

FORM U MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS  
 As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1 # 115076 & # 115077

58-UG87-60-P11-0014

1. Manufactured and certified by Doyle & Roth Mfg. Co., Inc. One Morse Avenue Simpson, PA 18407  
 (Name & address of Manufacturer)
2. Manufactured for Jacobs Engineering PO Box 53495 Houston, TX 77052  
 (Name & address of Purchaser)
3. Location of installation Jacobs Applied Technology 2040 Bushy Park Road Goose Creek, SC 29445  
 (Name & address)
4. Type: Vertical Heat Exchanger S-1381-1 & 2 B-11408-1 20053&20054 2005  
 (Horiz., vert., or sphere) (tank, separator, jkt. vessel, heat exch., etc) (Mfg's serial no.) (CRN) (Drawing No.) (Nat'l Bd. No.) (Year built)
5. ASME Code, Section VIII, Div 1 2004  
 Edition and Addenda (date) Code Case No. Special Service per UG-120(d)

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

6. Shell (a) No. of course(s): 1 (b) Overall length (ft & in): 7'9"

Course(s)			Material	Thickness		Long Joint (Cat A)			Circum. Joint (Cat A, B, & C)			Heat Treatment	
No.	Dia. in.	Length (ft & in)	Spec/Grade or Type	Nom	Corr	Type	Full, Spot, None	Eff	Type	Full, Spot, None	Eff	Temp	Time
1	24.0	7'9"	SA106B	.375	.125	S	None	100	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-

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

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

If removable, bolts used (describe other fastening) \_\_\_\_\_  
 (Mat'l Spec. No., Grade, size, no)

8. Type of jacket \_\_\_\_\_ Jacket closure \_\_\_\_\_  
 (Describe as ogee & weld, bar, etc.)

If bar, give dimensions \_\_\_\_\_ If bolted, describe or sketch.

9. MAWP 150 15 psi at max temp 400 400 °F Min design metal temp -20 °F at 150&-15 psi.  
 (Internal) (external) (internal) (external)

10. Impact test no per UG20(f) at test temperature of \_\_\_\_\_ °F.  
 (Indicate yes or no and the component(s) impact tested)

1. Hydro test press 195 Proof test \_\_\_\_\_

Items 12 and 13 to be completed for tube sections.

2. Tubesheet: SA516-70 28.375 1.3125 .125 Welded  
 [Stationary (Mat'l Spec No.)] [Dia., in. (subject to pressure)] [Nom thk., in] [Corr. Allow., in] [Attachment (Welded or bolted)]

3. Tubes: SA179 .75 .083" 487 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.

4. 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.	Dia. in.	Length (ft & in)	Spec/Grade or Type	Nom	Corr	Type	Full, Spot, None	Eff	Type	Full, Spot, None	Eff	Temp	Time
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-

5. Heads: (a) SA516-70 (b) -  
 (Mat'l Spec. No., Grade or Type) (H.T. - Time & Temp)

	Location (Top, Bottom, Ends)	Thickness		Radius		Ellip Ratio	Conical Apex Angle	Hemi Rad	Flat Dia	Side to Pressure		Category A		
		Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full, Spot, None	Eff
(a)	Ends	.375	.125	-	-	2:1	-	-	-	X	X	-	-	-
(b)	-	-	-	-	-	-	-	-	-	-	-	-	-	-

If removable, bolts used (describe other fastening) \_\_\_\_\_ Alloy SA193 B7 & SA194-2H 3/4" (24)

JACOBS ENGINEERING GROUP INC - CENTRAL REGION  
 PROJECT NO. P11-0014 SERIAL NO. 11-0  
 SIGNATURE DATE 9/16/05 ITEM NO.

B. COMMENTS NOTED - REVISE, RESUBMIT.  
 C. UNACCEPTABLE - DO NOT PROCEED WITH FABRICATION  
 D. FOR INFORMATION ONLY  
 (Mat'l Spec. No., Grade, size, no)

16. MAWP 150 15 psi at max temp 400 400 °F Min design metal temp -20 °F at 150&15 psi.  
(Internal) (external) (internal) (external)

17. Impact test no per UG20(f) at test temperature of - °F.  
(Indicate yes or no and the component(s) impact tested)

18. Hydro test press 195 Proof test -

19. Nozzles, inspection, and safety valve openings:

Purpose(Inlet, Outlet, Drain, etc.)	No.	Dia or size	Flange Type	Material		Nozzle Thickness		Reinforcement Material	How Attached		Location (Insp.Open)
				Nozzle	Flange	Nom.	Corr.		Nozzle	Flange	
Inlet Outlet	1	4"	RFWN	SA106B	SA105	Sch 80	.125	-	uw16.1c	fig2-4(6a)	-
Inlet Outlet	1	3"	RFWN	SA106B	SA105	Sch 80	.125	-	uw16.1c	fig2-4(6a)	-
Inlet Outlet	2	6"	RFWN	SA106B	SA105	Sch 80	.125	-	uw16.1c	fig2-4(6a)	-
Inlet Outlet	1	2"	RFWN	SA106B	SA105	Sch 160	.125	-	uw16.1c	fig2-4(6a)	-
Drain Vent	1	.75"	Cplg	SA105	-	6000#	.125	-	uw16.1z-1	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

20. Supports: Skirt - Lugs 2 Legs - Others - Attached Welded to shell  
(Yes or No) (No.) (No.) (Describe) (Where & 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)

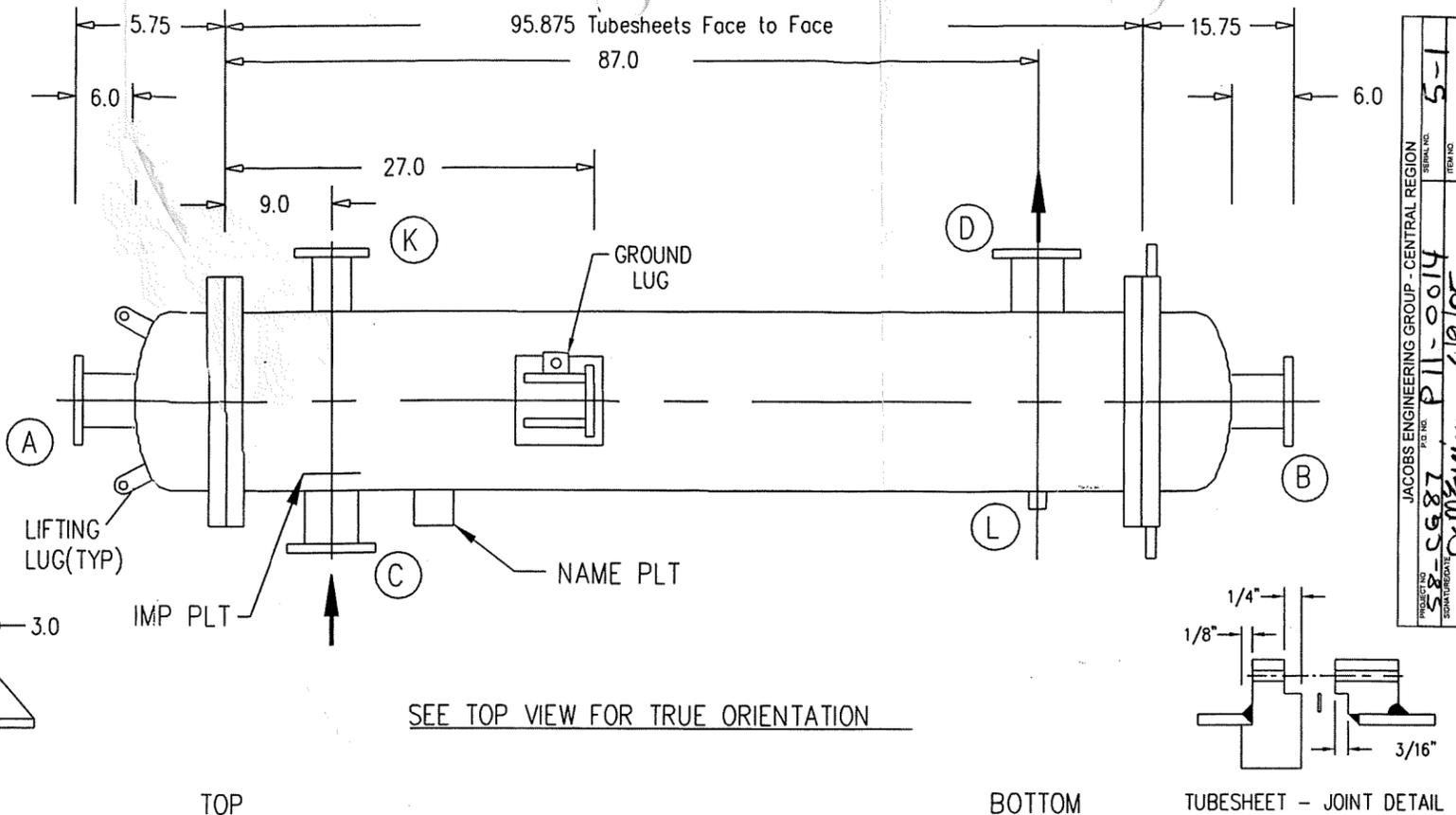
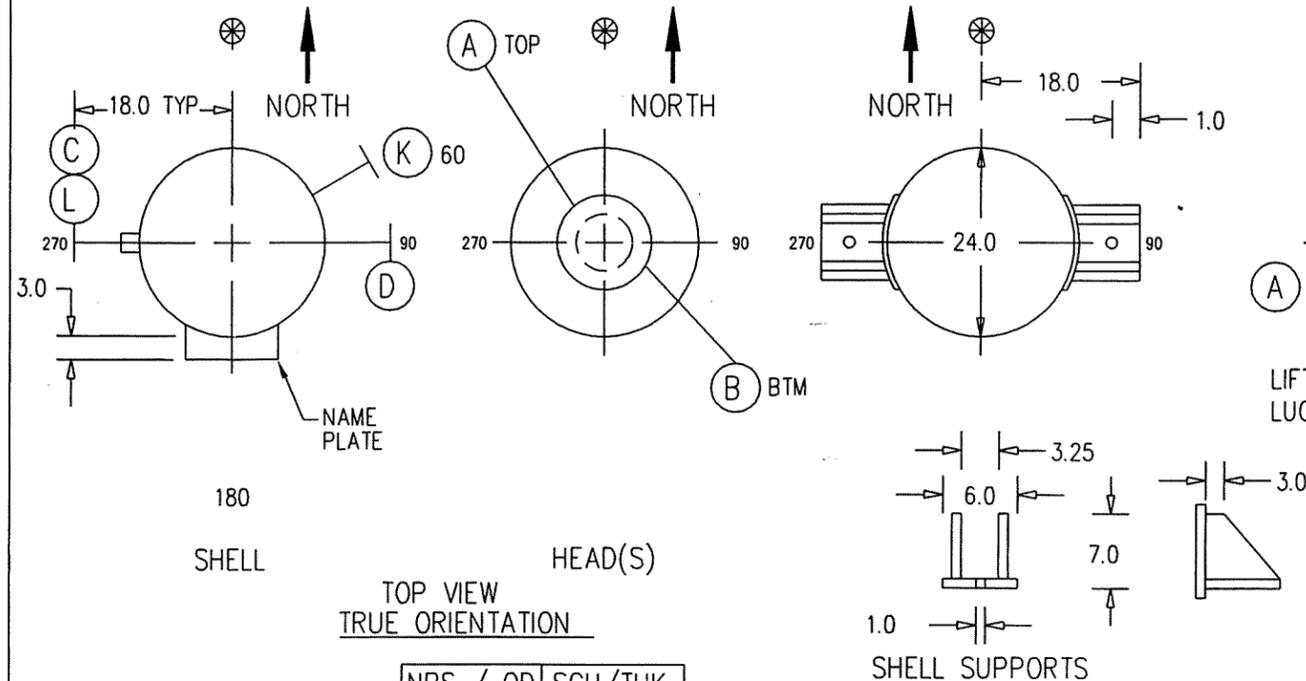
22. Remarks: Vertical Shell and Tube-Heat Exchanger Tag Equip No. E-2206 & E-2207 "Reactor Jacket Heater"  
Head Flanges: (2) 28.375" OD x2.0625" tk SA266 Gr 2 Ring Flange  
Shellside inspection openings omitted per UG46(a)

<b>CERTIFICATE OF SHOP COMPLIANCE</b>	
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 No. <u>982</u> Expires <u>January 31, 2008</u>	
Date <u>8-12-05</u> Name <u>Doyle &amp; Roth Mfg. Co., Inc.</u> Signed <u><i>Joseph S. ...</i></u> <small>(Manufacturer) (Representative)</small>	
<b>CERTIFICATE OF SHOP INSPECTION</b>	
I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and the State or Province of <u>PA</u> and employed by <u>ABS Group, Inc.</u> of <u>Houston, TX</u> and have inspected the pressure vessel described in this Manufacturer's Data Report on <u>Aug. 12, 2005</u> , 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 loss of any kind arising from or connected with this inspection.	
Date <u>8-12-05</u> Signed <u><i>Dalton E. Tillery</i></u> Commissions <u>NB 8845 'A' Pa 2361</u> <small>(Authorized Inspector) (Nat'l Board incl. endorsement, State, Province and No.)</small>	
<b>CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE</b>	
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 _____ <small>(Assembler) (Representative)</small>	
<b>CERTIFICATE OF FIELD ASSEMBLY INSPECTION</b>	
I, the undersigned, holding a valid commission issued by The National Board of Boiler & Pressure Vessel Inspectors and 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 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 a loss of any kind arising from or connected with this inspection.	
Date _____ Signed _____ Commissions _____ <small>(Authorized Inspector) (Nat'l Board incl. endorsement, State, Province and No.)</small>	

THIS DRAWING SHALL NOT BE COPIED, DISPOSED OF, OR USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS FURNISHED, WITHOUT THE WRITTEN PERMISSION OF DOYLE & ROTH MFG CO., INC

D & R MODEL: VT246. 3V  
ALL STEEL CONSTRUCTION

DIMENSIONS IN INCHES  
NOT DRAWN TO SCALE  
BOLT HOLES STRADDLE  
NATURAL CENTERLINES



JACOBS ENGINEERING GROUP - CENTRAL REGION  
PROJECT NO. PES-0014  
JOB NO. 5-1  
DATE 6/19/05  
SUBMIT DATE  
REVISIONS  
A. COMMENTS  
B. COMMENTS NOTED - REVISE, RESUBMIT, PROCEED WITH FABRICATION  
C. UNACCEPTABLE - DO NOT PROCEED WITH FABRICATION  
D. FOR INFORMATION ONLY

Review of this drawing by Jacobs Engineering Group does not relieve the supplier of his responsibility to supply the materials in accordance with the procurement documents

	NPS / OD	SCH/THK	
Nozzle A Tube Inlet	4	80	150 # ANSI RF W.N. Flg SA-105 With SA-106 Gr B Sml Steel Pipe
Nozzle B Tube Outlet	3	80	150 # ANSI RF W.N. Flg SA-105 With SA-106 Gr B Sml Steel Pipe
Nozzle C Shell Inlet	6	80	150 # ANSI RF W.N. Flg SA-105 With SA-106 Gr B Sml Steel Pipe
Nozzle D Shell Outlet	6	80	150 # ANSI RF W.N. Flg SA-105 With SA-106 Gr B Sml Steel Pipe
Nozzle K Expansion	2	160	150 # ANSI RF W.N. Flg SA-105 With SA-106 Gr B Sml Steel Pipe
Coupling L Shell Drain	0.75		6000 # SA-105 C Steel Coupl With Steel Plug (NPT Threaded)
Shell Cylinder	24.0	0.375	SA-106 Gr B Sml Steel Pipe
Head Covers	24.0	0.375	SA-516 Gr 70 Steel Pit Ellipsoidal Cover
Tubesheets	28.375	1.3125	SA-516 Gr 70 Steel Pit
Head Flanges	28.375	2.0625	SA-266 Gr 2 Carbon Steel Forg RING Flange
Gaskets	25.375		Spiral-Wound 304SS W/Non-Asbestos Filler Periph. width 0.375 in
Bolting	0.75		SA-193 B7 Steel Bit 24 Bolts on 26.625 in B.C. With SA-194 CI 2H Nuts & Spring Washers
Tubes	0.75	0.083	SA-179 Sml C Steel Tube Bare tubes
Baffles			SA-36 Steel Pit
Shell Supports		0.625	SA-516 Gr 70 Steel Pit with 3/8" Tk Pad

DESIGN CONDITIONS	SHELL SIDE	TUBE SIDE
MAWP (psig)	FULL VAC/150	FULL VAC/150
TEST PRESSURE [HORIZ.] (psig)	195 [200]	195 [200]
DESIGN TEMPERATURE/MIN ^C(^F)	400/-20	400/-20
NUMBER OF PASSES	1	1
CORROS ALLOW, C STL ONLY (in)	0.125	0.125
RADIOGRAPHY	None	None
LIMITING PART	Tubesheet	Tubesheet
TEMA TYPE BEM SIZE	23-96	SURFACE AREA 765 ft2 EA
TUBE TYPE Bare	NO.OF HOLES 487	LENGTH 96 in
LAYOUT	0.9375 in Tri TUBE-TUBESHT JT	Expanded W/2 Grooves
BAFFLE TYPE	Single Segmental	CUT 30 % V
BAFFLE SPACING (in)	6.0	
IMPINGEMENT PLATE	On Bundle	
CODE: ASME SECT VIII, DIV 1, 2004	TEMA CLASS R	
WEIGHT: EMPTY 4029 EA FLOODED 5323 EA	BUNDLE 2739 EA	lb
DATE: 04-25-05	DRAWN: HS	CHKD: APPD:

PROJECT: PES EXPANSION PROJECT

NOTES: ASME STAMP, NATIONAL BOARD INSPECTION & REGISTRATION ARE REQUIRED.  
SURFACE PREPARATION & PAINT ALL EXTERIOR C STL PER SSPC-SP-10 &  
ONE COAT ZINC PRIMER. ADDITIONAL PAINT: SECOND COAT OF EPOXY &  
THIRD COAT OF ACRYLIC ON LIFT LUGS & SUPPORT LUGS ONLY  
IMPACT TEST NOT REQD PER SECT VIII, DIV I, PARA UG 20(F)  
TUBES SHALL BE FLUSH WITH TOP TUBESHEET  
SEE SKNS1381 FOR ADDITIONAL NOTES

NO.	DATE	BY	REVISIONS
1	05-24-05	HS	NOZ A WAS 6", K WAS CPLG, REVISED NOZZLE ORIENTATION, RELOCATED SUPPORT

**DOYLE & ROTH MFG CO., INC**  
26 BROADWAY (SUITE 911) NEW YORK, NY 10004

CUSTOMER: JACOBS ENGINEERING FOR NOVA CHEMICALS  
P.O. NO.: 58-CG87-60-P11-0014 QTY: TWO (2)  
EQUIP NO.: E-2206, 2207 "REACTOR JACKET HEATER"

JOB NO. S-1381-1 & 2 | DWG NO. B 11408 | REV 1

#115076 & 115077