

## BeCu Diamond Anvil Cell (DAC) with integrated membrane canister for 42mm OD membrane for ST-500 cryostat

### Model BeCu-PC175-TMC-DAC

The BeCu-PC175-TMC-DAC Diamond Anvil Cell is a piston/cylinder type with integrated membrane canister specifically designed to work with cold-finger type cryostats, in particular Janis ST-500 cryostat, and allows accurate remote pressure control via integrated gas membrane (powered by He gas).

The DAC is made of BeCu alloy (C17200 / Alloy 25) with full-hard HT04 temper. The combination of the extremely high strength of the cell material and excellent thermal conductivity makes it optimal for cold-finger type cryostats.

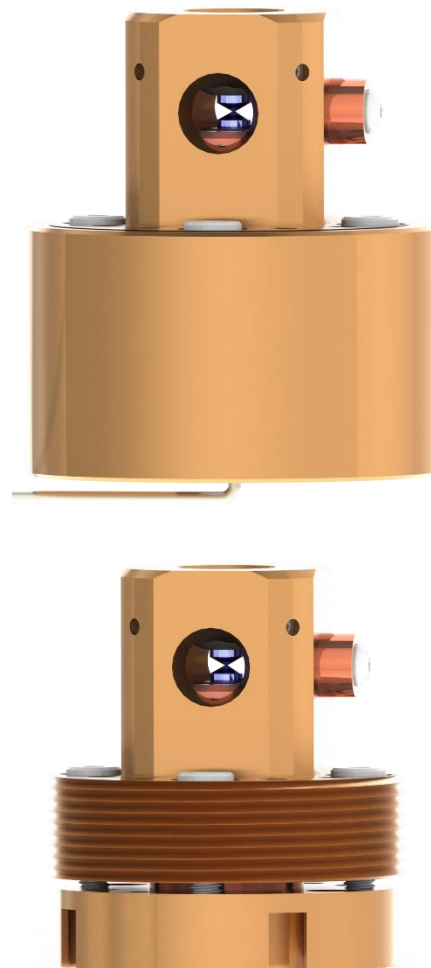
Beryllium-copper is a non-magnetic alloy and the DAC can be used in applications which require non-magnetic DACs (with proper screws and spring washers).

The DACs allows for multiple ways of pressure control – either with screws or with membrane. The DAC can be preloaded to starting pressure with screws from either bottom (e.g. for gas loading) or from top (shown). Inside the cryostat the pressure can be transferred to membrane for accurate remote pressure control at cryogenic temperatures. Moreover, the DAC allows to use decompression spring washers, which can be engaged before cooling for better pressure control and decompression experiments.

The modular piston / cylinder design is ideal for such kind of Diamond Anvil Cell as it allows relatively easy replacement of DAC components as Beryllium Copper tends to oxidize and wear out faster than high-strengths steels. When the fit between piston and cylinder becomes less than ideal– the DAC can be repaired relatively easily and inexpensively with replacing the DAC cylinder (instead of the complete DAC).

With proper diamond culet (<250  $\mu\text{m}$ ), diamond alignment, and sample preparation the DAC can be routinely used in sub-Megabar and Megabar pressure range.

While the DAC can be used for axial and radial diffraction, this particular model is optimized for optical studies in reflection mode, such as Raman spectroscopy and other spectroscopic techniques not requiring the light / signal to enter from below. Besides, the DAC has a very small working distance of ~12 mm allowing to use short working distance (<20 mm) optical objective even inside the cryostat.





## Specifications of BeCu-PC175-TMC-DAC with integrated membrane canister

### Main DAC Specifications

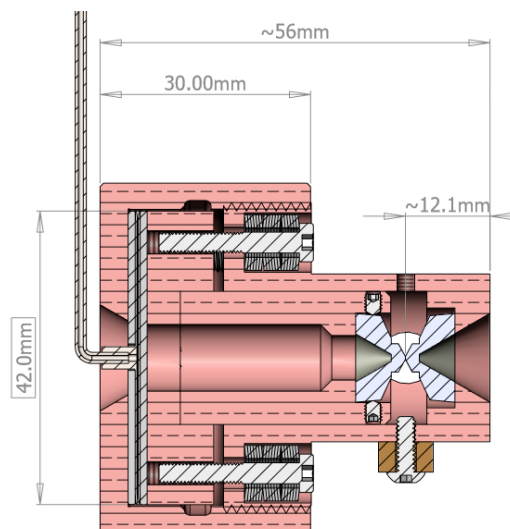
Height: 56 mm  
 Max diameter: 50 mm  
 Working distance: ~12 mm  
 Mass: ~ 450 g  
 Optical / top angle: 60 degrees  
 Seats: Tungsten carbide,  
 Pascalloy optional  
 Screws: M4-20 mm  
 Spring washers: 8.2 mm OD

### BeCu Material Properties

Type: C17200 / Alloy 25  
 Temper: HT04  
 Density: 8.25 g/cc  
 Ultimate strength: 1380 MPa (typ)  
 Yield strength (0.2%): 1240 MPa (typ)  
 Hardness Rockwell C: 38-42 (typ)  
 Thermal expansion (0°C): ~16.0  $\mu\text{m}/\text{m}\cdot^\circ\text{C}$   
 Specific Heat Capacity: 0.420 J/g $\cdot^\circ\text{C}$   
 Thermal conductivity (20°C): 105-130 W/m-K

### Membrane

Type: Blind, no central hole  
 Diameter: 42 mm  
 Material: Stainless 304  
 Max Gas pressure: 150 bar  
 Effective force: 1500-2000 Kg max  
 Tube: 1.59 mm (1/16 in)

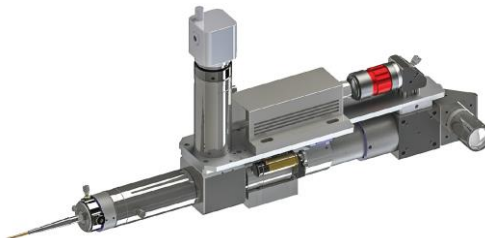


## Related equipment

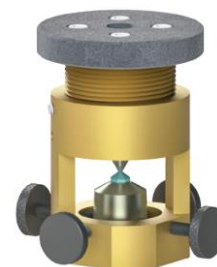
Pressure controllers



Ruby pressure systems



DAC Accessories



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