



BeCu Shortened Symmetric Diamond Anvil Cell Metric version (48 mm) Model BeCu-SYM48-WD12

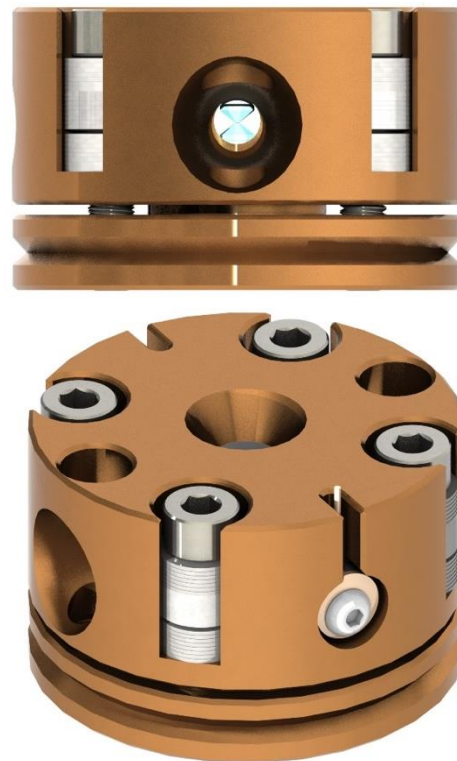
The Symmetric Diamond Anvil Cell (DAC) is perhaps the most popular DAC in the World. It is compact, versatile, simple to operate, user-friendly, and is easily adaptable to multiple experimental environments. The Symmetric DAC can be used for a multitude of laboratory-based optical spectroscopies (e.g. Raman, Brillouin, etc.), as well as X-ray diffraction, inelastic X-ray scattering, and a large variety of different experimental techniques. With proper diamond culet size ($<250\ \mu\text{m}$), diamond parallelness and alignment, and proper sample preparation, the DAC can readily reach megabar pressures ($>100\ \text{GPa}$).

The symmetric DACs are typically made of Vascomax or Stainless Steel 440C alloys, which are strong, but are magnetic and have low thermal conductivity limiting the use of such DACs in cold-finger type cryostats and measurements in strong magnetic fields. DACTools offers the Shortened Symmetric DAC made of BeCu alloy (C17200 / Alloy 25) with full-hard HT04 temper. To increase lifetime and decrease wear the DAC piston can be coated on request with a layer of hard chrome. The combination of the extremely high strength of the cell material and excellent thermal conductivity makes it optimal for use in cold-finger type cryostats, such as Physike Technology Scryo-S500 cryostat. Moreover, the design of the DAC allows to bolt the DAC piston directly to the cryostat cold finger, thus minimizing thermal losses, and conveniently attach temperature sensors, such as DT-670 in CU package, onto the DAC body close to the sample.

Beryllium-copper is a non-magnetic alloy and the DAC can be used in applications which require non-magnetic DACs. For such applications the DAC can be supplied with non-magnetic screws (e.g. Inconel and Ti5) and spring washers (Inconel or Beryllium Copper), as well as non-magnetic diamond seats made of either Pascalloy (non-magnetic NiCrAl alloy) or boron nitride.

While the DAC can be used for x-ray diffraction and other experiments, the shortened model is optimized for optical studies, such as Raman spectroscopy and other spectroscopic techniques requiring very small working distance: this DAC has a working distance of $\sim 12\ \text{mm}$ (5 mm shorter than a regular symmetric DAC) which allows to use short working distance ($<20\ \text{mm}$) optical objective even when the DAC is inside the cryostat.

The DAC allows for multiple ways of pressure control. Typically the pressure in the DAC is controlled by four M5 screws – two left and two right (to minimize relative rotation of the diamonds during pressure increase). Nevertheless the DAC can be easily integrated with standard and custom pressure control systems such as single or double membrane (compression and decompression), as well as piezo drive and mechanical (gearbox), which can be provided by DACTools.





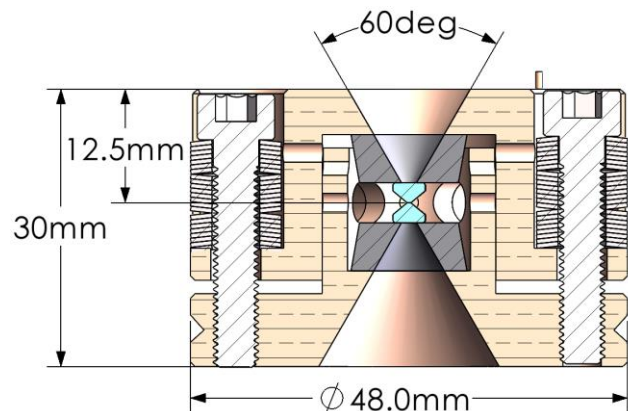
Specifications of BeCu Metric (48 mm) Shortened Symmetric Diamond Anvil Cell

Main DAC Specifications

Height:	~30 mm
Diameter:	48 mm
Working distance:	~12 mm
Mass:	~ 360 g
Optical opening:	Up to 60 degrees
Diamond seats:	Tungsten carbide (typ.), Optional Pascalloy and cBN (Non-magnetic)
Pressure screws:	M5 x 25 mm, 2x left and 2x right
Spring washers:	10.0 mm OD, 5.2 mm ID, 0.5 mm thick typ.
Diamond seat diameter:	12.5-13.0 mm (13.5 mm max)
Minimum height of two seat + diamonds:	13.5 mm
Maximum pressure:	>100 GPa

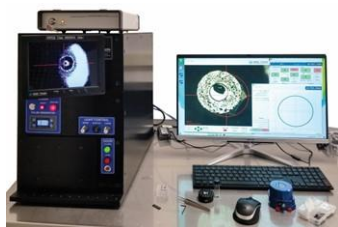
BeCu Material Properties

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



Related equipment

Laser drilling systems



Ruby pressure systems



Membrane P Control



For more information please visit www.DACTools.com



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