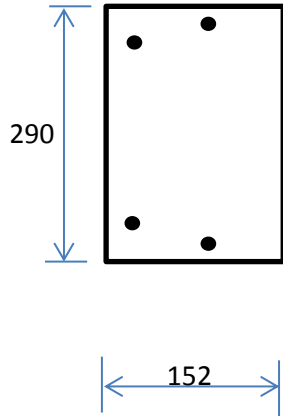
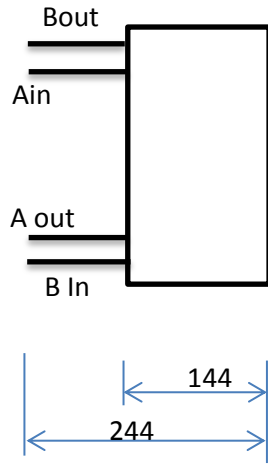


Ref.	Q18-161-01		MCHE DATA SHEET				Sheet 1 of 1				
Company	Maximator		Equipment		Hydrogen Precooler						
Operator	Maximator		Case		Design case (10K superheat exit)						
Project	-		No of Items		1						
Project ref no.	-		Sections per item		1						
Rev.											
THERMAL DESIGN											
Design heat load	kW	45.64	Area required, clean		m ²	0.474					
LMTD	°C	23.6	Area provided		m ²	0.628					
Corrected TD	°C	26.5	Oversizing		%	10					
Overall htc, clean	W/m ² K	3626	Fouling allowance		%	20					
MASS & SIZE											
Mass: dry/operating/test	kg	52 / 52 / 53									
Core dimensions (LxWxH)	mm	290 x 152 x 144									
PERFORMANCE OF ONE UNIT											
			SIDE A			SIDE B					
1	FLUID CONDITIONS		In	Out	In	Out					
2	Fluid		H2			CO2					
3	Flow rate, total		0.040			0.174					
4	Flow rate, gas/vapour		0.040	0.040	0.039	0.174					
5	Flow rate, liquid		0.0	0.0	0.135	0.0					
6	Temperature		40.0	-35.8	-40.1	-30.00					
7	Design temp: max/min		80.0 / -65			80.00 / -65					
8	Pressure: inlet/design		875 / 1000.0			10 / 30.0					
9	Pressure drop: calc/allwd		1.3 / 1.5			0.95 / 1.0					
10	FLUID PROPERTIES		Liq	Vap	Liq	Vap	Liq	Vap	Liq	Vap	
11	Density		kg/m ³	-	44.0	-	52.4	1117	26.0	-	21.7
12	Specific heat		J/kg K	-	15034	-	14928	2013	1034	-	962
13	Viscosity		cP	-	0.0119	-	0.0114	0.194	0.0119	-	0.0123
14	Thermal conductivity		W/mK	-	0.2719	-	0.2577	0.1595	0.0125	-	0.0130
16	CONNECTIONS										
17	No. of nozzles		1		1		1		1		
18	Nozzle size		mm NB	9/16" Cone & Thread	9/16" Cone & Thread	25 NB		25 NB			
19	Fitting		- Maximator MP fittings		- Maximator MP fittings		- Swagelok		- Swagelok		
20	Max strainer aperture		microns	150			250				
21	MATERIALS										
22	Nozzle material		SS 316L		SS 316L		SS 316L		SS 316L		
23	Flange material		SS 316L		SS 316L		SS 316L		SS 316L		
24	Header material		SS 316L		SS 316L		-		-		
25	Reinforcement pad material		-		-		-		-		
26	Core material		SS 316L								
36	Design Code		ASME BPV Code Section VIII Division 1								
							<div style="border: 1px solid black; padding: 5px; width: fit-content;">For details please Refer to the enclosed Arrangement Drawing</div>				
37	Remarks										
<ol style="list-style-type: none"> The performance is assuming 10K superheat CO2 outlet , with a 0.2226 vapor quality CO2 inlet at 10 bar using energy balance. Nozzle sizes are selected based on velocity head and flow distribution. Hydrogen side will have maximator fittings with fixed female adapter included in the block (to stay permanently with the block) Fouling allowance is covered by providing 20% oversizing on surface area. Weights and dimensions do not include mounting brackets and are for guidance only. Properties are taken from ASPEN Hysys Simulation using RefProp Property package. 											
3	Revised CO2 flow rate and temperatures.				12/18/18		AC		AW		
2	Revised CO2 nozzle location and increase H2 flow rate				12/12/18		AC		AW		
1	As per your specification				02/20/18		AC		AW		
No.	Revisions				Date		Prepared by		Approved by		