Introduction

The **Humidity Sensing Cell** is an accessory for the **MFP-3D** which independently measures humidity conditions with a sensor located within a sealed sample cell. This accessory also allows for simple humidity control. It is ideal for experiments where relative humidity plays an important role, such as crystal growth.

The Humidity Sensing Cell is a small sealed sample chamber with a dedicated side access port for the solid state humidity sensor. The sensor measures the relatively humidity of the air surrounding the sample and transmits it back to the AFM controller. The MFP-3D software displays humidity as a function of time and saves a value with every stored image. The sample cell accepts samples of up to 30 mm in diameter. Samples are mounted on a glass disc which forms the bottom of the cell. Optical access is available from above and below the sample. A clamp and FKM (Viton® equivalent) membrane fit on top of the cell for an airtight seal.

Temperature Correction

A temperature sensor built into the exterior of the sample stage monitors laboratory temperature and allows the MFP-3D software to make a small correction to the measured relative humidity (RH) value. *Note that temperature is not measured inside the sample cell.*
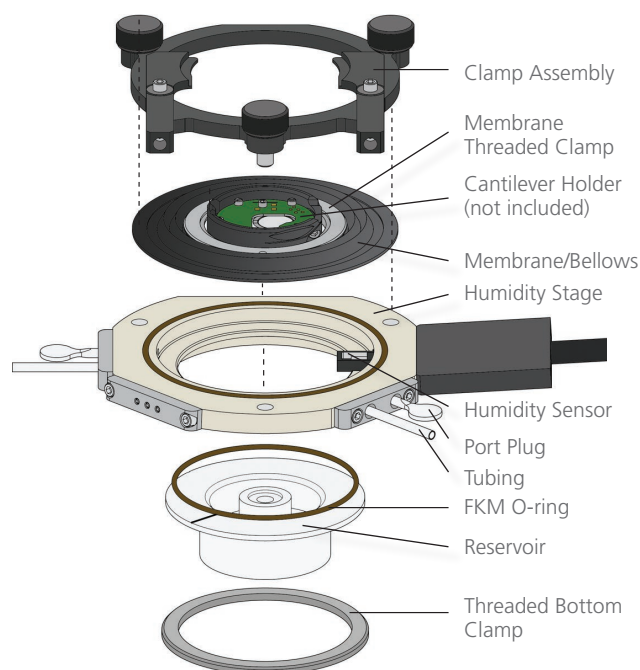
Humidity Control

Humidity control can be accomplished in either of two ways. The accessary can accommodate a Teflon® cup which takes the place of the glass cell bottom. The cup can be filled with concentrated salt solutions which, depending on the type of salt, provides a controlled, relatively humid environment. For example, a concentrated solution of NaCl leads to 75% RH which is almost independent of laboratory temperature. The sensor reading is used as a confirmation of the RH value. Other salts can span a range from nearly zero to nearly 100% RH.

A second method for controlling humidity is by flowing a mixture of dry and wet gas through one of the access ports. The sensor is used to confirm the RH value of the supplied gas and serves as a guide for adjusting the valves to the desired RH level.

The cell has four available 1/16" diameter access ports and three 0.036" ports. These access ports may be used with tubing to fill and drain the salt cup with various solutions or attach a gas supply.

High Voltage Compatible

Clamp Assembly
Membrane Threaded Clamp
Cantilever Holder (not included)
Membrane/Bellows
Humidity Stage
Humidity Sensor
Port Plug
Tubing
FKM O-ring
Reservoir
Threaded Bottom Clamp

Schematic of the Humidity Sensing Cell assembly.

Precise Measurement with the Environmental Controller

The Environmental Controller (purchased separately) is a state-of-the-art digital controller that is required for use with the Humidity Sensing Cell. All measurement functions are fully programmable through the MFP-3D software interface. SmartStart™ allows plug and play operation without the use of parameter files.

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Specifications

The Humidity Sensing Cell includes the Humidity stage and an accessory kit containing an initial supply of consumable items required for operation. The Humidity Sensing Cell also requires the Environmental Controller, which must be purchased separately and can be shared with other MFP-3D environmental control accessories.

Humidity control and sensing

- Operate from 0-100% relative humidity (non-condensing)
- Measures humidity with 2% accuracy, 0.5% repeatability and 3% hysteresis

Environmental control

- Sample chamber can be fully sealed to control gas environment
- Four 1/16" access ports and six 0.036" ports are provided for tubing connections

Sample compatibility

- Samples up to 30 mm diameter and 2 mm thickness (without salt cup)
- Samples up to 15 mm diameter and 2 mm thickness (with salt cup)

Materials

- PEEK, PTFE, FKM

Cleaning

- Can be fully disassembled for cleaning
- Autoclavable, except for detachable humidity sensor

System compatibility

- Compatible with all MFP-3D AFMs except the MFP-3D Origin™

Environmental Controller

- Closed loop operation
- SmartStart for plug and play operation
- Operates at 110 or 220 VAC
- CE tested
- Built-in microprocessor for temperature control (for use with other environmental accessories)
- Fully programmable through the MFP-3D software

Visit **www.AsylumResearch.com** to learn more

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6310 Hollister Avenue
Santa Barbara, CA 93117
Voice   +1 (805) 696-6466   www.AsylumResearch.com
Toll free +1 (888) 472-2795   info@AsylumResearch.com
Fax   +1 (805) 696-6444   sales@AsylumResearch.com

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