Salt Spray Chamber HKT 1000

Corrosion testing system to carry out atmospheric corrosion tests according to the following test specification:

DIN EN ISO 9227 (DIN 50 021) NSS, AASS, CASS test
DIN EN 60068-2-11
ASTM B 117
ASTM B 287
ASTM B 387

Optionally extensible to perform the following test specification:

DIN EN ISO 6270-2 (DIN 50017)
DIN EN ISO 6988 (DIN 50 018)
VDA 621-415
VDA 621-415 (B or new) (separate equipment series)
VW PV 1210
DIN EN ISO 4541 Corrodkote test
DIN EN 60068-2-52 with intensity degree 1 to 2
DIN EN 60068-2-52 with intensity degree 1 to 6
SWAAT / PV1208

Quality features:

- **Precision metering pump**
- **Acrylic nozzle**
- **Transparent hood**

Note: optionally also available lacquered in RAL 7035.

KÖHLER AUTOMOBILTECHNIK

Technical description

Outer frame:
Frame structure and external panelling made of stainless steel, marbled.
(Optionally outer frame also available with stove-lacquered RAL 7035.)

Test chamber:
Polypropylene tank with fully transparent acrylic hood with 30 degrees roof pitch.
The opening and closing movement is supported by two pneumatic springs.
5 support rods for positioning of the test material in the usable space are included.

Dimensions:

	Test chamber	External dimensions
Width:	1250 mm	2100 mm
Depth:	950 mm	1165 mm
Height without hood:	760 mm	940 mm
Height with hood: (Start of hood inclination)	850 mm	1370 mm

Test chamber heating:
Indirect heating by heating mats, which are placed on the outside of the internal tank for easy maintenance.

Compressed air humidifier:
Heated stainless steel tank with filling level indication and automatic water feeding for the continuous level control of the humidifier.

Flow control
Electronically controlled precision metering pump for a constant feeding of brine to the spraying nozzle. The function of the metering pump is independent from the spray pressure and the salt solution level. Therefore, it allows a very good reproducibility of the fog concentration.

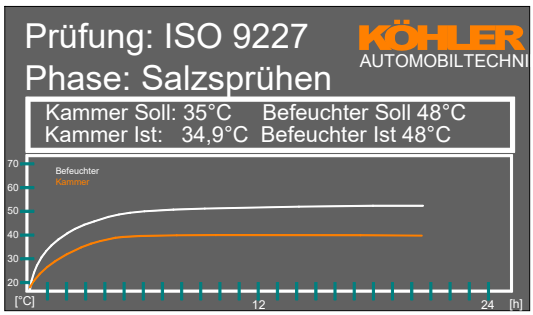
Spray pressure control:
By use of a constant pressure reducer, prepressure fluctuations of the compressed air supply provided by the customer practically have no influence on the spraying pressure. The pressure setting is indicated on a well visible front manometer.

Ventilation function
Manually or programme controlled rapid ventilation to discharge the salt fog out of the test chamber.

Control

Control system Basic:

- Easy operation
- Coloured screen display of test and interval times (resolution 480 x 272)
- TFT graphic display (resolution of 480 x 272)
- Temperature indication of set value / actual value for the test chamber and the humidifier
- All important tests are already programmed by factory
- Easy and comfortable programming of factory standards
- Control of the heating without contact
- Recovery of the current test after power failure



Technical data:

(The technical data partially depend on the additional options.)

Temperature range:	from ambient temperature to +55 °C
Temperature constancy:	+/- 1.0 K in time
Test chamber volume:	approx. 1000 l
Connecting power: **Mains voltage:**	2800 W 230/50 1P
Fog generation:	2-component spray nozzle of low wear acrylic glass (PMMA) with long durability, easy to maintain
Compressed air connection:	Consumption approx.: 2.5 – 3 Nm³/h Necessary pressure: 4.5 – 8.0 bar *Compressed quick air coupling for the compressed air supply provided by the customer included* *(Note: For all salt spray standards an oil-free and particle-free compressed air is necessary.)*
Water supply (deionised water):	2.0 – 5.0 bar Deionised water is necessary for the refeeding to the air humidifier. Systems with VDA auxiliary equipment also need deionised water for the rinsing device as well as for automatic filling of the test chamber bottom for condensation water tests.
Disposal:	Fog outlet: NW 32; e.g. by wall breakthrough Condensate drain: NW 32 by bottom discharge
Storage tank (brine):	External tank with 250 l sufficient for approx. 200 h spraying operation (Required brine during salt spraying: approx. 0.5l to 1l per hour)
Weight:	approx. 350 kg

Safety equipment

Temperature tolerance monitoring
Defective heating systems are identified and switched off by continuous comparison of the set target temperature and the measured actual temperature.

Over-temperature protection for test chamber heating
Safety temperature limiter STB according to DIN 3440 (VDE 0631)

Over-temperature protection for the humidifier heating
Safety temperature limiter STB according to DIN 3440 (VDE 0631)

Constant pressure reducer with reverse control and maximum pressure limitation
By use of the constant pressure reducer, pressure fluctuations in the spraying air are compensated.

Pressure control valve for humidifier
Safety pressure control valve with TÜV adjustment certification.
An increase of the humidifier pressure above the permitted set range of 1.8 bar is prevented.

Dry running protection
An overheating of chamber and humidifier is avoided by the installed dry running protection.

Scope to be provided customer:

- Laying of the electrical lines or provision of the necessary sockets depending on the type of chamber
- Even foundation at the place of installation
- The devices are only designed for an inside installation with the following limit values which have to be observed: ambient temperature 18°C to 28 °C, ambient humidity < 85%
- All wall / mortise breakthroughs
- Outgoing air conducts to be laid to the device with constant gradient
- Condensate discharge (preferably discharge via the bottom)
- Compressed air connection (filtered and oil-free compressed air): min. 4.5 to 8.0 bar
- Water connection / supply with demineralised water min. 2.0 to 5.0 bar
  o *optionally via water deionisation system or osmosis system feasible*

Extensions / additional modules

Order number

Extension module for condensation water testing: **4500420**
According to DIN EN ISO 6270-2 (DIN 50017), Corrodkote test DIN EN ISO 4541
Bottom water heating to achieve a high and constant air humidity
for an optimal thawing of the test material.
Temperature range: room temperature to +50°C
Note: Higher temperatures are possible with module 4500910.

Extension equipment for cyclic corrosion testing: **4500920**
e.g. VDA 621-415, VW PV 1210 (DIN EN ISO 554 23/50)
This module consists of additional technical equipment
to carry out corrosion change tests automatically.
The room air provided by the customer is used to adjust the climate for the useful volume.
Filling and discharge of the bottom trough are carried out automatically with fresh water.
The operating programme allows the selection of already firmly stored test standards and the free programming of customer-specific test sequences.

Notes:
- Already includes the extension module for condensation water testing (4500420).

- To implement the standard PV 1210 (DIN EN ISO 554-23/50), a standard climate module should be used at the place of installation with no air-conditioned environmental conditions. (Option 4500930 or 4500935)

Standard climate modules

Test standards, as for example PV1210 or VDA621-415, include test sections with "normal climate conditions" (23°C / 50% rH).
They can be generated at an air-conditioned place of installation by easy ventilation (already available in 4500920).
In case of places of installation with no air-conditioning or strongly changing installation conditions, the normal climate can be generated by the standard climate modules 1 or 2.
The standard climate modules 1 and 2 generate a constant climate of 23°C / 50% relative humidity (rH) in which a water bath and thus also the air can be cooled down to the corresponding dew point temperature. Differences exist in the regulation or control of the dew point temperature and the humidity measurement.

Standard climate module version 1: **4500930**
For test ventilation with conditioned air 23°C/50% rH
Control via dew point (exactitude: ± 1°C)
A controlled climate 23°C/50%rH is generated in the test chamber, as necessary for example for the VW testing PV 1210.
Climate conditions at the place of installation: temperature: +18 - +28°C, air humidity: max 85%
Standards: PV 1210, VDA 621-415, standard climate for DIN EN 60068-2-52 intensity 3-6

Note: The module for a humid air storage is additionally necessary to implement the standard DIN EN 60068-2-52. (4500960)

Standard climate module version 2: **4500935**
For test ventilation with conditioned air +23°C/50% rH
Controlled via dew point (exactitude: ± 1°C) with measurement via humidity sensor
A controlled climate 23°C/50%rH is generated in the test chamber,
as for example required for the VW testing PV 1210.
Climate conditions at the place of installation: temperature: +15 - +35°C, air humidity: max 85%
Standards: PV 1210, VDA 621-415, standard climate for DIN EN 60068-2-52 intensity 3-6

Note: The module for a humid air storage is additionally necessary to implement the standard DIN EN 60068-2-52. (4500960)

Climate module version 3 for extended test conditions: **4500940**

With this module, it is possible generate climate conditions in the range of +23°C to +50°C
and 30% to 95% (± 6%) rH.
Measurement and control of capacitive high humidity sensor
Climate conditions at the place of installation: temperature: +18 - +28°C, air humidity: max 85%
The hood or the door of the device has to be insulated (removable insulation) in connection with this module.
Specification of the standards: PV 1210, DIN EN 60068-2-52 intensity 1 to 6 as well as standards with climate conditions between 30% to 95% at 23°C to 50°C

Note: The extension module for the humid air storage (4500960) is already included in this option.

Please observe:
Due to the design of the device as salt spray and condensation water chambers, changing speeds (cold, heat - humidity/climate) as in the climate change test cabinets are not possible.

Extension module humid air storage: **4500960**

This module generates a test climate of +40°C/92% rH.
The humidity is controlled by means of a calculated dew point at which the corresponding humidity is generated in the test chamber;
e.g. to implement DIN EN 60068-2-52 with intensity degree 1 to 2

Note: An additional standard climate storage is necessary for the intensities 3-6.
This can either be generated via the room air or via the optional standard climate module (4500930 or 4500935).

Extension module warm air drying: **4500970**

This module generates a dry test climate (uncontrolled humidity) up to +60°C.
Standards: Nissan CCT, GME 9540 P, etc.

Note: The extension module is already included in the option of the climate version 3 (4500940).

Extension module for condensation water testing with increased temperature: **4500910**

This module extends the maximum condensation water temperature to +70°C
Standards: Nissan CCT 4 with increased useful room temperature up to +70°C

Extension module for SWAAT testing: **4500980**

This module makes the implementation of the SWAAT tests possible in case of which the test room bottom is permanently covered with water and spraying takes place at a constant temperature
of +50°C for 30 min. every 1.5 hour.
Specification of the standards: SWAAT, PV1208

Software options

Order number

Documentation package for the control unit Basic: **4501100**

Consisting of a serial interface RS 485 or RS 232 including software to record the operation data, as for example the chamber / humidifier temperature, testing times and status messages.
Saved data can be imported directly into excel.

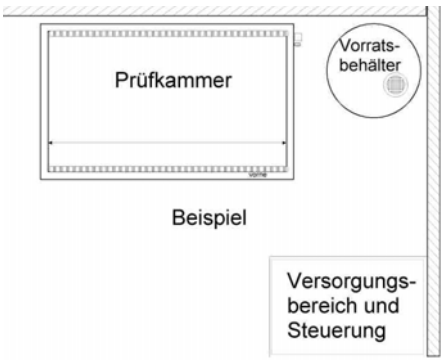
Control system Comfort: **4501110**

Control system on PC basis with extended equipment

- Easy operation by menu control with touch panel
- Temperature indication of set value / actual value for the test chamber and the humidifier
- Graphic display of the march of temperature and important process data
- Internal measured data registration (CSV, excel, dBase)
- All important national and international tests are pre-programmed.
- Easy and comfortable programming and saving of own tests
- Ethernet, USB and RS232 interface
- Status information by e-mail (SMTP server necessary)

Further options

	Order number
Operating hour counter: 5 digits, no resetting possible	**3500260**
Test chamber rinsing system: To clean the test chamber walls automatically after the salt spraying phase.	**3501062**
Increased compressed air humidifier: with a storage volume of approx. 22 litres. *Note: If no interruption-free deionised water supply can be guaranteed locally by customer (switch-off during the week-end), this option allows an independent operation of the spraying function for two weeks.*	**3501970**
Electrical stirrer for a 140l tank: mounted on brine tanks, for a simplified mixture of the salt solution in the storage tank	**2592523**
Electrical stirrer for a 250l tank: mounted on brine tanks, for a simplified mixture of the salt solution in the storage tank	**2592528**
Electrical stirrer for a 500l tank: mounted on brine tanks, for a simplified mixture of the salt solution in the storage tank	**2592525**
Compressed air filter unit: Pre- and fine filter for a compressed air supply with nearly no oil and solid matters according to DIN EN ISO 9227 (DIN 50 021)	**3501000**
Cable bushing NW 110 with closing cap:	**4500840**
Separate design: Test room and supply system can be placed separately at the place of installation, for example around the corner	**3501980**



Prüfkammer: test chamber
Vorratsbehälter: storage tank
Beispiel: example
Versorgungsbereich und Steuerung: supply area and control system

Accessory

	Order number
Compressed air compressor: incl. fine filter and manometer for an independent operation.	**2590410**
Water deionisation unit: with conductivity measurement unit to generate pure deionised water from tap water, volume 1000 l/h, capacity approx. 2,750 l at 10° dH	**2590420**
Reserve cartridge for water deionisation unit: Volume 1000 l/h, capacity approx. 2.750 l at 10° dH *Note: It is possible to ensure an interruption-free supply of fully deionised water with the reserve cartridge also during regeneration.*	**2590430**

Example of a water supply
with an easy cartridge change

Useful auxiliary means

Precipitation measurement goblet: according to DIN EN ISO 9227, made of unbreakable plastic	**4500760**
Densimeter: to measure and monitor the brine concentration	**4500710**
Digital refractometer: to measure and monitor the brine concentration	**4500840**
pH value measurement unit: for an easy measurement of the pH value in the brine	**4500830**
Cutting tool according to "Sikkens":	
Cutting tool with 1.0mm cutter edge	**4500850**
Cutting tool with 0.5mm cutter edge	**4500851**
Test sheet steels: to verify the standard conform functionality of the test system. (see ISO 9227 for this purpose). 5 sample sheet steels 70 x 150 x 1 mm made from CR4 steel according to ISO 3574	**4500810**

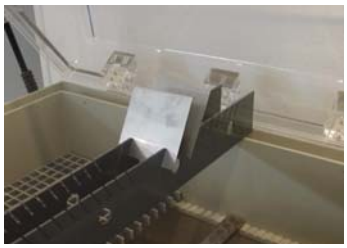
S-shaped hook made from glass: **2592620**

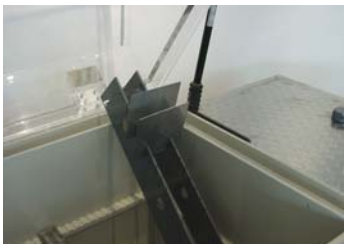
S-shaped hook made from special stainless steel: **2592622**

Support grid:
Load 50 kg
- Width 25 cm (1/4 cov.) **1560510**
- Width 50 cm (1/2 cov.) **1560511**

Test sheet steel support, horizontal: **1560542**
to accept approx. 25 test sheet steels, 150 x 70 mm

Test sheet steel support, diagonal: **1560543**
to accept approx. 30 test sheet steels, 150 x 70 mm





Support rod, full rod plastic: **1560650**
12 mm, load 8 kg

Support rod, hollow pipe: **1560651**
20 x 3 mm, load 10 kg

Support rod, full rod special stainless steel: **1560652**
8 mm, load 15 kg

Heavy load support rod: **1560653**
20 mm with 35 kg load plastic pipe with stainless steel insert, hermetically closed