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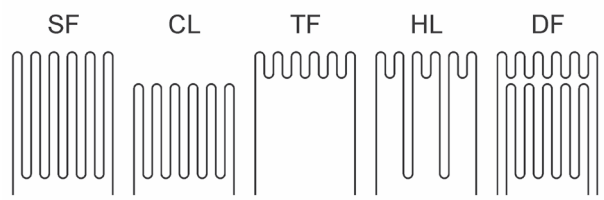
STANDARD EFFUSION CELL WEZ

- Applicable up to 1400°C
- Typical evaporants: Ga, In, Al, Si, Be, Cu, Ag, Au, CaF_2, etc.
- Excellent temperature and flux stability
- Various filament and crucible options
- Optional: integrated cooling shroud and shutter

WEZ 40-35-37 on DN40CF (O.D. 2.75") flange

Material	Melting point	T op.*	Filament
In	157 °C	742 °C	HL
Ag	961 °C	832 °C	SF
Ga	30 °C	907 °C	HL
Al	660 °C	972 °C	CL
Cu	1084 °C	1027 °C	HL
Au	1063 °C	1132 °C	SF
Ge	937 °C	1167 °C	SF

* Typical operating temperatures required for growth rates in the range of 0.1 to 0.5 ML/s (about 1-3 nm/min) using a WEZ 40-10-22-KS at a source to sample distance of 100 mm.



Filament types:
The standard filament **SF** heats the crucible evenly along its entire length.
The cold lip filament **CL** is a shorter version of the standard filament SF. It does not reach up to the orifice part of the crucible. This fact and some additional shielding leave the crucible lip clearly cooler than the lower parts. This is required for Aluminum evaporation, for example.
Only the topmost part of the crucible is being heated with the tip filament **TF**. This design provides the maximum temperature gradient between crucible bottom and lip.
The hot lip filament **HL** is wired more densely at the upper part than the standard heating assembly. That way a higher temperature near the crucible lip is achieved by using only one power supply for the heating.
A dual filament **DF** is composed of two heaters that can be independently operated by two PID controlled power supplies. A dual filament provides all operation possibilities: SF, CL, TF and HL.

Standard Effusion Cells WEZ can be used to evaporate or sublimate a great variety of materials at temperatures from 700°C to 1400°C. For applications at higher temperatures we recommend our High Temperature Effusion Cell HTEZ, for applications at lower temperatures our Low Temperature Effusion Cell NTEZ.

The evaporant in the crucible is heated by tantalum wire filaments, while the heater is shielded by multiple layers of tantalum foil. Only high quality refractory metals are used in the hot area to ensure high purity operation.

An excellent operation temperature stability of ±0.1 K by PID control enables very stable and reproducible growth rates in an extremely wide range from below 0.01 nm/h (e.g. doping applications) up to several nm/s for thin film growth.

A large variety of crucible shapes and capacities from 2 to 60 cm^3 are available for WEZ type effusion cells. The standard crucible material is PBN. Other crucible materials such as Al_2O_3, pyrolytic graphite (PG) or quartz are available as required.

To meet the different requirements of the evaporants we provide each WEZ with an appropriate filament, e.g. standard, cold lip, hot lip, tip or dual filament. (See drawing and explanation on the left.)

The thermocouple TC is fixed near the bottom of the crucible. For DF type an additional thermocouple is placed next to the top filament near the orifice of the crucible.

WEZ cells are available either with effective integrated water cooling (-K) or with separate water cooling shroud (CS). A rotary shutter can be optionally integrated.

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Applications

The typical fields of application for WEZ cells are MBE, sample preparation and thin film growth.

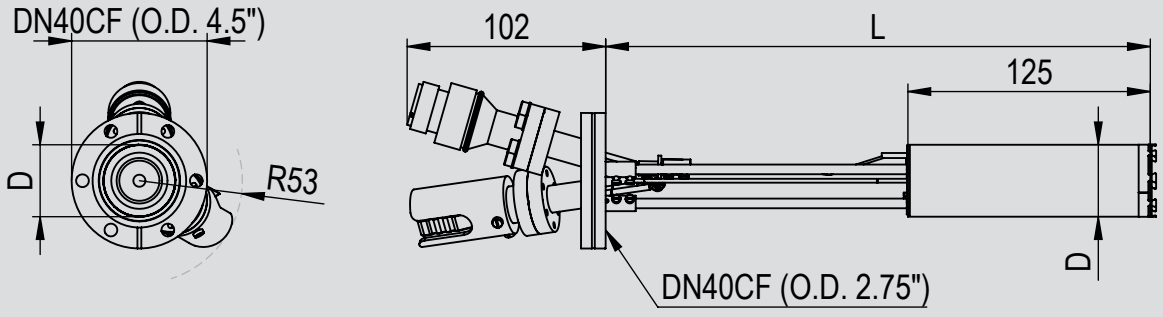
The compact WEZ variants (e.g, WEZ 40-10-22-KS and WEZ 40-2-16-KS) are ideally suited for small research surface analysis systems. Its effective water cooling, either by an integrated or a separate water cooling shroud minimizes the heat load by thermal radiation and thus protects both vacuum chamber and port tubes.

Large capacity WEZ cell variants are mainly used to evaporate Ga, In and Al in III-V MBE systems whereas WEZ doping cells with conical crucibles are used for, e.g., Si or Be doping.

For CIGS and CZTS optimized WEZ souces are applied for the evaporation of, e.g., Cu, In, Ga, Sn.

Technical Data

Mounting flange	DN40CF (O.D. 2.75“) or DN63CF (O.D. 4.5“)
Dimensions in vacuum	L=180-400 mm, D=16-57 mm
Filament type	standard (SF), hot lip (HL), cold lip (CL), dual (DF) or tip (TF) filament
Thermocouple	W5%Re/W26%Re (type C)
Bakeout temperature	max. 250°C
Outgassing temperature	max. 1500°C
Operating temperature	700-1400°C
Cooling	integrated water cooling (K) or seperate cooling shroud
Crucibles	2-60 cm³ (PBN, Al_2O_3, PG, other materials on request)
Option	integrated rotary shutter (S) with Ta shutter plate



Schematic drawing of the Standard Effusion Cell WEZ
(Drawing shows WEZ 40-35-37)

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