ATLAS - Solar Climatic Test Cabinet SC 2000 MHG
A T L A S - SolarClimatic

Type SC 2000 MHG
Test chamber capacity approx. 3400 l
Radiation area approx. 1.36 m²

♦ TECHNICAL DATA

Characteristic values for temperature tests with radiation
Temperature range -20 °C to +100 °C
Temperature fluctuation in steady state in accordance with IEC 60068-3-5 ±1 K temporal

Characteristic values for climatic tests with radiation
Temperature range +15 °C to +80 °C
Temperature fluctuation in steady state in accordance with IEC 60068-3-5 ≤ 0.5 K temporal
Humidity range 10 % to 80 % r.h.
Dew point range +5 °C to +74 °C
Humidity fluctuation, in steady state ±3 % to ±5 % r.h. temporal

The performance values are attained at an ambient temperature of +25 °C.
**Radiation**

Kind of radiation  
2 x 4 KW - metal -halide - lamp

Radiation intensity  
800 to 1200 W/m² related to the radiation area, infinitely variable

Regularity  
± 5% related to the radiation area

Filter system  
outdoor, indoor-glasses can be mounted

Spectral power distribution  
global radiation 280 to 3000 nm, recommended for eiging testings, CIE Publ. No. 85 Tab. 4 and DIN 75220 Tab. 1, print 2/4

Radiation area  
approx. 1700 x 800 mm, in a distance of min. 600 mm from the chamber ceiling

Radiation modulation  
< 1%

Output stability  
+/− 1%

**Characteristic values for temperature tests without radiation**

Temperature range  
approx. -30 °C to +100 °C

aperture  
approx. -40 °C to +120 °C (light transmission aperture closed with optional isolation cover)

Temperature fluctuation  
in steady state in accordance with IEC 60068-3-5  
±0.1 K to ±0.5 K temporal

Rate of temperature change  
in accordance with IEC 60068-3-5  
heating: 2.0 K/min.  
cooling: 1.5 K/min.
**Characteristic values for climatic tests without radiation**

Temperature range  
+10 °C to +90 °C

Temperature fluctuation  
in steady state in accordance  
with IEC 60068-3-5  
±0.1 K to ±0.3 K temporal

Humidity range  
10 % to 90 % r.h.

Dew point range  
+5 °C to +87 °C

Humidity fluctuation,  
in steady state ±1 % to 3 % r.h. temporal

The performance values are attained at an ambient temperature of +25 °C.

**Humidity diagram**

A Test space temperature in °C  
B Relativ humidity in % r.h.

1 Range without radiation  
2 Range with radiation
Data for installation and operation

Dimensions

external dimensions

3500 mm wide
1450 mm deep
2700 mm high*

with radiation attachment

test chamber

2000 mm wide
1150 mm deep
1510 mm high

* optional accessory

1 Installation position entry port Ø 80 mm
2 Area for further installation positions entry port Ø 50 mm*, Ø 80 mm* or Ø 125 mm*
14 Touch control panel
15 Drain for test space and humidification water R 3/4*
25 Radiation module
27 Isolation covers*
15a Cooling water connections R 3/4" 
15b Drain for overpressure for humidifier, NW 50 
16 Mains connection 
18 Main switch with independent, adjustable temperature limiter $t_{\text{min}} / t_{\text{max}}$. 
   connector panel 
19 Door with window 
22 Connection for humidification water R 3/4"
Weight approx. 1550 kg net (incl. radiation module)

Noise level approx. 68 dB(A) for free-field measurement at a distance of 1 m

EMC Test (electromagnetic compatibility) according to EN 50 081-1, 1993

Interference immunity according to EN 50 082-2, 1996

Electrical connection
Nominal voltage 3/N/PE AC 400 V ±10 % 50 Hz
Nominal power approx. 26 kW
Nominal current approx. 46 A (neutral conductor fully loaded)
Plug Cekon 50 A
Connection cable approx. 3.5 m
Customer-supplied fuse protection 50 A, slow-blow

Note: in combination with option “controlling of black standard temperature” the connection will be changing to fixed instead of plug.

Cooling water water quality: without contaminant (max. grain size: 40 Micrometers, pH-value approx. 7)
water pressure: 3 to 6 bar
differential pressure ≥ 2 bar
water temperature: +12 °C to max. +28 °C

Cooling water connection water inlet R 3/4” female thread
water outlet R 3/4” female thread

Cooling water consumption tap water:
max. 1.1 m³/h at a cooling water temperature of 18 °C and a temperature difference of 10 K
cooling tower:
max. 2.2 m³/h at a cooling water temperature of 28 °C and a temperature difference of 5 K
Humidifying water  

town-water min. 3 bar; R 3/4”

Drain for condensate and cleaning water  
hose connection R 3/4”, unpressurized

Operating conditions  
ambient temperature  +10

°C to +35 °C

max. relative air humidity 75 % r. h.

Installation conditions

The equipment is designed for installation in normal rooms. The max. permissible ambient temperature for storage and installation is +55 °C.
**Equipment**

**Radiation unit**
- radiation module with metal-halide-lamp
- lamp manual adjustable in height
- thermo-isolating glass
- electronic starter and receiver

**Filters systems**
- outdoor filter,
for indoor testing the test cabinet is equipped with a special guide rail, which is mounted below the lamp.
A window glass (optional accessory) can be then positioned in this rail.

**Test space**
- polished stainless steel - grade 1.4301
- max. load of test space floor 150 kg,
- internal racks must allow 20 mm space from the main walls

**Door**
- double wing,
one-hand operation,
lockable,
dimensions: 2000 mm wide
1510 mm high

**Entry ports**
- 1 entry port Ø 80 mm installed on l.h.side

**Refrigeration unit**
- low-noise (silent) refrigeration unit
- water-cooled
- continuously variable power adjustment by electronic monitoring and control system
- hermetically sealed refrigeration cycle

**Refrigerant**
- R 404 A
- chloride-free refrigerant
- The ozone depletion potential is zero (ODP = 0,00)

**Climatic system**
- steam generator
- capacitive humidity measuring system

**Fresh air equipment**
- to reduce test specimens emission,
  additional switchable in a temperature range from +15 °C to +80 °C
  stage 1 = 3 m³/h
  stage 2 = 9 m³/h

**Finish**
- resistant powder coating
  colour: RAL 9002, grey-white
Installation feet separately adjustable in height
Control microprocessor control and monitoring system SIMCON/32
- 32 bit technology
- graphical representation of set point and actual value
- digital display of set point and actual value of temperature in °C and relative humidity in % relative humidity
- digital input of temperature in °C and humidity in % relative humidity
- integrated programme generator
- programme memory
- manual and automatic operation
- fault diagnostic system
- radiation ON/OFF via digital channel
- digital input in % intensity

Control terminal

**Touch control panel**
- graphics LCD-display
- display with ¼ VGA resolution
- display with backlighting
- operation by touching function symbols
- graphics symbols for programming functions
- graphical representation of the current test values
- menu-guiding, clear text display, trend function
- easy programming of individual test programmes
- storage of individual programmes, which can be activated at any time.
- programme storage for 100 programmes with total 1000 sections, 250 loops and 9999 cycles
- software support for up to 32 digital switching channels
- password protection
- inspection system (maintenance system), giving information about combined working hours, number of switching events of a particular component and its failures
- digital input of temperature, rel. humidity and % intensity
- display of working hours of radiation unit

Centronics interface for graphical documentation for HP Deskjet Color and Epson printer

Interface RS 232 for connection of the laptop control unit or for communication with customer’s computer

Test specimen protection
- independent adjustable temperature limiter $t_{\text{min}} / t_{\text{max}}$
- according to EN 60 519-2 1993, thermal protection class 2
- individually adjustable fixed values,
movable sensor in test space,
• adjustable software temperature limiter min. / max.,
  individually adjustable fixed values
Protection of test specimens safety switch especially for heat emitting test specimens connection onto potential-free changeover contact, max. load 24 V, 0.5 A

Fault message radiation module if radiation module gives fault message the test cabinet error message is activ and gives message

Temperature safety device safety temperature limiter (STB) for protection of the test cabinet against overheating

Digital customer I/O • 4 digital outputs for switching of customers’ equipment via potential-free contacts, load max. 24 V-DC; 0.5 A

• 4 digital inputs for feedback from customers equipment, load max. 24 V-DC, approx. 30 mA

The insulation voltage for inputs against earth is 1000 V-DC

Protection class

climatic test cabinet: IP 22
 electrical compartment: IP 54
 control terminal: IP 54
 radiation module: IP 20

Notes and definitions

All figures are average values which have been obtained at an ambient temperature of +25 °C and a nominal voltage of 400 V/50 Hz, without test specimens, without radiation and without accessories.

The sensors of the temperature and humidity controller are fitted in the inlet air stream to test volume. The technical data mentioned are measured at the position of the controller sensor.

The temperature and humidity accuracy mentioned is measured in the centre of the work space, under stabilized conditions, without test specimens and without heat load in the work space.

The noise measurement and sound level statements are according to DIN 45 635, Part 1, Accuracy class 2.

The EMC Test (electromagnetic compatibility) and the statements regarding interference are
according to EN 50 081-1. The interference immunity is according to EN 50 082-2.
**CABINET DESCRIPTION**

The test cabinets series SolarClimatic provides you with a sophisticated testing system produced by applying highly innovative production technology. Numerous significant features support your tests in compliance with defined standards or in accordance with your specific demands. The modular and service-friendly design and the use of environmental-friendly refrigerants with no ozone depleting potential ensures that our systems have a long service life.

**Compact Housing**

The individual components are installed in a space-saving manner, so that they are easily accessible. The housing is made of galvanised steel sheet. An extremely wear resistant surface is achieved thanks to the environment-friendly powder coating. Attention has also been paid to good environmental use of the insulation material for the inner container. The insulating layer, consisting purely of mineral fibres, guarantees high heat insulation.

**Accurate Measuring System**

The measuring sensors for temperature and humidity are located in the supply air into the test space. The measured climatic values correspond to the test space climate. Humidity measurement is performed in accordance with the internationally recognised capacitive measuring principle.

**Radiation System (MHG)**

The radiation system is consisting of the radiation unit and the supply unit (power supply).

**The Radiation Unit**

The radiation unit is made out of two (2) SolarConstant systems. Each system is equipped with a MHG lamp of 4.000W, a reflector system and an igniter.

**Both systems will be installed on top of the climatic chamber and individual mechanical adjustments can be made. Radiation into the test chamber is made through filter glass (two layer glazing).**

**The spectral distribution of the system is based on the requirements for the "Total Radiation", as shown in the CIE Publ. No. 85 Tab.4. The spectral power distribution is in accordance to the percentages shown for the different spectral ranges in DIN 75220, Tab.1., the so-called “Outdoor Spectrum”**.
To meet the requirement of the DIN 75220 "Indoor-Spectrum" (Test behind window glass), two measures can be taken.

1. The "Indoor-Filter" (4mm window glass) will be directly adapted to each of the radiation systems.
2. Large window glass segments will be placed into the path of rays inside the test chamber.

![MHG System with optical filter](image)

**The Supply Unit**

The electronic power supply, **EPS-Modul 2500/4000**, is used to control the operation of the MHG lamps. For each SolarConstant system one EPS-Modul is required.

The **EPS-Modul** offers a **Stabilised power output**, a **Low modulation** (<±1%) of the radiation, an **Intensity control** from 50% to 110% and an **extended lamp life**.

Variation of the electrical power to control the irradiance will always result in a change of the spectral power distribution, as the various fillings of the lamp react differently. A reduced electrical power will cause an increase of the UV and a decrease of the IR portion.

If the application of the system is ageing test on material and components, the electrical power control needs to be limited to a range of max. 80%–110% (requirements spectral power distribution acc. to DIN 75220). When thermal solar load tests are performed, the full control range can be used.

**Microprocessor-supported Control SIMCON/32**

The electrical control devices are easily accessible in a swivel compartment. The design complies with regulations VDE 0100 and DIN EN 60204-1.

Digital control is via a modern microprocessor with 32-bit technology. With this computing performance the SIMCON/32 meets the high demands of process and control technology as well as those of microelectronics and information technology.

The standard control terminal is ergonomically positioned. Current temperature and humidity values are graphically displayed. The terminal provides access at all times to all operating functions. Help texts are available for easy operation.
With optional interfaces networking of several systems is possible.

**Touch Control Panel**

The touch control panel is easy to use with clear graphics display, function symbols and graphics symbols.

The display with ¼ VGA resolution (320 x 240 pixel) has backlighting and is therefore easily seen. Simply touch the required function symbol to operate the cabinet.

It offers complete access at all times to all operating functions, a graphical representation of the current test values and help text for the current operating function. Touch the terminal to switch between the three modes.

Individual test programmes are particularly easy to create.

Time-consuming acquisition of programming knowledge is not necessary. All functions such as jumps, ramps, loops etc. are displayed as graphics symbols and are adopted by the test cycle when touched. Thus you can easily create, save and retrieve extensive test programmes including the programming of test specimen activation.

**Built-in Safety**

The control monitors the system functions and gives necessary signals.

- Over temperature in the test space (according to EN 60 519-2 class 1, 1995)
- Over temperature in the test space, adjustable (according to EN 60 519-2 class 2, 1995)
- Under temperature in the test space, adjustable (according to EN 60 519-2 class 2, 1995)
- Excess pressure and over temperature in the refrigeration circuit
- Switching-off of test specimen via a potential-free contact

**Test Specimen Protection**

The test cabinet is equipped with an independent upper and lower temperature limiter (adjustable temperature limiter) according to EN 60 519-2 class 2, 1995. The threshold temperature \( t_{\text{min}} \) and \( t_{\text{max}} \) have a digital setting. Alarm message will be acoustical. This test specimen protection hardware is independent from the included programmable software temperature limiter.

**Environment-friendly Materials**

The refrigerant used R 404 A is CFC-free and is leading in ecological terms. Systems equipped with R 404 A meet with the latest standards. The ozone depleting potential is reduced to zero. The cabinets are prepared for the safe disposal of refrigerant and compressor
oils by our service engineers. The insulation material is an asbestos-free mineral fibre applied by a special process. This avoids environmental pollution using a CFC-foamed polyurethane insulation. The resistant powder coating does not release any harmful substances into the environment.

**Maintenance and Service**

In the event of a fault, our service network with trained technicians and spare part supply is available throughout the world. Training, commissioning and maintenance are possible by our specialists. If required, we can offer a maintenance and service contract.
**BASIC EQUIPMENT**

**Basic Equipment**

Basic equipment, type **ATLAS SC 2000 MHG**

- Touch control panel
- Micro-processor monitoring and control unit SIMCON/32
- Digital customer I/O, potential-free 24 V, 4 freely disposable inputs/outputs
- Independent adjustable temperature limiter \( t_{\text{min}} / t_{\text{max}} \)
- Adjustable software temperature limiter min./max.
- Humidity input and display in % rel. humidity
- Centronics printer interface
- Serial interface RS 232
- Potential-free contact for switching-off of test specimens

- Water-cooled refrigeration unit
- humidification and dehumidification
- Capacitive humidity measuring system
- Fresh air equipment

- 1 Entry port, NW 80 mm, left-hand side

- radiation unit with 2 x 4 kW metal-halogenid-lamps
- filter system outdoor
- set value of intensity in % intensity
- fault diagnostic system for radiation unit
- display of working hours of radiation unit

- 1 Set of operating instructions