

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

HC-5831

1. Manufactured and certified by Ward Tank & Heat Exchanger Corp. 8670 East Harris Blvd. Charlotte, NC 28215  
 (Name and address of Manufacturer)

2. Manufactured for Invista 124550 Strang Road LaPorte, Texas 77571  
 (Name and address of Purchaser)

3. Location of installation Unknown  
 (Name and address)

4. Type: Horizontal Heat Exchanger HC-5831 3438 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 2001 A03  
 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): 5 (b) Overall length (ft & in.): 15 ft 9.375 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
2	24"	7 ft 4.312 in	SA-106B	0.375"	0.125"	S	None	1	1	Spot	1	-	-
"	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-

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
(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 FV/100 - psi at max. temp. 212 - °F Min. design metal temp. -20 °F at 100 psi  
 (internal) (external) (internal) (external)

10. Impact test No Per UG-20(f) at test temperature of - °F  
 (Indicate yes or no and the component(s) impact tested)

11. Hydro., ~~proof~~, ~~check~~ test press. 188 Proof test -

Items 12 and 13 to be completed for tube sections.

12. Tubesheet: SA-240 304/304L 23.500" 1.1875" - Welded  
 Stationary (Mat'l Spec. No.) Dia., in. (subject to press.) Nom. thk., in. Corr. Allow., in. Attachment (welded or bolted)

- - - -  
 Floating (Mat'l Spec. No.) Dia., in. Nom. thk., in. Corr. Allow., in. Attachment

13. Tubes: SA-249TP304/304L 1" 0.065" 216 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): 2 (b) Overall length (ft & in.): 2 ft 1.250 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	24"	1 ft 0.625 in	SA-240 304/304L	0.187"	-	1	Spot			.85	1	Spot			.85	-	-
1	24"	0 ft 9.125"	SA-240 304/304L	0.187"	-	1	Spot			.85	1	Spot			.85	-	-
-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

15. Heads: (a) SA-240 304/304L (b) SA-240 304/304L  
 (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
(a)	End	0.187"	-	-	-	2:1	-	-	-	-	X	N/A	N/A	N/A	1
(b)	End	0.187"	-	-	-	2:1	-	-	-	-	X	N/A	N/A	N/A	1

If removable, bolts used (describe other fastening) Stud, 0.625"-UNC x 8.25" SA-193 B7(48) Nut, Hex, 0.625"-UNC SA-194 2H(96)  
 (Mat'l Spec. No., Grade, Size, No.)

16. MAWP FV/150 psi at max. temp. 212 °F Min. design metal temp. -20 °F at 150  
(internal) (external) (internal) (external)

17. Impact test No Per UHA-51(d)(1)(a) (Indicate yes or no and the component(s) impact tested) at test temperature of \_\_\_\_\_

18. Hydro. ~~pressure~~ test press. 225 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	
In/Outlet	1 Ea	4"	RFSO	SA-106B	SA-105	0.237"	0.125"	-	Welded	Welded	Shell
In/Outlet	1 Ea	6"	LJ	SA-312TP304/304L	SA-105	0.134"	-	-	Welded	Welded	Channel
Drain	2	0.75"	-	SA-182F 304/304L	-	3000#	-	-	Welded	-	Channel
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

20. Supports: Skirt No Lugs 2 Legs - Others Fixed Support(2) Attached Shell, Welded  
(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)  
\*\* Expansion Joint Systems Inc. S/N 1355.

22. Remarks: The customer is responsible for the pressure relief device per UG 125a. \* 2005-HC-5831 Rev. 1.  
Customer PO 3800040884. Customer Equipment No. 5001-7011-14.00

#### 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 No. 18365 Expires 2/17/2008

Date SEP. 26, 2005 Name Ward Tank & Heat Exchanger Corp. Signed [Signature]  
(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 the State or Province of NC and employed by NC Department of Labor of Raleigh have inspected the pressure vessel described in this Manufacturer's Data Report on 9-26-05, 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 9-26-05 Signed [Signature] Commissions NB# 11458(A)(B); NC# 1359  
(Authorized Inspector) (Nat'l Board incl. endorsement, 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 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 \_\_\_\_\_  
(Authorized Inspector) (Nat'l Board incl. endorsement, State, Province and No.)

**FORM U-2A MANUFACTURER'S PARTIAL DATA REPORT (ALTERNATIVE FORM)**  
**A Part of a Pressure Vessel Fabricated by One manufacturer for Another Manufacturer**  
**As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1**

1. Manufactured and certified by: Expansion Joint Systems, Inc. 8575 Roland Acres Drive Santee, CA 92071 USA  
(Name and address of Manufacturer)
2. Manufactured for: Ward Tank & Heat Exchanger, 6670 E. Harris Blvd., Charlotte, NC 28215.  
(Name and address of Purchaser)
3. Location of installation: Unknown  
(Name and address)
4. Type: 24" ND Single Expansion Joint Ass'y. 1355 NA  
(Description of vessel part (shell, two-piece head, tube bundle) (Alt's. serial No.) (CRN)  
NA M16641 Expansion Joint Systems, Inc. 2005  
(Mat'l Id. No. 1) (Drawing No.) (Drawing prepared by) (Year built)
5. ASME Code, Section VIII, Div. 1 2004 None None  
(Edition and Agenda (date)) (Case Code No.) (Special Service per UG-120(d))
6. Shell (a) No. of courses: 3 Overall Length (ft & in) 1' 1"

Courses			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	Ell	Type	Full, Spot, None	Ell	Temp.	Time
1	24.00"OD	4.438"	SA106 Gr. B	0.375"	0.063"	NA	None	I	*				
2	24.00"ID	5.775"	SA240-304/304L	0.036"	0	1	None	I	*				
3	24.00"OD	4.438"	SA106 Gr. B	0.375"	0.063"	NA	None	I	*				

7. Heads: (a) None (b) None  
(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 Min. | Corr. | Radius Crown | Knuckle | Elliptical Ratio | Conical Apex Angle | Hemispheric at Radius | Flat Diameter | Side to Pressure Convex | Concave | Category A Full, Spot, None | Ell. |
|------------------------------|----------------|-------|--------------|---------|------------------|--------------------|-----------------------|---------------|-------------------------|---------|-----------------------------|------|
| a                            |                |       |              |         |                  |                    |                       |               |                         |         |                             |      |
| b                            |                |       |              |         |                  |                    |                       |               |                         |         |                             |      |

If removable, bolts used (describe other fastening)

8. MAWP FV/102 psig at 212 max. temp. °F Min. design metal temp. -20° F at FV/102 psig  
(Internal) (External) (Internal) (External)

9. Impact test No per UG-20f

10. Hydro., Pneu., or comb. Test press. 133 psig by others Proof test  
Indicate yes or no and the component(s) impact tested

11. Nozzles, inspection, and safety valve openings:

Purpose (Inlet, Outlet, drain, etc.)	No.	Diameter or size	Flange type	Material Nozzle	Flange	Nozzle Thickness Nom.	Corr.	Reinforcement Material	How Attached Nozzle	Flange	Location (Inlet, Outlet)

12. Supports: Skirt Lugs Legs Others: Attached  
(Yes or No) (No) (No) (Describe) (Where and how)

13. Remarks: Axial Spring Rate 110356 lbs./in. Axial Movement 0.034" Design Cycle life per Appendix 26, 2000 cycles

Expansion Joint Systems, Inc. is responsible for the design of the expansion joint per ASME VIII, Div. 1, 2004 Edition.  
\*Per Appendix 26

**CERTIFICATE OF SHOP/FIELD COMPLIANCE**

We certify that the statements made in this report are correct and that all details of material, construction, and workmanship of this pressure vessel part conform to the ASME Code for Pressure Vessels, Section VIII, Division 1.

U Certificate of Authorization No. 24,671 Expires: March 6, 2008

Date 6/8/05 Name Expansion Joint Systems, Inc. Signed [Signature]  
(Manufacturer) (Representative)

**CERTIFICATE OF SHOP/FIELD INSPECTION**

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and for the State or Province of California and employed by HSB CT of Hartford, CT, have inspected the pressure vessel part described in this Manufacturer's Data Report on 6/8/05, and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel part 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 part 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 6/8/05 Signed [Signature] Commission CA 1994  
(Authorized Inspector) (N.B. Board no.)

Endorsement, State, Province and No. ( )