UV BOX

UV TESTER FOR UV-CONDENSATION ACCELERATION AGING TESTS

UV BOX simulates the effects of sunlight with ultraviolet rays using UV fluorescent lamps and also reproduces dew and rain using moisture condensation and water spray

- **New compact and functional design**
- **High connectivity 4.0**
- **Customizable sample holder**

CO.FO.ME.GRA. Via L. Zuccoli 18, 20125 MILANO – Tel. +39–02-67072112 Fax +39-02-6691270

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The accelerated UV aging test reproduces the damage caused by **sunlight**, **rain** and **dew**. In a few days or weeks of exposure of the samples inside the UV BOX, damages occurring in months or years of outdoor exposure can be reproduced.

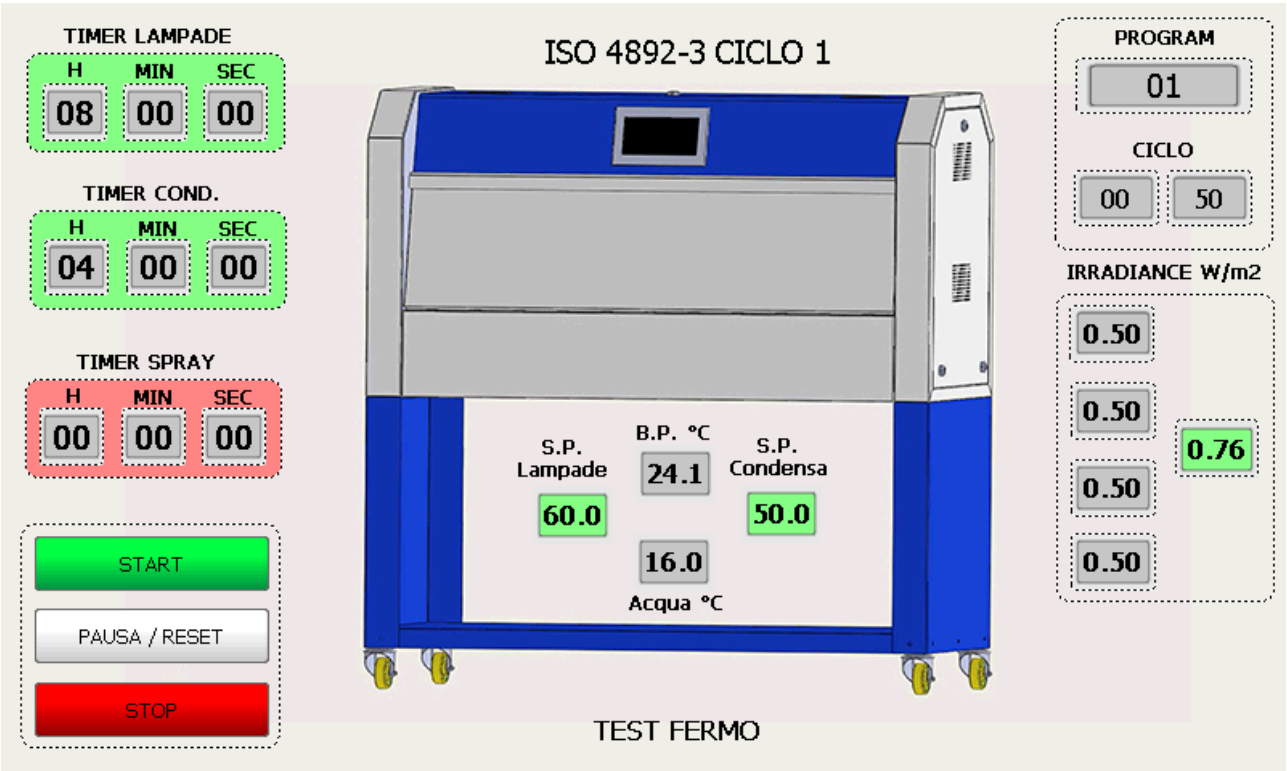
To simulate aging due to external atmospheric agents, UV BOX subjects the materials to alternating cycles of UV radiation and humidity at controlled high temperatures. The instrument simulates the effects of sunlight through the use of special **UV fluorescent lamps** and the simulation of the effect of dew and rain occurs through condensation or a spray of water (**Spray** option).

UV radiation is responsible for almost all the processes of photo degradation of durable materials exposed to the external environment. The fluorescent lamps used in the UV BOX simulate critical UV short waves and realistically reproduce the damage caused by sunlight. The types of damage that can be simulated with the UV BOX are the following: color change, loss of gloss, chalking, cracking, cracks, blistering, veiling, brittleness, loss of strength and oxidation.

Dew is mainly responsible for most of the moisture that occurs during outdoor exposure, much more than rain. The condensation system of the UV BOX realistically simulates dew and amplifies its effect through the use of high temperatures.

The condensation process automatically purifies the network water used in the system. This is because the process of evaporation and condensation of water on samples is actually a distillation process, which allows to remove all impurities.

UV BOX can accommodate up to **48 standard samples** (75mm x 150mm) and it is possible to create special sample holders according to customer specifications.

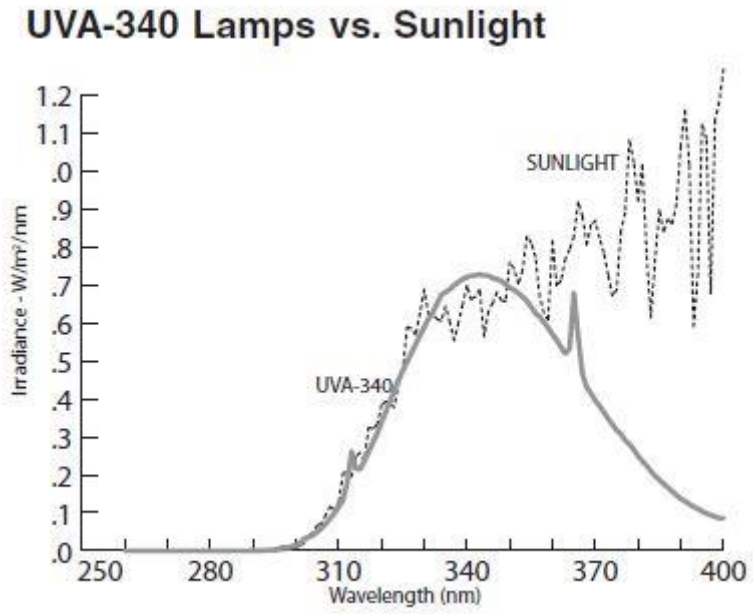


UV lamps

UV fluorescent lamps are more stable than other types of lamps, including xenon arc lamps. The spectral distribution (SPD) is not changed with the aging of the lamp, even after thousands of hours of operation, and this feature involves in more reproducible results, less frequent lamp replacements and a reduction in operating costs.

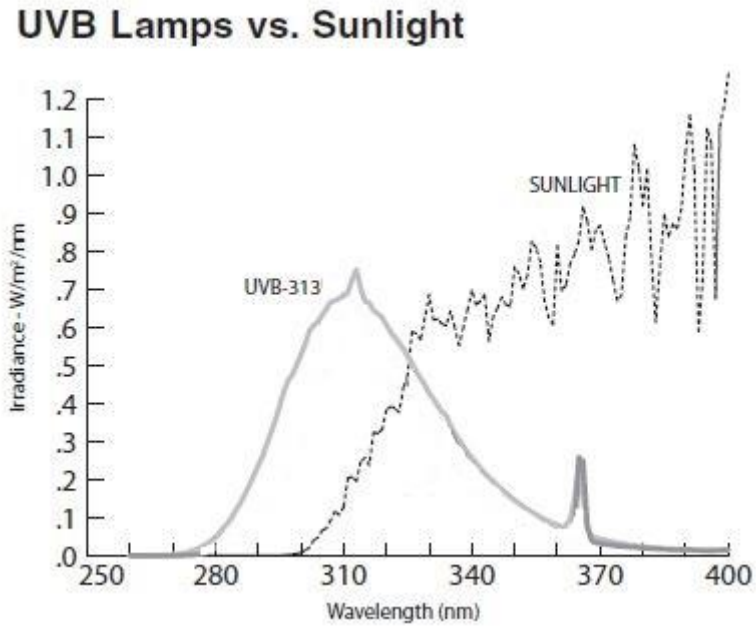
Lamps UVA-340:

UVA-340 lamps offer the best simulation of sunlight in the critical wavelength region from 365 nm up to the solar cut-off value of 295 nm.



Lamps UVB-313:

UVB-313 lamps maximize acceleration through the use of the most aggressive UV short waves compared to those normally arriving on the earth's surface. As a result, for some materials these lamps can produce too severe and unrealistic results.



UV BOX meets a wide range of international and industry specifications, ensuring the reliability and reproducibility of the tests.

Technical data

Model UV BOX – Enhanced	
Electrical requirements	
Mains voltage	230 Vac 10%, 50/60 Hz.
Mains connection	1/N/PE
Current consumption	10 A (max.)
Measures and weight	
Dimensions (WxDxH)	1300 x 700 x 1500 mm.
Weight	120 Kg.
Standard Specimen Capacity	48
Features	
Lamp UV (UVA or UVB)	8
Adjustment and control of irradiance level	yes
Display of current irradiance level	yes
Irradiance:	min 0.35 W/m^2 (UVA, UVB) – max 1.55 W/m^2 (UVA) - 1.23 W/m^2 (UVB)
BPT black panel temperature range	Stage UV 35-80°C – stage condensation 35-60°C
Microprocessor control	yes
Control panel touch screen	yes
Test report	yes
Storing various test conditions, free programming of tests standards	yes
Calibration sensor program	yes
Connectivity	Ethernet yes – WiFi optional
Water for condensation stage	Pressure 2-3 bar – water demineralized recommended
Water for spray stage (optional)	Pressure 2-6 bar – conductivity <5µS/cm
Standard	ASTM D4329, D4587, D4799, D5208, D6662, G53, G154, G151 ISO 4892-3, 11507, 11895, 11997-2, 16474-3 EN 927-6, 1297, 12224, 13523-10, 1898, pr 1062-4 SAE J2020 – AATCC TM186

Other products

Vertical Corrosionbox

Rectangular Corrosionbox H

Solarbox tabletop Xenon tester

Solarbox Xenon tester with RH

We reserve the right to make changes to equipment and systems in line with technological advances and change the parameters accordingly.

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CORROSIONBOX H

Horizontal test chambers with clear cover for salt spray, condensation tests and cyclic corrosion tests.

Available in 4 models: 600 and 1000 litres, basic and enhanced.

Customers often ask not only for a corrosion test chamber, but for a chamber suitable to their requirements.
For this reason CO.FO.ME.GRA. is now introducing a new line of horizontal chambers which, together with vertical Corrosionbox models, represents a wide and complete range of solutions for customer needs.

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Corrosionbox improves comparison with outdoor results

Worldwide, materials used by manufacturing industry are exposed to natural or industrial corrosion in shape of salt fog, humidity, smoke and vehicle exhaust. Laboratory corrosion tests are used extensively for selection of materials and their surface protection.
Corrosionbox chambers are what you need to predict corrosion resistance of materials such as paints and coatings.

National and international Standards

In order to generate reliable and comparable results, a large number of test methods and international standards have been developed and are relied upon as reference for test execution.
Most popular tests:

Basic models				Enhanced models
50180 method A1/A2/A3 AS 2331 method 3 ASTM B117 ASTM B287 ASTM B368 ASTM D1735 ASTM D2247 ASTM G43 ASTM G85 A1/ A3 BS 3900/F12 BS 3900/F4 BS 3900/F9 BS 5466 Part 1/2/3	BS 7479 BS EN 60068-2-11 BS EN ISO 7253 BS 2011 Part 2.1 D17 1058 DEF 1053 METH 24/36 EF 1053 METH 36 DIN 40046 DIN 50 017-KK DIN 50021 DIN 50907 DIN 50958 DIN 53167	DIN 55991 ECCA T8 FLTM BI 103-01 GM4298P GM4465P IEC 68-2-11 JIS H 8502 Meth1/2/3 JIS Z 2371 JNS 30.16.03 ISO 11503 ISO 1456 ISO 3231	ISO 3768 ISO 3769 ISO 3770 ISO 4541 ISO 7253 ISO 9227 MIL-STD-202 NFT 30-077 NFX 41-002 RES.30.CT.117 SIS 184 190 VG 95 210	*In addition to those of basic models:* **DRY** MIL-STD-810 UNI 9399 UNI 9590 UNICHIM 652 UNICHIM 741 **PROHESION** ASTM G85 /A5

Salt spray test

A corrosive solution is turned into a vapour mist through a nozzle located in the centre of the chamber. A fog diffusing tower distributes the fog over the entire test zone. The compressed air required for fog production is heated and saturated with moisture in a pressurized humidifier before it reaches the nozzle.
One or more heating elements, depending on chamber capacity, ensure uniform temperature in the test chamber. Exhaust solution collected in the bottom of test chamber is drained away through a drain to the floor.
Salt spray test can be executed with all chamber models.

Condensation water test

Test chamber bottom is filled with demineralised water. Water is heated and evaporates condensing on the surface of samples. Chamber temperature is 40 °C.
Continuous condensation test can be executed with all chamber models.

Cyclic corrosion test

A large number of cyclic corrosion tests are made possible by combining salt spray environment with condensation humidity and air drying . Cyclic corrosion testing has become increasingly necessary in recent years. Dry Corrosion is one of the most popular cyclic tests alternating salt spray and air drying.
Cyclic tests can be executed with all enhanced model chambers. Depending on cycle-type some options have to be installed during chamber manufacturing.

Chamber Design

Chamber structure is overall 10mm thick Polypropylene. Option in PPS plastics to meet CSA flam test. Test chamber is insulated with a double wall. Access to the test chamber is made via the pivoting cover. Control panel and all necessary control devices are on the right side in ergonomic position. The Salt solution storage tank is on the left side. The electrical board is completely enclosed in a dedicated zone: next to it we find the electro-valves, humidifier and salt solution dosing pump zone. Each part is of easy access for simple and fast maintenance.

Basic model

Absolutely easy to use. The first step for test execution is to load timer with total test time (up to 9999 hours), second is to set test chamber temperature on the controller, then press Salt spray or Condensation push-button. During the whole time of the test, the timer counts down and its display will indicate decreasing time running to test end. To inspect samples, suspend test execution pressing Salt spray or Condensation push-button, then press ventilation push-button to drain test chamber before opening it.
To resume test execution simply press Salt spray or Condensation push-button again. When timer reaches zero test execution is finished.

Enhanced model

Free programming, up to 15 different test programs, inputs via keyboard with soft keys and easy to use structure of the Menu. Test status is continuously displayed on the large LCD display with 4 lines of 20 characters each. Control and monitoring of test chamber and humidifier temperature, monitoring of nozzle air pressure and dosing pump RPH. Self-diagnostic including warning messages, alarm messages and safety shut down. Complete test report: chamber and humidifier temperature, nozzle air pressure and dosing pump RPH are periodically measured and stored in the controller memory together with test interruptions or alarms. By simply pressing a key a complete report of the test is printed. RS232-C interface is provided for serial printer connection.

Cyclic test options

Enhanced model control panel allows easy programming of cyclic test combining: Salt spray, Water condensation, Dry off and Ambient condition. To perform cycling the test chamber must be completed with the following optional parts:

Option for Dry Corrosion, Scab Corrosion cycle. An air heater is installed to heat purging air before introducing it in the test chamber and a Titanium panel on the bottom of test chamber turns a flooded bottom into a dry bottom. Only a dry chamber bottom allows fast drying of the samples.

Option for ASTM G85-98 annex 5 Prohesion**.** In addition to parts installed for dry corrosion a bypass is installed on the humidifier to meet standard requirements with respect to fog production.

Option for ASTM G85-98 annex 4 salt/SO_2 spray testing. An external SO_2 dosing system is supplied and a gas diffusing device is installed in the test chamber.

Features / Models	basic	enhanced
Strong structure overall 10mm thick polyprophilene construction with built-in salt solution reservoir.	**yes**	**yes**
Clear cover for easy viewing of test chamber, cover is peaked to prevent dripping on samples.	**yes**	**yes**
Access to test chamber with pivoting cover with water seal.	**yes**	**yes**
Complete Spray nozzle made in plastic material, suitable for ISO 9227 AASS and CASS tests.	**yes**	**yes**
Fog diffuser in the centre of the test chamber allows fog uniformity.	**yes**	**yes**
Humidifying tower with automatic water level restoring system and temperature-controlled water heater.	**yes**	**yes**
Peristaltic pump for salt solution dosage.	**yes**	**yes**
Ergonomic control panel.	**yes**	**yes**
Pressure regulator for control of nozzle air pressure.	**yes**	**yes**
Pressure gauge for display of nozzle air pressure.	**yes**	**no**
Digital temperature controller of test chamber temperature.	**yes**	**no**
Timer to set test duration, programmable up to 9999 hours, with stopping of all functions at test end.	**yes**	**no**
Pilot lamp to signal lack of salt solution.	**yes**	**no**
Microprocessor control panel. Test status continuously displayed on a large LCD with 4 lines display for test parameters and program menu.	**no**	**yes**
Free programming, up to 15 different test programs, input via keyboard with soft keys and tactile feedback.	**no**	**yes**
Self-diagnostic, routine service reminders including warning messages and safety shut down.	**no**	**yes**
Complete test report: chamber test temperature, humidifier temperature, air nozzle pressure, dosing pump RPH are periodically measured and saved in the controller memory, and by simply pressing a key you can print a complete report of the test.	**no**	**yes**
Data transfer via RS232-C serial interface.	**no**	**yes**
Air and water filter to be installed on supply lines.	**yes**	**yes**
4 bars and 3 standard specimen holders supplied.	**yes**	**yes**

Technical data / Models	600l basic / enhanced	1000l basic / enhanced
Physical dimensions		
Overall dimensions (mm)	2010 x 760 x 1400 (W x D x H)	2400 x 1000 x 1365 (W x D x H)
Test chamber internal dimensions (without dome area) (mm)	1300 x 650 x 700 (W x D x H)	1690 x 890 x 700 (W x D x H)
Test chamber volume (without dome area) (litres)	600	1050
Weight (Kg)	300	400
Salt solution reservoir capacity (litres)	130	160
Electrical supply		
Type of connection	1/N/PE	
Voltage (V)	230 +- 10 % 50 Hz	
Current consumption (A)	9	12
Water supply for humidifier		
Type of water	demineralised	
Water pressure (bar)	2-4	
Water consumption (approximate) (litres/day)	3	
Air supply		
Type of air	Filtered, oil free	
Air pressure (bar)	4-6	
Air consumption (approximate) (Nm^3/h)	5-8	
Temperature range		
Test chamber temperature range (°C)	Ambient to 50	
Humidifier temperature range (°C)	Ambient to 70	
Supplied accessories		
Rods	4	6
Test panel racks	3	4
Air filter and pipe (4 m)	yes	yes
Water filter and pipe (4 m)	yes	yes

Other products

Corrosionbox 400 l

Corrosionbox 1000 l

Solarbox 3000 e

Solarbox 3000 RH

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CORROSIONBOX

Vertical space saving test chambers with large glass front door for salt spray, condensation tests and cyclic corrosion tests.

Available in 4 models: 400 and 1000 litres, basic and enhanced.

- **New compact and functional design**
- **Salt Spray Tests**
- **Condensation Tests**

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Corrosionbox improves comparison with outdoor results

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Corrosionbox chambers are what you need to predict corrosion resistance of materials such as paints and coatings.

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Salt spray test

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One or more heating elements, depending on chamber capacity, ensure uniform temperature in the test chamber. Exhaust solution collected in the bottom of test chamber is drained away through a drain to the floor.
Salt spray test can be executed with all chamber models.

Condensation water test

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Continuous condensation test can be executed with all chamber models.

Cyclic corrosion test

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Cyclic tests can be executed with all enhanced model chambers. Depending on cycle-type some options have to be installed during chamber manufacturing.

Chamber Design

Chamber structure is overall 10mm thick Polypropylene. Option in PPS plastics to meet CSA flam test. Test chamber is insulated with a double wall. Access to the test chamber is made via the pivoting cover.
Control panel and all necessary control devices are on the right side in ergonomic position. The Salt solution storage tank is on the left side.
The electrical board is completely enclosed in a dedicated zone: next to it we find the electro-valves, humidifier and salt solution dosing pump zone. Each part is of easy access for simple and fast maintenance.

Basic model

Absolutely easy to use. The first step for test execution is to load timer with total test time (up to 9999 hours), second is to set test chamber temperature on the controller, then press Salt spray or Condensation push-button. During the whole time of the test, the timer counts down and its display will indicate decreasing time running to test end. To inspect samples, suspend test execution pressing Salt spray or Condensation push-button, then press ventilation push-button to drain test chamber before opening it.
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Cyclic test options

Enhanced model control panel allows easy programming of cyclic test combining: Salt spray, Water condensation, Dry off and Ambient condition. To perform cycling the test chamber must be completed with the following optional parts:

Option for Dry Corrosion, Scab Corrosion cycle. An air heater is installed to heat purging air before introducing it in the test chamber and a Titanium panel on the bottom of test chamber turns a flooded bottom into a dry bottom. Only a dry chamber bottom allows fast drying of the samples.

Option for ASTM G85-98 annex 5 Prohesion**.** In addition to parts installed for dry corrosion a bypass is installed on the humidifier to meet standard requirements with respect to fog production.

Option for ASTM G85-98 annex 4 salt/SO_2 spray testing. An external SO_2 dosing system is supplied and a gas diffusing device is installed in the test chamber.

Features / Models	Basic
Strong structure overall 10mm thick polypropylene construction with built-in salt solution reservoir.	**yes**
Clear cover for easy viewing of test chamber, cover is peaked to prevent dripping on samples.	**yes**
Access to test chamber with pivoting cover with water seal.	**yes**
Complete Spray nozzle made in plastic material, suitable for ISO 9227 AASS and CASS tests.	**yes**
Fog diffuser in the centre of the test chamber allows fog uniformity.	**yes**
Humidifying tower with automatic water level restoring system and temperature-controlled water heater.	**yes**
Peristaltic pump for salt solution dosage.	**yes**
Ergonomic control panel.	**yes**
Pressure regulator for control of nozzle air pressure.	**yes**
Pressure gauge for display of nozzle air pressure.	**yes**
Digital temperature controller of test chamber temperature.	**yes**
Timer to set test duration, programmable up to 9999 hours, with stopping of all functions at test end.	**yes**
Pilot lamp to signal lack of salt solution.	**yes**
Microprocessor control panel. Test status continuously displayed on a large LCD with 4 lines display for test parameters and program menu.	**no**
Free programming, up to 15 different test programs, input via keyboard with soft keys and tactile feedback.	**no**
Self-diagnostic, routine service reminders including warning messages and safety shut down.	**no**
Complete test report: chamber test temperature, humidifier temperature, air nozzle pressure, dosing pump RPH are periodically measured and saved in the controller memory, and by simply pressing a key you can print a complete report of the test.	**no**
Data transfer via RS232-C serial interface.	**no**
Air and water filter to be installed on supply lines.	**yes**
4 bars and 3 standard specimen holders supplied.	**yes**

Technical data / Models	400 l Basic / Enhanced	1000 l Basic / Enhanced.
Physical dimensions		
Overall dimensions (mm)	1320 x 780 x 1450 (W x D x H)	1640 x 880 x 1800 (W x D x H)
Test chamber internal dimensions (without dome area) (mm)	800 x 700 x 800 (W x D x H)	1100 x 800 x 1140 (W x D x H)
Test chamber internal volume (without dome area) (litres)	448	1000
Weight (Kg)	168	300
Salt solution reservoir capacity (litres)	110	260
Electrical supply		
Type of connection	1/N/PE	
Voltage (V)	230 +- 10 % 50 Hz	
Current consumption (A)	9	14
Water supply for humidifier		
Type of water	demineralised	
Water pressure (bar)	2-4	
Water consumption (approximate) (litres/day)	3	
Air supply		
Type of air	Filtered, oil free	
Air pressure (bar)	4-6	
Air consumption (approximate) (Nm^3/h)	5-8	
Temperature range		
Test chamber temperature range (°C)	Ambient to 50	
Humidifier temperature range (°C)	Ambient to 70	
Supplied accessories		
Rods	4	6
Test panel racks	3	4
Air filter and pipe (4 m)	yes	yes

Other products

Corrosionbox H 600 l

Corrosionbox H 1000 l

Solarbox 3000 e

Solarbox 3000 RH

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SOLARBOX

A family of two sizes and four models tabletop xenon test chambers

The sun you have always wanted: sunshine day and night for accelerated light stability and weathering tests.

Radiant energy in the SOLARBOX is provided by a single superior air-cooled Xenon Lamp generating an irradiance level up to **two times** the sun one. Irradiance is the rate at which light energy falls onto the samples.
A weathering tester must control irradiance if it is to achieve accurate and reproducible test results.

SOLARBOX offers constant measurement and control of irradiance during every test, compensating for lamp and UV filter ageing via a closed loop irradiance narrow-band sensor control system.

Irradiation uniformity is guaranteed by a parabolic reflector chamber with the Xenon Lamp in the focus, the best design for a reliable flat-bed xenon exposure system and very good agreement with rotating drum xenon exposures.

SOLARBOX 3000

TEMPERATURE CONTROL

Temperature is another component of the end use environment which plays a key role in material degradation. Heat in the natural environment comes from the infrared portion of natural sunlight.

An object exposed to direct sunlight is always warmer than the air surrounding it. Your product is exposed in the same manner in our SOLARBOX tester.

The radiant heat received from the Xenon Lamp is continuously monitored and controlled by a B.S.T. (Black Standard Thermometer) built in the plane of test panels near your samples.

In SOLARBOX **1500e** and **3000e** there is the control and display of the black standard temperature between 35°C and 100°C. The importance of temperature in the weathering degradation process is that the kinetic reaction rate doubles for every 10°C temperature increase.

Consequently, because the temperature produces an accelerated ageing, it is essential to be able to control of B.S.T. during exposure to filtered Xenon radiation.

SOLARBOX 3000 E

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SIMULATING THE EFFECT OF RAIN AND MOISTURE

A flooding system for conducting weathering tests with freely selectable flooding interval is an available option for SOLARBOX **1500e** and **3000e**:

- water level indicator
- continuous flooding possible
- flooding intervals selectable between 1 and 999 minutes throughout the test program
- water temperature of 30°C to 50°C.

During flooding, the Xenon Lamp can be programmed on or off.
The flooding system operates with demineralised water from a closed recycling circuit so to minimize the need of demineralised water but offering the same test results of a high consumption spray system.
PVC and corrosion-resistant materials ensure long life of this tank pump system: capacity up to 50 litres.

SOLARBOX 1500 E with FLOODING

XENON LAMP AND UV FILTERS COMBINATION OPTIMIZE SUNLIGHT SIMULATION

The SOLARBOX **1500**-**1500e** and SOLARBOX **3000**-**3000e** are 4 ultimate filtered Xenon light exposure and weathering instruments which simulate realistic natural outdoor weathering conditions.

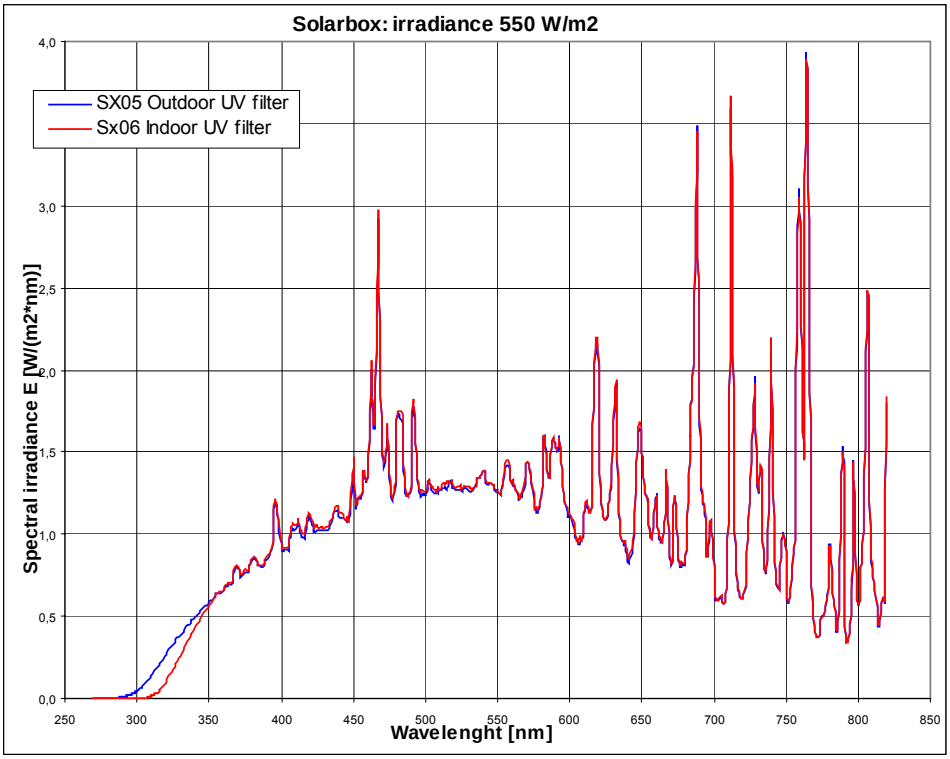
The large dimensions of SOLARBOX **3000** and **3000e** test chamber can accommodate 3 dimensional objects and finished industry products.

Accelerating the process requires the accurate reproduction of the sun's rays.
The air cooled Xenon Lamp in the SOLARBOX replicates the total spectrum of the sun and not just the short wavelength UV, as we have using UVA or UVB fluorescent lamps.

Easily interchangeable light filters allow the reproduction of the specific spectral distributions found in your product's end-use environments.

The available OPTICAL CUT-ON FILTERS limiting radiation of xenon lamp are:

- Soda-lime glass UV filter, extra long life, to simulate ***outdoor*** exposure.
- Soda-lime glass UV filter, extra long life, to simulate ***indoor*** exposure.
- Soda-lime glass UV filter, extra long life, to simulate *outdoor* exposure with ***Infra Red*** reflection coating.
- Soda-lime glass UV filter, extra long life, to simulate *indoor* exposure with ***Infra Red*** reflection coating.
- ***Dedicated UV filter*** especially tailored for specifications on request.



FEATURES OF THE SOLARBOX 4 MODELS

SOLARBOX **1500**/**3000** standard versions include the following equipment:

- timer and time elapsed meter for accurate control of test sequence
- superior air cooled Xenon Lamp
- rotary knob to adjust irradiance level
- control system for constant irradiance
- basic 290 nm. filter for maximum UV radiation effect.

SOLARBOX **1500e**/**3000e** enhanced models are additionally equipped with microprocessor control of irradiance, heat and flooding cycles, monitoring and controlling the test process:

- microprocessor controls for programming the test parameters
- LCD with 4 lines to display the test parameters and program menus
- control and monitoring of irradiance and black panel temperature
- optional measurement and display of temperature and relative humidity in the test chamber
- free programming, up to 15 different test programs, input via keyboard
- link-up with programmable flooding system accessories.

TEST REPORT

With SOLARBOX **1500e** and **3000e** the test conditions and all the parameters are periodically saved in a PC or sent to a printer through a RS 232 serial interface: a simple but powerful tool that fully documents the test.

RADIOMETER AND BLACK PANEL STANDARD THERMOMETER

The UV MULTIMETER is a battery operated radiometer and thermometer, specially developed for use with the SOLARBOX, but it can control the output of any UV Lamp in many industrial applications.
It is portable and together with its case, can easily be returned to the manufacturer (CO.FO.ME.GRA) for re-certification of calibration to an official national laboratory standard.
The UV MULTIMETER measures either irradiance or temperature using the following easily interchangeable, good cosine response sensor:

- UV 295 - 400 NM large band sensor
- UV 340 NM narrow band sensor
- UV 366 NM narrow band sensor
- UV 420 NM narrow band sensor
- Illuminance sensor spectral response similar C.I.E. photopic luminosity curve.
  Measuring range up to 2 MEGALUX.
- Black Standard Temperature sensor.

FIELDS OF APPLICATION & NORMATIVE REFERENCES

The SOLARBOX, because of its 6 different models and a wide flexibility in available options (i.e. Humidity Control: *see* ***SOLARBOX R.H.*** catalogue), meets the following standards:

ADHESIVES: ASTM D904; ASTM C1442; ASTM C1501; RILEM DBS.

AUTOMOTIVE: SAE J2527; SAE J2412.

COATINGS: QUALICOAT; ISO 2135; ISO 11341; ASTM D3451; ASTM D3794; ASTM D6577; ASTM D6695; GB 1865; JIS K 5600-7-7; MPI: #113; MS 133: Part F14.

DENTISTRY: ISO 4049:2000; ISO 7491:2000.

GENERAL: IEC 68-2-9; ISO 4892-1; ASTM G151; ASTM G155.

GEOTEXTILES: ASTM D4355.

INKS/PAPER: ISO 11798; ISO 12040; ISO 18909; ASTM D3424; ASTM D4303; ASTM D5010; ASTM D6901; ASTM F2366.

PACKAGING: ASTM D6551.

PHARMACEUTICAL: ICH Guideline Q1B.

PLASTICS: ISO 4892-2; JIS K 7350-2; DIN EN 513; ASTM D1248; ASTM D2565; ASTM D4101; ASTM D4459; ASTM D5071; ASTM D6662; UL 1581.

ROOFING: ASTM D4434; ASTM D4637; ASTM D4798; ASTM D4811; ASTM D5019; ASTM D6083.

RUBBER: ISO 3865; ISO 4665.

SEALANTS: ASTM C1442; ASTM C1501.

TEXTILES: AATCC TM 16; AATCC TM 169; GB/T-8430; IS: 2454; ISO 105-B02.

Technical data

SOLARBOX Model	1500	1500e	3000	3000e
Electrical connection				
Mains voltage	230 Vac 10%, 50/60 Hz.			
Mains connection	1/N/PE			
Current consumption	16 A (max.)			
Measures and weight	**1500**	**1500e**	**3000**	**3000e**
Dimensions	750 x 390 x 400 mm.		890 x 390 x 400 mm.	
Exposure area (Horizontal Specimen Holder)	280 x 200 mm.		420 x 200 mm.	
Weight	30 Kg.		32 Kg.	
Number of specimen panels (15 x 30 mm.)	more than 120		more than 180	
Features	**1500**	**1500e**	**3000**	**3000e**
Superior air-cooled Xenon Lamp: lasts for 1.500 hours	X	X	X	X
Adjustment and control of irradiance level	X	X	X	X
Display of current irradiance level		X		X
Irradiance range: from 250 to 1.100 W/m² region (290 - 800 nm.)	X	X	X	X
BST: control of temperature level, range: up to 100°C		X		X
BST: display of current temperature value		X		X
Timer for test time setting up to 999 hours	X	X	X	X
Microprocessor control		X		X
4 lines LCD for test parameters and program menu		X		X
Bi-directional RS 232 interface for data output		X		X
Free programming of 15 tests standards		X		X
Special sensors calibration program		X		X
Options and accessories	**1500**	**1500e**	**3000**	**3000e**
Soda-lime glass UV filter, to simulate **outdoor** exposure	X	X	X	X
Soda-lime glass UV filter, to simulate **indoor** exposure	X	X	X	X
Soda-lime glass UV filter, to simulate **outdoor** exposure with **Infra Red** reflection coating	X	X	X	X
Soda-lime glass UV filter, to simulate **indoor** exposure with **Infra Red** reflection coating	X	X	X	X
SPECIAL tailored to specifications UV coated filters	X	X	X	X
Flooding system for specimen		X		X
Water cooled specimen table	X	X	X	X
Test chamber humidity and temperature display		X		X
Magnetic stirrer for liquid samples	X	X	X	X
XEN 32 REPORT LEVEL		X		X
XEN 32 MAINTENANCE LEVEL data transfer and calibration software using our radiometer		X		X
Cooling unit, air refrigerator to reduce test temperature	X	X	X	X
Radiometer and thermometer with sensors:	X	X	X	X
Sensor 295-400 nm. wide band total UV	X	X	X	X
Sensor 340 nm. narrow band	X	X	X	X
Sensor 420 nm. narrow band	X	X	X	X
Illuminance sensor up to 2 Mlux	X	X	X	X
Black Standard Temperature sensor	X	X	X	X

Other products

Vertical Salt spray chambers.

Horizontal Salt spray chambers.

SOLARBOX R.H. with Humidity Control

We reserve the right to make changes to equipment and systems in response to advances in technology and modify parameter values accordingly.

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SOLARBOX

Models 1500e RH and 3000e RH

Accelerated xenon light fastness and weathering test chambers

The worldwide known SOLARBOXe light fastness testers are now available also in the RH series allowing Relative Humidity Control.

SOLARBOXe RH represent a breakthrough in small light fastness testers.

SOLARBOXe RH are the first small testing instruments allowing simulation and control of all weathering parameters like expensive xenon instruments.

Controlled irradiance and spectrum, controlled BST temperature, controlled humidity, flooding system, are features of a top weathering equipment.

Low purchase price, low operating cost, at last an affordable and easy to use xenon weathering testing instrument offering:

- Correlation
- Acceleration
- Repeatability
- Reproducibility

of an advanced weathering test chamber.

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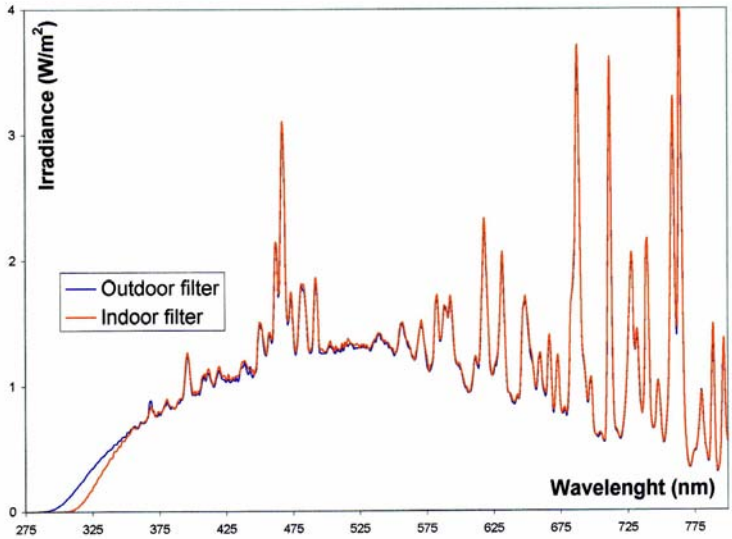
SOLARBOXe RH
Features

- Broad band irradiance control sensor (300-400 nm) ensures constant irradiance for the whole life of the lamp.
- Controlled and monitored irradiance up to 1000 W/m^2 (300-800 nm).
- Controlled and monitored temperature at specimen tray level with BST (Black Standard Thermometer).
- Controlled and monitored Relative Humidity. Ultrasonic humidifier ensures reliable functioning for long time.
- Sample flooding system for cyclic sample immersion throughout your test program.
- Microprocessor control with 4 lines LCD display. Friendly and intuitive operating system. Free programming up to 15 different test programs. Complete test report is produced for each test you perform simply connecting your PC to RS 232 interface: press print push button and history of test is printed.

Spectral power distribution of filtered Xenon



- A complete range of advanced UV filters are available to match sunlight conditions: direct exposure to sunlight (Outdoor); exposure through a window glass (Indoor); Outdoor and Indoor filters with IR coating to reduce infrared radiation on samples.

SOLARBOXe RH
Description

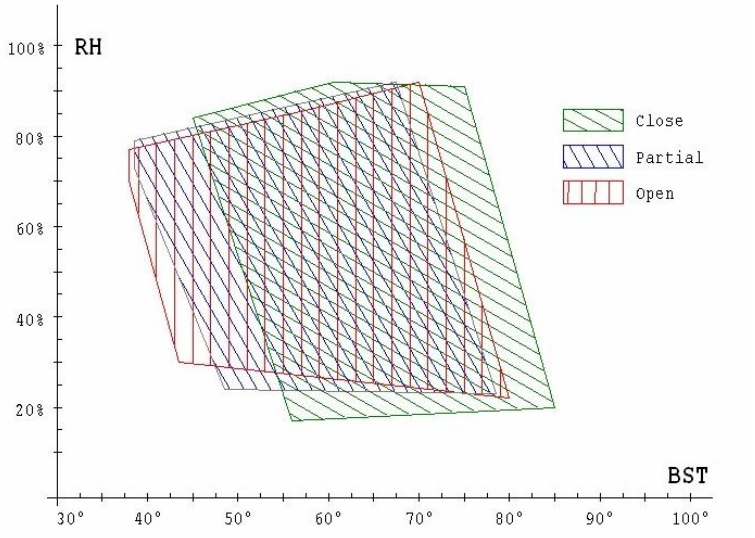
A strong structure is the base of SOLARBOXe RH. In the lower part two tanks are installed. The right one is for humidifier supply, the left one is for flooding system (option). Capacity of humidifier and flooding tanks ensures weeks and weeks of continuous functioning. Blinking lights on auxiliary panel inform when water level is low.

Sample temperature depends on air flow rate in the test chamber. BST temperature control system selects the blower speed by means of an inverter allowing accurate speed control, subsequently we have a high accuracy in BST temperature.

Relative humidity is set on auxiliary panel and displayed on Solarbox control panel.

Ultrasonic humidifier is proportionally controlled so to reach and maintain the programmed test condition. Air circulation may be modified by the user; in full closed circuit mode humidity is obtained in extreme high range with negligible water consumption and BST is in medium high range. In partial air recirculating mode BST temperatures of lower range are possible.

Operable ranges of humidity control at various test chamber temperatures



Laboratory temperature 20 °C

Green range is for fully closed air circulating circuit.
Blue range is for partially closed air circulating circuit.
Red range is for fully opened air circulating circuit

Technical data

SOLARBOXe RH MODEL	1500e RH	3000e RH
Electrical connection		
Mains connection	1/N/PE	
Mains Voltage	230 Vac +-10% 50/60 Hz	
Current consumption	16 A (max)	
Water supply for humidifier		
Tank capacity	50 litres	60 litres
Type of water	demineralized < 2 µSiemens	
Measures and weight		
Dimensions WxDxH (mm)	810x550x1600	950x550x1600
Floor weight (Kg)	100	125
Exposure area WxD (mm)	280x 200	420x200
Features		
Air cooled especially designed Xenon lamp (watt)	1500	2500
Microprocessor control with 4 lines LCD display	X	X
Free programming of 15 tests	X	X
Complete test report ready to print	X	X
RS232 interface for report output	X	X
Irradiance range: 300-1000 W/m^2 (300-800 nm)	X	X
BST Temperature controlled and displayed	X	X
BST temperature range up to 100 °C	X	X
Relative humidity controlled and displayed	X	X
Relative humidity range	See graph	
Options and accessories		
Flooding system	X	X
Standard borosilicate UV filter for outdoor test condition	X	X
Non aging soda lime UV filter for outdoor test condition	X	X
Non aging soda lime UV filter for outdoor with IR coating	X	X
Non aging soda lime UV filter for indoor test condition	X	X
Non aging soda lime UV filter for indoor with IR coating	X	X
Flooding system for specimen	X	X
Multimeter (radiometer and thermometer)	X	X
295-400 nm sensor, wide band total UV	X	X
340 nm sensor, narrow band	X	X
420 nm sensor, narrow band	X	X
Illuminance sensor, up to 2 MLux	X	X
Black Standard Thermometer sensor	X	X
XEN 32 software report level	X	X
XEN 32 software maintenance level	X	X

Other products

Vertical and Horizontal Salt spray chambers, 8 Models
Full range of options for continuous and cycling test.

Solarbox Table top xenon testers
4 Models

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DAMP HEAT CHAMBER

Humidity chamber for corrosion tests in constant and alternate humidity saturated atmosphere.

Available in 2 models: standard (D100)and with SO2 addition (D200).

D100: damp heat chamber for corrosion tests in constant humidity saturated atmosphere. The test chamber has an internal capacity of 300 lt. and it is built completely in plastic material. It is able to perform humidity tests in accordance with the following norms:
ASTM D1735, ASTM D2247, BS 3900/F9, DIN 50017, DIN 55958, DIN 55991, ISO 11503, ISO 6270-2:2005, ISO 4541, ISO3231, NFT 30-077.
Mains connection: 230V, 50 Hz.

D200: damp heat chamber AUTOMATIC for corrosion tests in constant and alternate atmosphere: in humidity saturated atmosphere with SO2 addition (Kesternich) and in ambient atmosphere. *Also available without SO2 gas option.* The test chamber has an internal capacity of 300 lt. and it is built completely in plastic material. Completely automatic execution of cycle. Phase with gas saturated atmosphere: loading of water dosage and SO2 gas every 8 hours at 40°C, unloading of chamber. Ambient phase: 16 hours of chamber ventilation with compressed air. The cycle is repeated constantly. In accordance with following norms:
ASTM D1735, ASTM D2247, BS 3900/F9, DIN 50017, DIN 55958, DIN 55991, ISO 11503, ISO 4541, ISO3231, NFT 30-077, DIN 50017-KFW, DIN 50017, EN ISO 6988 DIN 50018, DIN 53771, NFT 30-055, SFW 2,0 S, VDA 621-421.
Power supply: 230V, 50 Hz.

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CORROSIONBOX

Model 100 A.I.

Corrosion test system with cycling immersion of samples in a salt solution.

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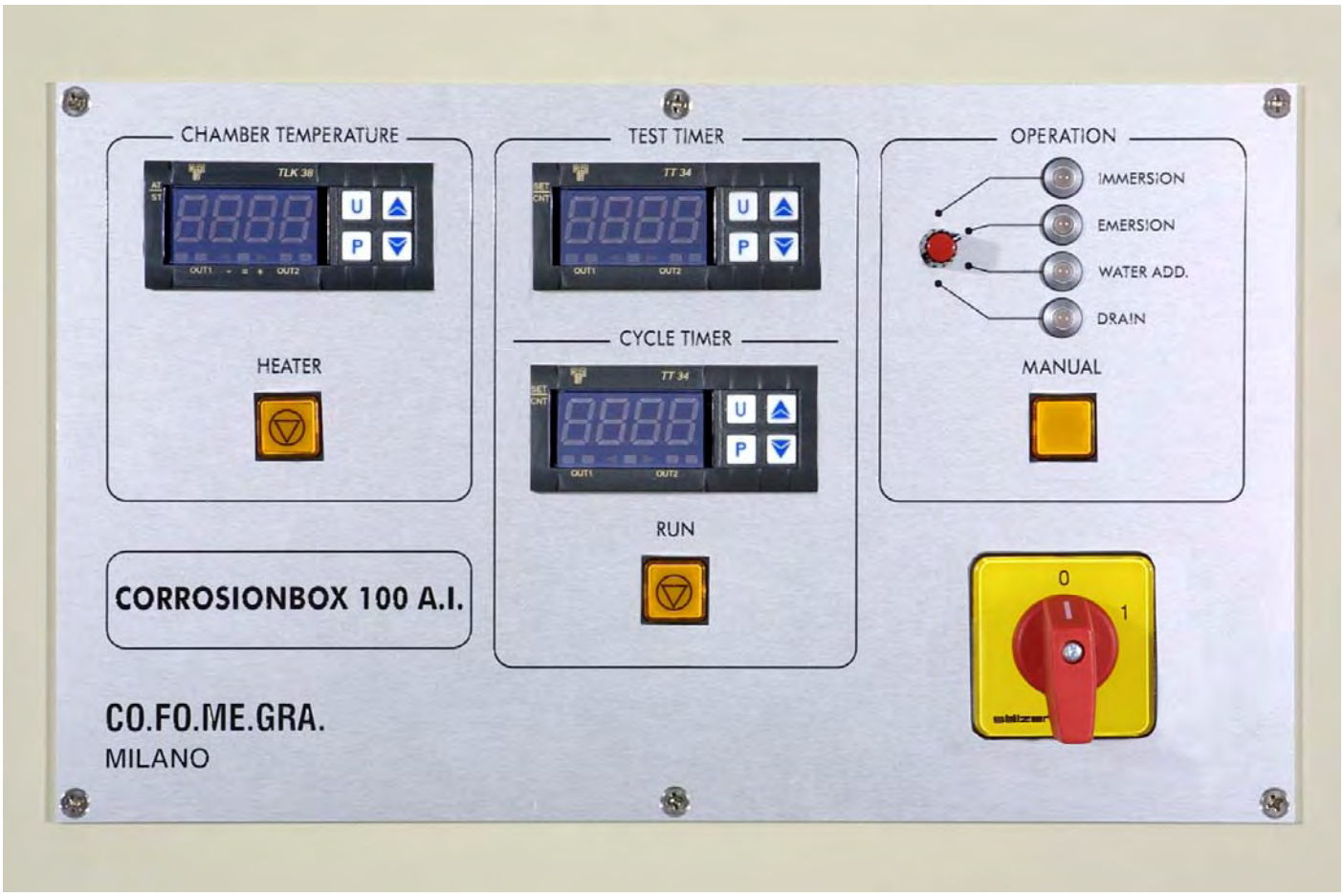
Control panel to select chamber temperature, immersion cycling and testing time.



Corrosion test chamber in conformity with EN3212 standard.

Test chamber built completely in PP resistant to corrosion. Basic characteristics:

- Temperature control system of the chamber with electronic digital thermoregulator. Temperature range: from ambient to 50°C (EN3212 standard requires 35°C).
- Container for the testing solution with specimen tray for specimen of 100 x 40 x 0,8-2 mm. Maximum number of specimen: 10 with 10 positions each.
- Device for cyclic specimen immersion in a solution contained in an apposite container. The immersion-emersion times are easily and simply programmable in a wide range through an electronic digital timer (EN3212 standard requires 2 hours immersion and 2 hours emersion).
- Digital electronic timer to set the total duration of the test. At the end of the test the specimen are held in emersion, the thermoregulation of the chamber is switched off and the solution automatically drained.
- Automatic system for restoring solution level with addition of distilled water drawn from an external tank.
- Automatic and manual system for draining the solution in an external collecting tank.

The points of standard EN3212 1995 that refer to the test apparatus

3 Principle
Immerse then emerge a sample in the test solution.

4 Apparatus
An environmental chamber equipped with a glass or plastic tank containing the test solution and an appropriate device to carry out the test automatically and continuously.
The chamber must be maintained at a temperature of 35 ± 2 °C and at a Relative Humidity ≥ 80%.

5 Test solution
It is given the composition of the solution.

6 Test pieces
Sample material complying to EN2633.
Sample minimum dimensions: 100 X 40 X 0,8 up to 2 mm.

7 Procedure
Make cuts in the test pieces in accordance with the annexes.
Immerse the test piece so that it is surrounded by at least 10 mm of the test solution. If there are several pieces in the chamber, the distance between them must be at least 10 mm. The volume of the solution must be > 4 ml/cm^2 of the test pieces surface.
A cycle comprises 2 hours of immersion and 2 hours of emersion.
The level of the test solution must be maintained constant by adding distilled or deionized water.
The test solution must be renewed twice during the first week, then every 10 days.

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