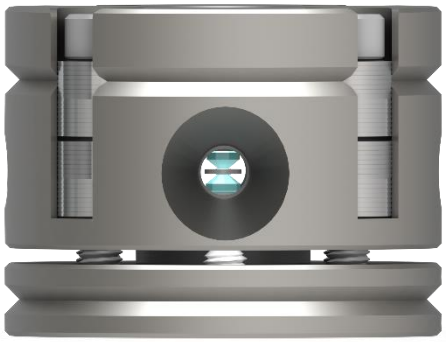
Symmetric Diamond Anvil Cell
Imperial and metric versions, 1.875 in. / 48.0 mm OD

Models STD-SYM-DAC / SYM-DAC-48mm



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.), electric measurements, as well as X-ray diffraction, inelastic X-ray scattering, and a vast variety of different experimental techniques. With proper diamond culet size (<250 μm), diamond parallelness and alignment, as well as proper sample preparation, the DAC can readily reach megabar, and even multi-megabar pressures.

The DAC can be provided with different tightness depending on the intended pressure range and experimental confitions. Also we can provide modified versions of the DAC – e.g. with shortened cylinder for smaller working distance or with built-in containment for special experiments.

The symmetric DAC is typically made of Stainless Steel 440C or Vascomax C-300/350 superalloy hardened and tempered to HRc 56-58 for optimal properties. The DAC can be used at both cryogenic conditions down to <4 K, as well as to high temperatures with resistive heating (with special setups and environments).

The DACs allows for multiple ways of pressure control. Typically the pressure in the DAC is controlled by four #10-32 / M5x0.8mm screws – two left and two right (to minimize relative rotation of the diamonds during pressure increase). Nevertheless the Symmetric DAC can be easily integrated with remote pressure control devices and the pressure in the DAC can be controlled with either mechanical gearbox, piezo control, or membrane (see e.g. *Sinogeikin et al., Rev. Sci. Instruments **86**, 072209, 2015*).

Recently DAC Tools introduced a double-membrane compression / decompression system which allows very accurate remote pressure control on pressure increase and decrease. This capability is extremely valuable in harsh environments, such as cryostats. The new double-membrane setup for room temperature allows symmetric 60 degrees opening (on both sides of the Symmetric DAC) for optical spectroscopy and x-ray diffraction (providing the proper choice of diamonds and diamond seats). The remote pressure control system can be provided separately.

DAC Tools
Custom Equipment for High-Pressure Research

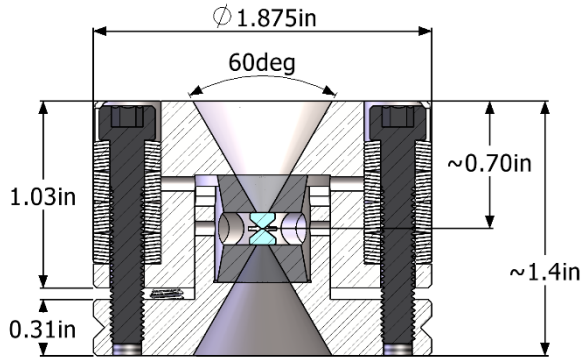
Specifications of Symmetric Diamond Anvil Cell

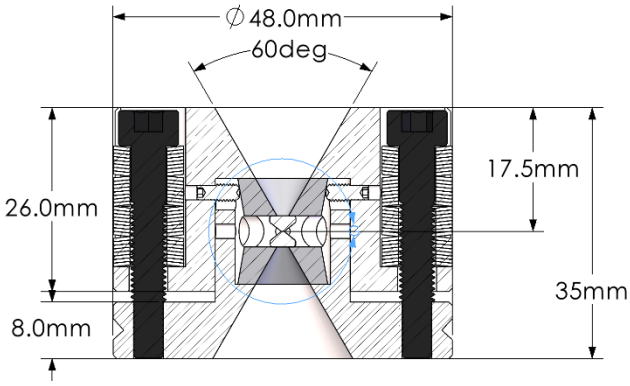
Main DAC Specifications

Height:	~1.4” / 35-36 mm)
Diameter:	1.875” / 48.0 mm
Working distance:	~17-18 mm
Mass:	~ 400 g
Optical angles:	60 degrees
Seats:	Tungsten carbide (typ.), cBN optional
Screws:	10-32 x 1.125” / M5x0.8 – 25-30mm 2x left and 2x right
Spring washers:	0.375” OD, 0.190” ID, 0.015-0.020” thick / 10.0 mm OD, 5.2 mm ID, 0.5 mm thick
Diamond seat diameter:	~0.5” / 12.5-13.0 mm Max 0.52” / 13.4 mm
Minimum height of two seat + diamonds:	0.53” /13.5 mm
Maximum pressure:	200-300 GPa with proper diamonds and alignment

DAC Material Properties

Type:	Stainless 440C or Vascomax C300/350 (Maraging steel)
Ultimate strength:	1750-2400 MPa (typ)
Yield strength (0.2%):	1280-2340 MPa (typ)
Hardness Rockwell C:	56-58
Magnetic?:	Yes

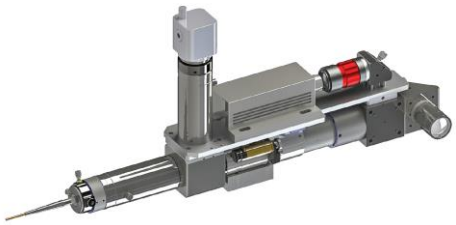




Related equipment

Laser drilling systems

Ruby pressure systems



Membrane P Control

For more information please visit www.DACTools.com

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