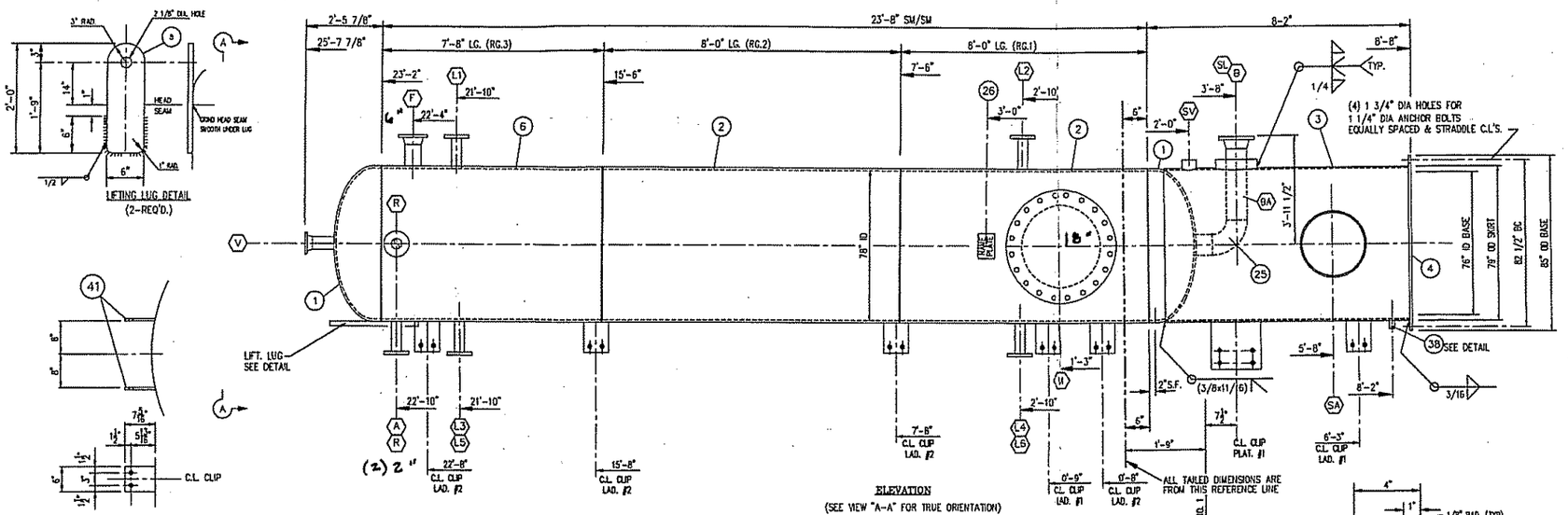

BILL OF MATERIAL

NO.	QTY.	DESCRIPTION	MAT'L SPEC.
1	2	HEAD, 78" ID X 0.4375" MIN THK 2:1 S.E. W/ 2" SF (1/2" NOM)	SA-516-70
2	2	PLATE, 1/2" THK. X 78" ID X 8'-0"LG.	SA-516-70
3	1	PLATE, 3/8" THK. X 79" OD X 7'-11 1/4" LG.	SA-516-70
4	1	PLATE, 3/4" THK X 76" ID X 85" OD	SA-36
5	2	PLATE, 3/4" THK X 6"WD. X 2'-0" LG (ROLL TO 39 1/2" ISR, 2'-0" INTO ROLLS)	SA-516-70
6	1	PLATE, 1/2" THK. X 78" ID X 7'-8"LG.	SA-516-70
7			
8			
9			
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14			
15			
16			
17	1	FLANGE, 18"-150# RF BLIND	SA-105
18	1	FLANGE, 18"-150# RFLWN X 12" LG.	SA-105
19	1	FLANGE, 8"-150# RF WN (XH BORE)	SA-105
20	1	FLANGE, 6"-150# RF WN (XH BORE)	SA-105
21	8	FLANGE, 2"-150# RFLWN X 9" LG.	SA-105
22	1	FLANGE, 4"-150# RF WN (XH BORE)	SA-105
23			
24			
25	1	ELL, WELD, 8" XH 90° LR	SA-234-WPB
26	1	NAME PLATE W/ BRACKET	304SS
*27	16	STUD BOLT, 1 1/8" X 6 1/4" LG. W/ 2 HH NUTS EA.(ZINC PL) (18"-150#)	SA-193-B7/SA-194-2H
28	1	DAVIT PER DWG. 00-BZE-3920 TYPE I-LH (18"-150#)	CS
29			
30	1	GASKET, 1/16" THK. (HYDRO ONLY)(18"-150#)	NON-ASB.
*31	1	GASKET, 1/8" THK. FLEX "CG" W/FLEXICARB FILLER (18"-150#)	304SS
32			
33			
34			
35			
36			
37			
38	1	FLAT BAR, 1/4" THK X 2" X 4" LG	SA-36
39			
40	12	FLAT BAR, 3/8" THK X 6" WD. X 0'-7 5/16" LG	SA-36
41	5	PLATE, 3/8" THK. X 11 1/2" WD. X 1'-0" LG.	SA-36
42			
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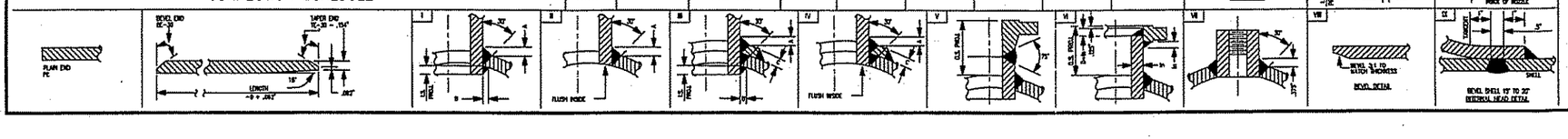
QTY.	MK.	SIZE	RATING	TYPE	FACING	SERVICE	REMARKS	O.S.	I.S.	WELD DETAIL NUMBER	A	B	C	D	WALL THICKNESS	SEAMLESS MATERIAL	LENGTH	END PREPARATION	END PREPARATION	ORIGIN
						CONNECTION SCHEDULE		PROJ.			WELD SIZE									
2	SV	4"		PIPE		SKIRT VENT		3"		XI			1/4	1/4	.237"	SA-106-B	0'-6"	PE	PE	
1	SL	12"		PIPE		SLEEVE F/NOZZ. "B"		3"		XI			1/4	1/4	.500"	SA-106-B	0'-6"	PE	PE	
1	SA	20"		PIPE		ACCESS OPENING		3"		XI			1/4	1/4	.593"	SA-106-B	0'-8 3/4"	PE	PE	
1	BA	8"		PIPE		LIQUID OUTLET									.500"	SA-106-B	2'-7 3/8"	BE 37 1/2°	BE 37 1/2°	
1	R	2"	150#	LWN	RF	BLANKET GAS	21	8"	0"	II				3/8						
1	V	4"	150#	WN	RF	VENT	22	SEE DET	0"	II				3/8	.337"	SA-106-B	0'-5 3/8"	BE 37 1/2°	PE	
1	M	18"	150#	LWN	RF	MANWAY W/BLIND & DAVIT	17,18,27,28,30,31	16"	0"	II				5/8						
4	L3-L6	2"	150#	LWN	RF	LEVEL TRANSMITTER	21	8"	0"	II				3/8						
2	L1,L2	2"	150#	LWN	RF	LEVEL GAGE	21	8"	0"	II				3/8						
1	F	6"	150#	WN	RF	TEMPERED WATER RETURN	20	7 7/8"	0"	II	V			1/2	.432"	SA-106-B	0'-5 1/8"	BE 37 1/2°	PE	
1	B	8"	150#	WN	RF	LIQUID OUTLET	19,25	SEE DET	0"	II	V			3/8	.500"	SA-106-B	0'-4 5/8"	BE 37 1/2°	PE	
1	A	2"	150#	LWN	RF	MAKEUP WATER	21	8"	0"	II				3/8						



GENERAL NOTES (UNLESS OTHERWISE NOTED)

12. MAGNETIC PARTICLE EXAMINATION PER ENGINEERING SPECIFICATION 98C-15, PAR. 6.3, HARDNESS TEST PER PAR. 6.7.
11. * ITEMS SHIP LOOSE.
10. ALL WELDS 1/4" CONTINUOUS UNLESS NOTED OTHERWISE.
9. SA-516-70 MATERIAL MAY BE SUBSTITUTED FOR SA-36 MATERIAL.
8. PAINT: CARBOLINE
   PRIMER: CARBOZINC 11 HS 2.5/3 MIL D.F.T.
   INTERVED.: 893 SG 4/6 MIL D.F.T.
   FINISH COAT: 134 HG 1.5/2 MIL D.F.T. (WHITE)
7. SURFACE PREPARATION: SSPC-SP10
6. ESTIMATED WEIGHT EMPTY: 17,845 LBS.
5. INSULATION: NONE
4. CLEAN VESSEL THOROUGHLY AND PROTECT ALL OPENINGS FOR SHIPMENT
3. ALL REINFORCING PADS AND SEGMENTS TO HAVE (1) .25" N.P.T. TELL-TALE HOLE PADS TO BE AIR TESTED AT 25 PSIG.
2. ALL FLANGES TO HAVE BOLT HOLES STRADDLING TRUE VESSEL CENTER LINES.
1. ALL NOZZLES TO HAVE FULL PENETRATION WELDS

GENERAL SPECIFICATION

AMOCO RATING NO. 4.

MATERIAL

SHELL: .500" THK SA-516-70
HEADS: 0.4375" MIN THK SA-516-70 TYPE 2:1 ELLIP.

FLANGES:	150#	SA-105
PIPE NOZZLES:		SA-106-B
WELDING FITTINGS:		SA-234-WPB
COUPLINGS:		SA-
STUD BOLTS:		SA-193-B7 (ZINC PLATED)
NUTS:		SA-194-2H (ZINC PLATED)
H.H. BOLTS & NUTS:		SA-307
GASKETS: 1/8"THK FLEX. "CG"		304SS W/FLEXICARB FILLER

DESIGN DATA

DESIGN PRESSURE: 50 PSIG AT 2T°/200T°
IMPACT TEST EXEMPT PER UCS-66(a)

HYDROSTATIC TEST: 289 PSIG
CORROSION ALLOWANCE: 0.125 INCHES
WIND PRESSURE ZONE: 105 MPH
EARTHQUAKE ZONE: 1
HEAT TREAT: NONE HRS MINUTES AT 1100 °F
HEATING RATE:
COOLING RATE:

RADIOGRAPHY

	RT1	RT2	RT3	RT4	NONE	
	☐	■	☐	☐		
CATEGORY A WELDS						
LONG SEAMS	FULL LTH	FULL LTH	SPOT		X	
CATEGORY B WELDS						
HEAD TO SHELL	FULL LTH	UW-11(a)(5)(b)	SPOT		X	
INTERMEDIATE GIRTH	FULL LTH	UW-11(a)(5)(b)	SPOT		X	
NOZZLE >10"OR >1.125 WT	FULL	UW-11(a)(5)(b)	SPOT		X	
NOZZLE ≤10"OR ≤1.125 WT	N/A	N/A	N/A		X	
JOINT EFFICIENCIES(%)						
LONG SEAM	100	100	85			70
SEAMLESS	100	100	100			85
ADDITIONAL N.D.E.(SEE NOTE)	12					

U VESSEL TO BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE 2001 ASME BOILER & PRESSURE VESSEL CODE SECTION VIII, DIVISION 1, 2003 ADDENDA AND IS TO BE SO STAMPED. INSPECTION BY AUTHORIZED INSPECTION AGENCY

NO.	REVISION/ISSUE	BY	CHK.	REVIEW	APPR.	DATE
3.0	ADDED LADDER & PLATFORM CLIPS AS SHOWN	DF	DH	EEK	MS	7/14/05
2.0	ADDED ORIENTATION & GEN REV, AS SHOWN	DF	DH	EEK	MS	5/26/05
1.0	APPROVED FOR CONSTRUCTION	DUNC	DH	EEK	MS	4/28/05
B	ROSSUE FOR APPROVAL	DUNC	DH	EEK	MS	3/2/05
4.0	REMOVED NAME PLATE & ADDED VESSEL MANUF	DF	DH			11/9/05

REFERENCE DRAWINGS — DWG. NO.

Linde BOC Process Plants LLC
A Member of the Linde Engineering Division

GIANT INDUSTRIES, INC.
B-350-V-0080
PROJECT NUMBER: AA13

D-518 TEMPERED WATER SURGE DRUM
78"I.D. X 24'-0" TAN/TAN
ULSD HYDROTREATER
YORKTOWN VA.

DWG. 52-BZE-3080 REV. 4.0 SCALE: NONE

FORM U-1A MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS
(Alternative Form for Single Chamber, Completely Shop or Field Fabricated Vessels Only)
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

Later

1. Manufactured and certified by ARROW TANK AND ENGINEERING COMPANY 650 NORTH EMERSON CAMBRIDGE, MINNESOTA 55008
(Name and address of manufacturer)

Manufactured for LINDE BOC PROCESS PLANTS 8522 EAST 61 ST STREET TULSA, OK 74133-1923
(Name and address of purchaser)

3. Location of installation UNKNOWN
(Name and address)

4. Type: Vert. (Horiz. or vert. tank) | 38931 (Mfgr's serial No.) | - (CRN) | D14570-18 (Drawing no.) | 34460 (Nat'l Bd. No.) | 2005 (Year 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 2001 (Year)

to 2003 (Addenda (Date)) | - (Code Case Nos.) | - (Special Service per UG 120(d))

6. Shell: SA-516-70 (Matl. (Spec. No., Grade)) | .375" (Nom. Thk. (in.)) | 1/8" (Corr. Allow. (in.)) | 6' - 6" (Diam. I.D. (ft. & in.)) | 23' - 8" (Length (overall) (ft. & in.))

7. Seams:

1	FULL	100	-	-	1	NONE	1
Long. (Welded, Dbl., Sngl., Lap, Butt)	R.T. (Spot or Full)	Eff. (%)	H.T. Temp (°F)	Time (hr)	Girth (Welded, Dbl., Sngl., Lap, Butt)	R.T. (Spot, Partial, or Full)	No. of Courses

8. Heads: (a) Matl. SA-516 Gr70 (Spec No., Grade) (b) Matl. SA-516 Gr 70 (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)	TOP	.4375"	1/8"	-	-	2:1	-	-	-	CONCAVE
(b)	BOTTOM	.4375"	1/8"	-	-	2:1	-	-		CONCAVE

If removable, bolts used (describe other fastenings) - (Matl., Spec. No., Gr., Size, No.)

9. MAWP 50 psi at max. temp. 200 °F

Min. design metal temp. 2 °F at 50 psi. Hydro., ~~Pneu., Combination~~ test pressure 289 psi.

10. Nozzles, inspection and safety valve openings:

Purpose (Inlet, Outlet, Drain)	No.	Diam. or Size	Type	Matl.	Nom. Thk.	Reinforcement Matl.	How Attached	Location
MANWAY	1	18"	LWNF/RF	SA-105	150#	NONE	UW16.1 (d)	SHELL
LIQUID OUTLET	1	8"	WNF/RF	SA-106-B	XH	NONE	UW16.1 (d)	-
H2O RETURN	1	6"	WNF/RF	SA-106-B	XH	NONE	UW16.1 (d)	-
VENT	1	4"	WNF/RF	SA-106-B	XH	NONE	UW16.1 (d)	-
MISC.	8	2"	LWNF/RF	SA-105	150#	NONE	UW16.1 (d)	-
-	-	-	-	-	-	-	-	-

11. Supports: Skirt YES (Yes or no) Lugs - (No.) Legs - (No.) Other - (Describe) Attached WELDED TO HEAD (Where and how)

12. Remarks: Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report: -

NONE
(Name of part, item number. Mfgr's name and identifying stamp)

IMPACT EXEMPT PER UG20(f)

HYDRO TEST IN HORIZONTAL POSITION ATE JOB# 14570-18

CERTIFICATE OF SHOP / FIELD 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. 10676 Expires December-31-2006.

Date August-01-2005 Co. Name ARROW TANK AND ENGINEERING COMPANY (Manufacturer) Signed (Representative)

CERTIFICATE OF SHOP / FIELD INSPECTION

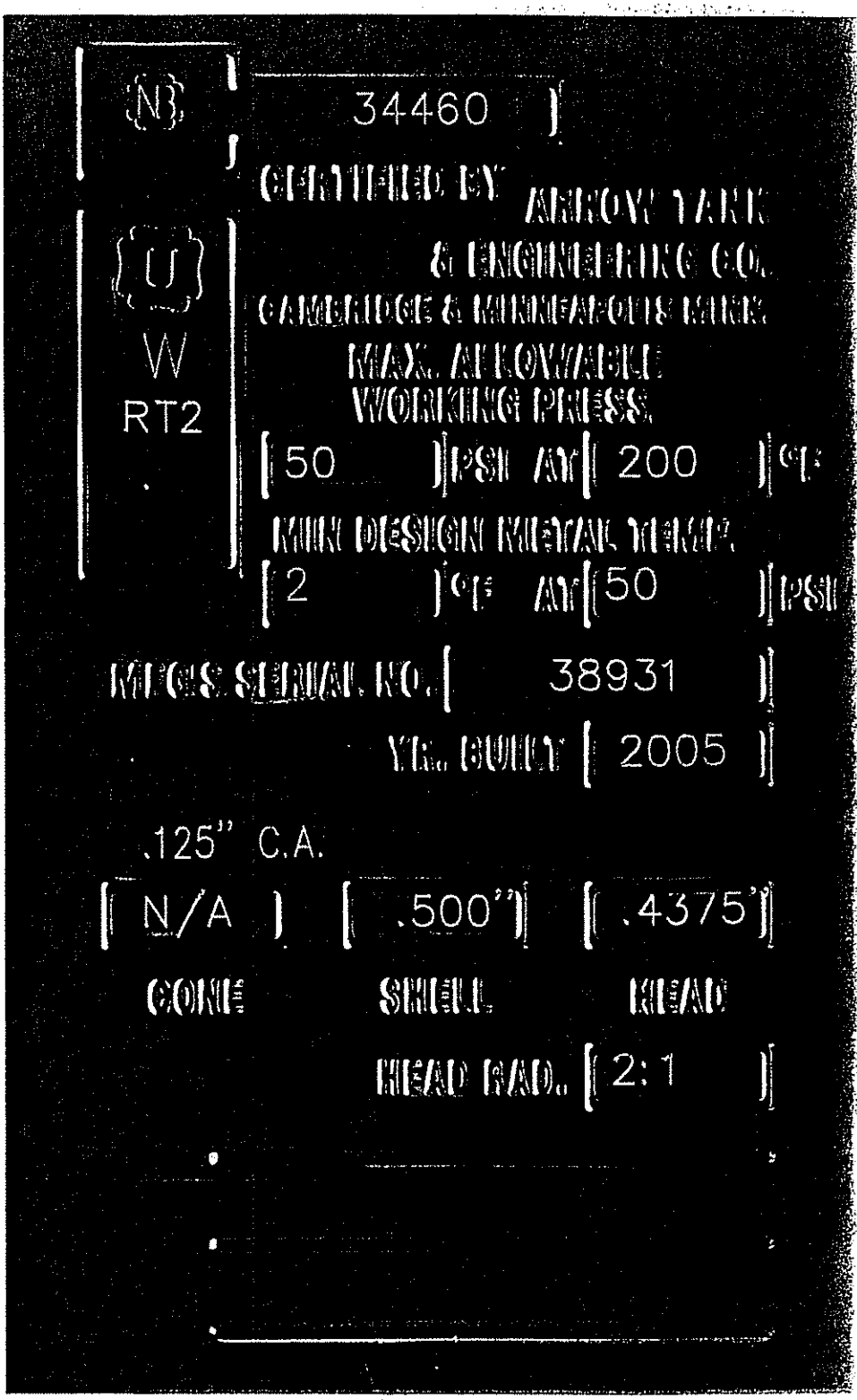
Vessel constructed by ARROW TANK AND ENGINEERING COMPANY at 650 NORTH EMERSON CAMBRIDGE, MINNESOTA 55008.

I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and the State or Province of MN and employed by Hartford Steam Boiler Insp. & Ins. Co. of CT have inspected the component described in this Manufacturer's Data Report on August-01-2005, 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 August-01-2005 Signed (Authorized Inspector) Commissions NB 11620A,B MN 039692-CO (Nat'l Board. (incl. endorsements) State, Prov. and No.)

Tag # D-518

CEI
Form 1002 Rev. 8


NB
34460
CERTIFIED BY ARROW TANK
& ENGINEERING CO.
CAMBRIDGE & MINNEAPOLIS MINN.
U
W
RT2
MAX. ALLOWABLE
WORKING PRESS.
50 PSI AT 200 °F
MIN DESIGN METAL TEMP.
2 °F AT 50 PSI
MFG'S SERIAL NO. 38931
YR. BUILT 2005
.125" C.A.
N/A
.500"
.4375"
CONE
SHELL
HEAD
HEAD RAD. 2:1