



## DUAL DOPANT SOURCES DCS



**Dual Dopant Source DCS 40-2x1-14-S**  
Two 0.6cc PBN crucibles on one flange DN40CF (O.D. 2.75"), with integrated water cooling surrounding the heaters

Each MBE system is limited due to its number of source ports. The Dual Dopant Sources DCS were developed to increase the available range of dopants in a MBE system. Dual Dopant Sources introduce two individually operated dopant sources on only a single flange.

Doping applications in Molecular Beam Epitaxy generally require low but stable flux rates. Large area uniformity of the doping level is obtained by using conical shaped crucibles. With a tapering angle of  $10^\circ$  a doping uniformity of less than 1% is reached on a 3" substrate at a distance of about 150 mm.

The individual sources operate efficiently and need only low power for high operation temperature. This compact cell design in combination with the water cooling reduces the thermal load on the MBE chamber.

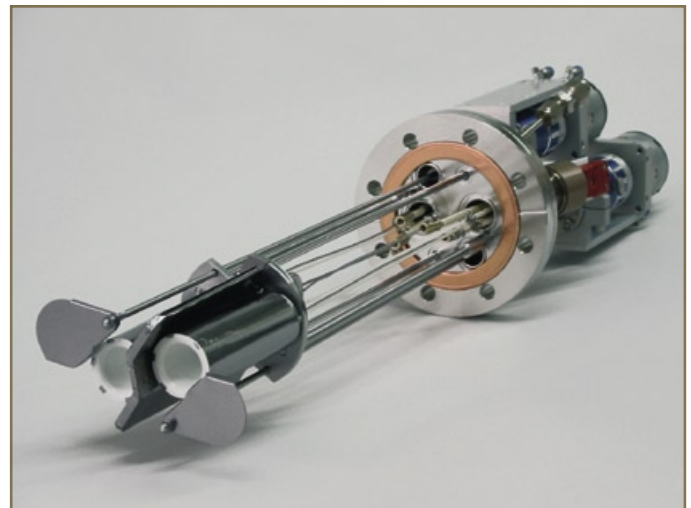
The water cooled Ta shielding between the cells reduces their thermal interaction. The temperature of a non-heated cell is below  $200^\circ\text{C}$  even if the other cell is on its maximum operation temperature.

Cross-contamination is minimized by the use of individual shutters separated by the water cooled Ta shielding.

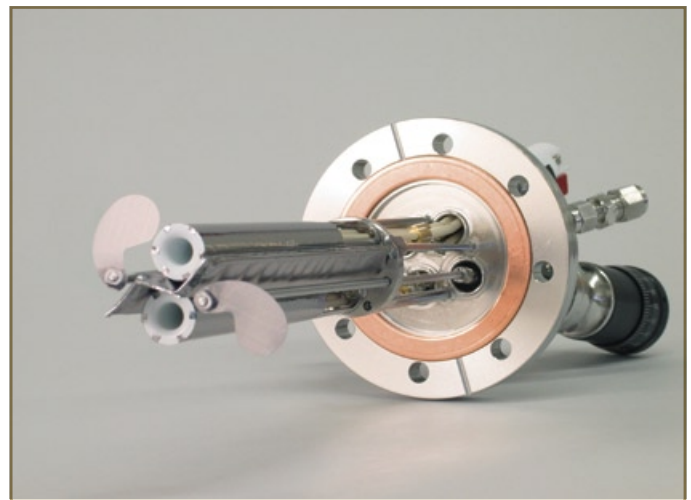
The main application of the Dual Dopant Source is the Si and Be doping. Both materials can be molten in an upward position. After that melting procedure, the DCS can even be used in downward pointing ports.

It is also possible to use the same dopant material in both cells at different temperatures. So a fast switch between different doping levels can be made without ramping the dopant cell temperature.

- Increase the range of dopants in your MBE
- Two dopant cells separated by a water cooled Ta-shielding
- Individual cell shutters
- Compatible with most MBE systems
- Compact cell design with low power consumption at high temperatures
- Precise and reproducible temperature measurement



**Dual Dopant Source DCS 63-2x5-27-S (V80)**  
Two 5cc PBN crucibles with individual cell shutter separated by a water cooling pipe on one flange DN63CF (O.D. 4.5") (For VG V80 or RIBER Compact 21 MBE systems)



**Dual Dopant Source DCS 63-2x2-16-S**  
Two 2cc PBN crucibles with individual cell shutter separated by a water cooling pipe on one flange DN63CF (O.D. 4.5") (For RIBER 32 MBE system)

We provide suitable cable sets, power supplies and temperature controller for our Dual Dopant Sources. Two 300W power supplies with temperature controller are recommended up to maximum operation temperature. In case of very high temperature outgassing with and without crucible or for short time high temperature operation above 1500 °C power supplies with larger output power are available.

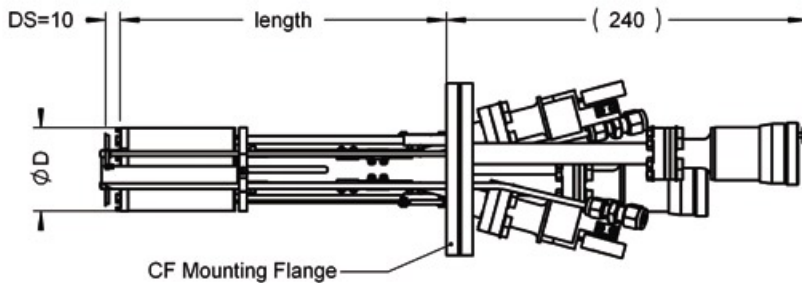
For automated shutter action we can provide our Soft Acting Shutter Module RSM. If your MBE system has a pneumatic shutter operation system we can offer rotary pneumatic shutter moduls RPM as an alternative. Please contact our sales department for details.

Technical Data

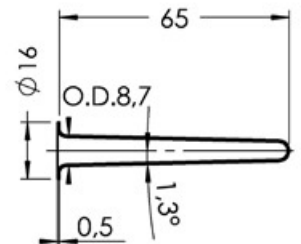
<b>Mounting flange</b>	DN40 CF (O.D. 2.75"), DN 63 CF (O.D. 4.5"), others on request
<b>Dimensions in vacuum</b>	<b>Length:</b> 180 - 400 mm; <b>ØD:</b> 36 mm for DCS 40-2x1-14-S <b>Length:</b> 216 - 400 mm; <b>ØD:</b> 55 mm for DCS 63-2x5-27-S (GEN II design) (small shutters) <b>Length:</b> 266 - 326 mm; <b>ØD:</b> 62 mm for DCS 63-2x5-27-S (V80 design) (large shutters) <b>Length:</b> 266 - 400 mm; <b>ØD:</b> 36 mm for DCS 63-2x2-16-S
<b>Ta wire filament</b>	max. power 250W/10A for DCS63-2xC5-S max. power 160W/7A for DCS63-2x2-S
<b>Temperature sensor</b>	W5%Re/W26%Re (Type C), others on request
<b>Bakeout temperature</b>	300°C
<b>Operating temperature</b>	200 °C -1400 °C (recommended 700-1350 °C)
<b>Outgassing temperature</b>	1500 °C (1600 °C for short times)
<b>Crucibles</b>	0.6 cm <sup>3</sup> up to 10 cm <sup>3</sup> ; two crucibles per source
<b>Cooling</b>	water cooling between the cells
<b>Shutter</b>	integrated rotary shutters (S)

Schematic drawing of the Dual Dopant Source DCS

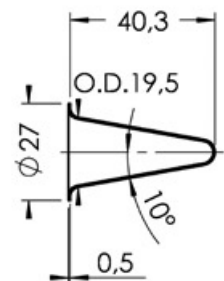
(drawing shows DCS 63 2x5-27-S with integrated shutters)



PBN crucible  
2ccm, taper 1.3°



PBN crucible  
5ccm, taper 10°



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