

# 102842

FORM U-2A MANUFACTURER'S PARTIAL DATA REPORT (ALTERNATIVE FORM)  
A Part of a Pressure Vessel Fabricated by One Manufacturer for Another Manufacturer  
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

1. Manufactured and certified by Ohmstede, Ltd., Lake Charles Plant, 1750 Swisco Road, Sulphur, LA 70665  
(Name and address of Manufacturer)
2. Manufactured for Giant Yorktown Refinery, 2201 Goodwin Neck Rd., Grafton, VA 23692  
(Name and address of Purchaser)
3. Location of installation Giant Yorktown Refinery, 2201 Goodwin Neck Rd., Grafton, VA 23692  
(Name and address)

4. Type: Shell Only 442082 ----  
(Description of vessel part (shell, two-piece head, tube bundle)) (Mfg's serial No.) (CRN)
- 2960 442082 R-1 Ohmstede, Ltd. 2004  
(Nat'l. Bd. No.) (Drawing No.) (Drawing prepared by) (Year built)
5. ASME Code, Section VIII, Div. 1 2001/2003 -- --  
Edition and Addenda (date) Code Case No. Special Service per UG-120(d)

6. Shell (a) No. of course(s): 2 (b) Overall length (ft & in.): 18'-8 9/16"

| 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         | 29 ID         | 9'-11"           | SA-516-70           | 3/8       | 1/8   | 1                    | A-Spot           | 85   | 1                              | B,C-Spot         | 85   | --             | --   |
| 1         | 29 ID         | 8'-9 9/16"       | SA-516-70           | 3/8       | 1/8   | 1                    | A-Spot           | 85   | 1                              | B,C-Spot         | 85   | --             | --   |
| --        | --            | --               | --                  | --        | --    | --                   | --               | --   | --                             | --               | --   | --             | --   |

7. Heads: (a) ----- (b) -----  
(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) ----- (Mat'l Spec. No., Grade, Size, No.)

8. MAWP -- -- psi at max. temp. -- -- °F Min. design metal temp. -- -- °F at -- -- psi.  
(internal) (external) (internal) (external)

9. Impact test No. UCS-66 at test temperature of --- °F  
(Indicate yes or no and the component(s) impact tested)

dro., ~~pressure~~, ~~hydrostatic~~ test press. -- Proof test --

11. 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 |                        |
| Connection                           | 1   | 8-150#           | RFLWN       | SA-105   | --     | --               | 1/8   | Weld                   | UW16.1e      | --     | --                     |
| Connection                           | 1   | 6-150#           | RFLWN       | SA-105   | --     | --               | 1/8   | Weld                   | UW16.1e      | --     | --                     |
| Connection                           | 4   | 1-150#           | RFLWN       | SA-105   | --     | --               | 1/8   | Weld                   | UW16.1e      | --     | --                     |

12. Supports: Skirt No Lugs -- Legs -- Others Saddles Attached Shell, Welded  
(Yes or No) (No.) (No.) (Describe) (Where and How)

13. Remarks No. 11-Pressure Relief Devices Per UG-125(a), Forming Per UCS-79(d), Design Data By Others.  
Item No.: E-104B

CERTIFICATE OF SHOP/FIELD COMPLIANCE

We certify that the statements made in this report are correct and that all details of material, construction, and workmanship of this pressure vessel part conform to the ASME Code for Pressure Vessels, Section VIII, Division 1.

U Certificate of Authorization No. 17,397 Expires 06/04/2006  
Date 2-10-04 Name Ohmstede, Ltd., Lake Charles Plant Signed K. J. Mahan v. Kollman  
(Manufacturer) (Representative)

CERTIFICATE OF SHOP/FIELD INSPECTION

I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and the State or Province of LA and employed by HSB CT of Hartford, CT have inspected the pressure vessel part described in this Manufacturer's Data Report on 2-11-04, and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel part 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 part 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 2-11-04 Signed [Signature] Commissions 1711377 (4) LA1184  
(Authorized Inspector) (Nat'l Board incl. endorsement, State, Province and No.)

 Ohmstede Ltd.

2966

OHMSTEDE Ltd.  
LAKE CHARLES PLANT

U

PART

WR13

315442082

YR-2004

ITEM NO. E-104B SIZE 28-240 TYPE AES

P.O. NO. 5841

DESIGN PRESSURE 115 PSIG AT 600 DEG. F

SHELL ONLY

FORM U-2 MANUFACTURER'S PARTIAL DATA REPORT  
A Part of a Pressure Vessel Fabricated by One Manufacturer for Another Manufacturer  
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

BD

1. Manufactured and certified by OHMSTEDE LTD., ST. GABRIEL PLANT, 4250 HIGHWAY 30 ST. GABRIEL, LOUISIANA 70776  
(Name and address of Manufacturer)

2. Manufactured for GIANT YORKTOWN REFINERY 2201 GOODWIN NECK ROAD GRAFTON, VA 23692  
(Name and address of Purchaser)

3. Location of installation GIANT YORKTOWN REFINERY 2201 GOODWIN NECK ROAD GRAFTON, VA 23692  
(Name and address)

4. Type: TUBE BUNDLE  
(Description of vessel part (shell, two-piece head, tube bundle)) 736884  
(Mfg's serial No.) (CRN)

2671 736884 OHMSTEDE LTD., ST. GABRIEL PLANT 2007  
(Nat'l. Bd. No.) (Drawing No.) (Drawing prepared by) (Year built)

5. ASME Code, Section VIII, Div. 1 2004 EDITION, 2005 ADDENDA  
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): - (b) Overall length ft & in.: -

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

7. Heads: (a) - (b) -

(Mat'l Spec. No., Grade or Type) H.T. - Time & Temp (Mat'l Spec. No., Grade or Type) H.T. - Time & Temp

| No. | 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) -

8. Type of jacket - Jacket closure - (Describe as ogee & weld, bar, etc.)

If bar, give dimensions - If bolted, describe or sketch.

IAWP \* \* psi at max. temp. \* \* °F Min. design metal temp. \* °F at \* psi.  
(internal) (external) (internal) (external)

10. Impact test YES, TBST, BAFFLES, SUPP. PL. & IMP. PL., ALL OTHERS NO PER UCS66(a). at test temperature of -50 °F  
(Indicate yes or no and the component(s) impact tested)

11. Hydro., ~~PSHH, G#2014~~ test press. - Proof test -

Items 12 and 13 to be completed for tube sections.

12. Tubesheet: SA-387-11CL2 28 3/4" 1 1/2" \* BOLTED  
Stationary (Mat'l Spec. No.) Dia., in. (subject to press.) Nom. thk., in. Corr. Allow., in. Attachment (welded or bolted)

SA-387-11CL2 28 5/8" 1 1/2" \* BOLTED  
Floating (Mat'l Spec. No.) Dia., in. Nom. thk., in. Corr. Allow., in. Attachment

13. Tubes: SA-179 3/4" .1090" 520 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 inner chambers of jacketed vessels or channels of heat exchangers.

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

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

15. Heads: (a) \_\_\_\_\_ (b) \_\_\_\_\_

|     | Location (Top, Bottom, Ends) | (Mat'l Spec. No., Grade or Type) H.T. - Time & Temp |       |        |         |                  |                    |                      |               |                  |         |            |                  |
|-----|------------------------------|-----------------------------------------------------|-------|--------|---------|------------------|--------------------|----------------------|---------------|------------------|---------|------------|------------------|
|     |                              | 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 |
| (a) | -                            | -                                                   | -     | -      | -       | -                | -                  | -                    | -             | -                | -       | -          | -                |
| (b) | -                            | -                                                   | -     | -      | -       | -                | -                  | -                    | -             | -                | -       | -          | -                |

If removable, bolts used (describe other fastening): \_\_\_\_\_

16. MAWP  $\frac{*}{(\text{internal})}$   $\frac{*}{(\text{external})}$  psi at max. temp.  $\frac{*}{(\text{internal})}$   $\frac{*}{(\text{external})}$  °F Min. design metal temp.  $\frac{*}{}$  °F at  $\frac{*}{}$  psi.

18. Hydro., ~~per test~~, ~~per test~~. test press. 100 PSI Proof test \_\_\_\_\_

19. Nozzles inspection and safety valve operation \_\_\_\_\_

[illegible]

21. Remarks: ITEM 3S 9,12 & 16 CONT: DESIGNED BY OTHERS, PRESSURES, TEMPERATURES AND CORROSION  
ALLOWANCE DETERMINED BY OWNER. FINAL HYDRO TO BE PERFORMED BY OWNERS.  
BUNDLE OVERALL LENGTH EQUALS 19' 117/8".

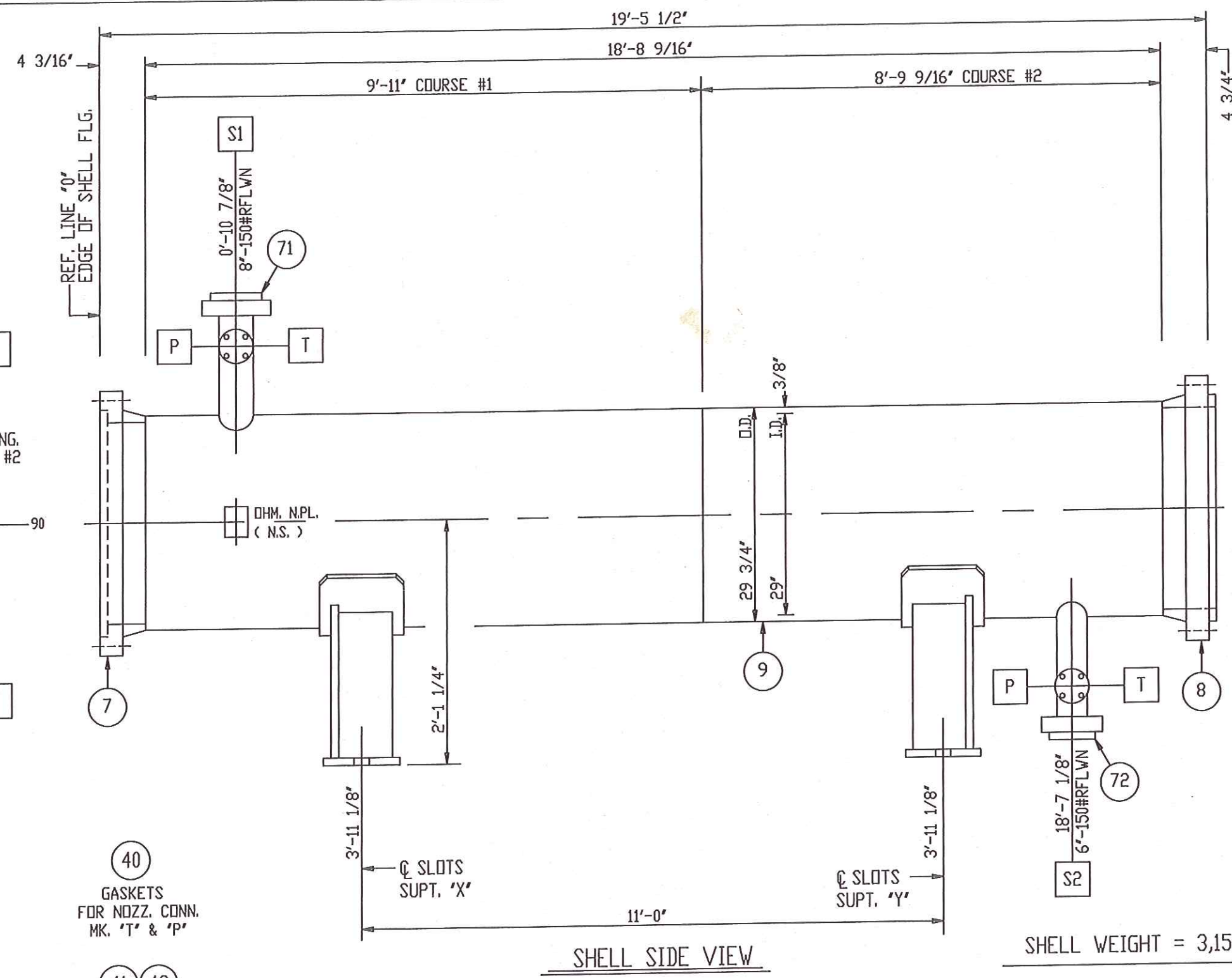
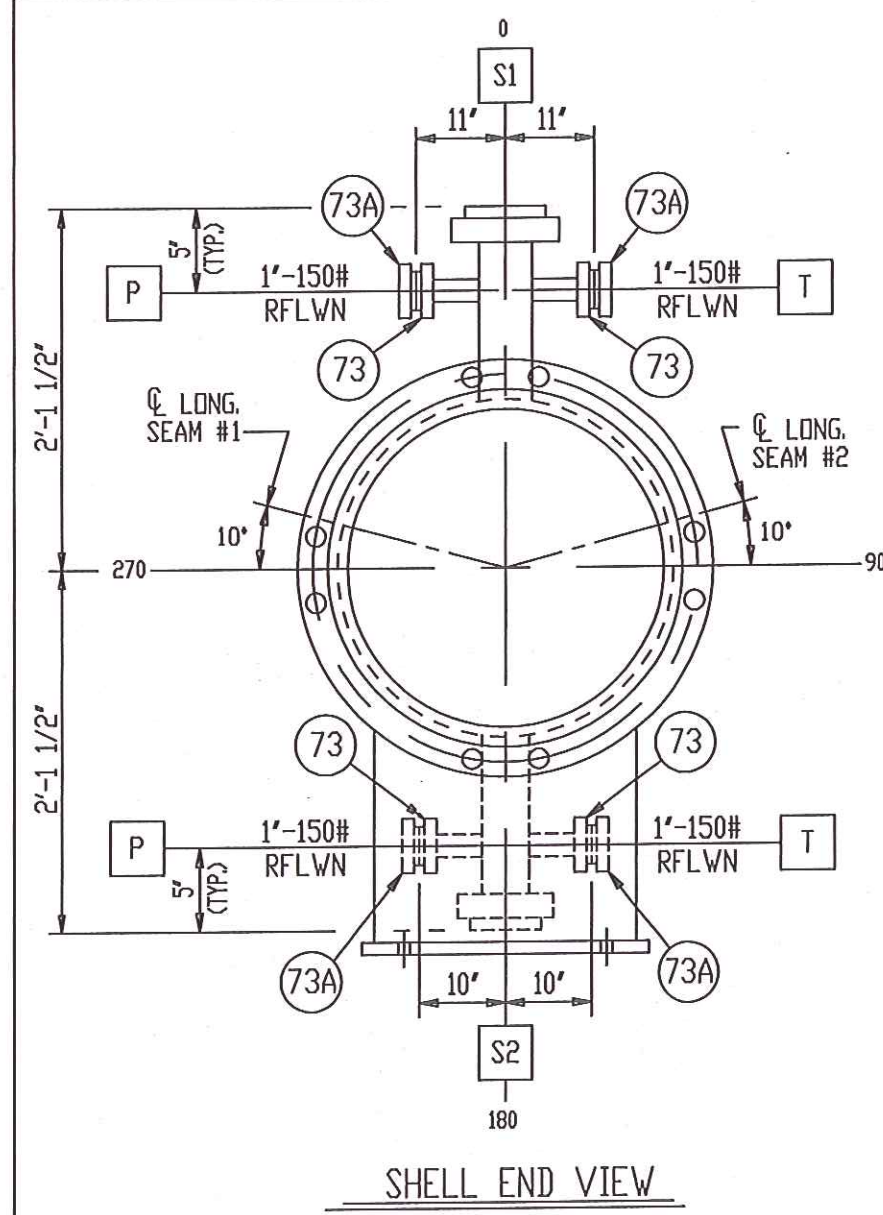
We certify that the statements made in this report are correct and that all details of material, construction, and workmanship of this pressure vessel part conform to the ASME Code for Pressure Vessels, Section VIII, Division 1.

I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and the State or Province of LA and employed by HSB CT of HARTFORD, CT have inspected the pressure vessel part described in this Manufacturer's Data Report on March 02, 2007, and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel part 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 part 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.

CEI  
Form 1041 Rev. 2

#102842

| DESIGN DATA                                                              | SHELL |
|--------------------------------------------------------------------------|-------|
| DESIGN PRESSURE P. S. I. G.                                              | 115   |
| CORR. ALLOW.                                                             | .125' |
| DESIGN TEMP. DEG. F.                                                     | 600   |
| BUILT IN ACCORDANCE WITH:<br>ASME CODE SECT. VIII, DIV. 1, 2001 ED., A03 |       |



NOTES:

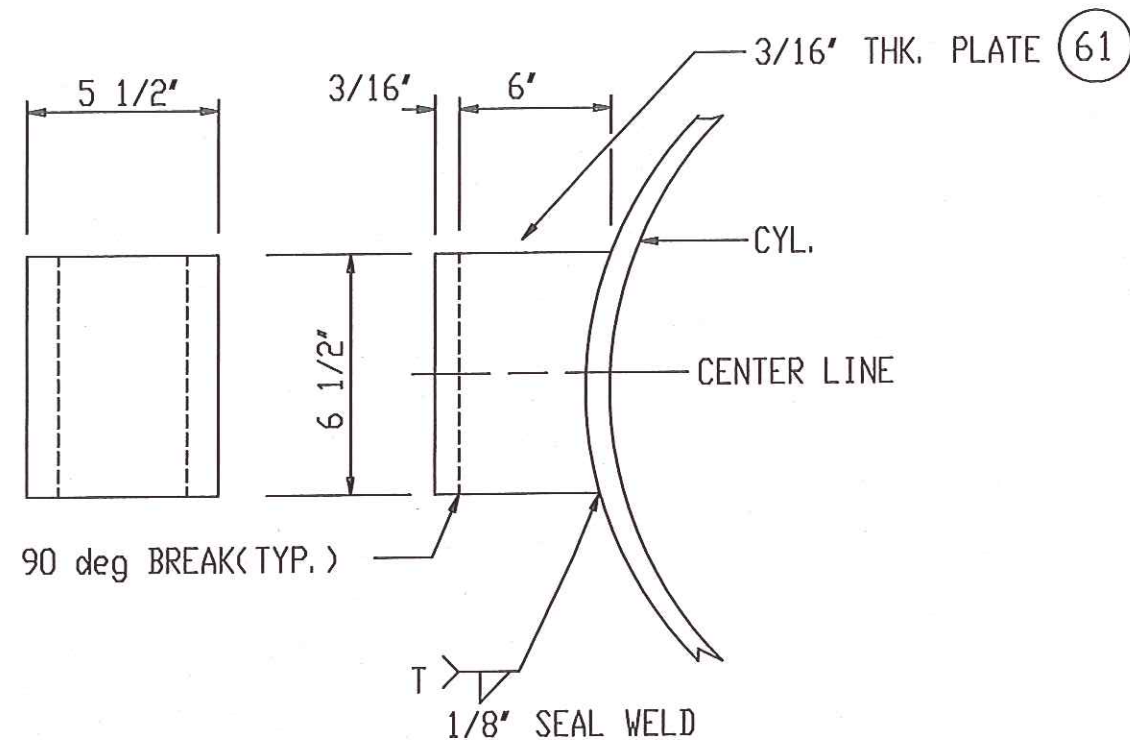
- 1) ALL BOLT HOLES TO STRADDLE CENTER LINES.
- 2) FOR WELD AND BEVEL DETAILS SEE DWG. SHEET #5
- 3) GRIND ALL INSIDE WELDS FLUSH IN BUNDLE CONTACT AREA.
- 4) SPOT RADIOGRAPHY.
- 5) PAINT: COMMERCIAL BLAST PER SSPC-SP6  
1 COAT OF CARBOLINE CARBOZINC 11  
2.0-3.0 MILS D.F.T.
- 6) FOR FLANGE DETAILS SEE DWG. SHEET #4

40  
GASKETS  
FOR NOZZ. CONN.  
MK. 'T' & 'P'

41 42  
STUDS & NUTS  
FOR NOZZ. CONN.  
MK. 'T' & 'P'

CERTIFIED: \_\_\_\_\_  
DATE: \_\_\_\_\_

|     |                           |     |      |           |                               |  |
|-----|---------------------------|-----|------|-----------|-------------------------------|--|
|     |                           |     |      |           | CUSTOMER: GIANT INDUSTRIES    |  |
|     |                           |     |      |           | OHMSTEDE JOB NO.: 442082      |  |
|     |                           |     |      |           | P. O. NO.: 5841               |  |
|     |                           |     |      |           | ITEM NO.: E-104B              |  |
|     |                           |     |      |           | SERVICE: REPLACEMENT SHELL    |  |
|     |                           |     |      |           | COPYRIGHT 2001, OHMSTEDE LTD. |  |
|     |                           |     |      |           | SHELL DETAILS                 |  |
|     |                           |     |      |           | DRAWING NO.                   |  |
|     |                           |     |      |           | 442082-1                      |  |
| 1   | REV. TITLE BLOCK          | BTB | XX   | 2-04-04   | OHMSTEDE Ltd.                 |  |
| 0   | REL. FOR FAB./CUST REVIEW | BTB | DG   | 1-27-04   |                               |  |
| ND. | REVISIONS                 | BY  | CHK. | DATE CHK. |                               |  |



(ONE) REQ'D.

## NAME PLATE BRACKET DETAIL

MATERIAL: 18-8 STN. STL.(16 GA) (60)



Ohmstede Ltd.

NAT'L. BRD. NO. \*

OHMSTEDE LTD.



MFG. S/N: 442082

DATE: 2004

PART



ITEM NO. E-104B SIZE 29 - 240 TYPE A E S



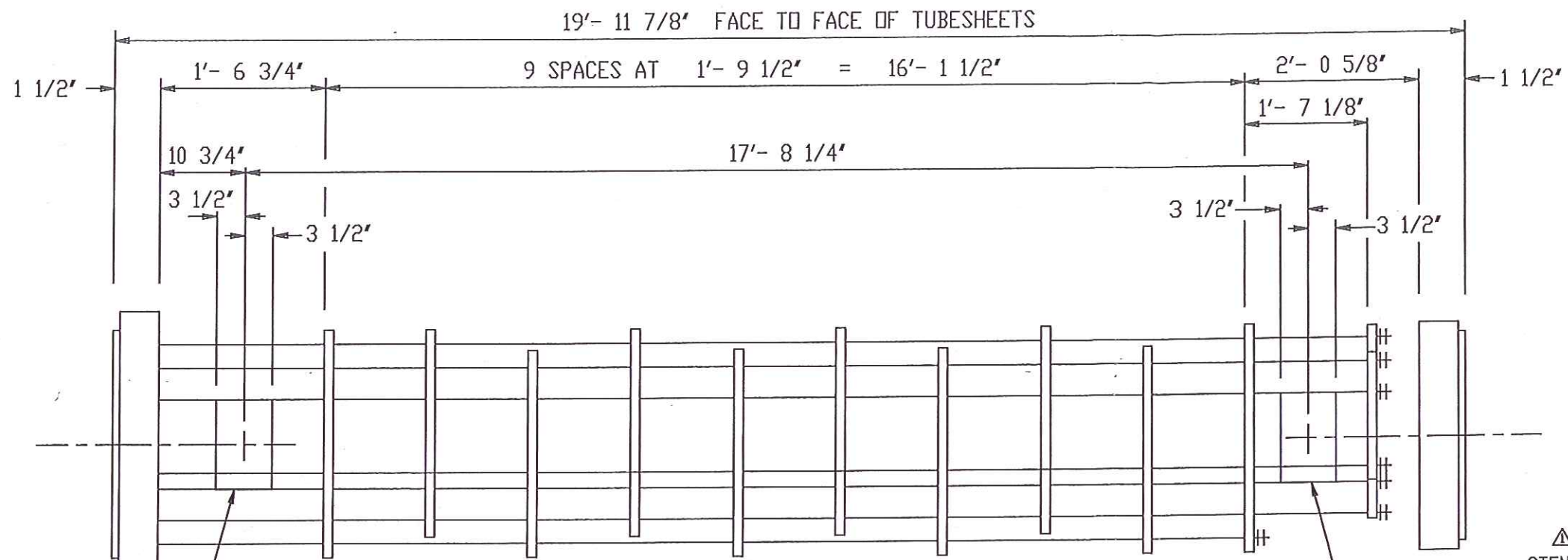
P.O. NO. 5841

DESIGN PRESSURE: 115 PSIG AT 600 deg. F.

SHELL ONLY

\* TO BE ASSIGNED AT TIME OF SHIPMENT

|     |                               |     |      |           |                                |
|-----|-------------------------------|-----|------|-----------|--------------------------------|
|     |                               |     |      |           | CUSTOMER: GIANT INDUSTRIES     |
|     |                               |     |      |           | OHMSTEDE JOB NO: 442082        |
|     |                               |     |      |           | P. O. NO. : 5841               |
|     |                               |     |      |           | ITEM NO. : E-104B              |
|     |                               |     |      |           | SERVICE : REPLACEMENT SHELL    |
|     |                               |     |      |           | 1                              |
| 1   | REV. TITLE BLOCK & NAME PLATE | BTB | XX   | 2-04-04   | NAMEPLATE, BRACKET & LIFT LUGS |
| 0   | REL. FOR FAB./CUST REVIEW     | BTB | DG   | 1-27-04   | OHMSTEDE Ltd.                  |
| NO. | REVISIONS                     | BY  | CHK. | DATE CHK. | DRAWING NO. 442082-3           |



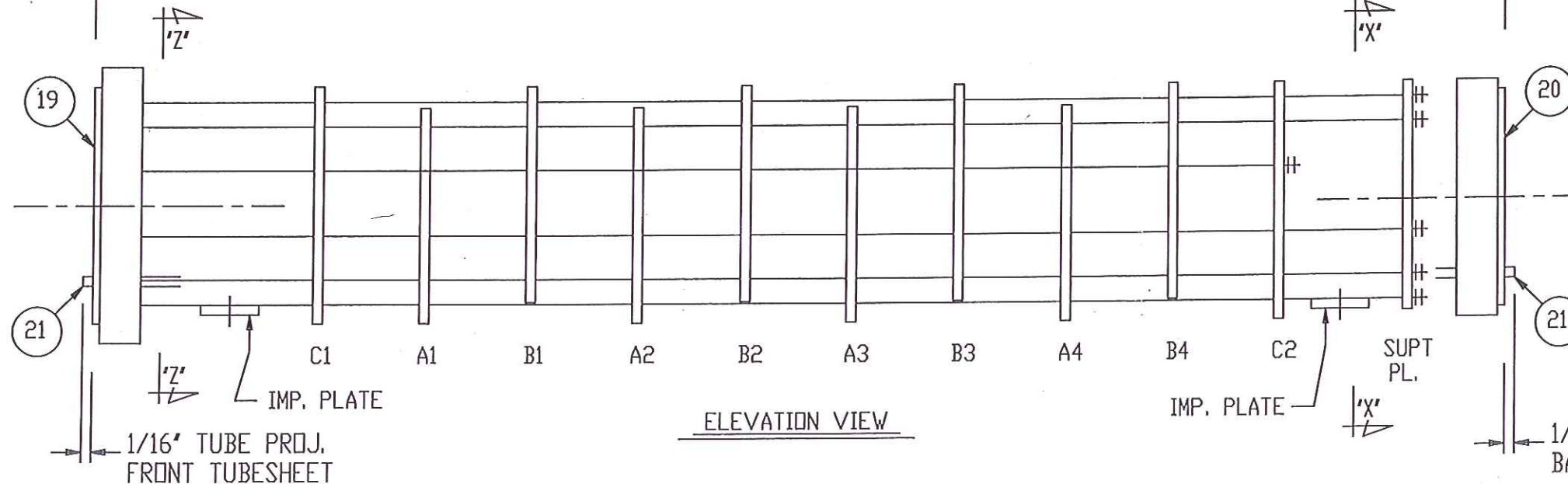
PLAN VIEW

(23C)  
3/8\"/>

(23C)  
3/8\"/>

△ SHOP NOTE!  
STENCIL ON THE PERIPHERAL  
EDGE OF THE TUBESHEET:

U  
PART  
CERTIFIED BY OHMSTEDE, LTD.  
ST. GABRIEL PLANT  
SERIAL NO. 736884  
2007



ELEVATION VIEW

WEIGHT OF BUNDLE = 5,600 LBS.

NOTES:

- 1) SEE DWG. SHEET NO. 2 FOR SECTION AND VIEW DETAILS.
- 2) HYDROSTATIC TEST TUBESIDE AT 100 PSIG.
- 3) DESIGN BY OTHERS.
- 4) ASME CODE SECT. VIII, DIV.1, (STAMP: YES) △
- 5) ALL MACHINE SURFACES TO BE COATED WITH A READILY REMOVABLE RUST PREVENTATIVE.

CERTIFIED [Signature]  
DATE 2.23.07

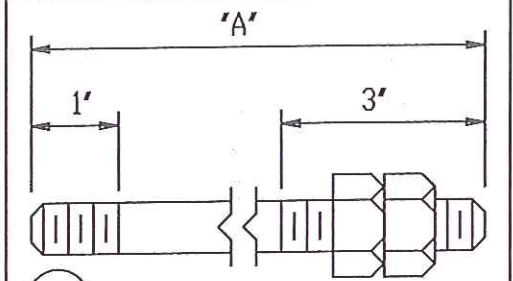
| CERTIFIED AS BUILT |                  |    |      |           |
|--------------------|------------------|----|------|-----------|
| 1                  | REVISED AS NOTED | TR | GK   | 2-22-07   |
| 0                  | RELEASE FOR FAB. | TR | GK   | 1-15-07   |
| NO.                | REVISIONS        | BY | CHK. | DATE CHK. |

CUSTOMER: GIANT INDUSTRIES  
OHMSTEDE JOB NO.: 736884  
P. O. NO.: PD21457  
ITEM NO.: E-104A

COPYRIGHT 2001, OHMSTEDE LTD.

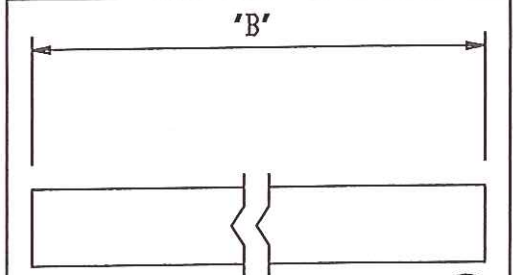
BUNDLE DETAILS

OHMSTEDE Ltd. DRAWING NO.  
736884-1



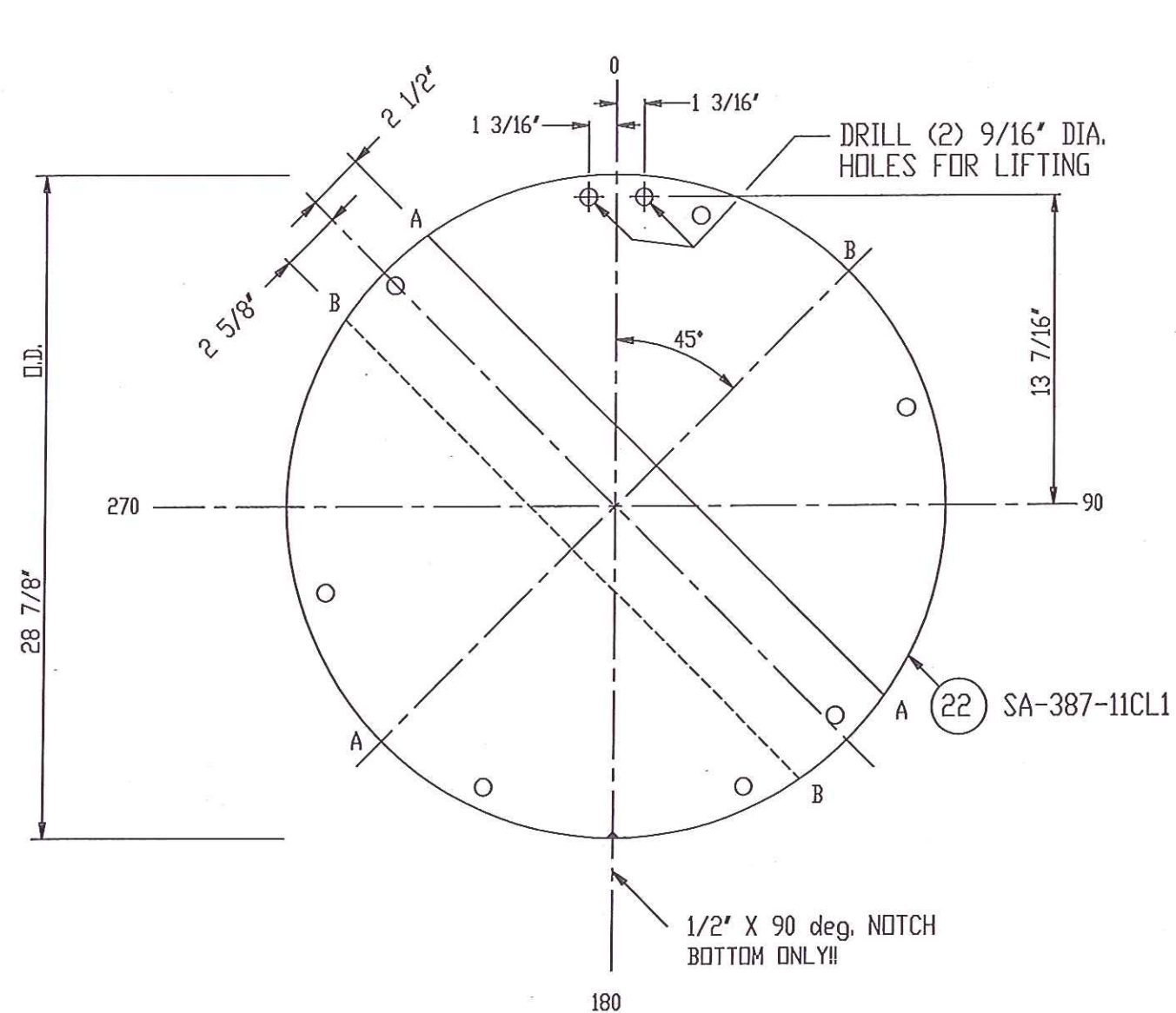
(23B) MAT'L: 1 1/4 Cr-1/2 Mo  
1/2\"/>

| REQ'D. | 'A'         |
|--------|-------------|
| 6      | 19'- 6 1/4" |
| 1      | 17'- 11"    |



(23A) MAT'L: 1 1/4 Cr-1/2 Mo  
3/4\"/>

| REQ'D. | 'B'        |
|--------|------------|
| 13     | 1'- 6 3/4" |
| 25     | 1'- 9 1/8" |
| 20     | 3'- 6 5/8" |

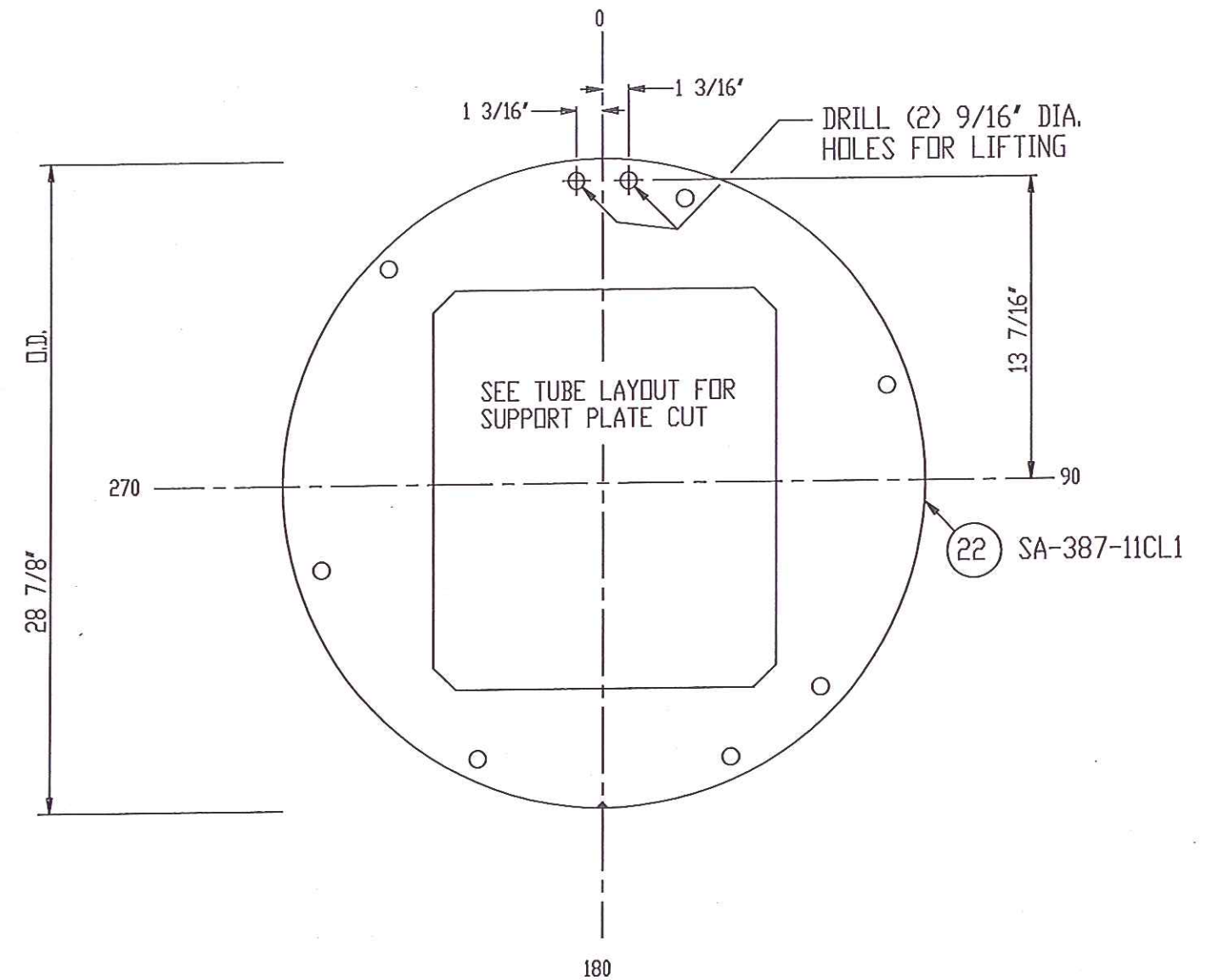


VIEW ZZ OF BAFFLES

3/8" THK.

4 - REQ'D. CUT AAA

4 - REQ'D. CUT BBB



VIEW ZZ OF BAFFLES

3/8" THK.

2 - REQ'D. CUT 'C'

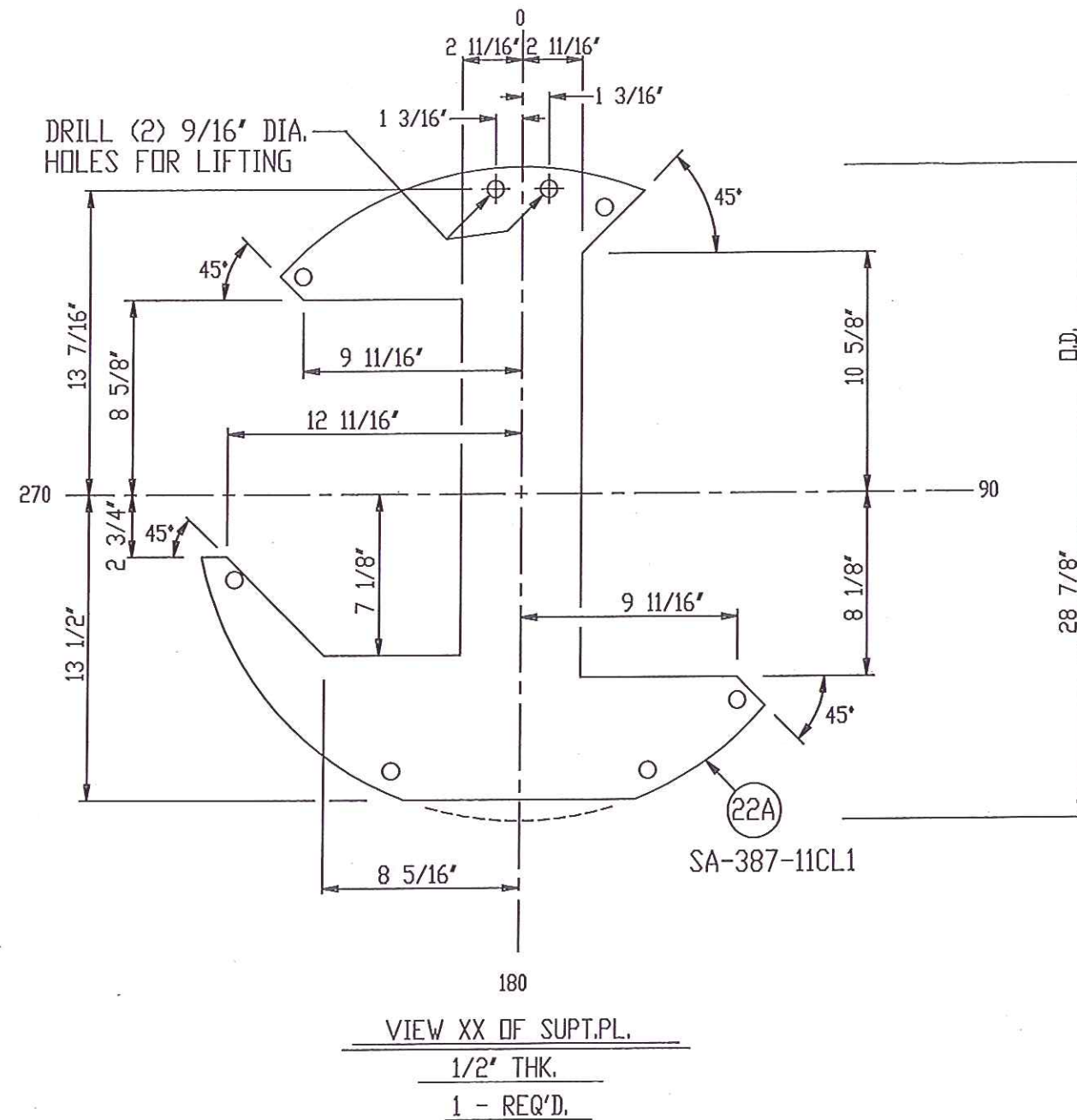
# NOTES:

- 1) DRILL TIE ROD HOLES 25/32" DIA. & DEBURR.
- 2) DRILL TIE ROD HOLES 9/16" DIA.  
SEE TUBE LAYOUT FOR LOCATION.
- 3) RADIUS ALL CORNERS ON BAFFLE CUTS.
- 4) MACHINE O.D. OF BAFFLES TO 250 AARH.

|                                         |  |  |  |  |                               |  |
|-----------------------------------------|--|--|--|--|-------------------------------|--|
| <div> <div>0</div> <div>NO</div> </div> |  |  |  |  | CUSTOMER: GIANT INDUSTRIES    |  |
|                                         |  |  |  |  | OHMSTEDE JOB NO: 736884       |  |
|                                         |  |  |  |  | P. O. NO. : PD21457           |  |
|                                         |  |  |  |  | ITEM NO. : E-104A             |  |
|                                         |  |  |  |  | COPYRIGHT 2001, OHMSTEDE LTD. |  |
|                                         |  |  |  |  | BAFFLE DETAILS                |  |
|                                         |  |  |  |  | OHMSTEDE Ltd.                 |  |
|                                         |  |  |  |  | DRAWING NO.                   |  |
|                                         |  |  |  |  | 736884-2                      |  |

CERTIFIED AS BUILT

|    |                  |    |      |           |
|----|------------------|----|------|-----------|
| 0  | RELEASE FOR FAB. | TR | GK   | 1-15-07   |
| NO | REVISIONS        | BY | CHK. | DATE CHK. |



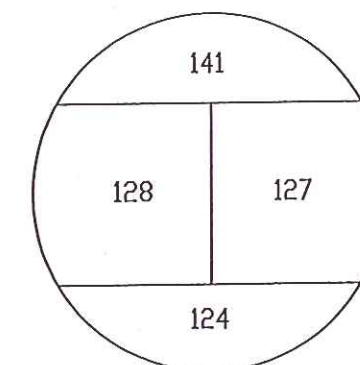
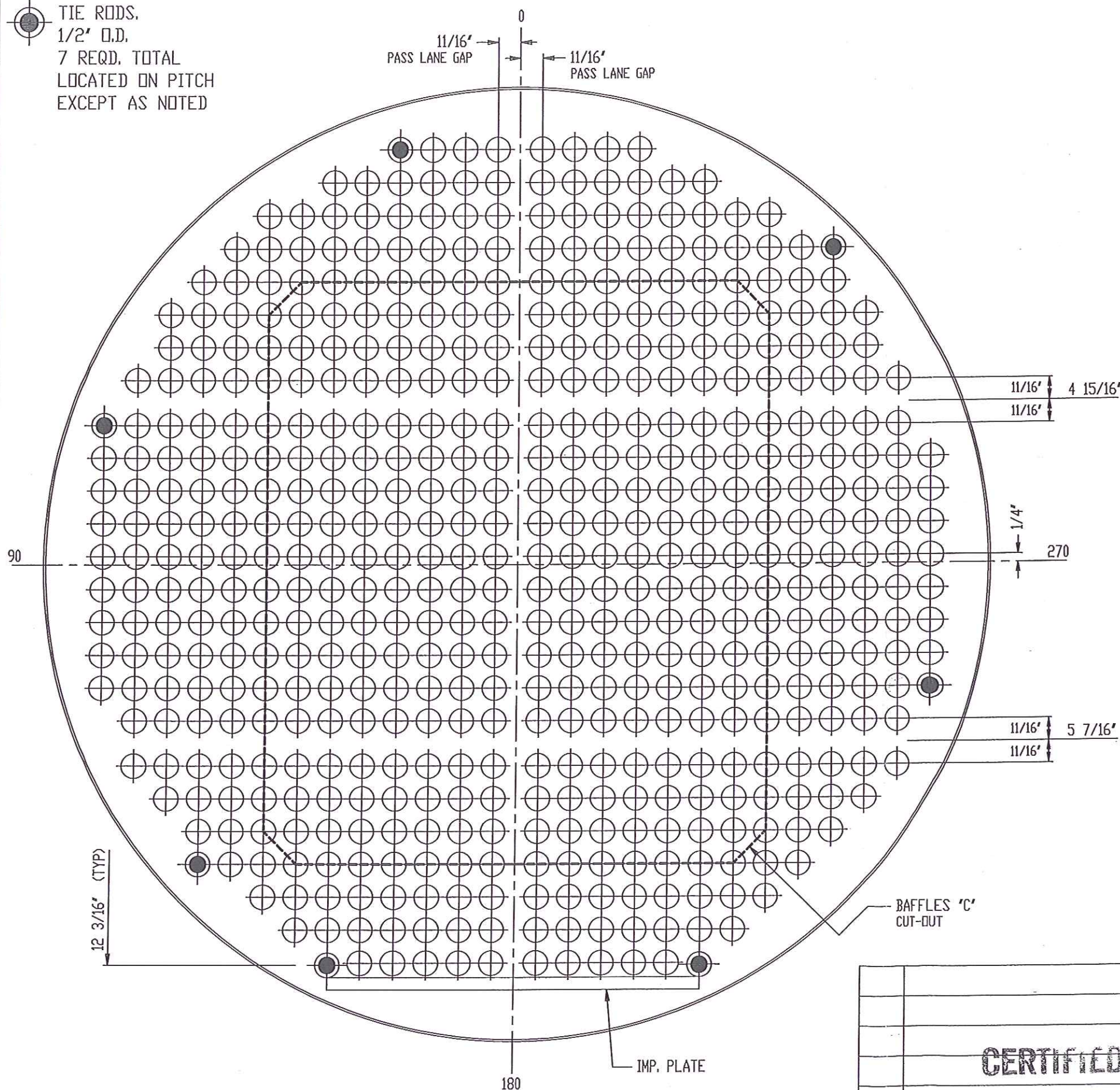
# NOTES:

- 1) DRILL TIE ROD HOLES IN BAFFLES 25/32" DIA. & DEBURR.
- 2) DRILL TIE ROD HOLES 9/16" DIA.  
SEE TUBE LAYOUT FOR LOCATION.
- 3) RADIUS ALL CORNERS ON BAFFLE CUTS.
- 4) MACHINE O.D. OF BAFFLES TO 250 AARH.

|    |                  |    |      |           |                               |                          |
|----|------------------|----|------|-----------|-------------------------------|--------------------------|
|    |                  |    |      |           | CUSTOMER: GIANT INDUSTRIES    |                          |
|    |                  |    |      |           | OHMSTEDE JOB NO.: 736884      |                          |
|    |                  |    |      |           | P. O. NO.: PD21457            |                          |
|    |                  |    |      |           | ITEM NO.: E-104A              |                          |
|    |                  |    |      |           | COPYRIGHT 2001, OHMSTEDE LTD. |                          |
|    |                  |    |      |           | BAFFLE DETAILS                |                          |
| 0  | RELEASE FOR FAB. | TR | GK   | 1-15-07   | OHMSTEDE Ltd.                 | DRAWING NO.<br>736884-2A |
| NO | REVISIONS        | BY | CHK. | DATE CHK. |                               |                          |



TIE RODS.  
1/2" O.D.  
7 REQD. TOTAL  
LOCATED ON PITCH  
EXCEPT AS NOTED



TUBE DISTRIBUTION

NOTES:

- 1) DRILL AND REAM TUBE HOLES IN TUBESHEETS TO 0.7600"  $\pm$  .002" DIA. FOR 520 - 3/4" O.D. TUBES.
- 2) TUBE PITCH = 1" SQUARE.
- 3) NUMBER OF PASSES = 4
- 4) SEE DRAWING SHEET NO. 4 FOR TUBE HOLE GROOVING DETAILS.
- 5) BAFFLE O.D. = 28 7/8"
- 6) O.T.L. = 27 1/4"

VIEW LOOKING AT SHELL SIDE OF NO. 19 TUBESHEET

|                    |                  |    |      |           |
|--------------------|------------------|----|------|-----------|
| CERTIFIED AS BUILT |                  |    |      |           |
| 0                  | RELEASE FOR FAB. | TR | GK   | 1-15-07   |
| NO.                | REVISIONS        | BY | CHK. | DATE CHK. |

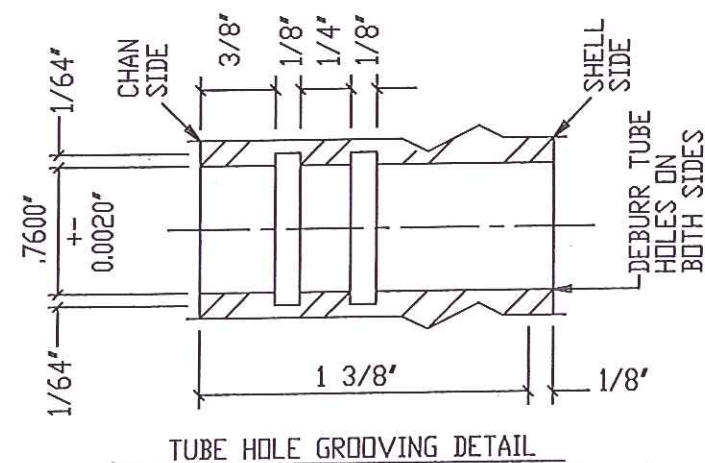
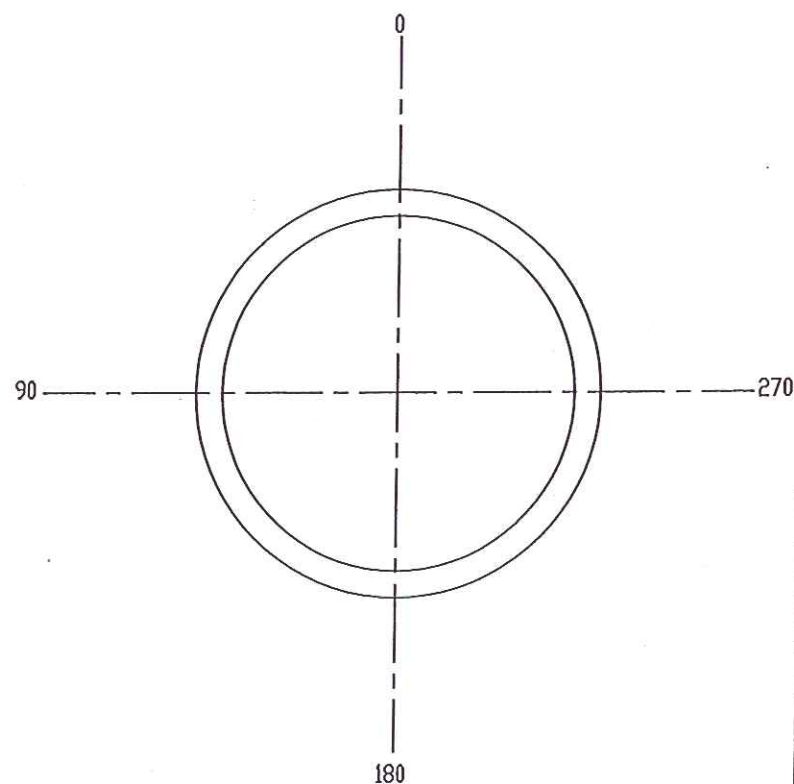
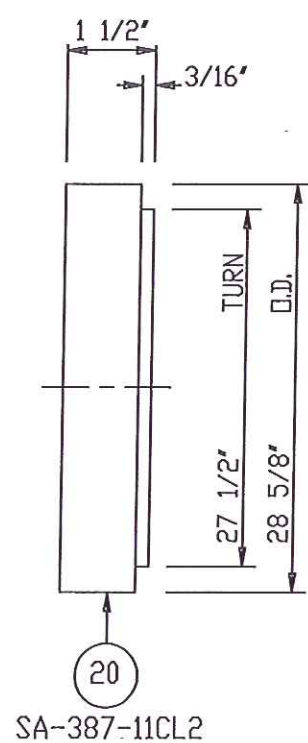
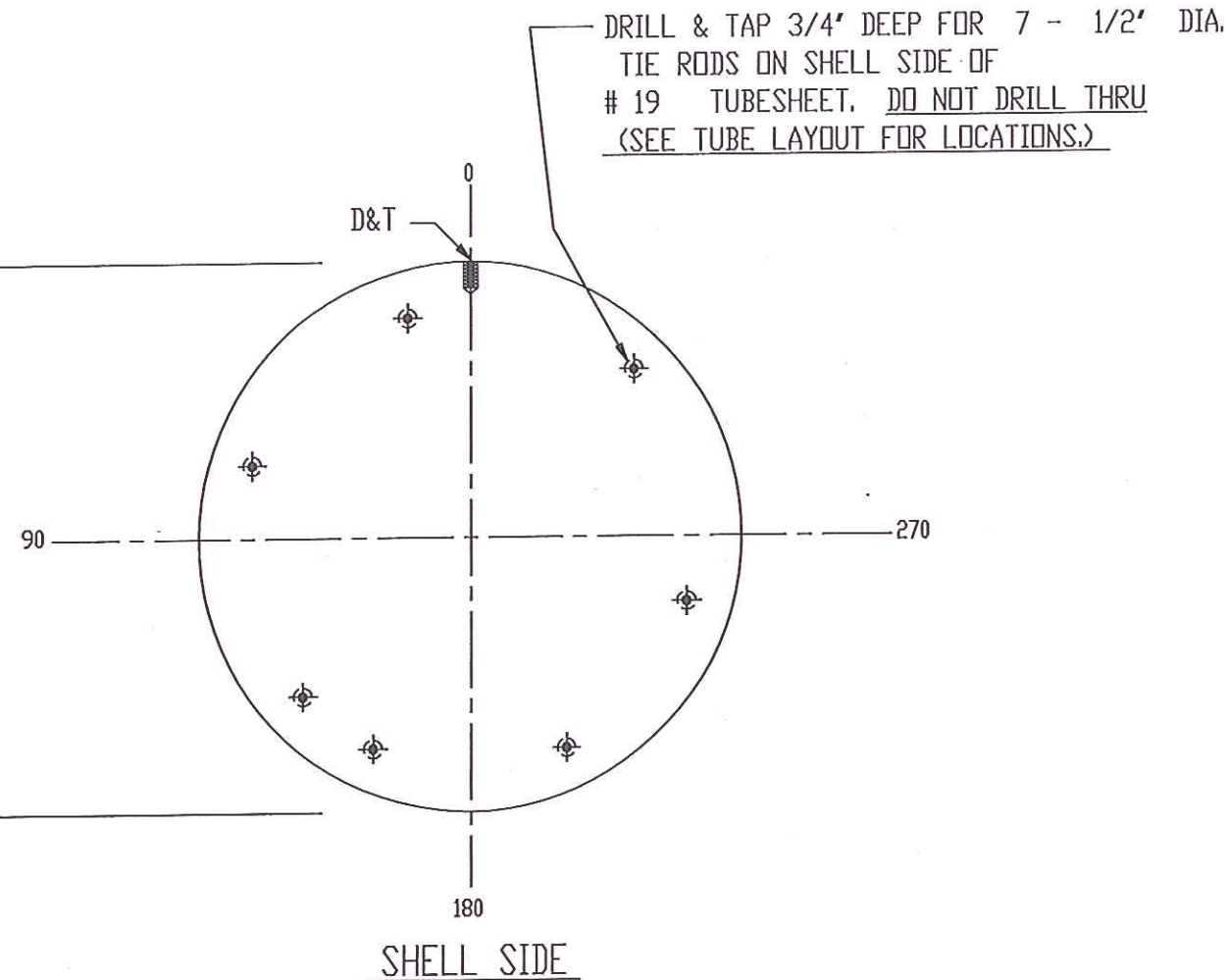
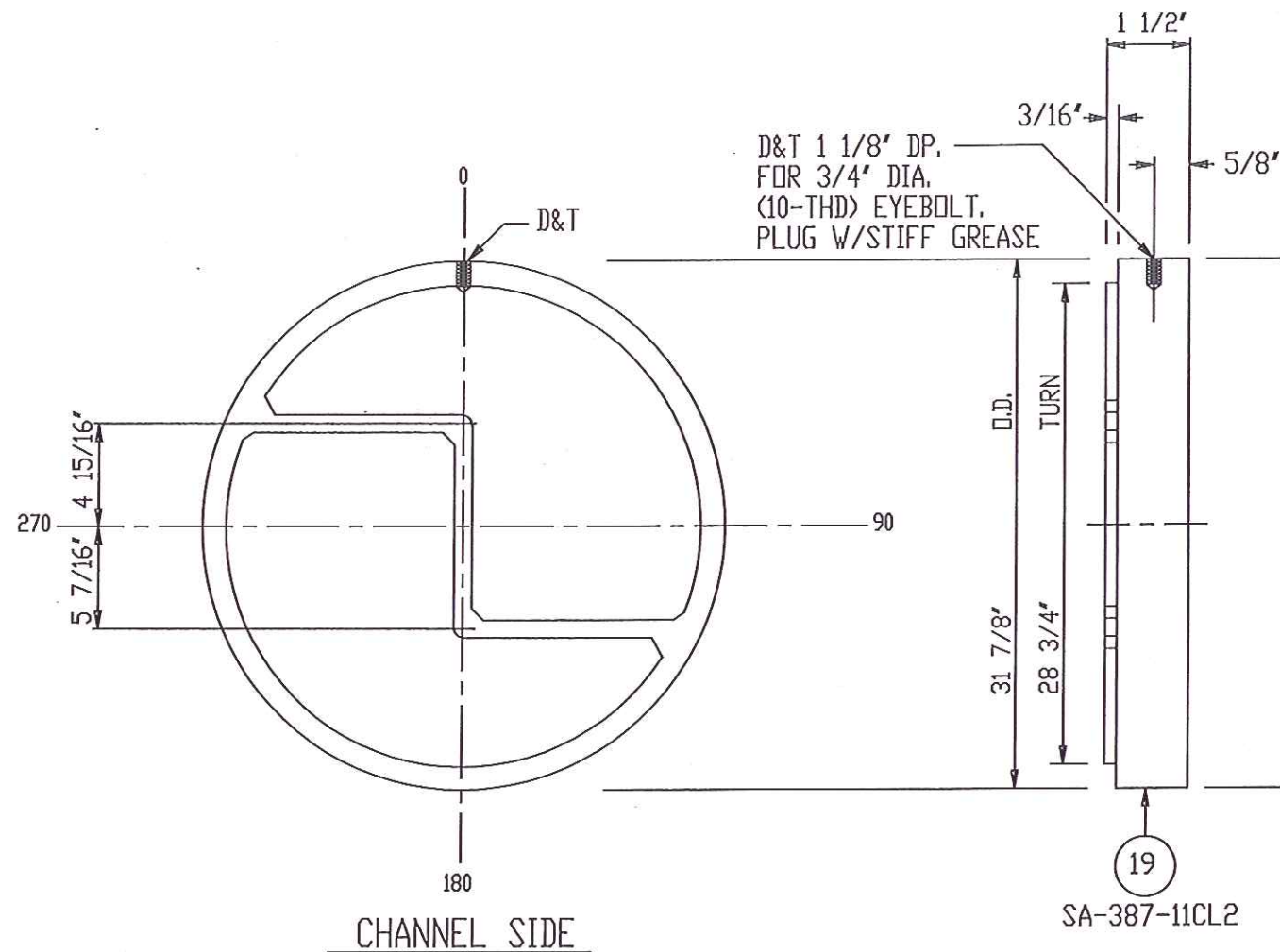
CUSTOMER: GIANT INDUSTRIES  
OHMSTEDE JOB NO.: 736884  
P. O. NO.: PO21457  
ITEM NO.: E-104A

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TUBE LAYOUT

OHMSTEDE Ltd.

DRAWING NO.  
736884-3



#### NOTES:

- 1) MACHINE ALL GASKET SURFACES TO 125 AARH.
- 2) ALL PASS PLATE GROOVE WIDTHS TO BE 1/2" WIDE.
- 3) ALL PASS PLATE GROOVE JUNCTIONS TO BE NOTCHED 3/8" AT 45 Deg.

**CERTIFIED AS BUILT**

| NO. | REVISIONS        | BY | CHK. | DATE    |
|-----|------------------|----|------|---------|
| 0   | RELEASE FOR FAB. | TR | GK   | 1-15-07 |
|     |                  |    |      |         |
|     |                  |    |      |         |
|     |                  |    |      |         |

CUSTOMER: GIANT INDUSTRIES  
OHMSTEDE JOB NO: 736884  
P. O. NO. : PO21457  
ITEM NO. : E-104A

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**TUBESHEET DETAILS**

**OHMSTEDE Ltd.**

DRAWING NO.  
736884-4