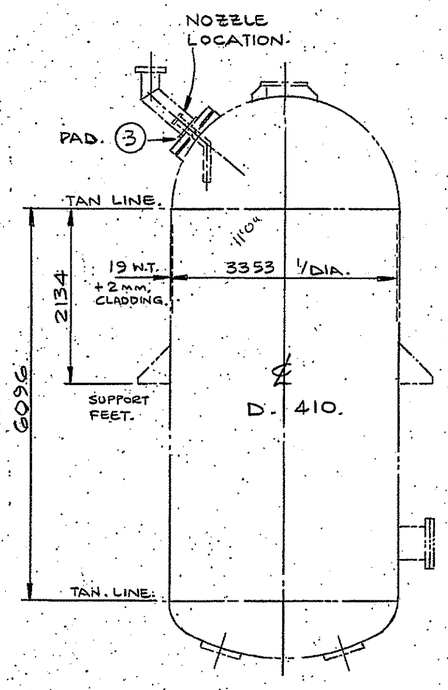
| PART No. | No. OFF | MATERIAL | DESCRIPTION | INDENT / ORDER No. |
|---|---|---|---|---|
| 1 | 1 | BS.1501. 321.512 | PLATE. 1½" THK. x 275 DIA. | 151.015.0033 |
| 2 | 8 | B8T | ¾" UNC x 2½" LG. HEX. HEAD FITTED BOLT. | I. 635999 |
| | | | | |

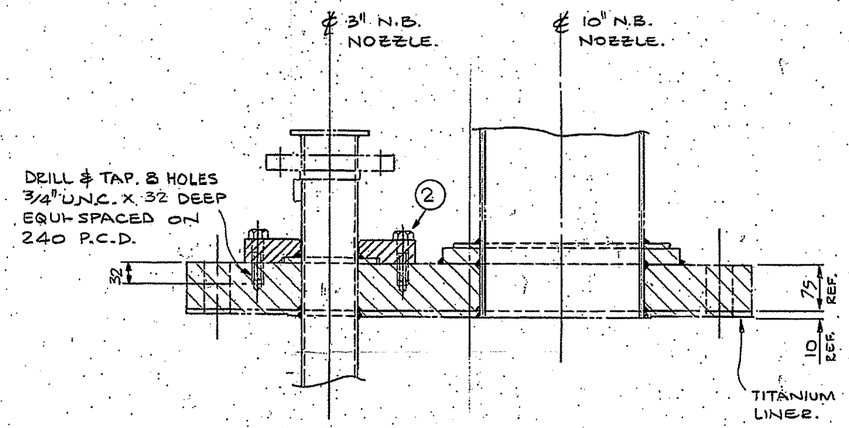
SEE NOTE ***

ALL MATERIAL TEST CERTIFICATES TO BE RETAINED IN P.V. FILE.

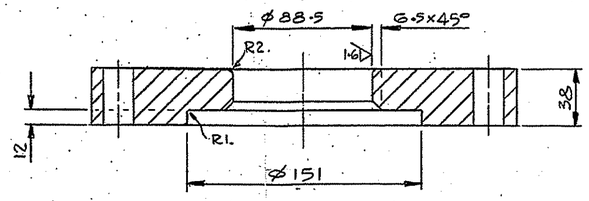
B ** FOR MATERIAL LIST FOR D.O. REF 940716/1 SEE DWG D/A7/13/7085



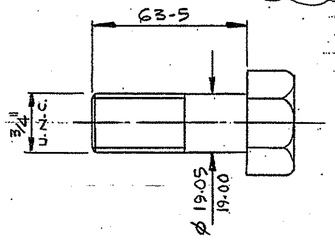

ELEVATION.




SECTION 'A-A'.

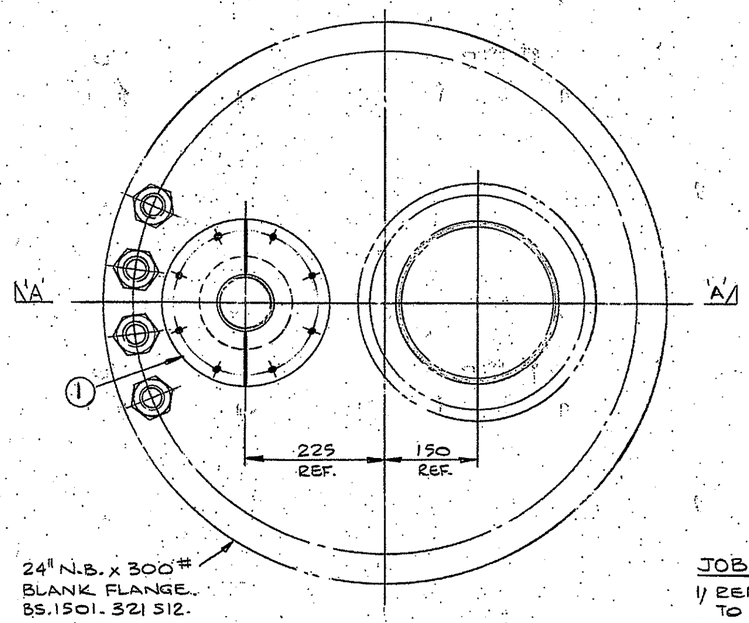



SECTION 'B-B'.

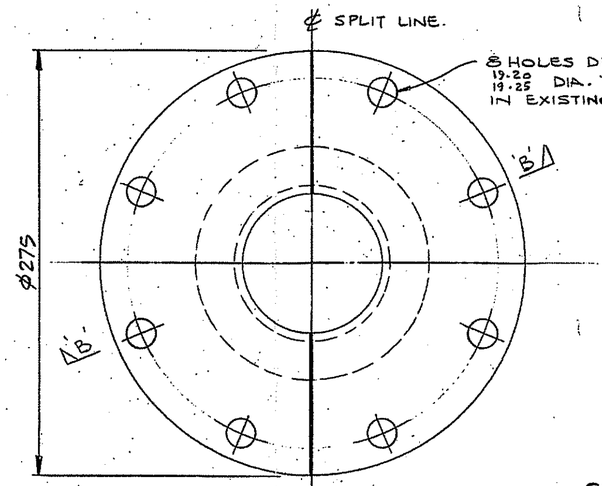



FITTED BOLT (2)

8 REQD.



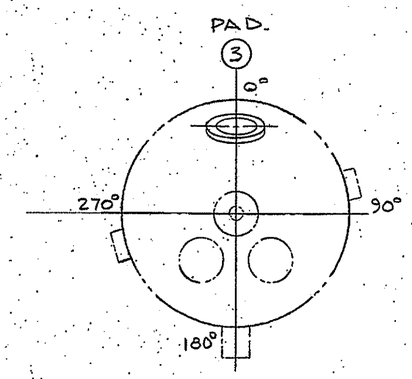

PLAN VIEW ON EXISTING FLANGE.




PLAN VIEW.

SPLIT COLLAR (1)

ONE REQD.




ORIENTATION PLAN.

## JOB PROCEDURE.

1/ REMOVE EXISTING FLANGE & SEND TO WORKSHOPS.
2/ DRILL & TAP NEW HOLES IN EXISTING FLANGE.
3/ MACHINE NEW SPLIT COLLAR AS DETAIL. CHECK OUTSIDE DIA. OF 3" N.B. PIPE AND ADJUST ø88·5 BORE TO GIVE A TIGHT FIT ON THE EXISTING PIPE.
4/ MARK OFF, DRILL & REAM HOLES IN SPLIT COLLAR TO MATCH HOLES IN EXISTING FLANGE.
5/ BOLT SPLIT COLLAR TO EXISTING FLANGE & RE-INSTALL ON VESSEL.

## ORIGINAL DESIGN DATA.

| | |
|---|---|
| DESIGN CODE. | ASTM VIII. DIV.1. 1968. |
| DESIGN PRESSURE. | 13·45 BARG. (TOP) |
| DESIGN TEMPERATURE. | 229·4 °C. |
| OPERATING PRESSURE. | 11·72 BARG. |
| OPERATING TEMPERATURE. | 200·6 °C. |
| HYDROSTATIC TEST PRESSURE. | 20·2 BARG. (TOP) * |
| CORROSION ALLOWANCE. | 2mm. (TITANIUM CLADDING) |

## GENERAL NOTES.

1/ REMOVE ALL SHARP EDGES & CORNERS.
* 2/ PRESSURE TEST TO BE WAIVED FOR THIS MODIFICATION. SEE LETTER OF DISPENSATION.



DRG No D/A7/15/6580.

| REV. | DATE | SIGNED |
|---|---|---|
| | | |

FILMED

K.D.N.E.G. APPROVAL OBTAINED DATED ____
SEE P.V. FILE FOR LETTER/STAMPED DRAWING B

P.V. Nº. D. 410.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| MATERIAL ORDERED FOR D.O. REF 940.716/1 | H. NOFER | A.HILL | | 12-5-94 | | 1360/85/1 | 'EMF. DRG. OF NOZZLE DETAIL. |
| ISSUED FOR CONSTRUCTION | A.HILL | | | 19-3-93 | | F/HB. 408458 | ORIGINAL VESSEL DATA SHEET. |
| ALTERATION | DRAWN | CHECKED | APPROVED | DATE | GRID | REFERENCE DRAWINGS | |

ENGINEERING
TEESSIDE OPERATIONS



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| SCALE | 1:2, 1:5 | | DO REF. No. | 930242/940716/1 | SITE | WILTON | BUSINESS | P.I.E. |
| DRAWN | A.HILL. | 18-3-93 | PROJECT No. | — | PLANT | TA.77. | PLANT AREA | OXIDATION. |
| CHECKED | H. NOFER | 18-3-93 | MOD. No. | — | TITLE | DETAIL OF SPLIT COLLAR FOR REFLUX LINE NOZZLE. D410 CRYSTALLISER. | | ORIG. SIZE A1 |
| APPROVED | SECTION | DATE | W.O. No. | 905510 | | | | |
| A.BERWICK | DO | 19. 3. 93. | CAD DISK | — | | | | |
| | | | | | DRG. No. | D/A7/15/6580 | | REV. B |
| | CLIENT | | MAT'L LIST | — | | | | |

WSEQ/PDT/DESN/0402/F3

REV 0 | 5117/03/1 | NSM DRG No. A1

## NOZZLE SCHEDULE

| MARK | SERVICE | No. REQ'D | SIZE | RATING | TYPE OF FLANGE | ITEM | NECK O/D | NECK THICK | NECK ITEM | FACING DIA | FACING THICK | FACING ITEM | COMP RING WIDE | COMP RING THICK | COMP RING ITEM | WELD DETAILS | | | NOZZLE PROJ'N & TO JT FACE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | |

## DESIGN DATA

| | |
|---|---|
| DESIGN AMD CONSTRUCTION TO | ASME VIII ON 1 |
| | SHELL |
| DESIGN PRESSURE INT/EXT | 13·45 BAR G |
| DESIGN TEMPERATURE | 250°C |
| WORKING PRESSURE INT/EXT | |
| WORKING TEMP | |
| CORROSION ALLOWANCE INT/EXT | |
| RADIOGRAPHY | PIPE BUTT WELDS 100% |
| POST WELD HEAT TREATMENT | |
| LONGIT. JOINT EFFICIENCY | |

## WELDING NOTES

ALL WELDERS ARE TO BE QUALIFIED IN ACCORDANCE WITH NSN ARE TO KEEP A RECORD OF ALL WELDERS. EACH WELDERS IDENTIFICATION MARK TO BE STAMPED/ETCHED ADJACENT TO THE SEAMS HE WELDS AT INTERVALS OF NOT MORE THAN 900mm

THE FOLLOWING WELD TEST PLATES ARE REQUIRED.

| No. OFF | SIZE | ITEM | TYPE | MATERIAL | TESTED TO |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

## INSPECTION

SUBJECT TO STAGE*/FINAL INSPECTION BY
DOCUMENTATION REQUIREMENTS — COPIES OF DATA FOLDERS REQUIRED*
COPIES REQD OF MILLSHEETS/TEST CERTS. HYDC TEST CERTS. HT TREATMENT RECORD.

*FOR DATA FOLDER CONTENTS REQUIREMENTS SEE

*INSPECTION STAGES ARE SPECIFIED ON INSPECTION CHECK LIST

## TESTING

| | SHELL SIDE | TUBE SIDE | |
|---|---|---|---|
| HYDROSTATIC TEST PRESSURE | 20·2 BAR G | | |

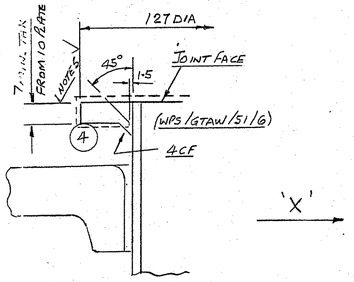
## FINISH

NATURAL

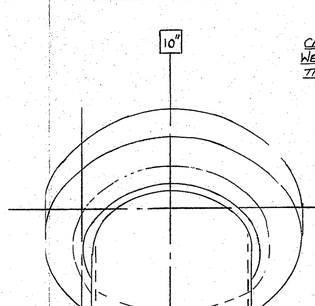
## GENERAL NOTES

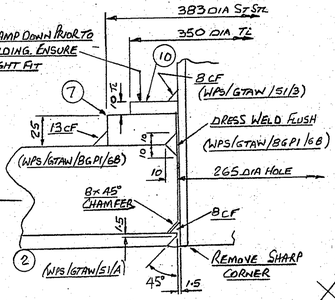
1) ALL PAD & FLANGE BOLT HOLES ARE TO BE OFF CRS TO MAIN/RADIAL ℄s
2) SERVICE GASKETS ARE TO BE USED FOR TEST YES/NO
3) ALL MATERIAL IDENTIFICATION Nos ARE TO BE TRANSFERRED AS THE MATERIAL IS CUT
4) NOZZLE REINFORCEMENT RINGS AND FULLY WELDED BACKING PLATES ARE TO BE DRILLED & TAPPED
5) ALL JOINT FACES TO HAVE 12.5 – 25 CLA FINISH
6) THK TRANSIT PLATES TO BE FITTED TO ALL OPEN FLANGES
USE STOCK BLACK HRH BOLTS. SEAL WITH DENSO TAPE.
7) ALL Ti WELDS TO BE DYE PENETRANT CHECKED.

* TITANIUM TO BE 0·05% MAX Fe & 60 P.P.M. MAX H.

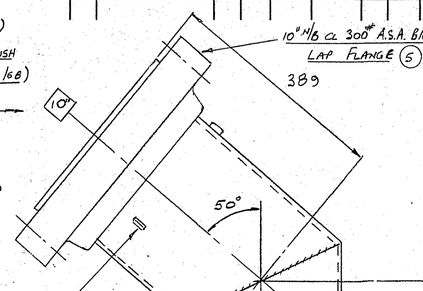


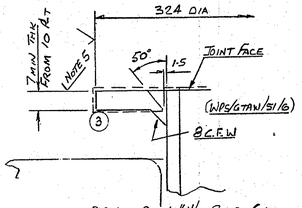

DETAIL OF 3" STUB END & BACKING FLANGE



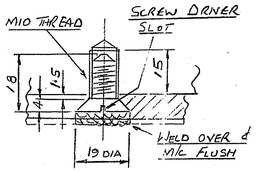




DETAIL OF 10"ᴺ/B PIPE TO COVER PLATE

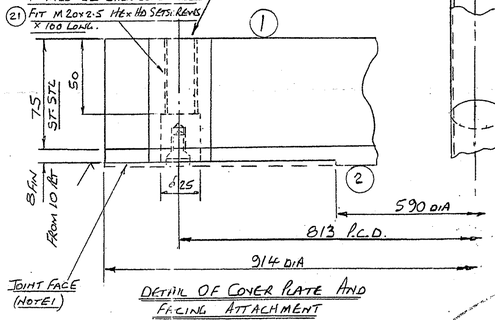


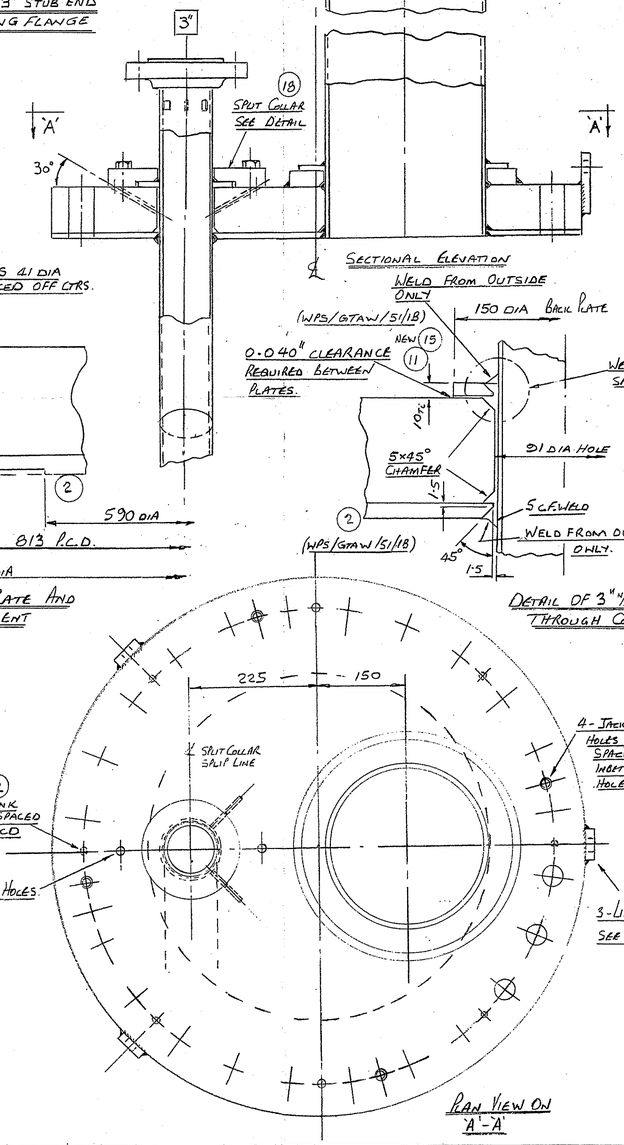

DETAIL OF 10"ᴺ/B STUB END & BACKING FLANGE



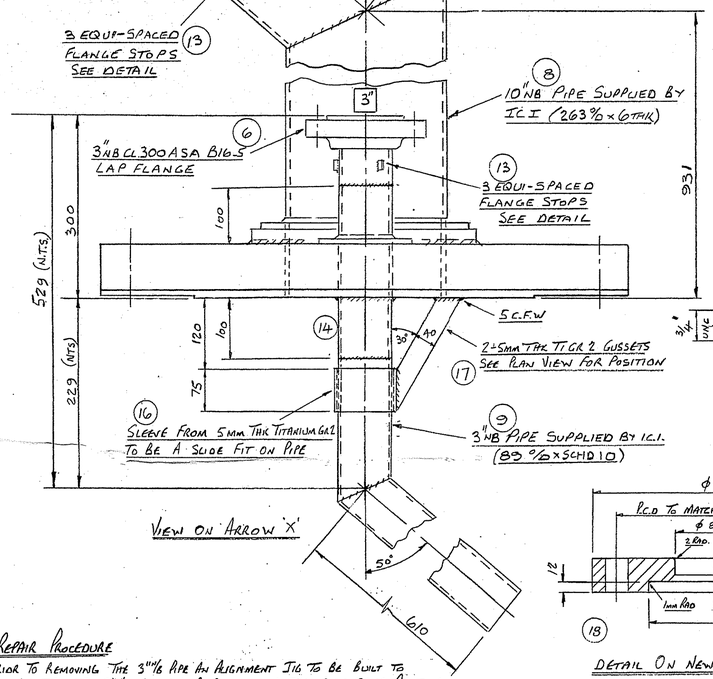

DETAIL OF COUNTER SUNK HEAD SCREWS – B.S.2100



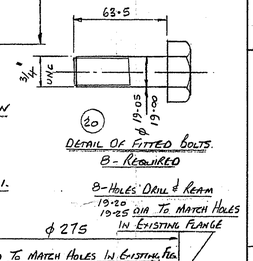

DETAIL OF COVER PLATE AND FACING ATTACHMENT



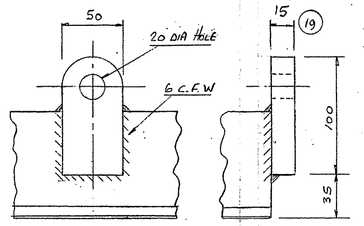

DETAIL OF 3"ᴺ/B PIPE THROUGH COVER PLATE



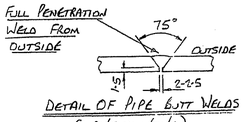

VIEW ON ARROW 'X'




DETAIL ON NEW SPLIT COLLAR SPLIT BETWEEN BOLT HOLES



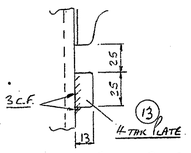

3 - LIFTING LUGS REQUIRED




DETAIL OF PIPE BUTT WELDS (WPS/GTAW/S1/1)




PLAN VIEW ON 'A'-'A'




DETAIL OF FLANGE STOPS 6 - REQUIRED.

### REPAIR PROCEDURE

1) PRIOR TO REMOVING THE 3"ᴺ/B PIPE AN ALIGNMENT JIG TO BE BUILT TO ENSURE THAT THE 3"ᴺ/B NOZZLE IS RE-POSITIONED IN THE EXACT SAME POSITION
2) CUT OUT DAMAGED 3"ᴺ/B PIPE 100 mm ABOVE & BELOW COVER PLATE RETAINING THE 3"ᴺ/B SUB END/FLANGE AND BEND.
3) MACHINE OUT WELD CONNECTING THE 3"ᴺ/B PIPE AND CLADDING PLATE ITEM 2
4) REMOVE THE 3"ᴺ/B PIPE CONCRETE WITH BACK PLATE ITEM 15 AND RETURN TO DUPONT
5) FABRICATE NEW 3"ᴺ/B PIPE SECTION USING SCH 10 THK SEAMLESS PIPE AND 12 THK BACK PLATE.
6) MACHINE BACK PLATE AFTER WELDING TO DETAILS SHOWN ON THIS DRAWING.
WELD SAVED 3"ᴺ/B STUB END/FLANGE TO TOP OF NEW 3"ᴺ/B PIPE SECTION AND 100% X-RAY
7) PRIOR TO REPLACING THE NEW PIPE INSPECT THE INTERNAL 3" HOLE IN THE C.S. FLANGE FOR CORROSION/DEFECTS. REPORT AS NECESSARY
8) INSERT THE NEW 3"ᴺ/B PIPE SECTION INTO COVER PLATE AND WELD THE LOWER SAVED BEND INTO POSITION AND 100% DYE-PENETRANT CHECK (EARTHING CLAMP TO BE CONNECTED TO PIPE)
9) USING THE ALIGNMENT JIG TO SET PIPE TO THE CORRECT POSITION WELD THE NEW 3"ᴺ/B PIPE SECTION INTO COVER PLATE CLADDING TO THE DETAILS SHOWN WITH THE 0·040" CLEARENCE BETWEEN COVER PLATE AND ITEM 11/15
CHECK BEFORE WELDING AT THE TOP PURGE POINT AND BOTTOM WELD CLEARANCE TO CONFIRM NO PRESENCE OF OXYGEN ALSO FOR THE PURGE ON THE INSIDE OF THE PIPE. PURGES TO BE PRESENT UNTIL WELD IS COMPLETED AND THE TEMPERATURE OF THE METAL IS BELOW 400°C. WELD TO BE CARRIED OUT IN ONE OPERATION WITH NO INTERMISSIONS. (EARTHING CLAMP TO BE CONNECTED TO PIPE)
10) DYE-PENETRANT CHECK ALL ATTACHMENT WELDS.
11) FIT NEW SPLIT COLLAR ITEM 18 AND CHECK CLEARANCES AGAINST INTERMEDIATE FLANGE WELD ITEM 11/15

| ITEM | DESCRIPTION | TYPE | SPECIFICATION MATERIAL | REMARKS |
|---|---|---|---|---|
| 21 | JACK SCREWS | S.S. | BS 4882 B8T | BAR. |
| 20 | FITTED BOLTS. | S.S. | BS 4882 B8T | BAR. |
| 19 | LIFTING LUGS. | S.S. | BS 1501-321-S12 | PLATE. |
| 18 | SPLIT COLLAR | S.S. | BS 1501-321-S12 | PLATE. |
| 17 | 3" PIPE SLEEVE GUSSETS | Ti | C.P. TITANIUM | PLATE * |
| 16 | 3" PIPE SLEEVE | Ti | C.P. TITANIUM | PLATE * |
| 15 | 3" PIPE BACK PLATE | Ti | CP TITANIUM GR2 | PLATE * |
| 14 | 3" PIPE | Ti | CP. TITANIUM GR2 | PIPE * |
| | | | | |
| 13 | FLANGE STOPS | Ti | CP TITANIUM GR2 | PLATE. * |
| 12 | SETSCREWS | Ti | CP TITANIUM GR2 | BAR * |
| 11 | 3" PIPE BACK R | Ti | CP TITANIUM GR2 | PLATE * |
| 10 | 10" PIPE BACK R | Ti | CP TITANIUM GR2 | PLATE * |
| 9 | 3" PIPE | Ti | C.P. TITANIUM GR2 | PIPE * |
| 8 | 10" PIPE | Ti | CP TITANIUM GR2 | PIPE * |
| 7 | 10" COMP. RING | S.S. | BS 1501-321-S12 | PLATE |
| 6 | 3" BACKING FLANGE | S.S. | ASTM A182 F321 | FORGING. |
| 5 | 10" BACKING FLANGE | S.S. | ASTM A182 F321 | FORGING |
| 4 | 3" FACING | Ti | CP TITANIUM GR2 | PLATE * |
| 3 | 10" FACING | Ti | CP TITANIUM GR2 | PLATE * |
| 2 | MAIN FACING | Ti | CP TITANIUM GR2 | PLATE * |
| 1 | COVER PLATE | S.S. | BS 1501-321-S12 | PLATE |

| REFERENCE DRAWINGS | PLANT DESCRIPTION AND ITEM No |
|---|---|
| R.M.F. DRG Nº 3510/93/1<br>I.C.I. DRG Nº D/AT/15/1296 | PLANT ITEM Nº D410 |

**CONTRACT DETAILS**

| | |
|---|---|
| CUSTOMER | DUPONT SA |
| CONTRACT No | |
| ORDER No | |
| PROJECT | |

TITLE
BRANCH COVER FOR TA-7
CHRYSTALLISER D410

**NSM** FABRICATORS IN SPECIAL METALS


NORTHERN SPECIAL METAL (FABRICATORS) LTD.
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MANSFIELD ROAD WALESWOOD SHEFFIELD S31 8PE
TELEPHONE: 0909-770799 FAX: 0909-515032


DUPONT SA Nº: D/AT/15/13670

| DRN BY: | NSM DRG No. A1 /5117/03/1 | REV 0 |
|---|---|---|
| CHD BY: P.A.T. | | |
| DATE: 21-5-03 | | |

| ESTIMATED WEIGHTS | STANDARD FABRICATION TOLERANCES |
|---|---|
| | DIAMETER: DIFFERENCE BETWEEN MAX/MIN INSIDE DIAMETER SHALL NOT EXCEED 1% OF INSIDE DIA CIRCUMFERENTIAL LENGTH SHALL BE WITHIN ± 5mm OR ± 0·25% OF OUTSIDE DIA WHICHEVER IS GREATER. |

| LENGTH (TAN TO TAN) | |
|---|---|
| UP TO & INCL. 3M | ± 5mm |
| OVER 3M TO 6M | ± 7mm |
| OVER 6M TO 9M | ± 10mm |
| OVER 9M TO 12M | ± 15mm |
| OVER 12M | ± 20M |

| UNTOLERANCED MACHINED DIMENSIONS | | |
|---|---|---|
| ABOVE | UP TO | PLUS OR MINUS |
| — | 30 | 0·2 |
| 30 | 120 | 0·3 |
| 120 | 1M | 0·7 |
| 1M | 2M | 1·2 |
| 2M | 4M | 2·0 |
| 4M | — | 4·0 |

DIMENSIONS IN MILLIMETRES

SURFACE FINISH

| | |
|---|---|
| ▽ ROUGH M/C | 6.4/12.8 |
| ▽▽ FINE M/C | 3.2 |
| ▽▽▽ EXTRA FINE | 1.6 |
| 3.2/ ▽ SPECIAL FINISH AS STATED | |

VALUES SHOWN ARE MICRO-METRES



REVISIONS