Light Exposure Test Apparatus SOLARBOX 522/522 RH

Modern Light Exposure and Weathering Instruments

Optional Programmable Flooding System

Fig. SOLARBOX 522/3000

testing equipment for quality management

ERICHSEN

Technical Description

ISO 11 341
ASTM D 5071
UNI 9397

Optional features:

- **Microprocessor Controls**
- **Data Transfer via Interface RS-232C**
- **Control of test chamber humidity**

SOLARBOX 522

Purpose and Application

The Light Exposure Test Apparatus

- **SOLARBOX 522/1500** and **522/1500e**
- **SOLARBOX 522/3000** and **522/3000e**

are modern light exposure and weathering instruments which simulate realistic conditions comparable to natural outdoor weathering.

Because severe insolation and extreme hot-house conditions have a highly deteriorating effect on coatings, etc. natural exposure tests in the laboratory are an essential development stage of many products on their way to series production.

Artificial solar radiation provides fast, reproducible results. Testing can be repeated as often as necessary and can be conducted in the laboratory, absolutely independent of the weather or season.

In comparison with **SOLARBOX 522/1500** and **522/3000**, versions **522/1500e** and **522/3000e** feature sophisticated microprocessor electronics, sensor technology and automatic controls. These instruments can also be linked to a programmable flooding system.

Fields of application

The effects of photochemical processes on solids, liquids and pastes can be systematically examined in the SOLARBOX under global radiation conditions. These instruments can be employed, for instance:

- for determining the light resisting properties of paints, bonding agents, pigments, plastics, cosmetics, pharmaceuticals and many other products
- for testing colour fastness to light
- for testing the durability of the techno-mechanical properties of plastics
- for evaluating the gloss endurance and chalk resistance of paints;
- for aging tests based on light exposure and cyclic wetting by way of the flooding system.

Design and Function

The samples to be tested are placed horizontally in the SOLARBOX and irradiated from above by a Xenon lamp. The spectral light distribution of natural sun radiation can be accurately adjusted from 300 to 800 nm by using a filter system. The irradiation intensity is about 1000 W/m².

One of the SOLARBOX's special features is its capability to adapt the UV fraction of excitation light to the individual test pieces by exchanging the filters. This measure also alters the wave length at which radiation commences. The following filter options are available:

Limitation of the UV fraction to

- Simulation of direct solar ray exposure
- Simulation of solar rays filtered through window glass.

To counteract the high rate of reflection of infrared fractions, an IR filter can be optionally used to prevent excessive heating of the irradiated objects. A fan ensures consistent thermal conditions in the test chamber.

On models **522/1500** and **522/3000** the exposure period can be preselected using the integrated timer (up to 999 h). An elapsed-time meter (up to 9999 h) simplifies timing control in duration tests and also ensures that the lamp (which has a service life of approx. 1500 h) is continuously monitored.

The **SOLARBOX models 522/1500** and **522/3000** are economical versions which incorporate the following equipment:

- Timer and elapsed time meter for accurate control of test sequence
- Air cooled Xenon lamp
- Rotary knob to adjust the irradiance level
- Control system for consistent irradiance
- Special filter, soda-lime glass, extra long life, to simulate outdoor exposure (simulation of direct solar ray exposure).

In addition the **SOLARBOX models 522/1500e** and **522/3000e** are equipped with state of art microprocessor electronics which provide the user with numerous possibilities for monitoring and controlling the test process:

- Microprocessor controls for programming the test parameters (e. g. test period)
- LCD with 4 lines to display the test parameters and programme menu;
- Control and monitoring of light density and black panel temperature;
- Optional: Measurement and display of temperature and relative humidity in the test chamber
- Free programming of 15 different test sequences
- Data transfer via RS-232C interface
- Optional: Software package XEN 32 "Report" for transfer of test parameters to PC, also available in the extended version XEN 32 "Rep. + Cal." with SOLARBOX calibration
- Connection with a programmable flooding system

Accessories

Flooding system
for conducting weathering tests with freely selectable flooding intervals

(optional for 5for22/1500e and 522/3000e)
- Level indicator
- Continuous flooding possible
- Flooding intervals selectable between 1 and 999 minutes

Mono Magnet Stirrer
The magnet stirrer is used when liquid substances are to be irradiated.
- Max. stirring volume: 1 - 3000 ml
- Speed range: 100 - 1000 U/min
- Dimensions (WxDxH): 150 x 200 x 35 mm
- Mains voltage: 220 - 240 VAC, 50/60 Hz.

Specimen plate with water cooling
When testing materials which are sensitive to heat the temperature can be effectively reduced by placing the specimen on a water-cooled specimen plate.

Air Cooling Unit
The air cooling unit feeds the test chamber with air at 7° C (reduces the temperature by approx. 10 to 20 °C).
Recommended to test thermosensitive substances and materials e.g. pharmaceutical or cosmetical products, etc.

Attention: The air cooling unit can only be supplied with new instruments; modification of existing instruments not possible.

SOLARBOX 522 eRH

Technical Data

Equipment	522 / 1500	522/ 1500e	522 /3000	522/ 3000e
Output of Xenon lamp	1.5 kW		2.5 kW	
Outer dimensions (W x D x H)	750 x 390 x 400 mm		890 x 390 x 400 mm	
Exposure area (W x D) - Removable plate	280 x 200 mm		420 x 200 mm	
Weight	29 kg		31 kg	
Number of specimen panels (15 x 30 mm)	approx. 120		approx. 180	
Adjustment and control of irradiation level	x	x	x	x
Display of current irradiation level		x		x
Irradiation level: 0.25 kW/m² to 1.0 kW/m² Range of wave length: between 300 and 800 nm	x	x	x	x
Time-elapsed meter (up to 9999 h) and timer (up to 999 h)	x	x	x	x
Adjustment, control and display of black panel temperature		x		x
Microprocessor controls for programming the test parameters (e. g. test period)		x		x
4 line LCD for test parameters and programme menu		x		x
Free programming of 15 different test sequences		x		x
Data transfer by way of RS-232C interface, bidirectional		x		x
Software package XEN 32 "Report" for data transfer to PC		x		x
Software package XEN 32 "Rep.+Cal." for data transfer to PC and Solarbox calibration		x		x
Special filter, soda-lime glass, extra long life, to simulate outdoor exposure (included in the scope of supply)	x	x	x	x
Special filter, soda-lime glass, extra long life, to simulate indoor exposure	x	x	x	x
Special filter, soda-lime glass, extra long life, to simulate outdoor exposure, with Infra Red reflecting coating	x	x	x	x
Special filter, soda-lime glass, extra long life, to simulate indoor exposure, with Infra Red reflecting coating	x	x	x	x
Possibility to connect programmable flooding system		x		x
Display of humidity and temperature in test chamber		x		x
Magnet stirrer for liquid test substances	x	x	x	x
Water-cooled specimen plate	x	x	x	x
Air cooling unit	x	x	x	x
Power supply	230 V AC, 50/60 Hz			

Purpose and Application

The Light Exposure Test Apparatus

- **SOLARBOX 522/1500e RH** and
- **SOLARBOX 522/3000e RH**

are the extended versions of model **522/1500e** and model **522/3000e**, but with additional control/monitoring of relative humidity in test chamber during the test.

Design and Function

A strong structure is the base of SOLARBOXe RH. In the lower part two tanks are installed. The bigger tank is for humidifier supply, the smaller tank is for flooding system (option). Capacity of humidfier 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.

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 1.000 W/m² (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 performed simply connecting your PC to RS-232C interfaces: press print push button and history of test is printed
- A complete range of advanced UV filters are available to match sunlight conditions

  a) direct exposure to sunlight ("Outdoor")
  b) exposure through a window glass ("Indoor").

  UV filters with IR coating reduce infrared radiation on samples and test temperatures.

Technical Data

Equipment	522 / 1500e RH	522 /3000e RH
Output of Xenon lamp	1.5 kW	2.5 kW
Outer dimensions (W x D x H)	750 x 390 x 400 mm	890 x 390 x 400 mm
Exposure area (W x D) - Removable plate	280 x 200 mm	420 x 200 mm
Weight	100 kg	125 kg
Number of specimen panels (15x30 mm)	approx. 120	approx. 180
Adjustment and control of irradiation level	x	x
Display of current irradiation level	x	x
Irradiation level: 0.25 kW/m² to 1.0 kW/m² Range of wave lenght: between 300 and 800 nm	x	x
Time-elapsed meter (up to 9999 h) and timer (up to 999 h)	x	x
Adjustment, control and display of black panel temperature	x	x
Microprocessor controls for programming the test parameters (e.g. test period)	x	x
4 line LCD for test parameters and programme menu	x	x
Free programming of 15 different test sequences	x	x
Data transfer by way of RS-232C interface, bidirectional	x	x
Software package XEN 32 "Report" for data transfer to PC	x	x
Software package XEN 32 "Rep. + Cal." for data transfer to PC and Solarbox calibration	x	x
Special filter, soda-lime glass, extra, long life, to simulate outdoor exposure (included in the scope of supply)	x	x
Special filter, soda-lime glass, extra, long life, to simulate indoor exposure	x	x
Special filter, soda-lime glass, extra, long life, to simulate outdoor exposure, with Infra Red reflecting coating	x	x
Special filter, soda-lime glass, extra, long life, to simulate indoor exposure, with Infra Red reflecting coating	x	x
Adjustment, control and display of the test chamber humidity	x	x
Integrated tank for humidity (litres)	50	80
Possibility to connect programmable flooding system	x	x
Display of temperature chamber	x	x
Magnet stirrer for liquid test substances	x	x
Water-cooled specimen plate	x	x
Air cooling unit	x	x
Power supply	230 V AC, 50/60 Hz	

Order Information

Order-No.	Product Name
0522.02.51	**SOLARBOX 522/1500**
0522.03.51	**SOLARBOX 522/1500e** as Ord.-No. 0522.02.51, but with microprocessor controls
0522.04.51	**SOLARBOX 522/3000**
0522.05.51	**SOLARBOX 522/3000e** as Ord.-No. 0522.04.51, but with microprocessor controls
0522.06.51	**SOLARBOX 522/1500e RH**
0522.07.51	**SOLARBOX 522/3000e RH**

Accessories

Order-No.	Product Name
0522.05.52 or 0522.06.52	**Programmable Flooding System**, for Models 522/1500e and 522/3000e for conducting weathering tests
0522.35.32/ 0522.36.52	**Programmable Flooding System**, for Models 522/1500e RH and 522/3000e RH for conducting weathering tests
0522.15.52	**Software package XEN 32 "Rep. + Cal."**, for data transfer to PC and Solarbox calibration
0522.19.52/ 0522.23.52/ 0522.27.52/ 0522.31.52	**Special filter**, soda-lime glass, extra long life, to simulate outdoor exposure (see Price List)
0522.20.52/ 0522.24.52/ 0522.28.52/ 0522.32.52	**Special filter**, soda-lime glass, extra long life, to simulate indoor exposure (see Price List)
0522.21.52/ 0522.25.52/ 0522.29.52/ 0522.33.52	**Special filter**, soda-lime glass, extra long life, to simulate outdoor exposure, with Infra Red reflecting coating (see Price List)
0522.22.52/ 0522.26.52/ 0522.30.52/ 0522.34.52	**Special filter**, soda-lime glass, extra long life, to simulate indoor exposure, with Infra Red reflecting coating (see Price List)
0522.10.52	**Magnet stirrer mono** for liquid test substances
0522.11.52/ 0522.17.52	**Water-cooled specimen plate**
0522.16.52	**Air cooling unit**

Subject to technical modifications.
Group 21 - TBE 522 – XII/2025

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 11341; ASTM D3451; ASTM D3794; ASTM D6577; ASTM D6695; GB 1865; JIS K5600-7-7; 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.
INTRA-OCULAR LENSES:	ISO 11979-5:2006.
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.

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