Maximum performance in minimum space

DEEP PHOTO CHEMICAL ETCHING
PRINTED CIRCUIT DIFFUSION BONDED DEVICES

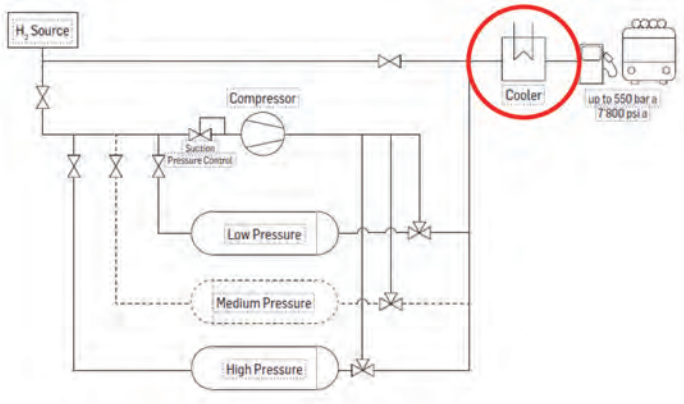
Microchannel Devices

HIGH PRESSURE PRINTED CIRCUIT HEAT EXCHANGER FOR HYDROGEN reFUELING STATIONS (HRS)

Hydrogen fueling of vehicles (heavy and light duty trucks, cars, trains, buses and small boats) must be carried out safely and within the time limits prescribed by the applicable standards (normally SAE J2601).
In most cases hydrogen shall be introduced into the vehicle tank at controlled temperature, in a range from -10°C and -40°C according to the desired filling procedure.
The heat exchanger fit for the purpose shall be:

- **Compact** – to minimize space requirements in or close to the hydrogen dispenser and to minimize heat exchange with the environment.
- **Efficient** – to grant hydrogen can be cooled down to the requested temperature in the lowest possible time.
- **Resistant** – Pressure changes during the filling procedure and may reach very high values. That means many cycles which need to be considered in the structural static and dynamic (fatigue) calculations.

Microchannel Devices has developed a dedicated portfolio of solutions, able to work with many coolant media (CO2 and other phase-change refrigerants, Therminol, water and glycole mixtures,...) and with the full range of hydrogen mass flow rates and temperatures.



MSE3570 - MULTISTREAM HIGH PRESSURE HYDROGEN PRE-COOLER FOR HRS - INNOVATIVE DUAL LOOP HYDROGEN PRE-COOLER TO FIT FOR T-20 AND T-40 STANDARDS WITH ONE SINGLE UNIT

INDEPENDENT FILLING OPERATION (T-20 OR T-40)

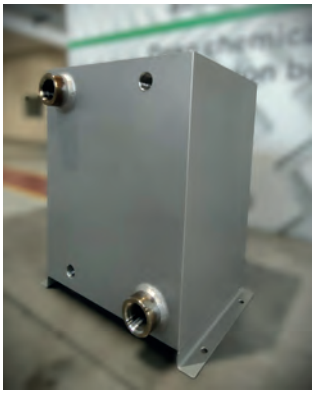
• HYDROGEN LOOPS:	2
• COOLANT LOOPS:	1
• MAX WORKING PRESSURE:	700 bar(g)
• DESIGN PRESSURE:	1000 bar(g)
• MAX WORKING TEMPERATURE:	60 °C
• MAX DESIGN TEMPERATURE:	80 °C
• H2 FLOW RATE/STREAM (typical):	220 kg/h
• Coolant flow rate (typical):	1200 kg/h
• Max pressure drop:	2 bar
• Mass:	357 kg
• COOLANT TYPE:	CO2 in phase change

SSE35 - HIGH PRESSURE HYDROGEN PRE-COOLER FOR HRS

A FULL FAMILY OF EXCHANGERS WITH VARIABLE THICKNESS TO MATCH DIFFERENT FLOW RATES AND HEAT DUTY CAPACITIES

PROTOCOLS:	T10, T20, T40
HYDROGEN LOOPS:	1
COOLANT LOOPS:	1
MAX WORKING PRESSURE:	750 bar(g)
DESIGN PRESSURE:	1050 bar(g)
MAX WORKING TEMPERATURE:	40 °c
MAX DESIGN TEMPERATURE:	70 °C
H2 FLOW RATE/STREAM (typical):	450 kg/h
Coolant flow rate (typical):	1700 kg/h
Max pressure drop:	3 bar
Mass:	124 ÷ 235 kg
COOLANT TYPE:	CO2 in phase change

SSE3570L - MID PRESSURE HYDROGEN PRE-COOLER FOR HRS FOR T10 AND T20 PROTOCOL - A FULL FAMILY OF EXCHANGERS WITH VARIABLE THICKNESS TO MATCH DIFFERENT FLOW RATES AND HEAT DUTY CAPACITIES



High permeability pre-cooler (also) for high viscosity refrigerants

- PROTOCOLS: T10, T20
- HYDROGEN LOOPS: 1
- COOLANT LOOPS: 1
- MAX WORKING PRESSURE: 435 bar(g)
- DESIGN PRESSURE: 550 bar(g)
- MAX WORKING TEMPERATURE: 40 °c
- MAX DESIGN TEMPERATURE: 60 °C
- H2 FLOW RATE/STREAM (typical): 150 kg/h
- Coolant flow rate (typical): 2000/8000 kg/h
- Max pressure drop: 1 bar
- Mass: 290 kg
- COOLANT TYPE: CO2 in phase change, Subcooled CO2
  Therminol, Water/glycole mixtures

SSE3570H - HIGH PRESSURE HYDROGEN PRE-COOLER FOR HRS FOR T40 protocol - A FULL FAMILY OF EXCHANGERS WITH VARIABLE THICKNESS TO MATCH DIFFERENT FLOW RATES AND HEAT DUTY CAPACITIES

High permeability pre-cooler (also) for high viscosity refrigerants

• PROTOCOLS:	T40
• HYDROGEN LOOPS:	1
• COOLANT LOOPS:	1
• MAX WORKING PRESSURE:	875 bar(g)
• DESIGN PRESSURE:	1050 bar(g)
• MAX WORKING TEMPERATURE:	45 °c
• MAX DESIGN TEMPERATURE:	60 °C
• H2 FLOW RATE/STREAM (typical):	120 kg/h
• Coolant flow rate (typical):	2000/4300 kg/h
• Max pressure drop:	1 bar
• Mass:	260 kg
• COOLANT TYPE:	CO2 in phase change, Subcooled CO2 Therminol, Water/glycole mixtures

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