

Ion Gauge Filament Material

APPLICATION NOTES

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1. Filament Materials

Filament type selection is a complex subject and is largely dependent on the vacuum environment they will be used in. A basic description follows but does not cover all situations.

FIL17 - Tungsten filaments

These are widely used because they are relatively inexpensive. They operate hotter than other types so will evaporate contamination from the filament surface resulting in a more stable gauge operation. However, this advantage may increase outgassing from surrounding surfaces due to elevated temperatures. Tungsten is not affected by Hydrocarbons and Halogens so is the filament to use if these are present. Tungsten filaments are very fragile and will not survive exposure to air or mechanical mishandling.

FIL18 - Thoria-coated iridium filaments

These operate at a relatively cool temperature (1400°C) resulting in reduced outgassing and chemical reactivity with other gasses. They are considered the filament of choice when operating in the ultra-high vacuum region. Iridium does not burn out if exposed for a short time to high pressures while hot and so can survive a sudden loss of vacuum without damage.

FIL19 - Yttria-coated iridium filaments

Exposure to the alpha particles emitted by thorium is of concern to some users. Yttria-coated filaments share very similar thermionic characteristics and behave the same as thoria-coated filaments but without the particle emission.