

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

1. Manufactured and certified by Atlas Industrial Manufacturing Co., 81 Somerset Place, Clifton, N.J. 07012
(Name and address of Manufacturer)

2. Manufactured for Merck & Company, Inc., PO Box 2000, Rahway, NJ 07065
(Name and address of Purchaser)

3. Location of installation Merck & Company, Inc., Linden Ave Gate, Building 53-Northside, Linden, NJ 07036
(Name and address)

4. Type Vertical Heat Exchanger 11580
(Horiz., vert., or sphere) (Tank, separator, jkt. vessel, heat exn., etc.) (Mfg's serial No.)

N/A D-19213-0 9920 2004
(CRN) (Drawing No.) (Nat'l. Bd. No.) (Year built)

5. ASME Code, Section VIII, Div. 1 2001 and 2003 N/A N/A
Edition and Addenda (date) Code Case No. Special Service per UG-120(a)

Items 6-11 incl. to be completed for ~~single~~ ~~double~~ ~~triple~~ ~~quadruple~~ ~~shell~~ of heat exchangers. ~~XXXXXX~~ ~~XXXXXX~~ ~~XXXXXX~~ ~~XXXXXX~~ ~~XXXXXX~~

6. Shell (a) No. of course(s): 4 (b) Overall length (ft & in.): 4'-10 1/8"

Course(s) No.	Diameter, in.		Length (ft & in.)	Material		Thickness			Long. Joint (Cat. A)			Circum. Joint (Cat. A, B, & C)			Heat Treatment	
	Full	Spot		Spec./Grade or Type	Nom.	Corr.	Type	Full	Spot	None	Eff.	Type	Full	Spot	None	Eff.
1	12 3/4'	O.D.	2'-11 1/4'	SA-106-B	3/8"	1/16"	S	None	.85	1	None	.70	N/A	N/A		
1	12 3/4'	O.D.	1'-1 5/8"	SA-106-B	3/8"	1/16"	S	None	.85	1	None	.70	N/A	N/A		
2 (See Line 7)			0'-4 5/8"							1	None	.70	N/A	N/A		

* 7. ~~XXXXXX~~ (a) SA-516-70 N/A (b) N/A
(or Exp. Joint) (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		
	Nom.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full	Spot
(a) Center	3/8"	1/16"		1 1/8"	(22' OD Flanged & Flued Heads)				---	Yes	S	None	.85
(b)													

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

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

if bar, give dimensions _____ if bolted, describe or sketch.

9. MAWP FV&150 --- psi at max. temp. 350 --- °F Min. design metal temp. -20 °F at FV&150 psi.
(internal) (external)

10. Impact test No. UG-20 (f) & UCS-66 (a). at test temperature of _____ °F.
(Indicate yes or no and component(s) impact tested)

11. Hydro. ~~XXXXXX~~ test press. 197 Proof test N/A

Items 12 and 13 to be completed for tube sections.

* 12. Tubesheet: SA-240, 316 1 1/8" 7/8" 0" 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
Floating (Mat'l Spec. No.) Dia., in. Nom. thk., in. Corr. Allow., in. Attachment

13. Tubes: SA-249, TP316L 3/4" 18 GA. (A.W.) 112 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 ~~single~~ ~~double~~ ~~triple~~ ~~quadruple~~ channels of heat exchangers.

14. Shell (a) No. of course(s) 1 / 1 (b) Overall length (ft & in.): 0'-2 11/16" / 0'-10 11/16"

Course(s) No.	Diameter, in.		Length (ft & in.)	Material		Thickness			Long. Joint (Cat. A)			Circum. Joint (Cat. A, B, & C)			Heat Treatment	
	Full	Spot		Spec./Grade or Type	Nom.	Corr.	Type	Full	Spot	None	Eff.	Type	Full	Spot	None	Eff.
1	12 3/4'	O.D.	0'-2 11/16"	SA-312W, TP316L	.180"	0"	1	None	.85	1	None	.70	N/A	N/A		
1	12 3/4'	O.D.	0'-10 11/16"	SA-312W, TP316L	.180"	0"	1	None	.85	1	None	.70	N/A	N/A		

* 15. Heads: (a) SA-240, 316L N/A (b) SA-240, 316L 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		
	Nom.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full	Spot
(a) Top	.0973"	0"				60°		---	Yes	1	None	.70	
(b) Bottom	.209"	0"	12 3/4"	7/8"				---	Yes	S	None	.85	

If removable, bolts used (describe other fastening) SA-193-B8 CL. 2, 5/8" 16.
(Mat'l Spec. No., Grade, size, No.)

1) See manufacturer drawing for detailed measurements.

Form U-1 (Back)

16. MAWP FV&150 --- psi at max. temp. 350 --- °F. Min. design metal temp. -20 °F at FV&150 psi.
(Internal) (external) (internal) (external)

17. Impact test No. UG-20 (f), UCS-66 (a) & UHA-51. at test temperature of _____ °F.
(Indicate yes or no and component(s) impact tested)

18. Hydro. ~~test press.~~ test press. 197 Proof test N/A

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 Fig. UW-16.1	Flange Fig.	
Inlet	1	6"	Cl 150 SO	SA-312W, TP316L	SA-182, F316L	.134"	0"		(C)	(3)	
Outlet	2	1 1/2"	Cl 150 SO	SA-312W, TP316L	SA-182, F316L	.145"	0"		(C)	(3)	
Inlet/Outlet	2	1 1/2"	Cl 150 SO	SA-106-B	SA-105	.145"	1/16"		(C)	(3)	
Vent/Drain	2	3/4"	H.C.	SA-105	----	Cl 3000	1/16"		(C)	---	
Hydro Drain	1	1/2"	H.C.	SA-105	----	Cl 3000	1/16"		(C)	---	

20. Supports: Skirt No Lugs 2 Legs No Others N/A 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)

N/A

22. Remarks: #12-60 Methanol Condenser, Tema Type BEM.
Merck & Company, Inc. P.O. No. F161029.
Atlas Job # 12025, *UG-46 (a)*.
* Flanged & Flued Expansion Joint Constructed Per Appendix 5.
Spring Rate = 276100#/in uncorroded & 164500#/in corroded.
Operating Condition: Tubeside Flow Only = .0127" Compression.
Tubeside Flow Only = .0319" Extension, 1000 Cycles
** Material meets all requirements of SA-240, 316 & SA-240, 316L.
Pressure relief devices (UG-125) are the responsibility of the user.

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. 5027 Expires APRIL 30, 2005

Date DEC 16 2004 Signed ATLAS INDUSTRIAL MANUFACTURING CO. Tommy Maloden
(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 NEW JERSEY and employed by HSB CT. of HARTFORD, CT. have inspected

the pressure vessel described in this Manufacturer's Data Report on DEC 13 2004 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 DEC 16 2004 Signed [Signature] Commissions NB 7050ARNI N.J. 476
(Authorized Inspector) (Not 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 _____, 20____

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 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) (Not Board Incl. endorsement, State, Province and No.)

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CLIFTON, NJ
USA

CERTIFIED BY

ATLAS

INDUSTRIAL MFG. CO.

MANIP

PSI

AT

350

°F

AT

350

°F

SHELL

EV & 150

PSI

EV & 150

PSI

TUBES

MDMT

20

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AT

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PSI

SHELL

20

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AT

EV & 150

PSI

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20

°F

AT

EV & 150

SERIAL

11580

YEAR

2004

CAUTION

THE CODE RECORDED PRESSURES AND TEMPERATURES MARKED ON THE HEAT EXCHANGER RELATE TO THE BASIC DESIGN HAS BEEN EVALUATED FOR THE SPECIFIC OPERATING CONDITIONS SHOWN ON THE ATLAS DRAWING AND SHOULD BE RE-EVALUATED BEFORE IT IS OPERATED AT DIFFERENT OPERATING CONDITIONS.

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