

Supply of Liquid Nitrogen cold traps

Qty.: 7 Nos.

1.0 Scope of work:

The scope of work involves the supply of Liquid nitrogen cold traps as per the schematic drawing given in the Annexure and as per the specifications and requirements given in this document.

2.0 Application: The Liquid Nitrogen cold traps will be used in roughing and fore vacuum lines of vacuum pumping systems of thermal vacuum chambers.

3.0 Technical specifications:

Sl. No.	Technical Parameters	Specification values
3.1	Type	Single fill & vent liquid nitrogen cold trap with provision for inner vessel removal. (Schematic drawing is given in the Annexure)
3.2	Working pressure	For inner vessel: 1.5 bar (g) For outer vessel: Vacuum (Better than 10^{-6} mbar) Minimum thickness for the inner and outer vessel shall be 4mm.
3.3	Working temperature range for inner and outer vessel	-196°C to +120°C
3.4	Material of construction and finish	Inner vessel Material: AISI Stainless Steel 304L Outer vessel Material: AISI Stainless Steel 304L Both the inner and outer vessel shall be electropolished to give an emissivity of less than 0.15.
3.5	Inlet and outlet flange size for vacuum pump connection	DN63 ISO-K with ISO-F rotatable bolt ring It shall be noted that all the inlet and outlet ports of the traps shall be provided with suitable stainless steel blank-off and necessary centering ring with O-ring & Double/Single claw clamps.
3.6	Vacuum Sealing for inner vessel flange	Oxygen Free High Conductivity (OFHC) Copper gasket suitable to the inner vessel flange (DN200 ISO-CF) shall be provided to ensure the leak tightness as per Specification Sl. No. 3.13.
3.7	Drain port for outer vessel	The outer vessel shall be provided with a drain port along with DN25 ISO-KF Normally closed, electro-pneumatically operated vacuum isolation gate valve to remove the trapped condensates. The offered valve shall be rated for 230VAC $\pm 10\%$, 50Hz $\pm 3\%$.

3.8	Gas purge port	The outer vessel shall be provided with a ½” size gas purge port along with suitable vacuum compatible, direct operated solenoid valve. The offered valve shall be rated for 230VAC ±10%, 50Hz ± 3%.
3.9	Fins on inner vessel	ETP copper fins oriented at 45°, as shown in the drawing, shall be provided on the inner vessel. Copper fins shall be nickel plated to have an emissivity of less than 0.15 and joined to the inner vessel by silver brazing or any other technique suitable for vacuum application.
3.10	Isolation plug for LN ₂ fill port	The inner vessel shall be provided with a suitable isolation plug made of PTFE. It shall be noted that the plug is both a mechanical cover for the opening and an insulating cover for the top of the trap, but it should be loose enough for the nitrogen to be able to boil away without pressure build-up.
3.11	Heater	A Tubular heater of 1.0 kW capacity with electrical rating 230VAC ±10%, 50Hz ± 3% and made of stainless steel 304 shall be provided for heating the trap during regeneration. The diameter of the heater shall be limited to 15mm and the length of the heater shall span for at least 3/4 th of the length of the inner vessel.
3.12	Welding	Welding shall be carried out as per standard vacuum practices.
3.13	Individual Leak rate	Better than 10 ⁻⁸ mbar-l/s for Helium by Mass Spectrometer Leak Detection test.
3.14	Cleaning	All the surfaces exposed to vacuum shall be cleaned for high vacuum application. (Vacuum better than 10 ⁻⁶ mbar).
3.15	Support stand	The cold traps shall be provided with a demountable stainless steel support stand. The stand shall be designed to offer good stability and portability.

4.0 General terms and conditions:

4.1 Vendor Experience: Vendor shall have specialization and good experience in the field of vacuum /cryogenic systems for fabrication of similar kind of items/equipments for a **minimum of 2 years**. Documents such as Purchase order references, contact details, etc., in support of the same, shall be provided along with the quote.

4.2 Submittals for URSC clearance: Vendor shall submit the fabrication drawings of cold traps for URSC clearance **within four weeks** from the date of P.O acknowledgement. Fabrication shall be initiated only after URSC clearance.

4.3 Pre-delivery inspection:

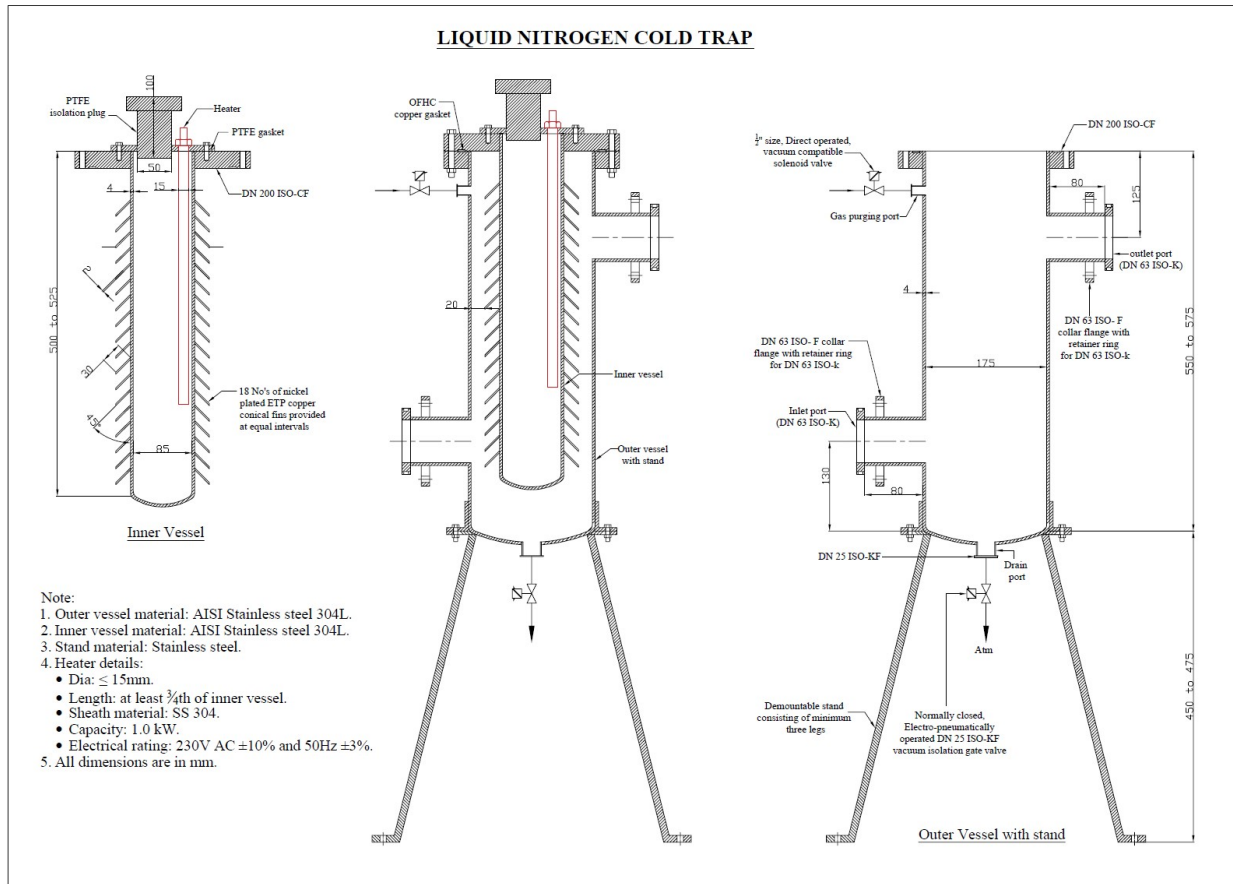
Pre-delivery inspection of the cold traps will be carried out by URSC at Vendor's premises. During pre-delivery inspection, the cold traps will be verified for its leak tightness and cleared for dispatch. Vendor should intimate about the pre-delivery inspection to URSC atleast **two weeks in advance**.

4.4 Packing: All the cold traps shall be blanked-off and packed suitably to avoid any dust ingress and scratches during handling and transportation.

4.5 Acceptance: The items will be accepted at URSC after verification of dimensional, functional and operational requirements.

4.6 Material test certificate: Material test certificate for the cold trap including the copper gasket from NABL accredited lab or any Govt. approved lab shall be provided along with the supply.

Compliance statement for the above specifications as per the attached format should be furnished along with the quote. Vendors failing to provide compliance statement/incomplete/non-specific for the above specifications will not be considered without any further correspondence.



Schematic drawing of Liquid Nitrogen cold trap