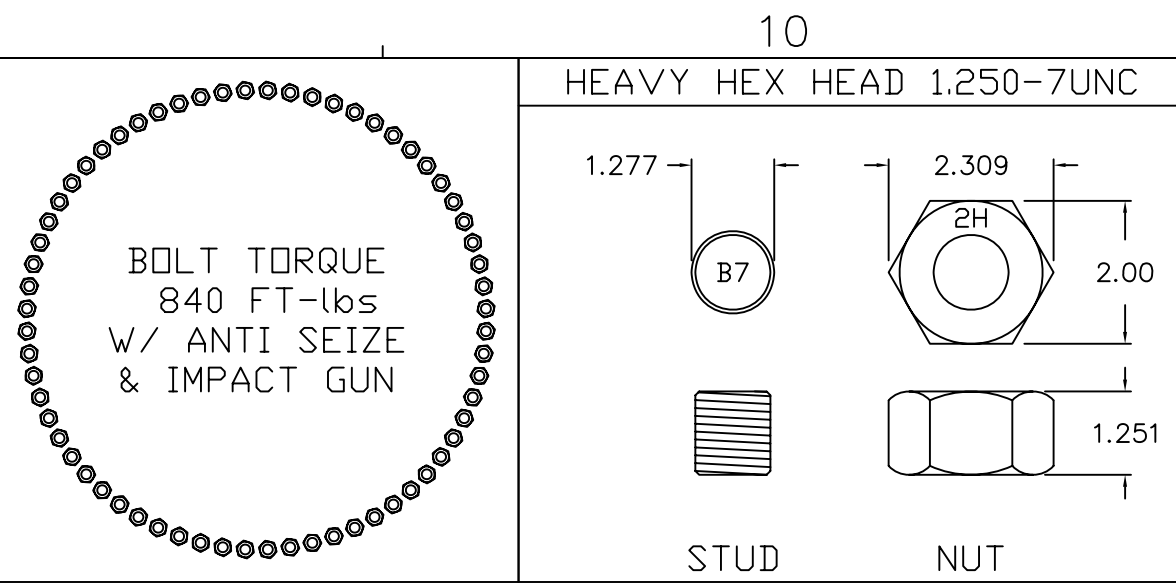
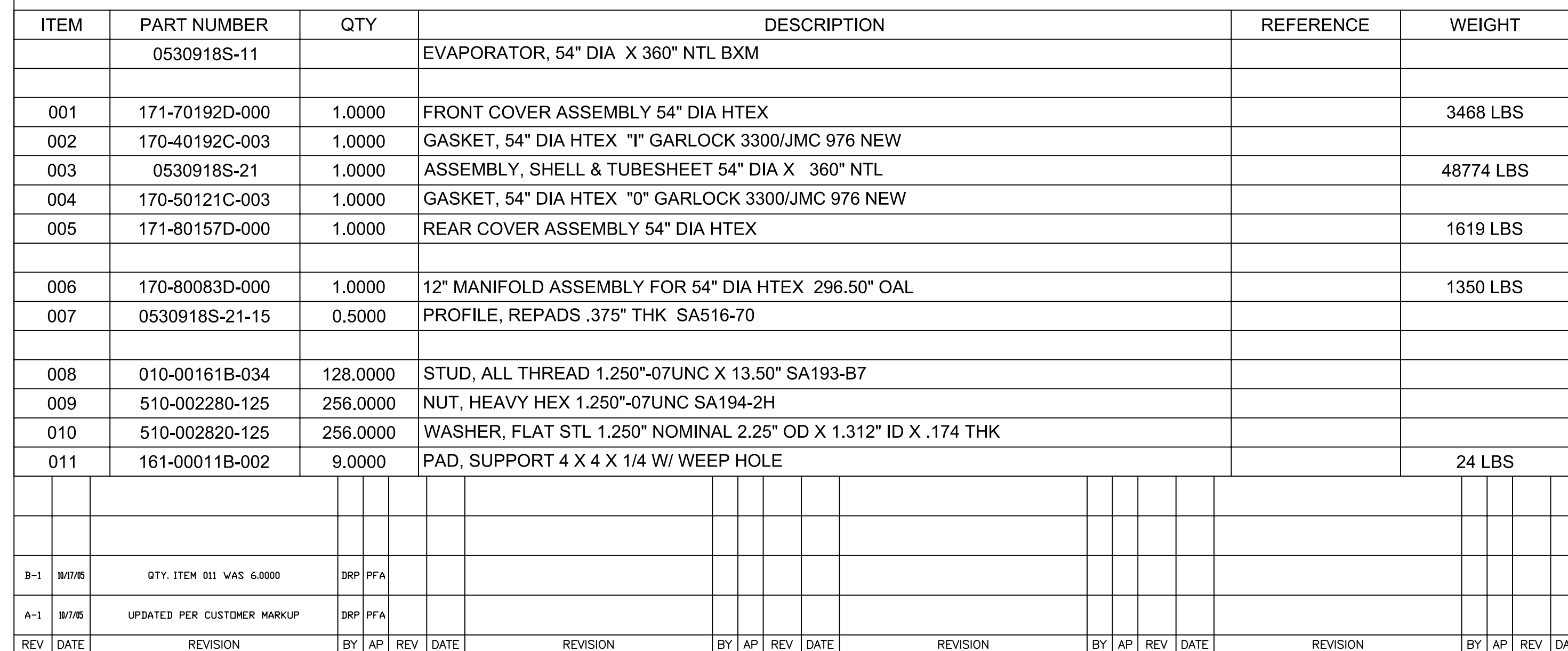




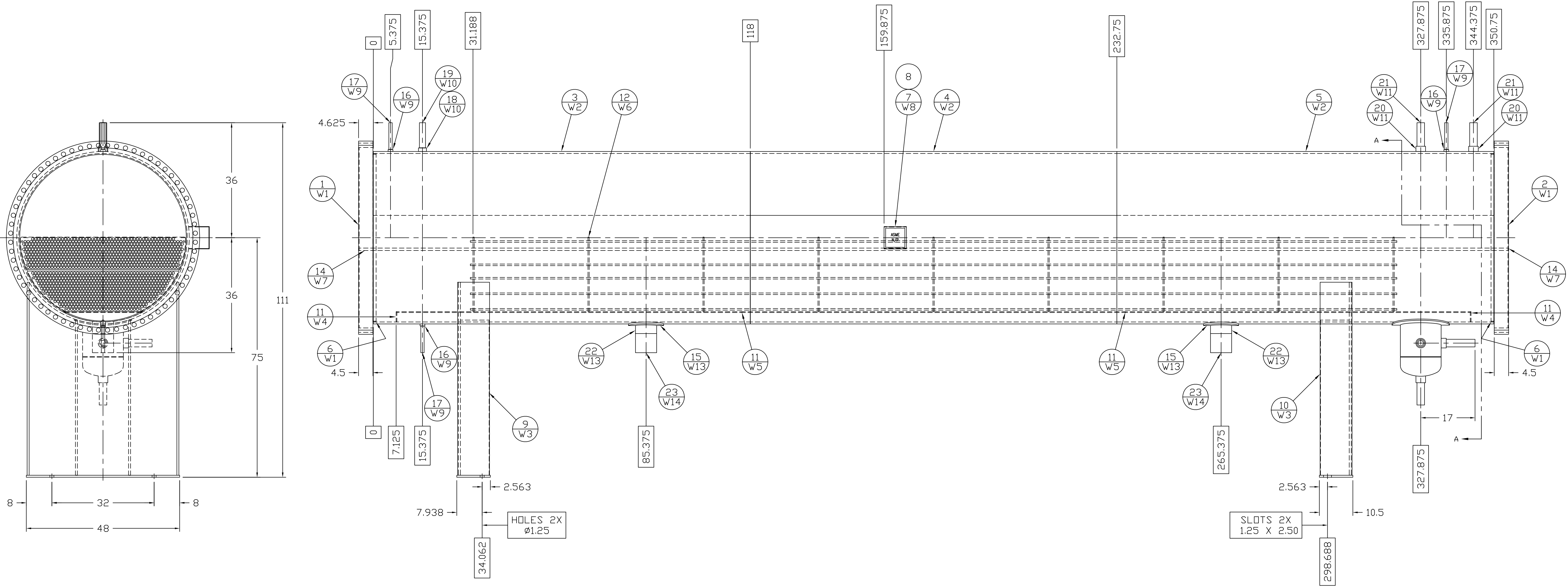
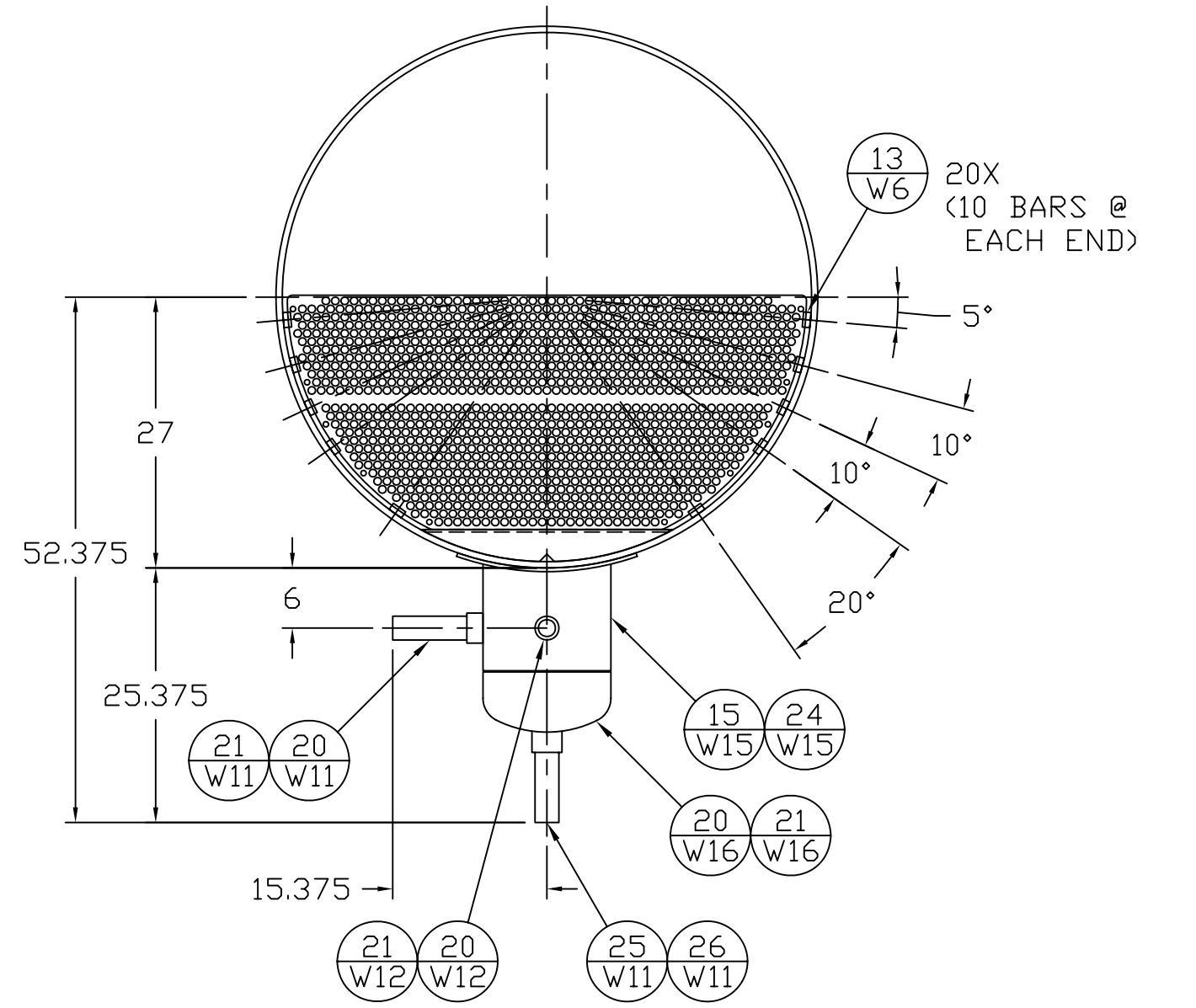
CATALOG NUMBER
0530918S-11



SPECIFICATIONS
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCE = ±
MAT'L = SEE BILL OF MAT'L
WT. =
DO NOT SCALE

CERTIFIED
BY
FES, INC.
SIGNATURE: P. ARSLAIN DATE: 10/7/05

CO2 CONDENSER, BXM 54" DIA X 360" NTL WITH 12" DAI X 296.50" OAL MANIFOLD	
DATE 8/31/05	DWG. NO. 0530918S-11 E
DWG. BY DRP	SHT. NO. 1 OF 4
APP. BY PFA	
SCALE 1/16" = 1"	
	ORIG. NO. 0530918S-11 E



ITEM	PART NUMBER	QTY	DESCRIPTION	REFERENCE	WEIGHT
012	0530918S-31	1.0000	ASSEMBLY, BUNDLE 54" DIA X 360" NTL		692.4 LBS
013	807-80207M-0015	20.0000	BAR, FLAT 0.250 X 0.750 1 1/2 LG SA36 HRS CUT TO LENGTH		1.58 LBS
014	170-00089B-030	1207.0000	TUBE, STL, SA214 ERW 0.750 OD X .083 MIN WA X 30'-0"(+1/8,-0)	APR 1230	29462.87 LBS
015	0530918S-2115	0.5000	PROFILE, REPADS .375" THK SA516-70		56. LBS
016	610-001930-075	3.0000	COUPLING, WHOLE 0.75" SW SA105 3000#		
017	806-00007M-0090	3.0000	PIPE, SMLS 0.75" SCH 80 (0.154) 9 LG SA106-B CUT TO LENGTH		
018	610-001930-150	1.0000	COUPLING, WHOLE 1.50" SW SA105 3000#		
019	806-00015M-0090	1.0000	PIPE, SMLS 1.50" SCH 80 (0.200) 9 LG SA106-B CUT TO LENGTH		
020	610-001930-200	5.0000	COUPLING, WHOLE 2.00" SW SA105 3000#		
021	805-00020M-0090	5.0000	PIPE, SMLS 2.00" SCH 40 (0.154) 9 LG SA106-B/SA53-B CUT TO LENGTH		
022	610-00003C-086	2.0000	TRANSITION, TAPER 80-40 6.00" X 12.00" LG SA53-B / SA106-B SMLS		
023	805-00060M-0060	2.0000	PIPE, SMLS 6.00" SCH 40 (0.280) 6 LG SA106-B/SA53-B CUT TO LENGTH		
024	610-00003C-111	1.0000	TRANSITION, TAPER 80-STD 12.00" X 18.00" LG SA53-B / SA106-B SMLS		
025	610-000550-120	1.0000	CAP, BW STD WT 12.00" A234		
026	080-000040-120	1.0000	RING, BACK-UP WELD 12.00" SCH 40		

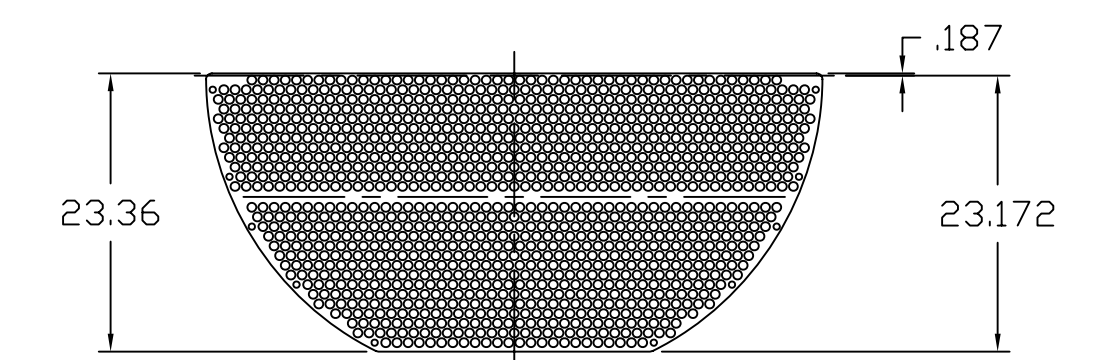
TAS C/O SHELL MAHOGANY RESEARCH PROJECT
FREEZE WALL TEST
RIO BLANCO COUNTY, COLORADO
SHELL PO NO. 4500183121



CO2 CONDENSER, BXM 54" DIA X 360" NTL WITH 12" DIA X 296.50" OAL MANIFOLD	
E 8/31/05 BY DRP BY PFA E 1/16" = 1"	DWG. NO. 0530918S-11 E SHT. NO. 2 OF 4 ORIG. NO. 0530918S-11 F

W1 TIE RODS & SUPPORTS

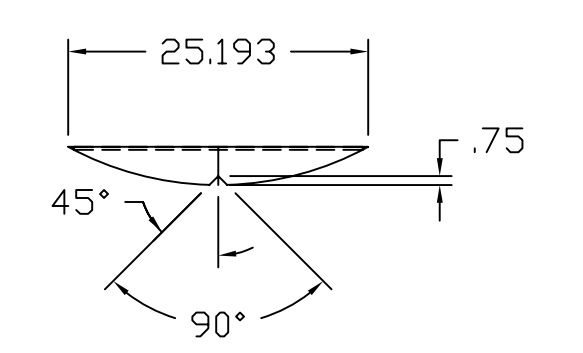
3/16 WPS-102 TYP
TIE RODS TO
ALL BAFFLES



W1

3/16

WPS-601
TYP.



CERTIFIED
BY
FES, INC.
SIGNATURE: P. ARSLAIN DATE: 10/7/05



CO2 CONDENSER, BXM 54" DIA X 360" NTL WITH 12" DIA X 296.50" OAL MANIFOLD	
DATE 8/31/05	DWG. NO. 0530918S-11 E
DWG. BY DRP	
APP. BY PFA	SHT. NO. 3 OF 4
SCALE 1/16" = 1"	ORIG. NO. 0530918S-11 E



FES Systems Inc.

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 # NB-26, Rev. 1

FES Sales Order # 05-309-18S

1. Manufactured and certified by: FES Systems Inc. 3475 Board Road PO Box 2306 (17405) York PA 17402
(Name and Address of Manufacturer)
2. Manufactured for: Turbine Air Systems, Ltd. 4300 Dixie Drive; Houston, TX 77021
(Name and Address of Purchaser)
3. Location of installation: SHELL EXPLORATION & PRODUCTION CO. NW COLORADO
(Name and Address)
4. Type: Horizontal 54" OD x 360" NTL CONDENSER, BXM 050353
(Horiz., vert, or sphere) (Tank, separator, jkt. Vessel, heat exh., etc.) (Mfg'r's. Serial No.)
0530918S-11E REV B-1 14401 2005
(CRN) (Drawing No.) (Nat'l Bd. No.) (Year built)
5. ASME CODE, Section VIII, Div. 1. 2004/-
(Edition and Addenda (date)) (Code Case Nos.) (Special Service per UG-120d)

Items 6-11 incl. to be completed for single wall vessels, jackets of jacketed vessels, shell of heat exchangers, or chamber of multichamber vessels.

6. Shell: (a) No. of course(s) 3 (b) Overall length (ft & in) 29' 2.75"

Course(s)			Material		Thickness		Long Joint (Cat A, B & C)			Circum. Joint (Cat A, B & C)			Heat Treatment	
No.	Diameter (in)	Length (ft & in)	Spec / Grade or Type		Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
2	54"	9' 10"	SA 516-70		.625"	.062"	T-1	Spot	85	T-1	Spot	85	-	-
1	54"	9' 6.75"	SA 516-70		.625"	.062"	T-1	Spot	85	T-1	Spot	85	-	-

7. Heads: (a) (Mat'l Spec. No., Grade or Type) (H.T. - Time & Temp.) (b) (Mat'l Spec. No., Grade or Type) (H.T. - Time & Temp.)
- | | Location
(Top Bottom,
Ends) | Thickness | | Radius | | Elliptical
Ratio | Conical
Apex Angle | Hemispherical
Radius | Flat
Diameter | Side to Pressure | | Category A | | |
|-----|-----------------------------------|-----------|-------|--------|---------|---------------------|-----------------------|-------------------------|------------------|------------------|---------|------------|------------------|------|
| | | Min. | Corr. | Crown | Knuckle | | | | | Convex | Concave | Type | Full, Spot, None | Eff. |
| (a) | | | | | | | | | | | | | | |
| (b) | | | | | | | | | | | | | | |

If removable, bolts used (describe other fastenings):

8. Type of Jacket: - Jacket closure -
(Material, Spec. No., Grade, Size, No.)
Describe as ogee & weld, bar etc.
If bolted, describe or sketch.
9. MAWP: 300 - psi at max. temp. 200 - °F. Min. design metal temp. -20 °F at 300 psi.
(internal) (external) (internal) (external)

10. Impact test: No per UCS 66(b) at test temperature of - °F.
[Indicate yes or no and the component(s) impact tested]

11. Hydro., pneu., or comb. test press. 390 psi Proof test N/A

Items 12 and 13 to be completed for tube sections.

12. Tubesheet: SA 516-70 60.5" 4.50" .062" WELDED
[Stationary (Mat'l Spec. No.)] [Dia., in. (subject to press.)] (Nom. thk., in.) (Corr. Allow., in.) [Attachment (welded or bolted)]
N/A N/A N/A N/A N/A
[Floating (Mat'l Spec. No.)] (Dia., in.) (Nom. thk., in.) (Corr. Allow., in.) (Attachment)
13. Tubes: SA 214 .750" .083" 1207 Straight
(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		Thickness		Long Joint (Cat. A)			Circum. Joint (Cat. A, B, & C)			Heat Treatment	
No.	Diameter, in.	Length (ft & in.)	Spec./Grade or Type		Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
1	54"	24"	SA 516-70		.875"	.062"	T-1	Spot	85	T-1	Spot	85		

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,
Bottom, Ends) | Thickness | | Radius | | Elliptical
Ratio | Conical
Apex Angle | Hemispherical
Radius | Flat
Diameter | Side to Pressure | | Category A | | |
|-----|---------------------------------|-----------|-------|--------|---------|---------------------|-----------------------|-------------------------|------------------|------------------|---------|------------|------------------|------|
| | | Min. | Corr. | Crown | Knuckle | | | | | Convex | Concave | Type | Full, Spot, None | Eff. |
| (a) | End | .875" | .062" | - | ELLIP | 2:1 | - | - | - | - | X | S | None | 100 |
| (b) | End | .875" | .062" | - | ELLIP | 2:1 | - | - | - | - | X | S | None | 100 |

If removable, bolts used (describe other fastening)

Bolts, SA 193-B7, 1.25", (128); Nuts, SA 1942H, 1.25", (256)

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

14. 05-309-18S

NATIONAL BOARD		14401	
U	CERTIFIED BY FES SYSTEMS INC.		
	W	SS MAWP 300	PSI AT 200 °F

FES		14401	
CERTIFIED BY FES SYSTEMS INC.			
U	SS MAWP 300	PSI AT 200	° F
W	SS MDMT -20	° F AT 300	PSI
RT-3	SS MDMT XX	° F AT XX	PSI
RT-3	TS MAWP 450	PSI AT 200	° F
RT-3	TS MDMT -20	° F AT 450	PSI
	TS MDMT XX	° F AT XX	PSI
YEAR 2005	FES S/N 050353		
E-5801-26			

1. Manufactured and certified by: FES Systems Inc. 3475 Board Road PO Box 2306 (17405) York PA 17402
(Name and Address of Manufacturer)

2. Manufactured for: Turbine Air Systems, Ltd. 4300 Dixie Drive; Houston, TX 77021
(Name and Address of Purchaser)

3. Location of installation: SHELL EXPLORATION & PRODUCTION CO. NW COLORADO
(Name and Address)

4. Type: Horizontal 54" OD x 360" NTL CONDENSER, BXM 050358
(Horiz., vert, or sphere) (Tank, separator, jkt. Vessel, heat exh., etc.) (Mfg'r's. Serial No.)
0530918S-11E REV B-1 14406 2005
(CRN) (Drawing No.) (Nat'l Bd. No.) (Year built)

5. ASME CODE, Section VIII, Div. 1. 2004/-
(Edition and Addenda (date)) (Code Case Nos.) (Special Service per UG-120d)

Items 6-11 incl. to be completed for single wall vessels, jackets of jacketed vessels, shell of heat exchangers, or chamber of multichamber vessels.

6. Shell: (a) No. of course(s) 3 (b) Overall length (ft & in) 29' 2.75"

No.	Course(s)		Material Spec./Grade or Type	Thickness		Long Joint (Cat A, B & C)			Circum. Joint (Cat A, B & C)			Heat Treatment	
	Diameter (in)	Length (ft & in)		Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
2	54"	9' 10"	SA 516-70	.625"	.062"	T-1	Spot	85	T-1	Spot	85	-	-
1	54"	9' 6.75"	SA 516-70	.625"	.062"	T-1	Spot	85	T-1	Spot	85	-	-

7. Heads: (a) (b)

(Mat'l Spec. No., Grade or Type) (H.T. - Time & Temp.) (Mat'l Spec. No., Grade or Type) (H.T. - Time & Temp.)

	Location (Top Bottom, Ends)	Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure		Category A		
		Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full, Spot, None	Eff.
(a)														
(b)														

If removable, bolts used (describe other fastenings):

8. Type of Jacket: - Jacket closure -
(Material, Spec. No., Grade, Size, No.)
If bar, give dimensions - Describe as ogee & weld, bar etc.
If bolted, describe or sketch.

9. MAWP: 300 - psi at max. temp. 200 - °F. Min. design metal temp. -20 °F at 300 psi.
(internal) (external) (internal) (external)

10. Impact test: No per UCS 66(b) at test temperature of - °F.
[Indicate yes or no and the component(s) impact tested]

11. Hydro., pneu., or comb. test press. 390 psi Proof test N/A

Items 12 and 13 to be completed for tube sections.

12. Tubesheet: SA 516-70 60.5" 4.50" .062" WELDED
[Stationary (Mat'l Spec. No.)] [Dia., In. (subject to press.)] (Nom. thk., in.) (Corr. Allow., in.) [Attachment (welded or bolted)]
N/A N/A N/A N/A N/A
[Floating (Mat'l Spec. No.)] (Dia., in.) (Nom. thk., in.) (Corr. Allow., in.) (Attachment)
13. Tubes: SA 214 .750" .083" 1207 Straight
(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.):

No.	Course(s)		Material Spec./Grade or Type	Thickness		Long Joint (Cat. A)			Circum. Joint (Cat. A, B, & C)			Heat Treatment	
	Diameter, in.	Length (ft & in.)		Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
1	54"	24"	SA 516-70	.875"	.062"	T-1	Spot	85	T-1	Spot	85		

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, Bottom, Ends)	Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure		Category A		
		Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full, Spot, None	Eff.
(a)	End	.875"	.062"	-	ELLIP	2:1	-	-	-	-	X	S	None	100
(b)	End	.875"	.062"	-	ELLIP	2:1	-	-	-	-	X	S	None	100

If removable, bolts used (describe other fastening) Bolts, SA 193-B7, 1.25", (128) ; Nuts, SA 1942H, 1.25", (256)
(Mat'l Spec. No., Grade, size, No.)

16. MAWP: 450 (internal) - (external) psi at max. temp 200 (internal) - (external) °F. Min design metal temp. -20 °F at 450 psi.
17. Impact test: No Per UCS 66(b) at test temperature of - °F.
(Indicate yes or no and the component(s) impact tested)
18. Hydro., pneu., or comb. Test press. 585 Proof test -
19. Nozzles, Inspection, and safety valve openings:

Purpose (Inlet, Outlet, Drain, etc)	No.	Diameter or Size	Flange Type	Material		Nozzle Thickness		Reinforcement Material	How Attached		Location (Insp. Open.)
				Nozzle	Flange	Nom.	Corr.		Nozzle	Flange	
TS CONNECTION	2-2	.75"/.75	-	SA 105	-	3000#	.062"	-	UW16.1c	-	-
TS CONNECTION	1	8"	WN 300#	SA 53-B	SA105	SCH 80-40	.062"	SA 516-70	UW16.1c	welded	-
TS CONNECTION	1	10"	WN 300#	SA 53-B	SA105	SCH 80-40	.062"	SA 516-70	UW16.1c	welded	-
SS CONNECTION	5	2"	-	SA 105	-	3000 #	.062"	-	UW16.1c	-	-
SS CONNECTION	1	12"	SUMP	SA 53-B	SA234	SCH 80-STD	.062"	SA 516-70	UW16.1c	welded	-
SS CONNECTION	3	.750"	-	SA 105	-	3000#/#	.062"	-	UW16.1c	-	-
SS CONNECTION	2	6"	-	SA 53-B	-	SCH 80-40	.062"	SA 516-70	UW16.1c	-	-
SS CONNECTION	1	1.500"	-	SA 105	-	3000 #	.062"	-	UW16.1c	-	-
RISERS	4	8"	-	SA 53-B	-	SCH 80	.062"	SA 516-70	UW16.1c	-	-

20. Supports: Skirt No Lugs 3 Legs 2 Others 6 Supports Attached Welded to O.D. of vessel
(Yes or No) (No.) (No.) (Describe) (Where and How)

21. Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report: (List the name of part, item number, mfg's. name and identifying number)

22. Remarks: (This vessel not designed for lethal or nuclear service.) Exempt from impact testing per UCS-66(b)

Inspection opening exempt per UG-46(a) 2 Weld Neck Ring flanges, SA 350 LF2, 54" Dia., x 4.5" Thk. SPOT X-RAY TO HEAD

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 of this vessel conform to the ASME Code for Pressure Vessels, Section VIII, Division 1.

"U" Certificate of Authorization Number: 12,647 Expires 5/14/2008

Date 12-06-2005 Name FES Systems Inc. Signed B. M. Limmon
(Manufacturer) (Representative)

CERTIFICATE OF SHOP INSPECTION

I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province of PA and employed by HSBCT of Hartford, CT

have inspected the pressure vessel described in this Manufacturer's Data Report on 12-06-2005, and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME Code, Section VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date 12-6-2005 Signed [Signature] Commissions NB 10801A PA92541
(Authorized Inspector) (Nat'l Board incl. endorsements, State, Province, and No.)

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 with the Requirements of ASME Code, Section VIII, Division 1. U Certificate of Authorization No. Expires

Date Name Signed
(Assembler) (Representative)

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 State or Province of and employed by

of, have compared the statements in this Manufacturer's Data Report with the described pressure vessel and state that parts referred to as data items, not included in the certificate of shop inspection, have been

inspected by me and to the best of my knowledge and belief, the Manufacturer has constructed and assembled this pressure vessel in accordance with the ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of psi.

By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or loss of any kind arising from or connected with this inspection.

Date Signed Commissions
(Authorized Inspector) (Nat'l Board incl. endorsements, State, Province, and No.)

14. 05-309-18T

NATIONAL BOARD

14406

U

CERTIFIED BY
FES SYSTEMS INC.

W

SS MAWP

300

PSI AT

200

°F

SS MDMT

-20

°F AT

300

PSI

NB

14406

CERTIFIED BY
FES SYSTEMS INC.

SS MAWP

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SS MDMT

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TS MAWP

450

PSI AT

200

°F

TS MDMT

-20

°F AT

450

PSI

TS MDMT

XX

°F AT

XX

PSI

YEAR

2005

FES S/N

050358

E-5802-26

1. Manufactured and certified by: FES Systems Inc. 3475 Board Road PO Box 2306 (17405) York PA 17402
 (Name and Address of Manufacturer)

2. Manufactured for: Turbine Air Systems, Ltd. 4300 Dixie Drive; Houston, TX 77021
 (Name and Address of Purchaser)

3. Location of installation: SHELL EXPLORATION & PRODUCTION CO. NW COLORADO
 (Name and Address)

4. Type: Horizontal 54" OD x 360" NTL CONDENSER, BXM 050357
 (Horiz., vert, or sphere) (Tank, separator, jkt. Vessel, heat exh., etc.) (Mfr's. Serial No.)

0530918S-11E REV B-1 14405 2005
 (CRN) (Drawing No.) (Nat'l Bd. No.) (Year built)

5. ASME CODE, Section VIII, Div. 1. 2004/-
 (Edition and Addenda (date)) (Code Case Nos.) (Special Service per UG-120d)

Items 6-11 incl. to be completed for single wall vessels, jackets of jacketed vessels, shell of heat exchangers, or chamber of multichamber vessels.

6. Shell: (a) No. of course(s) 3 (b) Overall length (ft & in) 29' 2.75"

Course(s)			Material		Thickness		Long Joint (Cat A, B & C)			Circum. Joint (Cat A, B & C)			Heat Treatment	
No.	Diameter (in)	Length (ft & in)	Spec./Grade or Type		Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
2	54"	9' 10"	SA 516-70		.625"	.062"	T-1	Spot	85	T-1	Spot	85	-	-
1	54"	9' 6.75"	SA 516-70		.625"	.062"	T-1	Spot	85	T-1	Spot	85	-	-

7. Heads: (a) (Mat'l Spec. No., Grade or Type) (H.T. - Time & Temp.) (b) (Mat'l Spec. No., Grade or Type) (H.T. - Time & Temp.)

	Location (Top Bottom, Ends)	Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure		Category A		
		Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full, Spot, None	Eff.
(a)														
(b)														

If removable, bolts used (describe other fastenings):

8. Type of Jacket: - Jacket closure - (Material, Spec. No., Grade, Size, No.)
 Describe as ogree & weld, bar etc.

If bar, give dimensions - If bolted, describe or sketch: -

9. MAWP: 300 - psi at max. temp. 200 - °F. Min. design metal temp. -20 °F at 300 psi.
 (internal) (external) (internal) (external)

10. Impact test: No per UCS 66(b) at test temperature of - °F.
 [Indicate yes or no and the component(s) impact tested]

11. Hydro., pneu., or comb. test press. 390 psi Proof test N/A

Items 12 and 13 to be completed for tube sections.

12. Tubesheet: SA 516-70 60.5" 4.50" .062" WELDED
 [Stationary (Mat'l Spec. No.)] [Dia., In. (subject to press.)] (Nom. thk., in.) (Corr. Allow., in.) [Attachment (welded or bolted)]
N/A N/A N/A N/A N/A
 [Floating (Mat'l Spec. No.)] (Dia., in.) (Nom. thk., in.) (Corr. Allow., in.) (Attachment)
 13. Tubes: SA 214 .750" .083" 1207 Straight
 (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		Thickness		Long Joint (Cat. A)			Circum. Joint (Cat. A, B, & C)			Heat Treatment	
No.	Diameter, in.	Length (ft & in.)	Spec./Grade or Type		Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
1	54"	24"	SA 516-70		.875"	.062"	T-1	Spot	85	T-1	Spot	85		

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, Bottom, Ends)	Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure		Category A		
		Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full, Spot, None	Eff.
(a)	End	.875"	.062"	-	ELLIP	2:1	-	-	-	-	X	S	None	100
(b)	End	.875"	.062"	-	ELLIP	2:1	-	-	-	-	X	S	None	100

If removable, bolts used (describe other fastening) Bolts, SA 193-B7, 1.25", (128) ; Nuts, SA 1942H, 1.25", (256)
 (Mat'l Spec. No., Grade, size, No.)

16. MAWP: 450 (internal) - (external) psi at max. temp 200 (internal) - (external) °F. Min design metal temp. -20 °F at 450 psi.
17. Impact test: No Per UCS 66(b) at test temperature of - °F.
(Indicate yes or no and the components(s) impact tested)
18. Hydro., pneu., or comb. Test press. 585 Proof test -
19. Nozzles, Inspection, and safety valve openings:

Purpose (Inlet, Outlet, Drain, etc)	No.	Diameter or Size	Flange Type	Material		Nozzle Thickness		Reinforcement Material	How Attached		Location (Insp. Open.)
				Nozzle	Flange	Nom.	Corr.		Nozzle	Flange	
TS CONNECTION	2-2	.75"/1.75	-	SA 105	-	3000#	.062"	-	UW16.1c	-	-
TS CONNECTION	1	8"	WN 300#	SA 53-B	SA105	SCH 80-40	.062"	SA 516-70	UW16.1c	welded	-
TS CONNECTION	1	10"	WN 300#	SA 53-B	SA105	SCH 80-40	.062"	SA 516-70	UW16.1c	welded	-
SS CONNECTION	5	2"	-	SA 105	-	3000 #	.062"	-	UW16.1c	-	-
SS CONNECTION	1	12"	SUMP	SA 53-B	SA234	SCH 80-STD	.062"	SA 516-70	UW16.1c	welded	-
SS CONNECTION	3	.750"	-	SA 105	-	3000#/	.062"	-	UW16.1c	-	-
SS CONNECTION	2	6"	-	SA 53-B	-	SCH 80-40	.062"	SA 516-70	UW16.1c	-	-
SS CONNECTION	1	1.500"	-	SA 105	-	3000 #	.062"	-	UW16.1c	-	-
RISERS	4	8"	-	SA 53-B	-	SCH 80	.062"	SA 516-70	UW16.1c	-	-

20. Supports: Skirt No (Yes or No) Lugs 3 (No.) Legs 2 (No.) Others 6 Supports (Describe) Attached Welded to O.D. of vessel (Where and How)

21. Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report: (List the name of part, item number, mfg's. name and identifying number)

22. Remarks: (This vessel not designed for lethal or nuclear service.) Exempt from impact testing per UCS-66(b)

Inspection opening exempt per UG-46(a) 2 Weld Neck Ring flanges, SA 350 LF2, 54" Dia., x 4.5" Thk. SPOT X-RAY TO HEAD

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 of this vessel conform to the ASME Code for Pressure Vessels, Section VIII, Division 1.

"U" Certificate of Authorization Number: 12,647 Expires 5/14/2008

Date 11-23-2005 Name FES Systems Inc. Signed B. m. J. J. J. J. J.
(Manufacturer) (Representative)

CERTIFICATE OF SHOP INSPECTION

I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province of PA and employed by HSBCT of Hartford, CT

have inspected the pressure vessel described in this Manufacturer's Data Report on 11-23-2005, and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME Code, Section VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date 11-23-2005 Signed [Signature] Commissions 20310801A PA02541
(Authorized Inspector) (Nat'l Board incl. endorsements, State, Province, and No.)

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 with the Requirements of ASME Code, Section VIII, Division 1. U Certificate of Authorization No. - Expires -

Date - Name - Signed -
(Assembler) (Representative)

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 State or Province of - and employed by -

of -, have compared the statements in this Manufacturer's Data Report with the described pressure vessel and state that parts referred to as data items -, not included in the certificate of shop inspection, have been

inspected by me and to the best of my knowledge and belief, the Manufacturer has constructed and assembled this pressure vessel in accordance with the ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of - psi.

By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or loss of any kind arising from or connected with this inspection.

Date - Signed - Commissions -
(Authorized Inspector) (Nat'l Board incl. endorsements, State, Province, and No.)

14. 05-309-18U

NATIONAL BOARD		14405	
U	CERTIFIED BY FES SYSTEMS INC.		
W	SS MAWP	300	PSI AT 200 °F
	SS MDMT	-20	°F AT 300 PSI

NB		14405	
CERTIFIED BY FES SYSTEMS INC.			
U	SS MAWP	300	PSI AT 200 °F
W	SS MDMT	-20	°F AT 300 PSI
	SS MDMT	XX	°F AT XX PSI
RT-3	TS MAWP	450	PSI AT 200 °F
RT-3	TS MDMT	-20	°F AT 450 PSI
	TS MDMT	XX	°F AT XX PSI
YEAR	2005		FES S/N 050357
E-5803-26			



HEAT EXCHANGER SPECIFICATION SHEET

1	SHELL OIL CO		**ALTERNATE**	
2	Location:			
3	Service of Unit: CO2 CONDENSER		Our Reference:	
4	Item No.:E-4		Your Reference:	
5	Date:04-13-05		Rev No.:0	
6	Size 53-360		Type BXM hor	
7	Surf/unit(eff) 6964		Connected in 1 parallel 1 series	
8	ft2; Shells/unit 1 Surf/shell(eff) 6964 ft2			
9	PERFORMANCE OF ONE UNIT			
10	Fluid allocation		Shell Side	
11	Fluid name		AMMONIA	
12	Fluid quantity, total lb/h		36976	
13	Vapor (in/out) lb/h		7395 36976	
14	Liquid lb/h		29581	
15	Noncondensable lb/h			
16	Temperature (in/out) F		-2 -2	
17	Dew point/bubble point F		123 8	
18	Density lb/ft3		41.503 0.1	
19	Viscosity cp		0.204 0.008	
20	Molecular weight, vapor		0.019 0.127	
21	Molecular weight, noncondensable			
22	Specific heat Btu/(lb*F)		1.08 0.497	
23	Thermal conductivity Btu/(ft*h*F)		0.329 0.012	
24	Latent heat Btu/lb		571 571	
25	Inlet pressure psia		28.9 349	
26	Velocity ft/s		10.8	
27	Pressure drop, allow./calc. psi		/ 2 / 0.945	
28	Fouling resist. (min.) ft2*h*F/Btu		0.0005 0.0005	
29	Heat exchanged 16900000 Btu/h; MTD (corrected)		10.0 F	
30	Transfer rate, service 244 dirty 254 clean 358		Btu/(ft2*h*F)	
31	CONSTRUCTION OF ONE SHELL			
32	Design/test pressure psig		300/code 450/code	
33	Design temperature F		200 200	
34	No. passes per shell		1 2	
35	Corrosion allowance in		0.0625 0.0625	
36	Connections in in		8/B.W. 10/300	
37	size/rating out in		8(3)/B.W. 6/300	
38			/ /	
39	Tube no. 1207 od 0.75 ;thk-avg 0.083 in;length 30 ft;pitch 0.9375 in			
40	Tube type plain, SA-214		Material CS Pattern 30	
41	Shell CS id od 54 in		Shell cover	
42	Channel or bonnet CS , SA516-70		Channel cover	
43	Tubesheet-stationary CS , SA516-70		Tubesheet-floating	
44	Floating head cover		Impingement protection on bundle	
45	Baffles-cross CS Type full sup		Cut (%d) ;Spacing: c/c 36.0 in	
46	Baffles-long Seal type		Inlet 36 in	
47	Supports-tube CS U-bend		Type	
48	Bypass seal		Tube-tubesheet joint exp./seal wid	
49	Expansion joint		Type	
50	Rho*V2-inlet nozzle 1449 Bundle entrance		Bundle exit	
51	Gaskets-shell side		Tube side comp. fiber	
52	-floating head			
53	Code requirements ASME Code Sec VIII Div 1		TEMA class B	
54	Weight/shell 57284 Filled with water		88026 Bundle 37197 lb	
55	Remarks			
56				
57				
58				

