

# HTEC

## High Temperature Effusion Cell

Design	HTEC
Heater	Self-supporting refractory filament
Flange Sizes	2.75" (DN40CF), 4.5" (DN63CF)
Optimal Temperature Range	800-2000 °C (max temp may be limited due to crucible material choice)
Outgassing Temperature	2100 °C
Bakeout Temperature	250 °C
Thermocouple	Type C
UHV Dimensions	See table below
Crucible	PBN, Al <sub>2</sub> O <sub>3</sub> , BeO, Vitreous Carbon, PG, W, Ta
Cables	200 °C bakeable, 20 ft
Option: Cooling	Integrated or separate water-cooling shroud Water requirements: 5-15 °C, 1.5 l/min flow rate
Option: Shutter	Integrated rotary Ta shutter blade, manual or pneumatic

VolkVac Instruments' HTEC is optimized for evaporation of low vapor pressure materials such as Co, Ti, V and others.

The design of the filament and radiation shielding inside the HTEC is optimized for stable temperature control ( $\pm 0.1$  °C, depending on PID controller used) in the 800-2000 °C range. To ensure clean UHV operation, the hot zone is constructed entirely of Ta and W, with all insulating ceramics shielded from the hottest parts of the cell.

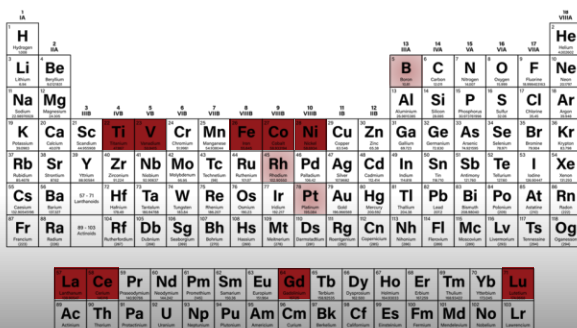
There is no 'standard' crucible material choice for the HTEC since each application requires careful consideration. The choice of crucible material may also restrict the maximum operating temperature of the HTEC to be lower than 2000 °C. Typical maximum recommended temperatures are (can be lower depending on evaporation material and desired film purity):

- PBN – 1600 °C
- Al<sub>2</sub>O<sub>3</sub> – 1700 °C
- BeO – 1800 °C
- VC/PG – 2000 °C
- Ta – 2000 °C
- W – 2000 °C

Please consult VolkVac for recommendations.

HTECs can be supplied with an integrated water-cooling shroud, or as bare evaporators if customer already has a cooling shroud in place. Some version of the HTEC can also be built with a hot lip filament. Evaporators can also be fitted with an integrated rotatable shutter, with manual or compressed air actuation. See table below for options.

### Suggested for evaporation of the following elements



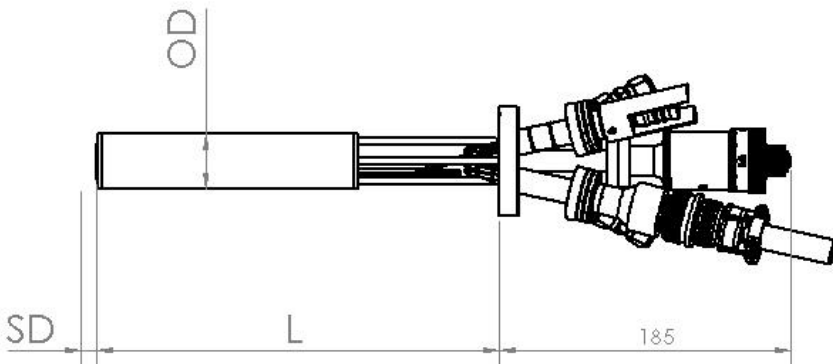
Please consult VolkVac about your required deposition rates to ensure optimal evaporator selection.

## Dimensions and options

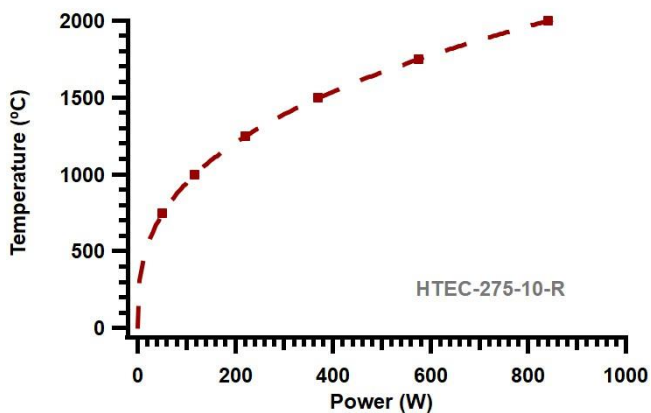
Specify UHV length L upon quotation request (minimum lengths for each evaporator are listed). Standard shutter-to-orifice distance SD is 10 mm. All thermocouples are type C.

**Crucible sizes:** 10, 25 cm<sup>3</sup>

Part Number	CF Flange Size	Integrated water cooling?	Can integrate shutter?	Crucible volume (cm <sup>3</sup> )	Filament options	Vacuum dimensions ODxL <sub>min</sub> (mm)
LTEC-275S-10	40		Yes	10	R	35x200
LTEC-450WCS-10	63	Yes	Yes	10	R,HL	57x250
LTEC-450S-25	63		Yes	25	R,HL	57x250



*HTEC-450WC-25 with Al<sub>2</sub>O<sub>3</sub> crucible*



*Typical HTEC-275-10 Power-Temperature curve, R filament.*