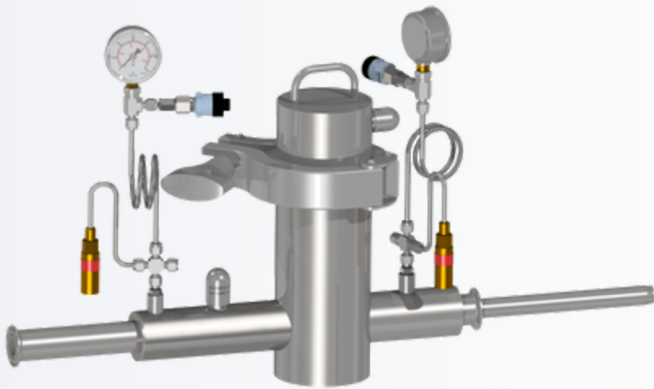


# Modular T-Filter



Modular Single T-Filter

Pre-engineered Modular T-Filter, to filter incoming liquid nitrogen for pure liquid supply. Vacuum insulated with lowest heat leak and lower liquid nitrogen losses compared to traditional non-vacuum insulated Y-filter. Also, it has high safety feature to prevent operator from cold burns.

## How it Works

Modular T-Filter is available with bayonet connection and is easily integrated into existing vacuum jacketed piping system effortlessly.

T-filter is also available in a switch-over station (S.O.S) for uninterrupted liquid nitrogen supply during filter maintenance or element change-out. The S.O.S consist of two T-filter, one active and one standby. When the filter in active use is due for service, the operator can manually switch over the liquid flow to the standby filter.

This T-filter station is available in automatic switch-over function using pressure differential instruments to monitor the filter element working condition. A differential pressure more than 1.5 bar indicates a filter element blockage and needs cleaning or replacement. The fully vacuum insulated design guarantees low heat leak compared to foam-insulated type with 30 times lesser liquid boil-off. Besides ensuring better liquid flow and quality, it also helps to save LN<sub>2</sub> losses, equivalent to less than 3 months of capital payback.

## Typical Applications

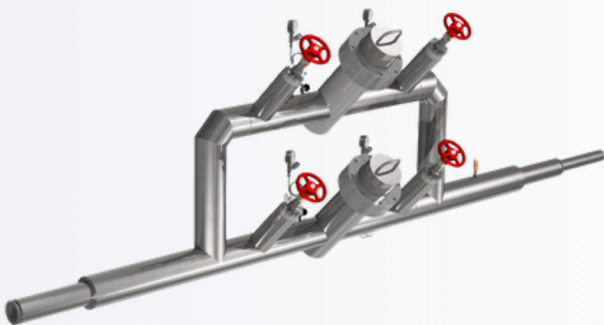
- To remove particle or debris from liquid stream that may pose problems to downstream piping, valves, instrumentation and production process.
- Suitable for of LIN, LAR, LOX or LCO<sub>2</sub> <sup>[1]</sup>.

<sup>[1]</sup> Mandatory to remove impurities e.g., ices for prolonged piping lifespan

## Features and Benefits

- Easy to replace filter element. There is no foam insulation to break & re-foam
- Installation is quick and easy. No costly on-site foam insulation work is needed
- Saving of liquid nitrogen usage between 300 kg to 500 kg per day, thanks to its vacuum jacketed feature compared to traditional non-vacuum insulated Y-filter
- Frost-free and condensation free operation, suitable for cleanroom & HACCP work area
- Requires less footprint due to top entry filter element design

All Modular T-Filter come with CSM renowned customer service, from conceptual design to implementation, and are backed by a 5-years Vacuum Warranty, and 1-year Defect Warranty.



Modular Switch Over Station (S.O.S) T-Filter

# T-Filter Module Specifications

Model	TF10	TF20	TF40
Pipe Size	½" or 1"	1.5" or 2"	3" or 4"
Filter Element Type	Multi-Layer Sintered		
Absolute Filter Pore Size	10 µm, 40 µm, 100 µm, 200 µm		
Filter Element Material Grade	SS316L (1.4404)		
Max. Flow Capacity	1600 LPH	4500 LPH	10300 LPH
Connection Size	C5, C10	B15 or B20	B30 or B40
Steady State Heat Loss	2 Btu/hr/ft (1.8 W)	8 Btu/hr/ft (7.2 W)	20 Btu/hr/ft (18 W)
Vacuum Insulation Type	Static / Dynamic Vacuum		
Max. Operating Pressure	150 psi (10.3 bar)		
Material Construction	Stainless Steel 300 Series		
Changeover Control Type	Manual or Automatic		
Monitoring System	Analog Gauge (Manual System) or Alarm Switch (Automatic System)		
Standard Testing	Dimensional Check He Leak Test @ $1.0 \times 10^{-9}$ cc/s		
Optional	Pneumatic Pressure Test, Vacuum Retention Testing, LN <sub>2</sub> Cold Shock, Pre-Material Certs., X-ray Inspection, ASME B31.3 Certification, CFOS Cleaning for O <sub>2</sub> Services, RPTSTD-8070-0001		

## Typical Cryogenic Switch-Over Filter Station for LN<sub>2</sub> Supply

