

FORM U-1 MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS

Form U-1

Customer Order No:

As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1 Fee Class:

B

1. Manufactured and certified by CHART Heat Exchangers L.P. 2191 Ward Avenue La Crosse, WI, USA 54601
(Name and address of Manufacturer)

2. Manufactured for Air Liquide AGS GmbH
(Name and address of Purchaser)

Location of installation Germany
(Name and address)

4. Type: Vert. HEAT EXCHANGER 509.9-13 15771A Rev. B 5130 2005
(Horiz., vert., or sphere) (Tank, separator, jkt. vessel, heat exh., etc.) (Mfg's serial No.) (CRN) (Drawing No.) (Nat'l. Bd. No.) (Year built)

5. ASME Code, Section VIII, Div. 1 2001 / 2003 2351, 1518-5 NONE
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): N/A (b) Overall length (ft & in.):

| No. | Course(s) | | Material | | Thickness | | Long. Joint (Cat. A) | | | Circum. Joint (Cat. A, B & C) | | | Heat Treatment | |
|-----|---------------|-------------------|---------------------|--|-----------|-------|----------------------|------------------|------|-------------------------------|------------------|------|----------------|------|
| | Diameter, in. | Length (ft & in.) | Spec./Grade or Type | | Nom. | Corr. | Type | Full, Spot, None | Eff. | Type | Full, Spot, None | Eff. | Temp. | Time |
| | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | |

7. Heads: (a) N/A (b) N/A
(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 fastening) N/A
(Mat'l Spec. No., Grade, size, No.)

8. Type of Jacket N/A Jacket Closure N/A
(Describe as ogee & weld, bar, etc.)

If bar, give dimensions N/A If bolted, describe or sketch.
AWP SEE U-4 SEE U-4 psi at max. temp. SEE U-4 SEE U-4 °F Min. design metal temp. U-4 °F at SEE U-4 psi.
(internal) (external) (internal) (external)

10. Impact test N/A
(Indicate yes or no and the component(s) impact tested)

11. Hydro., pneu., or comb. test press. SEE U-4 FORM Proof test

Items 12 and 13 to be completed for tube sections.

12. Tubesheet: N/A
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: N/A
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) N/A (b) Overall length (ft & in.):

| No. | Course(s) | | Material | | Thickness | | Long. Joint (Cat. A) | | | Circum. Joint (Cat. A, B & C) | | | Heat Treatment | |
|-----|---------------|-------------------|---------------------|--|-----------|-------|----------------------|------------------|------|-------------------------------|------------------|------|----------------|------|
| | Diameter, in. | Length (ft & in.) | Spec./Grade or Type | | Nom. | Corr. | Type | Full, Spot, None | Eff. | Type | Full, Spot, None | Eff. | Temp. | Time |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

15. Heads: (a) N/A (b) N/A
(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) | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

If removable, bolts used (describe other fastening) N/A
(Mat'l Spec. No., Grade, Size, No.)

16. MAWP N/A (internal) (external) psi at max.temp. (internal) (external) °F. Min. design metal temp. °F at psi.17. Impact test N/A
(Indicate yes or no and the component(s) impact tested)Hydro., pneu., or comb. test press. SEE U-4 Proof test
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 | |
| A&C IN&OUT | 4 | 6.625 | N/A | SB2415083 | N/A | .280 | N/A | N/A | 16.1(a) | N/A | N/A |
| B IN&OUT | 2 | 4.500 | " | " | " | .237 | " | " | " | " | " |
| D IN | 1 | 16.000 | " | SB2095083 | " | .250 | " | " | " | " | " |
| D OUT E IN | 2 | 20.000 | " | " | " | " | " | " | " | " | " |
| E OUT | 1 | 24.000 | " | " | " | " | " | " | " | " | " |

20. Supports: Skirt N/A (Yes or No) Lugs N/A (No.) Legs N/A (No.) Others ANGLES (2) (Describe) Attached SIDES, WELDED (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: MULTI STREAM (CHAMBER) VESSEL OF PLATE FINS CONSTRUCTION FOR NON-CORROSIVE SERVICE, SEE U-4 FORM FOR ITEM 9&11 AND OTHER DESIGN DETAILS (ITEM 22). CODE JURISDICTION ENDS AT THE NOZZLE TRIM LINE OR FIRST WELD PREP TO AN ATTACHED PIPE FITTING (ELBOW, FLANGE, REDUCER, ETC.) EXEMPTED FROM IMPACT TESTING PER UNF-65. PRESSURE RELIEF VALVES ARE NOT INSTALLED BY CHART Heat Exchangers, BUT ARE THE RESPONSIBILITY OF THE CUSTOMER OR THE INSTALLER.

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.

Certificate of Authorization No. 20,954 Expires JANUARY 6, 2007Date 4/4/05Name CHART Heat Exchangers L.P.
(Manufacturer)Signed [Signature]
(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 WISC. and employed by HSB CT of HARTFORD, CONN.have inspected the pressure vessel described in this Manufacturer's Data Report on 3-30-05, 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 APR 04 2005Signed [Signature]
(Authorized Inspector)Commissions NB 11873A W1100115
(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 _____

(Assembler)

Signed _____
(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 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 _____

(Authorized Inspector)

Commissions _____
(Nat'l Board incl. endorsement, State, Province and No.)

1. Manufactured and certified by CHART Heat Exchangers L.P. 2191 Ward Avenue La Crosse, WI, USA 54601
(Name and address of Manufacturer)

2. Manufactured for _____
(Name and address of Purchaser)

Location of installation _____
(Name and address)

4. Type: _____
(Horiz., vert., or sphere) (Tank, separator, heat exh., etc.)

HEAT EXCHANGER
509.9-13 (Mfg's. Serial No.)
15771A Rev. B (Drawing No.)
5130 (Nat'l. Bd. No.)
2005 (Year Built)

11. Working/test conditions: Working Temp. +150 F Max. -320 F Min. (All Streams/Chambers)
(Horizontally tested)

| Stream/Chamber | MAWP (P.S.I.) | Hydro., <u>Pneu</u> or Combination Test Pressure (P.S.I.) |
|----------------|---------------|--|
| A B C | 145 | 218 |
| D E | 29 | 32 |
| | | |
| | | |
| | | |
| | | |

20. (a) Heat Exchanger for _____ Service:
(b) Max. allowable working pressure of plate fin core determined by structural and proof tests:
(c) Parting Sheets: Mat'l SB209 -3003 Nom. Thk. .039 Width 52.00 Length 76.00
(d) Outside Sheets: Mat'l. SB209 -3003 Nom. Thk. .250 Width 52.00 Length 76.00
(e) Core Joints: Type: VACUUM Brazed Longitudinal Lgth. 76.00 Girth Lgth. 52.00
Side/End Bars: Mat'l SB221 -3003 Nom. Width .81 & 1.5 / .81
(f) Fins: Mat'l SB209 -3003
(g) Headers (Half Cylinders)

| Stream/Purpose (Inlet, Outlet, Drain, etc.) | No. | Diam. or Size | Matl. | Nom. Thk. | End Type | Nom. Thk. | End Matl. | End Bracing Size/Type | End Bracing Matl. |
|--|-----|------------------|-----------|--------------|-------------|--------------|--------------|--------------------------|----------------------|
| A IN&OUT | 1 | 13.670 | SB2095083 | .250 | FLAT | 1.000 | SB2095083 | N/A | N/A |
| B IN&OUT C IN | 3 | 11.000 | " | " | " | .625 | " | " | " |
| C OUT | 1 | 13.000 | " | " | " | .750 | " | " | " |
| D IN&OUT E IN&OUT | 2 | 48.550 | " | .375 | " | 1.000 | " | " | " |
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(i) Nozzle Permanent End Closures

| Stream/Purpose (Inlet, Outlet, Drain, etc.) | No. | Diam. or Size | Type | Mat. | Nom. Thk. |
|--|-----|------------------|------|------|--------------|
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Headers, Ends, End Bracing
and Nozzle Permanent
End Closures
Attached by Welding.

(j) Remarks: D & E IN&OUT HEADERS EACH HAVE 1.0 THK, SB-209-5083 ALUM, LATERAL SPLITTER PLATE.

Certificate of Authorization: Type "U" No. 20,954 Expires JANUARY 6, 2007
Date 4/4/05 Name CHART Heat Exchangers L.P. Signed [Signature]
(Manufacturer) Commission NB 11873A (Representative)
Date APR 04 2005 Name [Signature] (Nat'l. Board Incl. endorsement, State, Province and No.)
(Authorized Inspector)