

Acoustic and Vibration Isolation for Asylum Research AFMs

Isolation from the lab environment plays an important role in image and measurement quality. Our AFM systems inherently have some of the lowest noise specifications in the industry, however, Asylum Research offers a variety of isolation tables and integrated acoustic enclosures that will optimize your AFM's performance in noisy environments. Vibration isolation is required for all MFP-3D™ AFM systems and is optional for the Cypher™ AFM. Because each facility environment is different, we recommend prospective users evaluate their available options. As a courtesy to our customers, Asylum Research can provide a site survey kit to quantify the vibration and acoustic noise of your lab prior to your system installation.

Acoustic Isolation Enclosures

Two different models of enclosures are available for the small and large footprint MFP-3D systems. The enclosures provide excellent acoustic protection, low frequency passive vibration isolation and protect your instrument from air currents. The frame is made of powder-coated steel tubing. The chamber has a powder-coated steel exterior and a proprietary layered interior which provides the ultimate in sound insulation over a wide frequency range. Each enclosure is designed with a front window, an adjustable stand inside for resting the MFP-3D Head while changing cantilevers, two side cable clamps, swiveling casters, and leveling feet. *Contact Asylum Research for choices of compatible vibration isolation tables and their dimensions.*

AEK 2002

The AEK 2002 is a smaller enclosure designed for use with MFP-3D Stand Alone systems (Figure 1).



Figure 1: AEK 2002 acoustic isolation enclosure with the MFP-3D Stand Alone AFM inside.

BCH-45

The BCH-45 is designed for the large footprint of the MFP-3D-BIO™ systems. It provides room to access attachments such as illumination pillars, side mounted cameras, lamp houses, and epi-fluorescence, TIRF, or confocal accessories (Figure 2). Doors open for 180° interior access. Dual front windows open allowing for viewing and quick access and adjustment.

Options for Acoustic Isolation Enclosures

1) Air Temperature Control – Minimize drift with the AEK and BCH enclosures

The Air Temperature Control (ATC) option is available for the both the AEK and BCH enclosures (Figure 3). The ATC controls temperature inside the hood and reduces thermal drift by a factor of 20X-100X, improving AFM drift especially in labs with large temperature swings.

The ATC system keeps the air temperature inside of the hood constant around the instrument regardless of the laboratory temperature. A quiet fan draws air into the bottom of a vertical duct in the hood, then forces it through a series of heater coils and expels the warm air above a porous false ceiling which creates a plenum above the AFM. The warm air uniformly flows downward over the microscope where temperature feedback sensors, typically placed near the AFM head and scanner, monitor the hood temperature. The ATC simply plugs into the expansion port in the ARC2™ or MFP-3D AFM system controller. Fan speed, temperature setpoint, ramp rate, and heater power are easily controlled through the software interface. *(Contact Asylum Research for current specifications and current user upgrades.)*

2) BCH-45 Optical Window

This optical window can be installed in the BCH-45 enclosure and will protect low-light beams in applications such as fluorescence lifetime imaging, Raman spectroscopy, and single-molecule fluorescence. It fits into a standard or extra cable port location.

3) BCH-45 Extra Ports

This is a custom option for researchers needing additional ports in their BCH enclosure. The extra ports can be used for cables or with the BCH-45 optical window option. *The port location(s) are subject to review by Asylum Research before ordering.*



Figure 2: BCH-45 enclosure with a large footprint MFP-3D-BIO system.

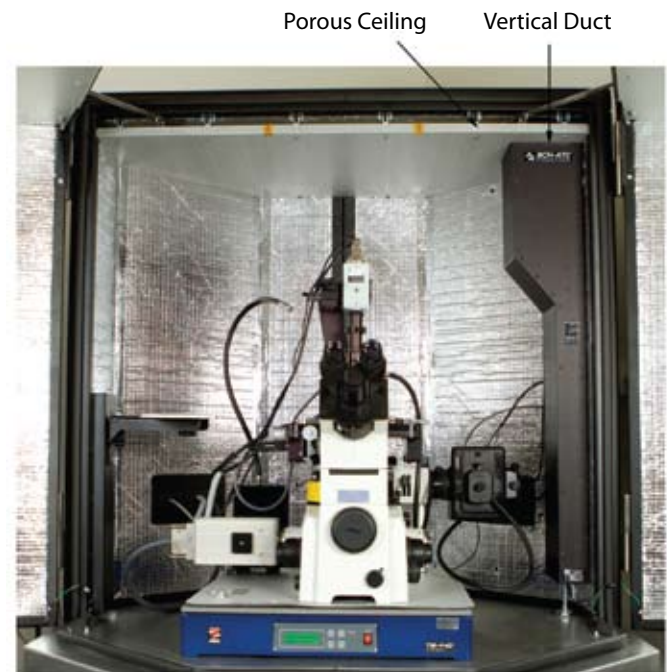


Figure 3: The BCH-45 Enclosure with Air Temperature Control installed including porous ceiling and vertical duct. The ATC reduces thermal drift by a factor of 20X-100X in labs with large temperature changes.

Vibration Isolation Tables

Asylum offers two series of vibration isolation tables, the Herzan AVI Series and the Table Stable Series. Either will fit nicely in the matching acoustic enclosures. We recommend the AVI-SA for the MFP-3D Stand Alone and the AVI-BIO for the MFP-3D-BIO.

AVI Series

The Herzan AVI Series provides active isolation with six degrees of freedom (Figures 4-6).

- Continuously senses external vibrations and, through a feedback loop, signals internal actuators to react to compensate for them.
- Active 1.2Hz to 200Hz; Passive >200Hz
- 5-20 msec response
- Virtually no amplification of noise at low frequencies. Will isolate under the most extreme vibration environments.
- Requires no on-site calibration
- No compressed air required
- Comes with rigid table top, isolators and control electronics. Available in a variety of sizes and models (*contact Asylum Research for size and enclosure compatibility*).
- Four models available: AVI-SA, AVI-BIO, AVI-BIO-XL, AVI-OCT

Table Stable Series

The Herzan TS-Series Table Stables (Figure 7) offer a precise automatic level adjustment mechanism that allows convenient handling of different loads without any user intervention. The TS-150 is recommended for use with the Cypher AFM when installed in an especially high vibration environment. In some MFP-3D-BIO systems with external optics, the automatic level adjustment of the TS-series helps stabilize optical alignment.

- Isolation begins at 0.7Hz, increasing rapidly to 40dB
- Active 0.7Hz to 1000Hz; passive beyond 1000Hz
- No low frequency resonance
- 500X stiffer than air tables
- Isolation of all six possible translational and rotational modes of vibration with automatic leveling
- Two models available: The TS-150 for small footprint AFMs and the TS-140 for large footprints
- No compressed air source required

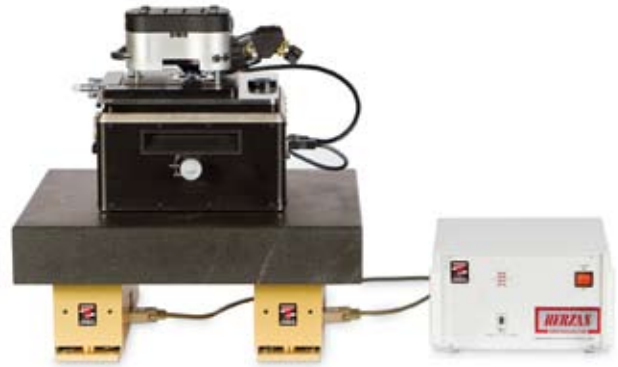


Figure 4: AVI-SA vibration isolation pictured with the MFP-3D Stand Alone AFM.



Figure 5: AVI-BIO table for large MFP-3D-BIO footprints; available with XL granite top (not pictured).



Figure 6: AVI-OCT table for large MFP-3D-BIO footprints.



Figure 7: TS-150 vibration isolation table.