PO# 33162
Tag# CL-7001

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 Dusenbery Engineering Co., Inc. 309 E. Hanover Ave. (Name and address of Manufacturer) Morristown, NJ 07962
2. Manufactured for Koch Process Tech., Inc. 1055 Parsippany Blvd. Parsippany, NJ 07054 (Name and address of Purchaser)
3. Location of installation Rodel, Inc. Monroe, NC (Name and address)
4. Type: Vertical (Horiz., vert., or sphere) | Distillation Column (Tank, separator, jkt. vessel, heat exh., etc.) | 1481A (Mfg's serial No.)
   – (CRN) | D-1222-08-01,R2 (Drawing No.) | 3480 (Nat'l. Bd. No.) | 1998 (Year built)
5. ASME Code, Section VIII, Div. 1 1995 Ed., 12/96 Add. (Edition and Addenda (date)) | 2236 (Code Case No.) | None (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): 8 (b) Overall length (ft & in.): 59'-0½"

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
1-6	36"OD	8'-0"+	SA240T316	3/16"	–	1	None	70%	1	None	70%	–	–
7	" "	4'-0"	"	"	–	"	"	"	"	"	"	–	–
8	" "	7'-1"	SB575C276	"	–	"	"	"	"	"	"	–	–

7. Heads: (a) SA-240-316 (Mat'l Spec. No., Grade or Type) H.T. – Time & Temp. (b) SB-575-C276 (Mat'l Spec. No., Grade or Type) H.T. – Time & Temp.

	Location (Top, Bottom, Ends)	Thickness Min.	Thickness Corr.	Radius Crown	Radius Knuckle	Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure Convex	Side to Pressure Concave	Category A Type	Category A Full, Spot, None	Category A Eff.
(a)	Top	.155'	–	36"	2.25'	–	–	–	–	X	X	S	–	85%
(b)	Bottom	.152'	–	36"	2.25'	–	–	–	–	X	X	S	–	85%

If removable, bolts used (describe other fastening) – (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 50 (internal) FV (external) psi at max. temp. 400 (internal) 400 (external) °F Min. design metal temp. -20 °F at FVor50 psi.
10. Impact test No, exempt per paras. UHA-51(d)&(e) and UNF-65. (Indicate yes or no and the component(s) impact tested)
11. Hydro., pneu., or comb. test press. 105 PSIG Proof test –

Items 12 and 13 to be completed for tube sections. N/A

12. Tubesheet: 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: 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. N/A

14. Shell (a) No. of course(s) (b) Overall length (ft & 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

15. Heads: (a) (Mat'l Spec. No., Grade or Type) H.T. – Time & Temp. (b) (Mat'l Spec. No., Grade or Type) H.T. – Time & Temp.

	Location (Top, Bottom, Ends)	Thickness Min.	Thickness Corr.	Radius Crown	Radius Knuckle	Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure Convex	Side to Pressure Concave	Category A Type	Category A Full, Spot, None	Category A Eff.
(a)														
(b)														

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

FORM U-1 (Back)

16. MAWP ____ (internal) ____ (external) psi at max. temp. ____ (internal) ____ (external) °F. Min. design metal temp. ____ °F at ____ psi.

17. Impact test ____ (Indicate yes or no and the component(s) impact tested)

18. Hydro., pneu., or comb. test press. ____ Proof test ____

19. Nozzles, inspection, and safety valve openings:

Purpose (Inlet, Outlet, Drain, etc.)	No.	Diameter or Size	Flange Type	316 Material 316 Nozzle	316 Material 316 Flange	Nozzle Thickness Nom.	Nozzle Thickness Corr.	Reinforcement Material	How Attached Nozzle	How Attached Flange	Location (Insp. Open.)
Misc.	4	1",2"150	#SO	SA312	SA182	S80	-	- UW-16.1e		DFW	Shell
Outlet	2	4",6"	" "	"	"	S40	-	-	" "	"	Sh1,Hd
Manway	3	20"	" "	SA240	*1	3/16"	-	-	" "	"	Shell
Misc.	2	2"	" "	*2	*3	S80	-	-	" "	"	"
Level Ga.	2	3"	" "	"	"	S40	-	-	" "	"	"
Return	1	10"	" "	*4	*5	5/16"	-	SA240316L	" q	"	"
Outlet	1	10"	" "	"	"	3/16"	-	-	" e	"	Bot.Hd

20. Supports: Skirt No (Yes or no) Lugs 4 (No.) Legs - (No.) Others - (Describe) Attached Welded to belly band. (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
*1:SA-105 lined w/SA-240-316L. *2:SB-622-C276. *3:SB-564-C276
*4:SB-575-C276. *5:SA-105 lined w/SB-575-C276.

22. Remarks: Vessel tested in horizontal position. Vessel used for chemicals. Liquid Penetrant Examination performed on all C276 welded joints per para. UNF-58(c).

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. 1,005 Expires 3/31 ~~XX~~ 2001

Date 5/19/98 Name Dusenbery Engineering Co., Inc. (Manufacturer) Signed (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 NJ and employed by Commercial Union Insurance Company of Boston, MA have inspected the pressure vessel described in this Manufacturer's Data Report on 5/19, 1998, 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 5/19/98 Signed William A Roland (Authorized Inspector) Commissions NB5776A-NJ2288 (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.

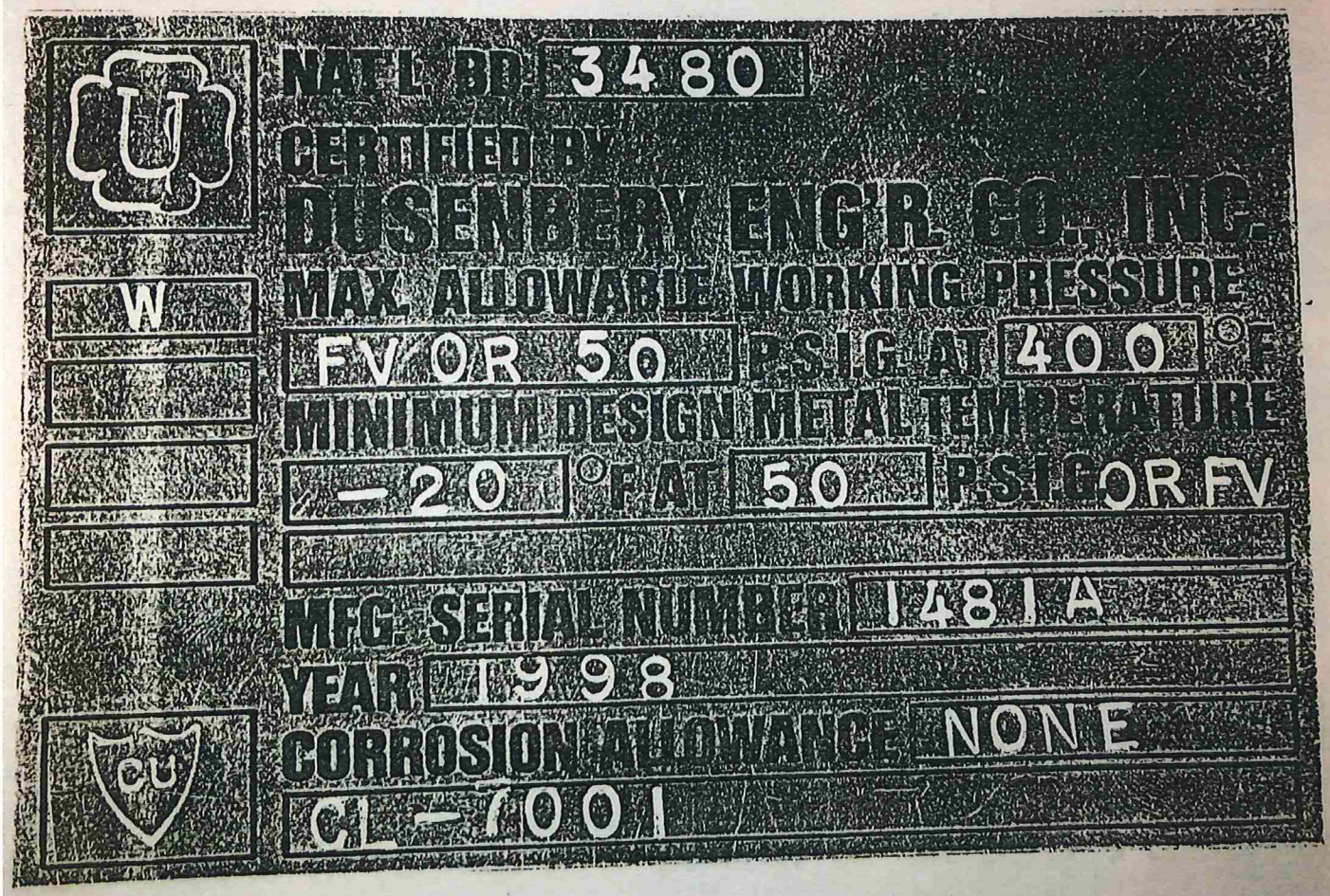
U Certificate of Authorization No. ____ Expires ____, 19 ____

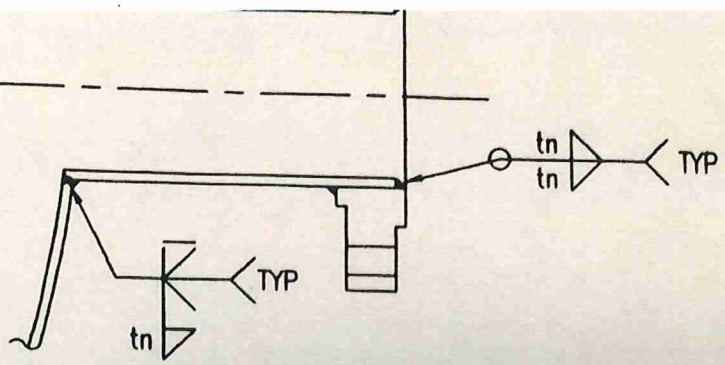
Date ____ Name ____ (Assembler) Signed ____ (Representative)

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 a 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.)


NAT'L BD 3480
CERTIFIED BY
DUSENBERY ENG'R. CO., INC.
W
MAX. ALLOWABLE WORKING PRESSURE
FV OR 50 P.S.I.G. AT 400 °F
MINIMUM DESIGN METAL TEMPERATURE
-20 °F AT 50 P.S.I. OR FV
MFG. SERIAL NUMBER 1481A
YEAR 1998
CORROSION ALLOWANCE NONE
CL-7001



TYPICAL NOZZLE DETAIL (U.O.N.)

REV.	DESCRIPTION	DATE	BY	APPVD
1	ADDED NOZZLE 'D' DETAIL & REVISED DAVIT ORIENTATION	4-3-98	CJB	CJB
0	FOR CONSTRUCTION	3-18-98	CJB	CJB
P2	REVISED NOZZLES, RENUMBERED TRAYS	2-26-98	EV	

REVISIONS

KOCH

KOCH PROCESS TECHNOLOGY INC

CLIENT INFORMATION

PROJ NO.

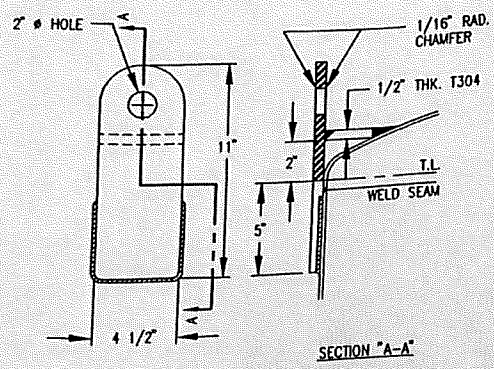
PO NO.

LAYOUT DRAWING FOR
CL-7001
36" O.D. TRAYED COLUMN

SCALE	1/4" = 1'-0"		
DESIGNED	EV	DATE	2-19-98
DRAWN	EV	DATE	2-19-98
CHECKED	RAB	DATE	2-19-98
APPROVED	RAB	DATE	2-19-98

JOB NO. T97-1222

DRAWING NO.	REV.
D-1222-08-01	1



SECTION "A-A"

LIFTING LUG DETAIL

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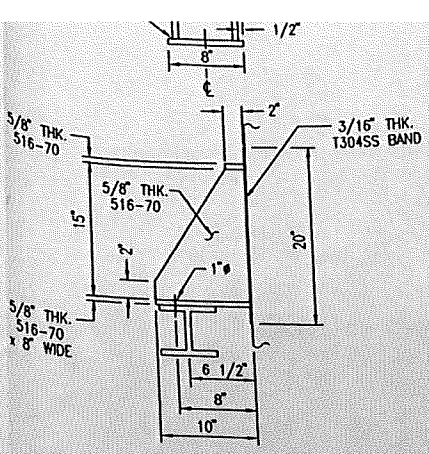
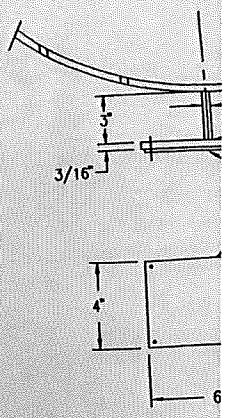
N.T.S.



LUG DETAIL

ORIENTATED @ 0°, 90°, 180°, & 270°
N.T.S.



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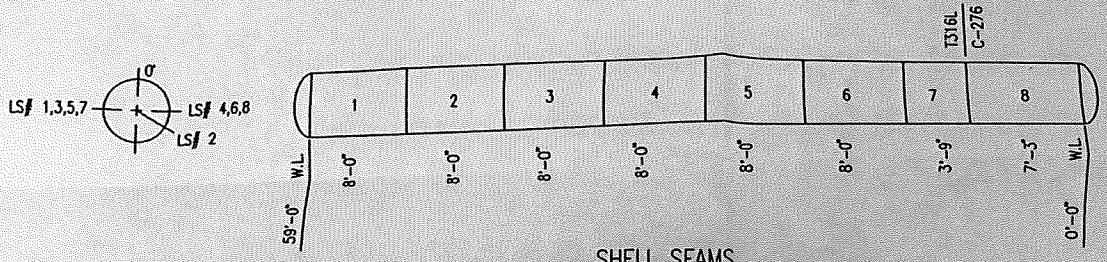
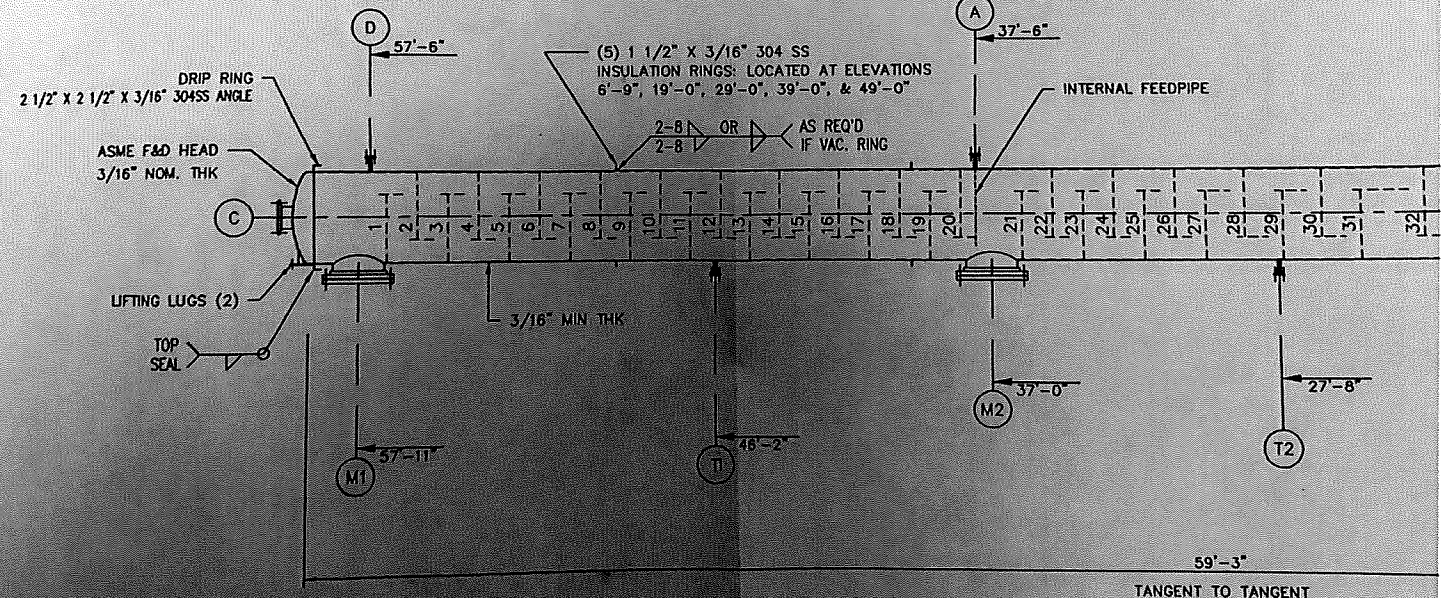


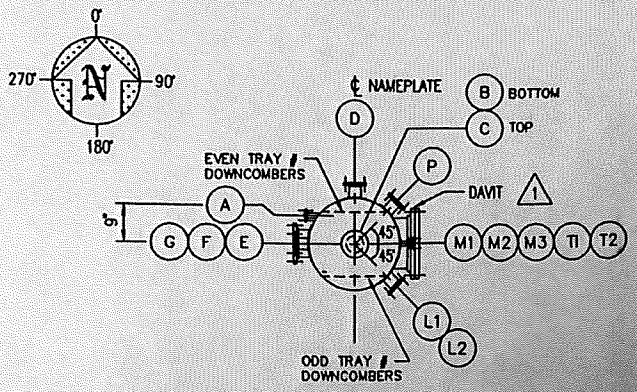
SHELL SEAMS

N.T.S.

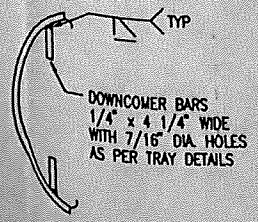


MARK	SERVICE	DESCRIPTION	ORIENT	CORR. ALLOW.	NECK MAT'L	IMPACT TEST	NORMALIZED	SIZE	TYPE	CLASS	RATING	FLG MAT'L	MATERI
		NOZZLE						FLANGE					REINF
G	CAUSTIC (FUTURE) W/BLIND	SCH 80	270.0	0	SB-619-N10276	–	–	1	SO	150#	200		
E	PRODUCT DRAW	SCH 40	270.0	0	SA 312 TP316L WELD HIGH	–	–	4	SO	150#	160	A182F316L	
P	PRESSURE	SCH 80	45.0	0	SB-619-N10276	–	–	1	SO	150#	160		
F	REBOILER RETURN	1/4" WALL MIN	270.0	0	SB-575-N10276	–	–	10	SO	150#	200	A105	SA-240-T31
L2	LEVEL GAUGE/TRANS.	SCH 40	135.0	0	SB-619-N10276	–	–	3	SO	150#	200	SB-564-N10276	
L1	LEVEL GAUGE/TRANS.	SCH 40	135.0	0	SB-619-N10276	–	–	3	SO	150#	200	SB-564-N10276	
T2	TEMPERATURE	SCH 80	90.0	0	SA 312 TP316L WELD HIGH	–	–	1	SO	150#	160	A182F316L	
T1	TEMPERATURE	SCH 80	90.0	0	SA 312 TP316L WELD HIGH	–	–	1	SO	150#	160	A182F316L	
D	REFLUX	SCH 80	0.0	0	SA 312 TP316L WELD HIGH	–	–	1	SO	150#	160	A182F316L	
A	FEED RECEPTACLE	SCH 80	–	0	SA 312 TP316L WELD HIGH	–	–	2	SO	150#	160	A182F316L	
M3	MANWAY	3/16" WALL	90.0	0	SA 240 316L HIGH	–	–	20	SO	150#	200	A105	
M2	MANWAY	3/16" WALL	90.0	0	SA 240 316L HIGH	–	–	20	SO	150#	200	A105	
M1	MANWAY	3/16" WALL	90.0	0	SA 240 316L HIGH	–	–	20	SO	150#	200	A105	
B	LIQUID OUTLET	3/16" THK.	–	0	SB-575-N10276	–	–	10	SO	150#	200	A105	
C	VAPOR OUTLET	SCH 40	–	0	SA 312 TP316L WELD HIGH	–	–	6	SO	150#	200	A182F316L	

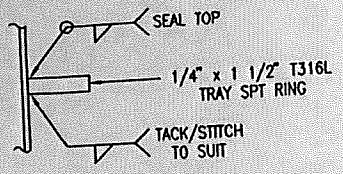
NOZZLE SCHEDULE



SHELL NOZZLE ORIENTATION

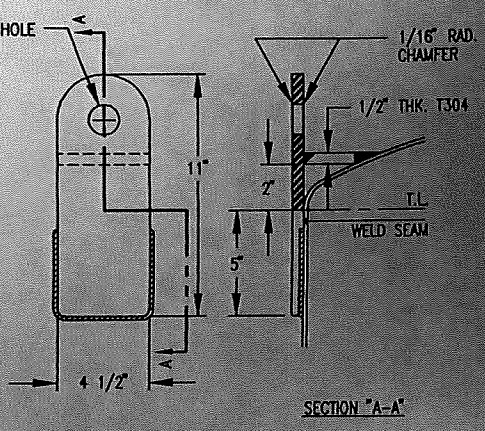


DETAIL DOWNCOMER BARS



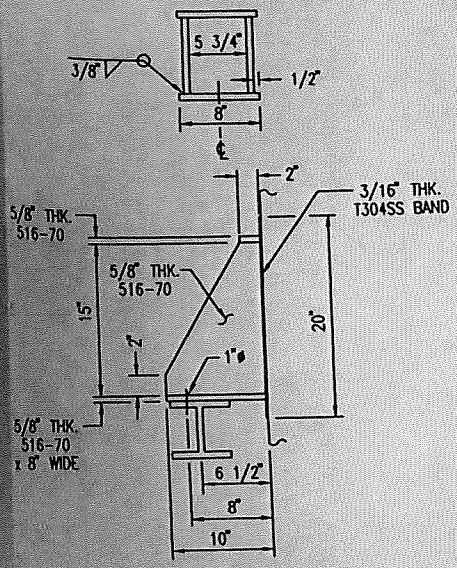
DETAIL TRAY SPT RINGS

SEE KOCH-GLITSCH
DWG D-909407-D000



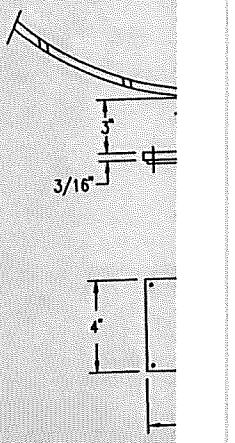
LIFTING LUG DETAIL

(2) REQ'D
N.T.S.



LUG DETAIL

ORIENTATED @ 0°, 90°, 180°, & 270°
N.T.S.



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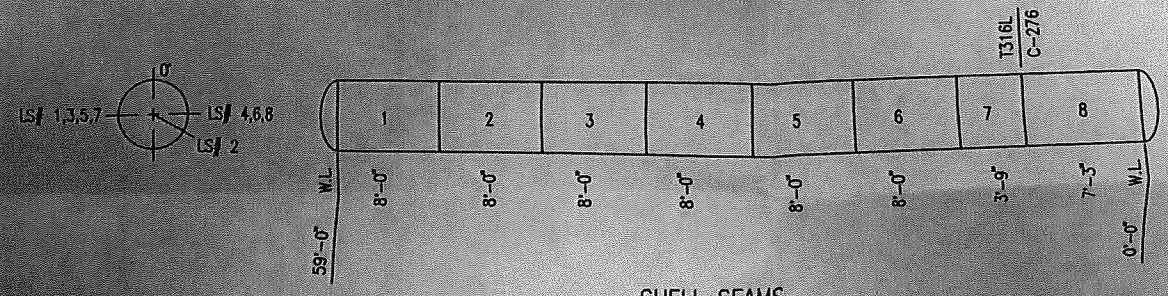

SHELL SEAMS

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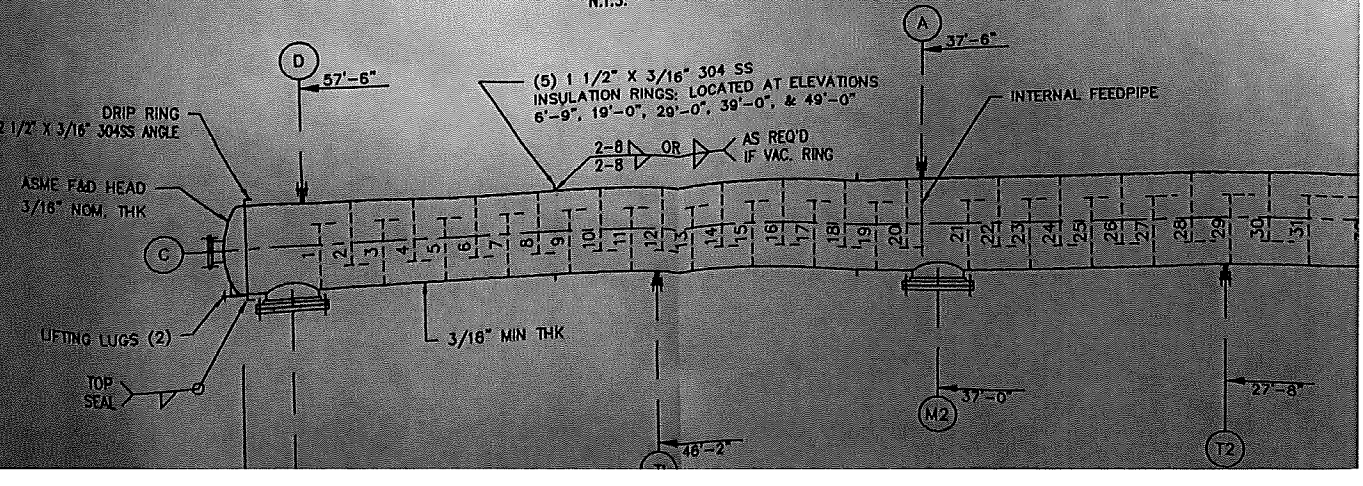
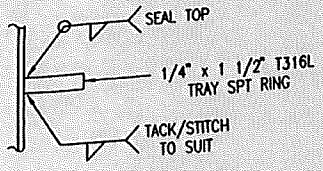
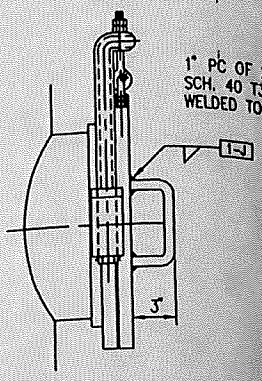
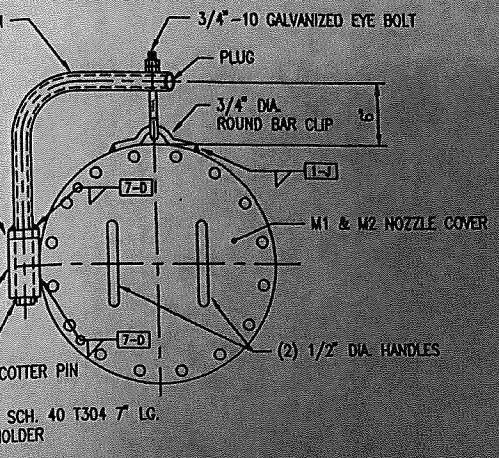




DETAIL TRAY SPT RINGS

SEE KOCH-GLITSCH DWG D-909407-D000



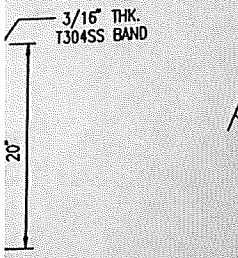


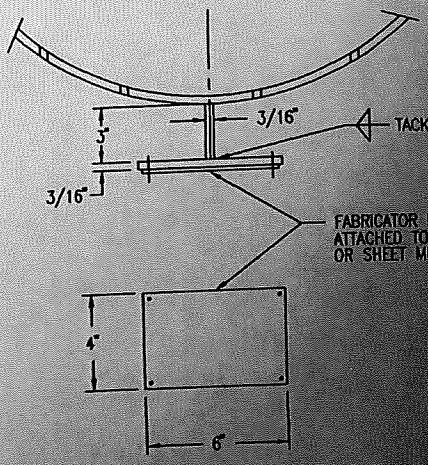
1 DAVIT ARM DETAIL

(NOT TO SCALE)

NOTES:

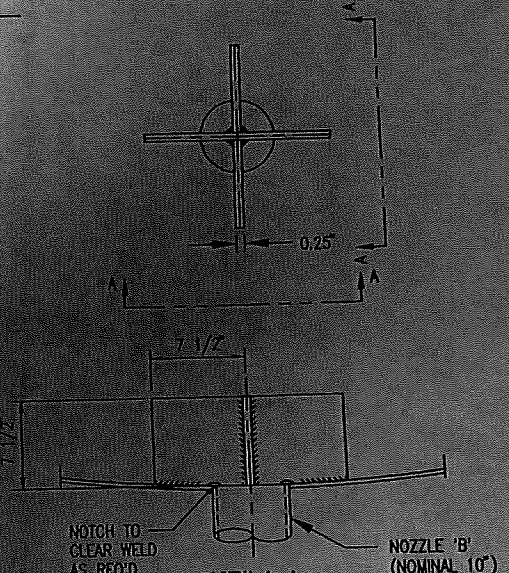
1) CONSTRUCTION SHA
ASME CODE SECTIO
ASME STAMP AND
2) MATERIAL OF CONST
SHELL –
SA 240 316L
HEADS –
TOP: SA 240
NOZZLES –
SEE NOZZLE
FLANGES –
SEE NOZZLE
C'STL FLANGE
BOLTS –
A193 B7 C'S
NUTS –
A194 2H C'S
LUGS –
SA 516 GR
3) LOCATE ALL WE
4) ALL BOLT HOLE
5) ALL NOZZLES S
TO FACE OF FL
MOUNTED TRUE
6) VENDOR SHALL
FLANGES ARE
ASTM A193-B
7) ALL WELDING
AND OTHER D
8) NO FLANGES
AFTER WELDI
9) GASKETS 1/
10) FABRICATOR
11) WHEN WELD
GOVERN THI
12) PAINTING:
PER KO
13) FABRICATOR
A) FABR
B) FABR
THICK
14) LIQUID PE
15) MANWAYS
16) NOZZLE 'F
17) DUSENBER
1-J
6-D
7-D
H-2
H-3
H-5
18) MTR'S REQ





NAMEPLATE BRACKET DETAIL

(NOT TO SCALE)

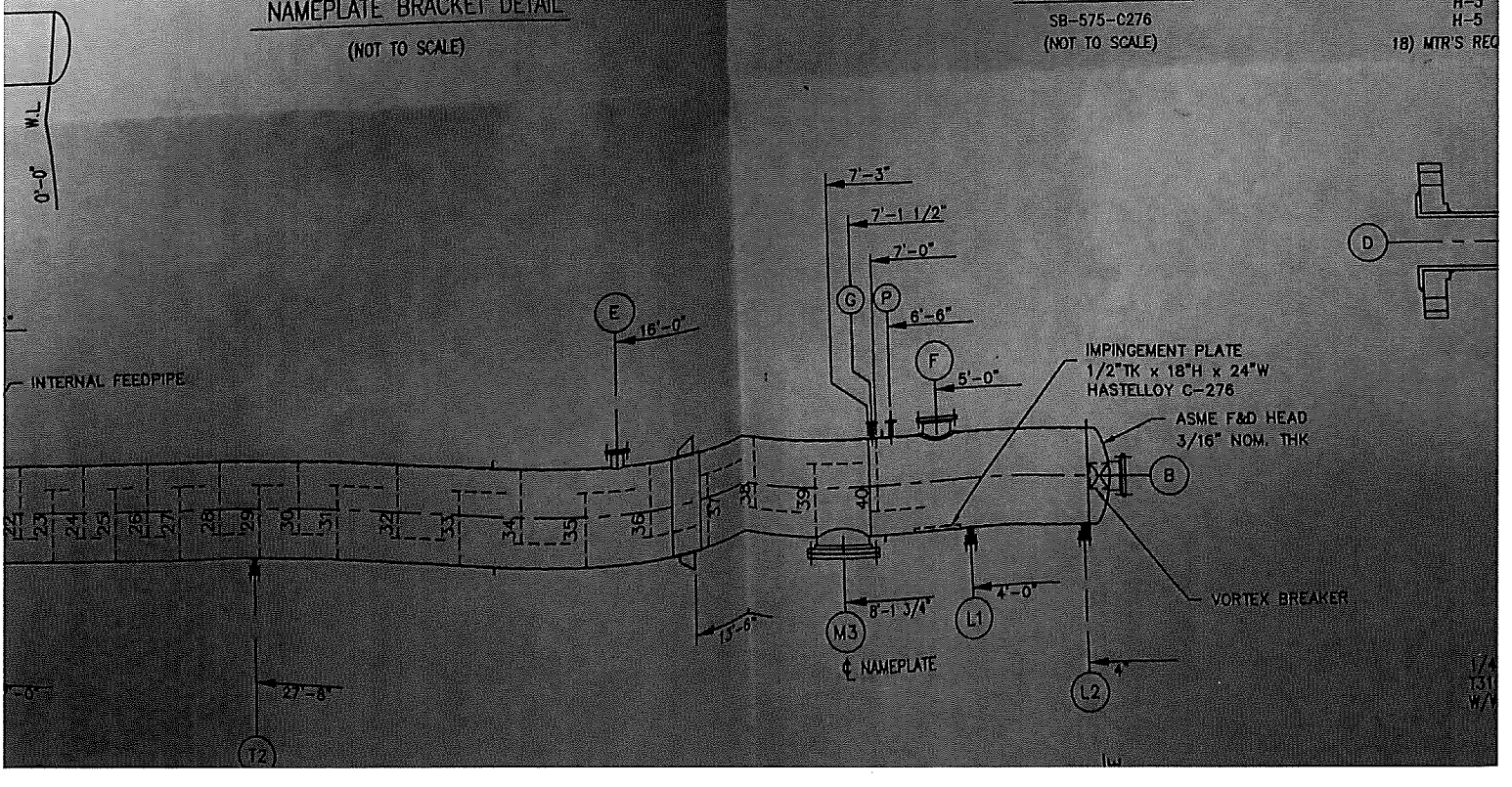


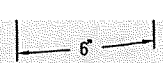
VIEW A-A

VORTEX DETAIL

SB-575-C276

(NOT TO SCALE)





NAMEPLATE BRACKET DETAIL

(NOT TO SCALE)

CLEAR WELD AS REQ'D.

VIEW A-A

NOZZLE B (NOMINAL 10")

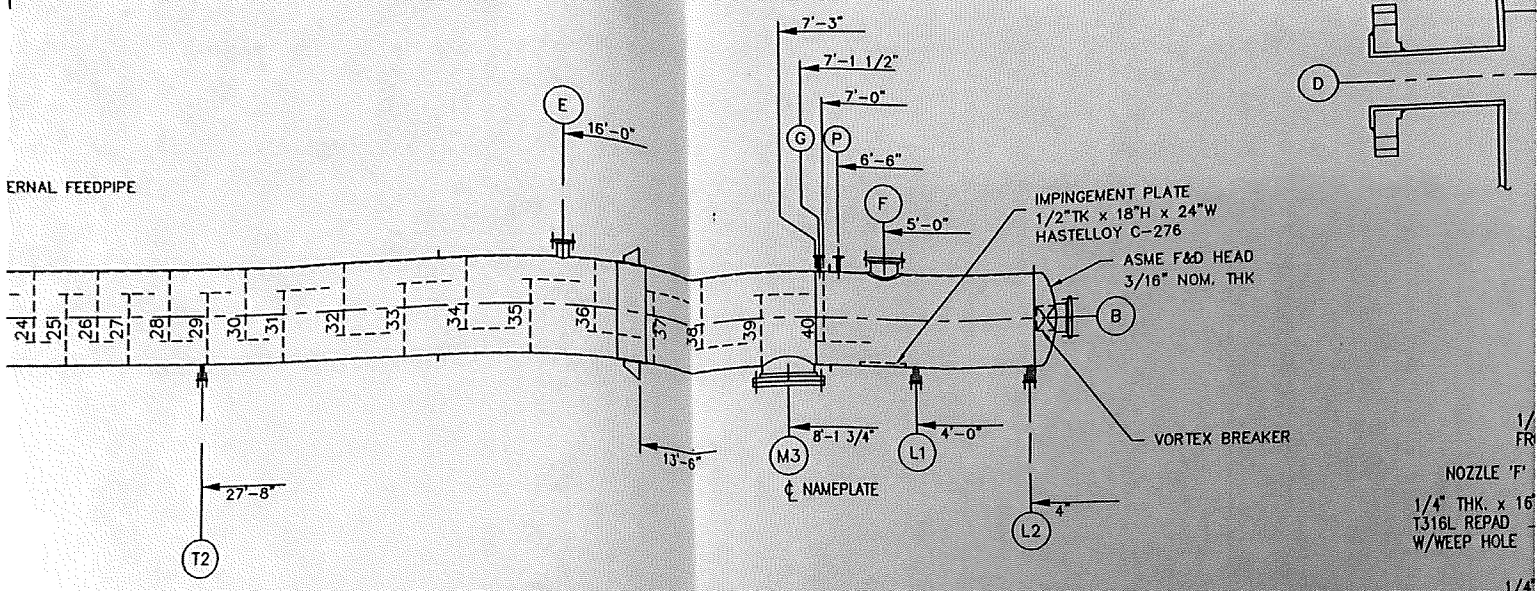
VORTEX DETAIL

SB-575-C276

(NOT TO SCALE)

17) DUSENBERY WELDING
1-J CARBON
6-D STAINLES
7-D STAINLES
H-2 C-276
H-3 C-276
H-5 C-276

18) MTR'S REQ'D ON HEA



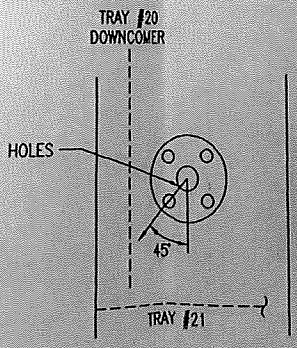
1/
FR

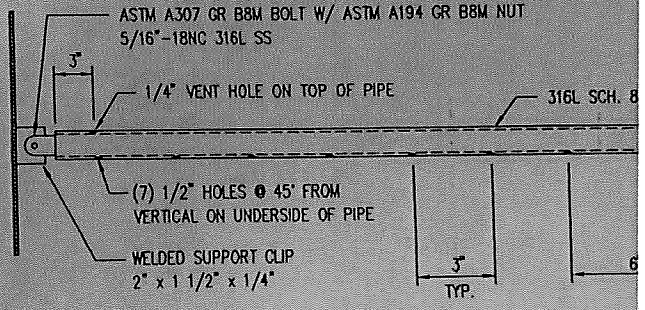
NOZZLE 'F'

1/4" THK. x 16"
T316L REPAD
W/WEEP HOLE

1/4"

0			–	–
)	A182F316L		–	–
)			–	–
)	A105	SA-240-T316L	–	–
)	SB-564-N10276		–	–
)	SB-564-N10276		–	–
)	A182F316L		–	–
)	A182F316L		–	–
)	A182F316L		–	–
)	A182F316L		–	–
)	A105		–	–
)	A105		–	–
)	A105		–	–
)	A105		–	–
)	A182F316L		–	–
G	FLG MAT'L	MATERIAL	IMPACT TEST	NORMAL -IZED
NGE		REINFORCING PAD		





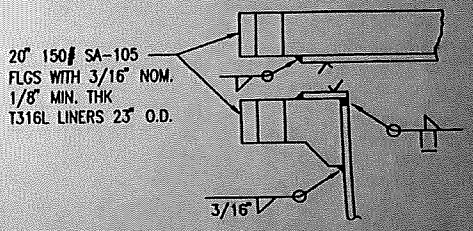
NOZZLE A DETAIL

3) LOCATE ALL WELDING SEAMS TO CLEAR UNLESS OTHERWISE NOTED.
4) ALL BOLT HOLES STRADDLE PRINCIPAL CENTERLINES
5) ALL NOZZLES SHALL PROJECT 6" FROM OUTSIDE OF EQUIPMENT TO FACE OF FLANGE, UNLESS OTHERWISE NOTED, AND SHALL BE MOUNTED TRUE TO CENTERLINES.
6) VENDOR SHALL FURNISH BOLTS, NUTS AND GASKETS WHERE MATING FLANGES ARE SUPPLIED. ALLOY STEEL STUD BOLTS, ASTM A193-B7, WITH HEAVY HEX NUTS ASTM A194-2H.
7) ALL WELDING SHALL BE FULL, CONTINUOUS, FREE FROM SLAG, POROSITY AND OTHER DEFECTS.
8) NO FLANGES SHALL BE WARPED, BUT SHALL BE TRUE AND GASKET SMOOTH AFTER WELDING.
9) GASKETS 1/8" THICK GYLON 3510.
10) FABRICATOR TO SUPPLY GASKETS FOR HYDROTEST.
11) WHEN WELDING DISSIMILAR METALS, THE HIGHER ALLOY SHALL GOVERN THE TYPE OF WELD ROD TO BE USED.
12) PAINTING:
PER KOCH SPEC. 011-03.
13) FABRICATOR RESPONSIBILITES
A) FABRICATOR TO SUPPLY DETAIL OF THE FOLLOWING: EQUIPMENT SUPPORT.
B) FABRICATOR TO VERIFY ALL SHELL, HEAD, NOZZLE AND SUPPORT THICKNESSES; KPTI IS TO HAVE A COPY OF CALCULATIONS.
14) LIQUID PENETRANT EXAM AS PER UNF-58.
15) MANWAYS TO BE PROVIDED WITH DAVITS.
16) NOZZLE 'F' NOT DESIGNED FOR REBOILER SUPPORT LOADS.
17) DUSENBERY WELDING PROCEDURES:

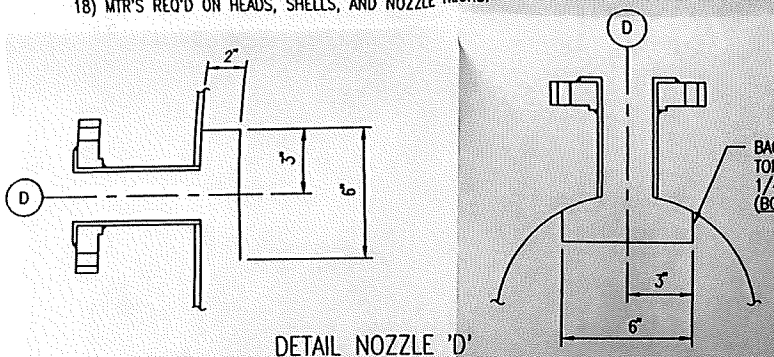
1-J	CARBON STEEL TO C.S.
6-D	STAINLESS STEEL TO S.S.
7-D	STAINLESS STEEL TO C.S.
H-2	C-276 TO C-276
H-3	C-276 TO STAINLESS
H-5	C-276 TO C.S.

18) MTR'S REQ'D ON HEADS, SHELLS, AND NOZZLE NECKS.

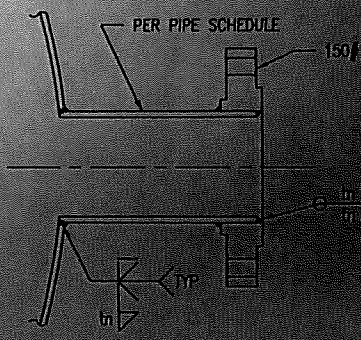
CORROSION ALLOWANCE	NONE		
HYDROSTAT	105 PSIG IN HORIZONTAL		
CONSTRUCTION CODE	ASME		
HEAT TREATMENT			
RADIOGRAPHY	NONE		
TYPE HEADS	F&D		
GASKETS			9
HARDWARE			2
AGITATOR			
SPECIAL TESTS			14
JOINT EFFICIENCY	SHELL	0.7	
	HEADS	0.85	



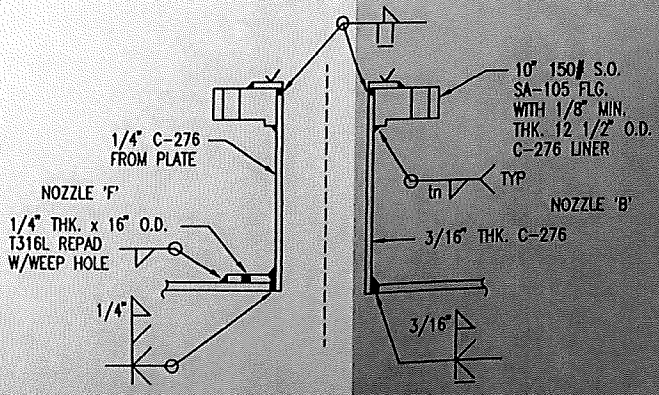
TYPICAL MANHOLE DETAIL



DETAIL NOZZLE 'D'



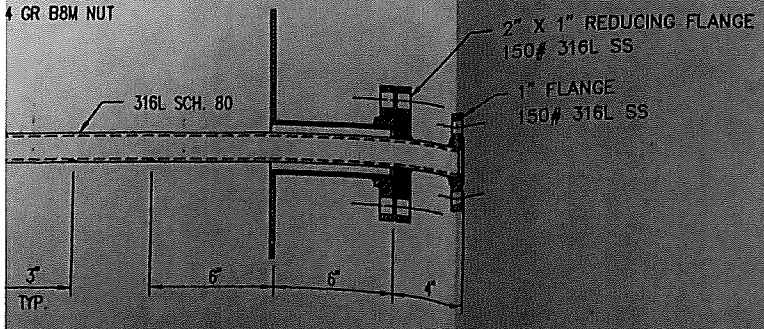
TYPICAL NOZZLE DETAIL (U.O.N.)



DETAIL NOZZLE 'F' & 'B'

1	ADDED NOZZLE 'D' DETAIL & REVISED DAVIT ORIENTATION	4-3-98	CJB	CJB
0	FOR CONSTRUCTION	3-18-98	CJB	CJB
P2	REVISED NOZZLES, RENUMBERED TRAYS	2-26-98	EV	
REV.	DESCRIPTION	DATE	BY	APP'D

REVISIONS



DETAIL

KOCH

KOCH PROCESS TECHNOLOGY INC

CLIENT INFORMATION	LAYOUT DRAWING FOR CL-7001 36" O.D. TRAYED COLUMN
PROJ NO.	
PO NO.	
SCALE 1/4" = 1'-0"	
DESIGNED EV DATE 2-19-98	
DRAWN EV DATE 2-19-98	JOB NO. T97-1222
CHECKED RAB DATE 2-19-98	DRAWING NO. D-1222-08-01 REV. 1
APPROVED DATE	

NOTES:

1) CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST ASME CODE SECTION VIII, DIV 1. ASME STAMP AND NATIONAL BOARD STAMP REQ'D.
2) MATERIAL OF CONSTRUCTION TO BE:
   SHELL –
   SA 240 316L EXCEPT BOTTOM 7'-3" WHICH IS TO BE SB 575 HASTELLOY C-276.
   HEADS –
   TOP: SA 240 316L; BOTTOM: SB 575 HASTELLOY C-276.
   NOZZLES –
   SEE NOZZLE SCHEDULE.
   FLANGES –
   SEE NOZZLE SCHEDULE.
   C'STL FLANGES TO BE LINED WITH APPROPRIATE ALLOY.
   BOLTS –
   A193 B7 C'STL, ZINC PLATED.
   NUTS –
   A194 2H C'STL, ZINC PLATED.
   LUGS –
   SA 516 GR 70 W/ 304SS BACKING BAND.
3) LOCATE ALL WELDING SEAMS TO CLEAR NOZZLES.
4) ALL BOLT HOLES STRADDLE PRINCIPAL CENTERLINES UNLESS OTHERWISE NOTED.
5) ALL NOZZLES SHALL PROJECT 6" FROM OUTSIDE OF EQUIPMENT TO FACE OF FLANGE, UNLESS OTHERWISE NOTED, AND SHALL BE MOUNTED TRUE TO CENTERLINES.
6) VENDOR SHALL FURNISH BOLTS, NUTS AND GASKETS WHERE MATING FLANGES ARE SUPPLIED. ALLOY STEEL STUD BOLTS, ASTM A193-B7, WITH HEAVY HEX NUTS ASTM A194-2H.
7) ALL WELDING SHALL BE FULL, CONTINUOUS, FREE FROM SLAG, POROSITY AND OTHER DEFECTS.
8) NO FLANGES SHALL BE WARPED, BUT SHALL BE TRUE AND GASKET SMOOTH AFTER WELDING.
9) GASKETS 1/8" THICK GYLON 3510.
10) FABRICATOR TO SUPPLY GASKETS FOR HYDROTEST.
11) WHEN WELDING DISSIMILAR METALS, THE HIGHER ALLOY SHALL GOVERN THE TYPE OF WELD ROD TO BE USED.
12) PAINTING:
    PER KOCH SPEC. 011-03.
13) FABRICATOR RESPONSIBILITES
    A) FABRICATOR TO SUPPLY DETAIL OF THE FOLLOWING: EQUIPMENT SUPPORT.
    B) FABRICATOR TO VERIFY ALL SHELL, HEAD, NOZZLE AND SUPPORT THICKNESSES; KPTI IS TO HAVE A COPY OF CALCULATIONS.
14) LIQUID PENETRANT EXAM AS PER UNF-58.
15) MANWAYS TO BE PROVIDED WITH DAVITS.
16) NOZZLE 'F' NOT DESIGNED FOR REBOILER SUPPORT LOADS.
17) DUSENBERY WELDING PROCEDURES:

1-J	CARBON STEEL TO C.S.
6-D	STAINLESS STEEL TO S.S.
7-D	STAINLESS STEEL TO C.S.
H-2	C-276 TO C-276
H-3	C-276 TO STAINLESS
H-5	C-276 TO C.S.

18) MTR'S REQ'D ON HEADS, SHELLS, AND NOZZLE NECKS.

COVER

'B'
L 10")

KER

DESIGN DATA

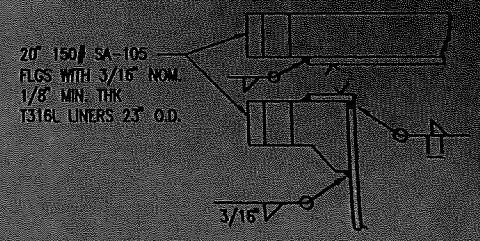
HORIZONTAL _____ VERTICAL X

TYPE SUPPORT CHAIR _____ LEGS _____ LUGS X SKIRT _____

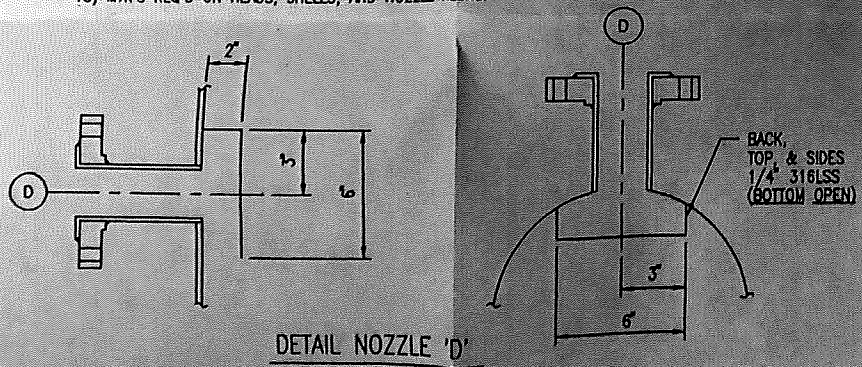
PAINT EXT. CARBON STEEL: SEE NOTE 12
INSULATION RINGS: 5 FOR 2" INSULATION

ESTIMATED WEIGHT
EMPTY: 8500 LBS FULL 34500 LBS OPERATING 14300 LBS

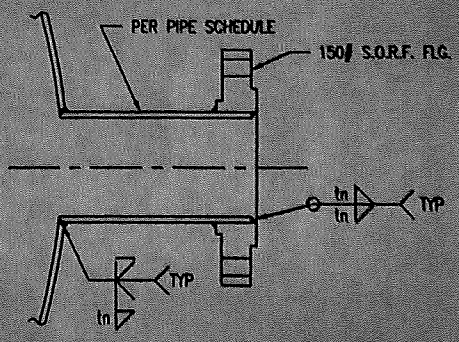
	VESSEL	NOTES
CAPACITY		
DIAMETER	36" O.D.	
LENGTH	59'-6"	
BASIC MATERIAL	316L S.S.	
INSIDE FINISH		
DESIGN TEMP.	400° F	
DESIGN PRESS.	50 PSIG/FV	
CORROSION ALLOWANCE	NONE	
HYDROSTAT	105 PSIG IN HORIZONTAL	
CONSTRUCTION CODE	ASME	
HEAT TREATMENT		
RADIOGRAPHY	NONE	
TYPE HEADS	F&D	
GASKETS		9
HARDWARE		9
AGITATOR		
SPECIAL TESTS		14
JOINT EFFICIENCY	SHELL 0.7	
	HEADS 0.85	



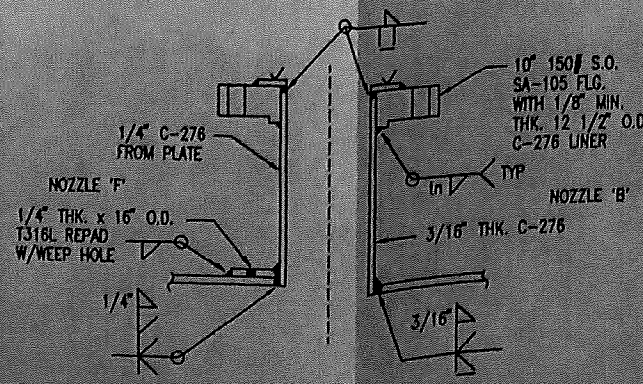
TYPICAL MANHOLE DETAIL



DETAIL NOZZLE 'D'

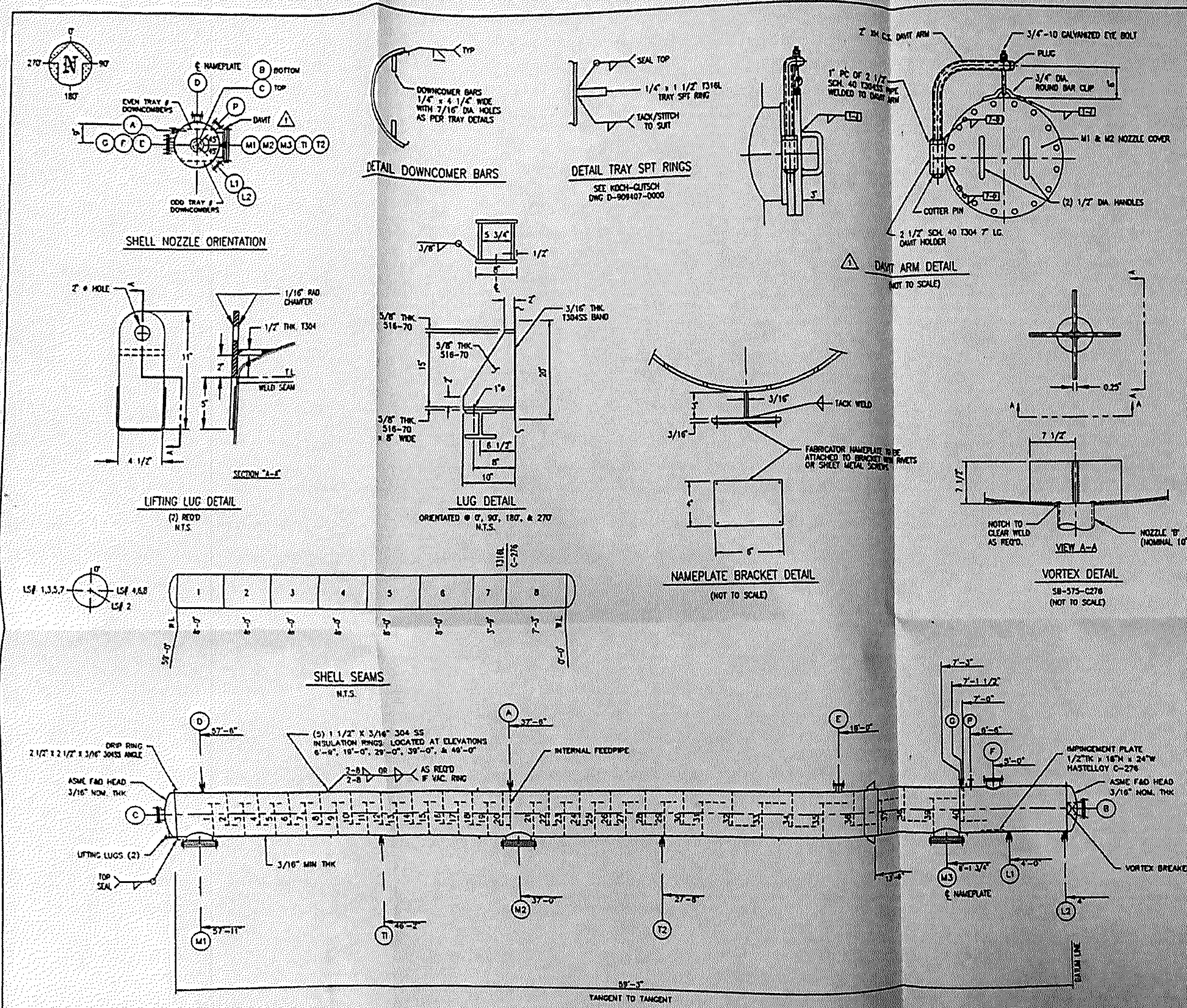


TYPICAL NOZZLE DETAIL (U.O.N.)



REV.	DESCRIPTION	DATE	BY	APPVD
1	ADDED NOZZLE 'D' DETAIL & REVISED DAVIT ORIENTATION	4-3-98	CJB	CJB
0	FOR CONSTRUCTION	3-18-98	CJB	CJB
P2	REVISED NOZZLES, RENUMBERED TRAYS	2-25-98	EV	

REVISIONS



NOTES:

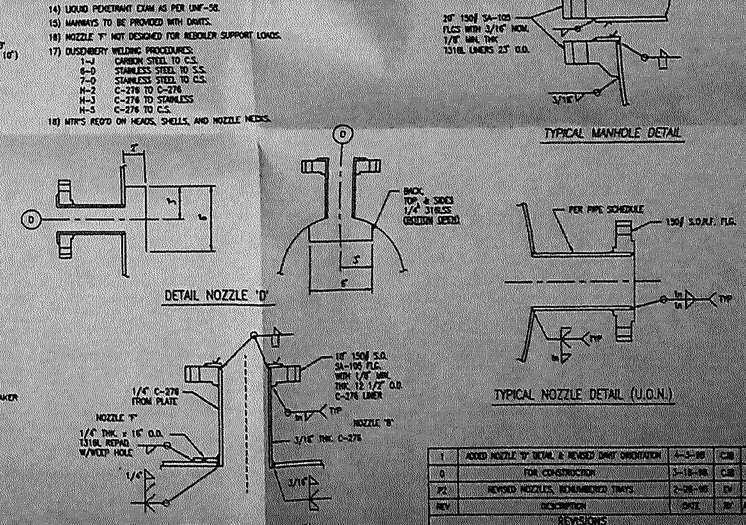
1) CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST ASME CODE SECTION VIII, DIV 1. ASME STAMP AND NATIONAL BOARD STAMP REQ'D.
2) MATERIAL OF CONSTRUCTION TO BE:
   SHELL –
   SA 240 316L EXCEPT BOTTOM 7'-3" WHICH IS TO BE SB 575 HASTELLOY C-276.
   HEADS –
   TOP: SA 240 316L; BOTTOM: SB 575 HASTELLOY C-276.
   NOZZLES –
   SEE NOZZLE SCHEDULE.
   FLANGES –
   SEE NOZZLE SCHEDULE.
   C'STL FLANGES TO BE LINED WITH APPROPRIATE ALLOY.
   BOLTS –
   A193 B7 C'STL. ZINC PLATED.
   NUTS –
   A194 2H C'STL. ZINC PLATED.
   LUGS –
   SA 516 GR 70 W/ 304SS BACKING BAND.
3) LOCATE ALL WELDING SEAMS TO CLEAR NOZZLES.
4) ALL BOLT HOLES STRADDLE PRINCIPAL CENTERLINES UNLESS OTHERWISE NOTED.
5) ALL NOZZLES SHALL PROJECT 6" FROM OUTSIDE OF EQUIPMENT TO FACE OF FLANGE, UNLESS OTHERWISE NOTED, AND SHALL BE MOUNTED TRUE TO CENTERLINES.
6) VENDOR SHALL FURNISH BOLTS, NUTS AND GASKETS WHERE MATING FLANGES ARE SUPPLIED. ALLOY STEEL STUD BOLTS, ASTM A193-B7, WITH HEAVY HEX NUTS ASTM A194-2H.
7) ALL WELDING SHALL BE FULL, CONTINUOUS, FREE FROM SLAG, POROSITY AND OTHER DEFECTS.
8) NO FLANGES SHALL BE WARPED, BUT SHALL BE TRUE AND GASKET SMOOTH AFTER WELDING.
9) GASKETS 1/8" THICK GYLON 3510.
10) FABRICATOR TO SUPPLY GASKETS FOR HYDROTEST.
11) WHEN WELDING DISSIMILAR METALS, THE HIGHER ALLOY SHALL GOVERN THE TYPE OF WELD ROD TO BE USED.
12) PAINTING:
   PER KOCH SPEC. 011-03.
13) FABRICATOR RESPONSIBILITES
   A) FABRICATOR TO SUPPLY DETAIL OF THE FOLLOWING: EQUIPMENT SUPPORT.
   B) FABRICATOR TO VERIFY ALL SHELL, HEAD, NOZZLE AND SUPPORT THICKNESSES; KPTI IS TO HAVE A COPY OF CALCULATIONS.
14) LIQUID PENETRANT EXAM AS PER UNF-58.
15) MANWAYS TO BE PROVIDED WITH DAVITS.
16) NOZZLE "F" NOT DESIGNED FOR REBOILER SUPPORT LOADS.
17) DUSENBERY WELDING PROCEDURES:
   1-J CARBON STEEL TO C.S.
   6-D STAINLESS STEEL TO S.S.
   7-D STAINLESS STEEL TO C.S.
   H-2 C-276 TO C-276
   H-3 C-276 TO STAINLESS
   H-5 C-276 TO C.S.
18) MTR'S REQ'D ON HEADS, SHELLS, AND NOZZLE NECKS.

DESIGN DATA

HORIZONTAL ______ VERTICAL X
TYPE SUPPORT CHAIR ___ LEGS ___ LUGS X SKIRT ___
PAINT EXT. CARBON STEEL: SEE NOTE 12
INSULATION RINGS: 5 FOR 2" INSULATION

ESTIMATED WEIGHT
EMPTY: 8500 LBS FULL 34500 LBS OPERATING 14300 LBS

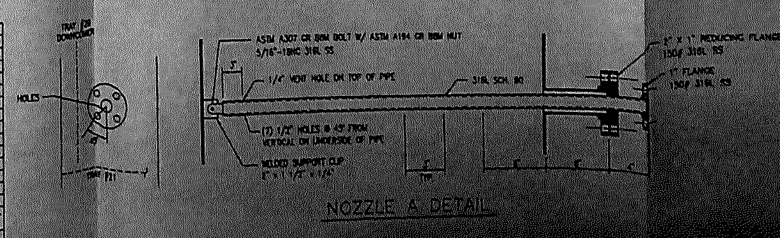
	VESSEL		NOTES
CAPACITY			
DIAMETER	36" O.D.		
LENGTH	59'-6"		
BASIC MATERIAL	316L S.S.		
INSIDE FINISH			
DESIGN TEMP.	400° F		
DESIGN PRESS.	50 PSIG/FV		
CORROSION ALLOWANCE	NONE		
HYDROSTAT	105 PSIG IN HORIZONTAL		
CONSTRUCTION CODE	ASME		
HEAT TREATMENT			
RADIOGRAPHY	NONE		
TYPE HEADS	F&D		
GASKETS			9
HARDWARE			2
AGITATOR			
SPECIAL TESTS			14
JOINT EFFICIENCY	SHELL	0.7	
	HEADS	0.85	



NOZZLE SCHEDULE

MARK	SERVICE	DESCRIPTION	ORIENT	CORR. ALLOW	NECK MAT'L	IMPACT TEST	NORMAL-IZED	SIZE	TYPE	CLASS	RATING	FLG MAT'L	MATERIAL	IMPACT TEST	NORMAL-IZED
G	CAUSTIC (FUTURE) W/BLIND	SCH 80	270.0	0	SB-619-N10276	–	–	1	SO	150#	200			–	–
E	PRODUCT DRAW	SCH 40	270.0	0	SA 312 TP316L WELD HIGH	–	–	4	SO	150#	160	A182F316L		–	–
P	PRESSURE	SCH 80	45.0	0	SB-619-N10276	–	–	1	SO	150#	160			–	–
F	REBOILER RETURN	1/4" WALL MIN	270.0	0	SB-575-N10276	–	–	10	SO	150#	200	A105	SA-240-T316L	–	–
L2	LEVEL GAUGE/TRANS	SCH 40	135.0	0	SB-619-N10276	–	–	3	SO	150#	200	SB-564-N10276		–	–
L1	LEVEL GAUGE/TRANS	SCH 40	135.0	0	SB-619-N10276	–	–	3	SO	150#	200	SB-564-N10276		–	–
T2	TEMPERATURE	SCH 80	90.0	0	SA 312 TP316L WELD HIGH	–	–	1	SO	150#	160	A182F316L		–	–
T1	TEMPERATURE	SCH 80	90.0	0	SA 312 TP316L WELD HIGH	–	–	1	SO	150#	160	A182F316L		–	–
D	REFLUX	SCH 80	0.0	0	SA 312 TP316L WELD HIGH	–	–	1	SO	150#	160	A182F316L		–	–
A	FEED RECEPTACLE	SCH 80	–	0	SA 312 TP316L WELD HIGH	–	–	2	SO	150#	160	A182F316L		–	–
M3	MANWAY	3/16" WALL	90.0	0	SA 240 316L HIGH	–	–	20	SO	150#	200	A105		–	–
M2	MANWAY	3/16" WALL	90.0	0	SA 240 316L HIGH	–	–	20	SO	150#	200	A105		–	–
M1	MANWAY	3/16" WALL	90.0	0	SA 240 316L HIGH	–	–	20	SO	150#	200	A105		–	–
B	LIQUID OUTLET	3/16" THK	–	0	SB-575-N10276	–	–	10	SO	150#	200	A105		–	–
C	VAPOR OUTLET	SCH 40	–	0	SA 312 TP316L WELD HIGH	–	–	6	SO	150#	200	A182F316L		–	–

NOZZLE (MARK–NORMALIZED) · FLANGE (SIZE–FLG MAT'L) · REINFORCING PAD (MATERIAL–NORMALIZED)



REVISIONS

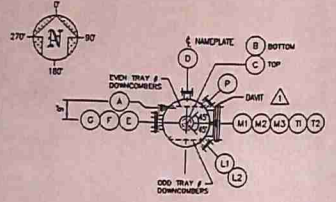
REV	DESCRIPTION	DATE	BY	APP'D
1	ADDED NOZZLE "D" DETAIL & REVISED DAVIT ORIENTATION	[illegible]	[illegible]	[illegible]
0	FOR CONSTRUCTION	[illegible]	[illegible]	[illegible]
P2	REVISED NOZZLES, RENUMBERED TRAYS	[illegible]	[illegible]	

KOCH

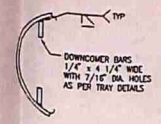
KOCH PROCESS TECHNOLOGY INC

CLIENT INFORMATION

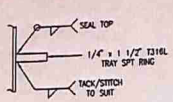
LAYOUT DRAWING FOR



SHELL NOZZLE ORIENTATION

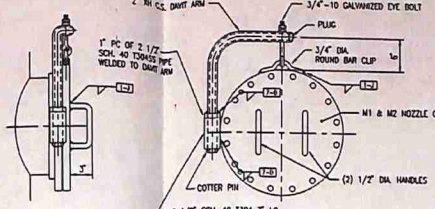


DETAIL DOWNCOMER BARS



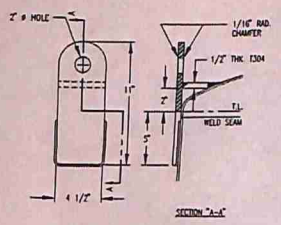
DETAIL TRAY SPT RINGS

SEE KOCH-GLITSCH DWG D-909407-0000



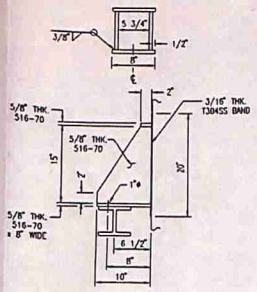
⚠ DAVIT ARM DETAIL

(NOT TO SCALE)



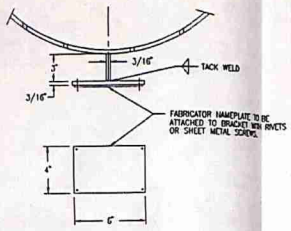
LIFTING LUG DETAIL

(2) REQ'D N.T.S.



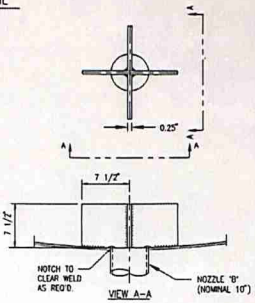
LUG DETAIL

ORIENTATED @ 0°, 90°, 180°, & 270° N.T.S.



NAMEPLATE BRACKET DETAIL

(NOT TO SCALE)



VORTEX DETAIL

SB-575-C276 (NOT TO SCALE)

NOTES:

1) CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST ASME CODE SECTION VIII, DIV 1. ASME STAMP AND NATIONAL BOARD STAMP REQ'D.
2) MATERIAL OF CONSTRUCTION TO BE:
   SHELL –
   SA-240 316L EXCEPT BOTTOM 7'-3" WHICH IS TO BE SB 575 HASTELLOY C-276.
   HEADS –
   TOP: SA 240 316L; BOTTOM: SB 575 HASTELLOY C-276.
   NOZZLES –
   SEE NOZZLE SCHEDULE.
   FLANGES –
   SEE NOZZLE SCHEDULE.
   C'STL FLANGES TO BE LINED WITH APPROPRIATE ALLOY.
   BOLTS –
   A193 B7 C'STL, ZINC PLATED.
   NUTS –
   A194 2H C'STL, ZINC PLATED.
   LUGS –
   SA 516 GR 70 W/ 304SS BACKING BAND.
3) LOCATE ALL WELDING SEAMS TO CLEAR NOZZLES.
4) ALL BOLT HOLES STRADDLE PRINCIPAL CENTERLINES UNLESS OTHERWISE NOTED.
5) ALL NOZZLES SHALL PROJECT 6" FROM OUTSIDE OF EQUIPMENT TO FACE OF FLANGE, UNLESS OTHERWISE NOTED, AND SHALL BE MOUNTED TRUE TO CENTERLINES.
6) VENDOR SHALL FURNISH BOLTS, NUTS AND GASKETS WHERE MATING FLANGES ARE SUPPLIED. ALLOY STEEL STUD BOLTS, ASTM A193-B7, WITH HEAVY HEX NUTS ASTM A194-2H.
7) ALL WELDING SHALL BE FULL, CONTINUOUS, FREE FROM SLAG, POROSITY AND OTHER DEFECTS.
8) NO FLANGES SHALL BE WARPED, BUT SHALL BE TRUE AND GASKET SMOOTH AFTER WELDING.
9) GASKETS 1/8" THICK GYLON 3510.
10) FABRICATOR TO SUPPLY GASKETS FOR HYDROTEST.
11) WHEN WELDING DISSIMILAR METALS, THE HIGHER ALLOY SHALL GOVERN THE TYPE OF WELD ROD TO BE USED.
12) PAINTING:
    PER KOCH SPEC. 011-03.
13) FABRICATOR RESPONSIBILITIES
    A) FABRICATOR TO SUPPLY DETAIL OF THE FOLLOWING: EQUIPMENT SUPPORT.
    B) FABRICATOR TO VERIFY ALL SHELL, HEAD, NOZZLE AND SUPPORT THICKNESSES; KPTI IS TO HAVE A COPY OF CALCULATIONS.
14) LIQUID PENETRANT EXAM AS PER UNF-58.
15) MANWAYS TO BE PROVIDED WITH DAVITS.
16) NOZZLE 'F' NOT DESIGNED FOR REBOILER SUPPORT LOADS.
17) DUSENBERY WELDING PROCEDURES:

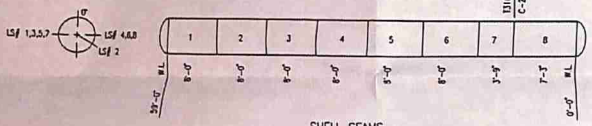
1-J	CARBON STEEL TO C.S.
6-D	STAINLESS STEEL TO S.S.
7-D	STAINLESS STEEL TO C.S.
H-2	C-276 TO C-276
H-3	C-276 TO STAINLESS
H-5	C-276 TO C.S.

18) MTR'S REQ'D ON HEADS, SHELLS, AND NOZZLE NECKS.

DESIGN DATA

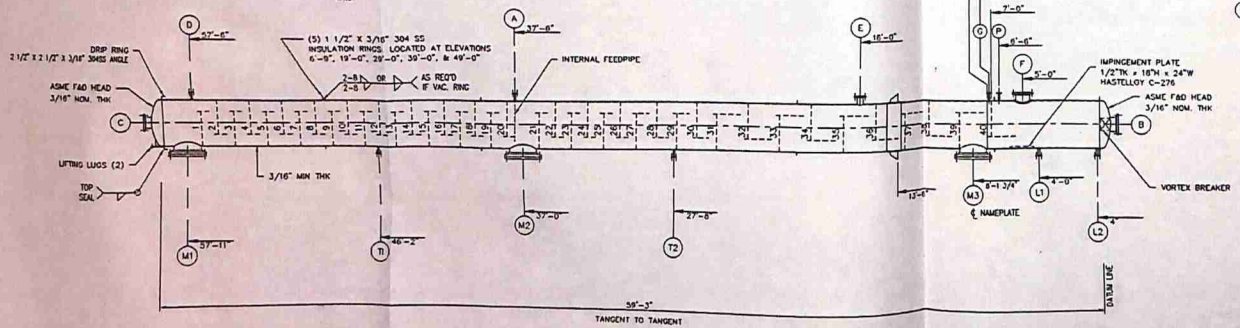
HORIZONTAL		VERTICAL	X	
TYPE SUPPORT	CHAIR	LEGS	LUGS X	SKIRT
PAINT EXT. CARBON STEEL: SEE NOTE 12				
INSULATION RINGS: 5 FOR 2" INSULATION				
ESTIMATED WEIGHT				
EMPTY: 8500 LBS	FULL 34500 LBS	OPERATING 14300 LBS		

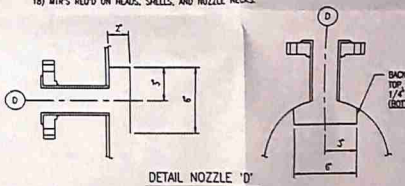
	VESSEL	NOTES
CAPACITY		
DIAMETER	36" O.D.	
LENGTH	59'-6"	
BASIC MATERIAL	316L S.S.	
INSIDE FINISH		
DESIGN TEMP.	400° F	
DESIGN PRESS.	50 PSIG/FV	
CORROSION ALLOWANCE	NONE	
HYDROSTAT	105 PSIG IN HORIZONTAL	
CONSTRUCTION CODE	ASME	
HEAT TREATMENT		
RADIOGRAPHY	NONE	
TYPE HEADS	F&D	
GASKETS		9
HARDWARE		2
AGITATOR		
SPECIAL TESTS		14
JOINT EFFICIENCY	SHELL 0.7	
	HEADS 0.85	



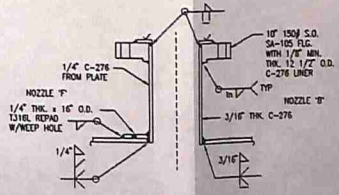
SHELL SEAMS

N.T.S.

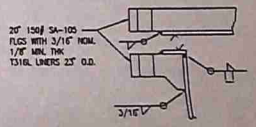




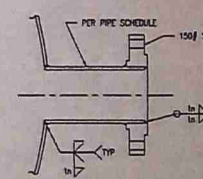
DETAIL NOZZLE 'D'



DETAIL NOZZLE 'F' & 'B'



TYPICAL MANHOLE DETAIL



TYPICAL NOZZLE DETAIL (U.O.N.)

1	ADDED NOZZLE 'D' DETAIL & REVISED DAVIT ORIENTATION	4-3-98	CJB	CJB
0	FOR CONSTRUCTION	3-16-98	CJB	CJB
P2	REVISED NOZZLES, RENUMBERED TRAYS	2-26-98	EV	
REV.	DESCRIPTION	DATE	BY	APPVD

REVISIONS

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CLIENT INFORMATION

PROJ NO.
PO NO.

SCALE 1/4" = 1'-0"

DESIGNED	EV	DATE	2-19-98
DRAWN	EV	DATE	2-19-98
CHECKED	RAB	DATE	2-19-98
APPROVED	RAB	DATE	2-19-98

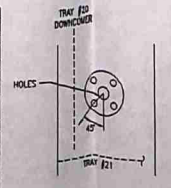
LAYOUT DRAWING FOR CL-7001 36" O.D. TRAYED COLUMN

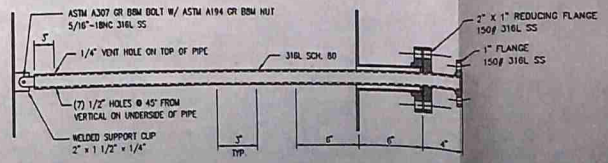
JOB NO. T97-1222

DRAWING NO. D-1222-08-01 REV. 1

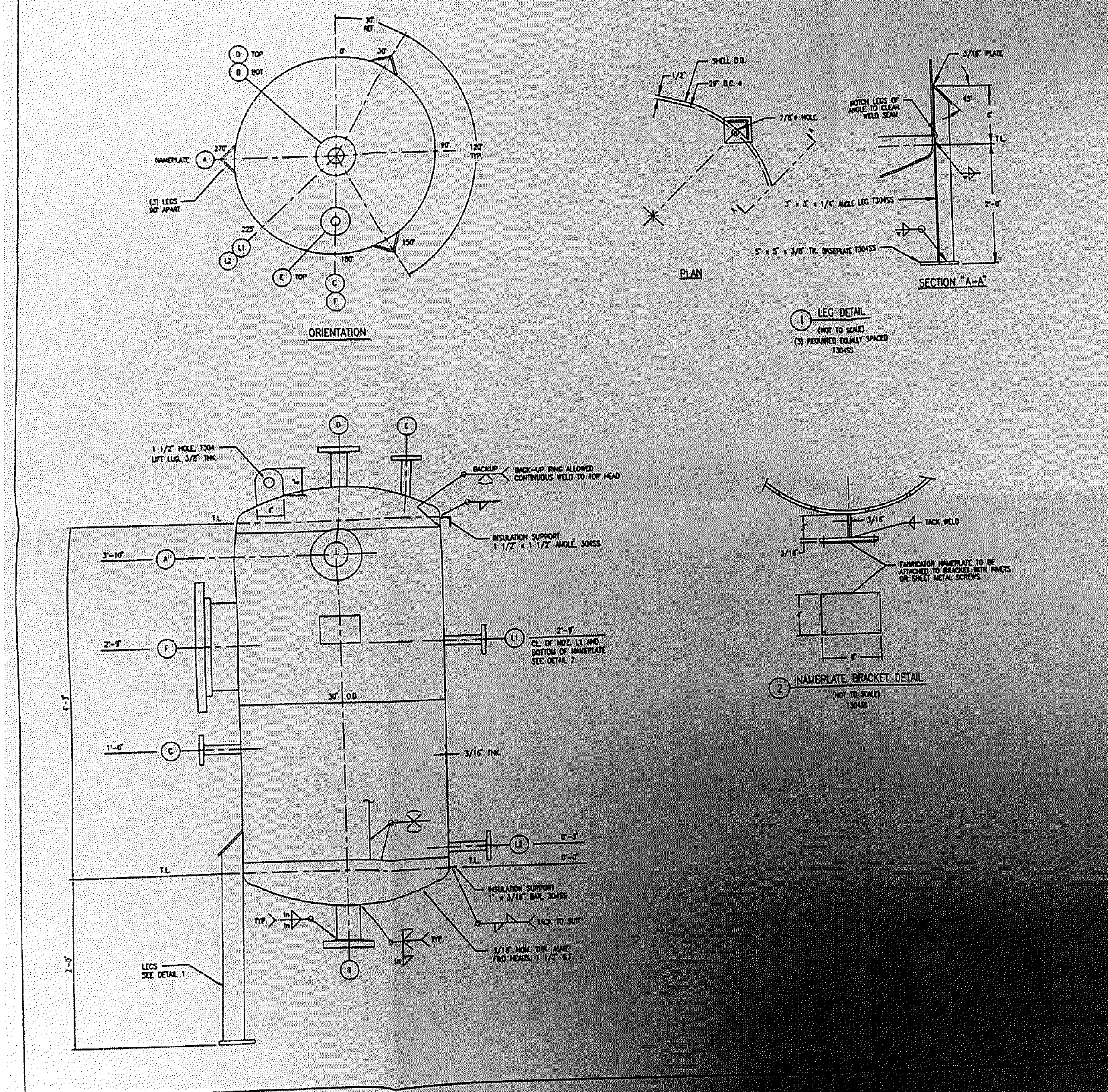
MARK	SERVICE	DESCRIPTION	NOZZLE ORIENT	NOZZLE CORR. ALLOW	NOZZLE NECK MAT'L	NOZZLE IMPACT TEST	NOZZLE NORMALIZED	FLANGE SIZE	FLANGE TYPE	FLANGE CLASS	FLANGE RATING	FLANGE FLG MAT'L	REINFORCING PAD MATERIAL	REINFORCING PAD IMPACT TEST	REINFORCING PAD NORMALIZED
G	CAUSTIC (FUTURE) W/BLIND	SCH 80	270.0	0	SB-619-N10276	–	–	1	SO	150#	200			–	–
E	PRODUCT DRAW	SCH 40	270.0	0	SA 312 TP316L WELD HIGH	–	–	4	SO	150#	160	A182F316L		–	–
P	PRESSURE	SCH 80	45.0	0	SB-619-N10276	–	–	1	SO	150#	160			–	–
F	REBOILER RETURN	1/4" WALL MIN	270.0	0	SB-575-N10276	–	–	10	SO	150#	200	A105	SA-240-T316L	–	–
L2	LEVEL GAUGE/TRANS.	SCH 40	135.0	0	SB-619-N10276	–	–	3	SO	150#	200	SB-564-N10276		–	–
L1	LEVEL GAUGE/TRANS.	SCH 40	135.0	0	SB-619-N10276	–	–	3	SO	150#	200	SB-564-N10276		–	–
T2	TEMPERATURE	SCH 80	90.0	0	SA 312 TP316L WELD HIGH	–	–	1	SO	150#	160	A182F316L		–	–
T1	TEMPERATURE	SCH 80	90.0	0	SA 312 TP316L WELD HIGH	–	–	1	SO	150#	160	A182F316L		–	–
D	REFLUX	SCH 80	0.0	0	SA 312 TP316L WELD HIGH	–	–	1	SO	150#	160	A182F316L		–	–
A	FEED RECEPTACLE	SCH 80	–	0	SA 312 TP316L WELD HIGH	–	–	2	SO	150#	160	A182F316L		–	–
M3	MANWAY	3/16" WALL	90.0	0	SA 240 316L HIGH	–	–	20	SO	150#	200	A105		–	–
M2	MANWAY	3/16" WALL	90.0	0	SA 240 316L HIGH	–	–	20	SO	150#	200	A105		–	–
M1	MANWAY	3/16" WALL	90.0	0	SA 240 316L HIGH	–	–	20	SO	150#	200	A105		–	–
B	LIQUID OUTLET	3/16" THK	–	0	SB-575-N10276	–	–	10	SO	150#	200	A105		–	–
C	VAPOR OUTLET	SCH 40	–	0	SA 312 TP316L WELD HIGH	–	–	6	SO	150#	200	A182F316L		–	–

NOZZLE SCHEDULE





NOZZLE A DETAIL



ORIENTATION
NAMEPLATE
(3) LEGS 90° APART
SHELL O.D.
28" B.C. ⌀
7/8"⌀ HOLE
3" x 3" x 1/4" ANGLE LEG T304SS
5" x 5" x 3/8" TK. BASEPLATE T304SS
NOTCH LEGS OF ANGLE TO CLEAR WELD SEAM
3/16" PLATE
PLAN
SECTION "A-A"
1 LEG DETAIL
(NOT TO SCALE)
(3) REQUIRED EQUALLY SPACED
T304SS
1 1/2" HOLE, T304 LIFT LUG, 3/8" THK.
BACK-UP RING ALLOWED CONTINUOUS WELD TO TOP HEAD
INSULATION SUPPORT 1 1/2" x 1 1/2" ANGLE, 304SS
CL. OF NOZ. L1 AND BOTTOM OF NAMEPLATE SEE DETAIL 2
30" O.D.
3/16" THK.
INSULATION SUPPORT 1" x 3/16" BAR, 304SS
TACK TO SUIT
3/16" NOM. THK. ASME F&D HEADS, 1 1/2" S.F.
LEGS SEE DETAIL 1
TACK WELD
FABRICATOR NAMEPLATE TO BE ATTACHED TO BRACKET WITH RIVETS OR SHEET METAL SCREWS.
2 NAMEPLATE BRACKET DETAIL
(NOT TO SCALE)
T304SS

NOTES:

1) CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST ASME CODE SECTION VIII,DIV.1., ASME CODE STAMP REQ'D.
2) ALL BOLT HOLES STRADDLE CENTERLINES UNLESS OTHERWISE NOTED.
3) LOCATE ALL WELDING SEAMS TO CLEAR NOZZLES AND SUPPORTS.
4) ALL NOZZLES SHALL PROJECT 6" FROM OUTSIDE OF EQUIPMENT TO FACE OF FLANGE, UNLESS OTHERWISE NOTED, AND SHALL BE MOUNTED TRUE TO CENTERLINES.
5) VENDOR SHALL FURNISH BOLTS, NUTS AND GASKETS WHERE MATING FLANGES ARE SUPPLIED. ALLOY STEEL STUD BOLTS, ZINC PLATED THREADED ENTIRE LENGTH, ASTM A193-B7, WITH ZINC PLATED HEAVY HEX NUTS ASTM A194-2H
6) ALL WELDING SHALL BE FULL, CONTINUOUS, FREE FROM SLAG, POROSITY AND OTHER DEFECTS.
7) NO FLANGES SHALL BE WARPED, BUT SHALL BE TRUE AND GASKET SMOOTH AFTER WELDING.
8) WHEN WELDING DISSIMILAR METALS, THE HIGHER ALLOY SHALL GOVERN THE TYPE OF WELD ROD TO BE USED.
9) GASKETS 1/8" GARLOCK GYLON 3510.
10) FABRICATOR TO SUPPLY GASKETS FOR HYDROTEST.

DESIGN DATA

HORIZONTAL ______ VERTICAL X
TYPE SUPPORT CHAIR ____ LEGS X LUGS ____ SKIRT ____
INSULATION RINGS: FOR 1" INSUL. AS SHOWN

ESTIMATED WEIGHT
EMPTY: 560 LBS FULL 2,000 LBS OPERATING 1,810 LBS

	VESSEL		NOTES
CAPACITY	170 GALLONS		150 GALLONS OPERATING
DIAMETER	30" O.D.		
LENGTH	4'-5" T/T		
BASIC MATERIAL	316LSS		
INSIDE FINISH	–		
DESIGN TEMP.	400°F / -20°F		
DESIGN PRESS.	50 PSIG/FV		
CORROSION ALLOWANCE	–		
HYDROSTAT	85 PSIG		
CONSTRUCTION CODE			NOTE 1
HEAT TREATMENT	N/A		
RADIOGRAPHY	NOT REQ'D.		
TYPE HEADS	ASME F&D		
GASKETS			NOTE 9
HARDWARE			NOTE 5
AGITATOR	–		
SPECIAL TESTS	–		
JOINT EFFICIENCY	SHELL	70%	
	HEADS	85%	

NOZZLE SCHEDULE

ITEM	SIZE	RATING / PIPE SCH.	SERVICE
A	3"	150# R.F.S.O. 316LSS SCH. 10S	FEED
B	3"	150# R.F.S.O. 316LSS SCH. 10S	LIQUID OUTLET
C	1"	150# R.F.S.O. 316LSS SCH. 40	PUMP RECYCLE
D	2"	150# R.F.S.O. 316LSS SCH. 40	VAPOR OUTLET
E	1"	150# R.F.S.O. 316LSS SCH. 40	DI WATER (FUTURE)
F	12"	150# R.F.S.O. 316LSS SCH. 40	HANDHOLE
L1,L2	1"	150# R.F.S.O. 316LSS SCH. 40	LEVEL GAUGE/TRANS.

REV.	DESCRIPTION	DATE	BY
1	ADDED NOZZLES E AND F	[illegible]	[illegible]
0	FOR CONSTRUCTION	[illegible]	[illegible]
A	FOR CUSTOMER APPROVAL	[illegible]	[illegible]

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