

## Heat Exchanger Mechanical Design Teams 25.0

File name: Debutanizer\_Overhead\_Condenser.EDR Date: 2012/--/-- Time: --:--:--

### Design Specifications

TEMA Class		Shell Side	Tube Side	Tubesheets
Design pressure	bar	6	6	
Vacuum design pressure	bar			
Test pressure	bar	7.8	7.8	
Design temperature	C	85	85	85
Average metal temperature	C	45.07	34.26	45.07
Corrosion allowance	mm	3.18	3.18	
Front tubesheet corrosion allow	mm	3.18	3.18	
Rear tubesheet corrosion allow	mm	3.18	3.18	
Radiographing		Spot	Spot	
Number of passes		1	2	
Nozzle flange rating		150	150	
Post weld heat treatment		Program	Program	
Code	ASME Section VIII Div.1 2010		TEMA 8th/9th Editions	
Weights	Empty: 5798	Full: 9704	Bundle: 3311	kgf



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### Nozzles

Nozzle designator		S1	S2	T1	T2
Vessel side		Shell	Shell	Tube	Tube
Outside diameter	mm	457.2	168.28	323.85	273.05
Calculated thickness	mm	5.49	4.55	4.91	4.76
Code minimum thk	mm	6.54	6.44	6.35	6.35
Actual thickness	mm	7.92	7.11	6.35	6.35
Reinf.pad OD	mm				
Reinf.pad thickness	mm				
Corrosion allowance	mm	3.18	3.18	3.18	3.18
External pressure	bar				
Length ext. press.	mm				
Maximum ext. press.	bar				

### Nozzle Flanges

Nozzle designator		S1	S2	T1	T2
Flange type		Slip on	Slip on	Slip on	Slip on
Flange rating		150	150	150	150
Flange OD	mm	635	279.4	482.6	406.4
Bolt circle	mm	577.85	241.3	431.8	361.95
Bolt diameter	mm	28.58	19.05	22.22	22.22
Bolt number	mm	16	8	12	12
Gasket OD	mm	533.4	215.9	381	323.85
Gasket width	mm	22.35	12.7	19.05	19.05
Gasket thickness	mm	3.18	3.18	3.18	3.18
Flange calc. thk.	mm				
Flange actual thk.	mm	39.62	25.4	31.75	30.23
Lap jnt ring OD	mm				
Hub length	mm				
Hub slope	mm				
Weld height	mm				

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### Body Flanges

	Front Head		Shell		Rear Head		Shell
	Cover	at TbSh	Front	Rear	at TbSh	Cover	Cover
Flange type		Hub			Hub		
Flange OD	mm	1120			1111		
Bolt circle	mm	1062			1057		
Bolt diameter	mm	28.58			25.4		
Bolt number		48			52		
Gasket OD	mm	1020			1018		
Gasket width	mm	13			13		
Gasket thk.	mm	3.18			3.18		
Flange calc. thk.	mm	57			47		
Flange overlay	mm						
Recess	mm	5			5		
Flange act. thk.	mm	62			52		
Lap jnt ring OD	mm						
Hub length	mm	26			26		
Hub slope	in	0.22			0.25		
Weld height	mm						

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### Tubesheets

		Front	Rear
Tubesheet diameter	mm	1120	1111
TEMA minimum thickness	mm	19.05	19.05
TEMA bending thickness	mm	28.59	28.06
TEMA shear thickness	mm	2.76	2.72
TEMA flange extension thk	mm	24.12	21.19
TEMA effective thickness	mm	29	29
Code thickness	mm	41.65	41.65
Corrosion allowance - shell	mm	3.18	3.18
Corrosion allowance - tube	mm	3.18	3.18
Recess	mm	5	5
Actual thickness	mm	48	48
Clad thickness (not included above)	mm		

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### Tube Details

Tube type		Plain
Tube OD	mm	19.05
Tube wall thickness	mm	1.2
Number of tubes		1108
Tube length	mm	4150
Tube pitch	mm	23.81
Tube pattern		60
Outer tube limit diameter	mm	937.3

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### Materials of Construction

Component	Material
Shell Cylinder	JIS G 3118 SGV480 Plate
Front Head Cylinder	JIS G 3118 SGV480 Plate
Rear Head Cylinder	JIS G 3118 SGV480 Plate
Front Head Cover	JIS G 3118 SGV480 Plate
Rear Head Cover	JIS G 3118 SGV480 Plate
Shell Lifting Lugs	SA-285 K02801 Grd C Plate
Shell Lifting Lugs Pad	SA-285 K02801 Grd C Plate
Front Tubesheet	JIS G 3118 SGV480 Plate
Rear Tubesheet	JIS G 3118 SGV480 Plate
Front Head Fling At TS	JIS G 3201 SF490A Forgings
Rear Head Fling At TS	JIS G 3201 SF490A Forgings
Front Head Gasket At TS	Flat Metal Jacket Fiber Iron
Rear Head Gasket At TS	Flat Metal Jacket Fiber Iron
Tubes	JIS G 3461 STB340 Wid. tube E
Baffles	JIS G 3118 SGV480 Plate
Tie Rods	SA-36 K02600 Bar
Spacers	SA-214 K01807 Wid. tube
Front Head Partitions	JIS G 3118 SGV480 Plate
Shell Support A	JIS G 3118 SGV480 Plate
Shell Support B	JIS G 3118 SGV480 Plate
Nozzle S1	JIS G 3455 STS410 Smls. pipe S
Nozzle S2	JIS G 3455 STS410 Smls. pipe S
Nozzle T1	JIS G 3455 STS410 Smls. pipe S
Nozzle T2	JIS G 3455 STS410 Smls. pipe S
Nozzle Fling S1	JIS G 3201 SF490A Forgings
Nozzle Fling S2	JIS G 3201 SF490A Forgings
Nozzle Fling T1	JIS G 3201 SF490A Forgings
Nozzle Fling T2	JIS G 3201 SF490A Forgings
Front Hd Bolting At TS	JIS G 3101 SS400 (40 < ) Bolting
Rear Hd Bolting At TS	JIS G 3101 SS400 (40 < ) Bolting
Nozzle Fling Bolting S1	JIS G 3101 SS400 (40 < ) Bolting
Nozzle Fling Bolting S2	JIS G 3101 SS400 (40 < ) Bolting
Nozzle Fling Bolting T1	JIS G 3101 SS400 (40 < ) Bolting
Nozzle Fling Bolting T2	JIS G 3101 SS400 (40 < ) Bolting
Nozzle Flg Gasket S1	Flat Metal Jacket Fiber Iron
Nozzle Flg Gasket S2	Flat Metal Jacket Fiber Iron

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Nozzle Flg Gasket T1	Flat Metal Jacket Fiber Iron
Nozzle Flg Gasket T2	Flat Metal Jacket Fiber Iron
Shell Side Nozzle Cplgs	SA-105 K03504 Forgings
Tube Side Nozzle Cplgs	SA-105 K03504 Forgings

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