

DM70 Hand-Held Dewpoint Meter for Spot-Checking Applications



The Vaisala DRYCAP® Hand-Held Dewpoint Meter DM70 offers accurate and fast measurement for industrial dewpoint applications, such as compressed air, metal treatment and plastics drying.

Features/Benefits

- Designed for industrial spot checking and field calibration
- Three models: accurate measurement ranges from -60 to +60 °C (-76 ... +140 °F)
- Vaisala DRYCAP® Sensor with patented autocalibration function
- Low maintenance need due to superior long-term stability
- Sensor withstands condensation
- Fast response, enhanced by Sensor Purge option
- Easy-to-use user interface
- Data can be logged and transferred to a PC via MI70 Link software
- Compact, small and light
- NIST traceable (certificate included)

The Vaisala DRYCAP® Hand-Held Dewpoint Meter DM70 measures dewpoint temperature accurately over a wide measurement range. The probe may be inserted directly into pressurized processes, and it responds rapidly from ambient to process conditions. The sensor withstands condensation and fully recovers from getting wet.

Three DMP74 probe models

Three probe models, all with auto-calibration, are available. The A and B models are both general purpose probes. The A model is for dewpoint range from -40 to +60 °C T_d , and the B model for -60 to +20 °C T_d . The C model is specifically developed for SF₆ gas with a dewpoint range down to -50 °C T_d .

The B and C probe models have an additional Sensor Purge feature. The Sensor Purge heats and dries the sensor, making the response from ambient to dry conditions exceptionally fast. This facilitates rapid spot checking measurements in low dewpoints.

Low maintenance due to innovative autocalibration

The DM70 is fitted with the Vaisala DRYCAP® Sensor. The sensor provides reliable and high-performance dewpoint measurement with revolutionary long-term stability. The patented autocalibration procedure detects on-line possible measurement inaccuracies and automatically corrects dry-end drift in the calibration curve. These advanced features provide a long calibration interval and low maintenance cost.

The meter is calibrated in the factory against internationally traceable standards and delivered with a calibration certificate. The DM70 can also be sent to a Vaisala Service Center for a traceable recalibration.

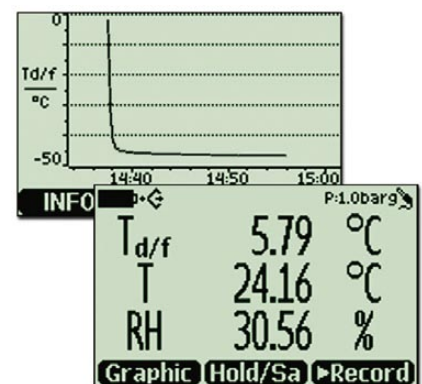
Easy-to-use user interface

The DM70 has a versatile and easy-to-use, menu-based user interface and a clear graphical LCD display with data-logger function. It can also be used as a tool for reading the output of fixed

Vaisala dewpoint transmitters, like the DMT242, DMT142 and DMT340.

Various display variables

The DM70 displays one to three parameters at a time, either numerically or graphically. Several humidity units can be selected. In addition, the DM70 includes conversion from gas pressure dewpoint to ambient pressure dewpoint. An analog output is also available.



The graphical display helps the user to know when the dewpoint plateau is reached.

Portable Sampling System and Sampling Cells

MI70 Link PC connection

The DM70 has a MI70 Link Windows® software program. In combination with a USB connection cable it's an excellent tool for transferring logged and real time measurement data from the DM70 to a PC.

Lightweight construction

The DM70 is small and rugged, and therefore an ideal choice for demanding applications. The long

or with the Vaisala DRYCAP® Sampling System DSS70A.

DSS70A portable sampling system

The DSS70A is designed to provide dewpoint sampling flexibility. For processes at atmospheric pressure, a battery powered pump is used to extract a gas sample. For pressurized processes up to 20 bar, the sample is measured at process pressure and then reduced to atmospheric pressure for venting or re-direction, bypassing the pump. In all cases, the sample gas passes through a filter to remove particulate contamination before measurement. Flow through the system is controlled and monitored with a needle valve and flow meter.

The DSS70A is easily connected to an appropriate sample point with tubing (typically 1/4" or 6 mm). The measured dewpoint must be below ambient temperature to avoid condensation in the system. Gas temperatures higher than +40 °C (+104 °F) should be cooled

with a short PTFE or stainless steel tube prior to entering the DSS70A.

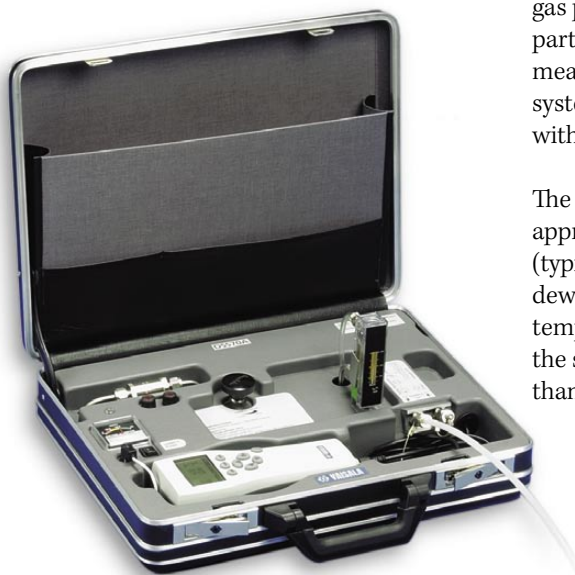
Sampling cells for pressurized processes

The DM70 can easily be connected to pressurized processes. In addition to direct pipeline installation, a variety of sampling cell options are available for gas sampling.

The DSC74 sampling cell is the recommended choice. It has a variety of connection adapters that allow several different ways of installation. The quick connector with a leak screw allows a very fast connection for compressed air lines. Additionally, two thread adapters are available for the inlet port.

The DSC74B is a two-pressure sampling cell, which enables measurements in both process and ambient pressure. This sampling cell is especially suitable for dewpoint measurements in SF₆ gas with the DMP74C probe.

The DMT242SC is a basic sampling cell. The DMT242SC2 is a sampling cell supplied with welded Swagelok connectors for sampling in a 1/4" pipeline.



The DSS70A provides a compact solution for field checking dewpoint where direct measurement is difficult. Typical applications for the sampling system are metal treatment and plastics drying processes.

battery life provides convenient use in the field.

DM70 Accessories

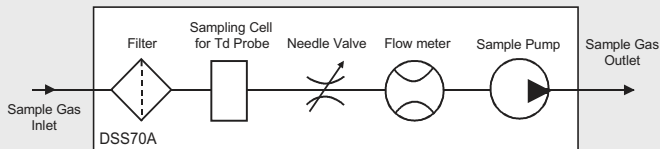
The DM70 meter is suitable for direct dewpoint measurements in the process in a wide temperature and pressure range. For more demanding applications, the DM70 can be used with the Vaisala sampling cell adapters,



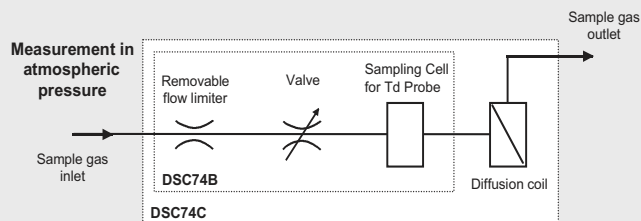
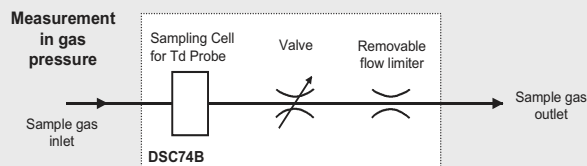
The sampling cells (from the left) DMT242SC2, DMT242SC and DSC74 can be used to connect the DM70 to sample gas flow. The DSC74B (right) is a two-pressure sampling cell that can be used for measurements in either pressurized or ambient pressure. The cooling/venting coil is included in the DSC74C sample cell, but is an option for all sampling cells.

Technical Data

DSS70A Sampling System and DSC74B/C Sampling Cells



The DSS70A sampling system includes a filter to clean the dirty sample gas and a needle valve to control the sample flow rate with the flow meter. A sample pump is used to generate a sample flow from processes at ambient pressure.



The DSC74B sampling cell enables the measurement of the sampled gas either in gas pressure up to 10 bar or in atmospheric pressure depending on the gas inlet and outlet. The DSC74C is like the DSC74B but with an additional coil to avoid back diffusion, the effect of surrounding moisture, in dewpoint measurements in atmospheric pressure.

DM70 hand-held dewpoint meter (DMP74 probe + MI70 indicator)

General

| | |
|------------------------|---------------------------------|
| Battery operation time | 48 h typical at +20 °C (+68 °F) |
| continuous use | up to 30 days |
| data logging use | ABS/PC blend |
| Housing materials | -40...+70 °C |
| Storage temperature | 0...100 %RH non-condensing |
| Storage humidity | 750 g |
| Total weight | |

Accessories

| | |
|---|----------|
| Connection cables for fixed Vaisala dewpoint transmitters | |
| for DMT242 transmitter | 27160ZZ |
| for DMT340 series | 211339 |
| for DMP248 transmitter | 27159ZZ |
| for DMT142 transmitter | 211917ZZ |
| USB cable for Mi70 | 219687 |
| Analog output cable | 27168ZZ |
| Windows® software, includes PC connection cable | MI70LINK |
| 10 m (32.81 ft) extension cable for probe | 213107SP |

MI70 indicator

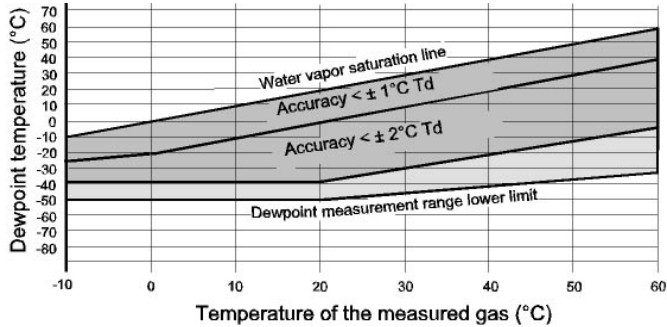
Indicator general

| | |
|------------------------------|--|
| Menu languages | English, Chinese, Spanish, Russian, French, Japanese, German, Swedish, Finnish |
| Display | LCD with backlight Graphic trend display of any parameter Character height up to 16 mm |
| Probe inputs | 1 or 2 |
| Power supply | Rechargeable NiMH battery pack with AC-POWER or 4xAA size alkalines, type IEC LR6 |
| Analog output | 0...1 VDC |
| Output resolution | 0.6 mV |
| Data interface | RS232 (accessible only with MI70 Link software) |
| Datalogging capacity | 2700 points |
| Alarm audible alarm function | |
| Operating temperature range | -10...+40 °C (+14...+104 °F) |
| Operating humidity range | non-condensing |
| Housing classification | IP54 |
| Weight | 400 g |

Technical Data

DMP74 dewpoint probes Measured variables, DMP74A probe

Dewpoint
 Measurement range (typical) -50 ... +60 °C (-58 ... +140 °F)
 Accuracy (A probe) -40...+60 °C ±2 °C (±3.6 °F)
 (see graph below)



Dewpoint accuracy vs. measurement conditions

Response time
 flow rate 0.2 m/s, 1 bar pressure, +20 °C (+68 °F) 63% [90%]
 0 -> -40 °C T_d (32 -> -40 °F T_d) 20 s [120 s]
 -40 -> 0 °C T_d (-40 -> 32 °F T_d) 10 s [20 s]
Dewpoint sensor Vaisala DRYCAP® 180S

Dewpoint converted to atmospheric pressure
 Dewpoint range for converted T_d (20 bar to 1 bar)
 with ±2 °C (±3.6 °F) accuracy -64 ... +60 °C (-83 ... +140 °F)

Temperature
 Measurement range -10 ... +60 °C (+14 ... +140 °F)
 Accuracy at +20 °C (+68 °F) ±0.2 °C (±0.36 °F)
 Typical temperature dependence of electronics ±0.005 °C/°C (±0.005 °F/°F)
 Temperature sensor Pt100 IEC751 1/3 class B

ppm volume and ppm weight concentration
 Measurement range (typical) 40 ... 200 000 ppm
 Accuracy at +20 °C (+68 °F) ±(7.3 ppm + 8.3% of reading)

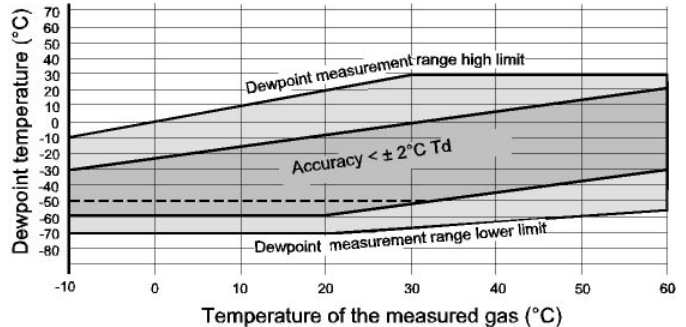
Absolute humidity
 Measurement range (typical) 0.5 ... 100 g/m³
 (0.2 ... 40 gr/ft³)
 Accuracy ± (0.2 g/m³ + 10% of reading)
 ± (0.1 gr/ft³ + 10% of reading)

Mixing ratio
 Measurement range (typical) 0.2 ... 100 g/kg
 (2 ... 700 gr/lbs)
 Accuracy ± (0.1 g/kg + 12% of reading)
 ± (0.8 gr/lbs + 12% of reading)

Relative humidity
 Measurement range 0...100 %RH
 Accuracy at +20 °C (+68 °F)
 RH < 5 % ±(0.025 %RH + 17.5% of reading)
 RH > 5 % ±(0.8 %RH + 2% of reading)

Measured variables, DMP74B and DMP74C (for SF₆ gas) probes

Dewpoint
 Measurement range (typical) -70 ... +30 °C (-94 ... +86 °F)
 Accuracy (B and C probe) -60...+20 °C ±2 °C (±3.6 °F)
 (see graph below)



Dewpoint accuracy vs. measurement conditions

Dotted line:
 For DMP74C the ±2 °C accuracy range is limited to -50 °C T_d when used in SF₆ gas.

Response time
 flow rate 0.2 m/s, 1 bar pressure, +20 °C (+68 °F) 63% [90%]
 0 -> -60 °C T_d (32 -> -76 °F T_d) 50 s [340 s]
 -60 -> 0 °C T_d (-76 -> 32 °F T_d) 10 s [20 s]
Dewpoint sensor Vaisala DRYCAP® 180M

Dewpoint converted to atmospheric pressure
 Dewpoint range for converted T_d (20 bar to 1 bar)
 with ±2 °C (±3.6 °F) accuracy -80 ... +20 °C (-112 ... +68 °F)

Temperature
 Measurement range -10 ... +60 °C (+14 ... +140 °F)
 Accuracy at +20 °C (+68 °F) ±0.2 °C (±0.36 °F)
 Typical temperature dependence of electronics ±0.005 °C/°C (±0.005 °F/°F)
 Temperature sensor Pt100 IEC751 1/3 class B

ppm volume and ppm weight concentration
 Measurement range (typical) 10 ... 40 000 ppm
 Accuracy at +20 °C (+68 °F)
 < 40 ppm ±(0.5 ppm + 25.4% of reading)
 > 40 ppm ±(7.3 ppm + 8.3% of reading)

Measurement environment, all probe models

| | |
|------------------|--|
| Temperature | -10 ... +60 °C (+14 ... +140 °F) |
| Pressure | |
| DMP74A | 0 ... 20 bar _a (0 ... 290 psia) |
| DMP74B | 0 ... 20 bar _a (0 ... 290 psia) |
| DMP74C | 0 ... 10 bar _a (0 ... 150 psia) |
| Sample flow rate | no effect for measurement accuracy |

General, all probe models

| | |
|-------------------------------|---|
| Measured gases | non-corrosive gases |
| Probe material (wetted parts) | Stainless steel (AISI 316L) |
| Sensor protection | Sintered filter (AISI 316L) |
| | partno: HM47280 |
| Mechanical connection | G1/2" ISO228-1 thread with bonded seal ring (U-seal) |
| Housing classification | IP65 (NEMA 4) |
| Weight | 350 g |

Technical Data and Dimensions

Sampling cells technical data

| | | | |
|---------------------------------|----------------|---|---|
| DSC74 | pressure limit | 1 MPa (10 bar _g , 145 psig) | sampling cell for pressurized gases |
| DSC74B | pressure limit | 1 MPa (10 bar _g , 145 psig) | two pressure sampling cell |
| DSC74C | pressure limit | 1 MPa (10 bar _g , 145 psig) | DSC74B with DMCOIL cooling/venting coil |
| DMCOIL | | | cooling/venting coil |
| DMT242SC | pressure limit | 10 MPa (100 bar _g , 1450 psig) | sampling cell |
| DMT242SC2 | pressure limit | 4 MPa (40 bar _g , 580 psig) | sampling cell with Swagelok connectors |
| Material for all sampling cells | | | stainless steel AISI316 |

DSS70A sampling system Operating conditions

| | |
|-----------------------------------|---|
| Operating gases | air, N ₂ and other non-toxic, inert gases |
| Dewpoint range | -70 °C ... T _{amb} (-76 °F ... T _{amb}) |
| Inlet/outlet connection | 1/4" Swagelok |
| Operating temperature | |
| ambient temperature | 0 ... +40 °C (32 ... +104 °F) |
| process gas temperature | |
| with PTFE tube at +20 °C (+68 °F) | max. +200 °C (+392 °F) |
| with stainless steel tube | specification according to stainless steel tube specification |
| maximum gas temperature at inlet | +40 °C (+104 °F) |
| Operating pressure | |
| with pump | 0.6 ... 1.2 bar _a (8.7 ... 17.4 psia) |
| pump disconnected | 0 ... 20 bar _a (0 ... 290 psia) |

General

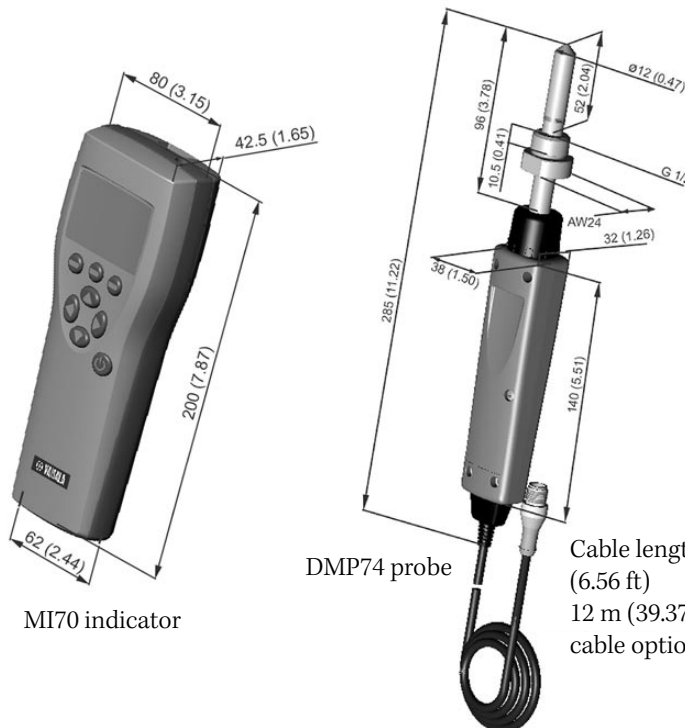
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|---------------------------------|---|
| Battery operation time for pump | 8 h continuous use |
| Filter | battery can be recharged using DM70 charger 7 mm inline filter cartridge 1/4" Swagelok SS-4F-7 (spare part order no. 210801) |
| Materials | |
| wetted parts | Stainless steel |
| carrying case | ABS plastic |
| Case size (W x D x H) | 430 x 330 x 100 mm |
| Weight | 5.5 kg (12 lbs) |

Electromagnetic compatibility

Complies with EMC standard EN61326-1, Electrical equipment for measurement, control and laboratory use - EMC requirements; Generic Environment.

Dimensions

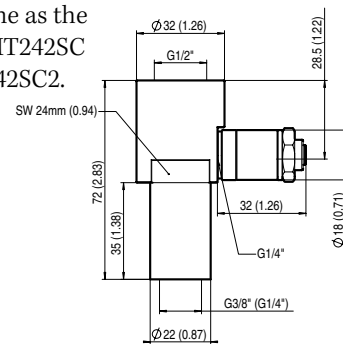
Dimensions in mm (inches)



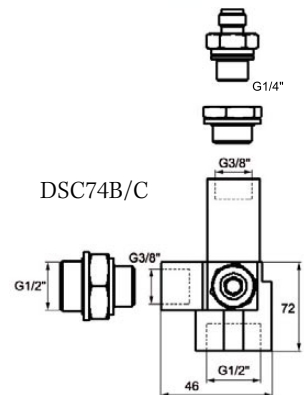
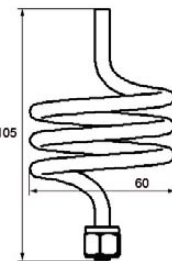
DMP74 probe

Cable length 2 m (6.56 ft)
 12 m (39.37 ft) cable optional

DSC74, same as the body of DMT242SC and DMT242SC2.



Cooling/venting coil



DSC74B/C