

HAMMCO AIR COOLERS
 P.O. Box 341
 Owasso, Oklahoma 74055
 Phone 918/272-9575

Sheet No. 1
 Proposal No. Q-1660A
 Contract No. 88-168
 Date 7/7/88

No.	Date	By

1	Customer	CHEVRON USA, INC.	Item No.	E-106 A/E *
2	Plant Location	WICKETT, TEXAS	Purch. Inv. No.	QR-273471 RPL
3	Service	COMPRESSOR JACKET WATER COOLER	Purch. Ord. No.	
4	Size (SEE ITEM E-108 A/E)	Type FORCED DRAFT	No. of Bays	1
5	Surface per Unit — Finned Tube	18860.	EFF Sq Ft Bare Tube	891. EFF Sq Ft
6	Heat Exchanged	3360000.	Btu/Hr MTD (Eff.)	36.6 *F
7	Transfer Rate — Finned Tube	4.86	Btu/Hr Sq Ft *F Bare Tube Service	102.9 Btu/Hr Sq Ft *F

PERFORMANCE DATA — TUBE SIDE

9	Fluid Circulated	50/50 ETHYLENE GLYCOL/WATER	Density, Lqd	64.3	Lbs Cu Ft
10	Total Fluid Entering	367680.	Lb/Hr Density, Vap.		Lbs Cu Ft
11		IN OUT	Bubble Point	*F Dew Point	*F
12	Temperature	*F 171.0 160.0	Sp. Heat, Lqd	0.860	Btu/Lb *F
13	Liquid	Lb/Hr 367680.	367680.	Sp. Heat, Vap.	Btu/Lb *F
14	Vapor	Lb/Hr MW		Th. Cond.	0.2420 (L) Btu Ft Hr Sc Ft *F
15	Noncond	Lb/Hr MW		Inlet Pressure	35.0 PSIG
16	Steam	Lb/Hr		Allowable Pressure Drop	10.0 PSI
17	Water	Lb/Hr		Calc. Pressure Drop	3.7 PSI
18	Viscosity: (Lqd Vap)	Cp 1.200 / 1.200/	Fouling Resis. inside	0.00100	Hr Sq Ft *F Btu

AIR SIDE

20	Air Quantity	75600.	SCFM Altitude	2700.0	Ft
21	Air Quantity Fan	(SEE ITEM E-108 A/E)	ACFM	Temperature in	105.0
22	Static Pressure	0.629	in. Water	Temperature Out	146.0
23	Face Velocity	565. FPM	Mass Velocity	Lb/Hr Sq Ft	Minimum Ambient

DESIGN — MATERIALS — CONSTRUCTION

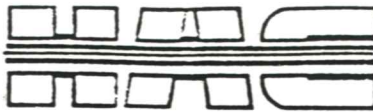
24	Design Pressure	125. PSI	Test Pressure	CODE	PSI	Design Temperature	220	*F
25	TUBE BUNDLE	HEADER	TUBE					
26	Size 4.2x34.	No. Tube Rows 5	Type FAB. BOX W/ PLUGS	Material	CARBON STEEL			
27	No. Bay 1	Material	SA-516-GR70	ASTM	SA-214			
28	Arrangement- Sections in Parallel	Passes-No	1	OD	1.000 in.	Min. Thickness	0.110	in.
29	MISCELLANEOUS	Plug-Design	SHOULDER	No. Bundle	103	Length	34	Ft
30	Struct. Mounting	GRADE	Material	SA-105	Pitch	2.3125		in.
31	Struct. Finish	SSPC6 & PAINT	Gasket Material	SOFT IRON	FIN			
32	Bundle Frame	SSPC6 & PAINT	Corrosion Allowance	0.0625	In. Type	TENSION WOUND FOOTEL		
33	Louvers	NONE	Size Inlet Nozzle	(1) - 6	In. Material	ALUMINUM		
34	Ladders	NONE	Size Outlet Nozzle	(1) - c	In. OD	2.250 in.	Stock Thickness	0.015 in.
35	Walkways	NONE	Rating & Facing	150.# RF	No./In.	10		
36	Vib. Switches	PMC/BETA	Code-ASME VIII Stamp-	YES	Specs-	API-661	D28.07	AS NOTED

MECHANICAL EQUIPMENT (SEE ITEM E-108 A/E)

39	FAN MFR. & MODEL	DRIVER TYPE	SPEED REDUCER TYPE
40	No. Bay	HP Fan	No. Bay
41	Diameter	Ft. RPM	RPM
42	No. Blades	Pitch	Enclosure
43	Blade Material	Angle	Volt/Phase/Hz
44	Hub Material	Mtr	Mtr

Control Action on Air Failure—Fan Pitch Louvers

45 NOTES *THE FOLLOWING ITEMS ARE COMBINED IN ONE BAY: E-106, E-107 & E-108.
 46 1) FIVE (5) IDENTICAL UNITS REQUIRED.
 47 2) TUBES WILL BE RAISED AT THE CENTER TO ALLOW DRAINAGE TO BOTH HEADERS.



HAMCO AIR COOLERS
 P.O. Box 341
 Owasso, Oklahoma 74055
 Phone 918/272-9575

Sheet No. 2
 Proposal No. Q-1660A
 Contract No. 88-168
 Date 7/7/88

"B"

No.	Date	By

1	Customer	CHEVRON USA., INC.	Item No.	E-107 A/E *	
2	Plant Location	WICKETT, TEXAS	Purch. Inv. No.	QR-273471 RPL	
3	Service	COMPRESSOR CYLINDER WATER COOLER	Purch Ord No	PHAA-273471	
4	Size (SEE ITEM E-108 A/E)	Type	FORCED DRAFT	No of Bays	1
5	Surface per Unit — Finned Tube	10620.	EFF. Sq Ft Bare Tube	502.	EFF. Sq Ft
6	Heat Exchanged	984000.	Btu/Hr (MTD (Eff.))	19.32	°F
7	Transfer Rate — Finned Tube	4.80	Btu/Hr Sq Ft °F Bare Tube Service	101.5	Btu Hr Sq Ft °F

PERFORMANCE DATA — TUBE SIDE						
9	Fluid Circulated	50/50 ETHYLENE GLYCOL/WATER	Density, Lqd.	55.0	Lbs./Cu Ft	
10	Total Fluid Entering	108600.	Lb/Hr Density, Vap.		Lbs./Cu Ft	
11		IN	OUT	Bubble Point	°F Dew Point	
12	Temperature	141.0	130.0	Sat. Heat. Lqd.	0.842	Btu/Lb °F
13	Liquid	Lb Hr	108600.	108600.	Sat. Heat. Vap.	Btu/Lb °F
14	Vapor	Lb Hr MW			Th Cond	0.2390 (L) Btu Ft/Hr Sq Ft °F
15	Noncond	Lb Hr MW			Inlet Pressure	15.0 PSIG
16	Steam	Lb Hr			Allowable Pressure Drop	10.0 PSI
17	Water	Lb Hr			Calc. Pressure Drop	5.8 PSI
18	Viscosity (Liq Vap)	Cp	1.400 /	1.600 /	Fouling Resis. Inside	0.00100 — Sq Ft °F Btu

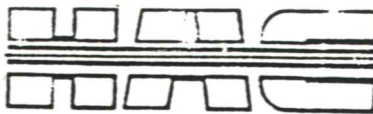
AIR SIDE						
20	Air Quantity	43900.	SCFM	Altitude	2700.0	Ft
21	Air Quantity Fan	(SEE ITEM E-108 A/E)	ACFM	Temperature In	105.0	°F
22	Static Pressure	0.623	in. Water	Temperature Out	125.7	°F
	Face Velocity	575.	FPM Std. Mass Velocity	Lb/Hr Sq Ft	Minimum Ambient	°F

DESIGN — MATERIALS — CONSTRUCTION									
	Design Pressure	125.	PSI	Test Pressure	CODE	PSI	Design Temperature	200.	°F
26	TUBE BUNDLE	HEADER		TUBE					
27	Size	2.5x34.	No. Tube Rows	5	Type	FAB. BOX W PLUGS	Material	CARBON STEEL	
28	No. Bay	1	Material	SA-516-GR70	ASTM	SA-214			
29	Arrangement	Sections in Parallel	Passes-No	2	OD	1.000 in./Min. Thickness	0.110	in.	
30	MISCELLANEOUS	Plug-Des gn	SHOULDER	No. Bundle	58	Length	34.	Ft	
31	Struct. Mounting	GRADE	Material	SA-105	Pitch	2.3125		in.	
32	Struct. Finish	SSPC6 & PAINT	Gasket Material	SOFT IRON	FIN				
33	Bundle Frame	SSPC6 & PAINT	Corrosion Allowance	0.0625	in. Type	TENSION WOUND FOOTED			
34	Ladders	NONE	Size Inlet Nozzle	(1) - 4	in. Material	ALUMINUM			
35	Ladders	NONE	Size Outlet Nozzle	(1) - 4	in. OD	2.250 in./Stock Thickness	0.015	in.	
36	Walkways	NONE	Rating & Facing	150.# RF	No. In.	10			
37	Control Switches	PMC/BETA	Code-ASME VIII Stamp	YES	Specs-	API-661 D28.07 AS NOTED			

MECHANICAL EQUIPMENT (SEE ITEM E-108 A/E)					
39	FAN MFR & MODEL	DRIVER TYPE		SPEED REDUCER TYPE	
40	No. Bay	HP Fan	No./Bay	IHP Driver	No./Bay
41	Diameter	Ft/RPM	RPM	Model	
42	No. Blades	Pitch	Enclosure	HP Rating	
43	Blade Material	Angle	Volt/Phase	-z	Ratio
44	Hub Material		Mt		Mt
45	Control Action on Air Failure—Fan Pitch	Louvers			

46 **NOTES** *THE FOLLOWING ITEMS ARE COMBINED IN ONE BAY: E-106, E-107, & E-108.
 47 **1) FIVE (5) IDENTICAL UNITS REQUIRED.**

51					
52					
53					
54					
55	Plot Area	Proposal Drawing No	Weight-Bundle	6200	Shipping



"A"

No.	Date	By

HAMMCO AIR COOLERS
P.O. Box 341
Owasso, Oklahoma 74055
Phone 918/272-9575

Sheet No. 3
Proposal No. Q-1660A
Contract No. 88-168
Date 7/7/88

1	Customer	CHEVRON USA., INC.	Item No.	E-108 A/E
2	Plant Location	WICKETT, TEXAS	Purch. Inv. No.	QR-273471 RPL
3	Service	COMPRESSOR COOLING WATER COOLER	Purch. Ord. No.	PHAA-273471
4	Size	1 HAC1634T13	Type	FORCED DRAFT
5	Surface per Unit — Finned Tube	40800.	EFF. Sq Ft	Bare Tube 1929.
6	Heat Exchanged	3565000.	Btu/Hr	MTD (Eff.) 18.52
7	Transfer Rate — Finned Tube	4.71	Btu/Hr Sq Ft	Bare Tube Service 99.8

PERFORMANCE DATA — TUBE SIDE

9	Fluid Circulated	50/50 ETHYLENE GLYCOL WATER	Density, Lb.	65.0	Lbs Cu Ft
10	Total Fluid Entering	158400.	Lb Hr	Density, Vap.	
11			IN	OUT	Bubble Point
12	Temperature		147.0	120.0	Dew Point
13	Liquid	Lb Hr	158400.	158400.	Sp. Heat, Lq.
14	Vapor	Lb Hr MW			Sp. Heat, Vap.
15	Noncond	Lb Hr MW			Th. Cond. 0.2390 (L)
16	Steam	Lb Hr			Inlet Pressure 15.0 PSIG
17	Water	Lb Hr			Allowable Pressure Drop 10.0 PSI
18	Viscosity (Liq Vap)	Cp	1.200/	1.800/	Calc. Pressure Drop 7.5 PSI
					Founding Resis. Inside 0.00100

AIR SIDE

20	Air Quantity	169100.	SCFM	Altitude	2700.0
21	Air Quant. Fan	169900.	ACFM	Temperature In	105.0
22	Static Pressure	0.648	In. Water	Temperature Out	124.5
	Face Velocity	590.	FPM (Std)	Mass Velocity	Lb Hr Sq Ft
				Minimum Ambient	0

DESIGN — MATERIALS — CONSTRUCTION

26	Design Pressure	125.	PSI	Test Pressure	CODE	PSI	Design Temperature	200.
27	TUBE BUNDLE		HEADER		TUBE			
28	Size 3.8x34.	No. Tube Rows 5	Type FAB. BOX W/ PLUGS	Material	CARBON STEEL			
29	No. Bay 1		Material SA-516-GR70	ASTM	SA-214			
30	Arrangement- Sections in Parallel		Passes-No. 4	OD 1.000	in. Min. Thickness 0.110	in.		
31	MISCELLANEOUS		Plug-Design SHOULDER	No. Bundle 223	Length 34.	ft		
32	Struct. Mounting GRADE		Material SA-105	Pitch 2.3125		in		
33	Struct. Finish SSPC6 & PAINT		Gasket Material SOFT IRON		FIN			
34	Bundle Frame SSPC6 & PAINT		Corrosion Allowance 0.0625	in. Type TENSION WOUND FOOTED				
35	Louvers NONE		Size Inlet Nozzle (1) - 4	in. Material ALUMINUM				
36	Louvers NONE		Size Outlet Nozzle (1) - 4	in. OD 2.250	in. Stock Thickness 0.015	in		
37	Wallops NONE		Rating & Facing 150.# RF	No./In. 10				
38	Vib. Switches PMC/EETA		Code-ASME VIII Stamp- YES	Specs- APT-661	228.07 AS NOTED			

MECHANICAL EQUIPMENT

39	Fan MFR & MODEL	MOORE SER 60	DRIVER TYPE	ELECTRIC MOTOR	SPEED REDUCER TYPE	COG-BELT
40	No. Bay 2	IHP/Fan 29.0	No. Bay 2	IHP/Driver 40.0	No. Bay 2	
41	Diameter 13.0	FIRPM 266.	RPM 1750	Model	POLY CHAIN GT	
42	No. Stages 7	Pitch MANUAL	Enclosure TEFC M&C HI-EFF	IHP Rating		
43	Base Material ALUM.	Angle 7.0	Volt. Phase/Hz 460/3/60	Ratio 6.588		
44	Support Material ALUM.		Mfr	GATES		
45	Control Action on Air Failure—Fan Pitch			Louvers		

46 **NOTES** *THE FOLLOWING ITEMS ARE COMBINED IN ONE BAY: E 106, E-107, NA DE-108.
47 **1) FIVE (5) IDENTICAL UNITS REQUIRED.**