Soiling tester

CST 117

Principle of operation

Soiling tester CST 117 - prototype.

Test system components.

The CST 117 is used to perform laboratory tests in accordance with VDI 3956 ("Test method for the dust soiling behaviour of solar energy systems"). This includes tests on the behaviour of glass surfaces under the influence of dusting, changing air humidity and glass temperature and the resulting condensation effects as well as cleaning by wind.

Experiments on other test specimens exposed to these environmental conditions are also possible.

Applications

- tests according to VDI 3956
- temperature-dependent dusting and cleaning tests of other types of samples

Features

- adjustable angle of the sample holder
- selectable dust dosing positions
- data logger
- largely automated processes
- optimised handling

The test specimen is mounted on a sample holder (2) in an air lock (1) and then drawn into the preconditioned main chamber (3). The air lock prevents the dust-containing atmosphere from entering the environment.
The desired angle of the specimen is set (up to 60° to the horizontal). The environmental scenarios to be investigated are imitated using the following equipment:

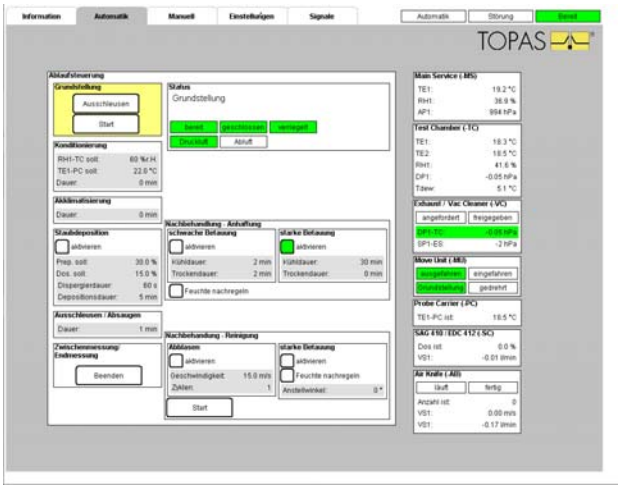
- dusting using generator (4) SAG 410/L (Topas) with dual-positionable nozzle (5)
- temperature control of sample holder: with heating mat/cooling unit (6)
- blowing off the sample using a movable air blade (7)

When air is introduced into the chamber by dust dosing, humidification or sample cleaning, a negative pressure must be present in the chamber to prevent the emission of dust into the atmosphere.

The negative pressure is automatically generated by a HEPA vacuum cleaner (8) and monitored. The dust from the extracted air is collected in a HEPA filter below the main chamber.

Test cycles according to VDI 3956 are performed automatically. At the end of the cycles, the test specimen is moved back into the air lock and removed by the user. Subsequently, the influence of artificial weathering on the surface properties of the test object can be determined by further analysis.

The test system is controlled with an intuitive software.



Operating window for test system control and monitoring.

Accessories (optional)

- aerosol spectrometer for measuring the particle number concentration and the particle size distribution (series LAP, Topas)
- aerosol dilution system (series DIL, Topas)
- electrostatic neutraliser for adjusting the state of particle charge (EAN 581, Topas)
- generator for salt aerosols (ATM 240/S, Topas)

References

The Fraunhofer Centre for Silicon Photovoltaics CSP in Halle (Germany) evaluated the compliance of the CST 117 with the test procedure of the VDI guideline 3956.
Provided that the installation room is temperature-controlled, the CST 117 fulfils the requirements for the test procedure, the required system parameters and the dust loading.

Technical specifications of the prototype

temperature chamber	ambient temperature
temperature range sample holder	5 °C...40 °C
humidity chamber	60 % ± 5 %, controlled
angle of specimen	0 °...60 ° (discrete using fixed stop)
air velocity	⩽ 15 m/s
aerosol distribution on sample holder	± 15 % (dosing from above)
dimensions main chamber	(700 × 720 × 700) mm
primary surface sample holder	(200 × 200) mm
thickness sample	⩽ 10 mm
power supply	3 ~ TN-C-S mains/PEN 400 V AC, 50 Hz
power consumption	⩽ 6 kW
nominal current	10 A
compressed air supply	6...10 bar (ISO 8573-1 6/4/2)
noise emission	L_{pA} ⩽ 76,7 dB(A) ± 1,5 dB(A)
dimensions (WxHxD)	(2107 × 890 × 1647) mm
weight including devices	450 kg
test method	VDI 3956 (conformity)

The development of customised test systems is possible on request.