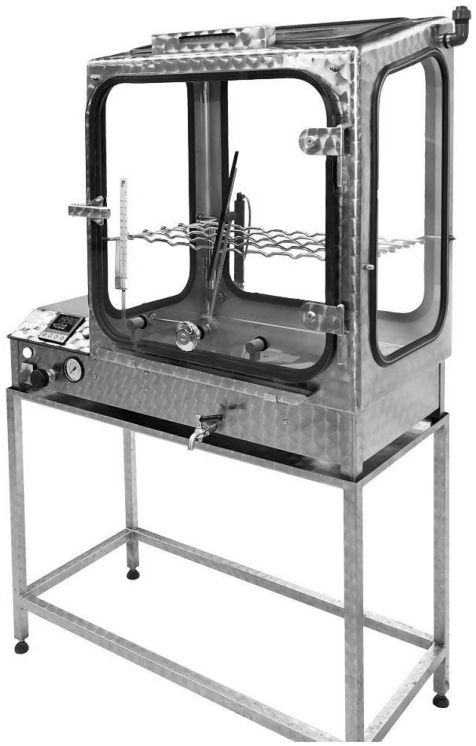
# Condensation water and HK combination systems

Corrosion test system for carrying out atmospheric corrosion tests according to the following test specifications:

- DIN EN ISO 6270-2 (DIN 50017 KK) CH
- DIN EN ISO 6270-2 (DIN 50017 KFW, KTW) AHT, AT (manual change-over)

## Highlights

- Selectable control depending on configuration
- Special stainless steel V4A
- Glass window



*(Example: HK 310 Basic system without extensions)*

# The HK family (basic series)

## HK *3xx*

| | |
|---|---|
| ***Volume*** | 300 liters |
| ***Test chamber dimensions*** | |
| Width | 750 mm |
| Depth | 500 mm |
| Height | 750 mm |
| ***Exterior dimensions*** | |
| Width | 920 mm |
| Depth | 540 mm |
| Height | 1000 mm |
| ***Weight*** | ca. 40 kg |

## HKT *4xx*

| | |
|---|---|
| ***Volume*** | 400 Liter |
| ***Test chamber dimensions*** | |
| Width | 750 mm |
| Depth | 500 mm |
| Height | 1020 mm |
| ***Exterior dimensions*** | |
| Width | 1050 mm |
| Depth | 600 mm |
| Height | 1000 mm |
| ***Weight*** | ca. 45 kg |

## HK *8xx*

| | |
|---|---|
| ***Volume*** | 800 Liter |
| ***Test chamber dimensions*** | |
| Width | 1000 mm |
| Depth | 800 mm |
| Height | 1170 mm |
| ***Exterior dimensions*** | |
| Width | 1350 mm |
| Depth | 920 mm |
| Height | 1350 mm |
| ***Weight*** | ca. 65 kg |

# Basic configuration

The HK 310, 410 and 810 systems already have all the necessary components in their basic configuration to carry out a condensation test according to DIN EN ISO 6270-2 (DIN 50017 KK) CH and DIN EN ISO 6270-2 (DIN 50017 KFW, KTW) AHT, AT (manual change-over).

## Explanation of variants:

**HK** *xxx-x*

- B: with ventilation
- S: with automatic refilling
- M: with gas dosing unit

- 00: Combination system
- 10: Basic system
- 20: Basic system with door opener

- 300 liters
- 400 liters
- 800 liters

## Technical description

### Outer housing

The framework structure is made of V2A stainless steel and is characterized by its high quality, strength and durability.

### Test chamber

The test chamber is made of V4A stainless steel. The entire test chamber is glass enclosed on all sides, including the roof, for better visibility. Support rods for test pieces can be positioned anywhere in the test chamber.

### Test chamber heating

Bottom fitted heating elements heat the test chamber indirectly. Various safety measures protect the test chamber from overheating.

# Technical information

*(Technical data is partly dependent on add-on options)*

| | |
|---|---|
| *Temperature range* | Room temperature to +55°C (131°F) |
| *Temperature constancy* | ± 1.0K temporal |
| *Power supply* | 16A, 230V/50Hz |
| *Compressed air connection* | Special order option, -B -S -M and with combination systems<br>Connection: Quick coupling for compressed air<br>Pressure : 6 to 8 bar<br>Consumption: 2.5 $Nm^3/h$ to 3$Nm^3/h$<br>*(Note: All salt spray standards require oil-free and particle-free compressed air)* |
| *Water hookup* | In the standard variants the device must be filled with demineralized water manually (310 and 810). Other variants (see below), are refilled automatically.<br>Quality:<br>fully demineralized water (conductivity <= 20µS/cm) |
| *Mist outlet* | Pipe socket d=32mm |
| *Controls* | JUMO diraTRON or Beckhoff control |
| *Drain* | Manual drain cock for emptying the test chamber |

## JUMO controller *(for x10 and x20 systems)*

- ✓ Easy to use
- ✓ Straightforward
- ✓ 2 4-digit 7-segment displays (red, green) for process values, parameters and timers


## Beckhoff control *(for -S, -M and combination systems)*

- ✓ Windows 10 installed
- ✓ Multi-touch panel with 12.1"
- ✓ graphical display for temperature and humidity curves
- ✓ Pre-programmed and customizable tests
- ✓ Exportable as CSV or image
- ✓ Ethernet interface for Industry 4.0

## Safety devices

Overtemperature protection for all installed heaters
*(Safety temperature limiter STB according to DIN EN 14597:2015-02)*

Constant pressure reducer with return control and maximum pressure limiter
*(Pressure fluctuations in the spray air can be compensated by using the constant pressure reducer.)*

Pressure relief valve for humidifier
*(Safety pressure relief valve with TÜV certificate as proof of the correct set pressure. This prevents the pressure in the humidifier from rising above the permissible setting range of 1.8 bar.)*

Protection against dry running
*(Overheating of the chamber and humidifier is prevented by the built-in dry-running protection, should there be a lack of water.)*

## On-site services

- Indoor installation Ambient temperature:18°C to 28°C (64.4 to 82.4°F)
  Environmental humidity: 85% non-condensing

- Install exhaust air pipe with a constant slope to avoid water bags due to condensation
  Exhaust air connection: 32 mm

- Compressed air connection: 6 to 8 bar
  The compressed air must be free of dirt, oil and other impurities.
  Reference point for permitted residual contamination from the replaced DIN 50 021:
  Maximum 0.2mg/m³ in the form of oil and dust (< 5µm)
  *(only for -B, -S, -M or combination systems)*

- Water connection/supply with demineralized water: 2.0 to 5.0 bar
  *(only for -S, -M and combination systems)*

- Power supply: 16A Schuko (Type F safety contact) plug - [adapter or refitting needed for US outlets]

# Special notes

Company-specific instructions for device use or internal company standards are **not** taken into account. However, these can be offered as an option with coordination.
Clearing up any issues with local authorities such as TÜV, EVU or the Trade Inspectorate etc. must be provided on site by the customer. Possible costs incurred are **not** included in the offer total!
The system is **not** suitable for tests with explosive, toxic or readily flammable substances, or with test material that produces or releases these substances.

The technical design of the device complies with the relevant basic safety and health requirements of the following directives and standards:

**Guidelines and laws:**
Machinery Directive 2006/42/EC
Low Voltage Directive 2014/35/EU
EMC Directive 2014/30/EU
Pressure Equipment Directive 2014/68/EU

**Mechanical standards:**

| | |
|---|---|
| DIN EN ISO 13857 (edition 06/2008) | |
| DIN EN 378-1,-2 (edition 041/2018) | (only for appliances with refrigeration systems) |
| DIN EN 378-3,-4 (edition 03/2017) | (only for appliances with refrigeration systems) |
| DIN EN ISO 13732-1 (edition 12/2008) | (only for devices with higher temp.) |
| DIN EN ISO 12100 (edition 03/2011) | |
| AD2000 A2 (edition 04/2015) | (Safety valves on pressure vessels) |

**Electrical standards:**
DIN EN ISO 13849-1 (edition 12/2016)
DIN EN ISO 13849-2 (edition 02/2013)

DIN EN IEC 61000-6-2 (edition 11/2019)
DIN EN IEC 61000-6-3 (edition 06/2022)
DIN EN 61010-1 (edition 03/2020)
DIN EN 61010-2-010 (edition 10/2018)
DIN VDE 0100-410 (edition 10/2018)
DGUV regulation 3

# Variants: Condensation water cabinets

### *HK 320 and 820 with automatic door opener* — *4/2022-HK_AT*

Extension of the basic system with an automatic door action, which opens the door automatically after a previously defined test time (adjustable).
*(Retrofit possible).*

### *HK 320-B and 820-B with automatic ventilation* — *4/2022-HK_AB*

Extension of the basic system with automatic ventilation, which automatically aerates the test chamber with compressed air after the set test time. The JUMO controller is used for this purpose.
The following is required: Compressed air connection with 6 to 8 bar
*(Retrofit possible).*

### *HK 300-S and 800-S with automatic refilling of demineralized water* — *4/2022-HK_AN*

Extension of the basic system with an automated refilling unit for demineralized water in the test chamber. The Beckhoff controller is used for this purpose. This variant also includes an under-frame.
The following is required: - Compressed air connection with 6 to 8 bar
- Water connection with demineralized water: 2.0 to 5.0 bar
*(No retrofitting option)*

### *HK 300-M and 800-M with automatic refilling of demineralized water and automatic gas dosing unit* — *4/2022-HK_ANAG*

Expansion of the basic system with an automated refill system for demineralized water in the test chamber as well as an automatic drain for a complete water replacement. The Beckhoff controller is used for this purpose. Also installed is a fully automatic SO2 gas dosing unit. This variant also includes an under-frame.
The following is required: - Compressed air connection with 6 to 8 bar
- Water connection with demineralized water: 2.0 to 5.0 bar
*(No retrofitting option)*

# Variants: Combination cabinets

***HK 400 and 800 with condensation water and salt mist function***

*4/2022-HK_KUS*

Extension of the basic system with a salt mist function. A fine salt mist is dispersed in the test chamber through a PVDF nozzle.

Air humidifier

In order to ensure a reproducible quality of the salt mist, the compressed air must be heated and moistened. This is done in a compressed air humidifier made of stainless steel. Demineralized water is heated with an immersion boiler. As a safety measure, the fill level of the humidifier is monitored at all times. If the fill level falls too low, new demineralized water will automatically be added.

Spraying pressure control

A constant pressure controller is installed so that the spraying pressure can be kept consistent. This can compensate for on-site pressure fluctuations. A pressure gauge on the front indicates the current pressure.

Brine supply

The standard is to store the brine in an external brine tank, where the brine solution can also be mixed. An optional agitator is recommended for that purpose. The location of the storage tank is freely selectable due to the self-priming dosing pump. The pump can be connected to the tank with a flexible hose over a distance of up to 10 meters. A 140-liter brine storage tank is included in the scope of delivery.

This variant also includes an under-frame.

The following is required: - Compressed air connection with 6 to 8 bar
- Water connection with demineralized water: 2.0 to 5.0 bar

*(No retrofitting option)*

# Other configurations

## 1 *Condensation water temperature range expansion to 70°C (158°F)* *4/2022-KW70*

Temperature range extension of the condensate function (EK1001) from +50°C to +70°C (122 to 158°F).
*(No retrofitting option)*

## 2 *Cable feedthrough* *4/2022-KD*

Cable entry with sealing cover. Nominal width 110 mm
*(Retrofit possible).*

## 3 *Compatible under-frame* *4/2022-HK_U*

Laboratory bench suitable for HK 310 and 320

Laboratory bench suitable for HK 810 and 820
*(No retrofitting option)*

# Brine tank and accessories

| Designation | Order no. | Space requirement |
|---|---|---|
| 140l tank (PE-natural/transparent) | 2592522 | D=500mm, H=860mm |
| 250l tank (PE-natural/transparent) | 2592527 | D=650mm, H=1100mm |
| 500l tank (PE-natural/transparent) | 2592526 | D=820mm, H=1190mm |
| Agitator for 140l tank | 2592523 | Mounted on tank |
| Agitator for 250l tank | 2592528 | Mounted on tank |
| Agitator for 500l tank | 2592525 | Mounted on tank |
| Creeper dolly for 140l tanks | 2599375 | Round, under tank H=80mm |
| Creeper dolly for 250l tanks | 2599375 | Round, under tank H=80mm |
| Creeper dolly for 500l tanks | on request | Round, under tank H=80mm |

*(The dosing tank is used for storing liquid media. The dosing tank is suitable for all media which PE (polyethylene) is resistant against within the material boundaries. The tank is not suitable for use in EX areas. The tank must be depressurized to be operated. Tanks cannot be stacked. The tank is not suitable for carrying loads. Take into account the load-bearing capacity of the installation surface on which the tank will stand. The installation surface must be flat and free of foreign objects.)*

**Note**: Experience shows that storage volumes that are too large can lead to problems. Storage volumes for 1 to 2 weeks have proven successful.

**Note**: A tank that is suitable for the device is already included in the basic equipment.

Black tanks are available upon request.

# Additional Accessories

4 **Air compressor** 4/2022-DK

Air compressor including fine filter and pressure gauge for independent operation.

5 **Compressed air filter unit** 4/2022-DFE

Pre- and fine filter for a compressed air supply low in oil and solid contaminants according to DIN EN ISO 9227:2017-07.

6 **Water desalination device** 2592420

Mixed bed cartridge including conductivity meter and magnetic valve for producing a fully desalinated water supply connection to the domestic water network. Capacity 1000 l/h, capacity 2,800 liters at 10° dH.

7 **Spare cartridge for water desalination device** 2592430

Mixed bed cartridge
Capacity 1000 l/h, capacity 2,800 liters at 10° dH

8 **2.5 liters of paraffin oil, low-viscosity** 2592820

Low-viscosity paraffin oil suitable for manual gas measurement and discharge unit (1-E1060)

# Other accessories

9 ***Hydrometer*** *2592621*

For measuring and monitoring the brine concentration
Density can be read on scale.


10 ***Digital refractometer*** *2593232*

For easy measurement and monitoring of the brine concentration.
Readout in the text display: Density and salinity of the solution

## 11 PH value meter 2593233

To easily measure and monitor the pH value in the brine.
Show in the text display: pH value and temperature of the solution

## 12 Precipitation gauges 4/2022-NSM

1 set (2 pieces) hopper according to DIN EN ISO 9227

Diameter=100mm,
Collection area=80cm²
Measuring volume =50ml

## 13 Glass or stainless steel S-hook Order no.

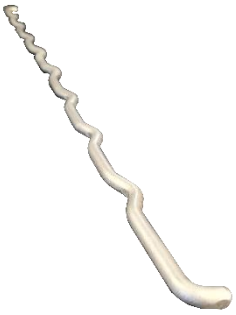
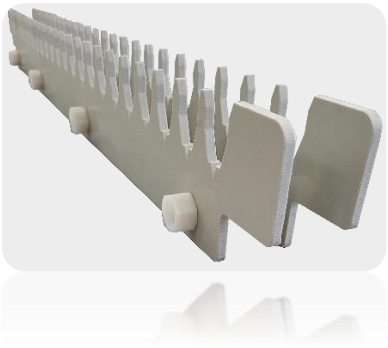
| | |
|---|---|
| Glass hook, S-shape, d=2mm | 2592620 |
| Stainless steel hook, S-shape, d=2mm | 2592622 |

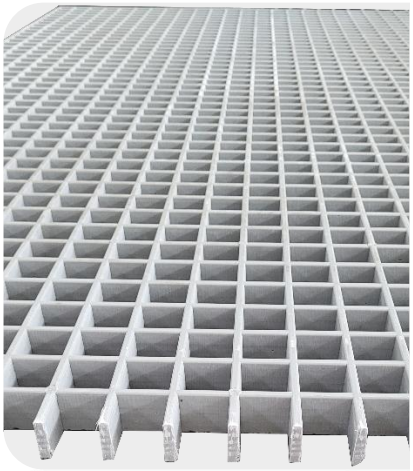
| 14 | Test plates | Order no. |
|---|---|---|
| | Test plate set according to ISO 9227, steel CR4<br>5 sample plates 150x70x1mm<br>*The corresponding European steel quality is supplied (German designation DC04 according to DIN EN ISO 1013 as described in DIN 50 021)* | 4/2022-PSS |
| | Test plate set according to ISO 9227, pure zinc<br>5 sample plates 100x50x1mm<br>*(Pure zinc with a purity of 99.975%, maximum copper content of 0.002%)* | 4/2022-PSZ |

| 15 | Sikkens scoring set | 4/2022-RSS |
|---|---|---|
| | For the exact creation of score lines during corrosion tests. Version with 0.5 mm or 1 mm cutting edge.<br>*(Delivered in a case)* |  |

## Test piece holders, support rods and support grids

| Designation | Order no. | Description | |
|---|---|---|---|
| Support rod, GRP pipe | 4/2022-AGFKR | Diameter 20 mm<br>Load capacity approx. 12 kg |  |

| | | | |
|---|---|---|---|
| Support rod, plastic GRP | 4/2022-AGFKS | Diameter 12 mm, load capacity approx. 8 kg |  |
| Support rod, solid rod, special stainless steel | 4/2022-ASE | Diameter 8 mm, load capacity approx. 16 kg |  |
| Test plate carrier, horizontal | 4/2022-PTW | for holding approx. 24 test plates, 150 x 70 mm |  |

| | | | |
|---|---|---|---|
| Test plate carrier, diagonal | 4/2022-PTD | for holding approx. 15 test plates, 150 x 70 mm |  |
| Support grate | 4/2022-AG25 | Load capacity: 50 kg<br>Width: 25 cm<br>Depth: same as test chamber |  |
| Support grate | 4/2022-AG50 | Load capacity: 50 kg<br>Width: 50 cm<br>Depth: same as test chamber | |