

Equipment Name: Cooling Heat Exchanger of 10 KW

Cooling Heat Exchanger of 10 KW Rated

The heat exchanger unit should be capable of handling the hot fluid of the pressure up to 200 bar and at a maximum flow rate of 0.2 kg/s and at a maximum inlet temperature of 40° C. The heat exchanger is expected to behave like a **condenser** unit to cool of gaseous CO₂ so that it turns in to liquid state before being pressurized further at a nominal inlet pressure of 60 bar gaseous CO₂. The working hot fluid is gaseous CO₂. The heat exchanger shall accept water / Refrigerant / MEG as one of the cold fluids. The cold fluid operating pressure shall not exceed 4 bar and maximum operating temperature of 40° C. The heat exchanger unit can be made of SS316L meeting ASME standards of 200 bar pressure application on the side while 4 bar maximum pressure on the cold side. The unit can be diffusion bonded multiple channel type compact heat exchanger type specially built for super critical CO₂ application purpose. The Unit shall be specifically meant for handling gaseous CO₂ or liquid CO₂ or super critical CO₂ as hot fluid. The cold and hot fluid ports must meet standard BSP flange connections to be able connect a 1-inch pipeline in the layout. The heat exchanger is expected to have an outer insulation to minimize the ambient temperature effects in the closed operation. The construction of the HX should comply the ASME design code for meeting the maximum operating pressure and temperature requirements. The units should have been pretested for any leak using the standard water leak test procedures.

Thermal Requirements

Parameter	Hot Side	Cold Side
Heat load	~10 KW @ max flow	~10 KW @ max flow
Inlet Temperature (C)	40	5
Outlet Temperature (C)	<10	45
Design Temperature_Max	200°C	50° C

Flow Requirements

Parameter	Hot Side	Cold Side
Pressure Drop	< 0.25 bar	< 0.3
Inlet Pressure	200 bar Max	4 bar Max
Inlet Flow (kg/s)	0.33	0.5

Mechanical Requirement

Parameter	Hot Side	Cold Side
Material (Nozzle, Flange, Header & Pipe)	SS316L	SS316L
Welding	No	No
Bonding	Diffusion	Diffusion
Inlet Flange Size Requirement	To connect to a 1-inch SS pipeline	To connect to a 1-inch SS pipeline

Outlet Flange Size Requirement	To connect to a 1-inch SS pipeline	To connect to a 1-inch SS pipeline
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Additional Requirements

Parameter	
Insulation	Yes for outside surface of the HX
Inbuilt Strainer for both fluids	Yes
Fouling Allowance	Not needed
Fluid Properties for Sizing the HX	Use Refprop of NIST database (https://www.nist.gov/srd/refprop)

General Conditions:

1. List of Purchase orders or supply references to any institute of National importance, PSU, or premier research institutes to be attached.
2. Quotation for 2 years standard warranty + 1 year optional warranty.
3. Installation/Commissioning to be done at IITM.
4. Should provide list of spares and their cost.
5. Must provide pressure test certificate for the item.