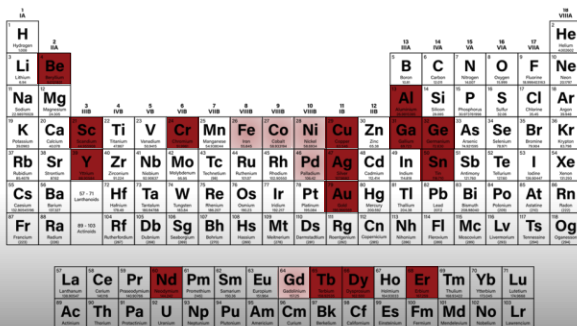


MTEC

Medium Temperature Effusion Cell

| Design | MTEC |
|------------------------|---|
| Heater | Ta wire, PBN insulator Regular/hot lip/dual filament options |
| Flange Sizes | 2.75" (DN40CF), 4.5" (DN63CF), Larger sizes on request |
| Temperature range | 300-1400 °C (max temp may be limited due to crucible material choice) |
| Outgassing temperature | 1500 °C |
| Bakeout temperature | 250 °C |
| Thermocouple | Type C |
| UHV dimensions | See table below |
| Crucible | PBN, Al ₂ O ₃ , W, Ta, other on request |
| Cables | 200 °C bakeable, 20 ft |
| Option: Cooling | Integrated or separate water-cooling shroud Water requirements: 5-15 °C, 1 l/min flow rate |
| Option: shutter | Integrated rotary Ta shutter blade, manual or pneumatic |

Suggested for evaporation of the following elements



VolkVac Instruments' MTEC is optimized for evaporation of medium vapor pressure material. Common examples are metals Ga, Al, and Au. Transition metals such as Co and Fe can also be evaporated at moderate deposition rates of 0.1-1 nm/min the chamber depending on deposition geometry.

The design of the Ta wire heater and radiation shielding inside the MTEC is optimized for stable temperature control (± 0.1 °C, depending on PID controller used) in the 400-1400 °C range. The filament can come in regular, hot lip and dual filament winding configurations (cold lip version available for Al evaporation). Please consult VolkVac for specific recommendations for your application.

The most common crucible material is PBN due to its chemical inertness, low vapor pressure and clean outgassing in UHV as well as high thermal shock resistance. However, other crucible materials may be appropriate based on the required application. Please consult VolkVac for recommendations.

Majority of application do well with cylindrical crucible geometry ($\sim 1^\circ$ wall taper) but conical crucibles ($\sim 10^\circ$ wall taper, commonly used for doping applications) are available on request. Please consult VolkVac for recommendations.

MTECs can be supplied with an integrated water-cooling shroud, or as bare evaporators if customer already has a cooling shroud in place. Most evaporators can also be fitted with an integrated rotatable shutter, with manual or compressed air actuation. See table below for options.



View of the MTEC-275WC-10 Regular filament with crucible removed.

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

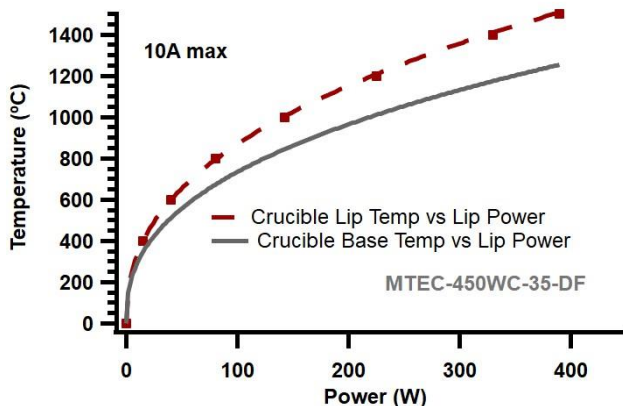
Dimensions and options

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 and crucibles are cylindrical PBN. Conical PBN crucibles and specialty material crucible are also available.

Cylindrical PBN crucible sizes: 1.5, 10, 25, 35, 40, 60, 85, 125 cm³

Conical PBN crucible sizes: 5, 8, 12, 16, 60, 80 cm³

| Part Number | CF Flange Size | Integrated water cooling? | Can integrate shutter? | Crucible volume (cm ³) | Filament options | Vacuum dimensions ODxL _{min} (mm) |
|----------------|----------------|---------------------------|------------------------|------------------------------------|------------------|--|
| MTEC-275S-1 | 40 | | Yes | 1.5 | R | 35x175 |
| MTEC-275WCS-1 | 40 | Yes | Yes | 1.5 | R | 35x175 |
| MTEC-275S-10 | 40 | | Yes | 10 | R, HL, D | 35x200 |
| MTEC-275WCS-10 | 40 | Yes | Yes | 10 | R, HL, D | 38x200 |
| MTEC-275S-25 | 40 | | Yes | 25 | R, HL, D | 38x200 |
| MTEC-275S-35 | 40 | | Yes | 35 | R, HL, D | 38x225 |
| MTEC-275-40 | 40 | | | 40 | R, HL, D | 38x225 |
| MTEC-275-60 | 40 | | | 60 | R, HL, D | 38x225 |
| MTEC-450S-35 | 63 | | Yes | 35 | R, HL, D | 57x200 |
| MTEC-450WCS-35 | 63 | Yes | Yes | 35 | R, HL, D | 57x200 |
| MTEC-450S-60 | 63 | | Yes | 60 | R, HL, D | 57x225 |
| MTEC-450WCS-60 | 63 | Yes | Yes | 60 | R, HL, D | 57x225 |



Typical MTEC-450WC-35 Power-Temperature curve, D filament.

