Process Insights
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tempcontrol

HYGROMETERS

PRODUCT DATASHEET

473 Dew Point Hygrometer

High Performance Chilled Mirror Hygrometer

SWISS ACCREDITATION sas.admin.ch SCS 0125

ISO/IEC 17025
ACCREDITED
SCS 0125

- Highly precise chilled mirror dew point technology
- Cable mounted dew point and temperature measurement
- Aspirated and direct insertion measuring heads
- Barometric pressure measurement options
- Intuitive color touchscreen user interface
- User verifiable calibration

KEY APPLICATIONS

- Climatic chamber validation to IEC60068
- Weather station calibration
- RH generator transfer standard
- Engine test cells

Highly Precise Chilled Mirror Technology

Chilled mirror condensation technology provides highly precise, stable and repeatable results. Water vapor condenses onto a temperature controlled mirror surface and this 'dew point' is detected with advanced optical electronics. Since dew point is specific to water vapor concentration and not temperature dependent, measurement precision is consistent across the full application range including high temperature and humidity conditions in climatic test chambers.

MBW chilled mirror hygrometers have a typical service life of more than 15 years thanks to the use of high quality materials and Swiss precision engineering. The high quality platinum resistance thermometer (PRT) element embedded within the mirror ensures excellent long term measurement stability. Thanks to the precise dew point and temperature measurements as well as the stability and long service life, MBW chilled mirrors are used by national standards and accredited laboratories worldwide. The 473 transfers reference standard performance into applications such as climatic chamber validation, relative humidity calibrators and a wide range of industrial processes.

Dew or Frost?

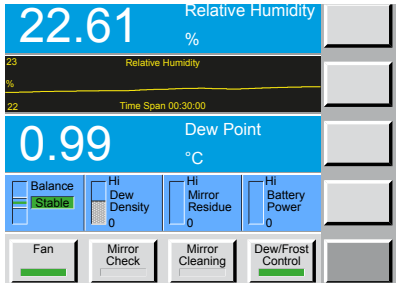
Below 0 ˚C (32 ˚F), water can condense in either the liquid or solid phase (dew or frost). The difference in the temperature at which the condensate layer stabilizes can be up to 3 ˚C (37.4 ˚F), therefore the condensate phase must be known for correct calculation or validation of parameters such as relative humidity. As shown on the picture to the right, it is also possible that dew and frost can exist concurrently on the mirror; this results in a non-stable value somewhere between the dew and frost point.

ForceFrost™ Function

Below a user defined temperature, the 473's ForceFrost function over-cools the mirror to force the condensed layer to the solid phase. This eliminates the uncertainty of whether dew or frost point is measured.

Intuitive User Interface

The 473 features a 5.7" color touchscreen with a high contrast ratio and wide viewing angle for clear and easy readability. Using the on-screen buttons and menus, each line of the instrument display can be configured for a variety of humidity, temperature and pressure parameters that may be viewed in the units of choice. These parameters can be displayed either numerically or graphically with user-configurable axes enabling measurement trends and stability to be confirmed without the need for external data acquisition or display hardware.



Easy To Use and Minimal Maintenance

The 473 does not require either calibration adjustment or sensor replacement. Maintenance is limited to periodic mirror cleaning.
The automatic mirror check feature can be user programmed to regularly check for surface contaminants.

Convenient Calibration Check

Users can easily check the 473 system's stability at any time using the built-in Ice-Test function. This automated test procedure allows the user to confirm that ice on the mirror melts at 0°C (32 ˚F) to verify the accuracy and stability of the mirror temperature measurement system.

Flexible Measurement Options
The 473 is available with different measuring heads together with temperature and pressure sensor options to meet the requirements of a wide range of applications.

RP2 Measuring Head
The RP2 dew point measuring head has a two-stage Peltier element in a compact probe format and includes a connection for temperature measurement. It is supplied with a calibrated head mounted temperature probe and an extension cable to enable optimum placement in working volumes.

RP2 is suitable for direct insertion into applications with moving air such as relative humidity generators, climatic chambers, manufacturing processes and air ducts.

SH2 Measuring Head
The SH2 is a flow-through dew point measuring head with a two-stage Peltier element for mirror temperature control. It includes a variable speed fan that pulls a consistent airflow across the mirror. Alternatively, with the fan removed, the SH2 head can also connect to applications using tubing and standard 6 mm or ¼" fittings. It is also supplied with a calibrated temperature probe with 0.5 m (19.7") and 3 m (118") cables for connection to either the measuring head or the 473 back panel. Typical SH2 applications include climatic chamber validation, humidity generators, engine test cells and on-site calibration projects.

Precise Temperature Measurement
The 473 is supplied with a 4-wire PT-100 platinum resistance thermometer (PRT) for precise temperature measurement and to enable calculation of relative humidity. The temperature probe supplied can be connected directly to the measuring head, or by cable to the 473 back panel. Wider temperature measurement ranges and alternative probe configurations are available on request.

Integrated Pressure Measurement
The internal pressure measurement option enables the 473 to compensate for pressure variations at the point of measurement resulting in the lowest possible uncertainties. A pressure measurement accuracy of 0.1 or 0.01% can be specified. The combination of precise dew point, temperature and pressure measurement makes the 473 suitable for use as a transfer standard for all three parameters. The pressure sensor is fitted inside the 473 housing with a 3 mm (0.12") gas connection on the back panel.

Transportable
The 473 is supplied complete with a robust IP65 case to ensure that the instrument can be transported safely to site for validation projects or shipped for calibration without risk of damage. The custom foam insert provides storage space for additional measuring heads, cables, manuals and calibration certificates.

Specifications

Specifications:	473-RP2 *	473-SH2
Measuring Ranges		
Frost/Dew Point:		
Working range	-30...+70 °C (-22...+158 °F)	-40...+70 °C (-40...+158 °F)
Calibrated range	-20...+70 °C (-4...+158 °F)	-20...+70 °C (-4...+158 °F)
Relative humidity:		
Working range	1...99 %rh **	1 ... 99 %rh **
Temperature:		
Working range	-50...100 °C (-58...148 °F)	-50...100 °C (-58...148 °F)
Calibrated range	-20...80 °C (-4...112 °F)	-20...80 °C (-4...112 °F)
Accuracy		
Frost/Dew point*	≤ ± 0.15 °C (0.27 °F)	≤ ± 0.1 °C (0.18 °F)
Temperature	≤ ± 0.07 °C (0.126 °F)	≤ ± 0.07 °C (0.126 °F)
Reproducibility		
Frost/Dew point	≤ ± 0.07 °C (0.126 °F)	≤ ± 0.05 °C (32.09 °F)
Temperature	≤ ± 0.05 °C (32.09 °F)	≤ ± 0.05 °C (32.09 °F)
Operating Conditions		
Measuring head	-50...80 °C (-58...112 °F), max 99 %rh **	-50...80 °C (-58...112 °F), max 99 %rh **
Temperature probe	-50...100 °C (-58...148 °F), max 99 %rh **	-50...100 °C (-58...148 °F), max 99 %rh **
Display unit	0...40 °C (32...104 °F), max 90 %rh	0...40 °C (32...104 °F), max 90 %rh
Standard Features		
Temperature probe	RP2: ø3 x 30 mm (0.12 x 1.1811") PRT, 0.5 m (19.7") cable	SH2: ø2 x 100 mm (0.08 x 3.94") PRT, 0.5 (19.7") and 3 m (118") cables
Digital I/O	RS-232	
Display	5.7" LCD with color touchscreen	
Mirror temperature sensor	Platinum Resistance Thermometer (Pt-100)	
Gas connections	6 mm or ¼" Swagelok (SH2 only)	
Transport case	Custom fit foam lined Peli 1550	
Power cable	2.5 m (98.5")	
Operating instructions	English	
Calibration certificate	Factory calibration: 5 points FP/DP, 3 points temperature	
Optional		
Internal barometric pressure sensor	0.1% or 0.01% accuracy, 700...1200 mbar	
Analog outputs	Two user programmable, -10...+10 V and 4...20 mA	
Calibration upgrade	Upgrade to SCS accredited ISO 17025 calibration	
Additional Information		
Power supply	100...120 VAC / 200...240 VAC, 50/60 Hz, 100 Watt (auto switching)	
Storage conditions	-20...50 °C (-4...58 °F)	
Weight & Dimensions	**Instrument**	**In Transport Case**
Dimensions	W310 x H155 x D265 mm (12.2 x 6.1 x 10.4")	W510 x H220 x D450 mm (20 x 8.6 x 17.7")
Weight	5 kg (11 lbs)	12 kg (26.4 lbs)
Protection	IP20	IP65

We reserve the right to change design or technical data without notice.

* Applicable only when calibrated.

** The RP2 measuring head is only suitable for use in applications with moving air.

*** Please note the operating conditions: The measuring head, temperature probe and connectors must be used in non-condensing conditions.

Ordering information

Description:		Order code
473-SH2	473 with SH2 measuring head on 2 m cable, external temperature probe, transport case	105003
473-RP2	473 with RP2 measuring head on 2 m cable, external temperature probe, transport case	105004

Calibration & Services:	Order code
473-Upgrade to SCS accredited calibration (ISO 17025) by comparison	103846
473-Upgrade to SCS accredited calibration (ISO 17025) by primary realization (only for SH2)	141683
Additional 1 year warranty upgrade (max. 3 years)	103632

Options:	Order code
Two Analog outputs, user programmable, -10...+10 V and 4...20 mA	102662
Three additional Temperature Inputs (cannot be combined with analog output option)	142612
Internal barometric pressure sensor, 0.1% accuracy	100282
Internal barometric pressure sensor, 0.01% accuracy	103954

For a complete range of options and accessories, please contact us and request our pricelist.

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