

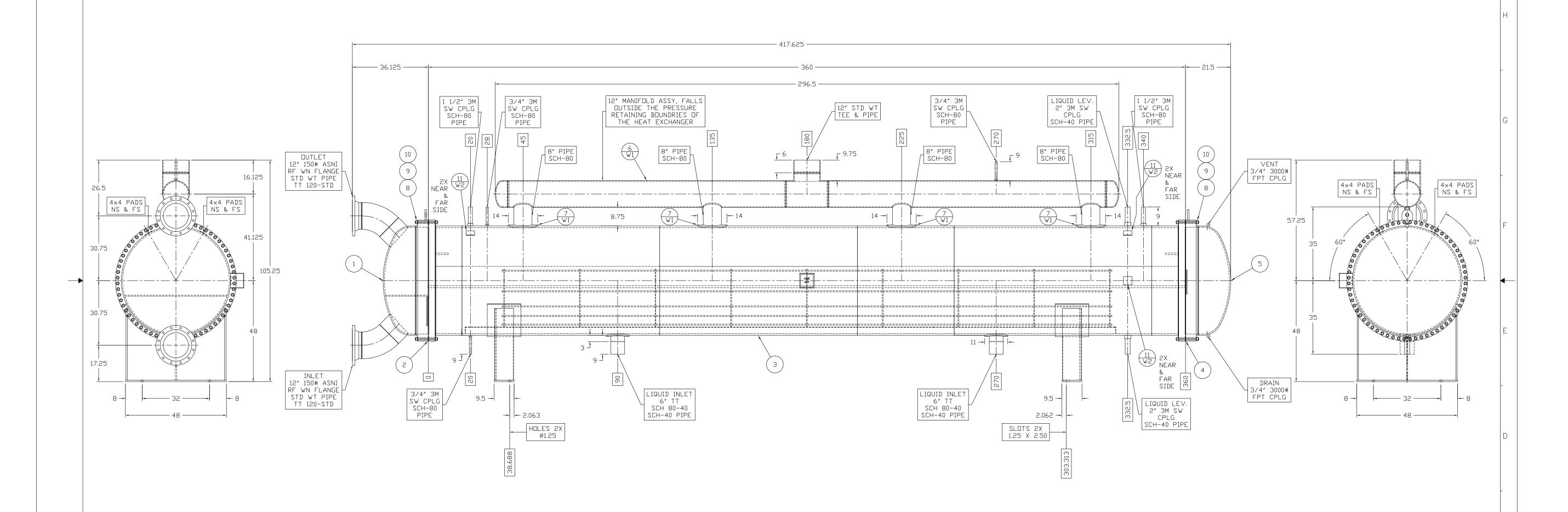
BOLT TORQUE 290 FT-Ubs W/ ANTI SEIZE & IMPACT GUN

HEAVY HEX HEAD .875-9UNC STUD NUT

NOTE

DO NOT LIFT UNIT BY LUG ON EITHER WATERBOX.

CATALOG NUMBER 0530918P-11



ITEM	PART NUMBER	QTY				DES	SCRIF	PTION					REFERENCE	WEI	GHT	
	0530918P-11		EVAPO	RATOR, 52" DIA X 360" NTL B	XM											
001	171-70191D-000	1.0000	FRONT	COVER ASSEMBLY 52" DIA H	TEX	(2017	LBS	;
002	170-40191C-000	1.0000	GASKE [*]	T, 52" DIA HTEX "I" 304L SPR	IAL	WO	UND	GRAPH	ITE FILLE	D						
003	0530918P-21	1.0000	ASSEM	BLY, SHELL & TUBESHEET 5	2" D	IA X	360	" NTL						35509	LB	3
004	170-50120C-000	1.0000	GASKE"	T, 52" DIA HTEX "0" 304L SPF	RIAL	WC	DUND	GRAPI	ITE FILLE	ED						
005	171-80156D-000	1.0000	REAR C	OVER ASSEMBLY 52" DIA HT	EX									1339	LBS	;
006	170-80082D-000	1.0000	12" MAN	NIFOLD ASSEMBLY FOR 52" [IA F	HTE	X 29	3.50" O/	۸L					1034	LBS	j
007	0530918P-21-17	0.5000	PROFIL	E, REPADS .500" THK SA516-	70N	I								36 L	BS	
800	510-001320-090	128.0000	STUD, A	ALL THREAD 0.875"-09UNC X	10.5	0" S	SA320	-L7								
009	510-001780-087	256.0000	NUT, HE	EAVY HEX 0.875"-09UNC SA19	94-7											
010	510-002820-087	256.0000	WASHE	R, FLAT STL 0.875" NOMINAL	1.7	5" C	D X C	.9375 l'	D X .134 T	HK						
011	161-00011B-002	9.0000	PAD, SI	JPPORT 4 X 4 X 1/4 W/ WEEP	HOI	LE								12. l	BS	
C-2 10/20/05	CHANGED OVERALL LENGT DISTRIBUTION PLATE ASSE	TH OF EMBLY. DRP PF														
C-1 10/20/05	DRAWING UPDATED TO REFLECT TO TUBESHEET ASSEMBL	T CHANGES DRP PF	A D-3 11/23/05	ADDED WELD DETAIL FOR TUBESHEET ASSEMBLY TO WRAPPER.	DRP	PFA			·	·				·		
B-1 10/17/05	QTY. ITEM 011 WAS 3.0	DRP PF	D-2 11/23/05	TUBESIDE INLET AND DUTLET CENTER TO CENTER WAS 60.00'	DRP	PFA										

A-1 10//1/5 UPDATED PER CUSTOMER MARKUP DRP PFA D-1 11/23/1/5 REDESIGNED DISTRIBUTION PLATE ASSEMBLY. DRP PFA D-1 EVEN DATE REVISION BY AP REV DATE REVISION BY AP REV DATE

TAG NUMBER	JOB NUMBER
E-5801-25	0530918P
E-5802-25	0530918Q
E-5803-25	0530918R

TAS C/O SHELL MAHOGANY RESEARCH PROJECT | SPECIFICATIONS UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES FREEZE WALL TEST $TOLERANCE = \pm$ MAT'L = SEE BILL OF MAT'L

FES Systems Inc.

SIGNATURE: P. ARSLAIN DATE: 10/7/05 EVAPORATOR, BXM
52" DIA X 360" NTL
WITH 12" DAI X 296.50" OAL MANIFOLD

DATE 10/7/05
DWG.BY DRP
APP.BY PFA SCALE 1/16" = 1" ORIG.NO. 0530918P-11 E

CERTIFIED

FES, INC.

CONFIDENTIAL: THE INFORMATION HEREON IS CONFIDENTIAL AND MAY NOT BE REPRODUCED OR DIVULGED WITHOUT THE WRITTEN PERMISSION OF FES SYSTEMS INC.

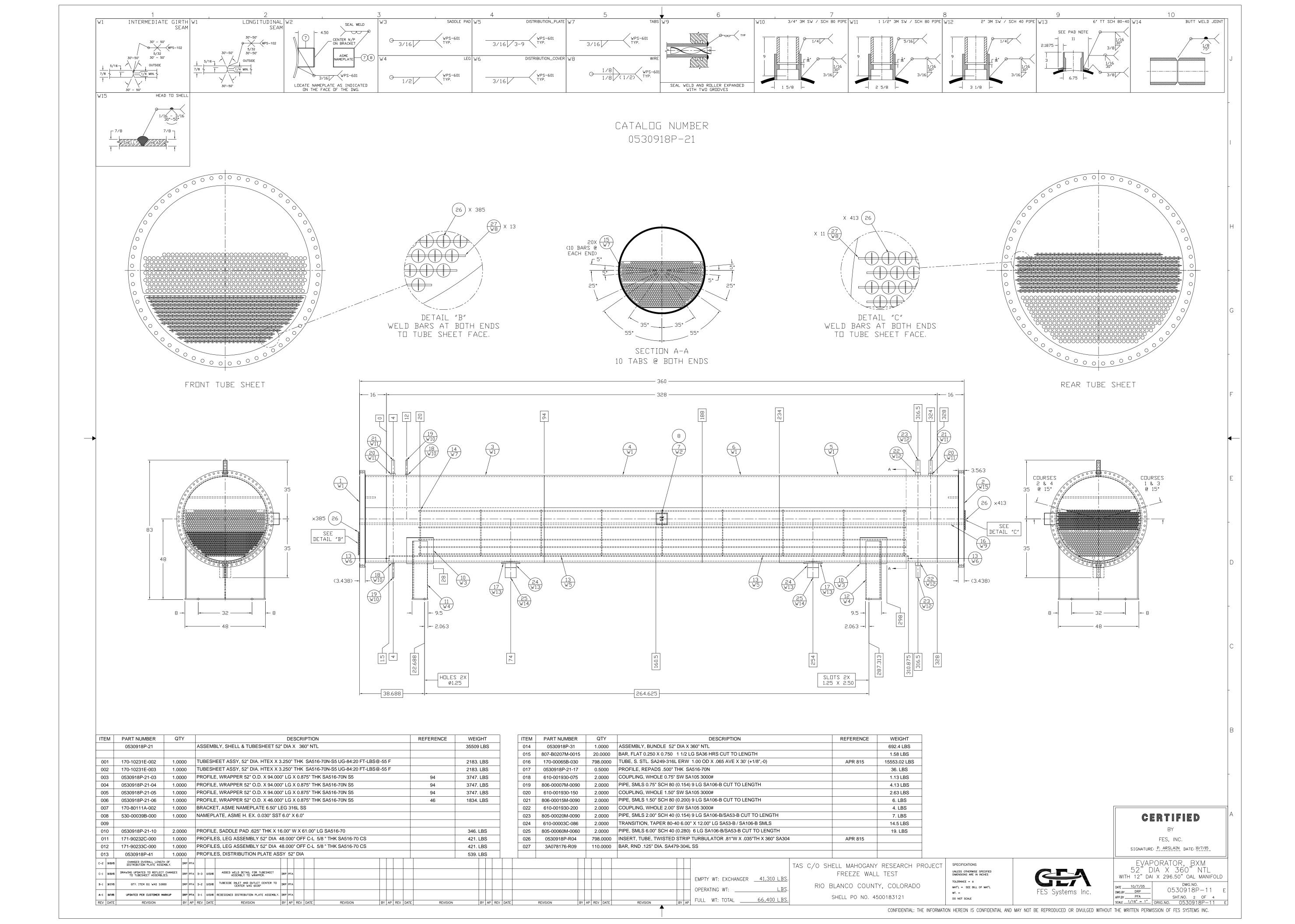
EMPTY WT: EXCHANGER 41,310 LBS.

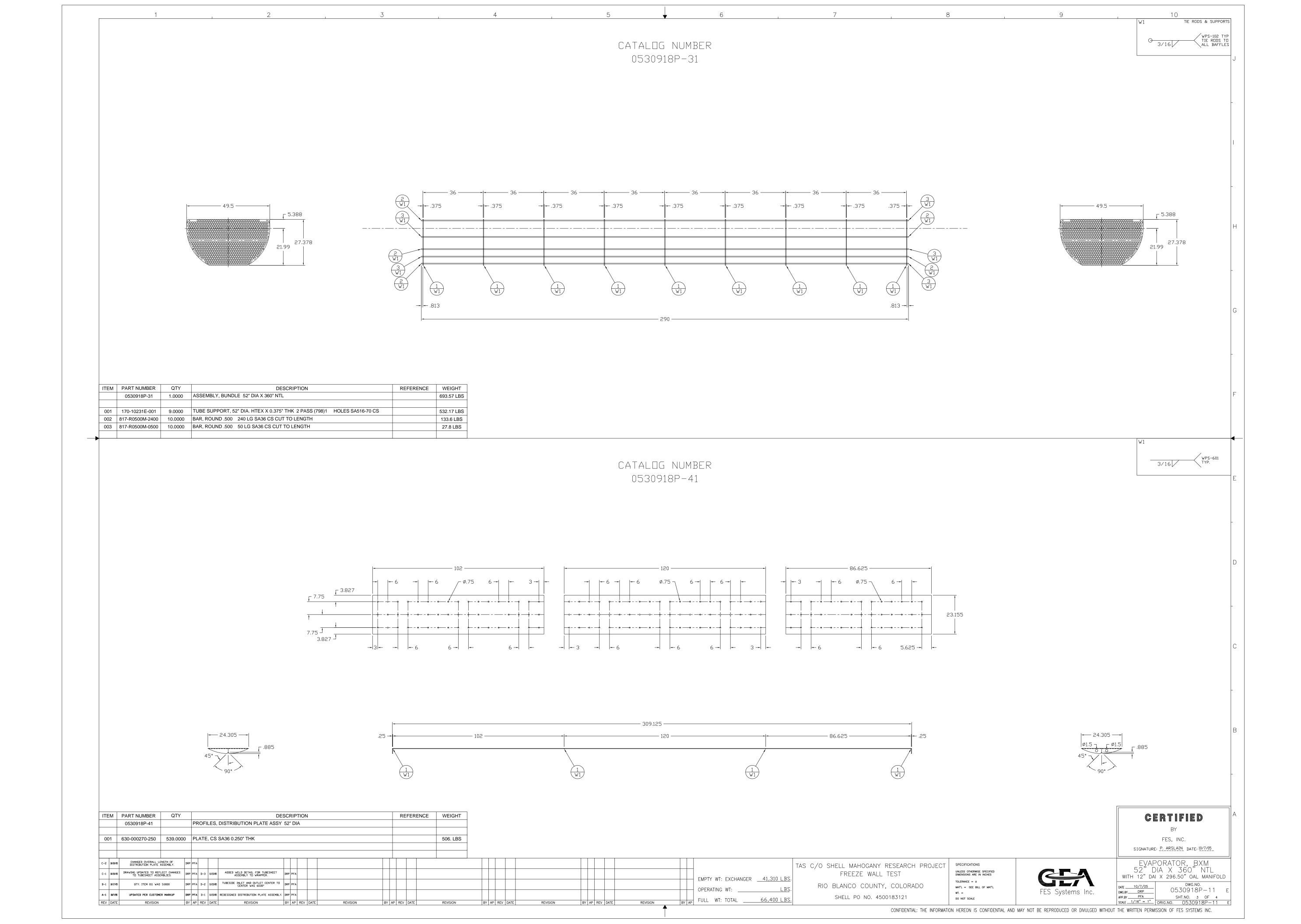
OPERATING WT:

BY AP FULL WT: TOTAL 66,400 LBS.

RIO BLANCO COUNTY, COLORADO SHELL PO NO. 4500183121

WT. = DO NOT SCALE

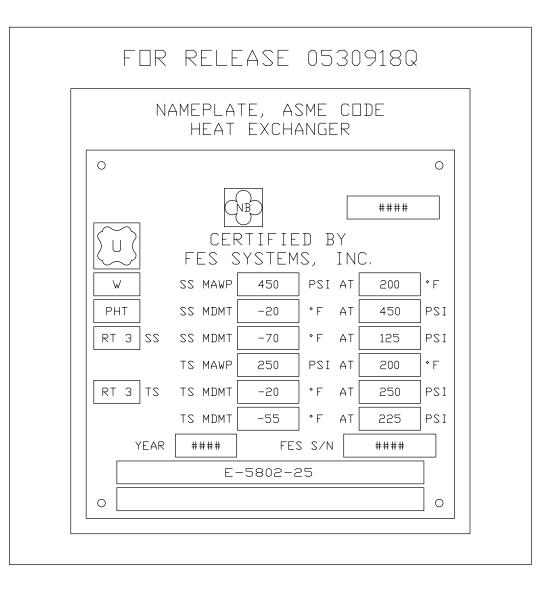


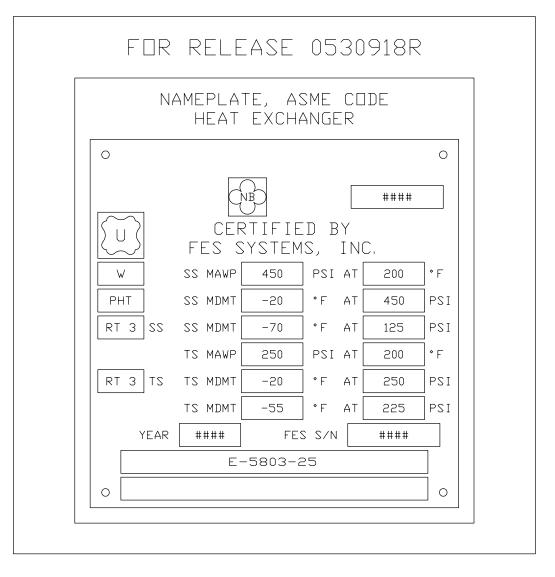


1. General 4. Assembly 1.1. STANDARDS 4.1. GENERAL 4.1.1. FLANGES - BOLT HOLES MUST STRADDLE CENTERLINES 1.1.1. ASME - THE DESIGN, MATERIALS, CONSTRUCTION AND 4.1.2. NOZZLES - PENETRATIONS SHALL BE SMOOTH AND FLUSH AS TESTING OF THE HEAT EXCHANGER CONFORMS TO THE 2004 ASME BOILER & PRESSURE VESSEL CODE, SECTION VIII, REQUIRED ON THE INSIDE OF THE VESSEL 4.1.3. NOZZLE REINFORCING PADS - 2" RADIUS CORNERS. DRILL DIVISION 1. THE HEAT EXCHANGER IS TO BE ASSIGNED A NATIONAL BOARD NUMBER, SHOP INSPECTED BY AN AND TAP WITH A 1/4" FPT HOLE AT THE LOWEST POINT. 4.1.4. SUPPORT PADS - 2" RADIUS CORNERS. DRILL AND TAP WITH A AUTHORIZED INSPECTOR, STAMPED WITH THE OFFICIAL "U" SYMBOL AND CERTIFIED ACCORDING TO PARAGRAPHS UG-115 1/4" FPT HOLE. TO UG-120. 4.1.5. NAMEPLATE BRACKET - STAINLESS STEEL. 4.2. TUBE INSTALLATION 1.1.2. TEMA - B 1.1.3. CANADIAN REGISTRATION - NOT REQUIRED 4.2.1. INSERT TUBES FLUSH WITH THE TUBESHEET FACES WITH A MAXIMUM OFFSET OF +1/32" ±1/32" EXTENSION AND SECURE. 1.1.4. CHINESE PRESSURE VESSEL CODE - NOT REQUIRED 1.2. DESIGN 4.2.2. SEAL WELD THE TUBES USING GTAW PROCESS (WITH THE USE OF FILLER METAL) USING ONE OR MORE PASSES 1.2.1. BOLTS MUST BE A 320 GRADE L7. 1.2.2. ALL CARBON STEEL PARTS MUST BE RATED FOR THE 4.2.3. PRESSURE TEST THE SEAL WELD JOINTS WITH 75 TO 125 PSIG TEMPERATURES AND PRESSURES AS SPECIFIED ON THE FES DRY NITROGEN USING A BUBBLE SOLUTION. HEAT EXCHANGER SPECIFICATION SHEETS. 4.2.4. MECHANICALLY EXPAND THE TUBES 1/8" FROM THE INNER 1.3. CONSTRUCTION FACE OF THE TUBESHEET FOR A LENGTH OF 2.0" WITH A 3 TO 1.3.1. MATERIALS 4% REDUCTION IN NOMINAL TUBE WALL THICKNESS COVERING 1.3.1.1. IMPACT TESTING IS EXEMPT PER UCS-66 (B) AND UHA-51 THE RECESSED GROOVES. 1.3.1.2. HEADS - ASME CODE CARBON STEEL 4.3. TUBESHEET 1.3.1.3. SHELL - ASME CODE CARBON STEEL 4.3.1. TUBE SHEET TO RING FLANGE CUMULATIVE BOW -1.3.1.4. TUBESHEET - ASME CODE CARBON STEEL PERIPHERAL GASKET CONTACT SURFACES SHALL HAVE A FLATNESS TOLERANCE OF +/- 0.031" MAX DEVIATION OVER A 1.3.1.5. TUBES - ASME CODE 316L STAINLESS STEEL 1.3.1.6. GASKETS - 304L STAINLESS STEEL SPIRAL WOUND 4.3.2. MACHINE PASS PARTITION LANE FLUSH WITH THE SURFACE 1.3.2. CIRCUMFERENTIAL MEASUREMENT - 1° = 0.4538" (52" OD) 1.3.3. CORROSION ALLOWANCE (CA) -ALL INTERNAL PRESSURE OF INNER EDGE OF GASKET DIAMETER (TOLERANCE OF RETAINING BOUNDARIES EXCEPT TUBES +0.000" / -0.016"). 4.3.3. MINIMUM TUBE SHEET THICKNESS AT GASKET SEATING 1.3.3.1. SHELL SIDE - 0.125" 1.3.3.2. TUBESIDE - 0.125" SURFACE 4.3.3.1. AT CENTER OF TUBESHEET - 3.25" (0.250" CA) 1.3.4. BACKING RINGS ARE ALLOWED 1.3.5. WIND OR SEISMIC LOADS - CONSIDERED 4.3.3.2. AT FLANGE EXTENSION - 1.302" (NO CA) 1.3.6. POST WELD HEAT TREATMENT (PWHT) - PERFORMED PER 4.4. HEAD ASSEMBLY UCS-56 ON TUBESHEET TO SHELL WELD JOINT @ 1100 F FOR A 4.4.1. STAMP NATIONAL BOARD NUMBERS ON ALL REMOVABLE THICKNESS OF 3.25 INCHES WITH A COOLING RATE EQUAL TO COVERS, CHANNELS AND BONNETS. 4.4.2. STAMP MATCHING MARKS TO ALIGN REMOVABLE PARTS. THE HEATING RATE. FURNACE TREATMENT: ALL SURFACES MUST BE EQUALLY EXPOSED TO CHAMBER ATMOSPHERE AND 4.4.3. PRIME CARBON STEEL TUBESHEET AND NOZZLE FLANGES FLOW TO ELIMINATE DISTORTION FROM THERMAL GRADIENTS. OUTSIDE THE GASKET SEATING SURFACE PRIOR TO BOLT UP. 1.4. INSPECTION/TESTING 4.4.4. HEAD INSTALLATION 1.4.1. CUSTOMER HOLD POINTS - (TO BE DETERMINED) 4.4.4.1. FASTENERS - SA 320-L7 1.4.2. RADIOGRAPHY (RT) - IN ACCORDANCE WITH PARAGRAPH 4.4.4.2. COAT FASTENERS WITH NEVER-SEEZ COMPOUND. 4.4.4.3. TACK GASKETS IN PLACE USING 3M 711 ADHESIVE 1.4.2.1. FRONT COVER ASSEMBLY (171-70191D-000) 4.4.4.4 EXTEND STUDS 3/8" MAX BEYOND ACCOMPANYING 1.4.2.1.1. HEAD - SPOT (1.00 EFFICIENCY) 1.4.2.2. SHELL ASSEMBLY (0530818P-21) 4.4.5. TESTING 1.4.2.2.1. SHELL - SPOT (0.85 LONG. AND 0.85 CIRCUM. 4.4.5.1. PRESSURE TEST EACH PAD WITH 25 PSIG AIR EFFICIENCY) 5. Hydrostatic Pressure Test 1.4.2.3. REAR COVER ASSEMBLY (171-80156-000) 5.1. SHELL SIDE 5.1.1. CLOSE ALL OPENINGS FOR TESTING. 1.4.2.3.1. HEAD - SPOT (1.00 EFFICIENCY) 1.4.2.4. ALL T-JOINTS MUST BE RADIOGRAPHED 5.1.2. BUBBLE TEST USING SOLUTIONS DESIGNED FOR BUBBLE 1.4.3. DYE PENETRANT TEST (DPT) - NOT REQUIRED 5.1.3. APPLY 585 PSIG BETWEEN 50 & 100°F PER UG-99 (b) PER FS-1.4.4. HELIUM LEAK TEST - NOT REQUIRED 1.4.5. POSITIVE MATERIAL IDENTIFICATION (PMI) - NOT REQUIRED USING APPROVED MINERAL OIL. DRAIN AND EVACUATE. 1.4.6. HARDNESS TEST - 2 LOCATIONS ON EACH LONG AND GIRTH 5.2. TUBE SIDE 5.2.1. CLOSE ALL OPENINGS FOR TESTING. SEAM. 5.2.2. BUBBLE TEST USING SOLUTIONS DESIGNED FOR BUBBLE 2.1. CLEAN AND GRIT BLAST ALL CARBON STEEL INTERNAL SURFACES 5.2.3. APPLY 325 PSIG BETWEEN 50 & 100°F PER UG-99 (b) PER FS-10 TO NEAR BARE WHITE METAL BEFORE FABRICATION OF PARTS, **EXCLUDING TUBING.** USING TESTING WATER. DRAIN AND EVACUATE. 3. Welding Requirements 6. Preparation for Shipment 6.1. PAINT SYSTEM - SYSTEM 2 (BLAST, PRIMER, ONE COAT AMERLOCK 3.1. ACCEPTABLE WELDING PROCESSES (1/2" MAX FILL PER PASS). 3.1.1. SMAW 6.2. NITROGEN CHARGE - 5 PSIG (SHELL SIDE AND TUBE SIDE). 3.1.2. GMAW 6.3. PACKAGE - MOUNT UNIT ON WOOD BLOCKS FOR DOMESTIC 3.1.4. GTAW TRANSPORT. 3.1.5. FCAW 7. Documentation 7.1. ASME U-1 FORM 3.2. USE WELDING PROCEDURES WPS 102 AND WPS 601 FOR ALL SHELL SIDE CARBON STEEL WELDING REQUIREMENTS, EXCLUDING 7.2. PRESSURE TEST REPORTS TUBESHEET TO SHELL WELD JOINT. 7.3. HYDROSTATIC PRESSURE TEST CERTIFICATE 3.3. USE LOW TEMPERATURE IMPACT TESTED WELDING PROCEDURES 7.4. HYDROSTATIC PRESSURE TEST RECORDER CHART FOR ALL TUBE SIDE AND TUBESHEET TO SHELL WELD JOINTS. 7.5. NAMEPLATE FACSIMILE 3.4. USE TGAW WELDING PROCEDURE WPS 1411 FOR SEAL WELDING 7.6. MATERIAL TEST CERTIFICATES - SHELL, ELLIPTICAL HEADS, GIRTH FLANGES AND TUBES, NOZZLE PIPES TUBES TO TUBESHEETS. 3.5. ALL WELDS MUST BE FULLY FUSED THROUGHOUT. 7.7. CERTIFICATES OF CONFORMANCE - NOZZLE FLANGES AND 3.6. SINGLE OR MULTIPLE PASSES ON ALL WELDS COUPLINGS 7.8. WELDING PROCEDURE SPECIFICATIONS (WPS) 3.7. PEENING IS NOT ALLOWED. 3.8. DO NOT WELD ATTACHMENTS ACROSS WELD SEAMS. 7.9. PROCEDURE QUALIFICATION RECORDS (PQR) 3.9. CONTINUOUS SEAL WELD STRUCTURAL SUPPORTS UNLESS 7.10. X-RAY READER SHEETS 7.11. POST WELD HEAT TREATMENT RECORDS OTHERWISE NOTED. 3.10. HOT FORMING IS NOT ALLOWED EXCEPT FOR DISHED HEADS. 7.12. VESSEL AS BUILT DRAWING 7.13. ASME DESIGN CALCULATIONS

NAMEPLATE, ASME CODE HEAT EXCHANGER CERTIFIED BY FES SYSTEMS, INC. W SS MAWP | 450 | PSI AT | 200 | ° 1 PHT SS MDMT | -20 | °F AT | 450 PSI RT 3 SS SS MDMT -70 | °F AT | 125 TS MAWP 250 PSI AT 200 -20 | °F AT | 250 | PSI RT 3 TS TS MDMT TS MDMT | -55 | °F AT | 225 | PSI YEAR | #### FES S/N #### E-5801-25

FOR RELEASE 0530918P





 $TOLERANCE = \pm$

WT. =

DO NOT SCALE

MAT'L = SEE BILL OF MAT'L

CERTIFIED FES, INC. SIGNATURE: P. ARSLAIN DATE: 10/7/05 EYAPORATOR, BXM 'DIA X 360"NTL WITH 12" DAI X 296.50" OAL MANIFOLD DATE _____10/7/05___ 0530918P-11 DWG.BY_____DRP

C-2 10/20/05 CHANGED OVERALL LENGTH OF DISTRIBUTION PLATE ASSEMBLY. EMPTY WT: EXCHANGER <u>41,310 LBS</u> DRP PFA D-2 11/23/15 TUBESIDE INLET AND DUTLET CENTER TO DRP PFA QTY. ITEM 011 WAS 3.0000 OPERATING WT: DRP PFA D-1 11/23/15 REDESIGNED DISTRIBUTION PLATE ASSEMBLY. DRP PFA A-1 10/7/05 UPDATED PER CUSTOMER MARKUP BY AP FULL WT: TOTAL 66,400 LBS. BY AP REV DATE BY AP REV DATE REVISION REVISION

TAS C/O SHELL MAHOGANY RESEARCH PROJECT SPECIFICATIONS UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES FREEZE WALL TEST

RIO BLANCO COUNTY, COLORADO

SHELL PO NO. 4500183121

FES Systems Inc.

SHT.NO. 4 OF 4 APP.BY PFA $SCALE = \frac{1/16" = 1"}{ORIG.NO.} O530918P - 11$

(Mat'l Spec. No., Grade or Type)

(O.D., in.)

(Nom. thk., in. or gauge)

(Number)

[Type (Straight or U)]

Items 14-18 incl. to be completed for inner chambers of jacketed vessels or channels of heat exchangers. 14. Shell (a) No. of course(s)

(b) Overall length (ft & in.):

			·										
	Course	(s)	Material	Thic	kness	•	Long. Joint (Cat. A)		Circu	m. Joint (Cat. A, B, &	C)	Heat Tr	eatment
No.	Diameter, in.	Length (ft & in.)	Spec./Grade or Type	Nom,	Corr.	Туре	Full, Spot, None	Eff.	Туре	Full, Spot, None	Eff.	Temp.	Time
								1		***************************************	f		
											<u> </u>		

15. Heads:

(a) SA 516-70

(b) SA 516-70

(Mat'l Spec. No., Grade or Type) (H.T. - Time & Temp.) (Mat'l Spec. No., Grade or Type) (H.T. - Time & Temp.) Location (Top, Thickness Radins Side to Pressure Elliptical Conical Category A Hemispherical Bottom, Ends) Ratio Apex Angle Padine Diameter Min Corr. Knuckle Crown Convex Concave Full, Spot, None 625" End ELLIP (a) 125" 2-1 _ None 100 (b) End .625" .125" ELLIP 2-1 100

If removable, bolts used (describe other fastening)

Bolts, SA 320-L7, 1.25", (128); Nuts, SA 194-7, 1.25", (256)

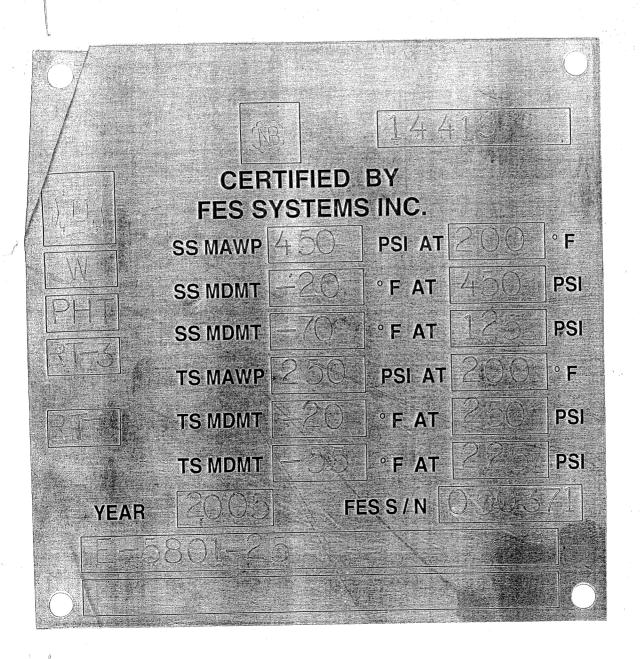
(Mat'l Spec. No., Grade, size, No.)

18. Hydro, pneu, or comb. Test press. 19. Nozzles, Inspection, and safety valve openings: Purpose Purpose Nozzles, Inspection, and safety valve openings: One Continue Nozzles, Inspection Nozzles,	MAWP:	250	-	manual for its control and its	at max, temp	200 (internal)			Min desi	gn metal temp	-20	°F at _	200 psi.
8. Hydro, pnou, or comb. Test press. 9. Nozzles, inspection, and safety valve openings: Manacul Nozzles, inspection, and safety valve openings: Manacul Nozzles, inspection, and safety valve openings: Manacul Nozzles, inspection, and safety valve openings: Manacul Nozzles, inspection, and safety valve openings: Manacul Nozzles, inspection, and safety valve openings: Manacul Nozzles, inspection, and safety valve openings: Manacul Nozzles, inspection, and safety valve openings: Nozzles, inspection, and safety va		(internal)	(exte	•	S 66(b) and		, (-	temperat	ure of	elle.		°F.
9. Nozzles, Inspection, and safety valve openings: Description Desc	-	Walter	***************************************		and the second second	(Indicate y	es or no and	accommodal and a second		444444444444444444444444444444444444444			
Parpose Parp	Hydro., pneu.,	, or comb	. Test pre	ss.	32	5	Pro	of test			100		
TS CONNECTION 2 1.75* . 5A 105 . 66004 1.125* . UW16.1c SS CONNECTION 2 1.75* . 5A 105 . 66004 1.125* . UW16.1c SS CONNECTION 2 1.75* . 5A 105 . 8A 35-8 . 120-5TD .125* . UW16.1c SS CONNECTION 2 1.75* . 5A 105 . 30000* . 125* . UW16.1c SS CONNECTION 2 1.500* . 5A 105-8 . SCH 80-40 . 125* . UW16.1c SS CONNECTION 2 1.500* . 5A 105-8 . SCH 80-40 . 125* . UW16.1c SS CONNECTION 2 1.500* . 5A 105-8 . SCH 80-40 . 125* . UW16.1c SS CONNECTION 2 1.500* . 5A 105-8 . SCH 80-40 . 125* . UW16.1c SS CONNECTION 2 1.70* . 5A 105-8 . SCH 80-40 . 125* . UW16.1c SS CONNECTION 2 1.70* . 5A 105-8 . SCH 80-40 . 125* . UW16.1c SS CONNECTION 2 1.70* . SA 105-8 . SCH 80-40 . 125* . UW16.1c SS CONNECTION 2 1.70* . SA 105-8 . SCH 80-40 . 125* . UW16.1c SS CONNECTION 2 1.70* . SA 105-8 . SCH 80-40 . 125* . SA 516-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-8 . SCH 80-40 . 125* . SA 516-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-8 . SCH 80-40 . 125* . SA 516-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-8 . SCH 80-40 . 125* . SA 516-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-8 . SCH 80-40 . 125* . SA 516-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-8 . SCH 80-40 . 125* . SA 516-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-8 . SCH 80-40 . 125* . SA 516-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-8 . SCH 80-40 . 125* . SA 516-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-70 . SCH 80-40 . 125* . SA 516-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-70 . SA 510-70 . SA 510-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-70 . SA 510-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-70 . SA 510-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-70 . SA 510-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-70 . SA 510-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-70 . SA 510-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-70 . UW16.1c SS CONNECTION 2 1.70* . SA 510-	Nozzles, Inspe	ection, an	id safety v	valve openin	gs:				idenskala oznaka doko oktober konski d		-		7
TS CONSECTION 2 15° 5A 105 6600 # 125° UVIG 12 13° SA 35-8 120-5TD 125° UVIG 12 13° SA 316.5 SCONNECTION 2 6° 5A 31-8 SCONNECTION 2 1500° SA 105 SA 30-8 125° SA 316-70 UVIG 12 13° SA 316-70 UVI		etc)	No.		Flange Type	ļ		·	T			tached Flange	Location (Insp. Open
TS CONNECTION 2 12" SA 33-B 128-STD 1325" - UW16.1e SS CONNECTION 2 73" SA 105 30069 125" SA 105 UW16.1e SS CONNECTION 2 1500" SA 105 30069 125" SA 105 UW16.1e SS CONNECTION 2 1500" SA 105 30069 125" SA 105 UW16.1e SS CONNECTION 2 1500" SA 105 30069 125" SA 105 UW16.1e SS CONNECTION 2 2" SA 105 50069 125" UW16.1e SS CONNECTION 2 2" SA 105 50069 125" SA 105 UW16.1e SS CONNECTION 2 2" SA 105 50069 125" SA 105 UW16.1e SS CONNECTION 2 2" SA 105 50069 125" SA 105 UW16.1e SS CONNECTION 2 2" SA 105 50069 125" SA 105 50069 125 50069			-, -					 	1	-		riange -	-
SS CONNECTION 2 6° . \$A 10.8 . \$30000 .125" \$A 516-70 .UW16.1e SS CONNECTION 2 6° . \$A 53-8 . \$CH 80-40 .125" \$A 516-70 .UW16.1e SS CONNECTION 2 2 1.500" \$A 5105 . 3000 \$B .125" \$A 516-70 .UW16.1e SS CONNECTION 2 2" \$A 5105 . 3000 \$B .125" \$A 516-70 .UW16.1e SS CONNECTION 2 2" \$A 5105 . 3000 \$B .125" \$A 516-70 .UW16.1e SS CONNECTION 2 2" \$A 5105 . 3000 \$B .125" \$A 516-70 .UW16.1e SS CONNECTION 2 2" \$A 5105 . 3000 \$B .125" \$A 516-70 .UW16.1e SS CONNECTION 2 2" \$A 516-70 .UW16.1e SS CONNECTION 2 2" \$A 516-70 .UW16.1e SS CONNECTION 2 2" \$A 516-70 .UW16.1e SS CONNECTION 2 2 Legs 0 O Others 9 Supports Attached Well Administrators's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the fireport: (List the name of part, item number, mfg's. name and identifying number) 12. Remarks: (This vessel not derisped for lethal or muclear service.) Exempt from impact testing per UCS-66(b) and UHA-51 Inspection opening exempt per UC3-66(a) 2 WN Ring flanges, Spot x-ray to bead, SA 350 LF2, 52" Dia, x 3.50" Thk. — Shell Side Concident Tube side Coincident: -55F @ 225 psig CERTIFICATE OF SHOP COMPLIANCE We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship conform to the ASME Code for Pressure Vessels, Section VIII, Division 1. Tu'' Certificate of Authorization Number: 12.647 Expires \$51472008 Tube side Coincident: -55F @ 225 psig CERTIFICATE OF SHOP INSPECTION It, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the Soft PA and employed by HSBCT of FIELD ASSEMBLY INSPECTION It, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the Soft PA and employed by HSBCT of FIELD ASSEMBLY INSPECTION It, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the Soft PA and Employed by HSBCT o							*		 	***	ļ		
SS CONNECTION 2 1.500" SA 13-B SCH 80-40 1.25" SA 516-70 UW16.1e SS CONNECTION 2 1.500" SA 105 3000 # 1.32" UW16.1e SS CONNECTION 2 1.500" SA 105 3000 # 1.32" UW16.1e RISERS 4 8" SA 516-70 UW16.1e RISERS 4 8" SA 53-B SCH 80 1.22" SA 516-70 UW16.1e RISERS 4 8" SA 53-B SCH 80 1.22" SA 516-70 UW16.1e RISERS 4 8" SA 53-B SCH 80 1.22" SA 516-70 UW16.1e RISERS 4 8" SA 53-B SCH 80 1.22" SA 516-70 UW16.1e RISERS 4 8" SA 53-B SCH 80 1.22" SA 516-70 UW16.1e RISERS 4 8" SA 516-70 UW16.1e RISERS 5 SCH 80 1.22" SA 516-70 UW16.1e RISERS 5 SCH 80 1.22" SA 516-70 UW16.1e RISERS 6 RISERS 6 SCH 80 1.22" SA 516-70 UW16.1e RISERS 6													
SS CONNECTION 2 1.500° SA 105 3000 # 115° UW16.14 SS CONNECTION 2 2° SA 105 3000 # 125° UW16.14 SS CONNECTION 2 2° SA 105 3000 # 125° UW16.16 RISERS 4 8° SA 53-B SCH 80 125° SA 516-70 UW16.16 8. Supports: Skirl No Lugs 2 Legs 0 Others 9 Supports Attached Wel (Yes or No) (No) (No) Others 9 Supports Attached Wel (Yes or No) (No) (No) Others 9 Supports Attached Wel (Pescribe) 1. Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the foreport: (List the name of part, item number, mfg's, name and identifying number) 2. Remarks: (This vessel not designed for lethal or nuclear service.) Exempt from impact testing per UCS-66(b) and UHA-51 Inspection opening exempt per UG-46(a) 2 WN Ring flanges, Spot x-ray to head, SA 350 LF2, 52° Dia, x 3.50° Tbk. – Shell Side Concident Tube side Coincident: -55F (@ 225 psig) CERTIFICATE OF SHOP COMPLIANCE We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship conform to the ASME Code for Pressure Vessels, Section VIII, Division 1. U'' Certificate of Authorization Number: 12,647 Expires S14/2008 The Undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the Soft PA and employed by The National Board of Boiler and Pressure Vessel Inspectors and/or the Soft PA and employed by Holding a valid commission issued by The National Board of Boiler and Pressure Vessel in accordance with ASME VIII, Division 1. By signing this certificate neither the Inspector nor his imployer makes any warranty, expressed or implied, cone vessel described in this Manufacturer's Data Report on CERTIFICATE OF FIELD ASSEMBLY COMPILIANCE We certify that the statements on this report are correct and that the field assembly construction of all parts of this vessel conforms Requirements of ASME Code, Section VIII, Division 1. U Certificate of Authorization No. Expires CERTIFICATE OF FIELD ASSEMBLY INSPEC		***************************************						-		SA 516-70	ļ		
SECONNECTION 2 2 2										5/10/10			-
O. Supports: Skirt No Lugs 2 Legs 0 Others 9 Supports Attached Well (Yes or No) (Wels) (Yes or No) (Wels) (Wels) (Describe) 1. Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the for report: (List the name of part, item number, mfg's. name and identifying number) 2. Remarks: (This vessel not designed for lethal or nuclear service.) Exempt from impact testing per UCS-66(b) and UHA-51 Inspection opening exempt per UG-46(a) 2 WN Ring flanges, Spot x-ray to head., SA 350 LF2, 52° Dia., x 3.50° Thk. – Shell Side Concident Tube side Coincident: -55F@ 225 psig CERTIFICATE OF SHOP COMPLIANCE We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship conform to the ASME Code for Pressure Vessels, Section VIII, Division 1. U'C Certificate of Authorization Number: 12,647 Expires 5/14/2008 Oute 12-16-2005 Name FES Systems Inc. (Manufacturer) (Representation of the State that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel maccordance with ASME VIII, Division 1. By signing this certificate neither the Inspector nor his mployer makes any warranty, expressed or implied, concessed described in this Manufacturer's Data Report on 12-16-209 Signed Assertificate neither the Inspector nor his mployer shall be liable in any mapersonal injury or property damage or a loss of any kind arising known connected with this inspection. Date 12-16-200 Signed Carter of the Certificate of Authorization No. Expires Name Name Name Name Name Name Name Name									<u> </u>				
0. Supports: Skirt No Lugs 2 Legs 0 Others 9 Supports Attached Wel (Yes or No) (Yes or No) (No.) (No.) (Obscribe) 1. Manufacturer's Parial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the fereport: (List the name of part, item number, mfg's. name and identifying number) 2. Remarks: (This vessel not designed for lethal or nuclear service.) Exempt from impact testing per UCS-66(b) and UHA-51 inspection opening exempt per UG-46(a) 2 WN Ring flanges, Spotx-ray to head, SA 350 LF2, 52" Dia, x 3.50" Thk. – Shell Side Concident Tube side Coincident: -55F @ 225 psig CERTIFICATE OF SHOP COMPLIANCE We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship conform to the ASME Code for Pressure Vessels, Section VIII, Division 1. 10. "Certificate of Authorization Number: 12,647 Expires 5/14/2008 11. Pure Certificate of Authorization Number: 12,647 Expires 5/14/2008 12. CERTIFICATE OF SHOP INSPECTION 13. the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the Shawe inspected the pressure vessel described in this Manufacturer's Data Report on 12-16-12-05 14. And and employed by He Manufacturer has constructed this pressure vessel in accordance with ASME VIII, Division 1. By signing this certificate neither the Inspector nor his fmployer makes any warranty, expressed or implied, cone vessel described in this Manufacturer's Data Report on his inspection. Date 12-16-12-05 13. Authorized Impector) 14. Constituted this inspector on his employer shall be liable in any mapersonal injury or property damage or a loss of any kind antispit good or connected with this inspection. On his employer shall be liable in any mapersonal injury or property damage or a loss of any kind antispit for or connected with this inspection. 15. CERTIFICATE OF FIELD ASSEMBLY INSPECTION 16. The undersigned, holding a valid commission issued by The Nati					-		ļ			\$4.516.70			
(Nes or No.) (Nes or No.) (No.) (No.) (No.) (No.) (Describe) 1. Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the for report: (List the name of part, item number, mfg's. name and identifying number) 2. Remarks: (This vessel not designed for lethal or nuclear service.) Exempt from impact testing per UCS-66(b) and UHA-51 Inspection opening exempt per UG-46(a) 2 WN Ring flanges, Spotx-ray to bead., SA 350 LF2, 52" Dia., x 3.50" Thk. – Shell Side Concident Tube side Coincident: -35F (2) 225 psig CERTIFICATE OF SHOP COMPLIANCE We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship conform to the ASME Code for Pressure Vessels, Section VIII, Division 1. U" Certificate of Authorization Number: 12,647	KISEKS .		4	8	-	5A 53-B	*	2CH 80	.143	5A 316-70	UW10.10	*	-
(Yes or No) (Pea) (No) (No) (Describe) 1. Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the for report: (List the name of part, item number, mfg's. name and identifying number) 2. Remarks: (This vessel not designed for lethal or nuclear service.) Exempt from impact testing per UCS-66(b) and UHA-51 Inspection opening exempt per UG-46(a) 2 WN Ring flanges, Spotx-ray to head., SA 350 LF2, 52" Dia., x 3.50" Thk. – Shell Side Concident Tube side Coincident: -55F (2) 225 psig CERTIFICATE OF SHOP COMPLIANCE Ve certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship on form to the ASME Code for Pressure Vessels, Section VIII, Division 1. U" Certificate of Authorization Number: 12,647 Expires S14/2008 The United Association of Pressure Vessels, Section VIII, Division 1. U" Certificate of Authorization Number: 12,647 Expires S14/2008 The United Association Num													
(Yes or No) (Ro.) (No) (Describe) 1. Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the for report: (List the name of part, item number, mfg's. name and identifying number) 2. Remarks: (This vessel not designed for lethal or nuclear service.) Exempt from impact testing per UCS-66(b) and UHA-51 Inspection opening exempt per UG-46(a) 2 WN Ring flanges, Spot x-ray to head., SA 350 LF2, 52" Dia., x 3.50" Thk. – Shell Side Concident Tube side Coincident: -55F @ 225 psig CERTIFICATE OF SHOP COMPLIANCE We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship on form to the ASME Code for Pressure Vessels, Section VIII, Division 1. U" Certificate of Authorization Number: 12,647 Expires 5/14/2008 Oute 12-16-2005 Name FES Systems Inc. Signed Be Machadam Systems Inc. (Manufacturer) CERTIFICATE OF SHOP INSPECTION 1. the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the South of PA and employed by Manufacturer has constructed this pressure vessel in accordance with ASME VIII, Division 1. By signing this certificate neither the Inspector nor his famployer makes any warranty, expressed or implied, cone vessel described in this Manufacturer's Data Report on the Signed or connected with this inspection. Date 12-16-200 Signed Cartificate neither the Inspector on Prise of the Test Prise of Prise Data Report on Signed (Represents Certificate neither the Inspector) CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE We certify that the statements on this report are correct and that the field assembly construction of all parts of this vessel conforms Requirements of ASME Code, Section VIII, Division 1. U Certificate of Authorization No. Expires CERTIFICATE OF FIELD ASSEMBLY INSPECTION I., the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the Sou	Supports:	Skirt	No	Luos	2	Leos	0	Others	9 Supr	orts Att	ached We	lded to O	D. of vess
Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the for report: (List the name of part, item number, mfg's. name and identifying number) 2. Remarks: This vessel not designed for lethal or nuclear service.) Exempt from impact testing per UCS-66(b) and UHA-51 Inspection opening exempt per UG-46(a) 2 WN Ring flanges, Spot x-ray to bead, SA 350 LF2, 52" Dia, x 3.50" Thk. – Shell Side Concident Tube side Coincident: -55F @ 225 psig CERTIFICATE OF SHOP COMPLIANCE Ve certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship on form to the ASME Code for Pressure Vessels, Section VIII, Division 1. U" Certificate of Authorization Number: 12,647 Expires 5/14/2008 Signed FES Systems Inc. Signed General Reports of Hamiltonian Signed Fes Systems Inc. (Manufacturer) CERTIFICATE OF SHOP INSPECTION the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the State that, to the best of my knowledge and belief, the Manufacturer's Data Report on The Inspector or his employer shall be liable in any materional injury or property damage or a loss of any kind anysing story or connected with this inspection. Ve certify that the statements on this report are correct and that the field assembly construction of all parts of this vessel conforms Requirements of ASME Code, Section VIII, Division 1. U Certificate of Authorization No. Expires CERTIFICATE OF FIELD ASSEMBLY INSPECTION (Representate Of the Undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the State Proceedings of the State Procedure of the State Proc	. Suppores.	OKH .			***************************************	D0B3		041015				(Where a	***************************************
CERTIFICATE OF SHOP COMPLIANCE /e certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship on form to the ASME Code for Pressure Vessels, Section VIII, Division 1. U' Certificate of Authorization Number: 12,647 Expires 5/14/2008 Pate 12-16-2005 Name FES Systems Inc. Signed Representation of the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the S of PA and employed by HSBCT of PA and employed by HSBCT of PA and employed by HSBCT of PA and employed gear and belief, the Manufacturer's Data Report on 12-16-2005 Late that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME ////////////////////////////////////		~~~~~~~			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~								
CERTIFICATE OF SHOP COMPLIANCE We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship conform to the ASME Code for Pressure Vessels, Section VIII, Division 1. "U" Certificate of Authorization Number: 12,647 Expires 5/14/2008 Date 12-16-2005 Name FES Systems Inc. Signed Representation (Manufacturer) CERTIFICATE OF SHOP INSPECTION It, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the Soft PA and employed by HSBCT of PSBCT of P		~~~~~~~			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							t .70F @	125 neia
CERTIFICATE OF SHOP COMPLIANCE We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship conform to the ASME Code for Pressure Vessels, Section VIII, Division 1. 12,647 Expires 5/14/2008 Date 12-16-2005 Name FES Systems Inc. Signed General Signed Certificate of Authorization Number: 12,647 Expires 5/14/2008 Date 12-16-2005 Name FES Systems Inc. Signed General Signed General Pressure Vessel Inspectors and/or the Signed General Pressure Vessel or implied, conceives and General Pressure Vessel or implied, conceives and General Pressure Vessel or implied, conceives and General Pressure Vessel Inspectors General Pressure Vessel Inspectors Accepted Treatment of Certificate Of Field Assembly Compliance Certificate Of Field Assembly Compliance (Representation Pressure Vessel Inspectors and/or the Signed General Pressure Vessel Inspectors and/or	Barrier Strategies Control of the Co		***************************************		rem <u>e numeus,</u>	Spot A 14 y	3 110000, 511	, , , , , , , , , , , , , , , , , , ,	141, 12 010 0				
(Manufacturer) CERTIFICATE OF SHOP INSPECTION The undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the Secondary in the state that, to the best of my knowledge and belief, the Manufacturer's Data Report on the Secondary in th								Sig	ned .	B.m.	Lim	non	
the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the Soft PA and employed by HSBCT of PA and employed by MSC and the the Inspector nor his employer rakes any warranty, expressed or implied, conceversed described in this Manufacturer's' Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any mapersonal injury or property damage or a loss of any kind arising from or connected with this inspection. Date 12-16-20-Signed And Andrew Papersonal injury or property damage or a loss of any kind arising from or connected with this inspection. Certificate of Field Assembly Compliance We certify that the statements on this report are correct and that the field assembly construction of all parts of this vessel conforms Requirements of ASME Code, Section VIII, Division 1. U Certificate of Authorization No. Expires Date Name Signed (Assembler) (Representation of Boiler and Pressure Vessel Inspectors and/or the State that parts referred to as data items in this Manufacturer's Data Report with the definition property and to the best of my knowledge and belief, the Manufacturer has constructed and assembled this pressure vessel with the ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of											(Representa	ative)	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
and employed by HSBCT of HSBCT		* * * * *	** *	* .*						and Impropriate	ond/ortho	Ctata am Da	ovinos
nave inspected the pressure vessel described in this Manufacturer's Data Report on state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, conceversel described in this Manufacturer's' Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any mappersonal injury or property damage or a loss of any kind arising from or connected with this inspection. Date 12-16-200 Signed County Commissions Commission in this report are correct and that the field assembly construction of all parts of this vessel conforms Requirements of ASME Code, Section VIII, Division 1. U Certificate of Authorization No. Expires Date Name Signed (Assembler) CERTIFICATE OF FIELD ASSEMBLY INSPECTION It, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the Commission	-					ne Nationai			ssure ves	_		Hartford, (
tate that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concessel described in this Manufacturer's' Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any material injury or property damage or a loss of any kind arising from or connected with this inspection. Commissions Commi									. 16			iaiuoiu, (
VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concressed described in this Manufacturer's' Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any materisonal injury or property damage or a loss of any kind arising from or connected with this inspection. Commissions Commission of all parts of this vessel conforms Requirements of ASME Code, Section VIII, Division 1. U Certificate of Authorization No. Expires Certificate of Authorization No. Expires Certificate of Field Assembly Inspection (Representation of and employed by the National Board of Boiler and Pressure Vessel Inspectors and/or the Stand state that parts referred to as data items And state that parts referred to as data items And state that parts referred to as data items In the Manufacturer has constructed and assembled this pressure vessel with the ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of												70-1- 0	, a
ressel described in this Manufacturer's' Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any mastersonal injury or property damage or a loss of any kind arising from or connected with this inspection. Commissions Commission of Interpretation of all parts of this vessel conforms Commission of all parts of t	ate that, to the	best of m	iy knowle	edge and beli	er, the Man	nacturer na	s construct	ed this pressui	re vessei	in accordance	Will ASIVII	cerning the	CUION Pareccure
Date 12-16-200 Signed (Authorized Inspector) Commissions (Nat'l Board incl. endorsements, State, Proceedings of this vessel conforms (Nat'l Board incl. endorsements, State, Proceedings of ASME Code, Section VIII, Division 1. U Certificate of Authorization No. Expires CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE We certify that the statements on this report are correct and that the field assembly construction of all parts of this vessel conforms (Requirements of ASME Code, Section VIII, Division 1. U Certificate of Authorization No. Expires Date Name Signed (Assembler) (Representation of Assembly Inspection) The undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the state of the state	III, Division I	. By Sign Lin thic M	ing unis co Aspufacto	eruncate nei rer's' Data I	uici uic iiisp Seport Furth	ermore rei	ther the In	spector nor his	arranicy, c employ	er shall he lial	ale in anv m	anner for :	anv
CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE Name (Assembler) CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE Name (Assembler) (Represented to an demployed by of	essei described ersonal iniury i	or proper	tv damaoi	e or a loss of	any kind ar	ising from o	or connecte	d with this ins	pection.	or Shall be had	ore in any in		
(Authorized Inspector) CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE We certify that the statements on this report are correct and that the field assembly construction of all parts of this vessel conforms Requirements of ASME Code, Section VIII, Division 1. U Certificate of Authorization No. Expires Date Name (Assembler) CERTIFICATE OF FIELD ASSEMBLY INSPECTION And employed by of and employed by of have compared the statements in this Manufacturer's Data Report with the decay and state that parts referred to as data items nspected by me and to the best of my knowledge and belief, the Manufacturer has constructed and assembled this pressure vessel with the ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of					7 X 1	Til (Commissio	ns VI3	10 80	VA PA	0254	/	
CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE We certify that the statements on this report are correct and that the field assembly construction of all parts of this vessel conforms Requirements of ASME Code, Section VIII, Division 1. U Certificate of Authorization No. Expires Date Name (Assembler) CERTIFICATE OF FIELD ASSEMBLY INSPECTION The undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the Stand state that parts referred to as data items The undersigned of the Statements in this Manufacturer's Data Report with the designed state that parts referred to as data items The undersigned of the Statements in this Manufacturer's Data Report with the designed state that parts referred to as data items The undersigned of the Statements in this Manufacturer's Data Report with the designed state that parts referred to as data items The undersigned of the Statements in this Manufacturer's Data Report with the designed state that parts referred to as data items The undersigned of the Statements in this Manufacturer's Data Report with the designed state that parts referred to as data items The undersigned of the Statements in this Manufacturer's Data Report with the designed state that parts referred to as data items The undersigned of t	/atc <u>C L - (G</u>	, –, –	_ organd	(At			001111111111111111111111111111111111111						No.)
Requirements of ASME Code, Section VIII, Division 1. U Certificate of Authorization No. Date Name (Assembler) CERTIFICATE OF FIELD ASSEMBLY INSPECTION I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the Solid and employed by of nhave compared the statements in this Manufacturer's Data Report with the designed state that parts referred to as data items nspected by me and to the best of my knowledge and belief, the Manufacturer has constructed and assembled this pressure vessel with the ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of							ELD ASS	EMBLY CON	IPLIAN	CE		***************************************	
Date Name (Assembler) (Represented to as data items (Assembler), not included in the certificate of shop in the ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of	Ve certify that	the staten	nents on t	his report ar	e correct and	I that the fie	ld assembl	y construction	of all pa	rts of this ves	sel conform	s with the	
(Represented CERTIFICATE OF FIELD ASSEMBLY INSPECTION If the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the State of and employed by and employed by have compared the statements in this Manufacturer's Data Report with the designed state that parts referred to as data items and state that parts referred to as data items and to the best of my knowledge and belief, the Manufacturer has constructed and assembled this pressure vessel with the ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of	Lequirements o	of ASME	Code, Sec	ction VIII, D	ivision 1. U	Certificate	of Authori	zation No.	***************************************		Expires _		
CERTIFICATE OF FIELD ASSEMBLY INSPECTION , the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the Solid and employed by of	Date		Name			•		Sig	ned				
the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the sof and employed by , have compared the statements in this Manufacturer's Data Report with the design and state that parts referred to as data items , not included in the certificate of shop in inspected by me and to the best of my knowledge and belief, the Manufacturer has constructed and assembled this pressure vessel with the ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of	49.9				(Assembler)					(Represent	tative)	
of and employed by of , have compared the statements in this Manufacturer's Data Report with the desard state that parts referred to as data items , not included in the certificate of shop in inspected by me and to the best of my knowledge and belief, the Manufacturer has constructed and assembled this pressure vessel with the ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of													
of, have compared the statements in this Manufacturer's Data Report with the desard state that parts referred to as data items, not included in the certificate of shop in inspected by me and to the best of my knowledge and belief, the Manufacturer has constructed and assembled this pressure vessel with the ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of	_	ied, holdii	ng a valid			he National	l Board of	Boiler and Pre	ssure Ve	ssel Inspector	s and/or the	State or P	rovince.
and state that parts referred to as data items , not included in the certificate of shop in inspected by me and to the best of my knowledge and belief, the Manufacturer has constructed and assembled this pressure vessel with the ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of				and employ	yeu by	omnared th	e statemen	ts in this Man	ufacturer	's Data Repor	t with the de	escribed p	essure ve
inspected by me and to the best of my knowledge and belief, the Manufacturer has constructed and assembled this pressure vessel with the ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of		arte rafa	ed to on d		, nave (ompared til	o statement	not	included	in the certific	ate of shore	inspection	have hee
with the ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of	uid state that pa	aris referr	tu to as c	iata itcilis Emy knowle	doe and helia	of the Man	ıfacturer h	as constructed	and asse	mbled this no	essure vesse	napoenon Lin accord	ance
												000010	psi psi
By signing this certificate neither the inspector nor his employer makes any warranty, expressed or implied concerning the pressur	No signing this	certificat	te neither	the Inspecto	r nor his em	oloyer make	s any wan	anty, expresse	d or imp	lied concernir	ig the pressu	ire vessel	P 311
described in this Manufacturer's' Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner f	lescribed in thi	is Manufa	acturer's'	Data Report	. Furthermor	e, neither th	ne Inspecto	r nor his empl	oyer shal	l be liable in a	any manner	for any pe	rsonal
injury or property damage or loss of any kind arising from or connected with this inspection.	njury or proper	rty damas	ge or loss	of any kind	arising from	or connecte	ed with this	s inspection.			•		
Date Signed Commissions									ns .				

NATIONAL BOARD

CERTIFIED BY
FES SYSTEMS INC.

W SS MAWP 450 PSI AT 200 °F



(Mat'l Spec. No., Grade or Type) (H.T. - Time & Temp.) (Mat'l Spec. No., Grade or Type) (H.T. - Time & Temp.) Radius Side to Pressure Location (Top. Elliptical Conical Hemispherical Category A Bottom, Ends) Knuckle Ratio Apex Angle Radius Diameter Min. Corr Crown Convex Concave Full, Spot, None (a) End .625" .125" ELLIP 2:1 None 100 625" 125" End ELLIP X

If removable, bolts used (describe other fastening)

Bolts, SA 320-L7, 1.25", (128); Nuts, SA 194-7, 1.25", (256)

described in this Manufacturer's' Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal

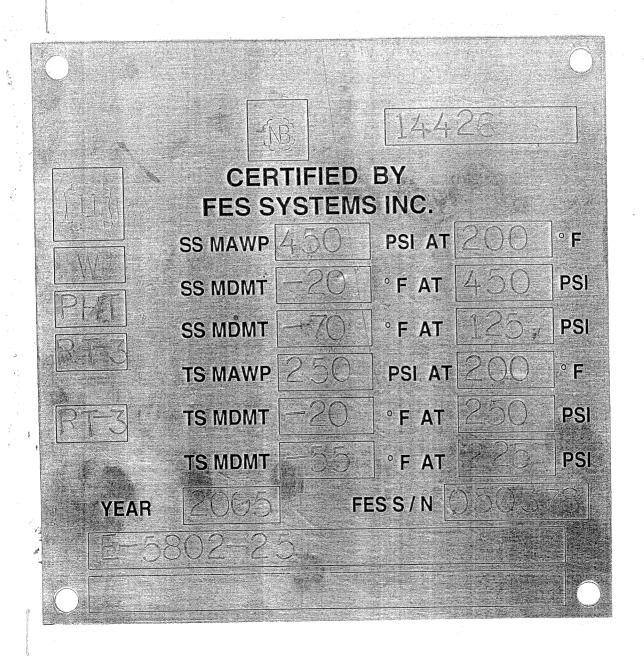
(Nat'l Board incl. endorsements, State, Province, and No.)

(Authorized Inspector)

injury or property damage or loss of any kind arising from or connected with this inspection.

14. 05-309-18Q

NATIO	NAL BOARD	14426	
 U	FES	CERTIFIED BY SYSTEMS INC.	
W	SS MAWP	450 PSI AT 200	\bigcirc_{F}



FORM U-1 MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

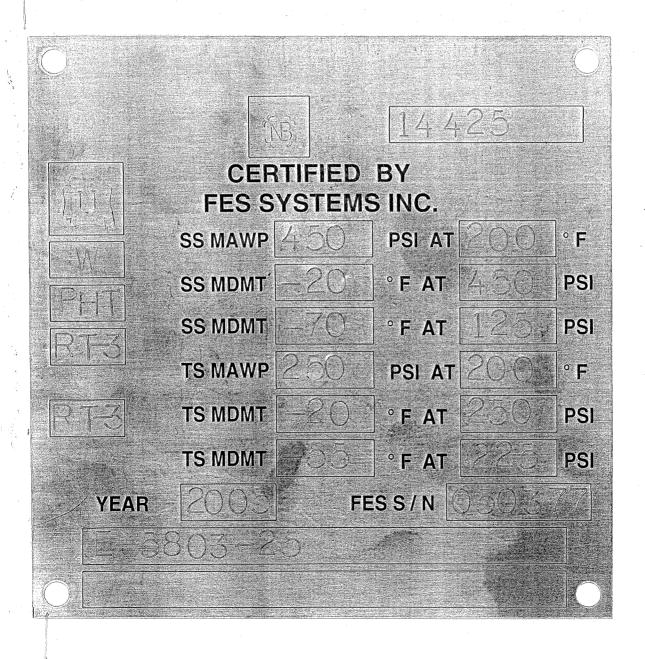
Form # <u>NB-26</u>, Rev. <u>1</u>

MCALINICAL MASSAGEMENT OF THE		Si de la companya de	GT PER	***************************************				NG NG SENSING SOURCE	SOMETHING AND AND	CONTROL OF THE PARTY OF THE PAR							FES.	Sales Orde	:#	05-309-1
1. Manufac	ctured an	id certif	fied by:		FES	Systems	Inc. 34	475 Bo	ard F	Road F	90 Вс	ox 2306	(17405)	York Pa	A 174	02				
2. Manufac										(Name	and A	ddress of	Manufactu	rer)			****************			***************************************
		and comments.						Lurbine	AIT.	System (Nar	s, Ltd ne and	. 4300 Di Address o	ixie Drive f Purchase	; Housto	n, TX	77021	····			
3. Location	n of insta	llation:			**	S	HELL	, EXPI	LOR		MC		DUCTI). N	1W CO	LORA	ADO		
4. Type:								52" OI) x 3	360" N			RATOR,	BXM)5037	7
	(Ho	riz, vert.	, or spher	e)				(T	ank,	separato	r, jkt. \	Vessel, hea	it exh., etc.)					's. Seni	
	(CRN)							IE RE	V C-	-2					1425				20	05
5. ASME (. ,	ection ³	VIII D	v I			(Drawii	ng No.) 2004	I					(Nat'l	Bd. No	.)			(Year	built)
							Edition	and Add	lenda	(date)]		-	(C)	ode Case N	Voe)		- (0	pecial Serv		TIO 1001
Items 6-11	incl. to b	e comp	oleted f	or sin	igle wa	ıll vessel.	s, jacki	ets of jo	ackei	ted ves	ssels,	shell of	heat exc	hangers	, or ch	hamber	ه) of mult	ichambe.	ice per r vessi	UG-120a. els
6. Shell:	(a)	No. o	f cours	e(s)	***************************************	6			(b)	Ove	rall le	ength (ft				4.75"	-,		, 055	J. V.G.,
	Cour	se(s)			М	laterial	T	Thickness	3	T	Long Jo	int (Cat A, I				int (Cat A,	B & C)	1 11	at Treatr	ment
	imeter (in)		gth (ft & in			rade or Type			orr,	Туре	Fu	il, Spot, Nor	ie Eff.	Туре		II, Spot, No		~~~~		Time
 	52"-52" 52"		- 3' 10"			516-70	.875		25"	T-1		Spot	85	T-1		Spot	85	-		-
	32		' .375"		SA.	516-70	.875	5" .13	25"	T-1		Spot	85	T-I		Spot	85	1100	F 2	h 46 m
7. Heads:	(a)	***************************************				W					((b)								
	ocation		Spec. No ickness	., Grad		pe) (H.T. – dius	1	1			······································		(Mat'l	Spec. No.	., Grade	or Type)	(H.T	Time & Te	mp.)	
	p Bottom, Ends)	Min.	Cor	r.	Crown	Knuckie	Ellipti Rati		Conic pex Ar		Hemisp Rad		Flat Diameter		ie to Pres				gory A	
(a)														Conve	x (Concave	Туре	Full, Sp	ot, None	EA
(b)										_			***************************************							
If bar, giv		 isions				die				Ja	cket	closure	-	A STATE OF THE STA		be as oges	,			
MAWP:	450	-		DS	si at ma	ax. temp.		200				°E M	in decia	n matal				or sketch.		
	(internal)		(external)			*		nternal)		(exten		A + 141.	ni. uesig	iniciai	temp.		20	°F at	450) psi
0. Impact te	st:			LX s,		No per	UCS (66(b)			***************************************		at	test tem	peratu	ire of	_			°F
l. Hydro., p	neu or	comb t	test nre	se finaic	ate yes o	or no and the		onent(s) i		•		C							***********	almost and a second
ems 12 and	13 to be	comple	eted for	tuho	section	Jo.)		psi		Pr	oof test					N/A			
. Tubeshee	et:		SA 51				. 5	7 75"				3.5"		1.	2511					
	_		ary (Mat					subject to	press	s.)]		om. thk., i	n.)	.1. (Сот. А	25" Ilow in	n)	ΓΔtta	WEL chment (w	DED	holes d\1
			N/A					N/A				N/A	,		I/A	~.,	[11ma		A	poned)
• Tubes:			ng (Mat'	-	. No.)]			Dia., in.)			(N	om. thk., i	n.)	(Corr. A	llow., ir	n.)			iment)	
1 4005.	- OM:		249-31 No., Gra		Timal		1" O.D., in.		determ	01	.065				798			Sti	aight	
ms 14-18 ii						nhers of	o.b., iii. "iacket	od vace	nala z	(Nom. I	thk., in	or gauge)) 	(Nu	ımber)			[Type (St	raight o	or U)]
- Shell	(a) No	o. of co	urse(s)	***************************************		7.00.15 Oj	jackei	EG ACTO	set3 (excnang gth (ft &					***************************************		
	Course(s)				Material		Thi	ckness			Long.	Joint (Cat. A	L)	Cir	cum. Joi	nt (Cat. A, 1	B, &C)		Heat Tre	atment
- Diameter,	, in	ength (ft &	č in.)	Spec	./Grade or	Туре	Nom.	Corr	-	Туре	Full,	Spot, None	Eff.	Type	Ful	l, Spot, No	ne Eff	f. Ten	ip.	Time
								-	_											
							···													
	_							-												
	i		70								<u> </u>						1			
Heada	(c) 5	1 4 2 1 /								(b) _	SA 516-	-70							
. Heads:	(a) S			Vo G	rade or T	Fime) (U T	T:	P. T	- 1			011010	_						-	
Location (To	ор,				rade or T	Type) (H.T				Hamissi	hariant	T				or Type)	(H.T. – T	ime & Ter		
Bottom, End	op, is) Mir	(Mai Thickness	t'l Spec.			Ellip	tical	& Temp Conical Apex Ang		Hemispi Radi		Flat Diamete	S	ide to Pressi	иге			Category ,	1	Lex
Location (To	ор,	(Mai Thickness n. Co	t'l Spec.	R:	adius	Ellip de Ra	tical tio	Conical				Flat	S	ide to Pressi		Type S			1	Eff. 100
			70							((b)	SA 516-	-70		·					

				7 17 W. 17 T. 10 T. 10 T.	Cont Take .			-			
16. MAWP: 250 (internal)			at max. tem			- °F.	Min desi	gn metal tem	p20	°F at	200 psi
17. Impact test:	(e:	xtemal) No Per UC	CS 66(b) and	(interna UHA-51	1) (external)		ure of			
			·····		yes or no and	the components(s) impact tes	ted)			°F.
18. Hydro., pneu., or com			32			oof test		,	_		
9. Nozzles, Inspection, a	nd safety	valve openin	igs:	T		-				***************************************	
Purpose (Inlet, Outlet, Drain, etc)	No.	Diameter or Size	Flange Type	Mat Nozzle	erial	Nozzle. This	T	Reinforcement Material		ttached	Location
TS CONNECTION	2	.75"	-	SA 105	Flange	Nom. 6000 #	.125"	iviateitai	Nozzie	Flange	(Insp. Open
TS CONNECTION	2	12"		SA 53-B	-	120-STD	.125"		UW16.1c	-	-
SS CONNECTION	2	.75"	*	SA 105		3000#/	.125"	***	UW16.1c	***	-
SS CONNECTION	2	6**		SA 53-B		SCH 80-40	.125"	SA 516-70	UW16.1c	-	-
SS CONNECTION	2	1.500"	4	SA 105	-	3000 #	.125"	271 270 70	UW16.1.c	-	-
SS CONNECTION	2	2"	*	SA 105		3000 #	.125"	-	UW16.1.c		
RISERS	4	8"	-	SA 53-B	-	SCH 80	.125"	SA 516-70	UW16.1c		
					And de la latera and an angle of the lateral and an analysis of the lateral analysis of the lat						
						***************************************		ed-de-common de per pri estante communication de la communication			
O. Supports: Skirt	No	Lugs	2	Legs _	0	Others	9 Supp	orts Atta	iched We	lded to 0.1) of vecco
. Manufacturer's Partia	(Yes or No		(No.)		(No.)	400.000	00	`	-		
Inspection opening exemp Tube side Coincident: -5.	5F @ 225	psig She	ll to Tubeshee	t weld repair	ed after PW	HT in accordan	i., x 3.50" ce with U	Thk. – Shell Si CS-56	ide Conciden	t: -70F@1	25 psig
		***************************************			od direct i vi	111 in accordan	ce with Ot	~3~30			
710000000000000000000000000000000000000									***************************************		
In anotic is all			CERTI	FICATE O	F SHOP	COMPLIAN	CF				
e certify that the stateme	nts made	in this repor	t are correct:	and that all	details of	COMPLIANO design, materi	CE al. constr	uction and w	orkmanshir	of this ve	rcel
	IU IUI I I U.	2201C A C22C12	t are correct; S, Section VI	and that all II, Division	details of a	design, materi	al, constr	uction, and w	orkmanship	of this ve	ssel
J" Certificate of Authoriz	zation Nu	imber:	t are correct; S, Section VI 12,647	and that all II, Division	details of	design, materi	al, constr		orkmanship	of this ve:	ssel
J" Certificate of Authoriz	zation Nu	imber:	t are correct is, Section VI. 12,647 FES Sy	and that all II, Division	details of	design, materi	al, constr	uction, and w	orkmanship	of this ve	ssel
J" Certificate of Authorizate /2-2/-2005	zation Nu Name	imber:	t are correct: S, Section VI: 12,647 FES Sy (Manual CERTI	and that all II, Division Stems Inc. Infacturer)	details of old l. Expires	5/14/200 Sign	al, constr	B. Mi	(Representati	on/	
J" Certificate of Authorizate /2-2/-2005	zation Nu Name	imber:	t are correct: S, Section VI: 12,647 FES Sy (Manual CERTI	and that all II, Division Stems Inc. Infacturer)	details of old l. Expires	5/14/200 Sign	al, constr	B. Mi	(Representati	on/	
J" Certificate of Authorizate /2-2/-2005 the undersigned, holding	zation Nu Name a valid c	ommission is	t are correct s, Section VI 12,647 FES Sy (Manuary CERTI ssued by The	and that all II, Division Stems Inc. Ifacturer) IFICATE (National B	details of of 1. Expires OF SHOP oard of Both HSB	5/14/200 Sign INSPECTIO	al, constr 08 ed N ure Vesse	B. M.	(Representate	on/ tive)	vince
J" Certificate of Authorizate /2-2/-2005 the undersigned, holding PA ave inspected the pressure	zation Nu Name a valid c and vessel d	ommission is employed by escribed in the	t are correct s, Section VI 12,647 FES Sy (Mann CERT) ssued by The	and that all II, Division stems Inc. ifacturer) FICATE (National B	details of of 1. Expires OF SHOP oard of Both HSB. Report on	5/14/200 Sign INSPECTIO biler and Press CT	al, constr 08 ed	B. M.	(Representation and/or the S	on/ tive) state or Pro sartford, C7	vince
J" Certificate of Authorizate /2-2/-2005 the undersigned, holding PA ave inspected the pressure that, to the best of my	vessel d	ommission is employed by escribed in the	t are correct s, Section VI 12,647 FES Sy (Mann CERT) ssued by The y nis Manufact the Manufact	and that all II, Division stems Inc. ifacturer) FICATE (National B	details of of 1. Expires OF SHOP oard of Both HSB. Report on	5/14/200 Sign INSPECTIO biler and Press CT /2-3	21 - 21 - 21	B. M.	(Representation and/or the S	on/ tive)	vince
the undersigned, holding PA ve inspected the pressure that, to the best of my III, Division 1. By signin	Name a valid c and vessel d knowled g this cer	ommission is employed by escribed in the	t are correct s, Section VI 12,647 FES Sy (Mann CERT) studed by The y nis Manufact c, the Manufact cert the Inspec	and that all II, Division stems Inc. ufacturer) FICATE (National B urer's Data ceturer has ceturer has ceturer has ceturer has ceturer has ceturer profibile.	DF SHOP oard of Bo HSB Report on constructed	5/14/200 Sign INSPECTIO biler and Press CT /2-3 I this pressure	N ure Vesse 21-21 vessel in	B. M. Collinspectors: of 005 accordance v	(Representate and/or the S	on/ state or Pro lartford, CT	vince
The undersigned, holding PA The inspected the pressure ate that, to the best of my III, Division 1. By signing assel described in this Ma	vessel d knowled g this cer	ommission is employed by escribed in the	t are correct s, Section VI 12,647 FES Sy (Mann CERT) ssued by The y his Manufact c, the Manufact the Inspect	and that all II, Division stems Inc. Infacturer) FICATE (National B urer's Data acturer has a ctor northis empre neither	DF SHOP oard of Bo HSB Report on constructed	5/14/200 Sign INSPECTIO Filer and Press CT 1 this pressure makes any war	N vessel in ranty, exponents	B. M. Collinspectors: of 005 accordance v	(Representate and/or the S	on/ state or Pro lartford, CT	vince
J" Certificate of Authorizate /2-2/-2005 the undersigned, holding PA we inspected the pressure at that, to the best of my III, Division 1. By signin ssel described in this Marsonal injury or property	a valid c and vessel d knowled g this cer nufacture damage	ommission is employed by escribed in the lge and belief tificate neither's' Data Report a loss of an	t are correct s, Section VI 12,647 FES Sy (Mann CERTI ssued by The sy nis Manufact f, the Manufact re the Inspect	stems Inc. Ifacturer) FICATE (National B cturer has course has consolidated)	OF SHOP oard of Bo HSB Report on constructed hployer in er the Insp	5/14/200 Sign INSPECTIO filer and Press CT /2-6 I this pressure makes any war ector nor his e with this inspe	Nure Vessel in ranty, exemployer	B. M. of of operations of operations of accordance was accordance where shall be liable.	(Representation and/or the S With ASME plied, concee in any man	conditive) State or Pro Startford, CO Code, Sec erning the panner for an	vince
J" Certificate of Authorizate /2-2/-2005 the undersigned, holding PA ve inspected the pressure atte that, to the best of my III, Division 1. By signin ssel described in this Marsonal injury or property	a valid c and vessel d knowled g this cer nufacture damage	ommission is employed by escribed in the lige and belief tificate neither's' Data Report a loss of an	t are correct s, Section VI 12,647 FES Sy (Mann CERT) ssued by The mis Manufact st, the Manufact the Inspect port. Further my kind arisin	and that all II, Division II, Division II, Division III. III. III. III. III. III. III. II	OF SHOP oard of Bo HSB Report on constructed hployer in er the Insp	Sign INSPECTIO filer and Press CT /2-6 I this pressure nakes any war ector nor his e with this inspection (2)	N ure Vessel in ranty, exemployer ection.	B. M. el Inspectors: of 005 accordance voressed or imshall be liable	(Representation and/or the S With ASME polied, concere in any many	on/ State or Pro Sartford, C7 Code, Sec erning the panner for an	vince f , and tion pressure
the undersigned, holding PA ave inspected the pressure ate that, to the best of my III, Division 1. By signin assel described in this Ma resonal injury or property ate 1-2-206	a valid c and e vessel d knowled g this cer nufacture damage o Signed	ommission is employed by escribed in the lige and belief tificate neither's' Data Report a loss of an Author CE	t are correct s, Section VI 12,647 FES Sy (Mann CERT) ssued by The visis Manufact f, the Manufact f, the Manufact for the Inspect	stems Inc. Infacturer) FICATE (National B urer's Data cturer has components of the components of t	DF SHOP oard of Bo HSB Report on constructed employer refer the Inspecton meted mmissions	Sign INSPECTIO Filer and Press CT 12-6 I this pressure nakes any war ector nor his e with this inspection (Signal Press (Signal Press (API V COMIT (Signal Press (Signal Pres	Nure Vessel in ranty, exemployer ection.	B. M. Collinspectors of 205 accordance workshall be liable A. Can dincl. endorsements.	(Representate and/or the S H) with ASME aplied, conce in any many many many many many many many	on/ state or Pro lartford, CT Code, Sec erning the p nner for an	vince f , and tion pressure y
the undersigned, holding PA The inspected the pressure ate that, to the best of my in the signing seed described in this Marsonal injury or property ate 1-2-2006 The certify that the statement of the inspected in this marsonal injury or property in the 1-2-2006	a valid c and vessel d knowled g this cer nufacture damage of Signed	ommission is employed by escribed in the lige and belief tificate neither's' Data Report a loss of an (Author CE) is report are constructions.	t are correct s, Section VI 12,647 FES Sy (Mann CERT) ssued by The six Manufact st, the Manufact ser the Inspect port. Further my kind arisin prized Inspector) RTIFICAT	and that all II, Division II, Division III. III. III. III. III. III. III. II	DF SHOP oard of Bo HSB: Report on constructed philoger in er the Inspectonnected mmissions D ASSEM assembly	Sign INSPECTIO Filer and Press CT 12-6 It this pressure makes any war ector nor his e with this inspection of the construction of the constru	Nure Vessel in ranty, exemployer ection.	B. M. Collinspectors of 205 accordance workshall be liable A. Can dincl. endorsements.	(Representate and/or the S H) with ASME aplied, conce in any many many many many many many many	on/ state or Pro lartford, CT Code, Sec erning the p nner for an	vince f , and tion pressure
the undersigned, holding PA we inspected the pressure atte that, to the best of my III, Division 1. By signin assel described in this Marsonal injury or property atte 1-2-2006 e certify that the statemer equirements of ASME Co	a valid c and e vessel d knowled g this cer nufacture damage Signed nts on thi ode, Secti	ommission is employed by escribed in the lige and belief tificate neither's' Data Report a loss of an (Author CE) is report are constructions.	t are correct s, Section VI 12,647 FES Sy (Mann CERT) ssued by The six Manufact st, the Manufact ser the Inspect port. Further my kind arisin prized Inspector) RTIFICAT	and that all II, Division II, Division III. III. III. III. III. III. III. II	DF SHOP oard of Bo HSB: Report on constructed philoger in er the Inspectonnected mmissions D ASSEM assembly	Sign INSPECTIO Filer and Press CT 12-6 It this pressure makes any war ector nor his e with this inspection of the construction of the constru	Nure Vessel in ranty, exemployer ection.	B. M. of O.	(Representate and/or the S H) with ASME aplied, conce in any many many many many many many many	on/ state or Pro lartford, CT Code, Sec erning the p nner for an	vince f , and tion pressure
the undersigned, holding PA we inspected the pressure ate that, to the best of my III, Division 1. By signin ssel described in this Marsonal injury or property ate 1-2-206 e certify that the statement equirements of ASME Contact and ASME Contact are a second as a second and a second are a second as a second are a second are a second are a second as a second as a second are a second as a second are a second as a second as a second are a second as a second are a second as a second are a second as a second a	a valid c and vessel d knowled g this cer nufacture damage of Signed	ommission is employed by escribed in the lige and belief tificate neither's' Data Report a loss of an experiment of the control of the contro	t are correct s, Section VI. 12,647 FES Sy (Mann CERTI sued by The sued by The sued has been the Inspect port. Further the Manufact support. Further the Man	stems Inc. Infacturer) FICATE (National B urer's Data cturer has compressed in the field the field relificate of	DF SHOP oard of Bo HSB Report on constructed employer in for the Insp connected mmissions D ASSEM assembly of Authorizat	Sign INSPECTIO Filer and Press CT 12-6 It this pressure makes any war ector nor his e with this inspection of the construction of the constru	Nure Vessel in ranty, exemployer ection. (Nat'l Boar PLIANC) f all parts	B. M. of O.	(Representate and/or the S H) with ASME aplied, conce in any many many many many many many many	on/ state or Pro lartford, CT Code, Sec erning the p nner for an	vince f , and tion pressure
the undersigned, holding PA The inspected the pressure ate that, to the best of my in the signing seed described in this Marsonal injury or property ate 1-2-2006 The certify that the statemer equirements of ASME Contact in the contact in the statemer i	a valid c and e vessel d knowled g this cer nufacture damage Signed nts on thi ode, Secti	ommission is employed by escribed in the lige and belief tificate neither's' Data Report a loss of an Author CE is report are con VIII, Divi	t are correct s, Section VI 12,647 FES Sy (Mann CERT) ssued by The strict Manufact f, the Manufact f, the Manufact for the Inspect port. Further my kind arisin for the Manufact for the Inspect for the Inspe	stems Inc. Infacturer) FICATE (National B Burer's Data acturer has a tor northis empre neither E OF FIEL at the field rtificate of	DF SHOP oard of Bo HSB Report on constructed phologer re for the Insp connected mmissions D ASSEM assembly of Authorizat	Sign INSPECTIO Sign INSPECTIO Filer and Press CT 12-6 I this pressure makes any war ector nor his e with this inspection of this inspection of this inspection of this inspection. IBLY COMP construction of this inspection No. Signe	Nure Vessel in ranty, exemployer ection. (Nat'l Boar PLIANC) f all parts d	B. M. of O. S. accordance voressed or imshall be liable dincl. endorsem. E. of this vesse	(Representate and/or the S H) with ASME aplied, conce in any many many many many many many many	conditive) State or Pro State	vince f , and tion pressure y
The undersigned, holding PA the undersigned, holding PA two inspected the pressure atte that, to the best of my III, Division 1. By signin ssel described in this Marsonal injury or property atte 1-2-206 e certify that the statement equirements of ASME Coate	a valid c and vessel d knowled g this cer nufacture damage Signed nts on thi ode, Secti	ommission is employed by escribed in the lige and belief tificate neither's' Data Report a loss of an (Author CE) is report are con VIII, Divi	t are correct s, Section VI 12,647 FES Sy (Mann CERTI stated by The street in Manufact f, the Manufact f, the Manufact for the Inspector for the Inspector for the Manufact for the Inspector for the Manufact for	and that all II, Division II, Division II. Stems Inc. Infacturer) FICATE (National B Burer's Data octurer has octurer has octurer has of the property of th	DF SHOP Oard of Bo HSB Report on constructed refer the Inspectonnected mmissions D ASSEM assembly of Authorizate	Sign INSPECTIO Sign INSPECTIO Filer and Press CT	Nure Vessel in ranty, expenditure of all parts	B. M. Constitution of 205 accordance voressed or important to the shall be liable dincl. endorsement of this vesse	(Representate and/or the S With ASME plied, conce e in any many many many many many many many	conditive) State or Pro State	vince f, and tion pressure y
the undersigned, holding PA The inspected the pressure atte that, to the best of my III, Division 1. By signin assel described in this Marsonal injury or property atte 1-2-206 The certify that the statement equirements of ASME Coate The undersigned, holding	a valid c and vessel d knowled g this cer nufacture damage o Signed nts on thi ode, Secti Name	ommission is employed by escribed in the lige and belief tificate neither's' Data Report a loss of an (Author CE) is report are con VIII, Divi	t are correct to specific to the specific to t	and that all II, Division III, Division III. Stems Inc. Infacturer) FICATE (National B Burer's Data cturer has of tor northis empty in the field religional Bell III. E OF FIEL At the field religional Bell III.	DF SHOP oard of Bo HSB: Report on constructed employer re er the Insp connected mmissions D ASSEM assembly of Authorizat LD ASSEI oard of Bo	Sign INSPECTIO Sign INSPECTIO Filer and Press CT /2-6 If this pressure enakes any war ector nor his ewith this inspection on the construction oction No. Signe MBLY INSPI iler and Press MBLY INSPI iler and Press	Nure Vessel in ranty, expending PLIANCI fall parts	Inspectors a of 205 accordance workshall be liable dincl. endorsem. E	(Representate and/or the S H) with ASME aplied, conce in any many many many many many many many	conditive) Itate or Pro lartford, CT Code, Sec erning the panner for an vince, and No with the ive) tate or Pro	vince f, and tion pressure y
the undersigned, holding PA ave inspected the pressure ate that, to the best of my III, Division 1. By signin this Matersonal injury or property ate 1-2-206 The certify that the statement equirements of ASME Coate the undersigned, holding	a valid c and vessel d knowled g this cer nufacture damage o Signed nts on thi ode, Secti Name a valid co	ommission is employed by escribed in the lege and belief tificate neither's' Data Report a loss of an CE is report are con VIII, Divident CE ommission is and employed.	t are correct to specific to the specific to t	and that all II, Division III, Division III. Stems Inc. Infacturer) FICATE (National B Burer's Data cturer has of tor northis empty in the field religional Bell III. E OF FIEL At the field religional Bell III.	DF SHOP oard of Bo HSB: Report on constructed employer re er the Insp connected mmissions D ASSEM assembly of Authorizat LD ASSEI oard of Bo	Sign INSPECTIO Sign INSPECTIO Filer and Press CT /2-6 If this pressure enakes any war ector nor his ewith this inspection on the construction oction No. Signe MBLY INSPI iler and Press MBLY INSPI iler and Press	Nure Vessel in ranty, expending PLIANCI fall parts	Inspectors a of 205 accordance workshall be liable dincl. endorsem. E	(Representate and/or the S H) with ASME aplied, conce in any many many many many many many many	conditive) Itate or Pro lartford, CT Code, Sec erning the panner for an vince, and No with the ive) tate or Pro	vince f , and tion pressure y
the undersigned, holding PA Ave inspected the pressure ate that, to the best of my III, Division 1. By signin this Matersonal injury or property ate 1-2-206 The certify that the statement and the undersigned, holding the undersigned, holding the undersigned, holding the state that parts referred	vastion Nu Name a valid c and vessel d knowled g this cer nufacture damage o Signed nts on thi ode, Secti Name a valid co a	ommission is employed by escribed in the lige and belief tificate neither's' Data Report a loss of an Author CE is report are con VIII, Divide the commission is and employed a items	t are correct to a specific to the correct to a specific to the correct to a specific to the correct to the correct to the correct and the correct and the correct and the correct to the	and that all II, Division II, Division II. Stems Inc. Infacturer) FICATE (National Burer's Data ecturer has consolining from or consolining from	DF SHOP oard of Bo HSB Report on constructed connected mmissions D ASSEM assembly of Authorizat LD ASSEI oard of Bo tatements i	Sign INSPECTIO Sign INSPECTIO Filer and Press This pressure makes any war ector nor his e with this inspection or his e with this manufacture or his electric or his elec	Nure Vessel in ranty, expension. (Nat'l Boar PLIANC) f all parts detection.	B. M. of Open State of State Report v	(Representate and/or the S H) with ASME applied, conce in any many many many many many many many	conditive) Itate or Pro lartford, CT Code, Sec erning the panner for an vince, and No with the ive) tate or Pro cribed pres	vince f, and tion pressure y vince sure vesse
the undersigned, holding PA Ave inspected the pressure atte that, to the best of my III, Division 1. By signin essel described in this Matersonal injury or property atte 1-2-206 The certify that the statement equirements of ASME Coate the undersigned, holding for the distate that parts referred spected by me and to the	vassel de knowled g this cer nufacture damage de Signed and to de, Secti Name	ommission is employed by escribed in the lege and belief tificate neither's' Data Report a loss of an Aller on VIII, Divi	t are correct to specific to the specific to t	and that all II, Division II, Division III. Stems Inc. Infacturer) FICATE (National B Burer's Data cturer has of the corner of the sembler of the combler) E OF FIEL At the field relificate of the Stems III. Stems III	DF SHOP oard of Bo HSB Report on constructed philoser in the Insp connected mmissions D ASSEM assembly of Authorizat LD ASSE oard of Bo tatements in	Sign INSPECTIO Sign INSPECTIO filer and Press CT /2- I this pressure makes any war ector nor his e with this inspection or ion No. Signe MBLY COMP construction or ion No. Signe MBLY INSPI iller and Press in this Manufa , not inceptated on constructed on	Nure Vessel in ranty, expending of all parts detection.	Inspectors a of 205 accordance workshall be liable dincl. endorsement of this vesse end of this vesse end of this vesse end of the certificate the certificate of the certificate the certificate the certificate of the certificate the certificate the certificate of the certificate the ce	(Representate and/or the S H with ASME aplied, conce in any many many many many many many many	conditive) Itate or Pro lartford, CT Code, Sec erning the panner for an vince, and No with the ive) tate or Pro cribed pres	vince f, and tion pressure y vince sure vesse
the undersigned, holding PA ave inspected the pressure ate that, to the best of my III, Division 1. By signin essel described in this Matersonal injury or property ate 1-2-2006 The certify that the statement of ASME Coate the undersigned, holding for the distance of the undersigned, holding for the distance of the ASME Code, Section 1. S	vassel de knowled g this cer nufacture damage de Signed de Name a valid co a	ommission is employed by escribed in the lege and belief tificate neither's' Data Report a loss of an Alexander CE is report are con VIII, Divide the commission is und employed a items by knowledge Division 1. T	t are correct to the correct and the correct and the correct and the correct and the correct to	and that all II, Division II, Division III. Stems Inc. Infacturer) FICATE (National B Burer's Data cturer has of the corner of this corner of the corner	DF SHOP oard of Bo HSB Report on constructec hployer ner the Insp connected mmissions D ASSEM assembly of Authorizat LD ASSEI oard of Bo tatements in	Sign INSPECTIO Sign INSPECTIO filer and Press This pressure makes any war ector nor his e with this inspection of the construction of the construction of the construction of the construction of the constructed and and subjected and subjecte	Nure Vessel Nure Vessel Nure Vessel Vessel in ranty, expending exterion. Nure Vessel Comployer ection. Nure Vessel Comployer ection.	Inspectors a of 205 accordance workshall be liable dincl. endorsement of this vesse end of this vesse	(Representate and/or the S H with ASME plied, conce in any many many many many many many many	convicted presspection, h	vince f, and tion pressure y vince sure vesse
ave inspected the pressure attention to the best of my III, Division 1. By signing assel described in this Matersonal injury or property attended to the certify that the statements of ASME Coate the undersigned, holding of the state that parts referred aspected by me and to the the ASME Code, Sective signing this certificate in	vassel de knowled g this cer nufacture damage of Signed of the valid control ode, Section Name a valid control ode to as data best of mion VIII, either the	ommission is employed by escribed in the lege and belief tificate neither's' Data Report a loss of an Albert are convill, Divided the lege and belief tificate neither's' Data Report a loss of an Albert are convill, Divided to the lege and	t are correct to Section VI. 12,647 FES Sy (Mann CERT) sued by The sued by The this Manufact to the Manufact t	and that all II, Division II, Division III. Division III. III. III. IIII. IIIII. IIII. IIIIII	DF SHOP oard of Bo HSB Report on constructec Philoser in er the Insp connected mmissions D ASSEM assembly of Authorizat LD ASSE coard of Bo tatements in conspected	Sign INSPECTIO filer and Press This pressure makes any war ector nor his e with this inspection of the construction of the constructed and and subjected and and subjected of the constructed and and subjected of the constructed and and subjected of the constructed and the construc	Nure Vessel in ranty, expension. 2 / - 2 / (Nat'l Boar PLIANC) f all parts detection. ECTION care Vessel in dassemble to a hydronia.	Inspectors a of 205 accordance workshall be liable dincl. endorsement of this vesse of this vesse of this vesse of the certificate led this press rostatic test of the certificate led the certificate led this press rostatic test of the certificate led the certifi	(Representate and/or the S H with ASME plied, conce in any many many many many many many many	convince) State or Professional Notation (Code, Sectorning the particular for an analysis of the profession (Code) (Code	vince , and tion pressure y vince sure vesse ave been ce psi.
the undersigned, holding PA ave inspected the pressure ate that, to the best of my III, Division 1. By signin assel described in this Matersonal injury or property ate 1-2-206 The certify that the statement of ASME Coate ate that parts referred spected by me and to the the ASME Code, Sective signing this certificate in scribed in this Manufacture.	vastion Nu Name a valid c and vessel d knowled g this cer nufacture damage Signed nts on thi ode, Secti Name a valid co a to as data best of m ion VIII, either the	ommission is employed by escribed in the lege and belief tificate neither's' Data Report are con VIII, Divide temployed a items by knowledge Division 1. The Inspector neutral Report, Full and the lege	t are correct t, Section VI. 12,647 FES Sy (Mann CERT) study by The this Manufact the Manufact the Manufact the Inspect port. Further the Inspect port. Further the Manufact the Manufact the Manufact the Manufact the Manufact the Manufact the Inspect port. Further the Inspect the Manufact th	and that all II, Division II, Division III. Division III. Stems Inc. Infacturer) FICATE (National Burer's Data ceturer has determined to more neither and from or Co E OF FIEL at the field relificate of E OF FIEL National Bellow III. Natio	details of of 1. Expires DF SHOP oard of Beches HSB. Report on constructed the Inspector of the Inspector	Sign INSPECTIO filer and Press CT /2- I this pressure makes any war ector nor his e with this inspection of the construction of the construction of the construction of the constructed and and subjected on this employer.	Nure Vessel in ranty, expension. 2 / - 2 / (Nat'l Boar PLIANC) f all parts detection. ECTION care Vessel in dassemble to a hydronia.	Inspectors a of 205 accordance workshall be liable dincl. endorsement of this vesse of this vesse of this vesse of the certificate led this press rostatic test of the certificate led the certificate led this press rostatic test of the certificate led the certifi	(Representate and/or the S H with ASME plied, conce in any many many many many many many many	convince) State or Professional Notation (Code, Sectorning the particular for an analysis of the profession (Code) (Code	vince , and tion pressure y vince sure vesse ave been ce psi.
the undersigned, holding PA ave inspected the pressure ate that, to the best of my III, Division 1. By signin essel described in this Matersonal injury or property ate 1-2-2006 The certify that the statement of ASME Coate the undersigned, holding for the distance of the undersigned, holding for the distance of the ASME Code, Section 1. S	a valid control and a vali	ommission is employed by escribed in the lege and belief tificate neither's' Data Report are con VIII, Divide temployed a items by knowledge Division 1. The Inspector neutral Report, Full and the lege	t are correct t, Section VI. 12,647 FES Sy (Mann CERT) study by The this Manufact the Manufact the Manufact the Inspect port. Further the Inspect port. Further the Manufact the Manufact the Manufact the Manufact the Manufact the Manufact the Inspect port. Further the Inspect the Manufact th	and that all II, Division II, Division III. Division III. Stems Inc. Infacturer) FICATE (National Burer's Data ceturer has determined to more neither and from or Co E OF FIEL at the field relificate of E OF FIEL National Bellow III. Natio	DF SHOP oard of Bo HSB Report on constructed philoger in er the Insp connected mmissions D ASSEM assembly of Authorizat LD ASSE oard of Bo tatements in course has of inspected	Sign INSPECTIO filer and Press CT /2- I this pressure makes any war ector nor his e with this inspection of the construction of the construction of the construction of the constructed and and subjected on this employer.	Nure Vessel in ranty, expension. 2 / - 2 / (Nat'l Boar PLIANC) f all parts detection. ECTION care Vessel in dassemble to a hydronia.	Inspectors a of 205 accordance workshall be liable dincl. endorsement of this vesse of this vesse of this vesse of the certificate led this press rostatic test of the certificate led the certificate led this press rostatic test of the certificate led the certifi	(Representate and/or the S H with ASME plied, conce in any many many many many many many many	convince) State or Professional Notation (Code, Sectorning the particular for an analysis of the profession (Code) (Code	vince , and tion pressure y vince sure vesse ave been ce psi.

14. 05-309-18R

 NATIO	VAL BOARD	14425
U	FES	CERTIFIED BY SYSTEMS INC.
W	SS MAWP	450 PSI AT 200 OF



HEAT EXCHANGER SPECIFICATION SHEET

1	Ţ <i>[[</i>	SHELL OIL C	Ω		** A1	TERNATE*	*		
2	Location:					TENINATE			
3	Service of Unit:	EVAPORATO	R FOR AN			Our Refe	rence:		
4		AQUEOUS AI	MMONIA CH	ILLER		Your Refe			
5	_1		Rev No.:2			Job No.:			
6		Туг	oe BXM I	nor C	onnected		1 parallel	1 se	ries
7		6182 ff	2; Shells/uni	t	1 Surf	shell(eff)	6182		ft2
8		PE	RFORMANC					***************************************	
9	1			Sh	ell Side		Tube S	ide	
10	1				CO2		AQUEOUS A	MONIA	1 26%
11 12	Fluid quantity, total	***************************************	lb/h		124648		1246	539	
13	Vapor (in/out)		lb/h	2077	1	124648			
14	Liquid Noncondensab	lo.	lb/h	10387	3		1246539	1246	539
15	Temperature (in/out)	IE .	lb/h						
16	Dew point/bubb	ale moint	F	-57		-57	-35	-4	5
17	Density	ve bourt	Ib/ft3	72,200	5	1 104	EC 004		
18	Viscosity		Ср	0.227		1.124	56.091	57	- 1
19	Molecular weight, vapo	ır	ср	0.221		0.014	4.951	5.	כ
20	Molecular weight, nonc								
21	Specific heat		Btu/(lb*F)	0,444		0.241	1.04	1.0	
22	Thermal conductivity		Btu/(ft*h*F)	0.099	1	0.009	0.246	0.24	
23	Latent heat		Btu/lb	125		125	0.240	U,Z	+0
24	Inlet pressure		psia		101,4	120	10	Λ	
25	Velocity		ft/s				3.		
26	Pressure drop, allow./ci	alc.	psi		7		10 /		
27	Fouling resist, (min.)		ft2*h*F/Btu		0.0005		0.0		
28	Heat exchanged	12964000	Btu/h;	MTD (corr	ected)	1	6.4		F
29	Transfer rate, service	128	dirty	128	C	lean 1	75	Btu/(ft2	2*h*F)
30		CONS.	TRUCTION C		1ELL		Sket		
31	D-1-1/04		Shell Sid		Tube				
32 33	Design/ Alt pressure	psig				0/100			
34	Design temperature No. passes per shell		-70 TC		-50	ΓΟ 200	- <u> </u>		-
35	Corrosion allowance		1	1		2)	***************************************
36	Connections	in ir		25 3.W.		125			
37	size/rating	out ir			***	1/150	-		
38	OILOTTAILIS	Out	/ 0(3)/6). VV.	[2	I/150	_		
	Tube no. 798 c	od 1.0 ;thk-a		.065 in;le	nath	/	ft: mitab	4.05	
		SA-249	<u> </u>	Mater		SS316	ft;pitch Pattern	1.25	
41	Shell CS		52	in Shell		00010	Fallerii		30
42	Channel or bonnet		516-70N		nel cover				
43	Tubesheet-stationary	CS, SA5			heet-floa	tina			
44	Floating head cover				gement p		on bu	ındle	
45	Baffles-cross CS	S Type	full sup	Cut (%			ng: c/c	36.0	in
	Baffles-long		Seal type			1 1	Inlet	36	
		CS	U-bend			Туре			
	Bypass seal			Tube-	ubeshee		exp./sea	l wld	
	Expansion joint			Туре					
	Rho*V2-inlet nozzle	3133	Bundle enti	апсе		Ві	ındle exit		
	Gaskets-shell side			Tı	ube side	spira	wound	***************************************	
52	-floating head								
·	Code requirements	ASME Code S					MA class	В	
	Weight/shell 49 Remarks	444 Filled	d with water		78084	Вι	ındle 2876	3 ~	lb
		EN ACITORIO AN	IMONUA IO O	0 0-0 -	···		·		
	FREEZING POINT OF 2 TUBES FITTED WITH 30	O /O AQUEUUS AM	INIUNIA IS -8	U DEG F.					
	PER ASME CODE PARA			TO CALL	DMT NO	NICES CO		***************************************	
	. L.C. COME CODE L'ARV	TOUCHUL OFFE	F SIDE MEE	10 -0UF N	א . וועוט.	NEED FO	K 88.		