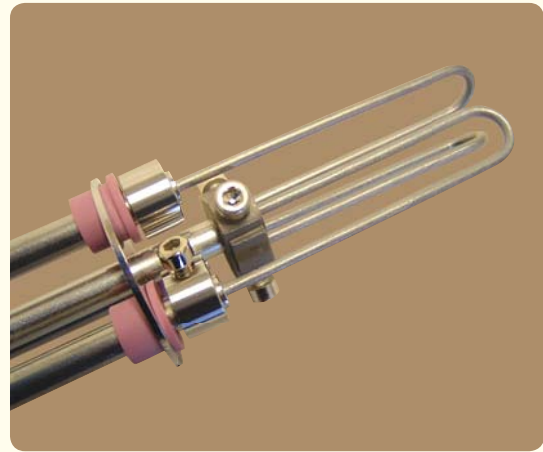


**INTRODUCTION**

Titanium Sublimation Pumps are true UHV pumps, used to supplement the pumping of other types of pump, such as ion pumps. TSP's have the advantage of being very simple, low cost and have a high pumping speed.

The A-TSP offered by LewVac has the following features:

- Large diameter titanium filaments
- High sublimation rate
- Strong construction
- Simple replacement of filaments, clamps and insulators
- Custom lengths available to special order



The A-TSP has three removable 'U' shaped filaments, manufactured from an alloy of titanium and molybdenum. The filaments are mounted to a simple carrier feedthrough having low electrical resistance. A high current, supplied by an external power supply (supplied separately) is passed through the filament causing its temperature to rise sufficiently to cause titanium to be sublimated from the filament. This sublimated titanium then coats the walls of the vacuum chamber. The titanium film will react with the gas molecules within the system to form low vapour pressure compounds. Once the film has reacted, a further sublimation should be made to repeat the process. The timing between sublimations is dependant upon system pressure and the gasses being pumped. To improve the pumping efficiency of the TSP, the chamber walls can be cooled to liquid nitrogen temperatures. The table below illustrates the advantage of cooling to such temperatures.

**PUMPING SPEED -  $l\text{-s}^{-1}\text{cm}^{-2}$**

Temp \ Gas	H <sub>2</sub>	N <sub>2</sub>	O <sub>2</sub>	CO	CO <sub>2</sub>	H <sub>2</sub> O	CH <sub>4</sub>	Inerts
+20°C	3	4	2	9	8	3	0	0
-196°C	10	20	6	11	9	14	0	0

**SPECIFICATIONS**

Operating Pressure	10 <sup>-1</sup> to 10 <sup>-11</sup> mbar
Operating Temperature	-196 to 250°C
Bakeout Temperature	Max 350°C
Maximum current setting	52 Amps (Degas)
Usual initial current setting	48 Amps

The A-TSP is a standard pump head mounted on a DN40CF style flange. The insertion length of the pump is 203mm, this being the distance between the knife edge face of the flange to the extent of the filament. Special lengths can be supplied to special order, the shortest practical length being approximately 120mm, and the longest approximately 400mm. It should be noted that performance will be reduced in longer length pumps, due to the increased electrical resistance of the feedthrough conductors.

Due to the nature of pumping by sublimation, the pump itself can become contaminated with titanium, resulting in the requirement to clean or replace insulators at regular intervals. Replacement parts are available to enable customer self service of these pumps.

Please note: When installing A-TSP, care should be taken to ensure that filament number 1 (numbered on air side of flange) is positioned at the bottom. This is because during operation the filaments can sag and if installed in any other orientation, an electrical short may be caused.

**Available spares:** Filaments, Filament clamps, Clamp screws, Insulator bushes

**Associated products:** Power supply / TSP controller, Cables

**Degas**

1. Ensure that the filament current control is set to its minimum setting.
2. Select filament 1.
3. Slowly increase filament current to 52 Amps ensuring that the system pressure does not rise too sharply.
4. When the pressure returns to or close to its original level (this may take a few minutes dependant upon system pumping speed), reduce the filament current to a minimum, switch to filament 2 and repeat the above procedure, then repeat again for filament 3.

**Filament changes**

When changing filaments we advise that the clamping screws be lubricated with isopropanol alcohol prior to loosening.