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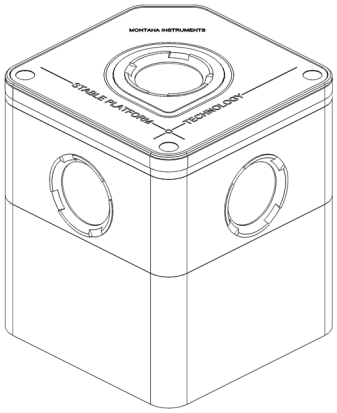
MONTANA INSTRUMENTS

APPLICATION NOTES

Window Options	**App-007**
B. Smithgall	August 23, 2011

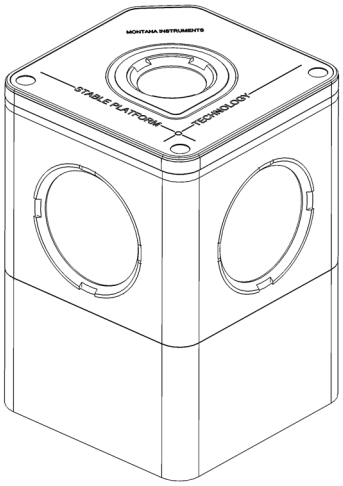
The Cryostation is designed so the user has flexibility in configuring the window area of the sample chamber. Options include:

- Larger windows on the top or sides
- Adding a bottom window
- Rotating the side windows by 45 degrees for integration with large equipment
- Choosing special optical materials for the windows

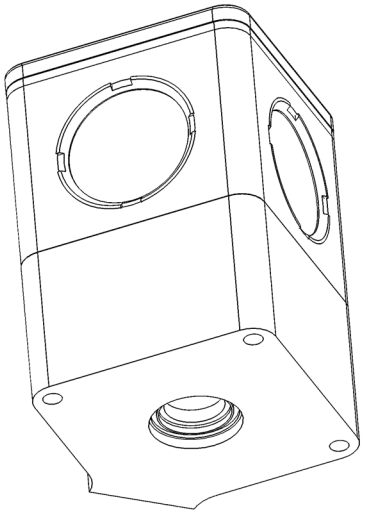


Window and sample chamber size

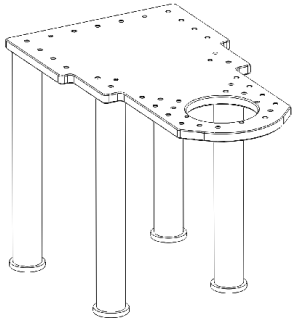
The standard unit has 30mm outer windows. These windows are made of fused silica and typically coated for 400-1000 nm transmission. With the 30mm outer windows, there are 20mm windows in the inner radiation shield. The inner windows are similarly coated fused silica.



We also offer 50 mm side or top windows. The larger windows allow for greater view angle of the sample under test. The radiation shield in this case has 30mm windows and is taller (50mm) than the standard enclosure.



A bottom window may also be added. This is usually done in conjunction with a platform stage. By elevating the entire cryostat, the system may be positioned over other system optics.



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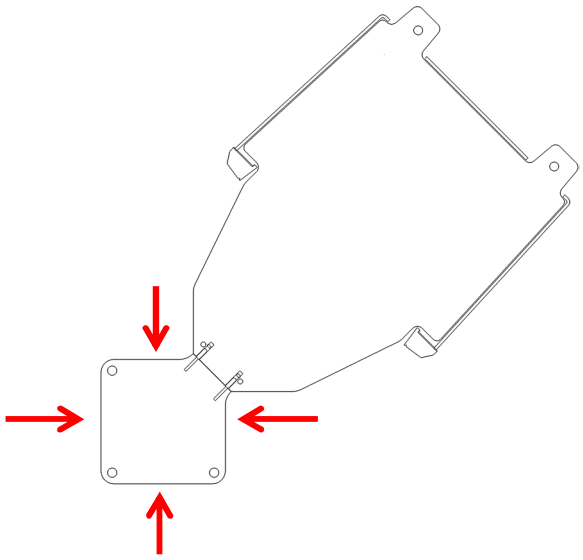
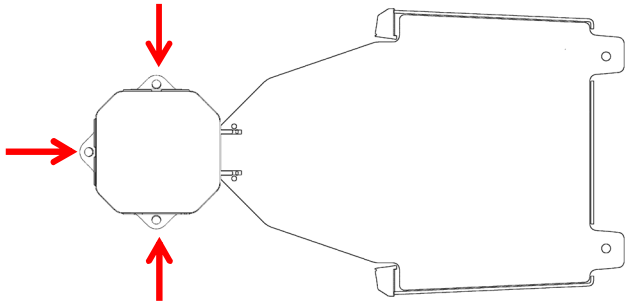
Window orientation on the optical table

The Cryostation is normally positioned so the cryostat body is at a 45 degree angle to the table grid, so the windows are aligned to that grid. See the view to the right.

There are four side windows and one top window. The side ports near the body have good optical access, but may not allow large equipment to be placed near the window. The arrows in the image at the right show the general access to the ports.



In order to allow large equipment to access opposing ports, we also offer a windows assembly with three side windows that is rotated 45 degrees. This allows the user to rotate the entire cryostat body to align the ports to the table grid. This takes up less table space, and allows large optics near the chamber ports.



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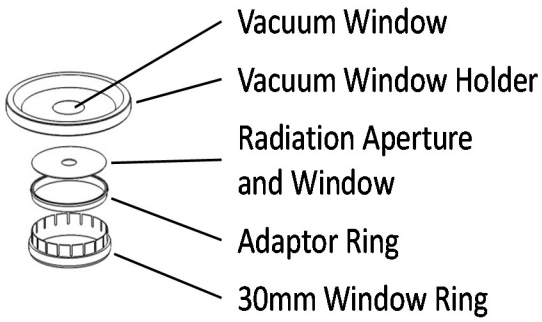
Low working distance windows

The windows can be configured with special thin windows to allow down to 1mm working distance. This is done using a ceramic holder for a central window, with a separate thin inner window or aperture, depending on the application. See the application note on this option for more details.

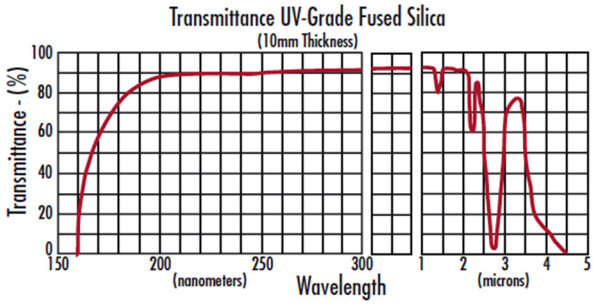


Window materials

Both the outer and inner windows may be easily replaced by the user within minutes. There are a variety of optical materials available for the optical ports:

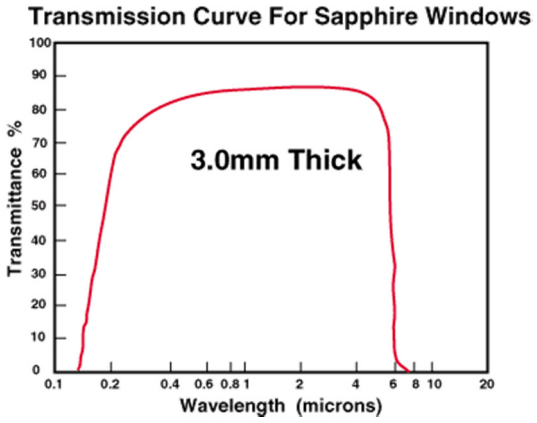
Fused Silica

Made from UV-grade synthetic fused silica. Applications include laser set-ups (i.e. at Brewster's angle), emitter/detector protection devices (such as in spectrophotometers), and imaging systems involving ultraviolet wavelengths.



Sapphire

These windows are made from single crystal sapphire, with extreme surface hardness, high thermal conductivity, high dielectric constant and resistance to common chemical acids and alkalis. Sapphire is the second hardest crystal next to diamonds and, because of their structural strength, sapphire windows can be made much thinner than other common dielectric windows with improved transmittance in a transmission range from 0.15 - 5.5µm.



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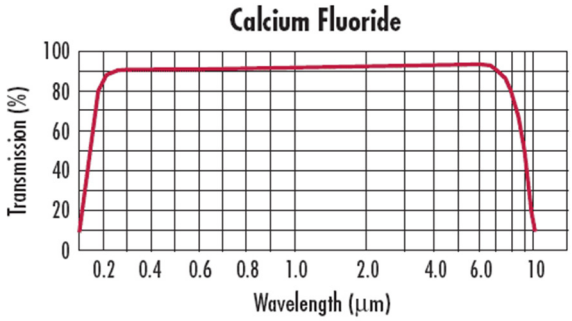
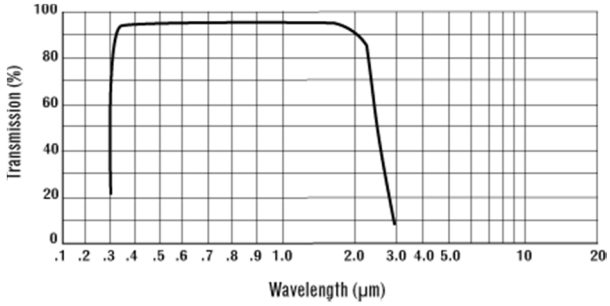
Calcium Fluoride

Calcium fluoride is often used in spectroscopic windows and lenses due to its high transmission from 250nm to 7µm. Its low absorption and high damage threshold makes it a popular choice for excimer laser optics. Calcium fluoride's low index or refraction allows it to be used without an anti-reflective coating.



BK7

These windows offer broadband anti-reflection coatings through the visible and near-infrared spectra. They are well suited for low power laser applications, where the high tolerance design yields minimal beam distortion and scatter.



Aluminized Kapton

These windows are suitable for x-ray work. They consist of a 0.005” thick Kapton layer, aluminized on each side with 300 Angstroms of aluminum. This window is made custom by Montana Instruments in 30 and 50mm sizes.

Other window materials are available with custom coatings. Contact Montana Instruments to discuss your application.