Others

METALLOGRAPHIC

- Failure analysis
- Corrosion analysis (Gumble)
- Brazing, joints, plastics cutting
- Microscopic analysis and contaminants identifications
- Analysis of quality of soldering

COMPLETE VALIDATION PLAN UNIFIED REPORTING

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TEST BENCH TECHNICAL DATA BRIEFING

TEST BENCH	APPLICATION	CONTROL PARAMETERS
COOLING PERFORMANCES		
BR1. Radiator or condenser (air)	Radiator Condenser	From RT to 70ºC Flow-rate: from 0,053 to 4 kg/s Pressure from 0 to 2500 Pa
BR1. Radiator or condenser (liquid)	Radiator Condenser	Temperature: up to 100ºC Flow-rate: from 0,14 to 5,66 l/s Pressure: from 0 to 0,2 MPa
BR1. Chargecooler (air)	Chargecooler Modules with recycling air	Pressure: up to 3 bar Flow-rate: up to 0,3 kg/s Temperature: up to 250ºC
ENDURANCES TEST		
3 axes hydraulic shaker Deima (+ climate)	Modules Radiators Condensers ...	Frequency: from 4 to 90 Hz Accelerations: up to 10g Testing mass: up to 100kg Displacement: ±50mm

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TEST BENCH TECHNICAL DATA BRIEFING

TEST BENCH	APPLICATION	CONTROL PARAMETERS
ENDURANCES TEST		
Climatic chambers	All products	Temperature: from -60ºC to 150ºC Relative Humidity: from 10% to 95%
Pressure pulse (liquid)	Radiator Heater core	Pressure: up to 3 bar Temperature: up to 140ºC
Pressure pulse hydraulic 1 (liquid)	Heater core	Pressure: up to 10 bar Temperature: up to 145ºC
Pressure pulse hydraulic 2 (liquid)	Condenser Evaporator	Pressure: up to 80 bars Temperature: up to 100ºC
Pressure pulse (air)	Chargecooler	Pressure_ up to 2,5 bar Temperature: up to 200ºC
Thermal shock (liquid)	Radiator Heater core	Temperature: -30ºC to 130ºC Flow-rate: until 9000 l/h
Thermal shock (air)	Chargecooler	Pressure: up to 2,2 bar Temperature: RT to 250ºC

TEST BENCH TECHNICAL DATA BRIEFING

TEST BENCH	APPLICATION	CONTROL PARAMETERS
CLIMA PERFORMANCES		
Dynamic climatic chamber	HVAC units Evaporator Complete AC Systems	Temperature: from -20°C to 60°C Humidity: 5% to 95% HR Flow-rate: 0,04 to 1600 m^3/h Pressure: -1000 to 1000 Pa
OTHERS PERFORMANCES		
Electromotor performances	Electromotor	Revolutions: up to 8000 rpm Force: up to 2,4Nm Currents: up to 100A
Leakage test bench	Radiator Charge air cooler Condenser Evaporator Heater core	Pressure: up to 6 bar

DESCRIPTION OF SOME TEST BENCH

BC2. DYNAMIC CLIMATIC CHAMBER (KK83)

Technical data	
Temperature range	-20 to 60 ºC
Dew Point Temperature	-20 to 60ºC
Airflow rate	0,04 to 1600 m^3/h Up to 0,54 kg/s
Pressure Range	± 1500 Pa

Requirements
Power (380V 50Hz 71kW)
Compressed air
Water supply
Cooling Tower

Dimensions (L/W/H)
6000 x 3000 x 2000 mm

DESCRIPTION OF SOME TEST BENCH

BR1. COOLING PERFORMANCES (KUE85)

Requirements
Power (380V 50Hz 50kW)
Compressed air

Dimensions (L/W/H)
4000 x 2000 x 2000 mm (Test Bench)
3500 x 2500 x 2000 mm (Hydraulic group)

Technical data

	AIR	LIQUID
Inlet temperature	RT to 50°C	Up to 100°C
Mass-flow	0,053 to 4 kg/s	0,14 to 5,66 l/s
Differential pressure	0 to 2500 Pa	0 to 0,2MPa

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DESCRIPTION OF SOME TEST BENCH

Evaporators Test Unit (UPE)

Technical data

Evaporator pressure range	0 to 4 bar
Condenser pressure range	13 to 22 bar
Flow rate	1 to 4 kg/min
Compressor	0 to 5000 rpm

Requirements

Power (380V 50Hz 15kW)
Cooling tower

Dimensions (L/W/H)

600 x 1500 x 2300 mm

Applications

Measurement of evaporators performance in combination with Dynamic Climatic Chamber BC2.

DESCRIPTION OF SOME TEST BENCH

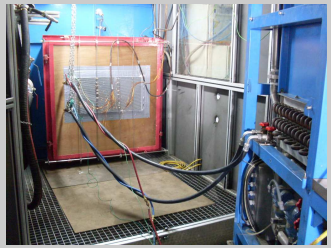
Condensers Test Unit (UPC)

Technical data

Evaporator pressure range	0 to 4 bar
Condenser pressure range	13 to 25 bar
Flow rate	1 to 4 kg/min
Compressor	0 to 5000 rpm
Refrigerants	R134a, R1234yf, R410a, R407c, R404a, R507a…

Applications

Measurement of condensers performance in combination with BR1 (Cooling performance).



Dimensions (L/W/H)

1900 x 1100 x 2400 mm

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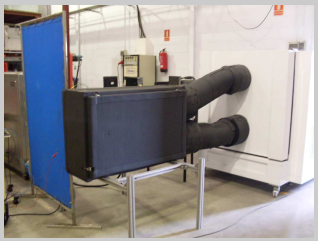
DESCRIPTION OF SOME TEST BENCH

Generator of Heat and Cold and Climatic Chamber (GCF-I)



It is possible to construct a chamber facility according to client necessities

Technical data

Max. Temperature	150 ºC
Min. Temperature	-70 ºC
Chamber capacity	1000 litters
Humidity range	10% to 95% RH
Power (H/C)	7,5 / 3 kW

Applications

Climatic test
Test where can be combined with circulation inside the heater or command efforts

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DESCRIPTION OF SOME TEST BENCH

Impulse and Circulation Bench Hydraulic, MAPRO1 & MAPRO2

Technical data		
	MAPRO 1	MAPRO 2
Fluid	Glycol	Oil
Max. Pressure	10 bar	80 bar
Max. Temperature	145 °C	100 °C
Max. Frequency	3 Hz	3 Hz
Flow rate	10 l/min	2 l/min
Max. No. of specimen	8	4
Heat power	24 kW	2 kW
Applications	Radiators and heater core	Condenser and evaporator

Applications
Endurance test to the pulsating pressure

DESCRIPTION OF SOME TEST BENCH

Liquid Pulsating Pressure

Technical data	
Max. No. specimens	4
Max. Pressure	4 bar
Change pressure freq.	1 - 5 Hz
Max. Flow	1500 l/h
Max. Temperature	130 °C
Heat Power	9 kW

Applications
Endurance test of pulsating pressure of radiators and heater core

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DESCRIPTION OF SOME TEST BENCH

Chargecoolers Pulsating Pressure

Technical data	
Max. No. specimens	4
Temperature air inlet	Up to 200ºC
Pressure	0 to 2,5 bar g.
Chamber temperature	Up to 130ºC
Frequency Range	Max. 0,5 Hz = 30 cycles/min.
Performance system	Control by valves
Control System	by Ineltec
Max. Temperature	Up to 250ºC
Max. frequency	1 Hz

Applications
Endurance test of pulsating pressure of radiators and heater core. Leakage test included (air)
Pulsating test in heat exchangers with compressed air

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DESCRIPTION OF SOME TEST BENCH

Hydraulic Burst Test Bench

Technical data	
Max. Pressure	150 bar
Max. No. specimens	2

Requirements
Power (230V 50Hz)

Dimensions (L/W/H)
450 x 600 x 2000 mm

Applications
Burst test
The surveillance system memorises the pressure of burst and the time that has passed since the start of the test

DESCRIPTION OF SOME TEST BENCH

Air Thermal Shock (XTA-IV)

Technical data

Max. Temperature	250 ºC
Min. Temperature	Room Temperature
Pressure	Up to 2,2 bar
Max. Charge Air flow	0,235 kg/s
Max. Fan Flow	4000 m3/h
Max. Frequency	1 cycle/minute

Applications

Thermal shock test in heat exchanger with compressed air

DESCRIPTION OF SOME TEST BENCH

Liquid Thermal Shock (XTL-IV)

Technical data

Max. Temperature hot loop	130 ºC
Min. Temperature cold loop	-40 ºC
Max. flow	9 m^3/h
Max. Pressure	3 bar
Max. No. of specimens	4
Max. gradient temperature	30ºK/s

Applications

Thermal shock test for radiators and heater cores

DESCRIPTION OF SOME TEST BENCH

Erosion Test Bench

Technical data

Max. Flow	12 m^3/h
Max. Pressure	1,5 bar
Max. No. specimens	4
Heat Power	12 kW

Requirements

Power (380V 50Hz 12kW)

Dimensions (L/W/H)

900 x 1500 x 3000 mm

Applications

Endurance and internal erosion for continuous liquid circulation

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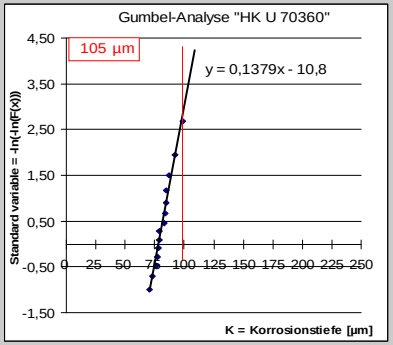
DESCRIPTION OF SOME TEST BENCH

Internal Corrosion Test Bench



Corrosive solution	0Y solution PH 3 [NaCl: 0.2244 g/L, Na_2SO_4: 0.0888 g/L, $CuCl_2 \cdot 2H_2O$: 0.00265 g/L, $FeCl_3 \cdot 6H_2O$: 0.1453 g/L] (Cl^-: 194.6 PPM, SO_4^{2-}: 60 PPM, Cu^{2+}: 1 PPM, Fe^{3+}: 30 PPM)
1 cycle	1) 88±3°C × 8 h (amount of circulating water: 40 L/min.) 2) Room temperature × 16 h (amount of circulating water: 0 L/min.)
Test device	

Engine body	Cast steel block
Pipe	Hose section: EPDM, Elbow brake: SUS304 for standard piping
Radiator	Radiator to be tested (Al)
Flowmeter	SUS
Corrosive solution tank	SUS
Heater core	Copper

Applications

Heat exchangers internal corrosion and erosion tests

After test: tightness and pitting corrosion evaluation (Gumble)

DESCRIPTION OF SOME TEST BENCH

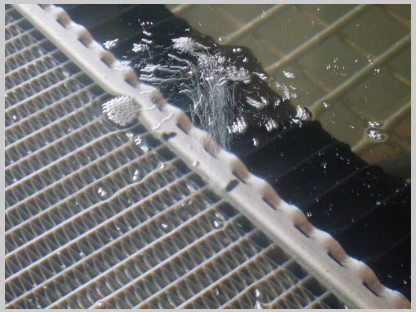
Leakage test bench

Technical data

Max. Pressure	6 bar
Detection of leaks	Visually
Container fluid	Water

Applications

Checking the tightness of heat exchangers and other components



DESCRIPTION OF SOME TEST BENCH

Electromotors Performance Bench

Technical data

Max. Voltage	30 V
Max. Torque	2,4 Nm
Max. Intensity	100 A
Max. rpm	8000 rpm

Applications

Characteristic curve of direct current electromotors:

- *Supply Voltage, intensity, torque, rpm*

Constant Torque Test

Constant Supply Voltage Test

Dimensions (L/W/H)

650 x 450 x 1100 mm

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DESCRIPTION OF SOME TEST BENCH

DO YOU NEED MORE TOOLS? ANOTHER SPECIFIC TEST?

DO NOT HESITATE TO ASK US ABOUT!

In samarTEST, we have experience in testing sector. We have an experienced team and high-qualified collaborators that could find the solution you need.

EXTERNAL COLABORATIONS

In order to provide to our clients the service based on the last achievements of science and technology, samarTEST collaborates actively with **Universities** and **highly-qualified independent professionals**. The main branches collaborations with Universities are:

UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

WE EXPAND CONSTANTLY OUR NET OF COLLABORATORS TO PROVIDE THE ADVANCED LEVEL OF OUR WORK

WORKING WITH INTERNATIONAL STANDARDS

samarTEST have more than 1200 different assay and quality standards, such as:

- MIL-STD
- UNE-EN
- IPC
- JEDEC
- ISO
- British Standards
- ASTM
- JIS
- SAE

And also, a wide number of special standards for Automotive applications, as various from:

- BMW
- FIAT
- Ford
- General Motors
- Iveco
- John Deere
- Mazda
- Mercedes
- Nissan
- Paccar
- PSA
- Renault
- Jaguar
- Land Rover
- Volkswagen

LOCATION AND CONTACT INFORMATION

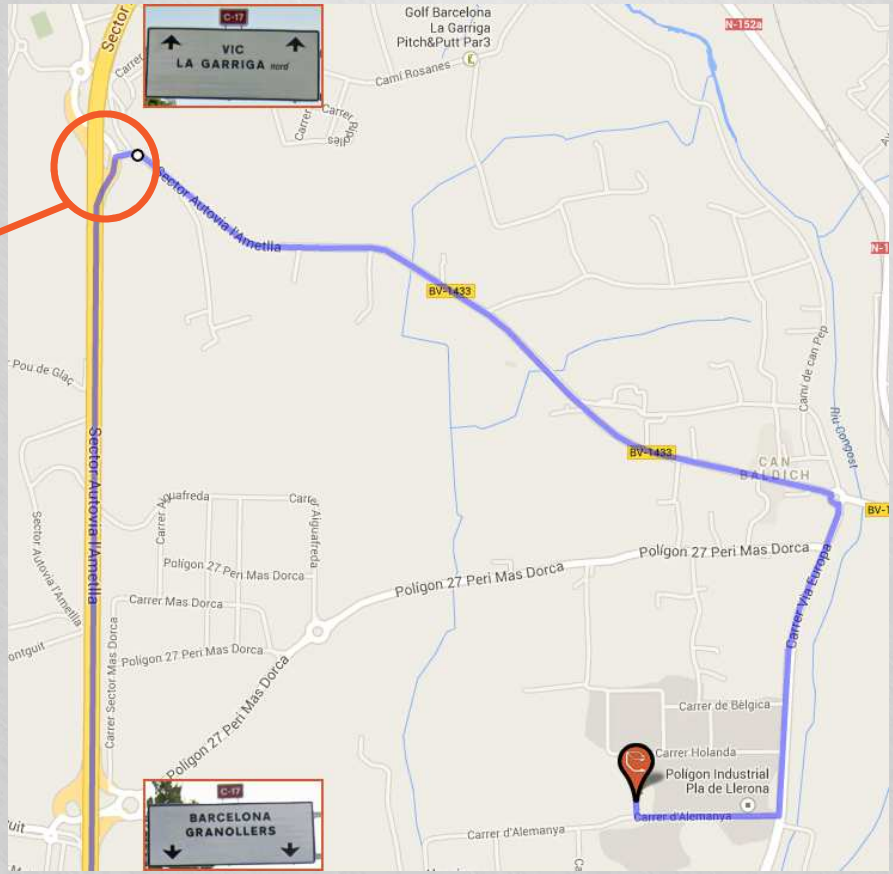
Location

C/ Suècia, nau 1, Pol. Ind. Pla de Llerona

Les Franqueses del Vallès, 08520, Barcelona

Catalonia, Spain

C17-EXIT



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