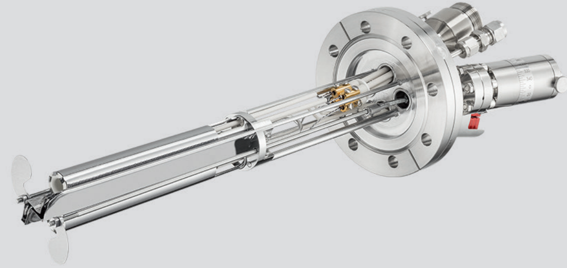
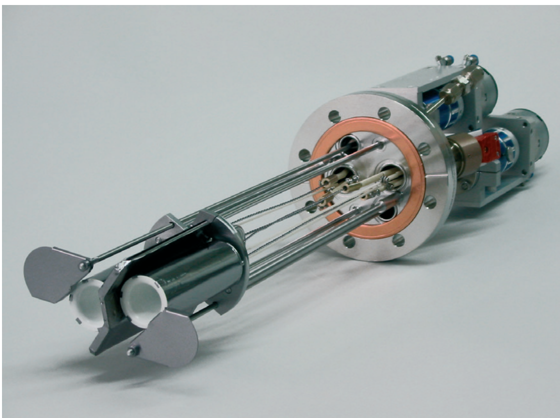
DUAL DOPING SOURCE DDS

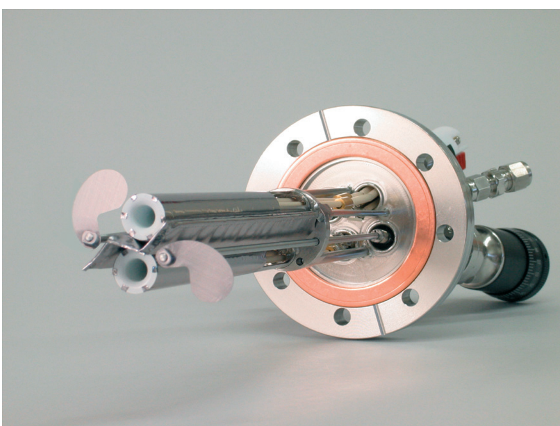
- Two doping cells separated by a water cooled Ta-shielding
- Individual cell shutters
- Compatible with most MBE systems
- Compact cell design with low power consumption at high temperatures
- Precise and reproducible temperature measurement



DDS 63-2x2-16-2S on DN63CF (O.D. 4.5") flange



Dual Doping Source DDS 63-2x5-27-S (V80)
Two 5 cm^3 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 Doping Source DDS 63-2x2-16-S
Two 2 cm^3 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)

Each MBE system is limited due to its number of source ports. The Dual Doping Sources DDS were developed to increase the available range of dopants in MBE systems. Dual Doping Sources introduce two individually operated dopant sources on 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° 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 water cooling reduces the thermal load on the MBE chamber.

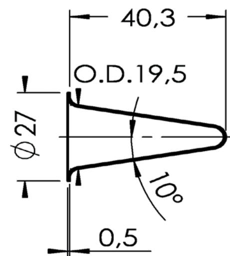
The water cooled Ta shielding between the cells reduces their thermal interaction. The temperature of a non-heated cell is below 200°C, even if the other cell is on its maximum operation temperature.
Cross-contamination is minimized by the use of individual shutters separated by the water cooled Ta shielding. The main application of the Dual Dopant Source is Si and Be doping. Both materials can be molten in an upward position. After that melting procedure, the DDS 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.

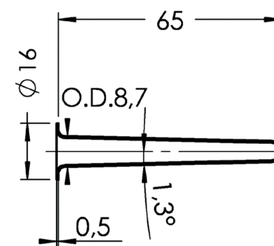
We provide suitable cable sets, power supplies and temperature controllers for the Dual Doping Sources. Two 300 W power supplies with temperature controller are recommended up to maximum operation temperature. In case of very high temperature outgassing with and without crucible or for short time high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

Technical Data

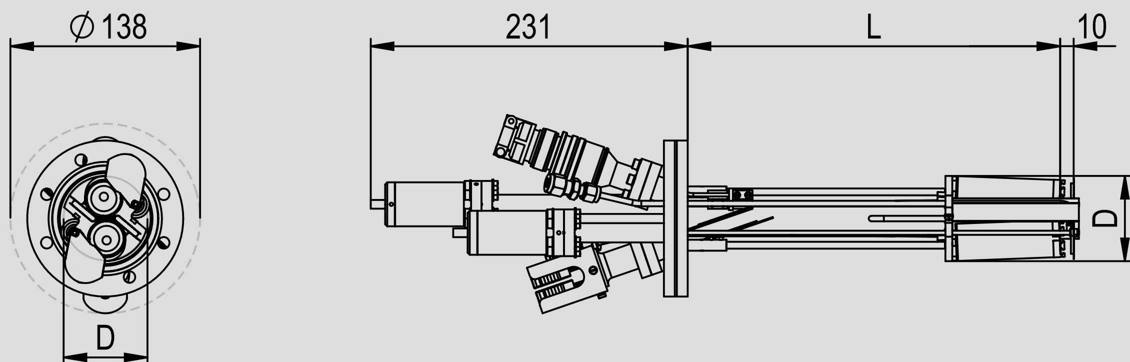
Mounting flange	DN40CF (O.D. 2.75''), DN63CF (O.D. 4.5"), others on request
Dimensions in vacuum	length: 216 - 400 mm; ØD: 55 mm for DCS 63-2x5-27-S
	(GEN II design, small shutters)
	length: 266 - 326 mm; ØD: 62 mm for DCS 63-2x5-27-S
	(V80 design, large shutters)
	length: 266 - 400 mm; ØD: 36 mm for DCS 63-2x2-16-S
Ta wire filament	max. power 250W/10A for DCS63-2x5-27-S
	max. power 160W/7A for DCS63-2x2-16-S
Thermocouple	W5%Re/W26%Re (Type C), others on request
Bakeout temperature	max. 250°C
Outgassing temperature	1500°C (1600°C for short times)
Operating temperature	200°C -1400°C (recommended 700-1350°C)
Crucibles	2 cm³ up to 10 cm³; two crucibles per source
Cooling	water cooling between the cells
Option	integrated rotary shutter (S)



PBN crucible
5 cm³, taper 10°



PBN crucible
2 cm³, taper 1.3°



Schematic drawing of the Dual Doping Source DDS
(Drawing shows DDS 63-2x5-27-S with integrated shutter)

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