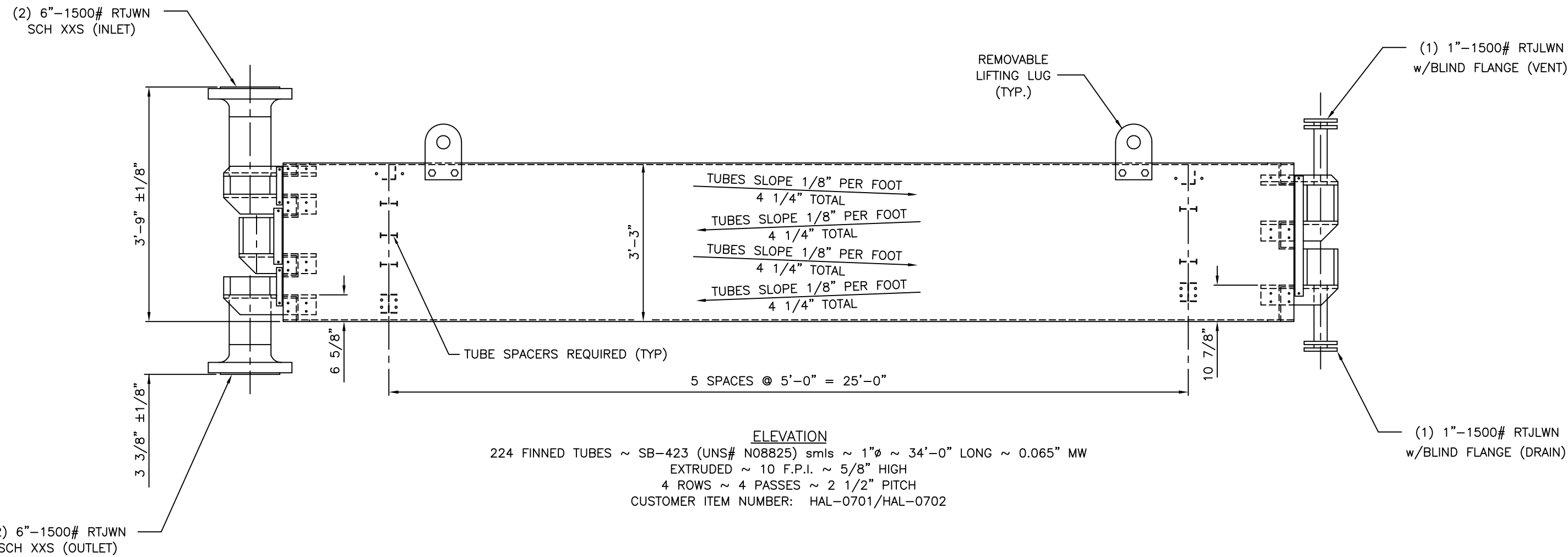


PLAN VIEW



NOTES:

- TUBES SHALL BE STRENGTH WELDED TO TUBESHEET PER WELD
DETAIL W9b OF DRAWING: 803700WIM
- TUBES EXPANDED INTO TUBESHEET IN ACCORDANCE WITH API-661 PARA. 9.3.3
- TUBE ACCESS PLUG THREADS TO BE COATED WITH A SUITABLE THREAD LUBRICANT.
- MAXIMUM PLUG TORQUE: 272 ft-lbs
- BUNDLE WEIGHT: 24,300 lbs ±10% /BUNDLE
- TOTAL QUANTITY REQUIRED FOR THE REFERENCED ITEM: 2 BUNDLE(S)

REFERENCE DRAWINGS

HEADERS: 8037010HDR
FINNED TUBES: 8037010FT
NAMEPLATE: 8037010NP

NO.	DESCRIPTION	DATE	DWN.	APPROVED
0	ORIGINAL ISSUE	3/16/11	RPK	
REVISIONS				

GEA Rainey Corporation
Tulsa Port of Catoosa
Catoosa, Oklahoma

GRC JOB NO: R-8037-1
CUST. P.O. NO: 6040-04-005953-M001
CUST. ITEM NO: HAL-0701/HAL-0702
SERVICE: PRODUCED NATURAL GAS COOLER

CUSTOMER		MCMORAN OIL & GAS		SMI 230 A DAVY JONES 1 - WELL #1	
TITLE	BUNDLE OUTLINE	SCALE	NONE	DWG. NO.	8037010BO
				REV.	0

BILL OF MATERIAL: 2 IDENTICAL SECTIONS REQ'D. FOR THIS ITEM

MARK NO.	QTY. EACH	QTY. TOTAL	DESCRIPTION	MATERIAL	WT.(lbs)
1	224	448	TUBE O.D. : 1" TUBE WALL THICKNESS : 0.065" MW TUBE LENGTH : 34'-0"	SB-423 (UNS# N08825) smls.	11286
2	224	448	ALUMINUM BLOOMS I.D. : 1.030" ±0.008" THICKNESS : 0.168" +0.005"/-0" LENGTH : 30'-3 1/8"	B221 1060-F	10086
N/A	N/A	N/A	ALUMINUM STRIP SPACER TUBE O.D. : 1" TUBE PITCH : 2 1/2" LIN. FT. : 1130'-0"	B209 1100-0	136

NOTES FOR PURCHASING :

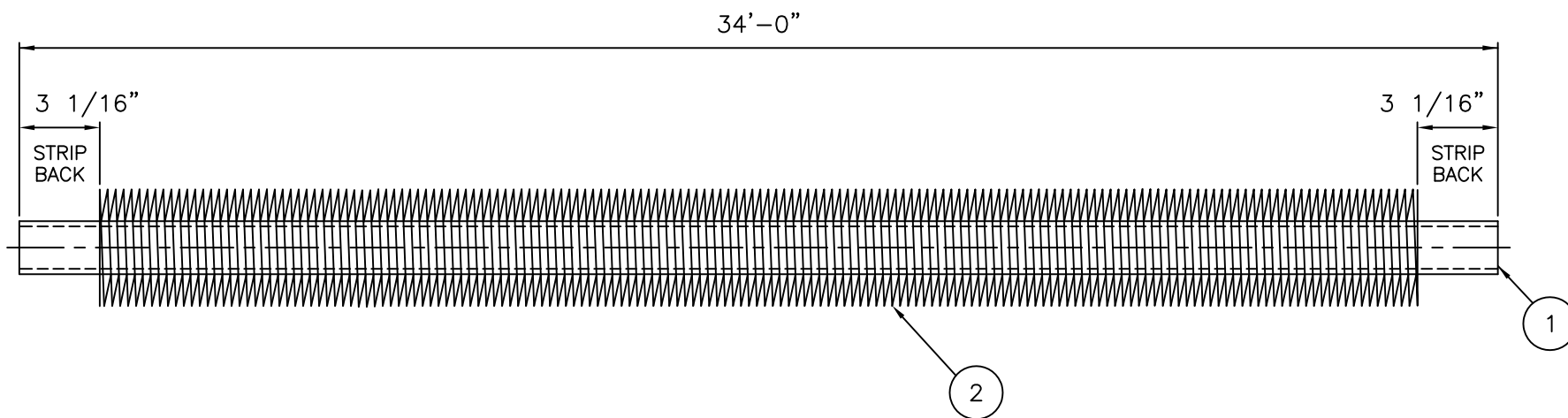
- WHEN ORDERING TUBES AND ALUMINUM BLOOMS, AN EXTRA 5% TIMES THE TOTAL NUMBER OF TUBES IS REQUIRED FOR SPARES.
- SB-423 TUBE MATERIAL SHALL BE IN COMPLIANCE WITH NACE MR0175 FOR H2S (50ppm) & SHOWN ON THE MTR's & HYDROSTATIC TESTED IN ACCORDANCE WITH ASTM A450.
- ALL MATERIALS SHALL BE OF DOMESTIC ORIGIN. MATERIAL THAT IS NOT DOMESTIC WILL REQUIRE APPROVAL OF CUSTOMER.

NOTES FOR FINNING :

- TUBES ARE STRENGTH WELDED TO TUBE SHEET.

FINNING INFORMATION

FIN TYPE	EXTRUDED
FINS PER INCH	10
FIN HEIGHT	5/8"



NO.	DESCRIPTION	DATE	DWN.	APPROVED
0	ORIGINAL ISSUE	3/16/11	RPK	
REVISIONS				

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CUST. P.O. NO: 6040-04-005953-M001
CUST. ITEM NO: HAL-0701/HAL-0702
SERVICE: PRODUCED NATURAL GAS COOLER

CUSTOMER

MCMORAN OIL & GAS

SMI 230 A DAVY JONES 1 - WELL #1

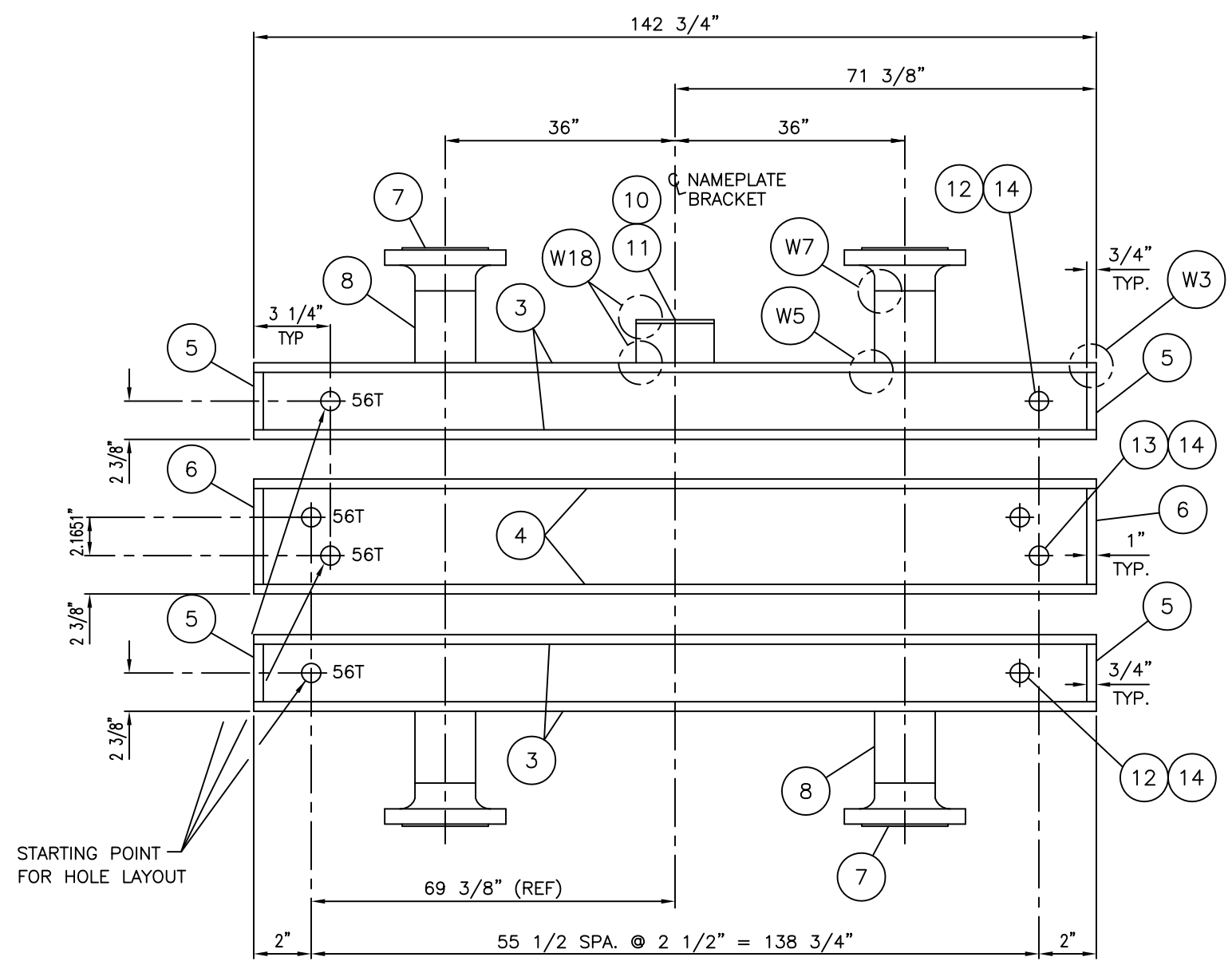
TITLE

FIN TUBE DETAIL

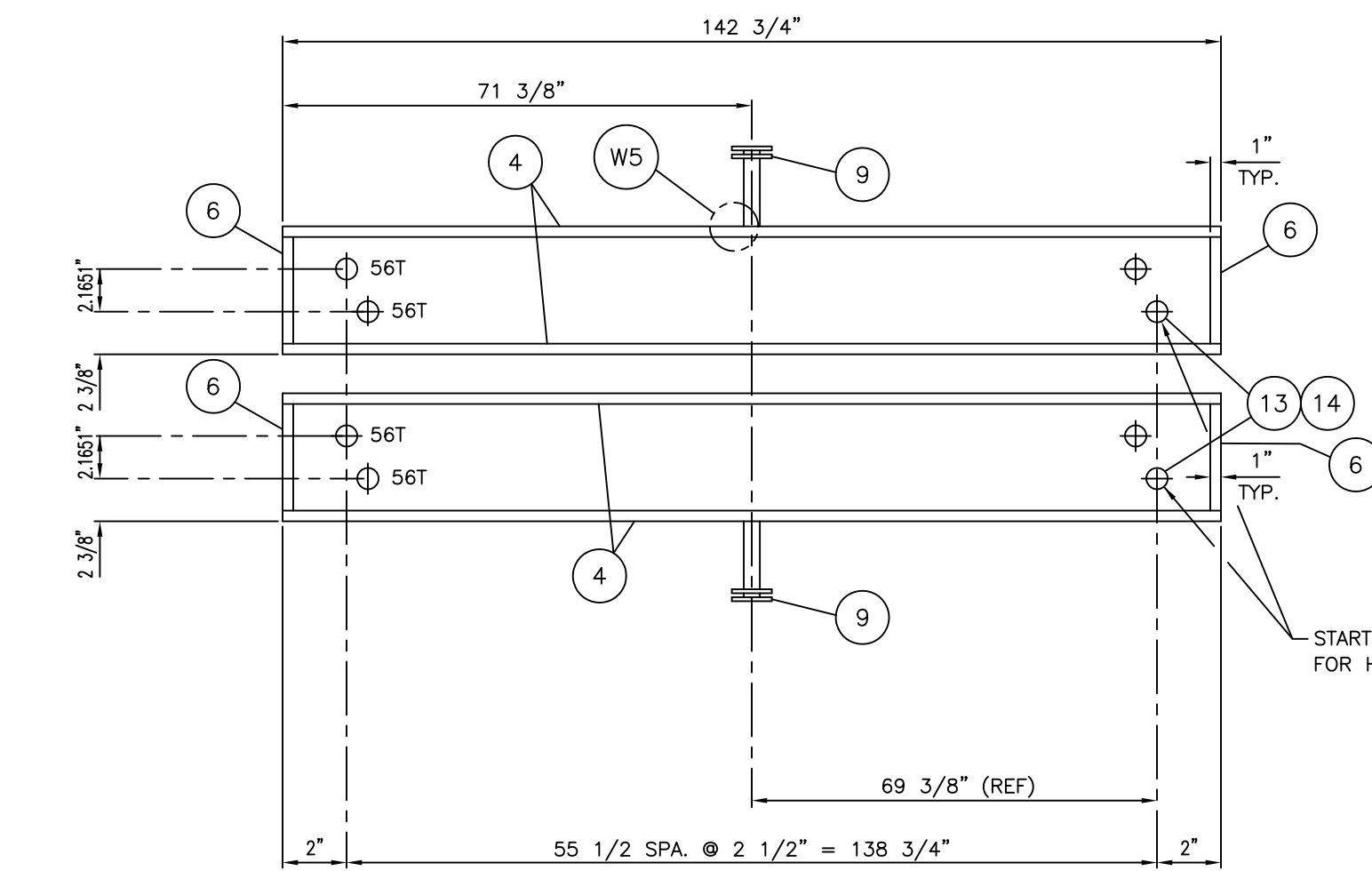
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DWG. NO.
8037010FT

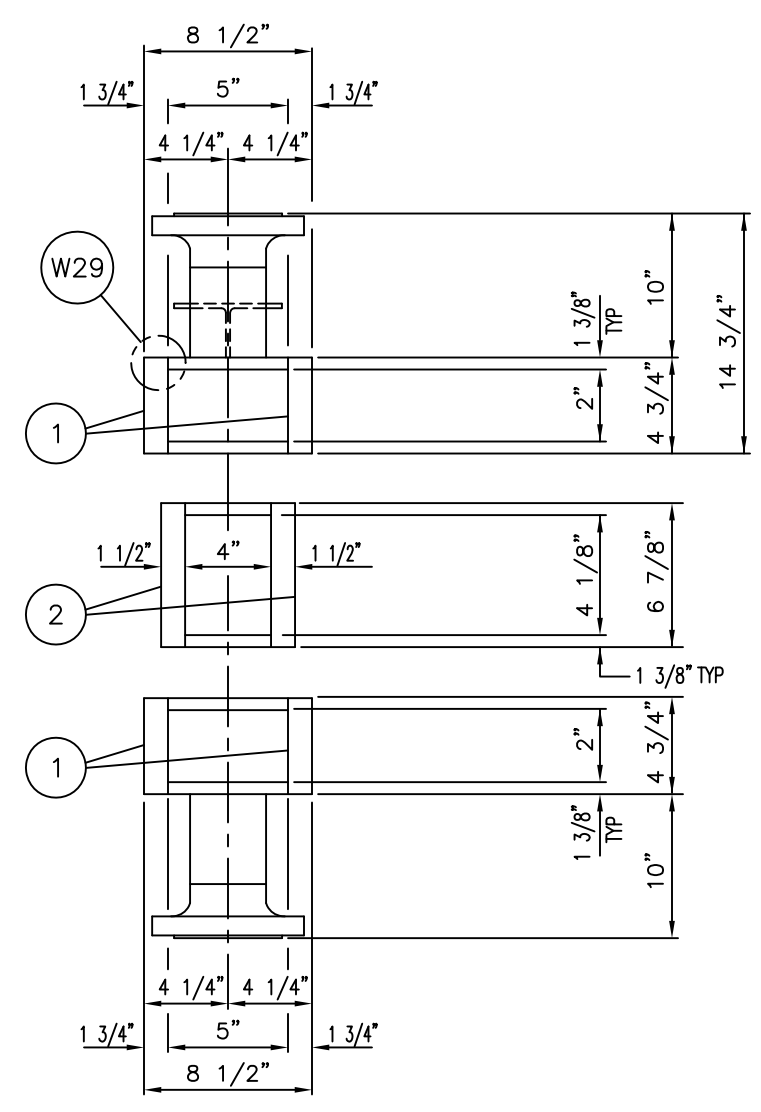
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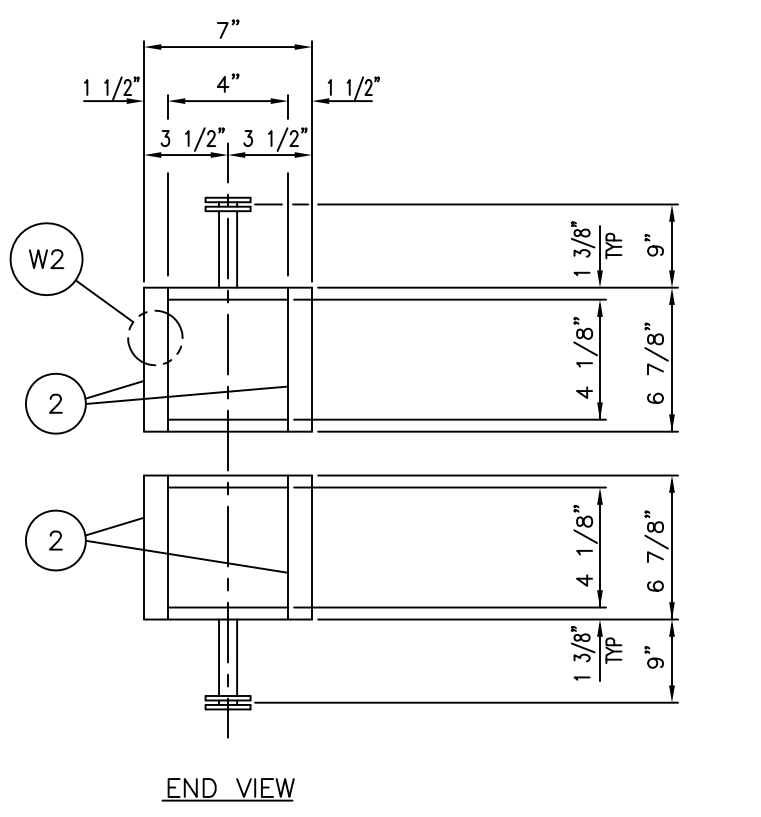
FRONT HEADERS
(PLUG SHEETS REMOVED)
SERIAL #: R-8037-1-FT-1 & 2 (APPROX. MFG. WEIGHT: 1700 LBS)
SERIAL #: R-8037-1-FM-1 & 2 (APPROX. MFG. WEIGHT: 1400 LBS)
SERIAL #: R-8037-1-FB-1 & 2 (APPROX. MFG. WEIGHT: 1700 LBS)



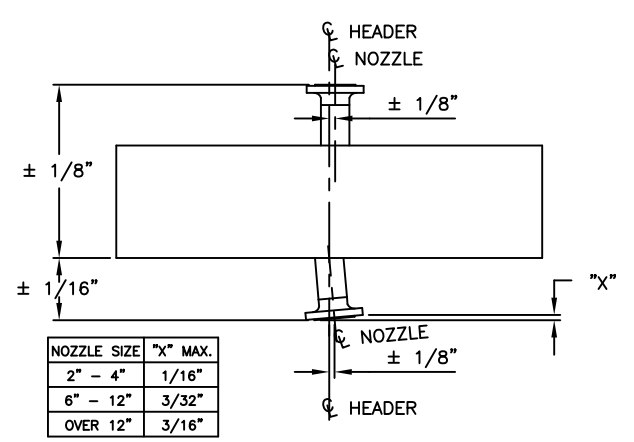
REAR HEADERS
(PLUG SHEETS REMOVED)
SERIAL #: R-8037-1-RT-1 & 2 (APPROX. MFG. WEIGHT: 1400 LBS)
SERIAL #: R-8037-1-RB-1 & 2 (APPROX. MFG. WEIGHT: 1400 LBS)



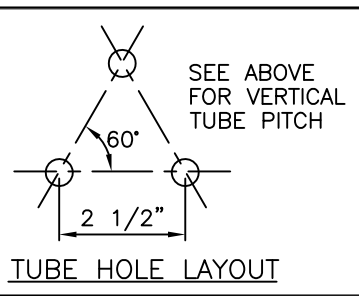
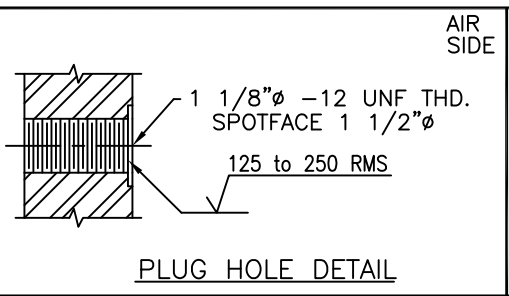
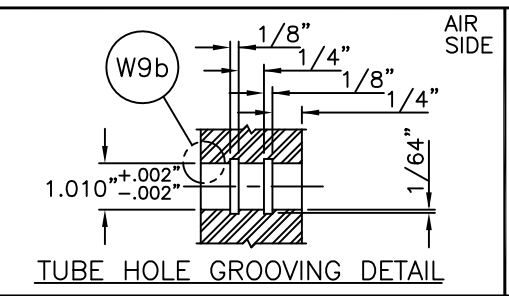
END VIEW



END VIEW



NOZZLE SIZE	X" MAX.
2" - 4"	1/16"
6" - 12"	3/32"
OVER 12"	3/16"



BILL OF MATERIAL FOR: 2 IDENTICAL SECTIONS REQ'D. FOR THIS ITEM					
MK NO.	QTY. EACH	TOTAL QTY.	DESCRIPTION	MAT'L SPEC	WT.
1	4	8	1 3/4" x 4 3/4" x 150 3/4"	SA516-70N	2840
2	6	12	1 1/2" x 6 7/8" x 150 3/4"	SA516-70N	5285
3	4	8	1 3/8" x 5" x 150 3/4"	SA516-70N	2349
4	6	12	1 3/8" x 4" x 150 3/4"	SA516-70N	2819
5	4	8	3/4" x 1 3/4" x 4 3/4"	SA516-70N	14
6	6	12	1" x 3 3/4" x 3 7/8"	SA516-70N	49
7	4	8	6"-1500# RTJWN SCH XXS	SA105N	1312
8	4	8	6" NPS x 2 3/4" LG. SCH XXS	SA106-B	97
9	2	4	1"-1500# RTJLWN x 9" LG. W/ BLIND FLG., STUDS, NUTS, & GASKETS	SA105N	96
10	1	2	NAMEPLATE RE: DWG. 8037010NP	316 S.S.	N/A
11	1	2	NAMEPL. BRKT. RE: DWG. MSTR000NPB	SA36	N/A
12	112	224	P-9-14 RE: DWG. MSTR000PLG	SA105N	N/A
13	336	672	P-9-12 RE: DWG. MSTR000PLG	SA105N	N/A
14	448	896	G-9 RE: DWG. MSTR000PGA	A-1008	N/A

TOTAL WT. = 14861#

- NOTES FOR PURCHASING :**
- 1) PLUG GASKETS SHALL BE IN THE FULLY ANNEALED CONDITION WITH A MAXIMUM HARDNESS OF 68 HRB FOR CARBON STEEL.
 - 2) FLANGE FACING SHALL BE 63 RMS.
 - 3) WHEN BLIND FLANGES ARE PROVIDED, STUD BOLTS ARE TO BE A193-B7M(QET) w/ A194-2HM NUTS AND 316S.S. RTJ GASKETS PER API 6A, TYPE "RX".
 - 4) ALL MATERIALS SHALL BE OF DOMESTIC ORIGIN. MATERIAL THAT IS NOT DOMESTIC WILL REQUIRE APPROVAL OF CUSTOMER.
 - 5) ALL PRESSURE RETAINING MATERIALS SHALL BE IN COMPLIANCE WITH NACE MR0175 FOR H2S (50ppm) & SHOWN ON THE MTR'S. CE SHALL BE 0.47 MAX BASED ON FORMULA: CARBON EQUIVALENT (CE) = C + Mn/6 + (Ni + Cu)/15 + (Cr + Mo + V)/5
 - 6) ALL SA516-70 AND SA105 MATERIAL SHALL BE NORMALIZED.
 - 7) BAR STOCK FOR PLUGS SHALL BE RADIALLY UT EXAMINED.
 - 8) ALL SA516-70 PLATE SHALL BE KILLED, TO FINE GRAIN PRACTICE & SHALL BE UT'd PER ASME SA-578, LEVEL III & S1.1 FOR 100% SCAN. INDICATIONS REPORTED BY PROVIDING A PLATE SKETCH WITH INDICATIONS DIMENSIONED TO LOCATION & DEPTH.

IMPACT TESTING REQUIREMENTS			
PART	REQ'D.		EXEMPTION CRITERIA OR CV VALUE FOR TEST
	YES	NO	
PLATE		x	UCS-66(a)/UCS-68(c)
NOZZLE PIPE		x	UG-20(f)
FLANGE		x	UCS-66(c)

- GENERAL NOTES :**
- 1) 2 SECTION(S) REQUIRED 224 TUBES
4 ROWS 4 PASS TUBE WALL : 0.065" MW
TUBE MATERIAL : SB-423 (UNS# N08825) smls CORROSION ALLOWANCE : 1/8"
DESIGN PRESSURE : 3000 psig HYDROTEST PRESSURE : 3900 psig
DESIGN TEMPERATURE : 450°F M.D.M.T. : -20°F
M.A.W.P.(HOT & CORRODED) : 3000 psig
LIMITING COMPONENT: TUBE
 - 2) DESIGNED IN ACCORDANCE WITH ASME SECT. VIII, DIV. 1, ED. 2010, ADD. 0 AND API-661, 6th EDITION, 2006.
 - 3) ASME CODE STAMP AND NATIONAL BOARD NUMBER REQUIRED.
 - 4) FLANGES, BOLT HOLES TO STRADDLE NATURAL CENTERLINE.
 - 5) MANUFACTURING TOLERANCES PER API-661, 6th EDITION, 2006.
 - 6) FOR DESIGN CALCULATIONS REF. DOC. : 8037010C31, C33, C41, C43 & C61.
 - 7) FOR WELDING DETAILS AND PWHT & NDT REQUIREMENTS REF. DOC. : 8037000WIM
 - 8) FOR FINISH REF. DOC. : 8037000ATS
 - 9) H2S (50ppm) SERVICE.

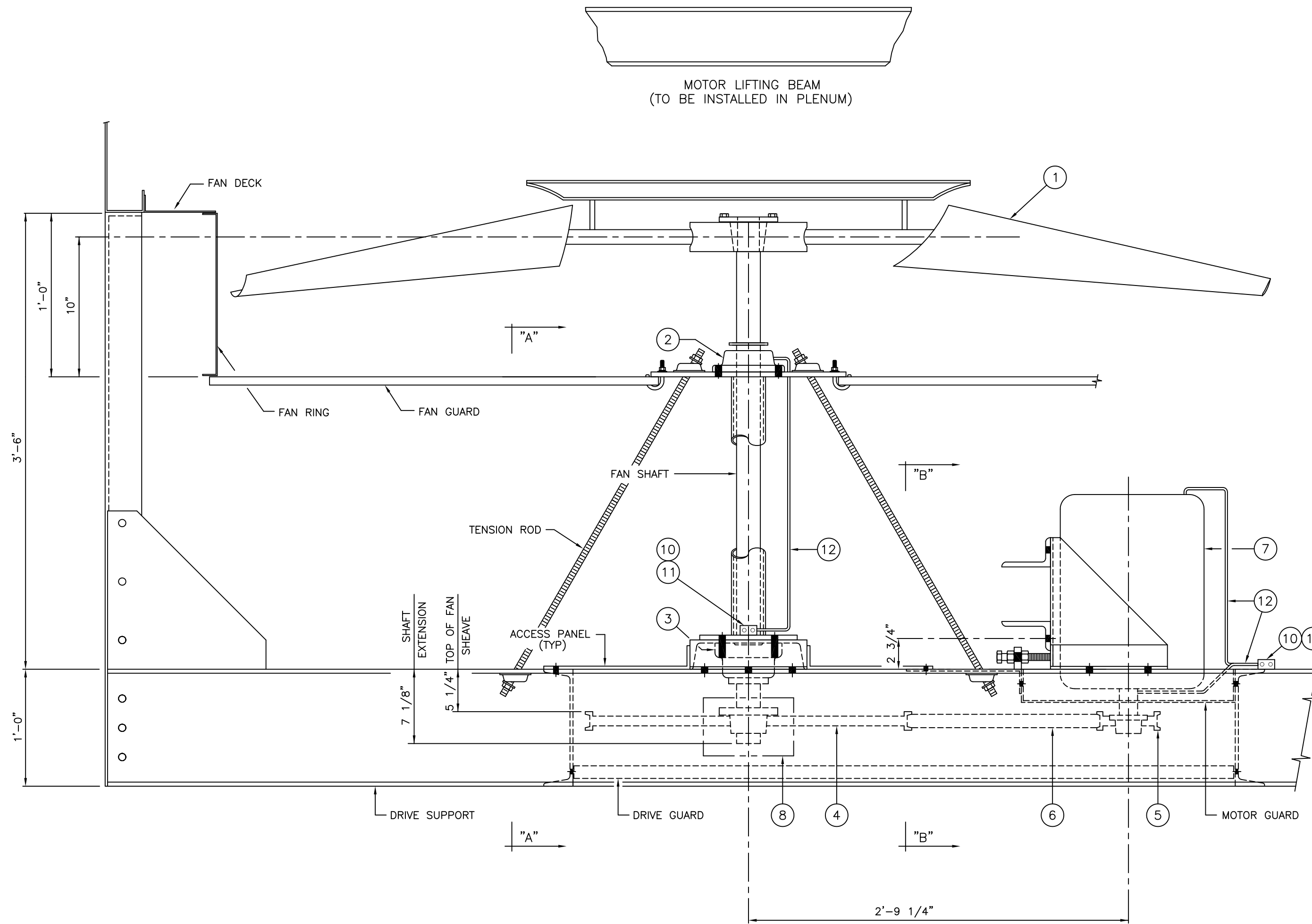
NO.	DESCRIPTION	DATE	RPK	DWN.	APPROVED
0	ORIGINAL ISSUE	3/16/11			

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Catoosa, Oklahoma

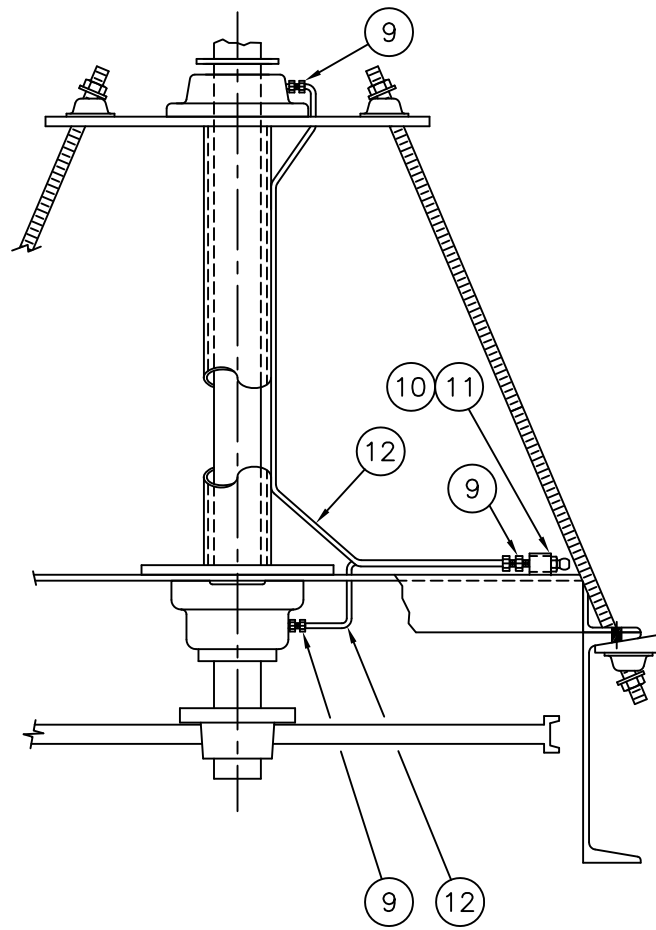
GRC JOB NO: R-8037-1
CUST. P.O. NO: 6040-04-005953-M001
CUST. ITEM NO: HAL-0701/HAL-0702
SERVICE: PRODUCED NATURAL GAS COOLER

CUSTOMER: MCMORAN OIL & GAS
SMI 230 A DAVY JONES 1 - WELL #1

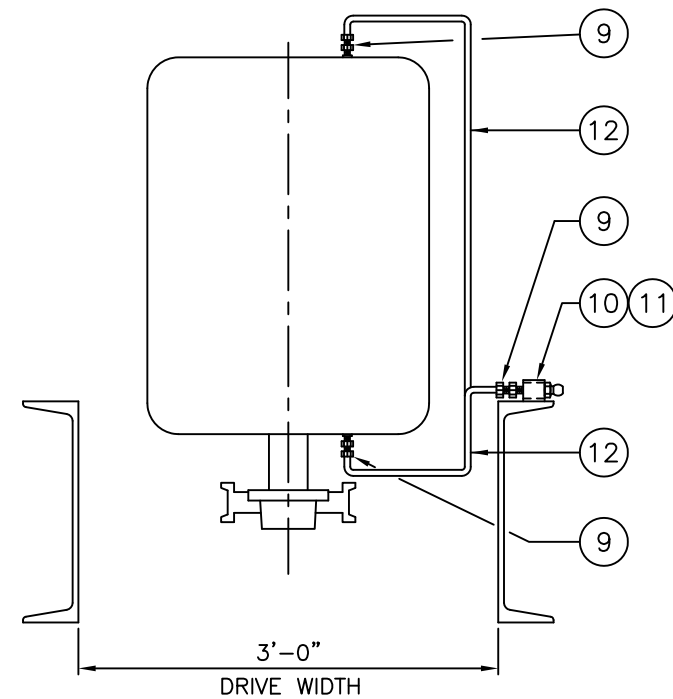
TITLE: HEADER DETAIL
SCALE: NONE
DWG. NO: 8037010HDR
REV. 0



4 ASSEMBLIES REQUIRED AS SHOWN



SECTION "A-A"



SECTION "B-B"

FAN DRIVE BILL OF MATERIAL

MARK NO.	QTY EACH	TOTAL QTY	DESCRIPTION
1	1	4	FAN: <u>MANUAL</u> CLASS, SERIES OR TYPE: <u>MOORE 10000 36HD SC VT</u> FAN DIA: <u>10'-0"</u> NO. OF BLADES: <u>7</u> BLADE MATL: <u>ALUMINUM</u> AMB. AIR TEMP: <u>95°F @ ELEV: 83 FT.</u> ROTATION: <input checked="" type="checkbox"/> CW <input type="checkbox"/> CCW (FACING DISCHARGE) ACFM: <u>140700</u> STATIC PRESSURE (H2O): <u>0.600"</u> FAN RPM: <u>308</u> FAN HP: <u>23.35</u> KEYWAY SIZE: <u>3/4" x 3/8"</u> QD BUSHING BORE: <u>2 15/16"φ</u> FAN BLADE ANGLE: <u>22.2°</u>
2	1	4	UPPER SHAFT BEARING: MODEL NO.: <u>DODGE TYPE "SCM"</u> SIZE: <u>2 15/16"φ</u>
3	1	4	LOWER SHAFT BEARINGS: MODEL NO.: <u>DODGE TYPE "E"</u> SIZE: <u>2 15/16"φ</u>
4	1	4	FAN SHEAVE: <u>F14M-180S-20-F</u> KEYWAY SIZE: <u>3/4" x 3/8"</u> QD BUSHING BORE: <u>2 15/16"φ</u>
5	1	4	MOTOR SHEAVE: <u>F14M-32S-20-SK</u> KEYWAY SIZE: <u>1/2" x 1/4"</u> QD BUSHING BORE: <u>1 7/8"φ</u>
6	1	4	BELT: <u>14MGT-3304-20 GATES POLYCHAIN GT CARBON</u>
7	1	4	MOTOR: <u>SIEMENS OR EQUAL</u> HP: <u>30</u> RPM: <u>1750</u> ENCLOSURE: <u>TEFC (HI EFFIC.)</u> VOLT/PHASE/CYCLE: <u>460/3/60</u> FRAME: <u>286T</u>
8	1	4	VIBRATION SWITCH: <u>METRIX ST5484E-121-012-00 w/8200-002</u>
9	8	32	MALE CONNECTOR: <u>BI-LOK 316SS #DCT 4-2</u>
10	2	8	LUBE JUNCTION BLOCK <u>BHR-2A-BG</u>
11	2	8	<u>1/4"-28 x 3" TEK5 HWH(ZINC PLATED) SELF TAPPING SCREW</u>
12	1	4	<u>1/4"φ x 0.020" STAINLESS STEEL TUBING 20'-0"</u>

NOTES FOR PURCHASING:

FANS

- FAN BLADES TO BE DYNAMICALLY BALANCED OR MOMENT BALANCED AGAINST A MASTER BLADE.
- FAN HUB TO BE DESIGNED TO PREVENT A NEGATIVE AIR FLOW.
- FAN HUB TO BE DYNAMICALLY BALANCED.

BELTS

- DESIGNED WITH A 2.0 SERVICE FACTOR.

MOTORS

- TO BE IN ACCORDANCE WITH SPEC: 005953-GS-E002.
- AREA CLASSIFICATION: CLASS 1, DIV. 2, GROUPS C & D.
- ADVISE MFR OF SHAFT-DOWN APPLICATION.
- SPACE HEATERS REQUIRED.
- MOTORS SHALL BE SUITABLE FOR VFD (VFD's BY OTHERS).

NOTES FOR ASSEMBLY:

- FAN TIP CLEARANCE PER API-661, 6th EDITION, 2006, PARA. 7.2.3.6.
- MOTOR REMOVAL BEAM REQUIRED.

NO.	DESCRIPTION	DATE	RPK	DWN.	APPROVED
0	ORIGINAL ISSUE	3/16/11	RPK		
REVISIONS					

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Tulsa Port of Catoosa
Catoosa, Oklahoma

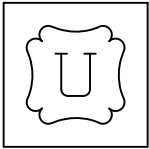
GRC JOB NO: R-8037-1
CUST. P.O. NO: 6040-04-005953-M001
CUST. ITEM NO: HAL-0701/HAL-0702
SERVICE: PRODUCED NATURAL GAS COOLER

CUSTOMER		MCMORAN OIL & GAS		SMI 230 A DAVY JONES 1 - WELL #1	
TITLE	SCALE	DWG. NO.	REV.		
FAN DRIVE ASSEMBLY (MANUAL)	NONE	8037010MFD	0		



LATER

CERTIFIED BY: **GEA** Rainey Corporation

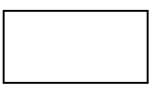


M.A.W.P. 3000 PSIG @ 450 °F BARG @ °C

M.A.W.P. (EXT.) 15 PSIG @ 450 °F BARG @ °C



M.D.M.T. -20 °F @ M.A.W.P. 3000 PSIG °C @ BARG



SERIAL NUMBER R-8037-1-* DATE 2011

SHOP TEST PRESSURE 3900 PSIG BARG



SB-423 (UNS# N08825)smls 1" O.D.x 0.065" MW

CUSTOMER: MCMORAN OIL & GAS

P.O. NO.: 6040-04-005953-M001

ITEM NO.: HAL-** C.A. 1/8"

SERVICE: PRODUCED NATURAL GAS COOLER

NATIONAL BOARD NO. REQUIRED

* = A & B

** = 0701 & 0702

1 EA. REQ'D-(2) TOTAL

NOTE :

- NAMEPLATE MATERIAL: 316 S.S.
- SEAL WELD NAMEPLATE TO BRACKET

NO.	DESCRIPTION	DATE	DWN.	APPV'D.
0	ORIGINAL ISSUE	3/11/11	RPK	

REVISIONS

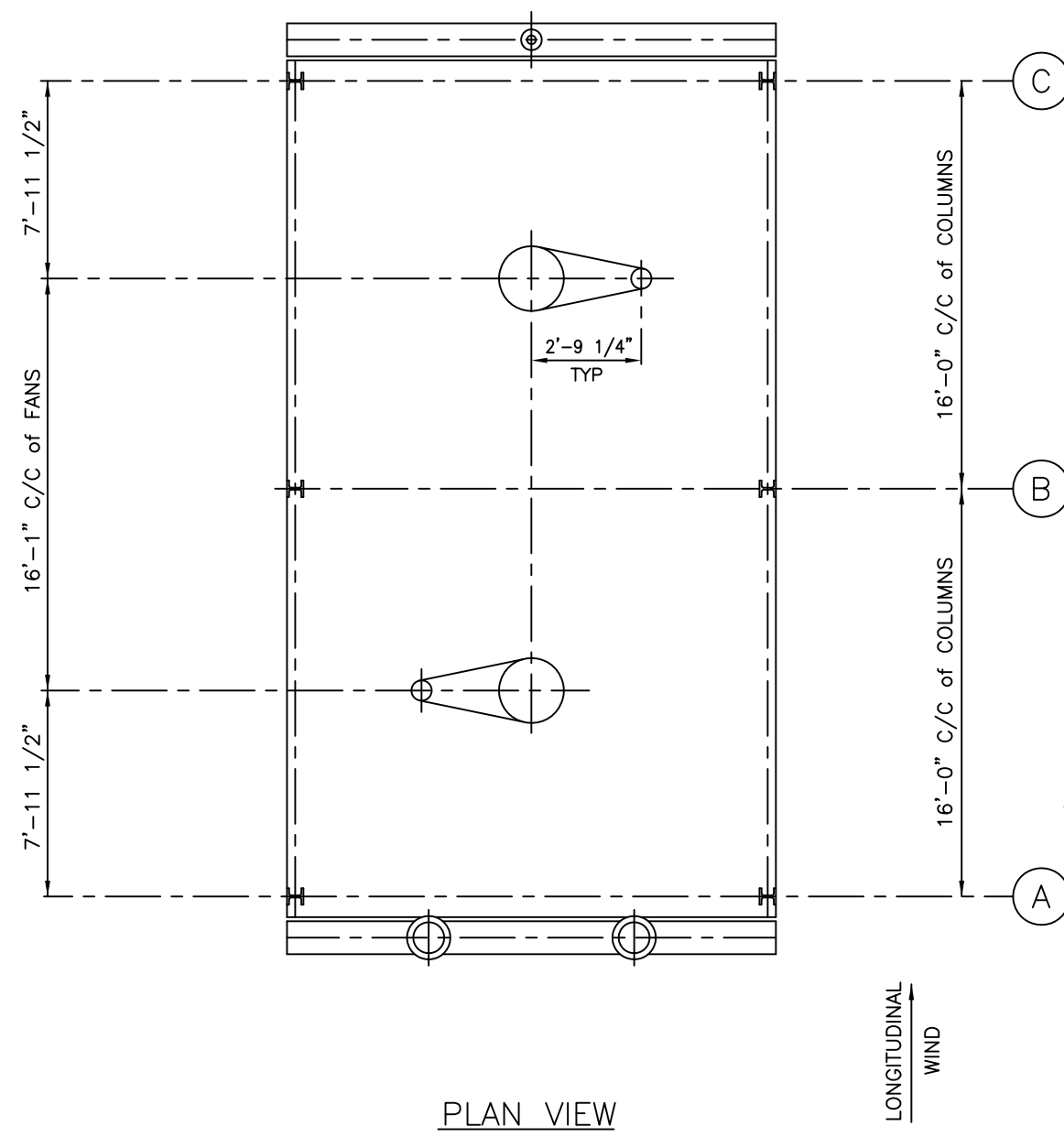


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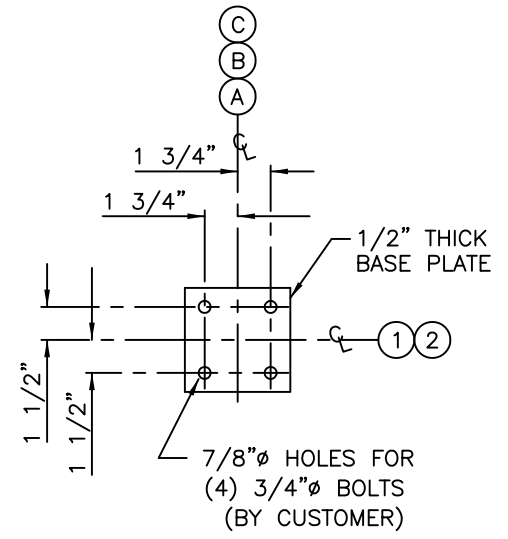
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CUST. P.O. NO: 6040-04-005953-M001
CUST. ITEM NO: HAL-0701/HAL-0702
SERVICE: PRODUCED NATURAL GAS COOLER

CUSTOMER MCMORAN OIL & GAS SMI 230 A DAVY JONES 1 - WELL #1

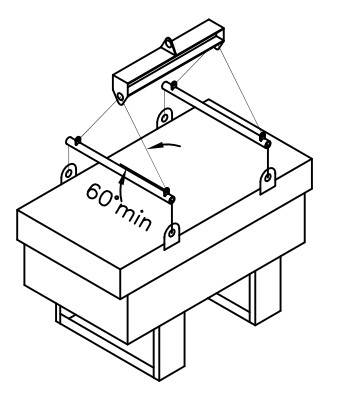
TITLE	NAMEPLATE DETAIL	DWG. NO.	8037010NP	REV.	0
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PLAN VIEW



ANCHOR BOLT LAYOUT



UNIT LIFTING DIAGRAM (STRAIGHT LIFT REQUIRED)

LOAD REACTIONS	
LOAD POINT	1 or 2
DEAD LOAD	5025
LIVE LOAD	0
OPERATING LOAD	2600
TRANSVERSE WIND SHEAR	3300
LONGITUDINAL WIND SHEAR	1100
TRANSVERSE WIND VERTICAL	± 5950
LONGITUDINAL WIND VERTICAL	± 1050
EARTHQUAKE SHEAR	1225
EARTHQUAKE VERTICAL	± 2475
SNOW LOAD	0
LOAD POINT	1 or 2
DEAD LOAD	10025
LIVE LOAD	0
OPERATING LOAD	500
TRANSVERSE WIND SHEAR	3300
LONGITUDINAL WIND SHEAR	1100
TRANSVERSE WIND VERTICAL	± 5950
LONGITUDINAL WIND VERTICAL	± 0
EARTHQUAKE SHEAR	2425
EARTHQUAKE VERTICAL	± 4925
SNOW LOAD	0
LOAD POINT	1 or 2
DEAD LOAD	5025
LIVE LOAD	0
OPERATING LOAD	325
TRANSVERSE WIND SHEAR	3300
LONGITUDINAL WIND SHEAR	1100
TRANSVERSE WIND VERTICAL	± 5950
LONGITUDINAL WIND VERTICAL	± 1050
EARTHQUAKE SHEAR	1225
EARTHQUAKE VERTICAL	± 2475
SNOW LOAD	0

NOTES FOR LOADING CHART :

- ALL LOADS ARE IN POUNDS.
- LIVE LOADS INCLUDE WALKWAY LOADS BASED ON API-661, 6th EDITION, PARAGRAPH 7.3.3.3.
- OPERATING LOADS INCLUDE LOAD OF HEADERS & TUBES FULL OF WATER & DOWNWARD NOZZLE LOADS PER API-661, 6th ED., 2006, FIGURE 6 & TABLE 4.
- WIND LOADS ARE PER ANSI/ASCE 7-05 EDITION & AUDUBON DATA SHEET: 005953-DS-M001:

$$qz = (0.00256)(Kz)(Kzt)(Kd)(V)^2(I)$$

$$WIND PRESSURE = (qz)(G)(Cf) = 79.56 PSF$$

$$F = (qz)(G)(Cf)(Af)$$
 Kz = 1.25 G = 0.85
 Kzt = 1.0 Cf = 1.3
 Kd = 1.0 C = EXPOSURE CATEGORY
 V = 150 MPH F = DESIGN WIND FORCE
 I = 1.0 Af = AREA PROJECTED TO WIND

(VERTICAL WIND LOADS RESULTS FROM OVERTURNING MOMENT)

- EARTHQUAKE LOADS ARE PER UBC 1997 EDITION & AUDUBON DATA SHEET: 005953-DS-M001:

$$V = \frac{(2.5)(Ca)(I)(W)}{(R)}$$

$$V = \text{TOTAL DESIGN LATERAL FORCE}$$
 Ca = 0.28 Z = 0.2 (SEISMIC ZONE 2B)
 Cv = 0.40 Sp = SOIL PROFILE
 Na = 1.5 Ct = 0.02
 Nv = 2.0 R = 2.9
 I = 1.0 W = DEAD LOAD

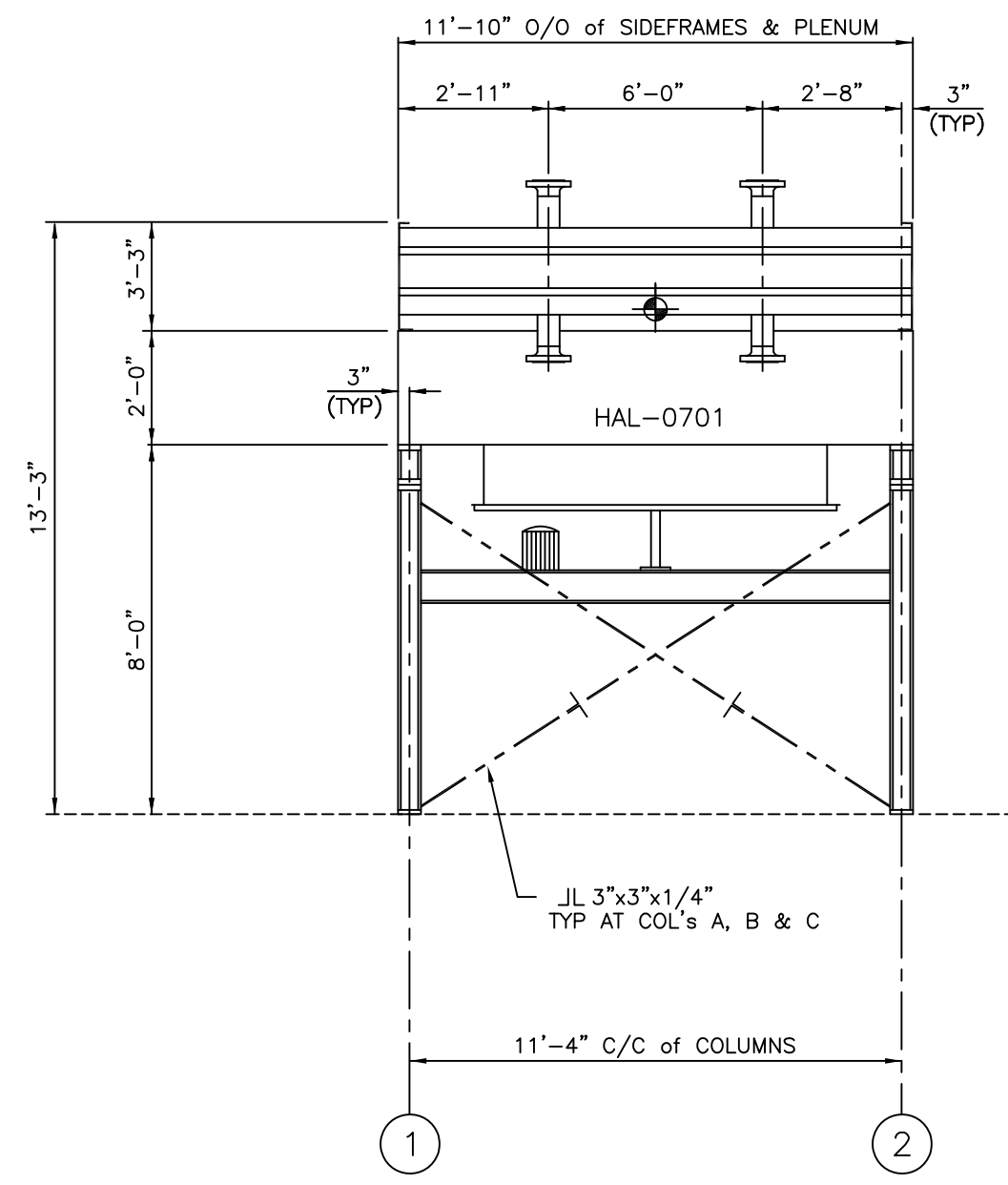
(VERTICAL EARTHQUAKE LOADS RESULTS FROM OVERTURNING MOMENT ASSUMING THE SHEAR LOAD AT CENTER OF GRAVITY)

- SNOW LOADS ARE PER ANSI/ASCE 7-05 EDITION & AUDUBON DATA SHEET: 005953-DS-M001:

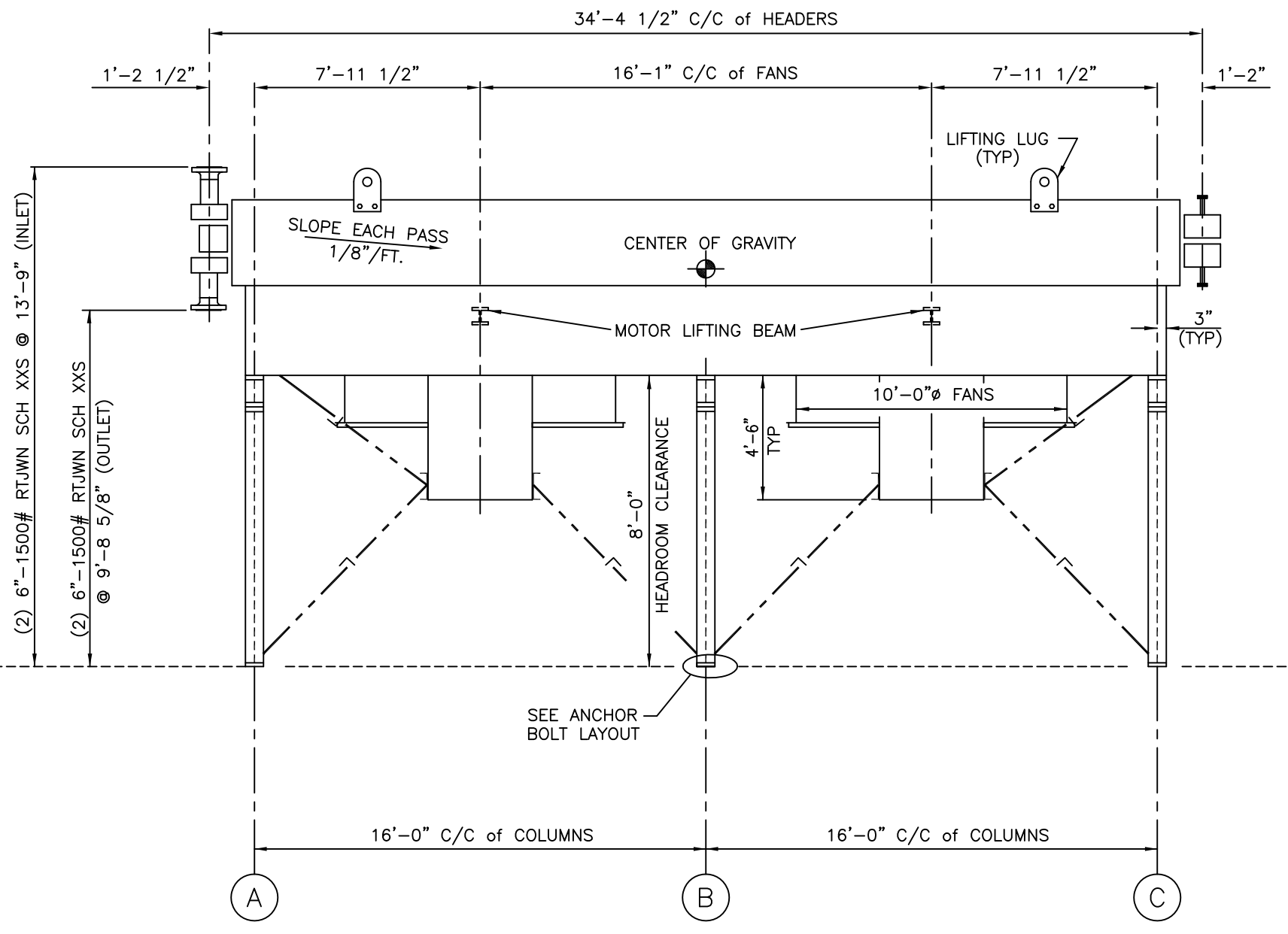
$$pf = (0.7)(Ce)(Ct)(I)(pg) = 0 PSF$$
 Ce = 1.0 pg = 0 PSF
 Ct = 1.2 pf = FLAT ROOF SNOW LOAD
 I = 1.0

GENERAL NOTES :

- DESIGNED PER API-661, 6th ED., 2006, OVERALL TOLERANCES PER API-661, FIG. 10 AND APPLICABLE SPECIFICATIONS.
- MAXIMUM PIPING NOZZLE LOAD 1 TIMES NOZZLE LOADING SPECIFIED IN API-661, 6th ED., 2006, TABLE 4.
- PROVISION FOR MINIMUM LATERAL MOVEMENT FOR TUBE BUNDLES ARE 1/4" IN BOTH DIRECTIONS OR 1/2" IN ONE DIRECTION.
- STRUCTURAL STEEL DESIGNED PER AISC/OSHA REQUIREMENTS AND APPLICABLE SPECIFICATIONS.
- REFERENCE DWGS:
 - 8037010HDR ~ HEADER DETAIL
 - 8037010BO ~ BUNDLE OUTLINE
 - 8037010FT ~ FINNED TUBE DETAIL
 - 8037010MFD ~ FAN DRIVE ASSEMBLY
 - 8037000ATS ~ ASSEMBLY, TESTING & SHIPPING
 - 8037-1-FE ~ FIELD ERECTION
- TEMPORARY HEADER SHIPPING BRACES (PAINTED ORANGE) SHALL BE REMOVED PRIOR TO UNIT START-UP.
- ONE UNIT SHOWN (HAL-0701), TWO UNITS REQUIRED TOTAL (HAL-0702 NOT SHOWN).
- LIFTING LUGS ARE DESIGNED FOR STRAIGHT LIFT ONLY USING 1 1/2" CROSBY SHACKLES (17 TON) OR EQUAL. LIFTING LUGS ARE DESIGNED WITH A SAFETY FACTOR OF 2.0.



ELEVATION @ COL. LINE A



ELEVATION @ COL. LINE 2

						GRC JOB NO: R-8037-1 CUST. P.O. NO: 6040-04-005953-M001 CUST. ITEM NO: HAL-0701/HAL-0702 SERVICE: PRODUCED NATURAL GAS COOLER											
				CUSTOMER		MCMORAN OIL & GAS											
				TITLE		SMI 230 A DAVY JONES 1 - WELL #1											
				SCALE		NONE											
				DWG. NO.		8037010PE											
				REV.		0											
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