



CALHEX INDUSTRIES LIMITED
1390-17th Avenue SE Calgary, Alberta

REV. NO. : 2

JOB NO. :

AIR COOLED HEAT EXCHANGER SPECIFICATION SHEET - Imperial Units

1	CUSTOMER	NATCO CANADA	PROP. NO. :	Q-04-0583-NT1 R2
2	ADDRESS	Calgary, Alberta	DATE :	November 26, 2004
3	PLANT LOCATION	CONOCO PHILLIPS- Narraway & Sherman Central Dehyd. Facilities	REF. NO. :	-
4	SERVICE OF UNIT	Inlet Gas Cooler	ITEM NO. :	E-101
5	SIZE & TYPE:	(1) 6.1 x 18 x 4RF	DRAFT TYPE:	FORCED
			No. of BAYS :	1
6	SURF. / UNIT ; FINNED TUBE	12796.2	FT ²	
			SURF. / UNIT; BARE TUBE	603
			FT ²	
7	HEAT EXCHANGED	1,360,000	BTU/HR	
			MTD (Corr.)	27.2
			°F	
8	TRANS. RATE Service; FINNED/BARE	3.91 / 82.90	BTU/HR FT ² °F	
			TRANS. RATE Clean; FINNED/BARE	5.53 / 117.34
			BTU/HR FT ² °F	
9	PERFORMANCE DATA - TUBE SIDE			
10	FLUID NAME	Inlet gas	VAPOR REF. TEMP. (in/out)	°F
				158.0 / 120.0
11	TOTAL FLUID ENTERING	LB/HR	SPECIFIC HEAT	BTU / LB °F
		55690		0.567 / 0.632
12	VAPOR	LB/HR	VISCOSITY	Cp
		55690		0.018 / 0.019
13	LIQUID	LB/HR	THERMAL COND.	BTU/HR FT ² °
		0		0.026 / 0.026
14	NON-COND.	LB/HR	MOLECULAR WEIGHT	
				24.0 / 23.980
15	STEAM	LB/HR	LIQUID REF. TEMP. (in/out)	°F
				120.0 /
16	WATER	LB/HR	SPECIFIC HEAT	BTU / LB °F
				1.005 /
17	FLUID Condensed or Vaporized	LB/HR	VISCOSITY	Cp
		128		0.570 /
18	TEMPERATURE (In / Out)	°F	THERMAL COND.	BTU/HR FT ² °
		158.0 / 120.0		0.362 /
19	OPERATING PRESSURE	PSIA	DENSITY	LB/FT ³
		1814.0		61.820 /
20	VELOCITY (In / Out)	FT / SEC		
		14.3 / 3.46		
21	PRESS. DROP (Allow / Calc.)	PSI	FOULING RESISTANCE	HR FT ² °F/BTU
		5.00 / 5.01		0.002
22	PERFORMANCE DATA - AIR SIDE			
23	AIR QUANTITY, TOTAL	LB/HR	ALTITUDE ABOVE SEA LEVEL	FT
		278549		5495.41
24	AIR QUANTITY / FAN	ACFM	TEMPERATURE IN (Dry Bulb)	°F
		40249.9		100.4
25	ACTUAL STATIC PRESSURE	IN H ₂ O	TEMPERATURE OUT	°F
		0.7256		120.56
26	FACE VELOCITY	SFM	MN. DESIGN AMBIENT	°F
		565.0		-40.0
27	MAX MASS VELOCITY	LB/HR·FT ²	FAN AIR TEMPERATURE	°F
		5,613		100.4
28	DESIGN - MATERIALS - CONSTRUCTION			
29	DESIGN PRESSURE	2074	PSI	TEST PRESSURE
				CODE
				PSI
				DESIGN TEMP.
				-40/174 °F
30	TUBE BUNDLE	HEADER	TYPE	PLUG
				TUBE SIDE
31	SIZE	6.094 x18.0	MATERIAL	SA-516-70N
				MATERIAL
				SA-179
32	No./Bay	1	No. OF PASSES	4
				OD
				1.000
				THK.
				0.083
				in.
33	ARRANGEMENT	Counter	SLOPE	NONE
				NO/BUNDLE
				128
34	BUNDLES	1 Parallel	PLUG MATERIAL	SA-350-LF2
				LENGTH
				18.0
				FT.
35	BAYS	1 Parallel	GASKET MATERIAL	SOFT IRON
				PITCH
				2.25
				in.
36	BUNDLE FRAME	SA-36	CORROSION ALLOWANCE	0.125 in
				FINNING, TYPE
				TWF
37	MISCELLANEOUS	NO. SIZE INLET NOZZLE (1)	4.0 in	MATERIAL
				ALUMINIUM
38	STRUCT. MOUNT	NO. SIZE OUTLET NOZZLE (1)	4.0 in	OD
				2.25
				THK.
				0.016
				in.
39	SURFACE PREP.	SSPC- SP6	SPECIAL NOZZLES	NONE
				NO./IN.
				10.0
				FIN DES. TEMP.
				350.0
				°F
40	LOUVRES TOP	AUTO	RATING / FACING	900# RTJ.LWN.
				CODE-
				ASME SEC. VIII, DIV. 2001, Add 2003
41	SIDES	MANUAL	TI: 2"- 900# RTJ.WN	Pi: 2"- 900# RTJ.WN
				STAMP
				YES
42	VIBRATION SWITCH	Murphy XP	CHEM. CLEANING CONN.	NONE
				SPEC.S
				API 661
43	MECHANICAL EQUIPMENT			
44	FAN DATA	DRIVER DATA	SPEED REDUCER DATA	
45	MFG. & MODEL	Moore 27 series	TYPE	Electric (VFD compatible 3:1 min.)
				TYPE
				V-BELT
46	No./Bay	2	RPM	603
				MFG.
				TOSHIBA
47	DIA.	5.5	No. Blades	4
				No./Bay
				2
48	PITCH	1.4	ANGLE	7.7°
				HP / DRIVER
				10
				x
				1.15
				SF
49	MATL.; Blades/Hub:	Alum. / Alum.	RPM	1750
				AGMA RATING
				14
				HP
50	Blade Adjustment:	Manual	ENCLOSURE	TEFC
				RATIO
				2.902
				(driver/fan)
51	HP/Fan. D.	7.8	Min Amb. °F	-40
				VOLT/PHASE/CYCLE
				480/3/60
				SUPPORT
				C.Steel Structure
52	AIR FAILURE ACTION:	FAN PITCH-	LOUVRE FAILURE -	TOP: CLOSED
				RECIRC.: OPEN
53	CONTROL OF PROCESS OUTLET TEMPERATURE:		HEATING COIL:	GLYCOL @ 100PSI - 212°F
54	RECIRCULATION:	OVER ONE END	BUG SCREENS & HAIL GUARD:	YES
				LADDER & PLATFORM:
				ONE END
55	REMARKS:	U'CALC.'D AT 4.32/91.6 (ext/bare) BTU/HR-FT ² -°F PROVIDING FOR 10% EXCESS SURFACE AREA		
56		Fan Noise rating 3ft Below = 84.7 dB, 3ft to the Side = 79.0 dB., FAN TIP SPEED 10419 FPM		
57		SOUR SERVICE 100% XR/UT & SR, SPECIAL CHEM ON PLATE MATERIAL (NOT HIC TESTED)		
58				
59				



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2	ADDRESS	Calgary, Alberta	DATE :	November 26, 2004
3	PLANT LOCATION	CONOCO PHILLIPS- Narraway & Sherman Central Dehyd. Facilities	REF. NO. :	-
4	SERVICE OF UNIT	Inlet Gas Cooler	ITEM NO. :	E-101
5	SIZE & TYPE:	(1) 1.86 x 5.49 x 4RF	DRAFT TYPE:	FORCED
6	SURF. / UNIT ; FINNED TUBE	1188.8 m ²	SURF. / UNIT; BARE TUBE	56.0 m ²
7	HEAT EXCHANGED	398.6 KW	MTD (Corr.)	15.1 °C
8	TRANS. RATE Service; FINNED/BARE	22.2 / 470.7 W / m ² °C	TRANS. RATE Clean; FINNED/BARE	31.4 / 666.3 W / m ² °C
9	PERFORMANCE DATA - TUBE SIDE			
10	FLUID NAME	Inlet gas	VAPOR REF. TEMP. (in/out)	70.0 / 48.9
11	TOTAL FLUID ENTERING	Kg/HR 25261.0	SPECIFIC HEAT	KJ/Kg °C 2.375 / 2.646
12	VAPOR	Kg/HR 25261.0	VISCOSITY	Cp 0.018 / 0.019
13	LIQUID	Kg/HR 0.0	THERMAL COND.	m ² °C/W 0.045 / 0.046
14	NON-COND.	Kg/HR	MOLECULAR WEIGHT	24.0 / 24.0
15	STEAM	Kg/HR	LIQUID REF. TEMP. (in/out)	48.9 /
16	WATER	Kg/HR	SPECIFIC HEAT	KJ/Kg °C 4.208 /
17	FLUID Condensed or Vaporized	Kg/HR 58.1	VISCOSITY	Cp 0.570 /
18	TEMPERATURE (In / Out)	°C 70.0 / 48.9	THERMAL COND.	m ² °C/W 0.626 /
19	OPERATING PRESSURE	KPa (abs) 12507.1	DENSITY	Kg/m3 990.3 /
20	VELOCITY	m / SEC 4.359 / 1.055		
21	PRESS. DROP (Allow / Calc.)	KPa 34.5 / 34.5	FOULING RESISTANCE	m ² °C/W 0.00035222
22	PERFORMANCE DATA - AIR SIDE			
23	AIR QUANTITY, TOTAL	Kg/HR 126349.8	ALTITUDE ABOVE SEA LEVEL	m 1675.0
24	AIR QUANTITY / FAN	A m3/S 19.0	TEMPERATURE IN (Dry Bulb)	°C 38.0
25	ACTUAL STATIC PRESSURE	KPa 0.1807	TEMPERATURE OUT	°C 49.2
26	FACE VELOCITY	S m/s 2.8702	MN. DESIGN AMBIENT	°C -40.0
27	MAX MASS VELOCITY	Kg/m ² s 7.6124	FAN AIR TEMPERATURE	°C 38.0
28	DESIGN - MATERIALS - CONSTRUCTION			
29	DESIGN PRESSURE	14300 Kpag	TEST PRESSURE	CODE Kpag DESIGN TEMP. -40/79 °C
30	TUBE BUNDLE	HEADER	TYPE	PLUG
31	SIZE	1.86 x 5.49	MATERIAL	SA-516-70N
32	No./Bay 1	No. Rows 4	No. OF PASSES	4
33	ARRANGEMENT	Counter	SLOPE	NONE
34	BUNDLES	1 Parallel	PLUG MATERIAL	SA-350-LF2
35	BAYS	1 Parallel	GASKET MATERIAL	SOFT IRON
36	BUNDLE FRAME	SA-36	CORROSION ALLOWANCE	3.2 mm
37	MISCELLANEOUS	NO. SIZE INLET NOZZLE (1)	4.0 in	MATERIAL ALUMINIUM
38	STRUCT. MOUNT	NO. SIZE OUTLET NOZZLE (1)	4.0 in	OD 57.2 THK. 0.4064 mm
39	SURFACE PREP.	SSPC- SP6	SPECIAL NOZZLES	NONE
40	LOUVRES TOP	AUTO	RATING / FACING	900# RTJ.LWN.
41	SIDES	MANUAL	TI: 2"- 900# RTJ.WN	PI: 2"- 900# RTJ.WN
42	VIBRATION SWITCH	Murphy XP	CHEM. CLEANING CONN.	NONE
43	MECHANICAL EQUIPMENT			
44	FAN DATA	DRIVER DATA	SPEED REDUCER DATA	
45	MFG. & MODEL	Moore 27 series	TYPE	Electric (VFD compatible 3:1 min.)
46	No./Bay 2.0	RPM 603	MFG.	TOSHIBA
47	DIA. 1.68	No. Blades 4	No./Bay 2	MANUFACTURER WOODS or Equivalent
48	PITCH 1.4	ANGLE 7.7°	KW / DRIVER 7.46	x 1.15 SF
49	MATL.; Blades/Hub:	Alum. / Alum.	RPM 1750	MODEL
50	Blade Adjustment:	Manual	ENCLOSURE TEFC	AGMA RATING 10.44 KW
51	KW/Fan. D. 5.82	Min Amb. °C -40.0	VOLT/PHASE/CYCLE 480/3/60	RATIO 2.902 (driver/fan)
52	AIR FAILURE ACTION:	FAN PITCH-	LOUVRE FAILURE -	TOP: CLOSED RECIRC.: OPEN
53	CONTROL OF PROCESS OUTLET TEMPERATURE:		HEATING COIL:	GLYCOL @ 100PSI - 212°F
54	RECIRCULATION:	OVER ONE END	BUG SCREENS & HAIL GUARD:	YES
55	REMARKS:	U'CALC.'D AT 4.32/91.6 (ext/bare) BTU/HR-FT ² -°F PROVIDING FOR 10% EXCESS SURFACE AREA	LADDER & PLATFORM:	ONE END
56		Fan Noise rating 3ft Below = 84.7 dB, 3ft to the Side = 79.0 dB., FAN TIP SPEED 10419 FPM		
57		SOUR SERVICE 100% XR/UT & SR, SPECIAL CHEM ON PLATE MATERIAL (NOT HIC TESTED)		
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