



# With vibration and high speed to top quality

Vibration test chambers WT/V and WK/V

# Additional safety...

## ...to temperature/humidity testing vibration test – for safety.

High product reliability is a basic requirement for today's competitive market and is often the only difference between the products of various manufacturers.

The reliability of electronic products can be substantially improved by the use of environmental stress screening (ESS) techniques.

ESS is a process that accelerates the occurrence of latent defects before delivery.

This will minimize the risk of errors and failures of products and simultaneously improve the reputation of a company.

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Where thermal/climate tests are not sufficient the test severity can be increased by the addition of a dynamic parameter vibration.



# ... Temperature + Humidity + Vibration



## ... convincing product advantages by ESS-tests

- Improvement of product reliability. The products do not simply function, they operate correctly for a long period of time.
- The quality itself is substantially improved, customer satisfaction increases and the sale of reliable products likewise. Reliable products ensure that the reputation of the manufacturer on the market remains a good one.
- ESS means reduced costs as product failures do not occur during the warranty period when they are already in the possession of the customer.
- ESS reduces the risks connected with the launching of a new product or a new technology.
- ESS means quick “feedback”. Weak points of products are detected in the manufacturer’s plant at an early point of time and can be remedied immediately.



# Method . . .

## The test . . .

During the ESS test, the products are subject to a precisely defined stress.

In practice, the following ESS methods have prevailed:

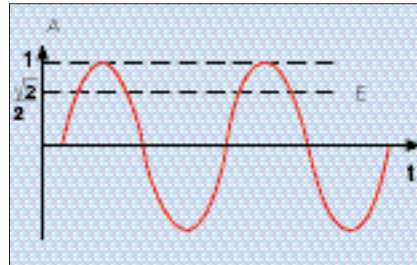
- Temperature stress
- Vibration stress
- Humidity stress

in conjunction with electrical stress.

Test tailoring is essential so as to ensure that sufficient stress is applied so as to precipitate early failures, but should not be so severe as to cause undue damage to good products.

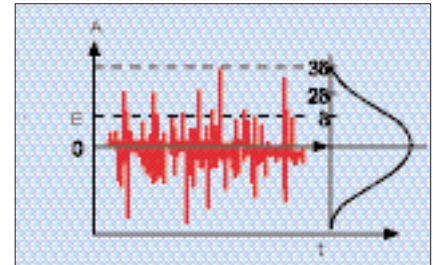
## Increased severity through vibration . . .

Sinus



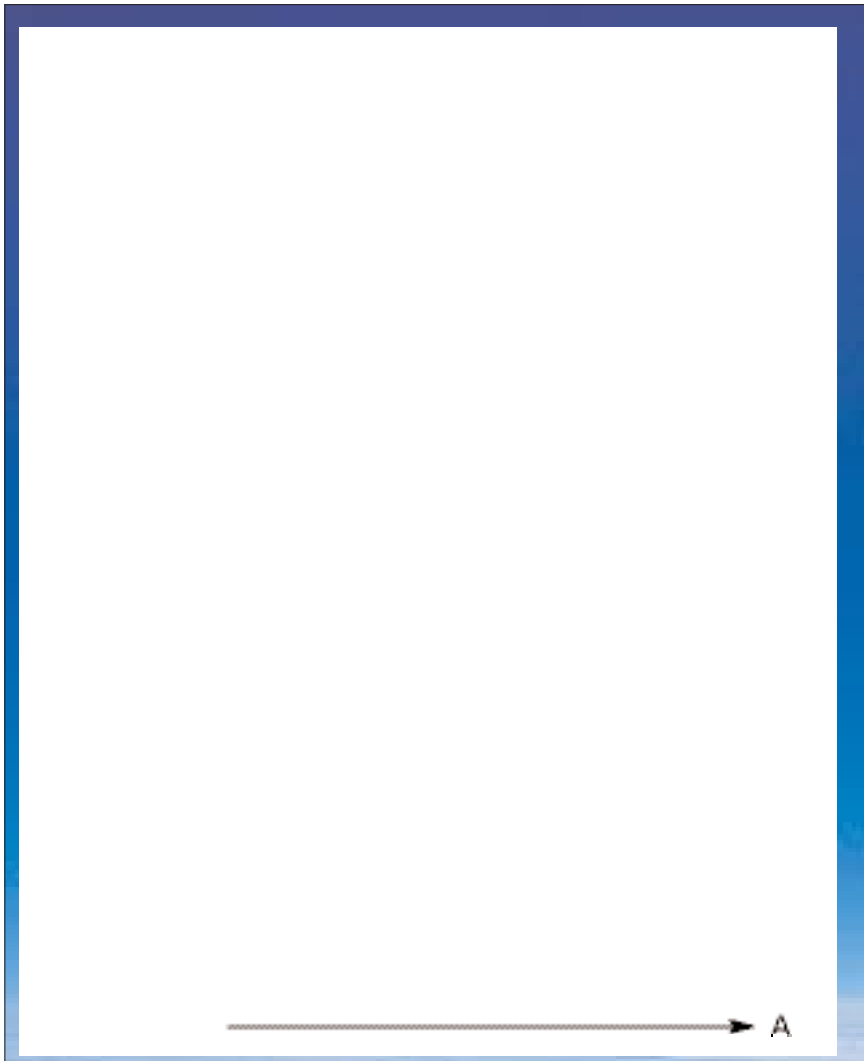
A = Amplitude  
E = effective  
t = Time

Random



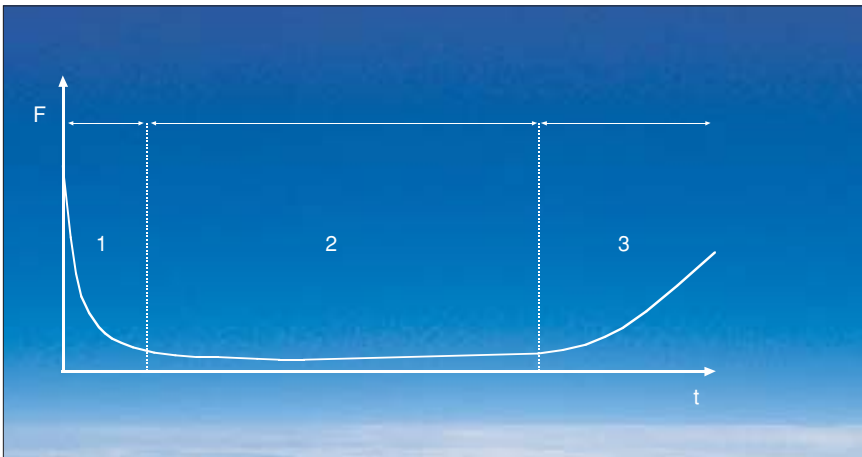
A = Amplitude  
E = effective  
t = Time

## Effectiveness of environmental screens



- 1 Temperature cycling
- 2 Vibration, Random
- 3 High temperature
- 4 Electrical stress
- 5 Temperature shock
- 6 Vibration, sinus
- 7 Low temperature
- 8 Vibration sinus, sweep
- 9 Combined test
- 10 Mechanical shock
- 11 Humidity
- 12 Acceleration
- 13 Low pressure

A = Weighted rank



Service life curve of electronic components  
 ESS means that errors which normally occur during the usage phase occur in the production phase  
 $F = \text{error} \cdot t = \text{time}$   
 1 = early failures · 2 = usage phase · 3 = wear phase

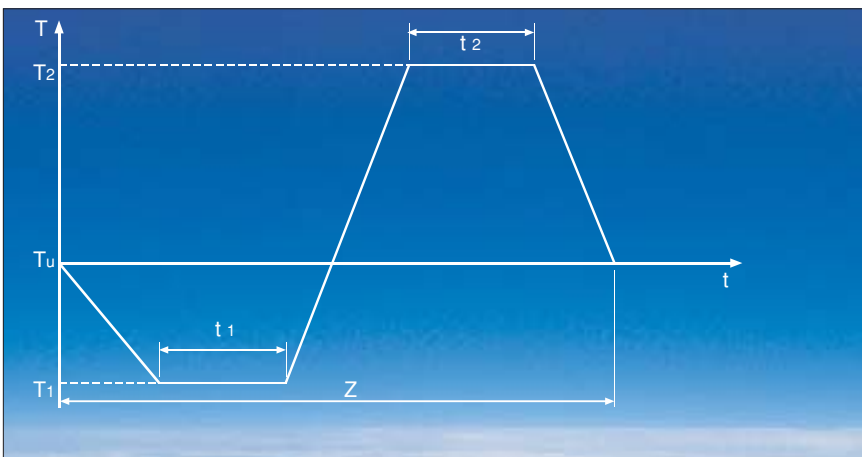
## Mode and effects ...

Our stress screening test chamber series was specially designed for temperature stress. The WK series of climate test chambers is available for humidity stress. Additionally, WT/V and WK/V chambers are available for combination of the above parameters with vibration.

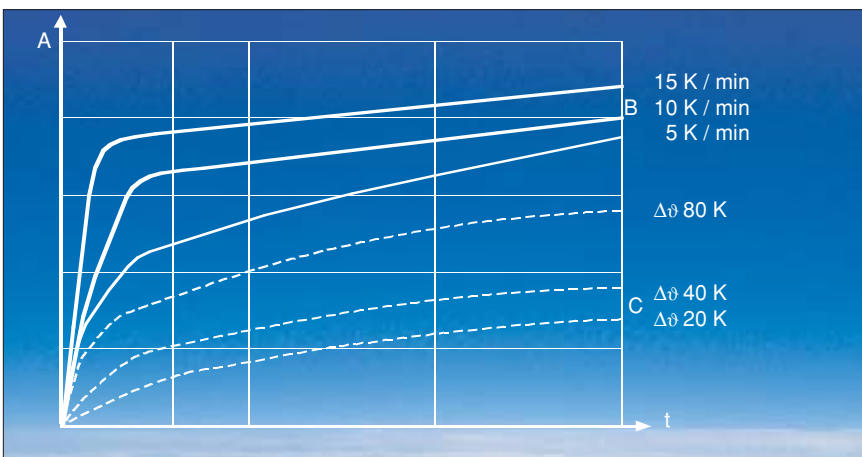
Environmental stress screening on PCBs (or other products) is achieved by thermal stress with quickly changing temperatures. ESS is the most effective method of detecting poor soldering joints as well as manufacturing errors before delivery.

Typical ESS test profiles have a temperature ramping rate of 5...15 K/min over a wide temperature range (see technical data on page 10/11).

Weiss Umwelttechnik has developed a range of systems especially for this purpose which does more than justice to the above mentioned requirements.



Temperature shock cycling test as per IEC 60068-2-14, Test Nb  
 $T = \text{temperature}$  ·  $T_1 = \text{low temperature}$  ·  $T_2 = \text{high temperature}$   
 $T_u = \text{ambient temperature}$  ·  $Z = \text{cycle}$  ·  $t = \text{time}$



Effectiveness of thermal cycles and high temperature storage for preconditioning of circuit boards  
 $A = \text{effectiveness}$  ·  $B = \text{thermal cycles}$  ·  $C = \text{high temperature storage}$  ·  $t = \text{time}$   
 $\Delta\vartheta = \text{temperature increase to max. working temperature}$

# Convincing technology...

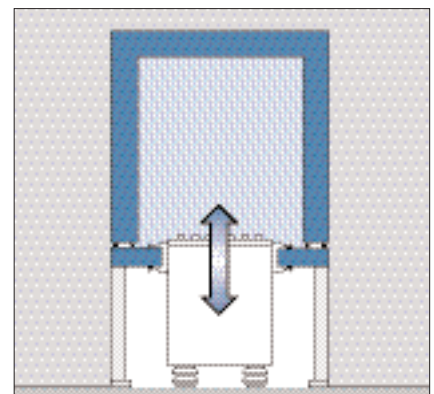
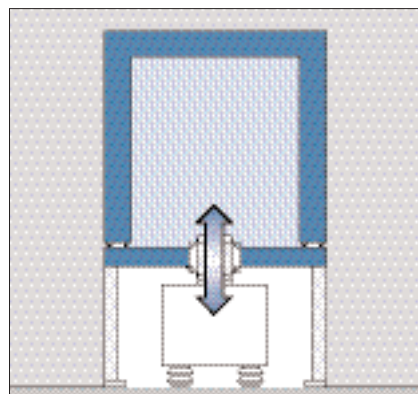
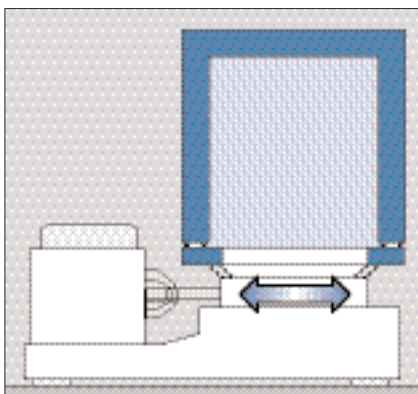
## Vibration test chamber configuration...

The test systems based on the well-tried modules of the WT and WK series with increased power for heating, cooling and circulating air and test chamber volumes of 600 to 2200 litres are capable of meeting virtually all requirements.

The WK/V series also complies with customary climatic test standards.

The technology of the systems, as is to be expected from the ergonomic design, provides optimum operation and reliable functioning:

- Powerful, homogeneous temperature and/or climate conditioning of the test chamber.
- The specimens are protected by an independent temperature measurement and monitoring.
- Optimized air ductwork for all test chamber volumes.
- No obstruction from struts or legs below test space.
- Colour touch panel with simple, menu-guided operation.
- 32 bit measuring and control system.
- Easily accessible maintenance elements ensure minimum service times.
- Automatic water replenishment without interrupting operation with large storage tank for the WK/V series.
- Environmentally friendly, high-quality insulation.
- Precise adjustment of system height to accommodate standard shakers.
- Optimal, compact external dimensions.
- Minimal installation work on site.
- Embossed stainless steel test space with integral shelf support.
- Easy-to-clean test chambers thanks to special welding and molded racks.
- Tightly sealed and easy-to-clean surfaces thanks to powder coating.
- Simple integration of all standard shakers.
- Networking of chamber control software and shaker control software possible (TCP/IP-Protocol).



# ... and functional design



# Function and technology in detail . . .

## Construction features and function principle

The beautifully designed outer casing is made of corrosion-resistant, galvanized sheet steel with an environmentally friendly coating.

The test chamber door is hinged on the left and has optimum contact pressure when closed.

The machine unit with the large cooling units is located underneath the test chamber in a maintenance-friendly position.

The entire power electronics is located in a switch cabinet at the back of the test chamber.

Every electronic function circuit has its own safety mechanism which switches off the relevant function circuit and/or the entire test chamber when faults occur.

The test space is made of high-gloss polished, high-quality stainless steel and is vapor-tight welded. The evaporator, heating elements and the large ventilation equipment with external drive motors are installed behind the conduit which is at the back of the test space.

A special air ductwork system together with the enhanced temperature conditioning systems ensures quick and even temperature conditioning of the specimens.

The test chamber is equipped with separate sensors to protect the specimens irrespective of the temperature control system. Additional ducts in the side panels are provided for the electrical connections of the specimens from the outside.

The temperature conditioning system of the WK series is also equipped with humidification and dehumidification equipment with a humidity sensor. The humidity sensor is located in front of the specimens in the air stream together with the control sensor for the temperature.

## Standard version

- Chamber height adaptable to shaker system.
- Low/high temperature safety cutout as per EN 60519-2 (1993) with separate sensor, thermal safety class 2.
- Serial interface RS 232 C, 4 potential-free switching inputs and outputs each.
- Contactless switching of heating elements.
- 50 mm Ø entry port in the left and 125 mm Ø in the right side panel.
- Water-cooled condensers.
- Control system **SIMCON/32\*-NET** with colour touch panel.
- WKD-calibration.

## Additional features for WK/V series

- Capacitive humidity sensor.
- Special temperature conditioning system in the climate working range for optimum temperature and humidity constancy.
- Low water indicator.



## Options

- Mobile version.
- Electro-mechanical height adjustment.
- Test chamber floor without vibrator port.
- Test chamber floor with rectangular port for slip table.
- Ethernet/LAN interface.
- Software package **SIMPATI**!
- Additional potential-free switching inputs and outputs.
- Measured data recording system for Pt 100 and voltage signals  $\pm 10$  V.
- Configuration modules for interface standards e. g. RS 422, RS 485, IEEE 488.2 and optical waveguide.
- Analog outputs for set and actual values.
- Additional Pt 100-sensor/thermal elements.
- Door with window.
- Door with window and reach-through openings.
- Fresh air purge system.
- Adjustable air speed.
- Entry ports 50 mm, 80 mm, 125 mm Ø.
- Other mains supplies and frequencies.
- Air-cooled condenser.
- GN<sub>2</sub>-purge.
- LN<sub>2</sub>-shock cooling.
- Compressed air drying for protection against condensation.
- Sound insulation.
- Notches.
- DKD-calibration.

## For WK/V series

- Water demineraliser.
- Dewpoint extension in the climate range.



# ... Operation and documentation

## ... convenient and stress-free operation

The Vibration Test Chambers are equipped with the self-monitoring, digital 32-bit measuring and control system **SIMCON/32\*-NET**. This system coordinates all control functions. Integration of the test unit

into your computer network is easily possible via Ethernet/LAN interface (RJ 45). Input functions and display of the operating parameters are effected via the graphic colour touch panel.



Additional features:

- High-resolution colour display (VGA).
- Operating and error display in clear text.
- Operation by simply touching the function symbols.
- Program editor and program storage for up to 100 programs.
- Password protection.
- Menu-guidance.

## ... the right software as an optimum extension

# SIMPATI\*

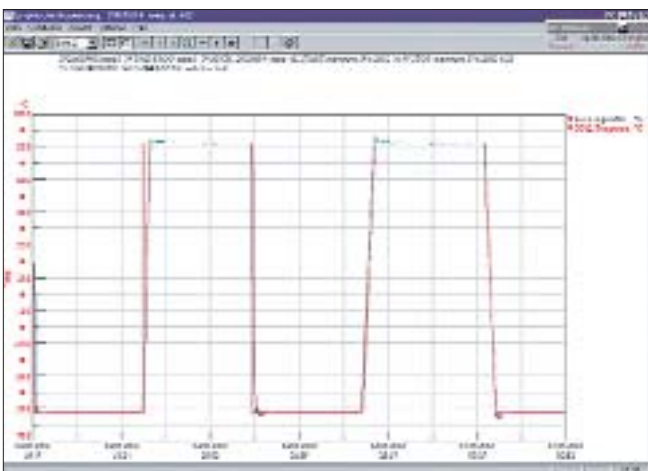
2000/Windows XP Professional, Windows 2000 Server, Windows 2003 Server.

graph and copying in other programs for evaluation purposes. Max. 99 systems can be networked.

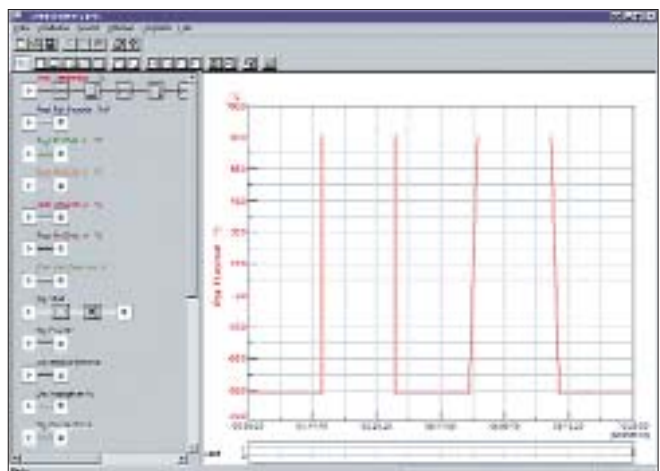
The software package **SIMPATI\*** enables for the preparation, realisation and documentation of simulation processes by PC under Windows

This means controlling the test sequence, storing measured data, creating comfortable test programs with the graphics editor and printing the measured data in the form of a

Thanks to an internal interface, the software is compatible with Microsoft Word, Microsoft Paint, Microsoft Excel, National Instruments Labview and special user software.



Symbolic editor



Graphic display

# Technical data . . .

## Vibration test chambers

## WT/V – WK/V 5 K/min

Type	WT/V - WK/V	600		1200		2200		
		/40/5/V	/70/5/V	/40/5/V	/70/5/V	/40/5/V	/70/5/V	
Test space contents	Liter	600	600	1150	1150	2160	2160	
Test space dimensions	Height	950	950	950	950	1100	1100	
	Width	800	800	1100	1100	1400	1400	
	Depth	800	800	1100	1100	1400	1400	
Outside dimensions	Height	2150	2150	2150	2150	2300	2300	
	Width	1225	1225	1525	1525	1825	1825	
	Depth	2860	2860	3210	3210	3590	3590	
Chamber width (incl. colour touch panel)	mm	1500	1500	1800	1800	2100	2100	
Height (up to bottom side test space floor min/max)	mm	660/1380	660/1380	660/1380	660/1380	660/1380	660/1380	
Largest shaker port diameter	mm	680	680	980	980	1280	1280	
Largest slip-table port	mm	600*600	600*600	900*900	900*900	1200*1200	1200*1200	
<b>Performance for temperature tests</b>								
Temperature range	°C	-40...+180	-70...+180	-40...+180	-70...+180	-40...+180	-70...+180	
Change rate (1)	Cooling	K/min	5.5	5.0	5.5	4.5	6.5	6.0
	Heating	K/min	5.0	5.0	5.5	5.5	6.0	6.0
Heat compensation	at +20 °C	W	5000	5000	5000	5000	5000	5000
	at -20 °C	W	2000	5000	2000	5000	2000	5000
Temperature fluctuation	K	±0.1 to ±0.5 in time, ±0.5 bis ±2.0 spatial				±0.1 – ±0.8 in time, ±0.5 – ±2.0 spatial		
Climate calibration values +23 °C and +80 °C								
<b>Performance for climate tests</b>								
<b>only WK/V</b>								
Temperature range	°C	+10 ... +95						
Dewpoint range (5)	°C	+4 ... +94						
Humidity range	% r.F.	10 ... 95						
Humidity fluctuation	% r.F.	±1 to 3 in time						
Temperature fluctuation	K	±0.1 to ±0.3 in time, ±0.5 to ±1.0 spatial						
Heat compensation (2)	W	500						
Climate calibration values +23 °C / 50 % r.h. and +95 °C / 50 % r.h.								
Electrical connection 3/N/PE AC, 400 V ± 10 %, 50 Hz								
Max. connected load	kW	11	14	21	24	26	34	
Max. current consumption	A	18	26	39	41	41	50	
Sound pressure level – 1 m from the front (3)	dB (A)	68	71	75	76	76	77	
Cooling water consumption (4) max.	m <sup>3</sup> /h	2.2	2.7	3.3	3.8	4.1	6.6	
Weight	kg	1000	1075	1450	1600	2100	2500	

Performance data refer to +25 °C ambient temperature

(1) Change rate as per IEC 60068-3-5, measured in the supply air stream

(2) At +25 °C to +90 °C, humidity to max. 90 % r.h.

(3) Free field measurement as per DIN 45635, Part 1, accuracy class 2

(4) At a cooling water temperature of +28 °C and temperature difference of 5 K, water temperature +12 °C to +28 °C

(5) Data only valid with blank floor element



**WT/V – WK/V 10 K/min**

**WT/V – WK/V 15 K/min**

WT/V – WK/V 10 K/min						WT/V – WK/V 15 K/min					
600 /40/10/V	600 /70/10/V	1200 /40/10/V	1200 /70/10/V	2200 /40/10/V	2200 /70/10/V	600 /40/15/V	600 /70/15/V	1200 /40/15/V	1200 /70/15/V	2200 /40/15/V	2200 /70/15/V
600	600	1150	1150	2160	2160	600	600	1150	1150	2160	2160
950	950	950	950	1100	1100	950	950	950	950	1100	1100
800	800	1100	1100	1400	1400	800	800	1100	1100	1400	1400
800	800	1100	1100	1400	1400	800	800	1100	1100	1400	1400
2150	2150	2150	2150	2300	2300	2150	2150	2150	2150	2300	2300
1225	1225	1525	1525	1825	1825	1225	1225	1525	1525	1825	1825
2860	2860	3590	3590	3940	3940	2860	2860	3590	3590	3940	3940
1500	1500	1800	1800	2100	2100	1500	1500	1800	1800	2100	2100
660/1380	660/1380	660/1380	660/1380	660/1380	660/1380	660/1380	660/1380	660/1380	660/1380	660/1380	660/1380
680	680	980	980	1280	1280	680	680	980	980	1280	1280
600*600	600*600	900*900	900*900	1200*1200	1200*1200	600*600	600*600	900*900	900*900	1200*1200	1200*1200
-40...+180	-70...+180	-40...+180	-70...+180	-40...+180	-70...+180	-40...+180	-70...+180	-40...+180	-70...+180	-40...+180	-70...+180
12.0	10.5	11.5	10.5	11.5	11.0	17.0	14.5	17.0	14.5	16.0	15.5
9.5	9.5	12.0	11.0	10.5	10.5	15.5	16.5	16.0	16.0	15.0	15.0
8000	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000
3000	8000	3000	8000	3000	8000	3000	8000	3000	8000	3000	8000
±0.1 to ±0.8 in time, ±0.5 to ±2.0 spatial +23 °C and +80 °C <b>only WK/V</b> +10 ... +95 +4 ... +94 10 ... 95 ±1 to +3 in time						±0.1 to ±0.8 in time, ±0.5 to ±2.0 spatial +23 °C and +80 °C <b>only WK/V</b> +10 ... +95 +4 ... +94 10 ... 95 ±1 to +3 in time					
±0.1 to ±0.5 in time, ±0.5 to ±1.0 spatial 500 +23 °C / 50 % r.h. and +95 °C / 50 % r.h. 3/N/PE AC, 400 V ± 10 %, 50 Hz						±0.1 to ±0.5 in time, ±0.5 to ±1.0 spatial 500 +23 °C / 50 % r.h. and +95 °C / 50 % r.h. 3/N/PE AC, 400 V ± 10 %, 50 Hz					
16	20	24	26	35	44	20	24	30	32	54	65
26	37	41	49	51	63	30	43	51	65	88	111
74	75	76	77	76	77	74	75	76	77	76	77
3.5	4.2	6.6	6.6	8.4	8.3	6.1	6.3	8.4	8.3	10.0	10.1
1250	1400	1850	2150	2350	2750	1300	1450	2000	2300	2500	2900

We reserve the right to make any technical alterations.  
Some equipment photos show chambers with optional accessories.



# Test systems 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 – as one of the leading producers of environmental simulation systems world-wide – 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.

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

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