

Rev	Date	Reviewed by:	Approved by: Engineering Manager
0	2/9/98	J. Angelo	

EQUIPMENT - DATA SHEET

Equipment : E-6103B (Auxilliary Reactor Cooler)
Manufacturer : Doyle & Roth
Year Fabricated : 1990
Natl. Board No. : 15100
Serial No. : J-6307
Classification : Class 2
PSM Covered : Yes
P&ID's : 6-F-1A
TML Dwg. No. : PSM-E6103B
Contents : Acetonitrile (1.9%-15.1%) Methyl Acetate (0.1%-2.5%)
Methyl Acetimidate (39.8%) Methyl Chloride (<0.5%)
MCT (38%-53.6%) TMOA (0.1%-26.9%)
HCL (3.3%-16.6%) Methyl Triazine (0.90%-1.2%)
Ammonium Chloride (15.1%) Methanol (1.6%-13.2%)

#93470

Item	Vessel	
Design Conditions	Shell Side	Tube Side
Internal Pressure (psig)	85	75
External Pressure (psig)	Not rated	Not rated
Design Temperature (°F)	150	150
MDMT (°F)	-20	-20
Hydrotesting (psig)	130	115
Head Type (top/bottom)	N/A	Flat
Material of construction	SA106-B	SB626-B2
Diameter	12.75" (OD)	12.75" (OD)
Length	19'-11.875"	13 ½" / 13 ½"
Corrosion Allowance	0.125"	0.0"
Heat treatment	No	No
Min. Wall Thickness (shell/head)	0.161"	0.0225"
Nom. Wall Thickness (shell/head)	0.330"	0.125"
Operating Conditions	Shell Side	Tube Side
Operating Pressure (psig)	87	70
Operating Temperature (°F)	-4 - 95	50 - 113

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

As required by the Provisions of the ASME Code Rules, Section VIII, Division I

1. Manufactured and certified by DOYLE & ROTH MFG. CO., INC. ONE MORSE AVENUE SIMPSON, PA 18407
2. Manufactured for CUMMINS WAGNER CO. INC. / FMC CORPORATION
(Name and address of purchaser)
3. Location of Installation 1701 EAST PATAPSCO AVE. BALTIMORE, MD 21226
4. Type HORIZONTAL J-6307 - B-8434-2 15100 1990
(Horiz.or Vert.tank) Mfr. Serial No. CRN Drawing Natl.Bd.# Yr. Built
5. The chemical and physical properties of all parts meet the requirements of material specifications of the ASME Boiler and Pressure Vessel Code. The design, construction and workmanship conform to ASME Rules, Section VIII, Division 1 1989
Addenda (date) Code Case No. Special service per UG-120(d) Year

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

6. Shell: SA106B .330" 1/8" 1'0-3/4" 19' 11-7/8"
Matl. Spec. No. Grade Nom. Thk. (in.) Corr.Allow.(in.) Diam. O.D. (ft. & in.) Length (Overall)(ft. & in.)
7. Seams SHLS 85 1
Long (Dbl., Sngl.) R.T. (Spot or Full) Eff. (%) H.T. Temp. (Deg. F)
Time Girth (Dbl. Sngl.) R.T. (Spot, Partial or Full) No. of Courses

8. Heads: (a) Matl. - (b) Matl. -
Spec. No. Grade Spec. No. Grade

	Location (Top, Bottom Ends)	Minimum Thickness	Corrosion Allowance	Crown Radius	Knuckle Radius	Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure Convex or Concave
a	-	-	-	-	-	-	-	-	-	-
b	-	-	-	-	-	-	-	-	-	-

If removable bolts used (describe other fastenings) -

(Matl., Spec. No. Gr. Size, No.)

9. Type of Jacket - Proof Test 93470
10. Jacket Closure - If bar, give dimensions
(Describe as ogee & weld, bar, etc)
11. MAWP 85 PSI at max. temp 150 Deg. F. Min. design metal temp. -20 Deg. F at 85 PSI
Hydro., pneu., or comb. test press 130 PSI

Items 12 and 13 to be completed for tube sections

12. Tubesheets: SB-333 B2NI ALLOY 17" .875" WELDED
Stationary Matl. (Spec. No. Gr.) Diam. (in.) (Subject to Pressure) Nom. Thk. (in.) Corr. Allow. (in.) Attach. Welded, Bolted
13. Tubes: SB626 3/4" .065" 126 STRAIGHT
Floating Matl. (Spec. No. Gr.) Diam. (in.) Nom. Thk. (in.) Corr. Allow. (in.) Attach
Matl. (Spec. No. Gr.) O.D. (in.) Nom. Thk. (in. or Gauge) Number Type (Straight or "U")

Items 14-17 Incl. to be completed for inner chambers of jacketed vessels or channels of heat exchangers

14. Shell SB-333 B2NI ALLOY .125" - 1' 0-3/4" 1' 1-1/2" / 1' 1-1/2"
Matl. (Spec. No. Grade) Nom. Thk. (in.) Corr. Allow. Diam. O.D. (ft. & in.) Length (Overall)(ft. & in.)
15. Seams DWB 70 2
Long. (Dbl., Sngl.) R.T. (Spot or Full) Eff. (%) H.T. Temp. (F)
Time Girth (Dbl., Sngl.) R.T. (Spot, Partial or Full) No. of Courses
16. Heads: (a) Matl. SA516-70 W/ ALLOY B2 LINER (PLATE) (b) Matl. -
(Spec. No. Grade) (Spec. No. Grade)

	Location (Top, Bottom Ends)	Minimum Thickness	Corrosion Allowance	Crown Radius	Knuckle Radius	Elliptical Ratio	Conical Apex Angle	Flat Diameter	Side to Pressure (Convex or Concave)
a	ENDS	1.0"	-	-	-	-	-	17"	-
b	-	-	-	-	-	-	-	-	-

If removable, bolts used (describe other fastenings) ALLOY SA-193 B7M AND SA194-2H 12 (3/4")
Matl. Spec. No., Gr., Size, No.)

17. MAWP 75 PSI at max. temp 150 Deg. F. Min. design metal temp. -20 Deg. F at 75 PSI
Hydro., pneu., or comb. test press. 115 PSI

18. Nozzles, Inspection and Safety Valve Openings:

Purpose (Inlet, Outlet Drain, etc.)	No.	Diam. or Size	Type	Material	Nom. Thk.	Reinforcement Material	How Attached	Location
INLET OUTLET	2	3"	RF/SO	SA106B	SCH 80	-	WELDED	-
INLET OUTLET	2	4"	LJ	SB626 ALLOY B2	SCH 10 W	STUB ENDS	WELDED	-
INLET OUTLET	2	1"	LJ	SB626 ALLOY B2	SCH 10 W	STUB END & BLIND FLG. WELDED	-	-
DRAINS	4	3/4"	CPLGS	SA105	6000#	-	WELDED	-
DRAINS	2	3/4"	CPLGS	ALLOY B2	6000#	-	WELDED	-

19. Supports: Skirt NO Lugs - Legs - Other 2 SADDLES Attached WELDED TO SHELL
 Yes/No (No.) (No.) (Describe) (Where & How)

20. Remarks: Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report _____
 Name of part, item number, mfrs. name and identifying stamp

HORIZONTAL SHELL AND TUBE HEAT EXCHANGER
 TAG EQUIP #E6103B AUXILIARY REACTOR COOLER
 IMPACT TESTING EXEMPTED PER UG 20(F) AND NF6

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. 982 expires 1/31/93
 Date NOV 20 1990 Co. DOYLE & ROTH CO., INC. Signed Joseph J. Smith

CERTIFICATE OF SHOP INSPECTION

Vessel constructed by DOYLE & ROTH MFG. CO., INC. at One Horse Avenue, Simpson PA
 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 Pennsylvania and employed by Arkwright Mutual Insurance Co. of Norwood Massachusetts have inspected the pressure vessel described in this Manufacturer's Data Report on NOV 20 1990 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 the 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 NOV 20 1990 Signed DETILLEY Ohio
 (Authorized Inspector) Commissions NB8845 Pa 2361 Factory Mutual Systems
 (Natl. Bd. State, Province and No.)

CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE

We certify that the field assembly construction of all parts of this vessel conforms with the requirements of Section VIII, Division 1 of the ASME Boiler and Pressure Vessel Code.
 "U" Certificate of Authorization No. _____ Expires _____ 19____

Date _____ Co. Name _____ Signed _____
 (Assembler that certified & constructed Field Assembly) By Representative

CERTIFICATE OF FIELD ASSEMBLY INSPECTION

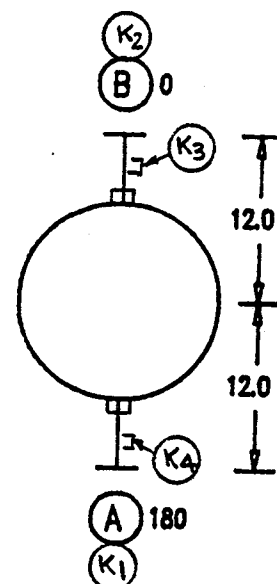
I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province of _____ and employed by _____
 of _____ have compared the statements in this Manufacturer's Data Report with the described pressure vessel and state that parts referred to as data items _____, not included in the Certificate of Shop Inspection, have been inspected by me and that, 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 (Natl. Board (incl. endorsements) State, Prov. & No.)

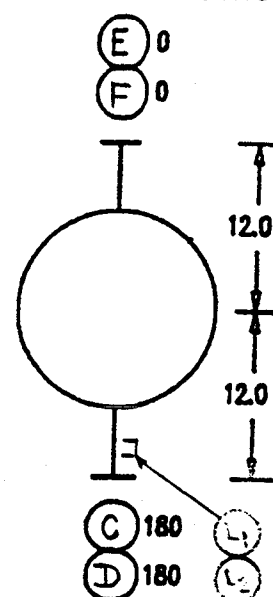
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D & R MODEL: LL1261-20H
HASTELLOY B2 TUBESIDE CONSTRUCTION

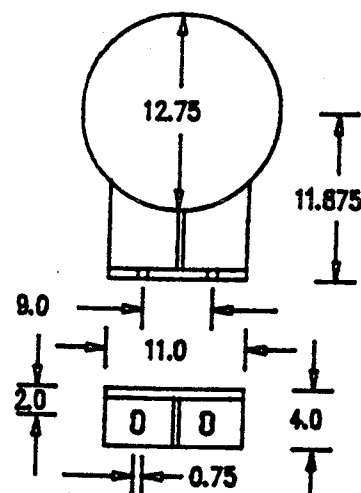
DIMENSIONS IN INCHES
NOT DRAWN TO SCALE
BOLT HOLES STRADDLE
NATURAL CENTERLINES



FRONT VIEW



HEAD(S)



SHELL SUPPORTS (SLOT REAR SUPPT ONLY)

Nozzle A & B
Nozzle C & D
Nozzle E & F

NPS / OD	SCH/THK
3	80
4	10
1	10
0.75	
0.75	

Coupling K 1 THRU 4
Coupling L 1 & 2

Shell Cylinder
Head Cylinders
Head Covers
Tubesheets
Head Flgs at T/S & COV
Head Gaskets at Tbshts
Head Gaskets at Covers
Head Bolting at Tbshts
Head Bolting at Covers
Tubes
Baffles
Shell Supports

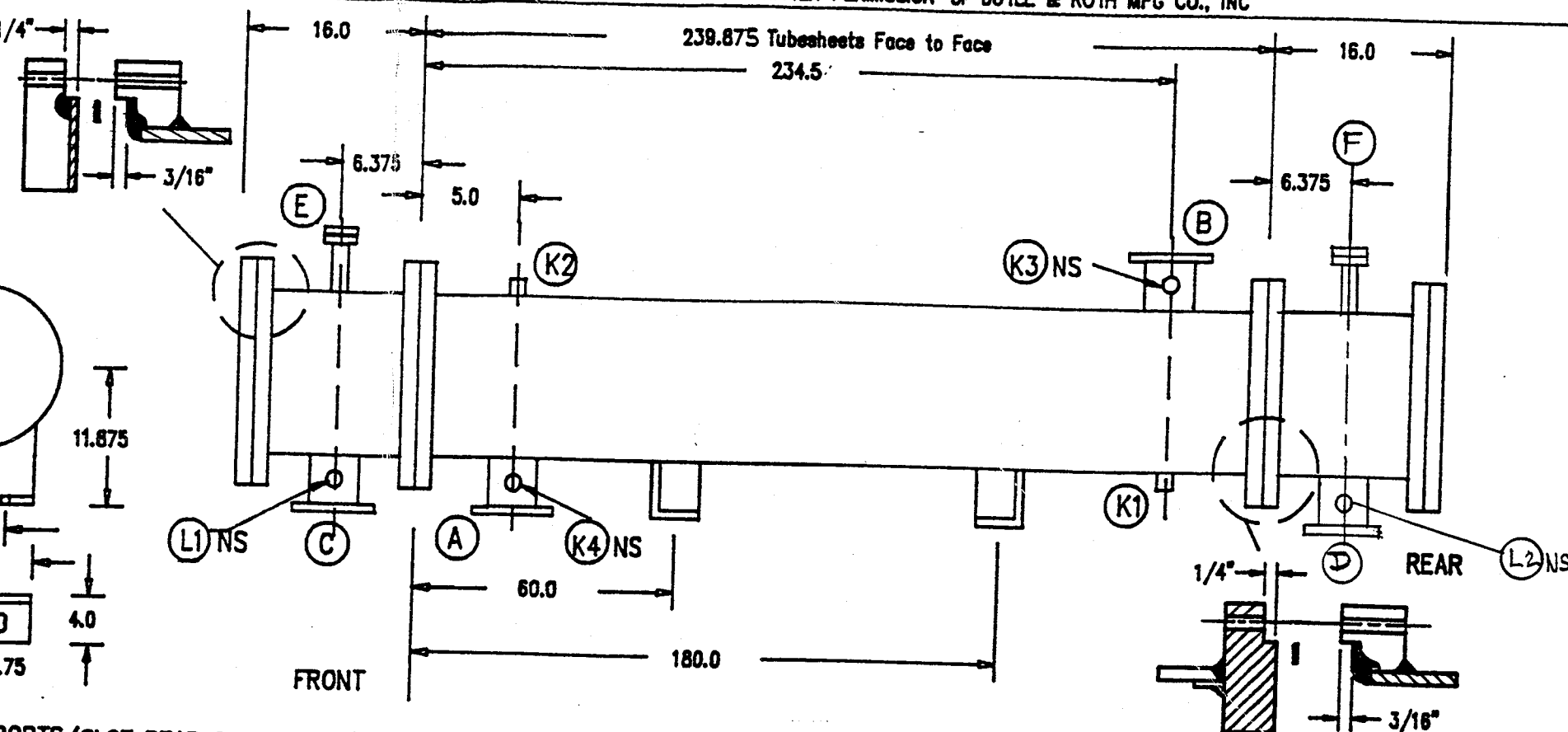
12.75	0.33
12.75	0.125
17.0	1.0
17.0	0.875
17.0	1.5
14.0	
14.0	
0.75	
0.75	
0.75	
0.75	0.065
	0.375

150 # ANSI S.O.R.F. Fig SA-105 With SA-106 Gr B Sml Steel Pipe
150 # ANSI L.J. Fig SA-105 With SB-626 Alloy B2Wd NI Pipe W/Stub End
150 # ANSI L-J Fig SA-105 With SB-626 Alloy B2Wd NI Pipe W/Stub End & Blind Fig
SA-105 W/ALLOY B-LINER, ASB GSKT & C/S BOLTING
6000 # SA-105 C STEEL COUPLING W/ C/S PLUG
6000 # ALLOY B2COUPL W/ALLOY B2PLUG

SA-106 Gr B Sml Steel Pipe
SB-333 Alloy B2Wd NI Plate
SA-516 Gr 70 Steel Plate Flat Cover W/ Alloy Liner Pit B2
SB-333 Alloy B2NI Plate
SA-181 Cl.60 Carbon Steel Forging RING Flange Faced w/ Alloy B2
BLUEGARD 1/16" Thick Periph. width 0.375 in
BLUEGARD 1/16" Thick Periph. width 0.375 in
SA-193 B7M Steel Bolting 12 Bolts on 15.375 in B.C.
SA-193 B7M Steel Bolting 12 Bolts on 15.375 in B.C.
SB-626 Alloy B2Wd NI Tube Bare tubes
SA-36 Steel Plate
SA-36 Steel Plate

NOTES: ASME STAMP AND NATIONAL BOARD INSPECTION ARE REQUIRED
PAINT EXT C STL ONLY; SANDBLAST AND ONE(1) SHOPCOAT OF SHERWIN WILLIAMS E41N1 PRIMER
IMPACT TEST NOT REQD PER SECT VII, DIV I, PARA UC 20(F) & NFB
PROVIDE ONE(1) SPARE SET OF GASKETS.

NO.	DATE	BY	REVISIONS
2	7-16-90	RH	CHANGED HASTELLOY B MAT'L TO B2
1	6-27-90	CK	ADD SPARE GASK, CHGD. ORLEN. D&F.



FRONT

REAR

TUBESHEET - JOINT DETAIL

DESIGN CONDITIONS	SHELL SIDE	TUBE SIDE
DESIGN PRESSURE (psig)	85	75
TEST PRESSURE (psig)	130	115
DESIGN TEMPERATURE / MIN (F)	150 / -20	150 / -20
NUMBER OF PASSES	1	1
CORROS ALLOW, C STL ONLY (in)	0.125	0.0
RADIOGRAPHY	None	None

TEMA TYPE	AEL	SIZE	12-240	SURFACE AREA	495 ft2
TUBE TYPE	Bare	NO. OF HOLES	126	LENGTH	240 in
LAYOUT	0.9375 in Tri	TUBE-TUBESHT JT	Seal weld		
BAFFLE TYPE	Single Segmental	CUT	25 % H		
BAFFLE SPACING (in)	8.75				
IMPINGEMENT PLATE	None				
CODE: ASME SECT VII, DIV 1,	89	TEMA CLASS	R		
WEIGHT: EMPTY	3049	FLOODED	4009	BUNDLE	1600 lb
DATE: 06-11-90	DRAWN: PRP	CHKD: RJA	APPD: [Signature]		



DOYLE & ROTH MFG CO., INC
26 BROADWAY (SUITE 1275) NEW YORK, NY 10004

CUSTOMER: CUMMINS-WAGNER CO INC
P.O. NO: 26251 KMW
EQUIP NO.: E 6103B AUXILIARY REACTOR COOLER
QTY: ONE (1)

JOB NO. J 6307
DWG NO. B 8434
REV 2