TEMPERATURE SHOCK TEST CHAMBERS
VARIOUS TEST POSSIBILITIES

Thanks to rapid and high-speed temperature change tests, failures on products which will undergo such extreme impacts can be detected in an early production stage — prior to delivery to end user.

The wide product range of Air-to-Air and Liquid-to-Liquid Temperature Shock Test Chambers are suitable for quality control and production screening.

VARIOUS TEST POSSIBILITIES

AIR-TO-AIR TEMPERATURE-SHOCK TEST CHAMBERS — ENABLE TESTS ACCORDING TO THE FOLLOWING STANDARDS:

- MIL-STD 202 D/E/F, method 107C/F/G, test conditions A; B; C; F
- MIL-STD 202 D/E, method 102 A
- MIL-STD 883 A, method 1010.1, test conditions A; B; C; D; G
- MIL-STD 883 C, method 1010.6, test conditions A; B; C; D; F
- MIL-STD 883 C, method 1010.7, test conditions A; B; C; D; F
- MIL-STD 883 D, method 1010.7, test conditions A; B; C; D
- MIL-STD 883 C, method 1011.4, test conditions A; B; C; D
- MIL-STD 883 C, method 1011.7, test conditions A; B; C; D (on request E/F)
- MIL-STD 883 D, method 1011.9, test conditions A; B; C
- MIL-STD 883 D, method 1011.9, test conditions A; B; C
- IEC 68-2-14 (IEC test Na) and further requirements.

LIQUID-TO-LIQUID TEMPERATURE SHOCK TEST CHAMBERS — ENABLE TESTS ACCORDING THE FOLLOWING STANDARDS:

- MIL-STD 202 F, method 107 G, test conditions AA; BB; CC; DD
- MIL-STD 883 A, method 1011.1, test conditions A; B; C; D (on request E/F)
- MIL-STD 883 C, method 1011.4, test conditions A; B; C; D (on request E/F)
- MIL-STD 883 C, method 1011.7, test conditions A; B; C (on request E/F)
- MIL-STD 883 C, method 1011.9, test conditions A; B; C
- MIL-STD 883 D, method 1011.9, test conditions A; B; C
- IEC 68-2-14 (test Nc, severity 1)

TTS 8100 S2 – horizontal shock test chamber with 1000 l volume.
TWO CHAMBER - TEMPERATURE SYSTEM -
SPECIMEN MOVING WITH THE BASKET

Conventional version:
specimen moving with the basket

Vertical types:
TTS 8013 S2, TTS 8030 S2

Horizontal types:
TTS 8050 S2, TTS 8100 S2

Special types are available on request.

The two test compartments (cold chamber/hot chamber) can be placed vertically or horizontally. An electrically driven basket moves the test specimen between the cold- and hot chamber, the rapid temperature cycling in the temperature range from -80 °C till +220 °C, which will produce a temperature shock and an extremely stressing of the test specimen.

- Casing: Galvanized sheet steel, paint coated, colour light grey (RAL 7035)
- Interior and basket: stainless steel, mat.-no. 1.4301
- Doors: (one for cold- and one for hot chamber) fitted with safety microswitches (stop immediately the chamber operation when one of the doors is opened)
- Portholes for measurement line etc.: 2 pieces Ø 23 mm for vertical types (further portholes optional)
- Nitrogen-purging system (N2): to avoid condensation on the specimen
- Horizontal laminar airflow: for even spatial temperature distribution
- Powerful fans: for rapid adaption of the specimen at the air circulation
- Short temperature change time
- Key-Kratos Plus Color-touchscreen panel enables user-friendly control, interface and documentation of the chamber

<table>
<thead>
<tr>
<th>Type description</th>
<th>Basket capacity in l</th>
<th>Basket load in kg</th>
<th>Basket useful dimensions in mm (W x D x H)</th>
<th>External dimensions in mm (W x D x H)</th>
<th>Chamber weight in kg</th>
<th>Electrical power in kW average / max.</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTS 8030 S2</td>
<td>310</td>
<td>50</td>
<td>700 x 700 x 650</td>
<td>1150 x 2900 x 2400</td>
<td>1600</td>
<td>24 / 40</td>
<td>400 V ± 10% 50Hz 3ph+ N+G</td>
</tr>
<tr>
<td>TTS 8050 S2</td>
<td>510</td>
<td>100</td>
<td>630 x 900 x 900</td>
<td>1830 x 2080 x 2640</td>
<td>3500</td>
<td>28 / 48</td>
<td>400 V ± 10% 50Hz 3ph+ N+G</td>
</tr>
<tr>
<td>TTS 8100 S2</td>
<td>1000</td>
<td>150</td>
<td>730 x 1000 x 1400</td>
<td>4490 x 2420 x 2650</td>
<td>4920</td>
<td>60 / 112</td>
<td>400 V ± 10% 50Hz 3ph+ N+G</td>
</tr>
</tbody>
</table>

horizontal cross-section
(top-view)
TWO CHAMBER - TEMPERATURE SYSTEM - SPECIMEN MOVING WITH THE BASKET

TTS 8013 S2 – Spinner
# TECHNICAL DATA

TTS 8013 S2 – Spinner

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basket capacity</td>
<td>130 litres</td>
</tr>
<tr>
<td>Max. basket load</td>
<td>35 kg</td>
</tr>
<tr>
<td>Basket useful dimensions (W x D x H)</td>
<td>approx. 614 x 500 x 425 mm</td>
</tr>
<tr>
<td>Chamber external dimensions (W x D x H)</td>
<td>approx. 1165 x 2025 x 2700 mm</td>
</tr>
<tr>
<td>Temperature range hot chamber</td>
<td>+70 /+220 °C (± 1 K)</td>
</tr>
<tr>
<td>Temperature range cold chamber</td>
<td>-80 /+60 °C (± 1 K)</td>
</tr>
<tr>
<td>Basket displacement speed</td>
<td>&lt; 10 s</td>
</tr>
<tr>
<td>Resetting time with 5 kg compact steel in the temperature range -65/+150 °C</td>
<td>2 min</td>
</tr>
</tbody>
</table>
| Max. load with MIL 883 (15 min resetting time on specimen) | 10 kg with MIL 883 test D  
14 kg with MIL 883 test C  
18 kg with MIL 883 test B |
| Electrical power maximal                                | 26 kW               |
| Noise (measured at 1 m from the front of the chamber in a non reverberating room) | 70 dB (A)          |
| Weight                                                 | 1250 kg             |
| Voltage                                                | 400 V ± 10% 50Hz 3ph+ N + G |

**COMPACT**

- reduced footprint by optimized cooling units

**PRECISE**

- integrated spindle drive ensures a noise- and vibration less as well as precise guidance of the basket

**QUIET**

- operating noise reduced thanks to the modification of components parts

**USER FRIENDLY**

- new controlling S/W and colour LCD interactive touchscreen, remotely programmable by PC and Winkratos® S/W.
SINGLE CHAMBER - TWO TEMPERATURE SYSTEM - SPECIMEN FIXED IN ITS POSITION BY SHIFTING OF THE AIRFLOW FROM HOT- TO COLD CHAMBER

THE CONCEPT

The new generation of these shock test chambers features an innovative method of shock tests suited for a huge variety of applications, essentially enhancing the use thereof.

The test specimen is located in a fixed test compartment. The otherwise usual basket moving in between the cold and hot chamber may cease. The rapid temperature change rate of up to 40K/min is achieved by reversing the airflows from hot to cold chamber and reverse.

THE ADVANTAGES

- Electrical and/or mechanical connections to specimen can be established without any problems (easy and authentic evidence of test results provided by the rest position of test specimen and its connections).
- Any interim values can be run for cooling temperature-/ heating temperature change rate.
- Temperature cycles according to MIL STD 883 and IEC 68-2-14 are met.
- ESS-tests und conventional temperature tests can be performed.
- Distinguished by high performance, safe operation, reliability, space-saving, low energy cost.

<table>
<thead>
<tr>
<th>Temperature range</th>
<th>-80 °C / +220 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature accuracy in time</td>
<td>± 0.5 K</td>
</tr>
<tr>
<td>Heating temperature rate from -55 °C to +125 °C</td>
<td>40 K / min</td>
</tr>
<tr>
<td>Cooling temperature rate from +125 °C to -55 °C</td>
<td>20 K / min</td>
</tr>
<tr>
<td>Recovering time (-55 °C/+125 °C) with 5 kg compact steel</td>
<td>15 min</td>
</tr>
<tr>
<td>Voltage</td>
<td>400 V ± 10 % 50Hz 3ph+ N + G</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type description</th>
<th>Useful dimensions in mm (W x D x H)</th>
<th>External dimensions in mm (W x D x H)</th>
<th>Max. load in kg</th>
<th>Weight in kg</th>
<th>Max. electric power in kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTS 8013 F</td>
<td>580 x 510 x 420</td>
<td>1400 x 1780 x 1950</td>
<td>30</td>
<td>900</td>
<td>17</td>
</tr>
<tr>
<td>TTS 8032 F</td>
<td>700 x 700 x 650</td>
<td>2740 x 1700 x 2450</td>
<td>50</td>
<td>2400</td>
<td>40</td>
</tr>
</tbody>
</table>

TTS 8013 F  

TTS 8032 F
THREE CHAMBER - TEMPERATURE SYSTEM - SPECIMEN MOVING WITH THE BASKET

Some international standards (MIL-STD, IEC, DIN etc.) require a short intermediate step at ambient temperature during thermal shock tests. UTK deals with this issue by using three cabinet units. Between the hot- and cold compartments is a third cabinet with both heating and cooling units. A sophisticated system allows the basket to be moved from the cold cabinet to the ambient and from this to the hot cabinet. A set of special sliding gaskets on the basket allow the air seal to be made in various positions of its travel minimising thermal interaction.

The three cabinet chamber series have a transparent door for the ambient chamber in order to facilitate the specimen loading and unloading.

Special models can be manufactured in horizontal configuration on request.

<table>
<thead>
<tr>
<th>Type description</th>
<th>Useful capacity in l</th>
<th>Max. Basket load in kg</th>
<th>Basket useful dimensions in mm $W \times D \times H$</th>
<th>External dimensions in mm $W \times D \times H$</th>
<th>Weight in kg</th>
<th>Max. Electrical power in kW</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTS 8003 S3</td>
<td>27</td>
<td>16</td>
<td>250 x 360 x 300</td>
<td>970 x 2050 x 2150</td>
<td>1000</td>
<td>18</td>
<td>400 V ± 10% 50Hz 3ph+N+G</td>
</tr>
<tr>
<td>TTS 8011 S3</td>
<td>110</td>
<td>28</td>
<td>500 x 500 x 440</td>
<td>1400 x 2600 x 2500</td>
<td>1350</td>
<td>28</td>
<td>400 V ± 10% 50Hz 3ph+N+G</td>
</tr>
</tbody>
</table>

TTS 8050 S3

TTS 8011 S3
### OPTIONAL ACCESSORIES - FOR ALL AIR - TO - AIR TEMPERATURE SHOCK TEST CHAMBERS

**LN2-Auxiliary Cooling**

UTK Temperature Shock Test Chambers can be equipped with an auxiliary cooling system with LN2 supplied by means of centralized tank or bottles. This auxiliary cooling system achieves a fast temperature recovery time when the thermal load in the basket is exceeding the load limits.

**Specimen Temperature Recording**

Additional thermal probes can be connected to the recorder to measure the temperatures at additional points. The probes are installed in the movable basket passing through two special dedicated portholes (see further accessories).

**Connecting Portholes**

Various sizes of portholes are available according to chamber models. They allow an easy electric connection between equipment external to the chamber and the devices under test in the basket.

---

<table>
<thead>
<tr>
<th>Constructive features</th>
<th>Your advantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galvanized sheet steel, exterior surface: paint coated, interior surface: stainless steel, mat.-no. 1.4301</td>
<td>Robust construction, ergonomic features and functional design, no corrosion formation</td>
</tr>
<tr>
<td>TIG welded and vapour tight internal chamber, internal structure connected to the external structure by means of phenolic joints</td>
<td>No ingress of humidity, no thermal bridge between internal chambers and external environment, resulting in energy savings</td>
</tr>
<tr>
<td>2 extra-large full-light doors with soft double silicone gaskets and key-locks</td>
<td>Full accessibility to the chambers, no water vapour infiltration at low temperatures, possibility to use the cabinets separately</td>
</tr>
<tr>
<td>Powerful fans, driven by external motors, ensure the air circulation</td>
<td>Quick response of the specimen to temperature changes, uniform temperatures inside the cabinets</td>
</tr>
<tr>
<td>Cooling systems driven by two cascade compressors, complete with safety valves and thermal protections Refrigerations: R404A for the first stage and R23 for the second stage</td>
<td>Rapid cooling with low noise level, maximum reliability of the equipment, low level of vibration, ozone friendly and non-inflammable refrigerations, low cost of operation</td>
</tr>
<tr>
<td>Heating system by means of ripped pipe heaters, protected by adjustable failsafe over temperature switches</td>
<td>Fast recovery times due to low thermal inertia, heat radiation in the cabinet is minimized</td>
</tr>
<tr>
<td>Control by means of PLC controller input/output are connected on variable Pt 100 temperature probes</td>
<td>Fast thermal response with continuous and linear control over the whole range, precise control of temperatures by means of Pt100-thermal probes</td>
</tr>
<tr>
<td>Temperature probes Pt 100 with 100 ohms at 0 °C as per DIN-specifications</td>
<td>Fast response and good linearity in the range -100 °C to +200 °C</td>
</tr>
<tr>
<td>Electric connections according IEC-specifications</td>
<td>High reliability and operator safety</td>
</tr>
<tr>
<td>Continuous recording</td>
<td>Fully automatic chamber operation with recorded results</td>
</tr>
<tr>
<td>Fans-stop during the basket movement</td>
<td>Reduced air mixing between the cold- and hot chambers</td>
</tr>
<tr>
<td>Micro switches on the chamber doors</td>
<td>Chambers stop in case of doors opening, operator safety</td>
</tr>
<tr>
<td>Safety push button in case of emergency</td>
<td>Easy protection of chamber and specimen in case of failure</td>
</tr>
<tr>
<td>“Undercooling” or “overheating” operation modes available</td>
<td>Faster temperature recovery time after basket transfer</td>
</tr>
</tbody>
</table>

---

**Nitrogen (N2) Purging system**

This system allows to avoid the condensation of internal humidity on the specimen under test, thus increasing the number of cycles before defrosting. The use of this option also eliminates the presence of oxygen in the chamber to prevent oxidation phenomena at high temperature on the contacts of the components under test.

**Set of no. 8 auxiliary contacts**

**Interface and Software**

**Winkratos®**

for remote control and programming via PC

**Remote air condenser** (on request)

**Special voltages or frequency** (on request)
LIQUID-TO-LIQUID TEMPERATURE SHOCK TEST CHAMBERS

Using our Liquid-to-Liquid Temperature Shock Test Chambers, a complete standard series for many applications to perform liquid-to-liquid thermal shock tests is available. Two powerful compressors are connected in cascade and provide rapid and reliable temperature cooling performance.

A specially conceived evaporator ensures condensation and recovery of liquid vapours to minimize consumption. Environmentally friendly refrigerations are used.

Basket movement operates electrically and takes less than 10 seconds when changing from cold well to hot well.

To minimise liquid losses due to evaporation, an plexiglass safety door closes the test compartment.

The Liquid-to-Liquid Temperature Shock Test Chambers can be operated optionally with two different liquids or with one liquid only as compared to GALDEN D02.

An expansion valve ensures pressure compensation during the tests.

The TTS L-models can be equipped with a wide range of accessories (recorders, customized trays for the specimen, vapour suction blower with automatic butterfly valve etc.).

<table>
<thead>
<tr>
<th>Type description</th>
<th>Hot well capacity in l</th>
<th>Cold well capacity in l</th>
<th>Basket useful dimensions in mm (W x D x H)</th>
<th>External dimensions in mm (W x D x H)</th>
<th>Weight in kg</th>
<th>Max. Electrical power in kW</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTS 6012 L</td>
<td>19</td>
<td>26</td>
<td>120 x 120 x 120</td>
<td>1160 x 1050 x 1900</td>
<td>700</td>
<td>6</td>
<td>400 V ± 10% 50Hz 3ph+ N+G</td>
</tr>
<tr>
<td>TTS 6020 L</td>
<td>44</td>
<td>56</td>
<td>200 x 200 x 200</td>
<td>1400 x 1050 x 2100</td>
<td>950</td>
<td>10</td>
<td>400 V ± 10% 50Hz 3ph+ N+G</td>
</tr>
<tr>
<td>TTS 6030 L</td>
<td>103</td>
<td>123</td>
<td>300 x 300 x 300</td>
<td>2320 x 940 x 1950</td>
<td>1200</td>
<td>18</td>
<td>400 V ± 10% 50Hz 3ph+ N+G</td>
</tr>
</tbody>
</table>
CONTROL SYSTEM / INTERFACE / DOCUMENTATION

BASIC CONFIGURATION: KEYKRATOS PLUS

Hardware
- 4096 colours with STN tecnology
- 3 types of memory support for storing cycles, recordings and alarms
- Compact Flash, Pendrive (USB key style), internal memory
- User friendly data input during editing, check and administration of cycle

OPTIONAL: WINKRATOS® SOFTWARE

Winkratos® S/W package offers a powerful and flexible control and management system. It allows the user to:
- Control and monitor the chamber from a remote PC
- Create and manage a test programs archive
- Record and manage a test records archive

Graphic functions
- Graphic monitoring of chamber measure behavior with multiple charts panel
- Delayed start of the chamber to optimize time scheduling
- Graphic test programs editor with two editing mode: „entry-level“ and „advanced“

Acquisition functions
- Record of occurred events such as alarms, commands etc.
- Record of chamber values during tests

Additional functions
- Print test programs in text format
- Export test data recorded in ASCII format
- Possibility to add notes on the graph
- Global monitor to control many chambers at the same time

Winkratos® can be installed on PCs

Real time recording of temperatures versus time (LOG on compact flash)
- USB interface on front panel for stick or printer
- Recording in CSV format (Comma Separated Value) for easy export to Excel®, program files are easily convertible into graphic format
CUSTOMISED-SOLUTIONS

Walk-in Temperature- and Climatic-Shock Test Chamber
Two chamber - system, test space volume 54 m³, specimen movement via trolley

Temperature Shock Test Chamber
three chamber - system – specimen fixed in its position (horizontal) by shifting of the airflow from hot- to cold chamber, basket capacity: 3000 l

THE UTK PRODUCT SPECTRUM INCLUDES FURTHERMORE:

- Temperature- and climatic test chambers
- Walk-in and drive-in temperature- and climatic test chambers
- Vibration test chambers
- Test chambers with sunlight simulation
- Sand- and dust test chambers
- Rain test chambers
- Dry corrosion test chambers

- Vacuum test chambers
- High-vacuum test chambers / Space simulators
- Temperature- and climatic units
- Chambers (internal and external) for tempering / conditioning of existing rooms
- systems of the environmental simulation for the integration of manufacturing processes
- Customised-specific special solutions