



The Stress Limit for your products

Temperature Shock Test Chamber Model TS¹³⁰

Application

We at Weiss...

The model **TS¹³⁰** temperature shock test chamber is a further example of the future-oriented testing systems developed by Weiss Umwelttechnik.

The design, the control system and the operation of the test chamber have been revised to provide the user with a testing system that is the best possible in every respect.

This is true for a great variety of technical and practical details as well as the price/performance ratio, whereby we gave equal weight to capital investment and operating costs.

The digital measuring and control system **SIMCON/32*-NET** with 32 bit processor developed by Weiss Umwelttechnik provides highest control comfort.

In conjunction with the software package **SIMPATI*** an extremely uncomplicated simulation management system is available that ensures complete documentation and management of complex test series.

Why performing shock tests?

Environmental conditions have a considerable effect on the function and the reliability of electronic components, devices and systems.

International standards and test specifications define the test performances for standard applications, e. g. in the electronics and automobile industries as well as in the aerospace industries.

The main purpose of temperature shock tests is to determine,

- if sudden temperature changes have an influence on the specimen's long term function,
- if safe operation of the specimen is still guaranteed after sudden temperature changes.

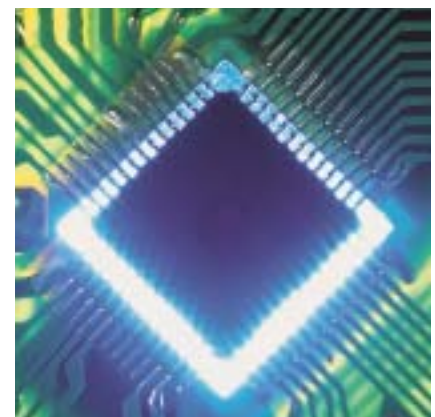
In addition, early failures due to part and workmanship defects can be provoked without reaching the mechanical and thermal stress limits of the construction. This test process, the **ESS stimulation (ESS = Environmental Stress Screening)**, is applied to discover such defects in early production stages.

Physical damage incurred as a result of temperature shock is principally caused by differing expansion coefficients. This gives an indication of the ageing properties and suitability of various materials and quickly reveals hidden defects (accelerated ageing).

A long term temperature cycle test is therefore increasingly gaining in importance.

The life expectancy of the test specimens can be forecast after a test carried out with a few hundred, or even a few thousand, temperature cycles.

The Temperature Shock Test Chamber System Weiss guarantees the user assured test results by complying with the requirements specified in the standards.



Test Description

The Test Procedure

The test chamber consists of two independently controlled chambers, one hot and one cold. These are positioned on top of each other. The temperature shock is achieved by rapid transferring the samples from one chamber to the other. The temperature levels and the number of cycles determine the severity of test.

A variety of standards specify the details of the test:

- Temperature of the hot chamber
- Temperature of the cold chamber
- Dwell time in the hot chamber
- Dwell time in the cold chamber
- Duration of transport process
- Number of cycles

Some of the standards also state requirements on how quickly the set temperature should be reached inside or on the surface of the test specimens. This requirement arises from the fact that however quickly the temperature changes at any point in the air stream inside the chamber it is of little significance for the true temperature stress in the test specimens.

It is the temperature change in the test specimen itself, and not that of the air, that determines the generation of temperature stresses within the test specimen.

Mode of operation

For a fast and even temperature conditioning the air flows horizontal through the hot and the cold chamber. In each chamber an axial fan blows the air over the conditioning elements – the electric resistance heaters in the hot chamber and the fin-type heat exchanger (evaporator) in the cold chamber.

A cascade refrigerating system with robust semi-hermetic compressors is being used. The safe performance of the compressors is monitored by several safety devices. Easy access enables an optimal servicing.

The Test Methods

Test method	Upper temperature			Lower temperature			Number of temperature
	°C	Dwell time (h)	$\Delta\theta$ (°C)	°C	Dwell time (h)	$\Delta\theta$ (°C)	
DIN-IEC 68-2-14 Na 1987 edition	+40 ... +220	0.5 ... 3	3 %	-10 ... -65	0.5 ... 3	8 %	5
MIL-STD 202F/107G 3/84 edition	+85 ... +200	0.25 ... 8	±0	-55 ... -65	0.25 ... 8	0/-5	5 / 25 / 50 / 100
MIL-STD 750C method 1051.5 4/92 edition	+85 ... +200	10 mins	±15/0	-55 ... -65	10 mins	±0/-10	20
MIL-STD 810F method 503.4 3/98 edition	upon agreement						
MIL-STD 883G method 1010.8 conditions A, B, C, [D, F]* 02/06 edition	+85 ... +200	min.10 mins upon specimen reach. setpoint	±15/0	-55 ... -65	min.10 mins upon specimen reach. setpoint	0/-10	at least 10
MIL-STD 331B Test 113.1/C7 3/97 edition	+71	>4		-54	>4		3
DEF 5011 4/71 edition	+70 ... +200	1	±3	-25 ... -65	1	±3	10
DEF 133 dry 8/71 edition	+55	3	±2	-40	3	±3	dry by agreement

These and other standards can be performed with the Temperature Shock Test Chamber System Weiss.

* Conditions D + F with options only

Technical Description

Design features and technical data

The temperature shock test chamber consists of the two internal chambers arranged one on top of the other with an automatically driven lifting basket.

The casing is made from corrosion-resistant galvanised sheet steel and is finished in two colours (RAL 5000 blue and RAL 9002 white grey).

The insulation consisting of mineral wool between the internal and external casing guarantees optimum insulation and thus the lowest possible operating costs.

The two internal chambers are constructed from high-quality stainless steel welded vapourtight.

Fluctuations in the air volume caused by temperature variations during the test cycles are compensated for by means of an integrated expansion device.

The test basket is raised from the cold chamber to the hot chamber by an electrical motor and a rod with pinion.

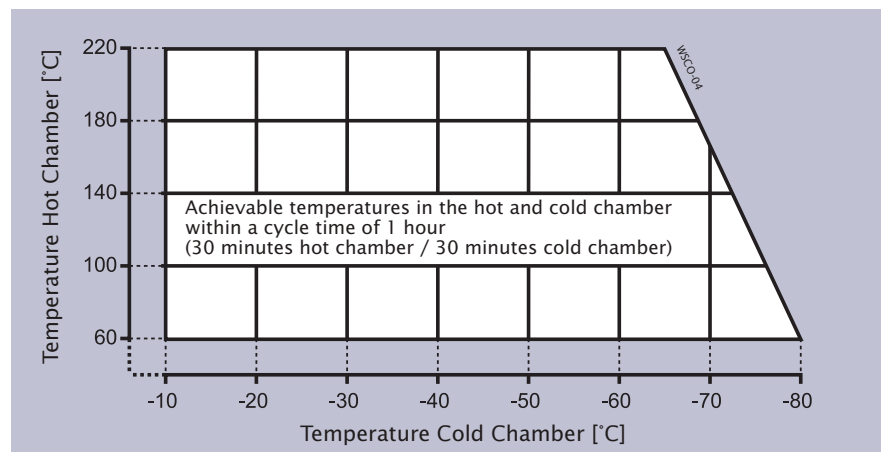
The vertical operating sliding door in ergonomic working height closes the hot chamber and saves space in front of the test chamber.

The window in the sliding door allows optimal observation of the test basket.

Model	TS 130	
Test basket volume	approx.	130 l
Test basket dimensions		
Height	approx.	430 mm
Width	approx.	500 mm
Depth	approx.	600 mm
External dimensions		
Height	approx.	1,990 mm
Width	approx.	1,820 mm
Width inclusive of door hinge	approx.	1,850 mm
Depth without door	approx.	900 mm
Depth with removable door	approx.	1,155 mm
Depth of notebook swivel	approx.	170 mm
Window in the sliding door		
Height	approx.	450 mm
Width	approx.	500 mm
Temp. range (refer to working range)		
Hot chamber	approx.	+60 ... +220 °C
Cold chamber	approx.	-10 ... -80 °C
Temperature constancy, in time	approx.	±1 K
Changeover time	approx.	10 secs
Max. specimen weight	approx.	20 kg
Temperature change of 10 kg ICs in		≤15 mins
Electrical connection	3/N/PE AC 400 V ±10 % 50 Hz CEE 32A connector	
Max. power consumption	approx.	28 A
Connected load	approx.	14 kW
Paint finish	RAL 5000 (blue) / RAL 9002 (grey)	
Sound pressure level free field 1 m distance from front of unit	approx.	61 dB (A)
Weight	approx.	950 kg

We reserve the right to make technical changes.

Working range:



Control and Monitoring

Operation and Program Control via the Digital Measuring/Control System SIMCON/32*-NET

SIMCON/32*-NET is a self-monitoring digital 32 bit measuring and control system and has especially been developed for the application in test chambers.

With its computing efficiency SIMCON/32*-NET fulfils the requirements of the process engineering and eases the entry function with an especially developed touch panel.

The graphic TFT colour touch panel with a resolution of 640 x 480 pixels is standard equipment.

The SIMCON/32*-NET system takes over all necessary control functions. Besides the control for hot and cold chambers it contains a powerful software PLC which coordinates and monitors all functions and informs you about failures.

Special features:

- TFT colour touch panel, adjustable in height for the easy input of parameters and performing program operation. Graphical representation of set and actual values, operating time and number of remaining cycles etc., including help function
- Program memory for up to 100 programs with a total of 1,000 program steps, 250 loops and 9,999 program cycles
- Software support of the potential-free switching inputs and outputs
- 4 each potential-free switching inputs and outputs
- Two-level password access that protects against unintentional editing
- Integrated threshold value monitoring system for hot and cold chamber
- Diagnostic system provides information on interruptions in operation and logs the machine operating times and switching frequencies of the individual system components
- Parallel printer interface [Centronics] for graphic documentation for HP Deskjet Color and EPSON printer
- Serial interface RS 232 C, galvanically isolated, for connecting to a computer system or for networking
- Compatible with simulation management software SIMPATI* for uncomplicated management and logging of data records
- 2 expansion slots for measuring, input and output modules.



Operating and Documentation

The temperature shock test chamber can be operated via the

- Colour touch panel or via a
- notebook.

Test cycles can be programmed and started via the touch panel.

A trend graphics informs about the temperature levels in both the hot and cold chambers. Duration of test and number of cycles are displayed and are easy to monitor.

Programmes set up in the notebook are transferred into the measuring and control system SIMCON/32*-NET.

The test chambers are equipped with a serial interface for the upgrading of configurations.

Linking to peripheral systems not only allows for compatibility and flexibility but also opens up new opportunities in the field of environmental simulation technology.

Thanks to compatibility with all software products of Weiss Umwelttechnik many more convenient operating and monitoring features are available.



Shock chamber – basic menu



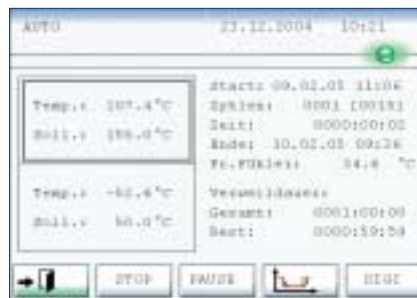
Shock chamber – basic menu for automatic mode



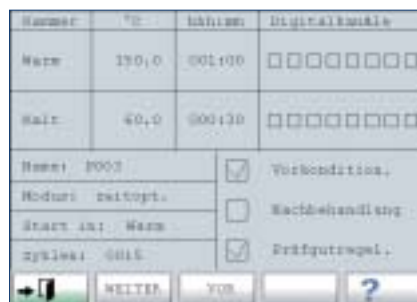
Shock chamber – settings for start of program



Shock chamber – status menu



Shock chamber – program editor



Simulation package for test system integration SIMPATI*

For complete documentation and graphic evaluation the computer-aided simulation management software SIMPATI* is available. Installed on the optional notebook service station the user can access the complete service of a PC via Windows:

Especially:

- Coordinate the test procedure
- Safe measuring data
- To easily establish test programs via the graphic editor
- To network up to 99 units with each other
- To print measuring data as graphic and to copy them into other programmes for evaluation

By the use of internal interfaces SIMPATI* is compatible with

- Microsoft Word
- Microsoft Paint
- Microsoft Excel
- Labview
- Special user software by the use of online and socket interface

Standard

- High performance temperature cycling (sufficient for 10 kg of integrated circuits as specified in MIL-STD 883G/1010.8, Conditions A, B and C)
- Manual sliding door with window 450 x 500 mm
- Height-adjustable specimen shelf in the lifting basket
- 1 access port, diameter approx. 32 mm, integrated into the rack to insert the connecting lines
- Integrated expansion device allows up to 1000 cycles without defrosting
- Icing sensor for cold chamber heat exchanger
- Hermetic, water cooled, refrigerating cascade
- Pre-cooling/pre-heating
- Superheating/supercooling
- Digitally adjustable high and low temperature protection (specimen protection according to EN 60 519-2 [1993] with separate sensor) one for the hot and one for the cold chamber
- Preselection of position of test basket before test start
- TFT colour touch panel with simple, menu-guided operation [no programming knowledge necessary]
- Operational modes adjustable (normal, optimized processing time and energy-saving mode)
- Temperature sensor to record the temperature profile of the surface of the specimen, freemoving inside the test basket
- Serial interface RS 232 C
- 4 each potential-free switching inputs and outputs (digital)
- Efficient cross-air circulation
- Low energy consumption
- Modular construction
- Easy access to the units
- Small footprint
- Ready-to-plug-in construction
- Factory calibration (WKD) of 2 temperature values (hot chamber 125 °C/cold chamber -40 °C)

Options

- Heating of cold chamber
Extension of cold chamber temperature range to -80 ... +40 °C
- Cooling of hot chamber
Extension of hot chamber temperature range to +20 ... +220 °C
- Cold accumulator for cold chamber
- Variable speed air circulation fans
- Electrically opening and closing of sliding door
- Inert gas feed via solenoid valve
- Air-cooled refrigeration unit
- Special wire box in the specimen basket for ICs
- Cable port diameter 60 mm (or NW 100 mm) in the basket and in the chamber ceiling
- Lifting device for specimen weight of max. 50 kg
- Other voltages and frequencies
- Additional calibrations
- Ethernet/CAN interface (100/10 Mbit) in connection with SIMPATI* for integration into a network
- Software package SIMPATI* for Windows 2000, Windows 2003 Server or Windows XP Prof
- Additional potential-free switching inputs and outputs
- Measuring data acquisition system for Pt 100 and voltage signals ± 10 V
- Potential-free contact for emergency call appliance
- Configuration modules for interface standards such as RS 422, RS 485 [4 pole], IEF 488.2 and optical waveguide
- Mobile design
- Analog outputs for set and actual values
- Increased heating and cooling capacity
- Additional Pt 100 sensor/with plugs

Special accessories on request.

Test Technology for Professionals. Test the best...



A complete line of systems is available offering test space volumes ranging from approx. 34 l to 2,160 litres, a working range from $-75 \dots +180 \text{ }^\circ\text{C}$ and relative humidity values ranging from 10 ... 98% r.h.

We also offer an extensive line of field-proven test systems specially for simulating exposure to weather, temperature shock, corrosion and long-time tests for application in research, development, quality control and production.

Of course, Weiss Umwelttechnik – as one of the leading producers of environmental simulation systems worldwide – offers the entire spectrum of high-tech test systems starting from a series of cost-effective test systems up to customized walk-in chambers and in-line systems as per customer specifications.

If it's know-how, service and reliability that you are looking for – contact Weiss Umwelttechnik.

Further information, offices in Germany, subsidiaries and representatives worldwide are available at

www.weiss.info



Weiss Umwelttechnik GmbH
Simulationsanlagen • Messtechnik

35447 Reiskirchen-Lindenstruth / Germany • Greizer Str. 41–49
Telefon (0 64 08) 84-0 • Telefax (0 64 08) 84-87 10
www.weiss.info • www.wut.com • eMail: info@wut.com