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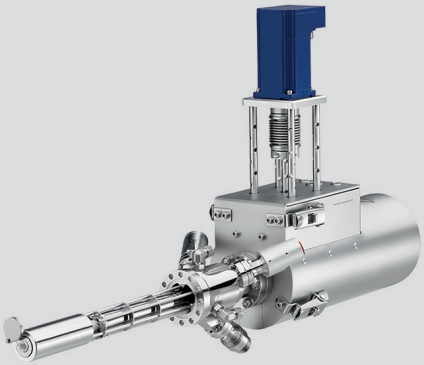
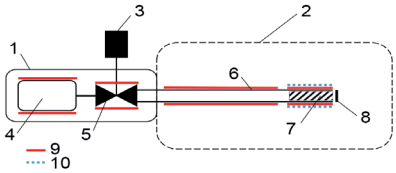
VALVED SULFUR SOURCE VSS

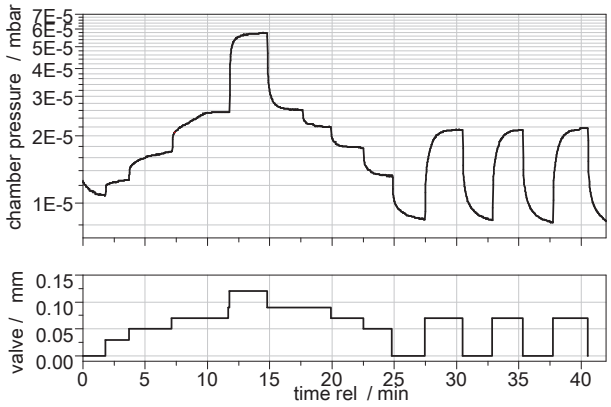
- Provides sulfur flux for R&D applications on a DN40CF (O.D. 2.75“) flange
- Flux regulation and on/off control by motorized valve
- 150 cm³ reservoir
- Integrated cooling of cracker stage
- Integrated rotary shutter option



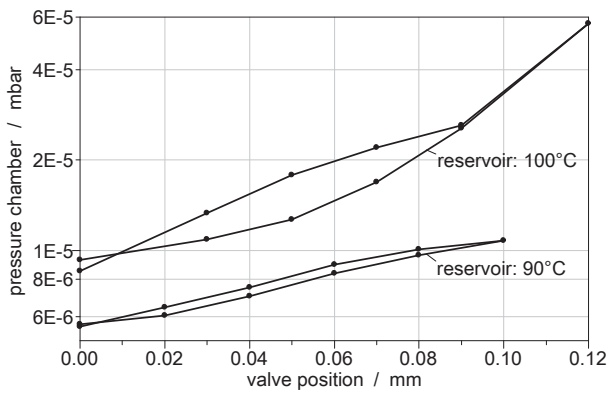
VSS 40-150-51-KS-RV-MC on DN40CF (O.D. 2.75”) flange



Schematic of VSS. 1 case, 2 vacuum chamber, 3 stepper motor for valve regulation; 4 material reservoir, 5 valve, 6 PBN injector tube, 7 cracker insert, 8 shutter, 9 electrical heater, 10 water cooling



Dynamic behavior of valve operation measured with sulfur



Valve characteristic for 90°C and 100°C reservoir temperature

The Valved Sulfur Source VSS provides valve-controlled small to medium flux rates of high vapor pressure materials. It is equipped with a water-cooled cracker that reaches temperatures up to 1300°C.

Reservoir and valve are both located outside the vacuum. This offers a huge benefit for maintenance work, or when reloading the reservoir which can be done without venting the chamber. Industrial grade electrical heaters are used to heat reservoir and valve. Both are temperature controlled by Pt100 thermometers.

In order to achieve the highest possible cleanness all critical seams on valve and reservoir are prepared by electron beam welding.

The VSS is designed for reservoir temperatures up to 300°C and works smoothly down to 80°C. The internal thermal design ensures ideal temperature gradients for trouble-free operation. For maximum process control the source includes four independent heating circuits (reservoir, valve, tube, cracker). Depending on the application, it is possible to operate the source without active heating of the tube.

The VSS valve is actuated by a high precision motor. A flux modulation in the order of two magnitudes can be typically attained. On request, pneumatic or manual valve control is also possible.

Two different valve designs are available: a high throughput version with higher overall throughput and a valve with smaller throughput but finer flux regulation characteristics.

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Applications

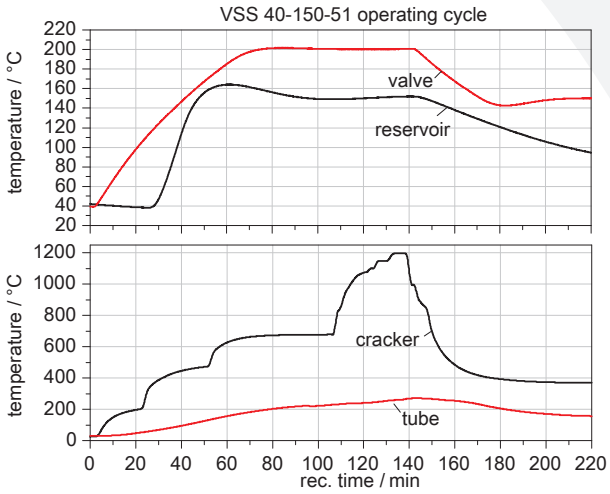
The Valved Sulfur Source VSS is intended for R&D applications that require valve-controlled small to medium flux rates of high vapor pressure materials.

A source concept like this is usually used for evaporation of high vapor pressure materials that tend to form atomic clusters. Typical evaporants are S and Se.

The in-vacuum length of the VSS is either 220 mm or 287 mm. For other in-vacuum lengths application specific spacers can be used.

By default, the cracker insert is made from pyrolytic boron nitride that ensures efficient cracking of sulfur and selenium.

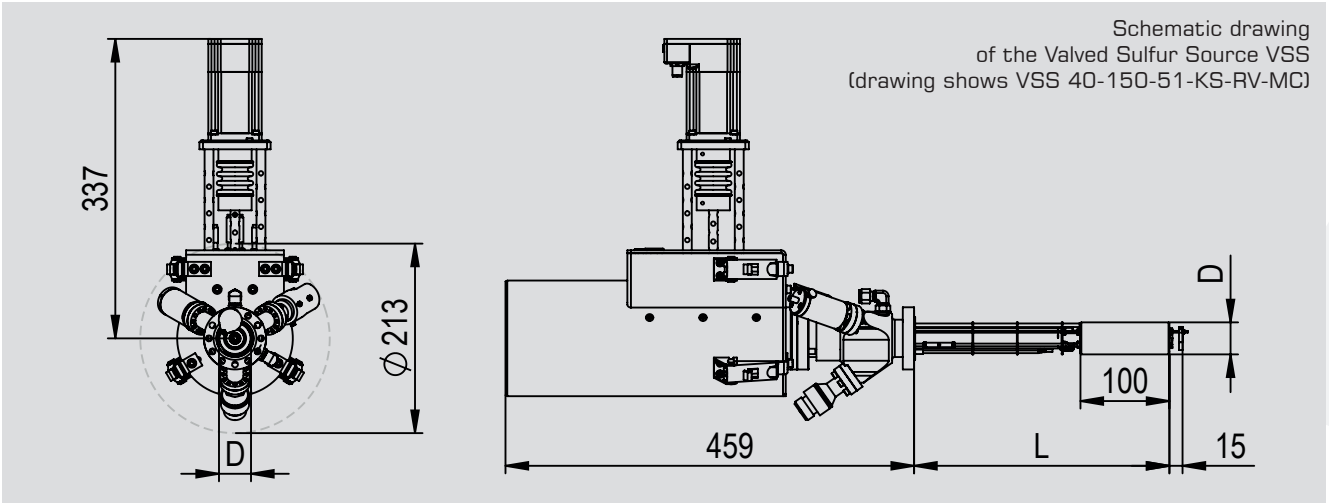
The figure on the right shows an example of a short operating cycle of the VSS.



Temperature / time chart for an operation example of the VSS 40-150-51.

Technical Data

Mounting Flange	DN40CF (O.D.2.75")
Dimensions in Vacuum	L=220 or 287 mm, D=36 mm
Heating system	reservoir / valve: airside electrical heater; tube / cracker: Ta-wire heater
Temperature sensors	reservoir / valve: Pt100 class A; tube / cracker: thermocouple type C
Bakeout temperature	200°C
Operating temperature	reservoir: 80-300°C, valve: 100-300°C
	tube: 150-500°C, cracker: 300-1300°C
Cooling	integr. water cooling shroud (K)
Valve type	fine flux regulation (RV) / high throughput (TV)
Valve control	motorized (MC) / manual (HC) / pneumatic (PC)
Reservoir	150 cm^3



Schematic drawing
of the Valved Sulfur Source VSS
(drawing shows VSS 40-150-51-KS-RV-MC)

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