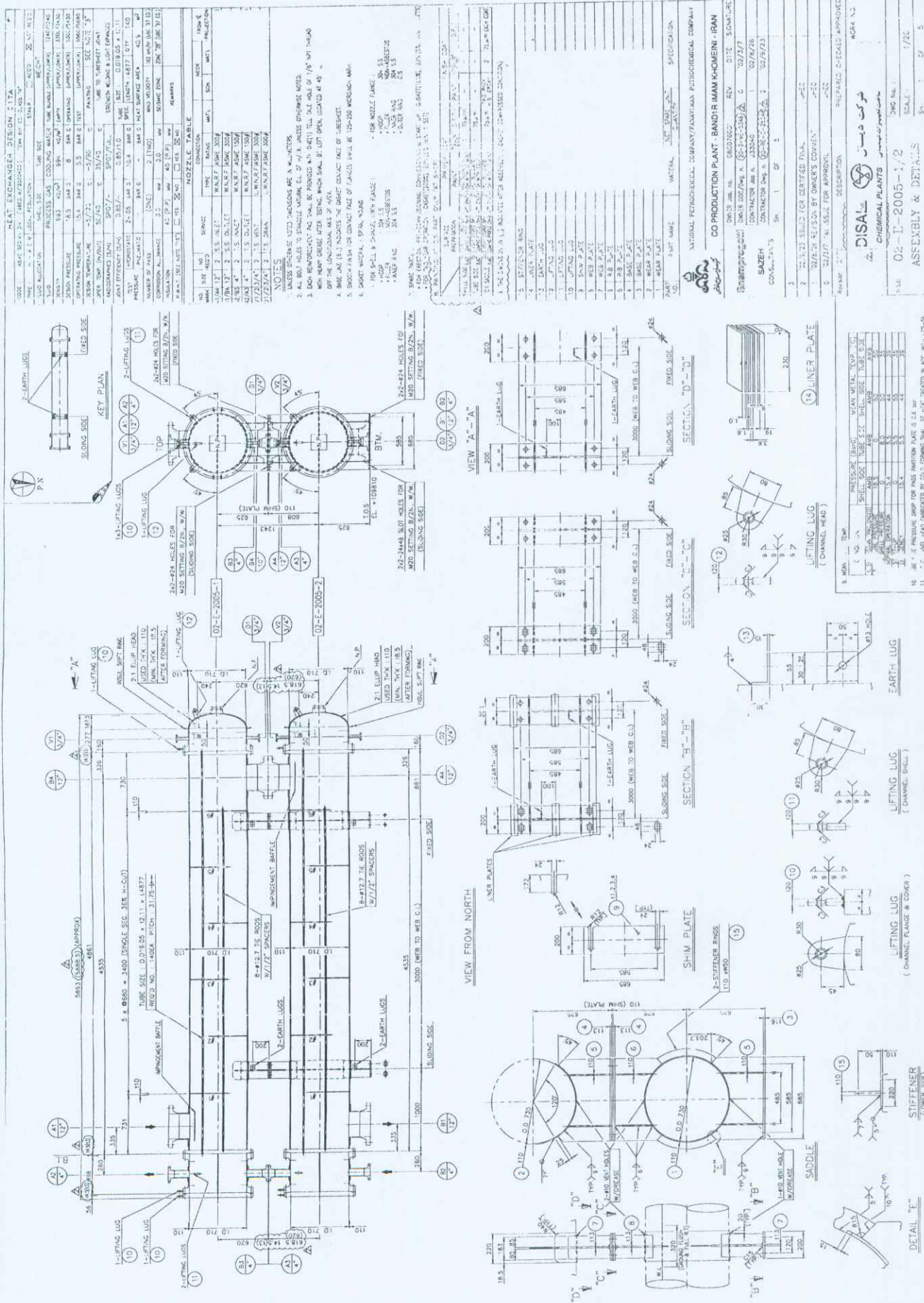




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SAZEH ENGINEERS ARCHITECTS
CONSULTANTS
مهندسان مشاوران

Client

NATIONAL PETROCHEMICAL COMPANY
FANAVARAN PETROCHEMICAL COMPANY

PLANT LOCATION

BANDAR IMAM, IRAN

CO PRODUCTION PLANT

Contractor Job no

J33040

Owner Job No

080076001

Contractor Doc no

20-RA-E-06649

Owner Doc no

DSH-PR-649

Sheet

3 of 3

Rev.

2

SHELL AND TUBE HEAT EXCHANGER DATA SHEET

CONSTRUCTION OF ONE SHELL												
1	TUBE NO.	140	△ ₂	OD	19.05	mm	THICKNESS	2.11	mm	LENGTH	4877	mm
3	TUBE PITCH	31.75	mm	△ _{30°}	U-BAND SUPPORT TYPE							
4	SHELL / BUNDLE ID	710	/	mm					OTL	mm		
5	CROSS BAFFLE TYPE	Segment, horiz. cut		NO.	C/C SPACING	680 mm	CUT 36/	%	☐ PARALLEL ☐ PERPEND.			
6	IMPINGEMENT PROTECTION	SEALING STRIPS PAIRS NO.				SEALING RODS NO.						
7	FACE JOINT CONSTRUCTION	Shell Side				TUBE SIDE						
8	TUBE / TUBE-SHEET JOINT TYPE	Welded				INSULATION:		☐ SHELL ☐ CHANNEL				
MATERIALS												
10	TUBES	SA213 TP316L TYPE				U-tubes	CROSS BAFFLES		SA240 Gr 304L			
11	SHELL	SA240 Gr 304L				SHELL COVER						
12	CHANNEL	SA240 Gr 304L				CHANNEL COVER						
13	TUBE SHEET	SA240 Gr F316L				FLOATING HEAD COVER						
14	GASKETS	SHELL		FLTG. HEAD		CHANNEL						
15	PROVIDE SR:	☐ CHANNEL ☐ BUNDLE ☐ SHELL		PROVIDE:		☐ CHANNEL ☐ SHELL						
ADDITIONAL INFORMATION FOR FIXED TUBE SHEET TYPE ONLY												
17	DIFFERENT CONDITIONS FROM NORMAL RUN				INLET PRESSURE		Mpa	INLET TEMPERATURE		°C	DESIGN LIFE	
18					SHELL SIDE		TUBE SIDE	SHELL SIDE		TUBE SIDE	CYCLES NO.	
19												
20												
21												
22												
23												
24												
MECHANICAL DESIGN DATA												
26	EXPANSION JOINT:											
27	MEAN METAL TEMPERATURE				SHELL		TUBES	TUBE SHEET		LIFE CYCLES NO.		
28	NORMAL OPERATION				°C							
29					°C							
30					°C							
31					°C							
NOTES												
33	1. Design : Design Case △ ₂											
34	2. Pressure loss at shell side inlet and outlet nozzles included.											
35	3. Mean metal temperature. Shell: 44 °C Tube: 39 °C											
36	Design mean metal temperature difference Shell/Tube: 15 °C											
37	4. Impingement plate to be installed at shell side inlet nozzles											
38	No tubes in baffle window.											
39	5. Cooling water contains 50 mg/l chloride as Cl ⁻											
40	6. Baffle to contain a triangular notch in bottom with an approximate area of 170mm ²											
41	7. Tie Rod SA479 Gr 304L											
42	8. SPACER SA240 Gr 304L											
43	9. Body Flange shell A182 F304L											
44												
45												
46												
47												

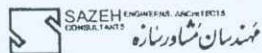
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2 of 3

Rev.

01/2

SHELL AND TUBE HEAT EXCHANGER DATA SHEET

1	SERVICE	Final Gas Cooler				ITEM	02-E-2005	
2	SIZE	x	x	mm	TYPE	AEM	POSITION	
3	NO. OF UNIT	1	SURFACE PER UNIT		81.8	m ² / 2	SURFACE PER SHELL m ²	
4	SHELLS PER UNIT	2	CONNECTED IN		PARALLEL	SERIES	X	MANUFACTURER
5	PERFORMANCE OF ONE UNIT (CASE: Design)							
6					SHELL SIDE		TUBE SIDE	
7	FLUID CIRCULATED	Process Gas				Cooling Water (5)		
8	FLUID QUANTITY, TOTAL	23953 kg/h				48521		
9		IN				OUT		IN
10	VAPOUR (MOL. WT.)	23953 (8.84)				23859 (8.82)		0 ()
11	LIQUID	0				94		0
12	STEAM	0				0		0
13	WATER	0				0		48521
14	NON CONDENSABLES (MOL. WT.)	0 ()				0 ()		0 ()
15	HYDROGEN VAPOURS	0				0		0
16	TEMPERATURE	50 °C				40		35
17	DENSITY at T and P LIQ. / VAP.	/ 5.37				993 / 5.53		994 /
18	VISCOSITY at T and P LIQ. / VAP.	/ 0.016				0.655 / 0.015		0.723 /
19	SPECIFIC HEAT LIQ. / VAP.	/ 0.794				0.997 / 0.794		0.998 /
20	THERMAL CONDUCTIVITY LIQ. / VAP.	/ 0.103				0.535 / 0.101		0.53 /
21	SURFACE TENSION (FOR BOILING STREAM)	mN/m						
22	PSEUDOCRITICAL PRESSURE / TEMP.	bara / °C				/		/
23	LATENT HEAT	kcal/kg						
24	INLET PRESSURE	barg				15.4		5.5
25	PRESSURE DROP ALLOWABLE / CALCULATED	bar				/ 0.13		/ 0.5
26	FOULING RESISTANCE	m ² °C/kcal				0.0002		0.0004
27	TYPE OF CLEANING MAINTENANCE	☐ NONE ☐ MECHANIC ☐ CHEMICAL				☐ NONE ☐ MECHANIC ☐ CHEMICAL		
28	HEAT EXCHANGED	Gcal/h				0.24		
29	TRANSFER RATE SERVICE / CLEAN	520 / 756 kcal/m ² °C				MTD (CORRECTED) 6.64 °C		
30	CONSTRUCTION OF ONE SHELL							
31	DESIGN / TEST PRESSURE	barg				18.5 /		8 /
32	DESIGN TEMPERATURE	°C				-5/120		-5/90
33	MIN DESIGN METAL TEMP. AT PRESS. OF	barg °C				/		/
34	CORROSION ALLOWANCE	mm				3		3
35	NO. OF PASSES PER SHELL					1		2
36	PIPE PER UNIT INLET / OUTLET	RATING				/		/
37	NOZZLE: INLET / INTERMEDIATE / OUTLET					12 / / 12		4 / / 4
38	PARTICULAR SERVICE							
39	DIFFERENTIAL PRESSURE FOR TUBE BUNDLE	bar						
40	SIDES CHANGE ALLOWABLE	☐ YES ☐ NO		☒ REQUIRED OVERDESIGN 10 % ON		☒ DUTY AND FLOW RATES ☐ SURFACE		
41	THIS EXCHANGER IS JOINED WITH	CODE				TEMA CLASS R		
42								
43								
44								
45								
46								
47								

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