



BHARAT HEAVY ELECTRICALS LIMITED

FABRICATION PLANT, JAGDISHPUR

NOTICE INVITING TENDER

No.: TE-FP-13-W-034

Date: 23.11.2013

BHEL-Fabrication Plant, Jagdishpur invites sealed bid in Two part bid system (Part I: Techno-commercial bid; Part II: Price Bid) for following work from experienced and financially sound bidder who fulfill the qualifying criteria contained in the enclosed tender document:

1. **Description of work:** Works Contract for Fabrication and Assembly of DT cone as per drawing at Fabrication plant, Jagdishpur.
2. **Quantum of Work:** Approx. 32,920 Kgs. Qty. Variation shall be +/- 30 %.
3. **Duration of Contract:** Two Months from the date of award of work or completion of works whichever is earlier
4. **Cost of tender Document:** Rs 500/-
5. **EMD Amount:** Rs 10,000/- or One time EMD of Rs 2,00,000/-
6. **Due Date and Time for Submission of Bid:** On or before **02.12.2013** (2:30 PM)
7. **Due Date and Time for Opening of Techno-Commercial Bid:** **02.12.2013** (3:00 PM)
8. **BHEL** reserve the right to accept or reject any of the bid/all bids or cancel/withdraw the invitation for bid without assigning any reason whatsoever and in such case no bidder/intending bidders shall have any claim arising out of such action by BHEL.
9. **BHEL** can accept/reject any or all tenders fully or partly, reduce/increase quantum of work without assigning any reasons thereof.
10. **Address for submission and opening of Tender:**
Tender Box- Administrative Building
Centralised Stamping Unit & Fabrication Plant
Jagdishpur Industrial Area,
Distt. Amethi- 227817 (U.P.) INDIA

Note:

1. The contractors may personally visit the work place to understand the scope of work before submitting their bids.
2. For relevant details please visit our website "www.bhel.com". All subsequent corrigendum/amendment shall be published only on website and not in press. Hence, bidders are advised to always be in touch with our said website until the tender is finally opened

Centralized Stamping Unit & Fabrication Plant, Jagdishpur Industrial Area, Distt. Amethi (UP) 227 817, INDIA
Tel.: + 91 5361 270177; FAX: 27 0057; web site: www.bhel.com, E-mail: manohar@bhelcsufp.in
Registered & Corporate Office: 'BHEL House', Siri Fort, New Delhi 110 049



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QUALIFYING REQUIREMENTS

Sl. No.	Description of Qualifying requirement	Documentary Proof enclosed
1.	Contractor should have PF number.	Yes/No
2	Contractor should have independent ESI Code number.	Yes/No
3.	Contractor should have PAN / TAN number.	Yes/No
4.	Contractor should have Service Tax number (PAN based).	Yes/No
5.	Self Certificate / Declaration that the bidder is not blacklisted / under hold / banned or delisted by any unit / region / office of BHEL on the date of tender.	Yes/No
6.	Self Declaration that he is not guilty by a Court of Law in India for any offence involving fraud, dishonesty and moral turpitude.	Yes/No
7.	Contractor should have executed fabrication of single component of minimum 5 MT involving RT/UT in last 3 years. Copy of orders and performance report/Completion Certificate issued by customer for successful execution of the order is to be submitted along with technical offer.	Yes/No
8.	Contractor should have minimum 05 nos. qualified welders for ASME section IX / AWS D 1.1 (Certificates to be enclosed).	Yes/No
9.	Contractor should have minimum 05 nos. qualified ITI Holder fitters (Certificates to be enclosed).	Yes/No
10.	Tender Cost to be submitted as specified in NIT	Yes/No
11.	EMD amount as specified in NIT	Yes/No

In case the Tenderers not fulfilling the above conditions, the offer is liable for rejection. The semi filled, incomplete Tender Documents will be rejected



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SCOPE OF WORK

1. The contractor shall be responsible for Fabrication & assembly of DT CONE as per drawing no. 02010118801 Sht 1&2, 02010118802 Sht 1&2, 12010118802, 12010118803 & 1201011804 at Fabrication Plant, Jagdishpur. For Fabrication & assembly of jobs to be completed following activities are included:
 - I. Study of Drawings: BHEL will provide drawings of jobs to be completed. Contractor shall study the drawings and prepare sub assembly drawings, as required.
 - II. Receipt of Material: Cutting of raw material shall be done by BHEL with development drawings in consultation with contractor. However, small components which can be cut by PUG machines/Gas Cutting torches shall be done by contractor. Cut to size materials shall be received by contractor from BHEL Shop. Grinding/dressing/cleaning of flame cut components, maintaining dimensions as per drawing, if required shall be responsibility of contractor.
 - III. Rolling: Rolling/bending shall be in BHEL's Scope. However, assistance of manpower for rolling/Bending will be provided by contractor and also Rolling will be done in presence of contractor.
 - IV. Assembly: Assembly of all prepared components as per drawing shall be done by contractor. The fitting, marking and tacking of components as per drawing shall be done by contractor. All assemblies shall be fabricated to our drawings and notes thereon. All stiffeners required during assembly to control the distortion will be arranged by the contractor at his own cost.
 - V. Welding: Welding of all joints as per drawing shall be done by contractor. All welding shall be performed as per approved WPS provided by BHEL by qualified welders only. Contractor shall carryout the welding in such a manner that no distortion takes place. Due care shall be taken to control the distortion by suitably clamping the assembly during welding. The arcing on parent material and machined faces should be avoided strictly.
 - VI. Dressing: Strict measures of quality control should be maintained throughout the work. The job should be free from spatters and undercuts. All dressing and cleaning shall have to be done to the satisfaction of Engineer In-charge/BHEL-QC.
2. Raw material, electricity, consumables like electrodes, grinding wheels, gases available with BHEL shall be provided by BHEL free of cost. Contractor shall maintain records of the material and consumables issued by BHEL.
3. Suitable machines / equipments such as welding machines, grinding machines, Small portable drilling machines and their drill bits, PUG cutting machines, Gas cutting torches along with all their accessories and all other tools and tackles required for execution of job shall be arranged by Contractor.
4. All nut, bolts, washers required for assembly shall be arranged by contractor.
5. Contractor may be required to work in 3 – Shifts, Sundays and holidays also. Contractor shall appoint supervisors for all Shifts for co-ordination with BHEL. Contractor to arrange adequate work force of experienced welders and fitters who should have good knowledge of reading BHEL Drawings and execute the job as per requirement of BHEL.
6. EOT crane shall be provided by BHEL free of cost; however, the assistance in operation of the same shall be the responsibility of contractor. In contingency, in order to meet the job requirement, any additional resources, if required shall be arranged by the contractor at their cost.



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7. Contractor to submit their internal inspection reports in appropriate format before offering the job for inspection by BHEL QC. Inspection at various stages during fabrication shall be done by BHEL - QC and proper record by Contractor shall be maintained.
8. DPT at various stage of welding shall be done by contractor and submit the report. BHEL may witness the DPT and verify the reports submitted. DPT kit shall be provided by BHEL.
9. RT/UT shall be carried out as per drawing requirement/QAP by BHEL. Re-work to be done, if required by BHEL QC without any charge.
10. Inspection / clearance of fabricated assemblies by BHEL QC shall be Contractor's responsibility. Fabricated assemblies should not fail in post weld heat treatment and final testing as mentioned in drawing/QAP.
11. Contractor shall start the work within 7 days from date of work order given by BHEL.
12. To keep fabrication areas clean by doing complete housekeeping daily in all shifts. This responsibility will be totally of the contractor & failure in same will entail suitable action against him.
13. Contractor must deploy manpower as per shop requirement. In case of failure to deploy required manpower suitable action shall be taken and suitable deduction also will be made from bills.
14. Contractor shall be responsible for loss of tools, instruments & as deemed fit recovery for loss/damage shall be made from contractor's bill.
15. Contractor to provide safety appliance (personnel protection equipment) compulsory to their labour.
16. The work shall be measured in terms of weight (Kilogram) for complete assembly cleared by BHEL- QC. The weight for payment shall be taken as per drawing only.
17. The payment shall be made after fabrication of complete assemblies as per above scope of work & duly cleared by BHEL-QC on monthly basis.



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TERMS AND CONDITIONS

1.0 SECURITIES:

1.1 EARNEST MONEY DEPOSIT:

Offer should be accompanied with Earnest Money as specified in NIT in the form of Demand Draft. DD shall be drawn in favour of "Bharat Heavy Electricals Limited" payable at IA Jagdishpur. The Earnest money deposit shall not carry any interest & shall be returned, after the award of the contract to the successful bidder.

1.2 SECURITY DEPOSIT:

10% of contract value for contract value up to Rs. 10 lakhs or Rs 1 lakh + 7.5% of contract value amount exceeding Rs 10 lakhs. 50% of the SD shall be deposited before start of work and the remaining 50% shall be recovered from the running bills @ 10% per bill as per BHEL norms. EMD of the successful Tenderer shall be converted and adjusted against the security deposit. Security deposit shall not carry any interest. Security deposit shall not be refunded to the contractor except in accordance with the terms of the contract. It will be returned to the contractor, within 30 days, after success full completion of the Contract.

2.0 OFFER SUBMISSION IN RESPONSE TO INVITATION:

2.1. The bid is invited in single part i.e. Price Bid in the format specified.

2.1.1. The offer should contain documents in the same order as listed below:

- I. EMD as specified in NIT.
- II. Declaration as per annexure-A.
- III. Certificate of Declaration Confirming the knowledge of Site Condition as per annexure-B.
- IV. Signed copy of tender document.

2.2 If the bidder deliberately gives wrong information in his tender, BHEL reserves the right to reject such tender at any stage or to cancel the contract, if awarded, forfeit the Earnest Money / Security Deposit / any other moneys due and blacklist the contractor.

2.3 Before tendering, the bidder is advised to inspect the site of work, drawings and the environments and be acquainted with the actual working and other prevalent conditions, facilities available etc. No claim will be entertained later on grounds of lack of knowledge.

3.0 EVALUATION OF OFFERS

3.1 The price bids will be evaluated by preparing a comparative statement and the lowest bidder (L1) will be arrived in terms of lowest cost to BHEL and will be considered successful for awarding the work.

3.2 BHEL reserve the right to split the work in two or more vendors, as specified in NIT. If not specified, total work in full shall be ordered on a single party i.e. L-1 bidder.

4.0 CONTRACT AGREEMENT

The Contractor has to make an agreement with BHEL in the format prescribed only on Rs. 100/- Non-Judicial Stamp Paper.



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5.0 TERMS OF PAYMENT:

Payment shall be made, on the Nos. of Measurement units, successfully executed, by the firm. Firm shall submit their clear & legible bills (in duplicate) **on Monthly basis**, duly verified by concerned engineer. Each bill must be enclosed with work/ activity completion report duly signed by contractor & and BHEL representative. All payments shall be released through electronic-pay mode only.

6.0 PENALTY :

For late completion of work, BHEL standard LD clause shall be applicable which is 0.5% per week for unexecuted portion of work subject to maximum 10% of work order value. Cost of rejection, as appropriate shall be recovered from contractor as compensation for defective job done resulting in rejection even after performing necessary rework. The decision of GM (CSU & FP) on the extent of penalty shall be final and binding on contractor.

7.0 SAFETY AND OCCUPATIONAL HEALTH:

The contractor has to assume full responsibility of the Safety of the worker deployed. All the safety items to the worker should be arranged by contractor. The contractor is required to maintain first aid box at work place.

8.0 ARBITRATION:

GM-CSU & FP (or any official appointed by him) shall be the sole arbitrating authority for this contract.

9.0 RIGHTS OF BHEL :

BHEL reserves to itself, the following rights without entitling the Contractor to any compensation. Resorting to any, some, all of the actions like Contract termination, recovering the dues/ losses from the Security Deposit and the contract amount, forfeiting the Security Deposit, getting the work done through other agencies at the cost of the contractor, cancellation of registration, banning the business with BHEL etc., in any event of the followings:

- a) Contractor's repeated poor performance, withdrawal from or abandonment of the work, except in force majeure conditions.
- b) Serious lapse in performance, Persistence disregard of the BHEL instructions.
- c) Insolvency of the contractor.
- d) Assignment, transfer, subletting of the contract work without BHEL's written permission.
- e) Non-fulfilment of any contractual obligations or obligations under the law.

10.0 ABANDONING OF WORK:

In the event of contractor abandoning the work or delay in execution of work or denial to do the work, BHEL reserves the right, to get the unfinished work completed at contractor's risk and cost.

11.0 CONTRACT LAW AND JURISDICTION:

This Contract shall be governed by the laws of India. No court shall entertain or try any suit or legal proceedings to enforce any claim arising out of the Contract except in a court of law having jurisdiction at **Sultanpur**.



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CONTRACTOR'S OBLIGATIONS

A) CONTRACTUAL

1. Contractor shall ensure that adequate no. of workmen are deployed for execution of the Work awarded to him from time to time ensuring uninterrupted working.
2. Contractor and or his authorized supervisor should be available at all time to supervise the work allotted to him.
3. Contractor to ensure that the workmen deployed in the premises of BHEL are physically and mentally fit and Contractor should ensure that all the workmen are having Police verification and are member of the PF /ESI scheme. Such workmen should possess requisite skill & experience for carrying out work as define in scope of work of contract.
4. Contractor to maintain appropriate records under labour laws of his workmen.
5. Contractor to provide employment card/ identity card with photograph duly verified and attested by the Contractor to his workmen.
6. In case of any misconduct/misbehavior by any workmen, the contractor will replace such workmen immediately.
7. Under no circumstances the contractor will sub-contract the job.
8. Contractor will be liable for any pilferage/ loss to BHEL due to acts of omission and commission by his workmen or any damage of material during shifting.
9. Contractor should ensure proper safety of all workmen his equipments, material and plants belonging to him or to BHEL. The Contractor shall be responsible for enforcing all safety rules and regulations as applicable at the work place and as notified from time to time.
10. The Contractor shall ensure that all his workmen wear the required personnel protective equipment while working on the jobs. The contractor shall ensure to provide all safety precautions for prevention of accident of his workmen.
11. In case of any accident it will be the sole responsibility of the contractor to provide necessary medical aid to his injured workmen and liaison with the concerned authority's i.e. ESI etc.
12. Up keeping and maintenance of all tools & tackles issued to contractor will be the responsibility of the contractor. Any loss or damage of the same will be recovered from the contractor.
13. In the event of termination of contract for any reason whatsoever, the Contractor shall withdraw all his workmen from the premises of BHEL. In case contractor decides to terminate services of his workmen, he should settle all terminal dues including retrenchment compensation and shall indemnify BHEL against all such claims.



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B) TOWARDS STATUTORY LIABILITY

1. All statutory requirements under Minimum Wages Act, 1948, Payment of wages Act, 1936, Workmen Compensation Act.1923, EPF & MP Act, 1952, Payment of Gratuity Act 1972, ESI Act, 1948, The Contract Labour (R & A) Act, 1970, Payment of Bonus Act, 1965, Income Tax Act, Service Tax Act, and all other applicable Acts shall be complied with by the Contractor.
2. Minimum wages rate as define by BHEL HR department from time to time for unskilled, semi skilled & skilled labourer working in BHEL shall be applicable and not state government defined rate.
3. Contractor shall comply with all statutory requirements, rules & regulations, and notifications in relation to employment of his workmen issued from time by the concerned authorities.
4. Contractor shall ensure payment of BHEL prescribed minimum wages as applicable before expiry of seventh day from the last day of wages period in the presence of authorized representative of BHEL and maintain proper records of their timely disbursement. These records shall be preserved for a period of 5 years and should be made available for any verification by the statutory authorities/ BHEL authorities. Contractor to issue wages slips to his workmen.
5. Contractor to provide PF Pass book to his workmen and ensure payment of PF, EDLI, pension dues under EPF & MP Act, 1952 to the RPFC.
6. Contractor shall ensure payment of ESI contribution under ESI Act, 1948 and provide ESI membership No./card of each workmen.
7. Contractor shall produce proof of deduction as well as remittances of PF, EDLI, Pension, ESI contribution, administrative charges etc. wherever applicable and shall maintain proper records.
8. Contractor shall furnish proper returns to the concerned statutory authorities and shall provide a copy of the same to BHEL.
9. Contractor shall be solely responsible for non-payment/delayed payment of Wages/DA, contributions under EPF & MP Act, ESI Act etc.
10. Contract Labourer shall be paid minimum wages as prescribed by the BHEL HR from time to time (not state Govt. declared rates).
 - (a) This Payment is to attract statutory payment/ PF, ESIC, BONUS & Leave etc.
 - (b) Payment to Contract Labour through bank/cheque/cash by the respective contractor in presence of HR representative.
 - (c) The implementation of PF (through booklets), Bonus & leave elements timely submission of return and up keeping of records in various form 12,14,16 & 17 will be part of tender document.



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11. In case the contractor fails to make payment of wages to his workmen or remittance of contribution to the concerned authorities, by the due date the security deposit/other dues/running bills under the contract shall be utilized by BHEL to discharge the liability of the contractor.
 12. Contractor shall indemnify BHEL against all claims and losses under various Labour Laws, statues or any civil or criminal law in connection with workmen deployed by him.
 13. The liability for any compensation on account of injury sustained by any workman of the contractor will be exclusively that of the contractor.
 14. Contractor shall observe Provisions of the Factories Act in respect of working hours, holidays, rest intervals, leave and overtime to his workmen.
 15. In case a contractor employs Women he will discharge his obligation under law in respect of such women workers like prohibition of engaging them during night-hours, prohibition of employing them for more than 9 hours per day, provision of crèche facility, grant of maternity leaves as per rules etc.
 16. Contractor to obtain license under CL (R&A) Act, 1970.
 17. Contractor shall not employ a worker less than 18 years of age on the premises of BHEL or otherwise in execution of his work.



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PRICE BID FORMAT

- a. Name of the firm :
- b. Name of the proprietor/partners :
- c. Address and contact nos :
- d. Price offer on work measurement basis:

Sl. No	Work Description	Unit of Measurement	Quantum of work	Rate quoted Rs. Per kg	Total value (E=C*D)
	A	B	C	D	E
1	Works Contract for Fabrication and assembly of DT CONE (02 Nos.) as per scope of work.	Kg	32,920		
Quoted Service Tax, If any					

Note:

1. Rates to be quoted in figures and words by the Contractor. There should not be any corrections in price bid contradictory to the above the offer will be liable for rejection.
2. The rate quoted should be kept firm during the execution of contract. No increase in rate of DA / Wages hike shall be reimbursed to the Contractor. Contract shall anticipate such hike and quote in the tender.
3. Rate quoted above shall be inclusive of minimum wages as per BHEL rules, statutory requirements like PF & ESI, Uniform, shoes, PPEs, leaves/holiday wages, bonus, machinery charges, supervision charges, and all other charges as per scope of work exclusive of service tax. Service tax, if applicable shall be paid extra at actual.

Date:

Signature with Name
& Office Seal



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ANNEXURE A

DECLARATION SHEET

I / We hereby certify that, all the information and data furnished by me / us with regard to this Tender are true and complete to the best of my / our knowledge. I / We have gone through the specification, conditions and stipulations in detail and understand fully the scope of work and agree to comply with the requirement and intent of specification.

I / We, hereby give undertaking that I / We will submit the Provident fund certificate to BHEL, before deployment of labours and follow all statutory compliances of state/central govt. and all the prevailing Industrial / Labour laws/ Govt. laws.

I/We, further certify that I/We am/are the duly authorized representative(s) of the under mentioned bidder and a valid power of attorney to this effect is also enclosed.

I/We, hereby declare that I/We shall treat the tender documents, drawings, specifications and other records connected with the work as secret / confidential and shall not communicate information / derived there from to any persons other than a person I/We am/are authorized to communicate the same or use the information in any manner prejudicial to the safety of the same.

Bidder's Name & Address:

Name & Signature of the bidder

(Seal)



**BHARAT HEAVY ELECTRICALS LIMITED
FABRICATION PLANT, JAGDISHPUR**

ANNEXURE B

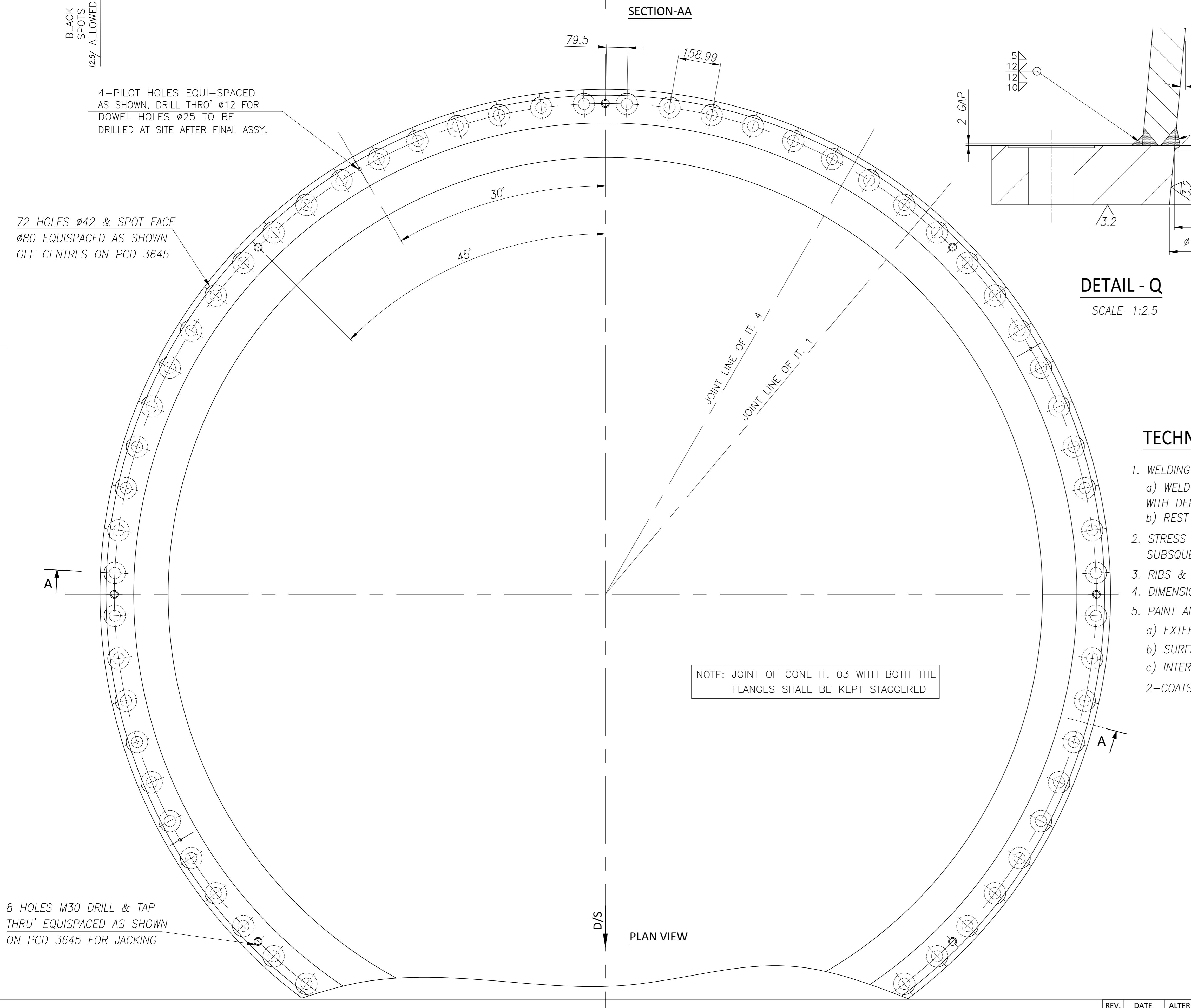
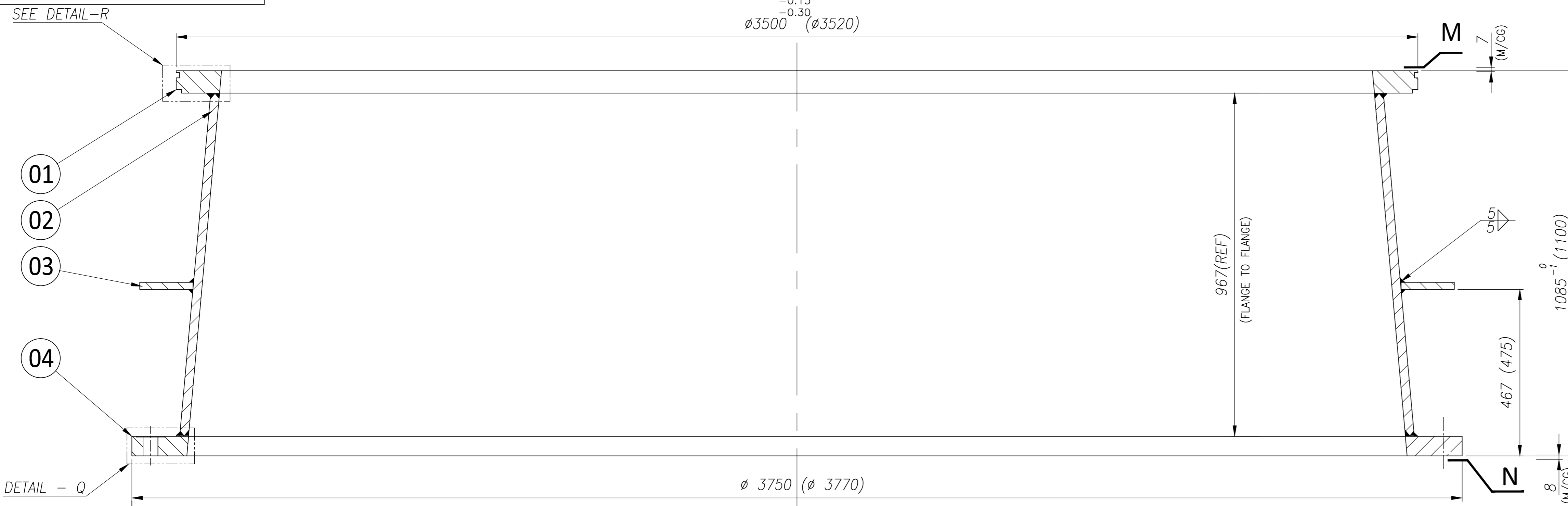
CERTIFICATE OF DECLARATION CONFIRMING THE KNOWLEDGE OF SITE CONDITION

We..... here
by declare and confirm that we have visited the project site under the subject
namely.....and acquired full
knowledge and information about the site conditions, wage structure, industrial climate and total work
involved. We further confirm that the above information is true and correct and we will not raise any
claim of any nature due to lack of knowledge of site condition.

Bidder's Name & Address:

Name & Signature of the bidder
(Seal)

2088T 10101 1 ON DRG

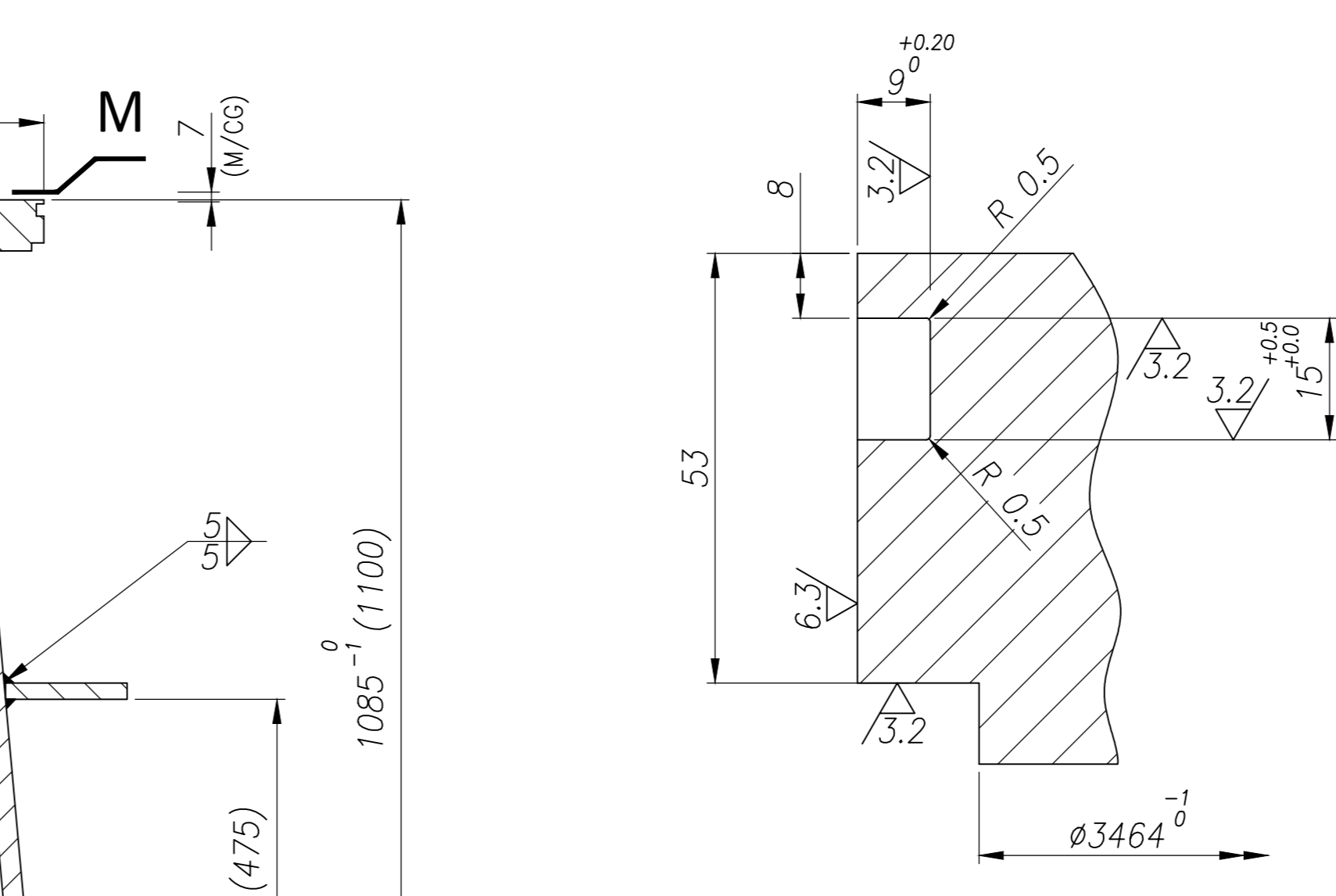


8 HOLES M30 DRILL & TAP THRU' EQUISPACED AS SHOWN ON PCD 3645 FOR JACKING

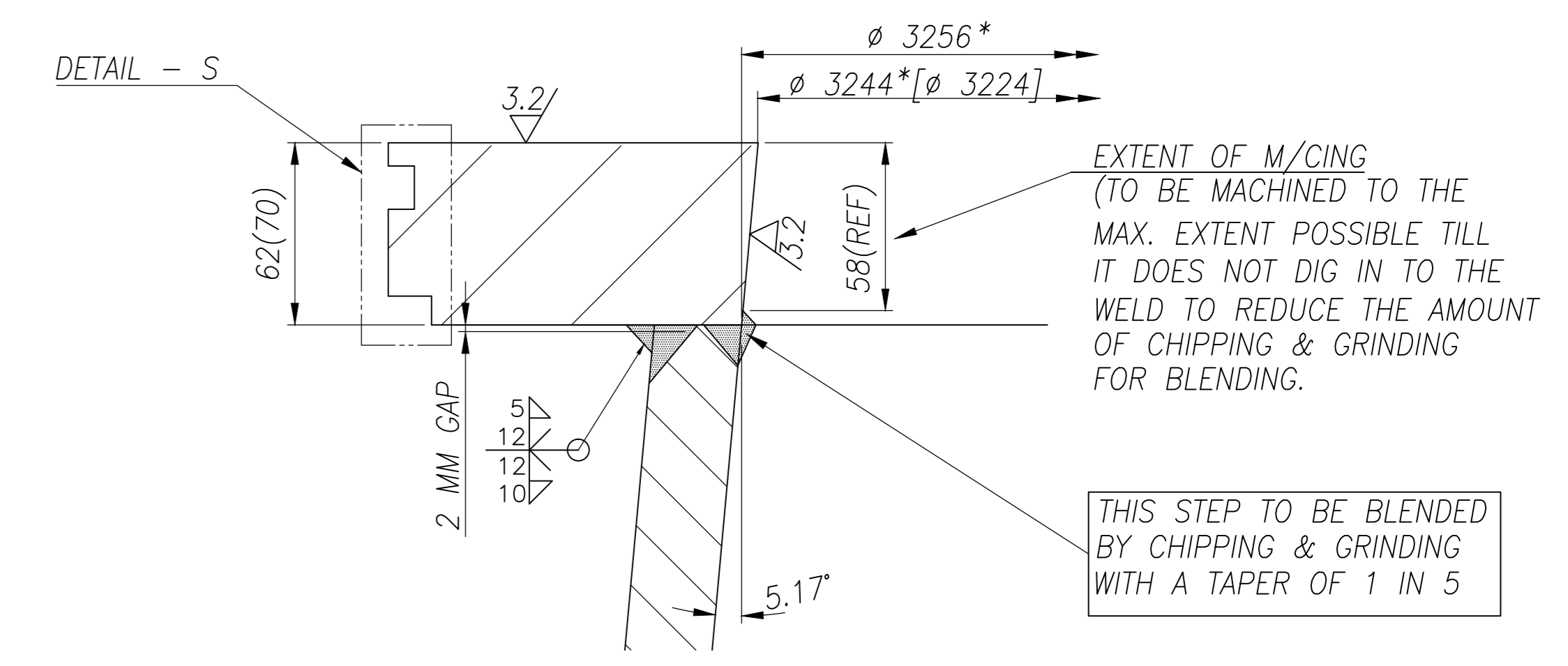
4-PILOT HOLES EQUI-SPACED AS SHOWN, DRILL THRO' Ø12 FOR DOWEL HOLES Ø25 TO BE DRILLED AT SITE AFTER FINAL ASSY.

72 HOLES Ø42 & SPOT FACE Ø80 EQUISPACED AS SHOWN OFF CENTRES ON PCD 3645

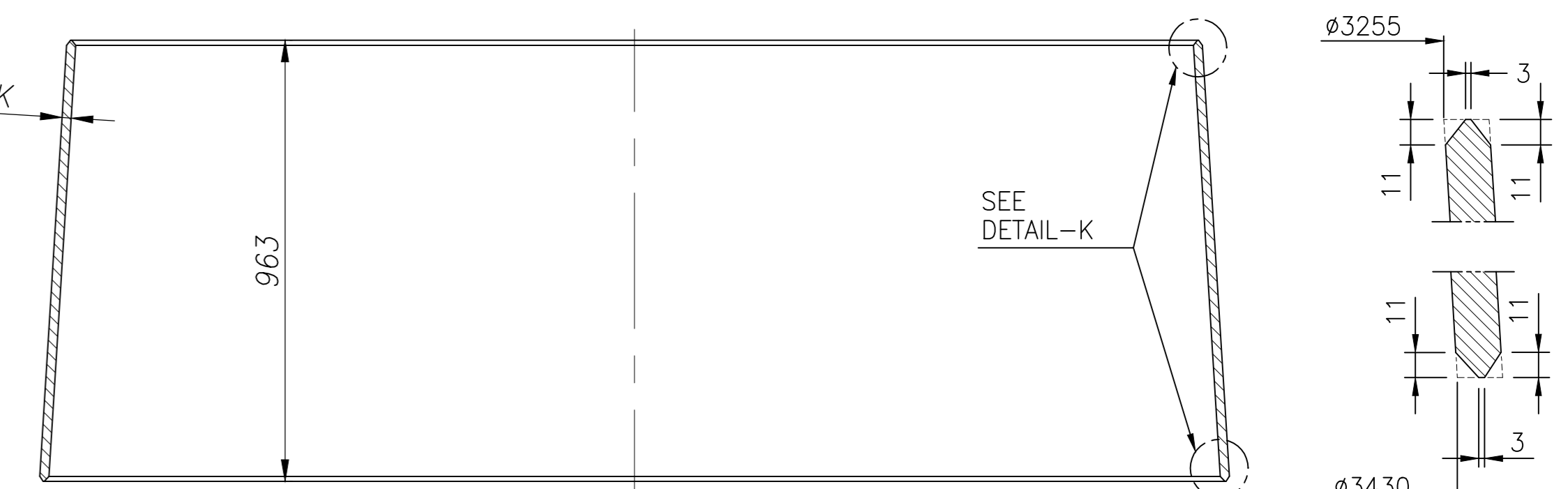
BLACK SPOTS 12% ALLOWED



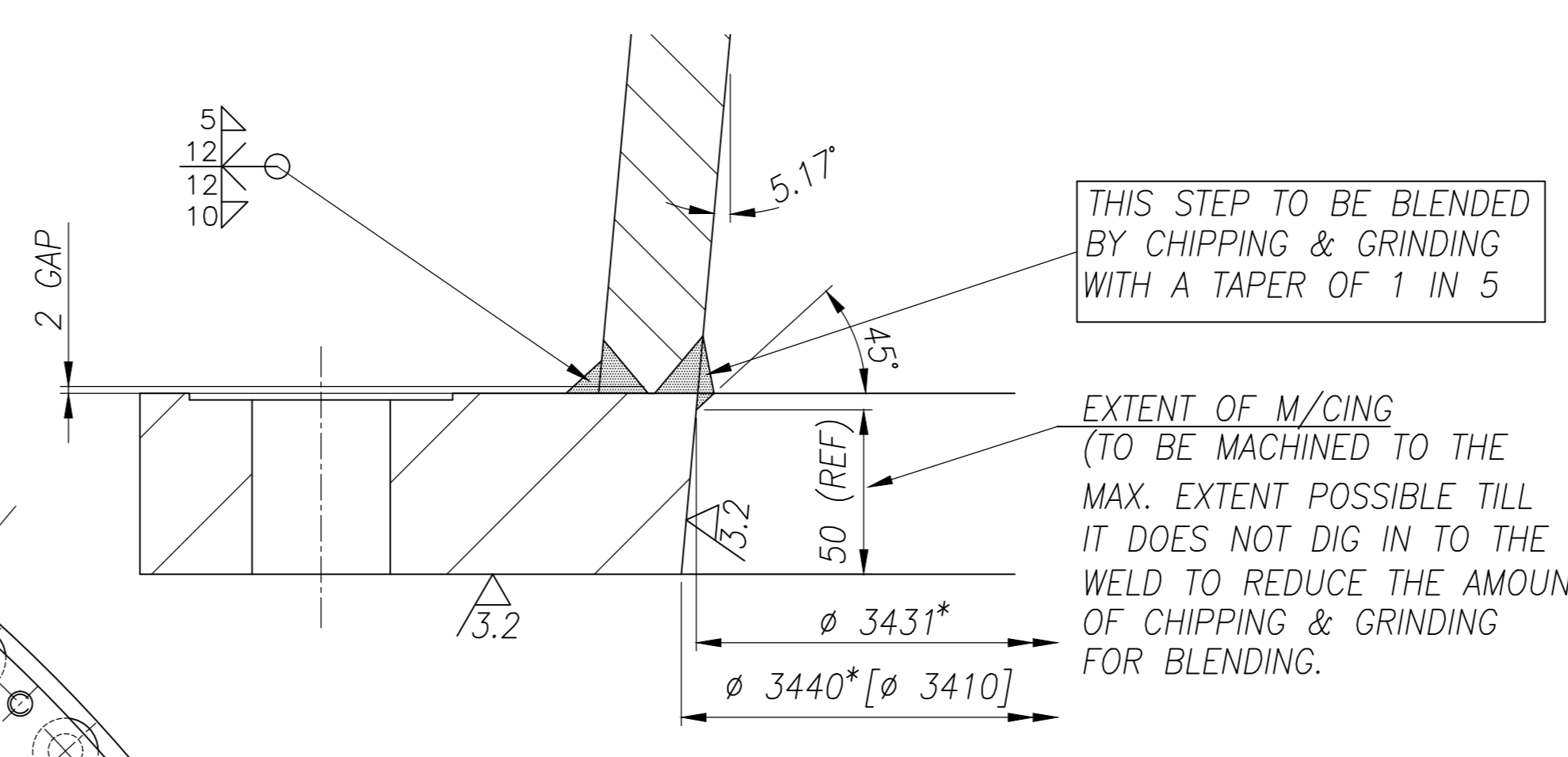
DETAIL - S SCALE-1:1



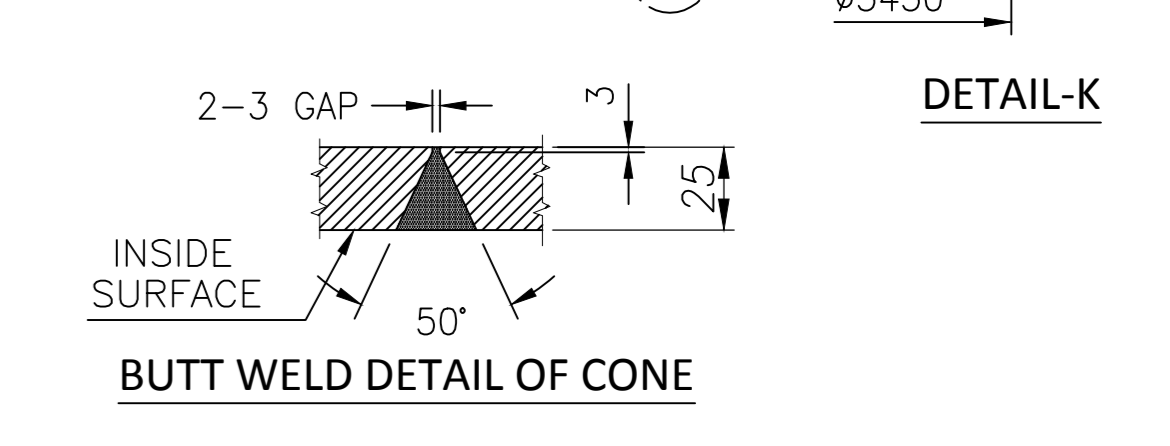
DETAIL - R SCALE-1:2.5



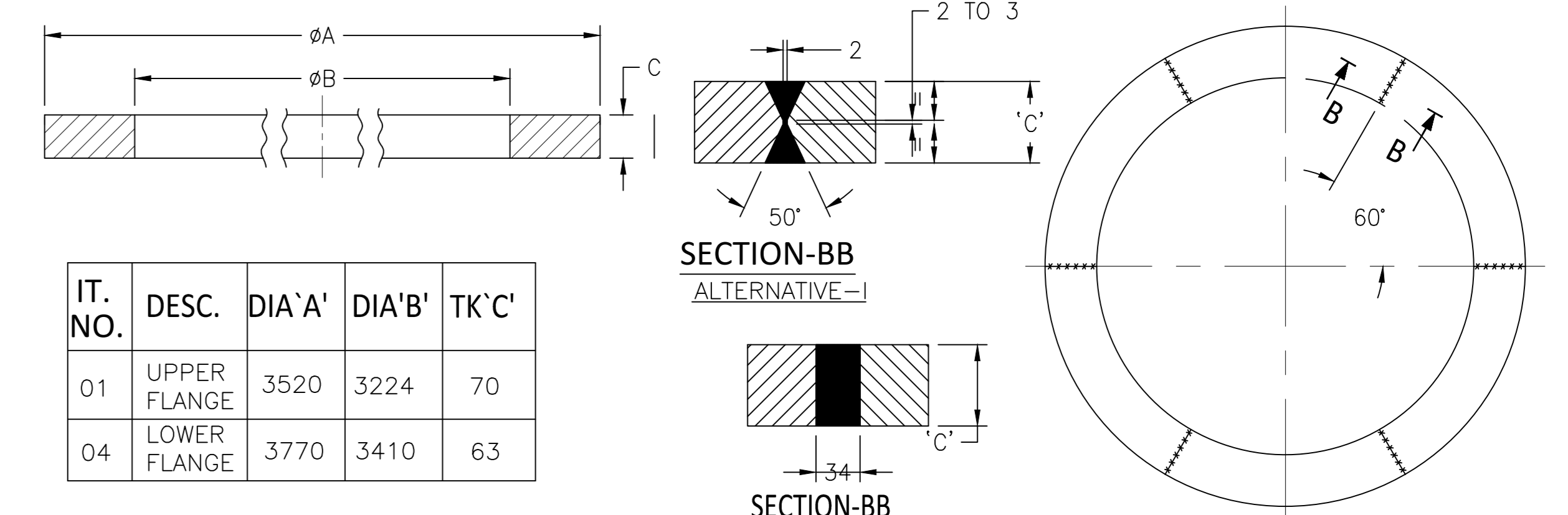
DETAIL OF IT.NO-02



DETAIL - Q SCALE-1:2.5



BUTT WELD DETAIL OF CONE



IT. NO.	DESC.	DIA 'A'	DIA 'B'	TK 'C'
01	UPPER FLANGE	3520	3224	70
04	LOWER FLANGE	3770	3410	63

TECHNICAL REQUIREMENTS

- WELDING TO BHEL STD. A40622101 AS FOLLOWS.
 - WELD OF IT 01 & 02, IT 02 & 04 SHALL BE AS PER CAT. II WITH DEPTH OF INSPECTION BY U.T= WELD SIZE-5 mm.
 - REST OF WELD TO GRADE III.
- STRESS RELIEVING TO BE CARRIED OUT AS PER BHEL SPCN. BP0640299 & SUBSEQUENT SHOT BLASTING TO BE CARRIED OUT.
- RIBS & STIFFENERS CAN BE CUT SUITABLY ON ASSY. IF REQUIRED.
- DIMENSIONS SHOWN WITHIN () BRACKETS ARE FABRICATED DIMENSIONS.
- PAINT AND PROTECT WELDS AS PER PROD. STD. HT 00005 AS FOLLOWS:-
 - EXTERNAL SURFACES TO CAT. F.
 - SURFACES MARKED "M", "N" AND THREADS TO CAT. G.
 - INTERNAL SURFACES AS FOLLOWS
- TAPER BORES AT TOP & BOTTOM ENDS AS SHOWN IN DETAIL R & Q, SHALL BE MACHINED AND BLENDED WHILE ON VERTICAL BORING MACHINE TO THE MAXIMUM EXTENT POSSIBLE TILL IT DOES NOT DIG INTO WELD. THIS IS TO REDUCE CHIPPING AND GRINDING.
- * MARKED DIAMETERS AT THE TWO ENDS SHALL BE CONCENTRIC WITHIN 0.5.
- FACES "M" & "N" SHALL BE PERPENDICULAR TO AXIS WITHIN 0.5.
- REMOVE ALL BURRS AND SHARP EDGES.
- ADDITIONAL CHECKS CALLED IN QA PLAN SHALL BE CARRIED OUT.

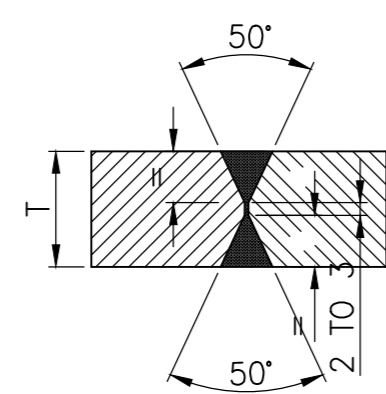
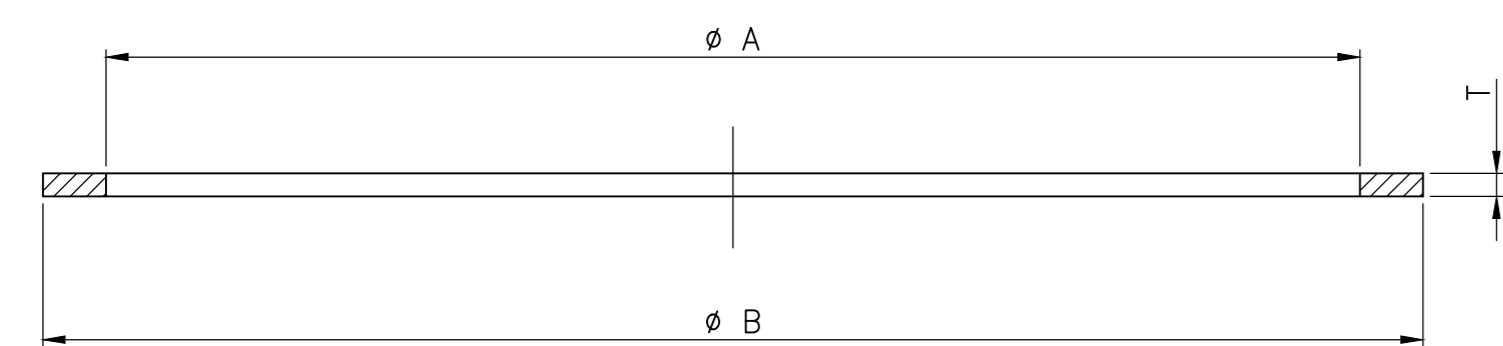
NOTE: JOINT OF CONE IT. 03 WITH BOTH THE FLANGES SHALL BE KEPT STAGGERED

VAR. NO.	REMARKS	VAR. NO.	ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT WT.
63	TK.	04	BOTTOM FLANGE	ASTM A516 GR. 70		1005.0	01
20	TK.	03	STIFFENER (O.D.-3705X I.D.-3405)	AA 1011819171 AA 10119		263.0	01
25	TK.	02	CONE	ASTM A516 GR. 70		2010.0	01
70	TK.	01	TOP FLANGE	ASTM A516 GR. 70		863.0	01

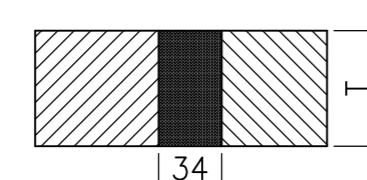
DRAWING REVIEW		ADDITIONAL INFORMATION		TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT	
DEPT.	NAME	SIGN.	DATE	FAB WEIGHT = 4160 kg	6 X 170 MW V. FRANCIS TURBINE PUNATSANGCHHU - II HEP
STATUS OF DRAWING				DISTRIBUTION OF PRINTS	
U				HTE-2, WTM(PL)-1, WTM-4 THX-1, FBM-7	
DEPT. CODE		H.T.E. AS PER DRG.		SCALE	
402		32000049014		1:10 & AS STATED	
REV.		DATE		WEIGHT(K.G.)	
ZONE		ZONE		3650.0	
REV.		DATE		REF. TO ASSY. DRG.	
ZONE		ZONE		0 20101 18801	
REV.		DATE		ITEM NO.	
ZONE		ZONE		02	
REV.		DATE		DRAWING NO.	
ZONE		ZONE		1 20101 18802	
REV.		DATE		NO. OF SH.	
ZONE		ZONE		01	

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20881 10102 0 'ON' 980

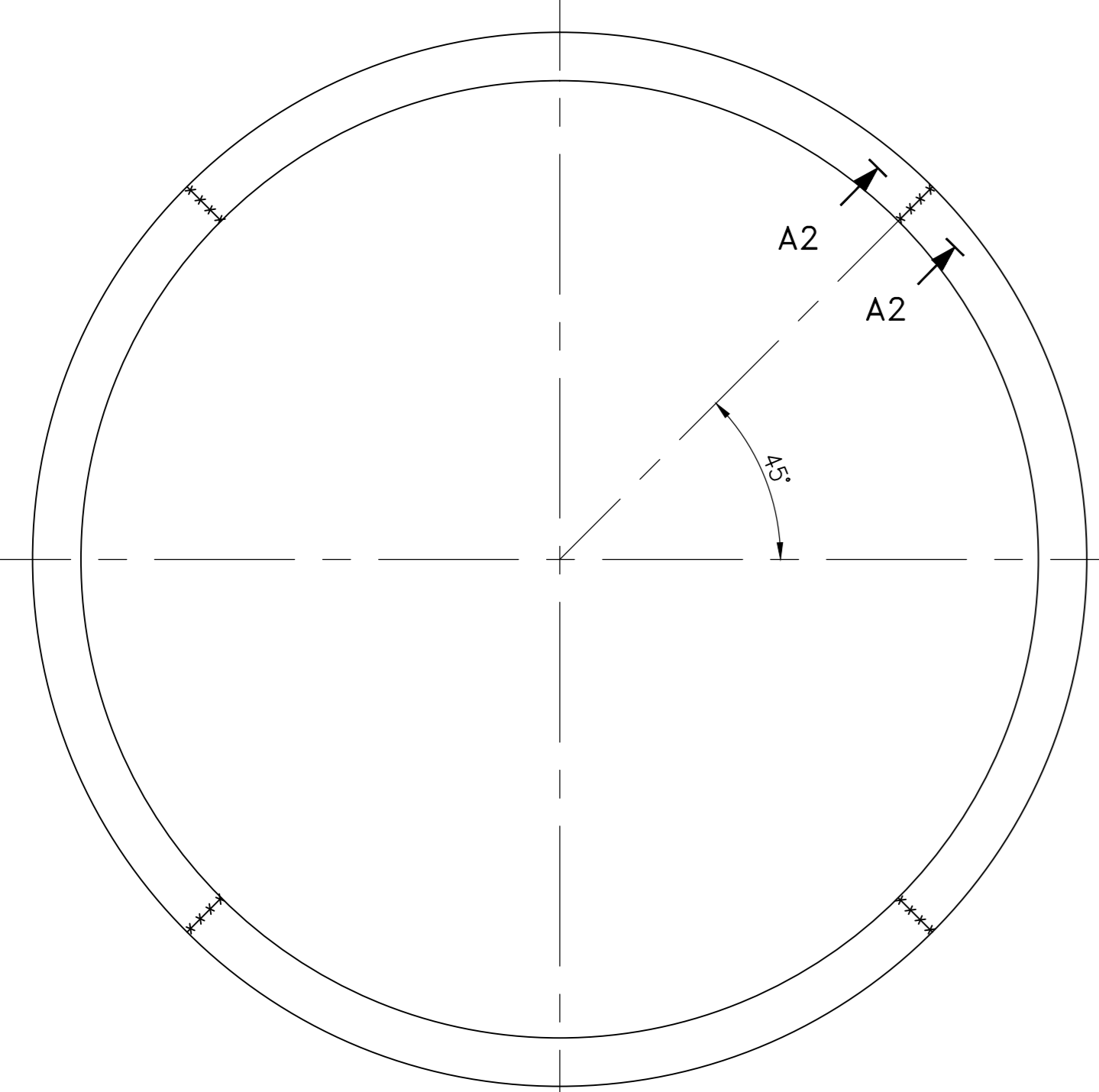


SECTION-A2A2
SCALE-1:2
ALTERNATIVE-I

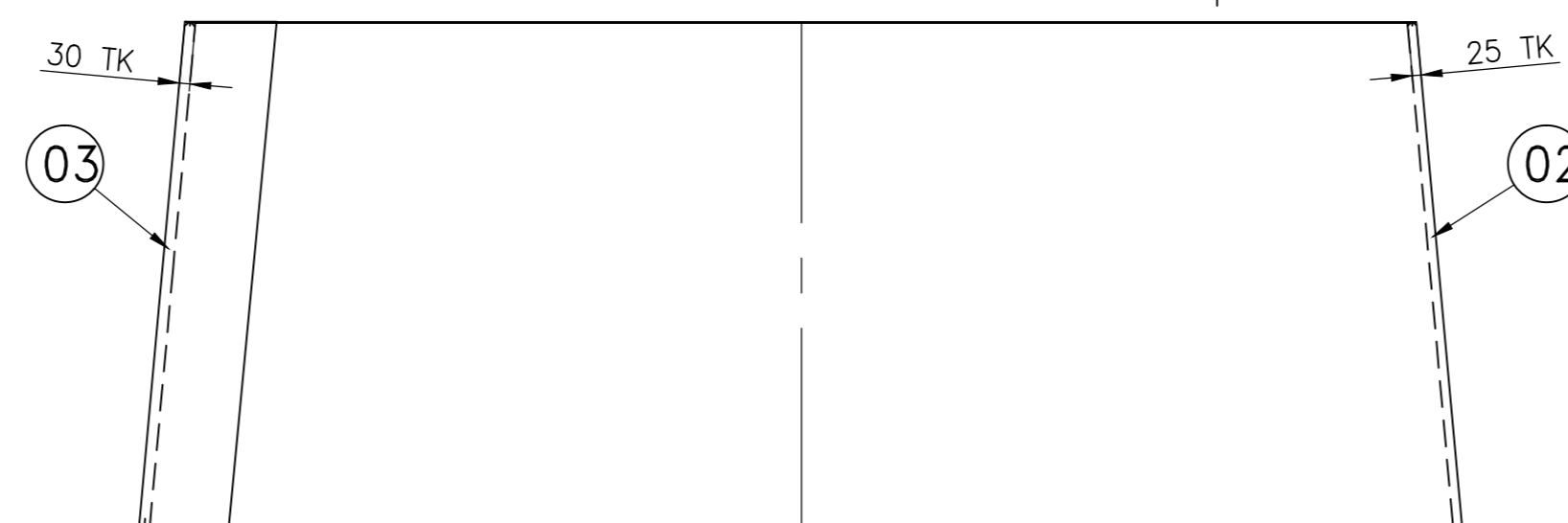


SECTION-A2A2
SCALE-1:2
ALTERNATIVE-II
(DETAIL OF ELECTRO SLAG WELDING)

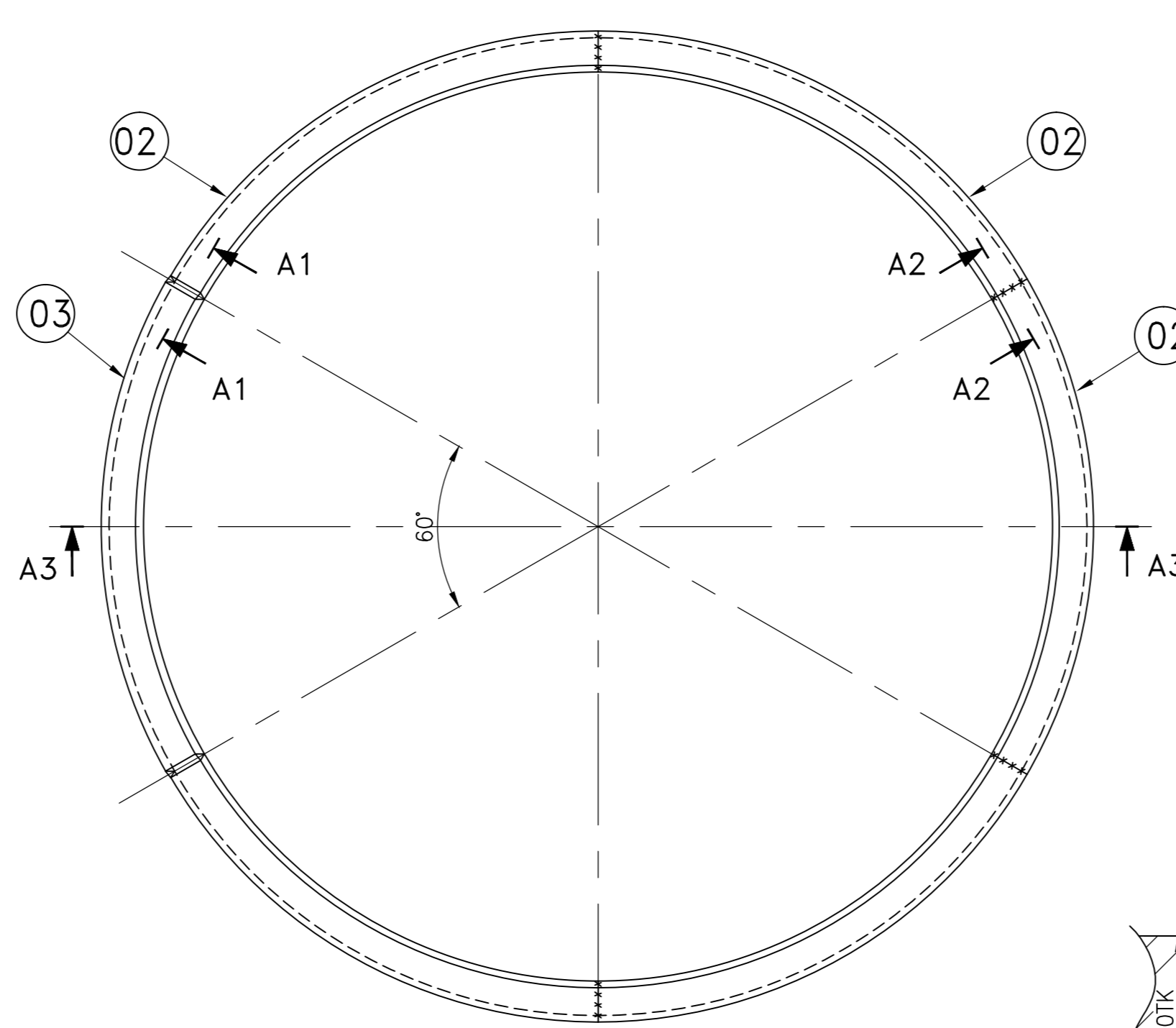
IT. NO.	φ A	φ B	T
01	3420	3765	63
11	3690	4065	63



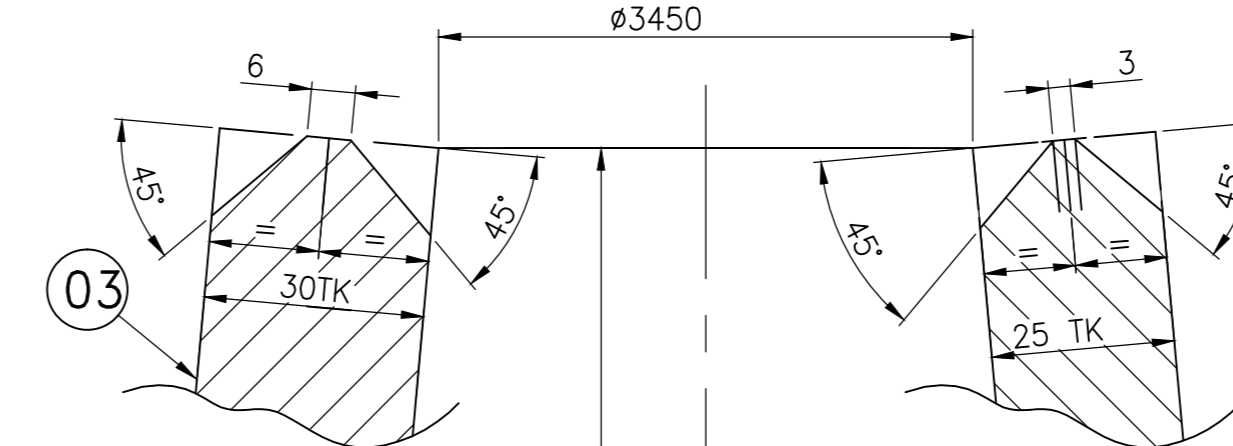
DETAIL OF ITEM 01 & 11



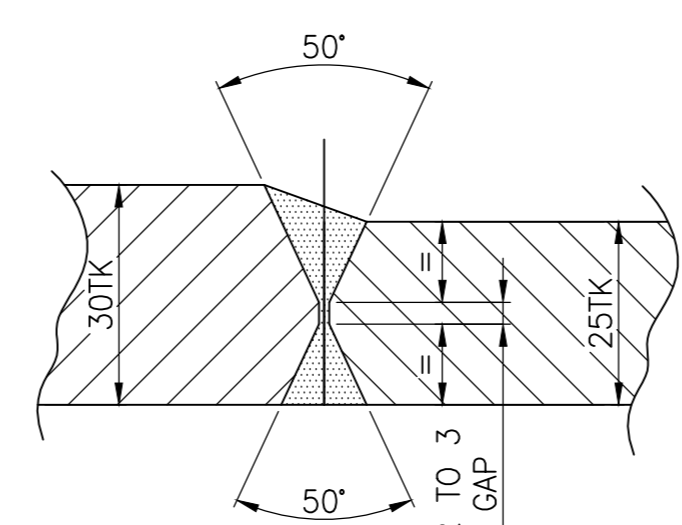
VIEW-Z1



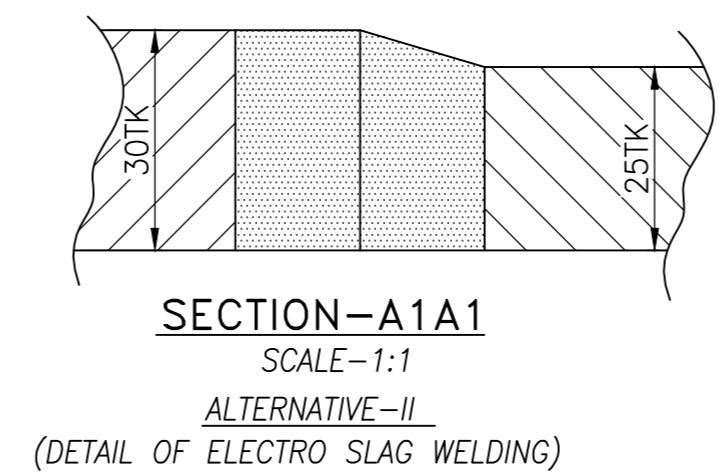
DETAIL OF ITEM 02 & 03



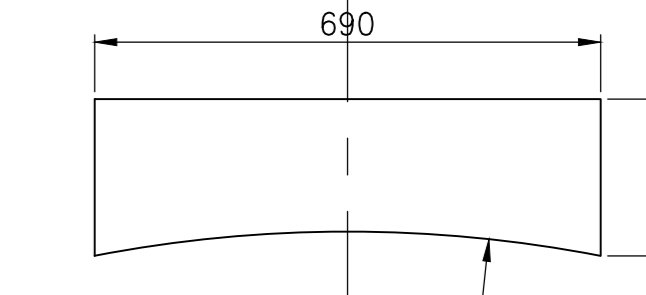
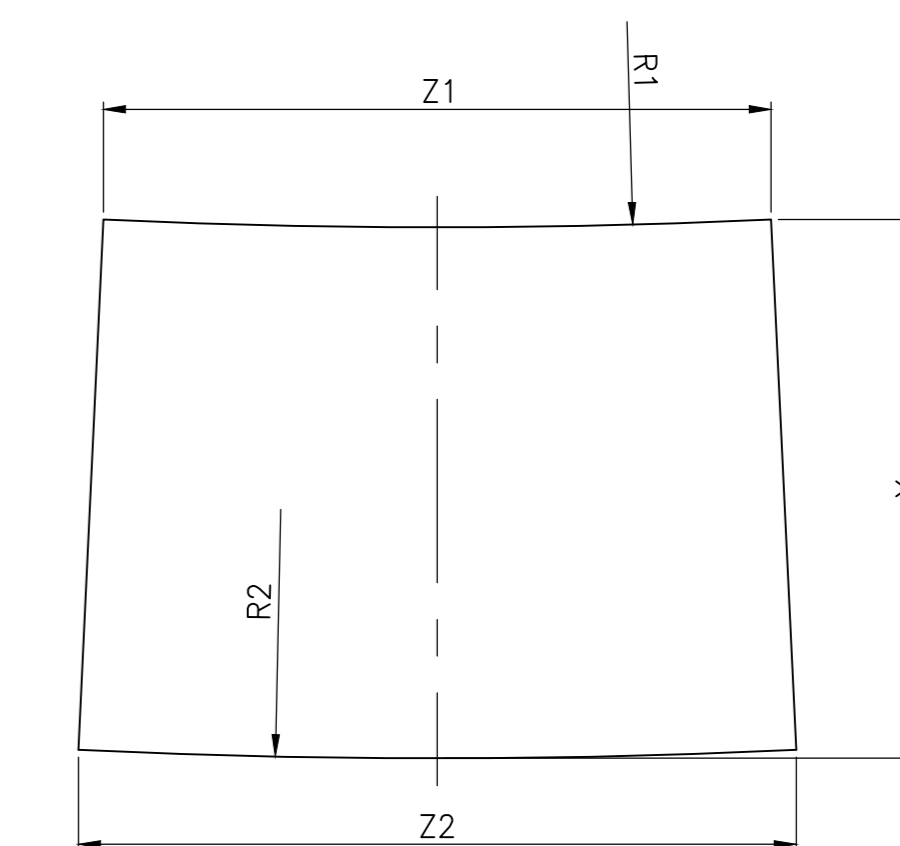
SECTION-A3A3
SCALE-1:1



SECTION-A1A1
SCALE-1:1
ALTERNATIVE-I



SECTION-A1A1
SCALE-1:1
ALTERNATIVE-II
(DETAIL OF ELECTRO SLAG WELDING)

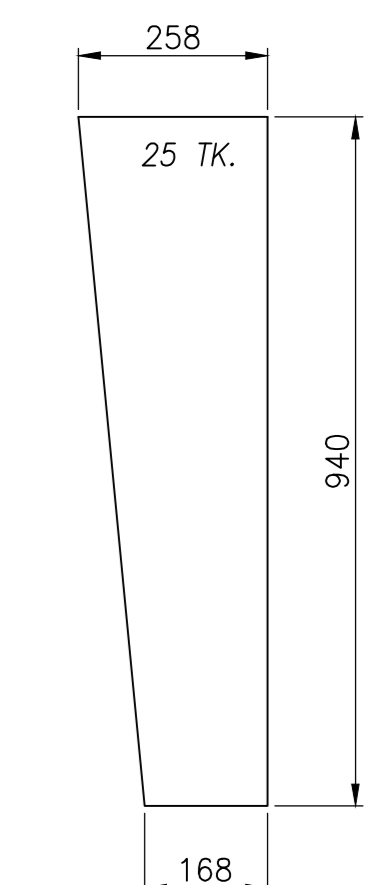


IT. NO.	D	R	T
05	258	1776	25
07	168	1864	25

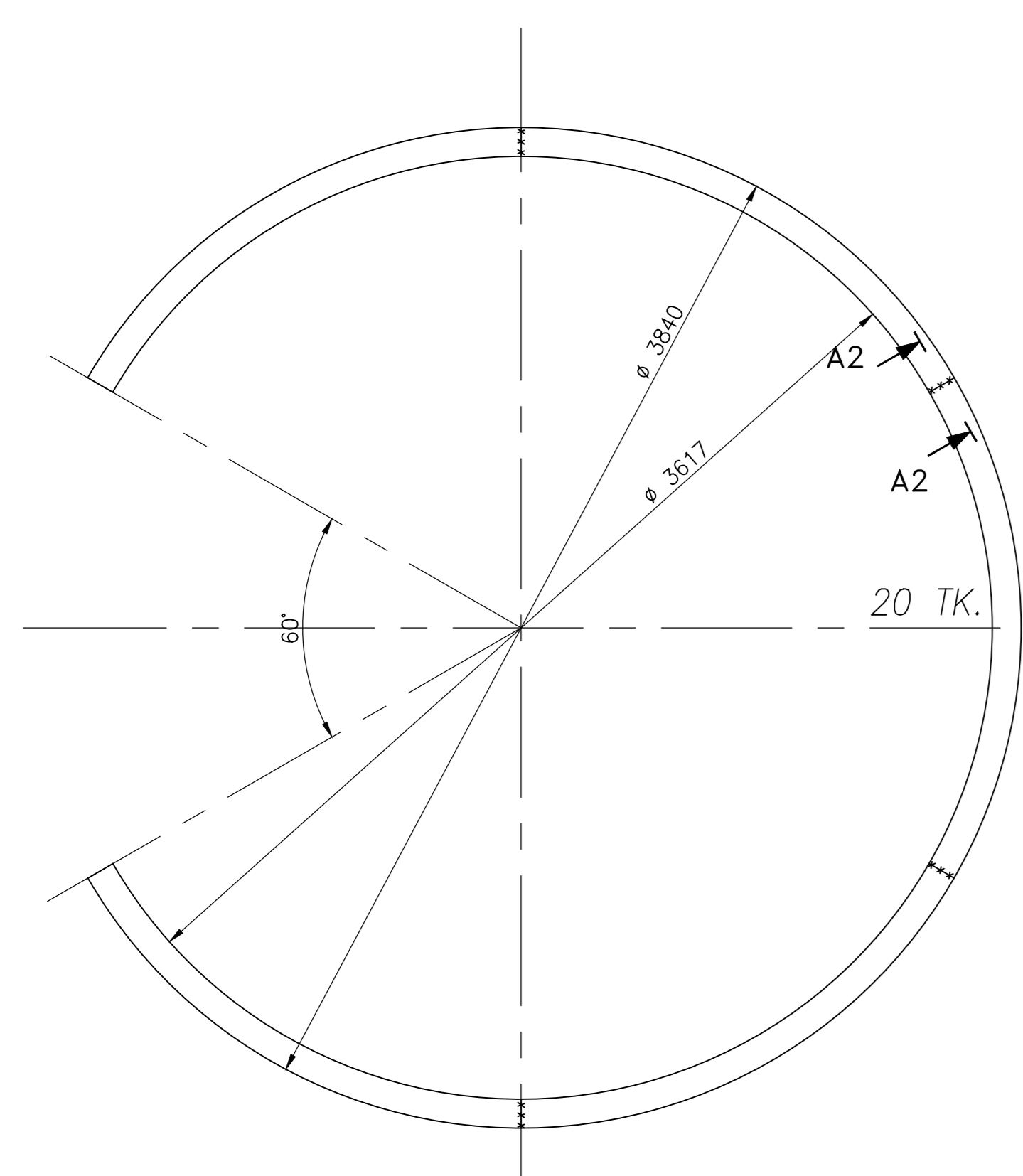
DETAIL OF ITEM 05 & 07

IT. NO.	Z1	Z2	Y	R1	R2	THICKNESS
02	1821	1958	1470	19304	20753	30
03	1819	1955	1470	19277	20725	25

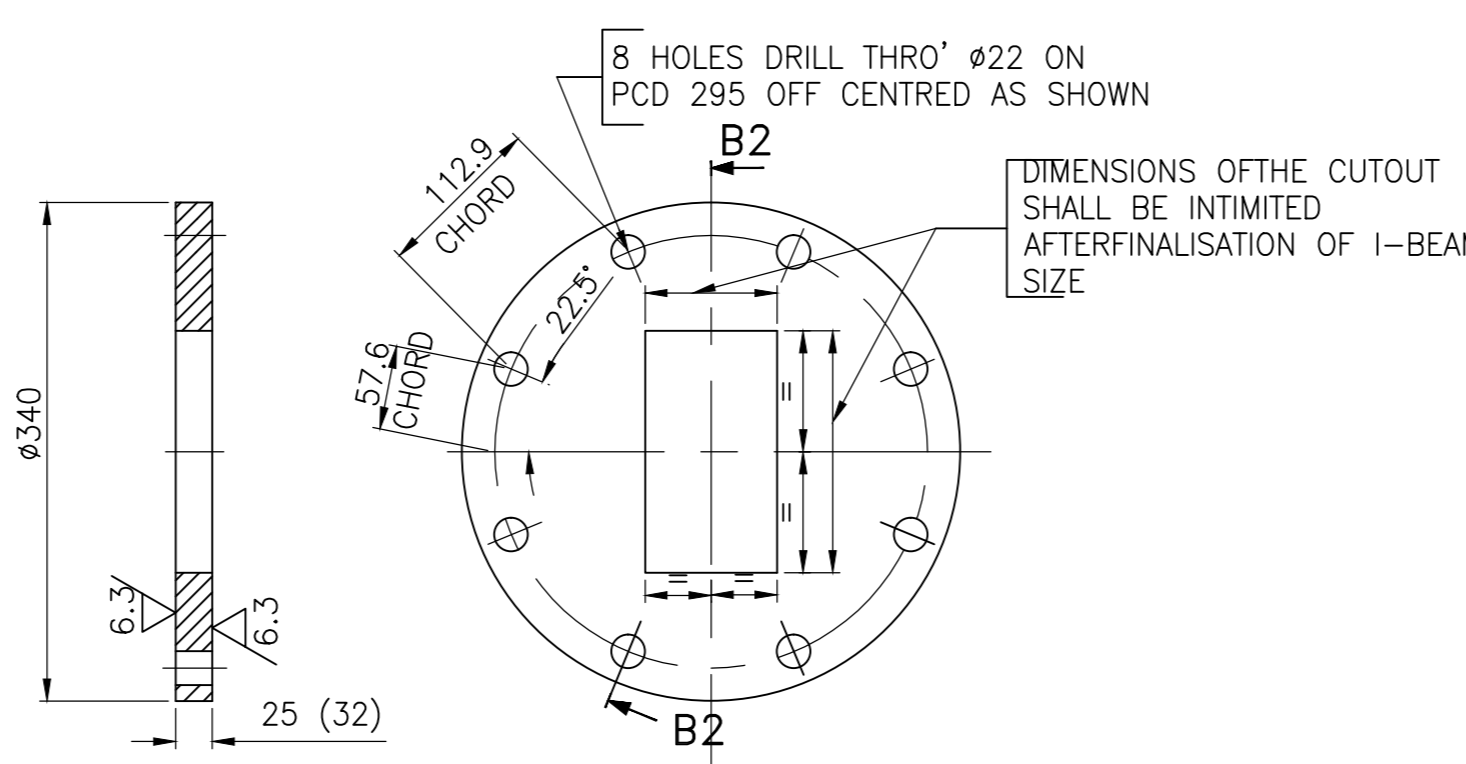
CONE DEVELOPMENT IN SIX PIECES. MAY BE VARIED TO SUIT FABRICATION



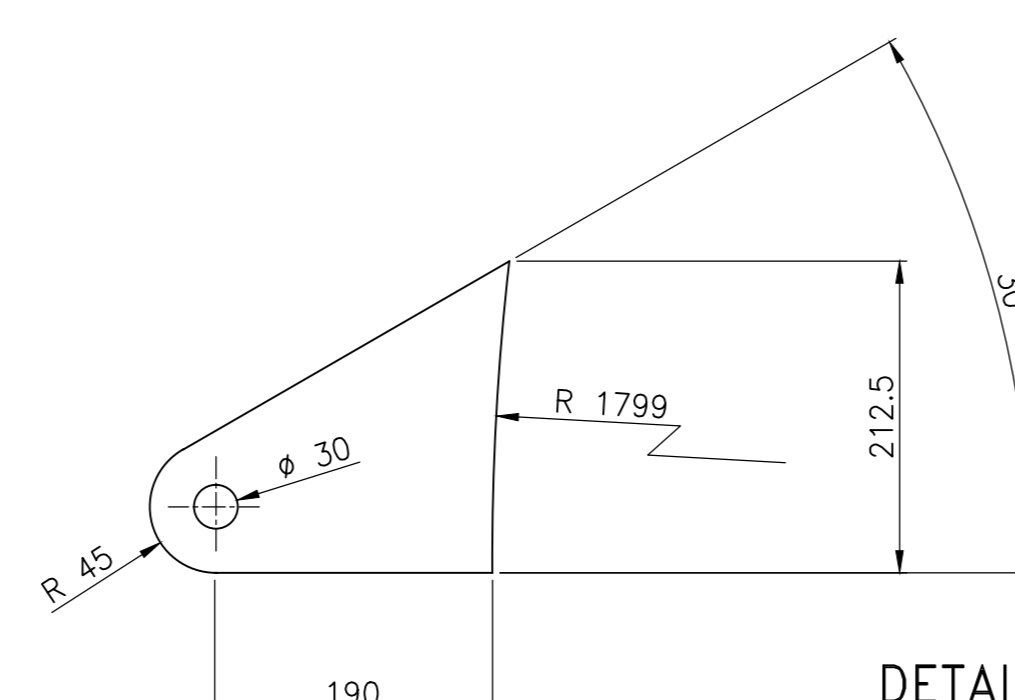
DETAIL OF ITEM 06



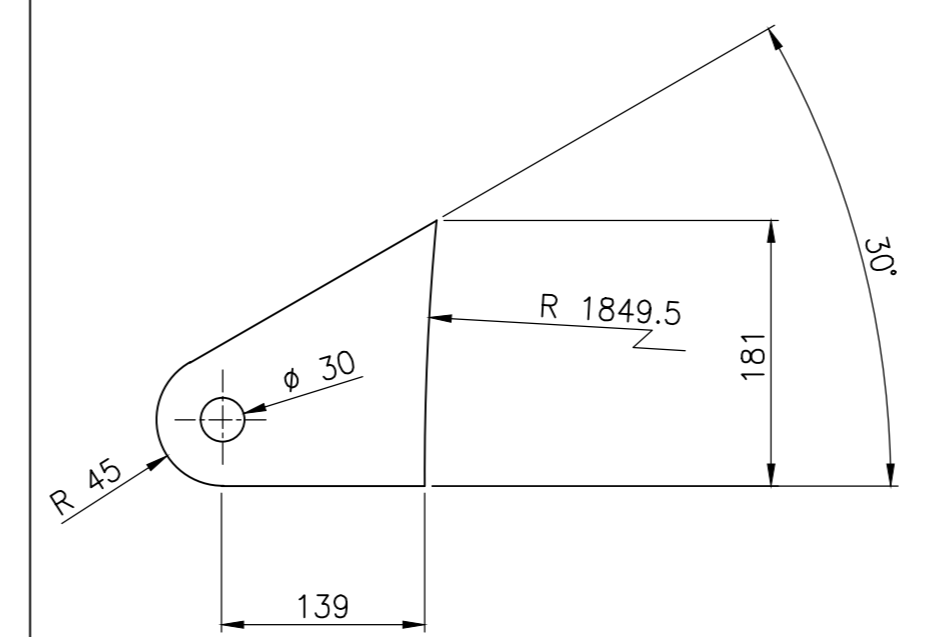
DETAIL OF ITEM 12



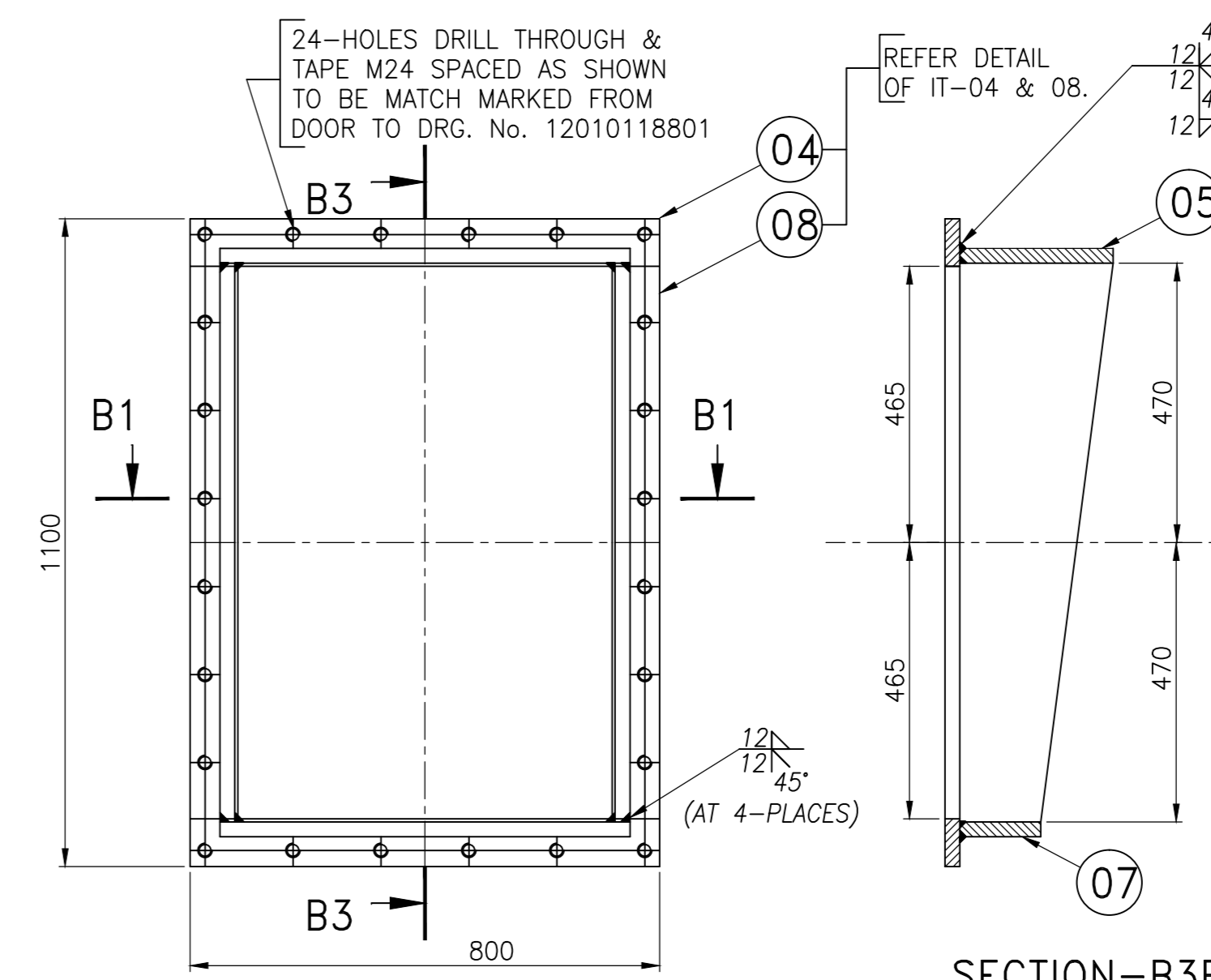
SECTION-B2B2
DETAIL OF FLANGE IT. 21
SCALE-1:2.5



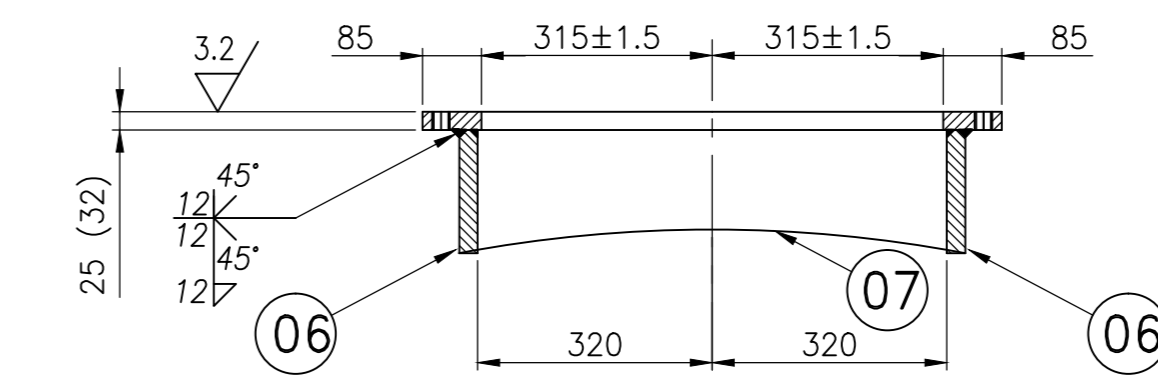
DETAIL OF ITEM 18
SCALE-1:5



DETAIL OF ITEM 19
SCALE-1:5

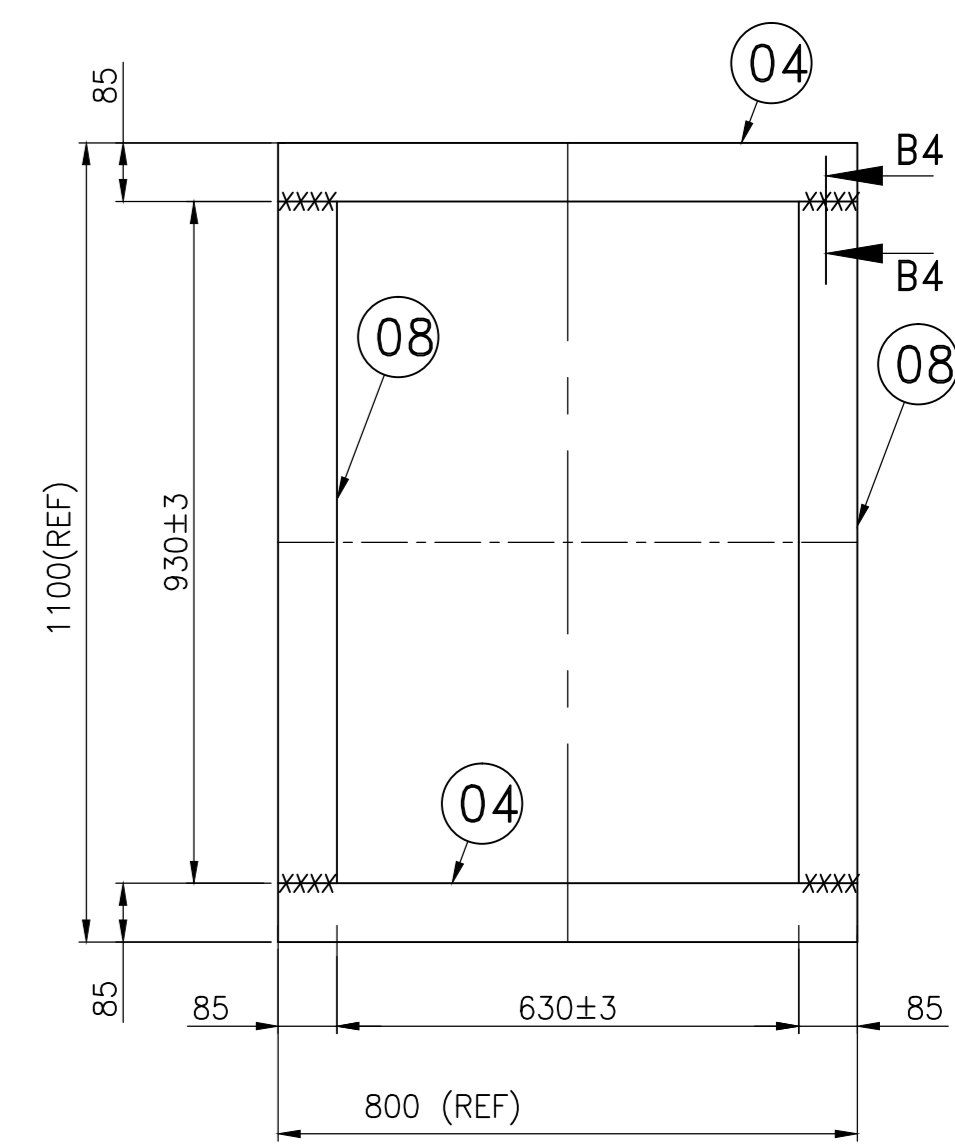


SECTION-B3B3

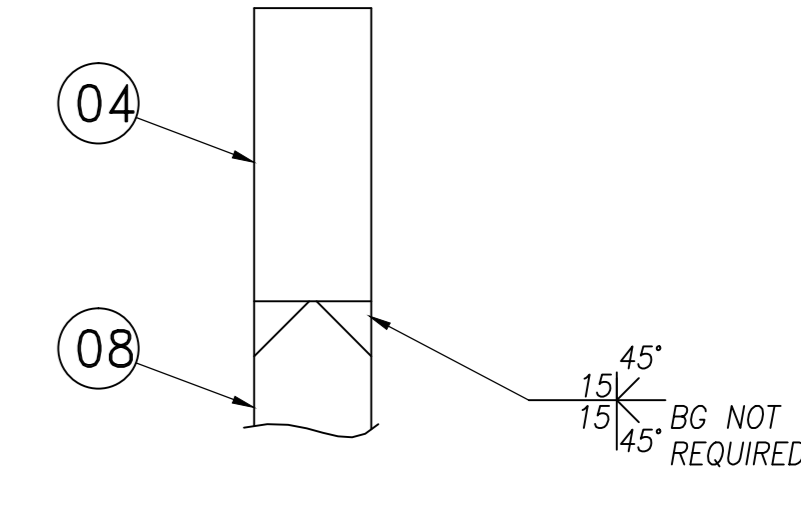


SECTION-B1B1

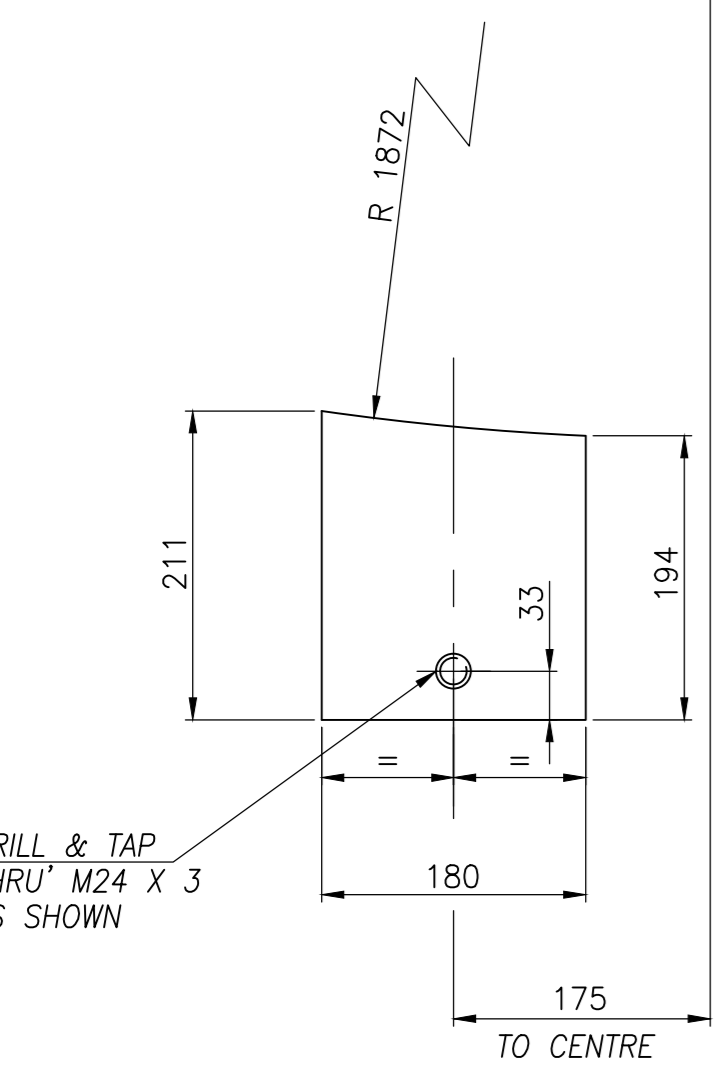
DETAIL OF MAN HOLE DOOR FRAME.



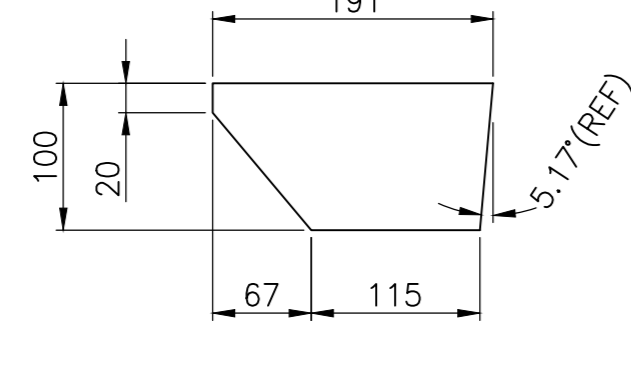
DETAIL OF ITEM 04 & 08



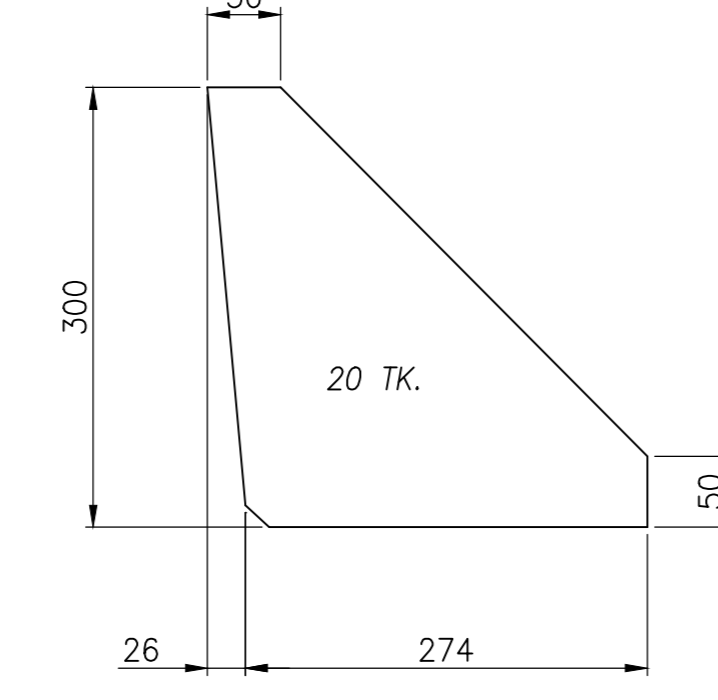
SECTION-B4B4



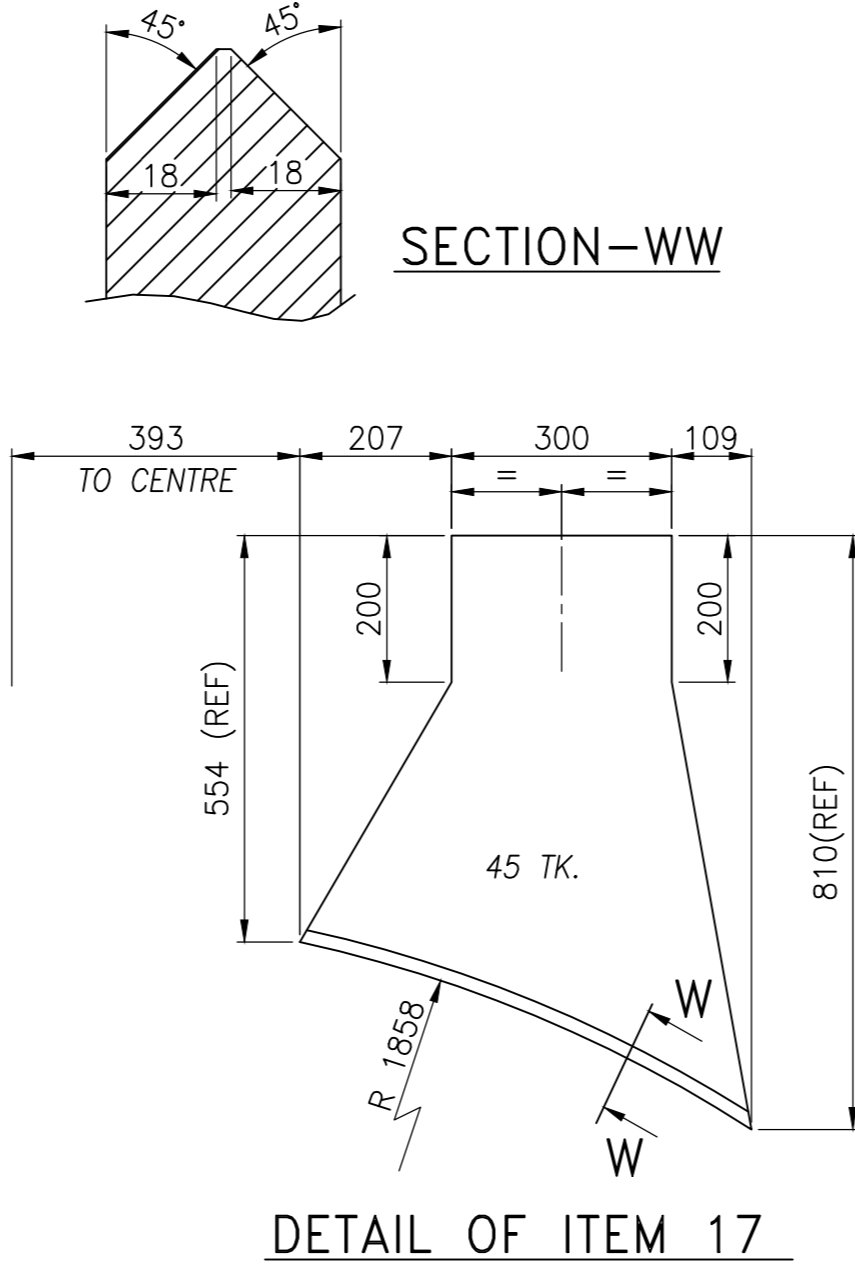
DETAIL OF ITEM 09



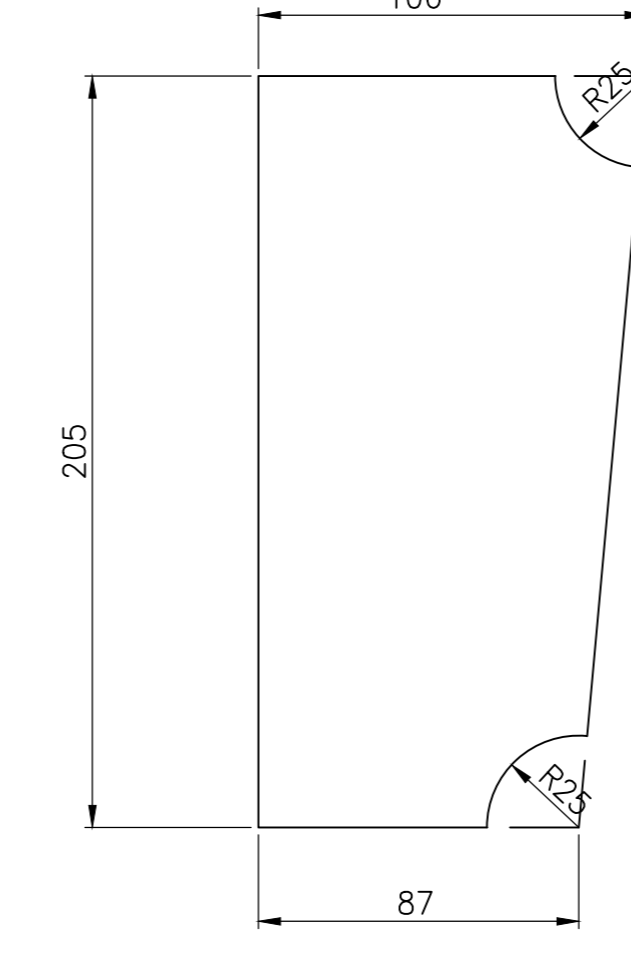
DETAIL OF ITEM 10
SCALE-1:5



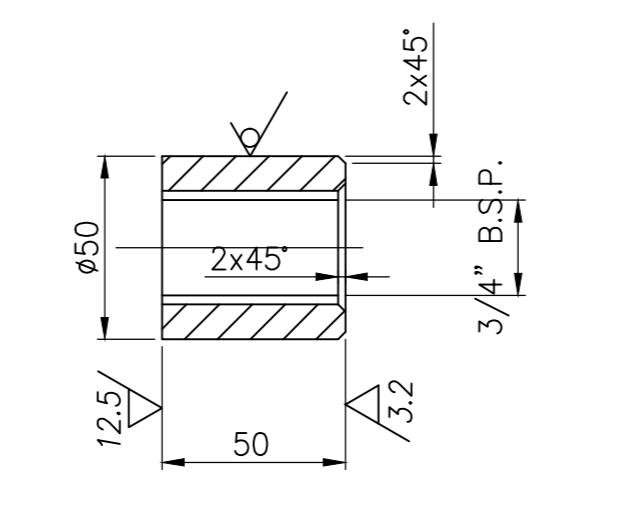
DETAIL OF ITEM 16
SCALE-1:5



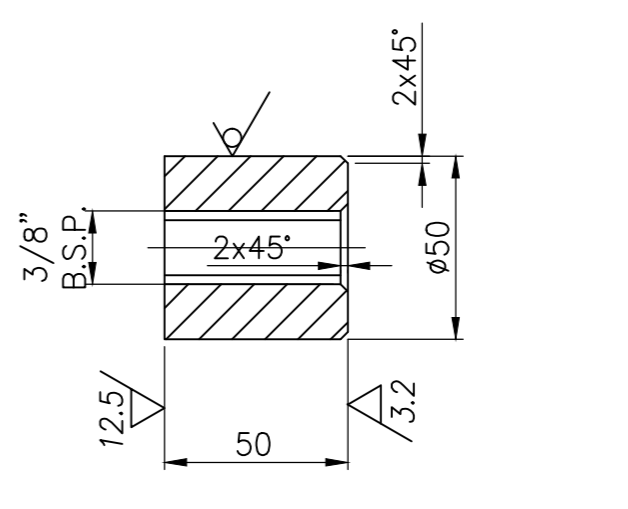
DETAIL OF ITEM 17



DETAIL OF ITEM 23



DETAIL OF TEST COCK BOSS IT. 15
SCALE-1:2



DETAIL OF PRESSURE GAUGE BOSS IT. 22
SCALE-1:2

NO.	REV.	DATE	BY	CHKD.	APPD.	REMARKS
01						
02						
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						

ADDITIONAL INFORMATION
STATUS OF DRAWING U
DISTRIBUTION OF PRINTS
HTE-2, WTM(PL)-1, WTM-4
THX-1, FEM-7

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT
6x170 MW. V. FRANCIS TURBINE
PUNATSANGCHHU-II H.E.P.

NAME
DC DIXIT
A KHARE
A MANDAL

DATE
10/3/13
10/3/13
10/3/13

SCALE
1:10

WEIGHT(K.G.)
32000049014

REF. TO ASSY. DRG.
0 20101 18801

DRAWING NO.
0 20101 18802

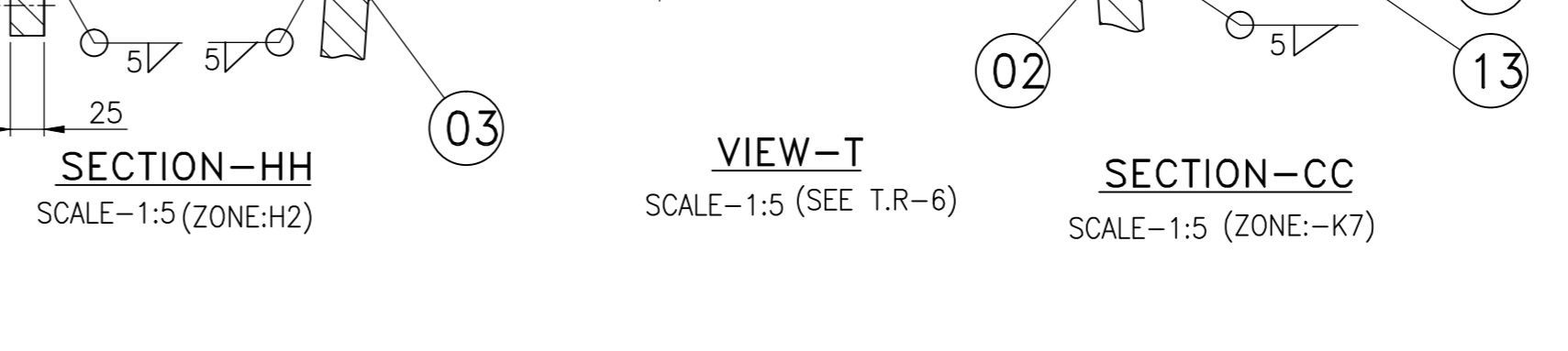
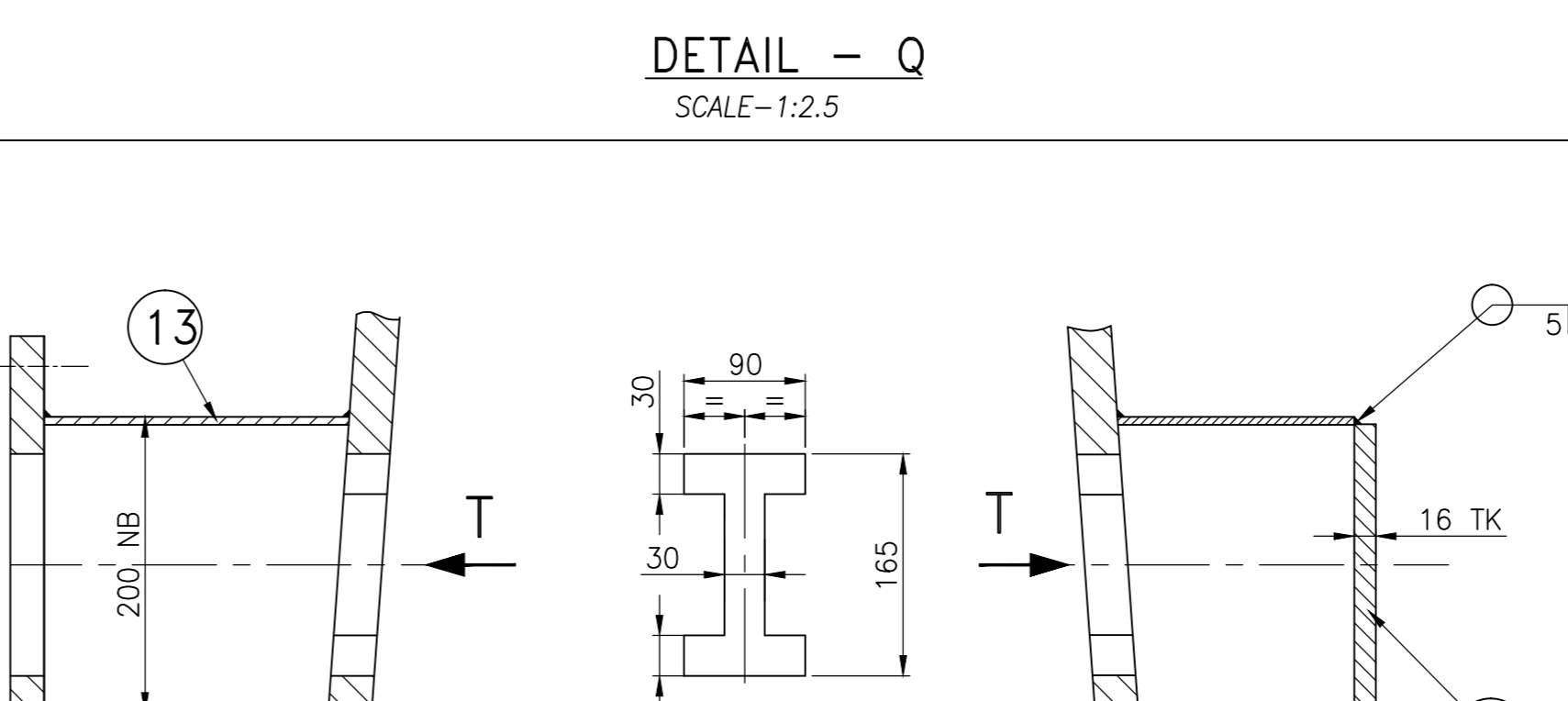
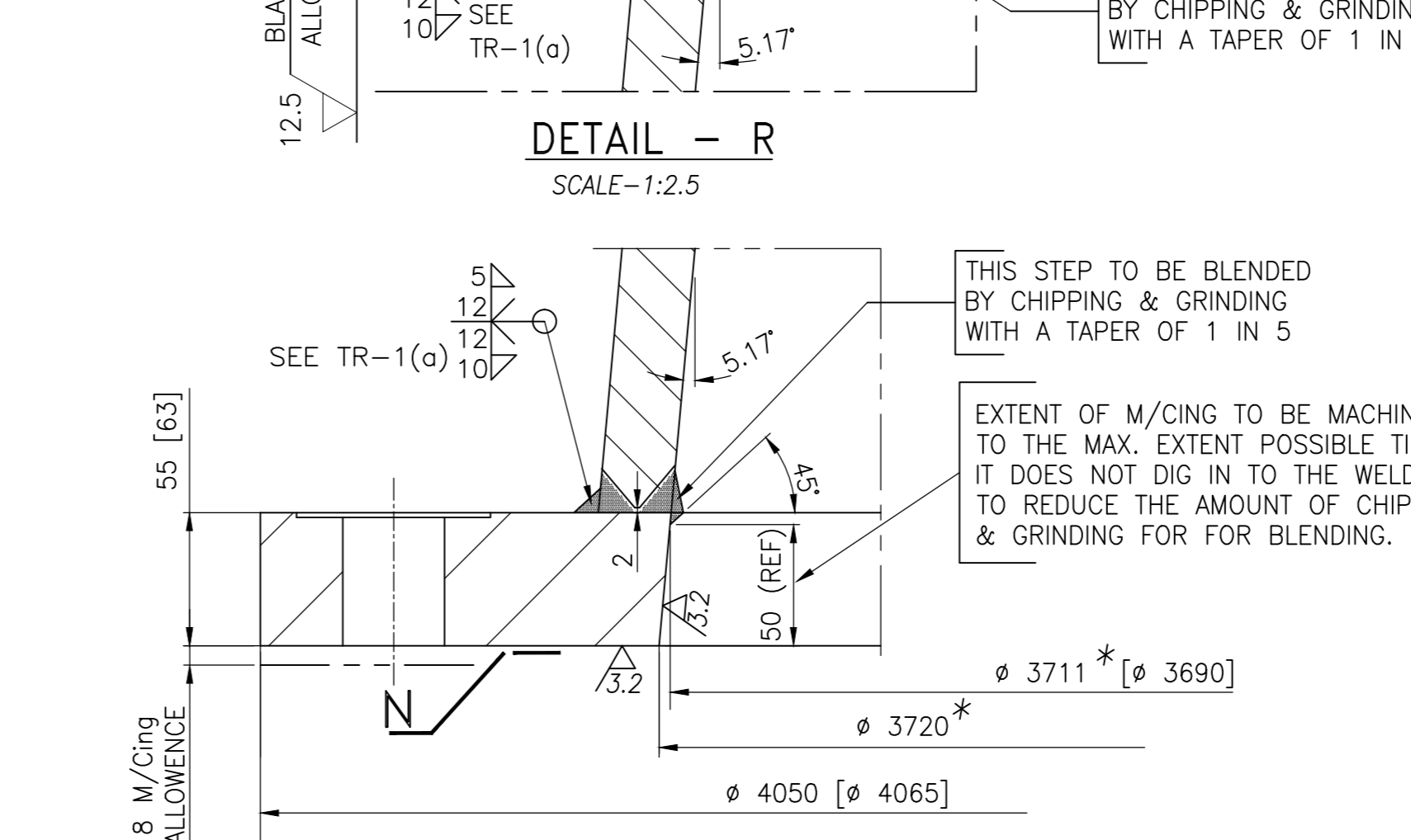
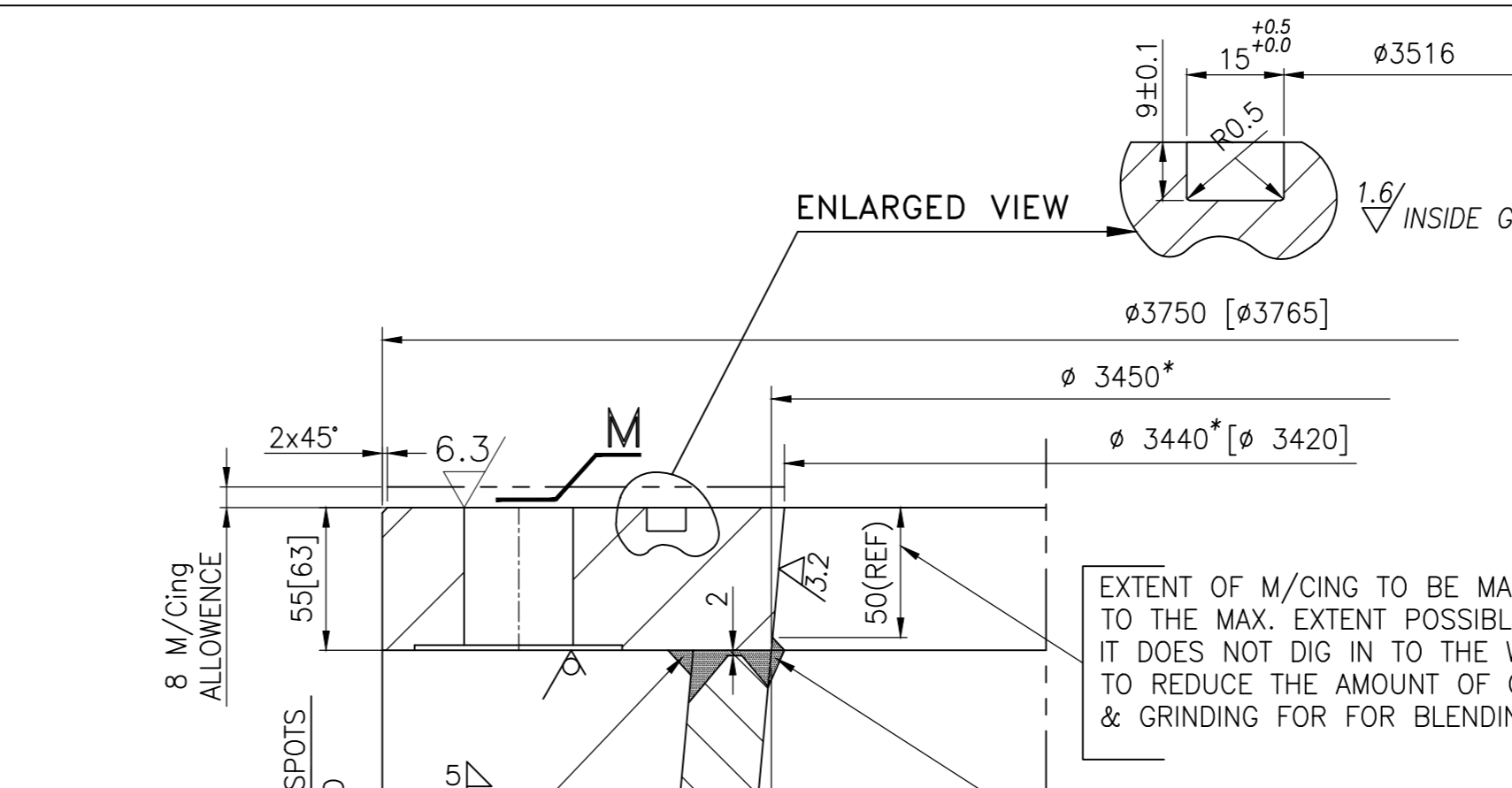
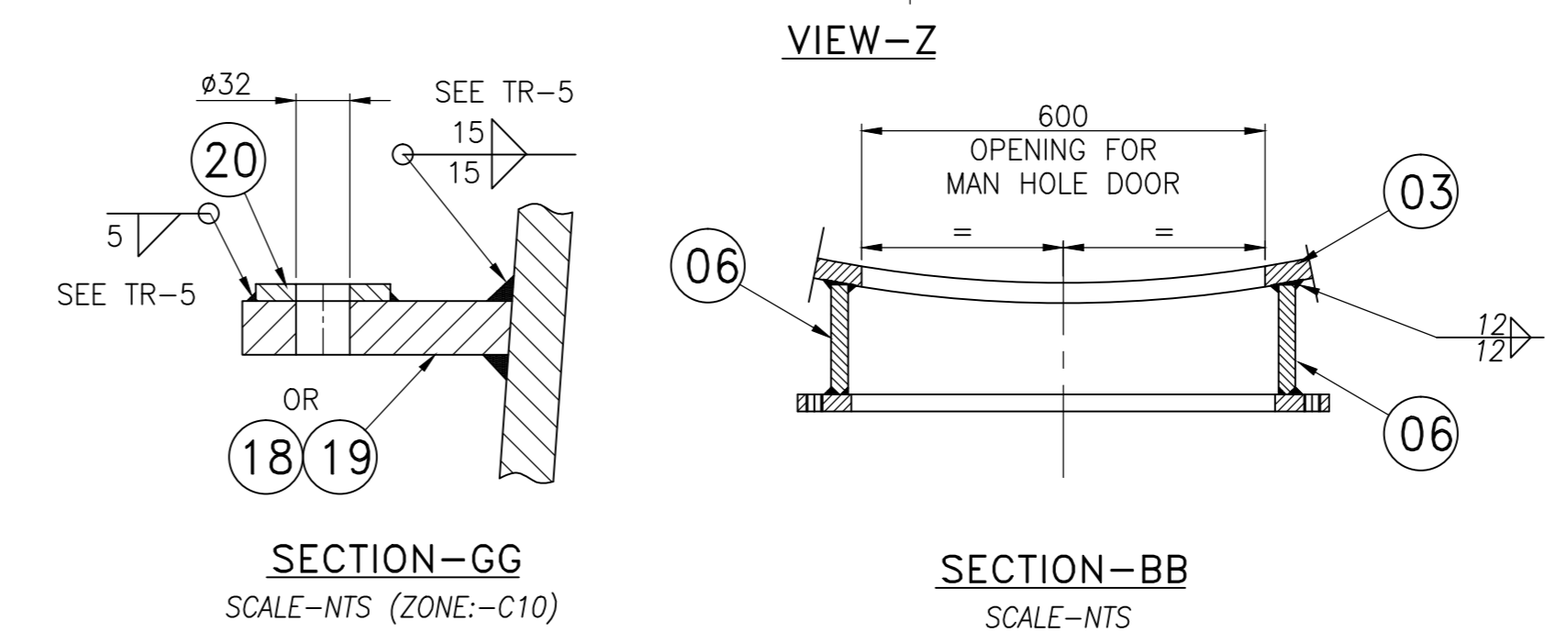
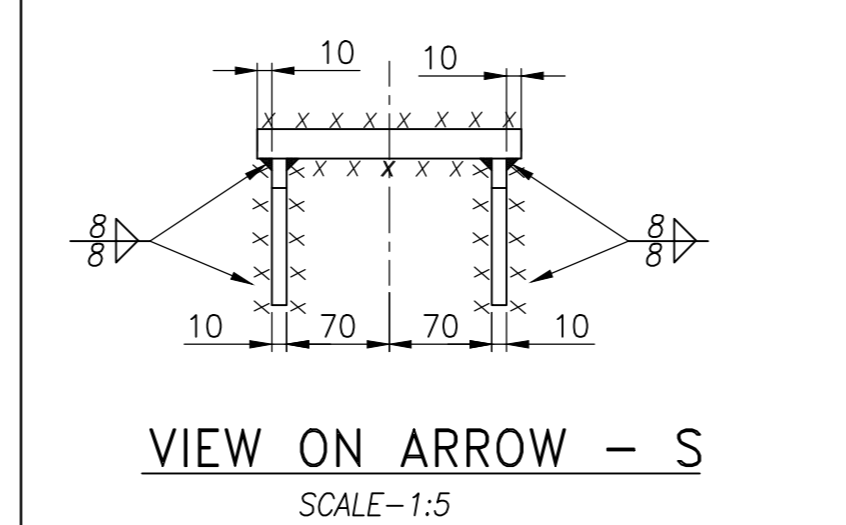
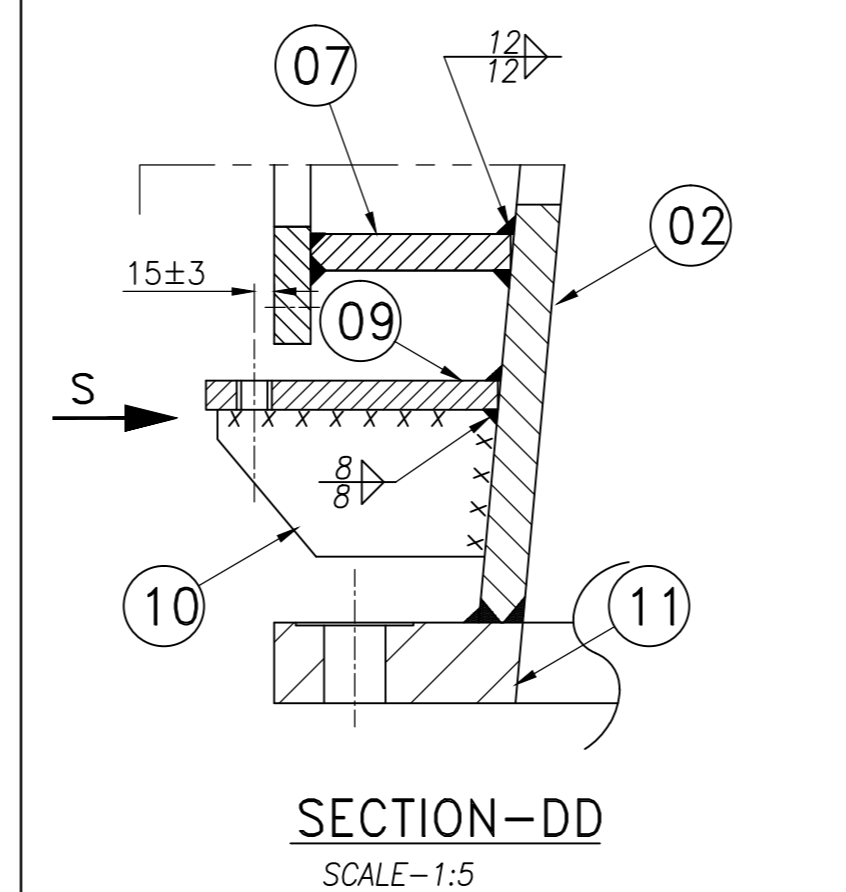
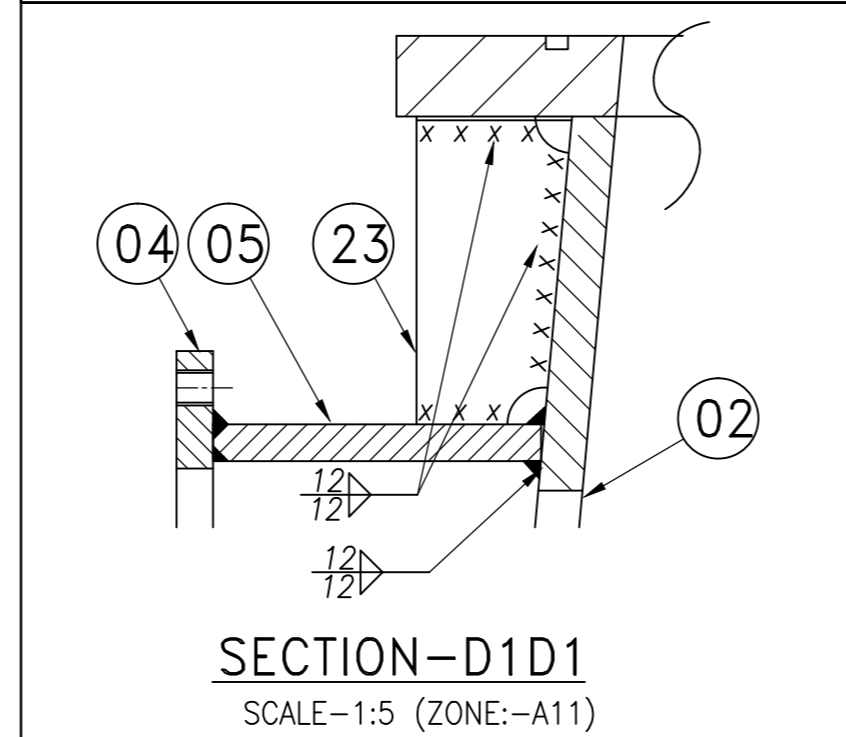
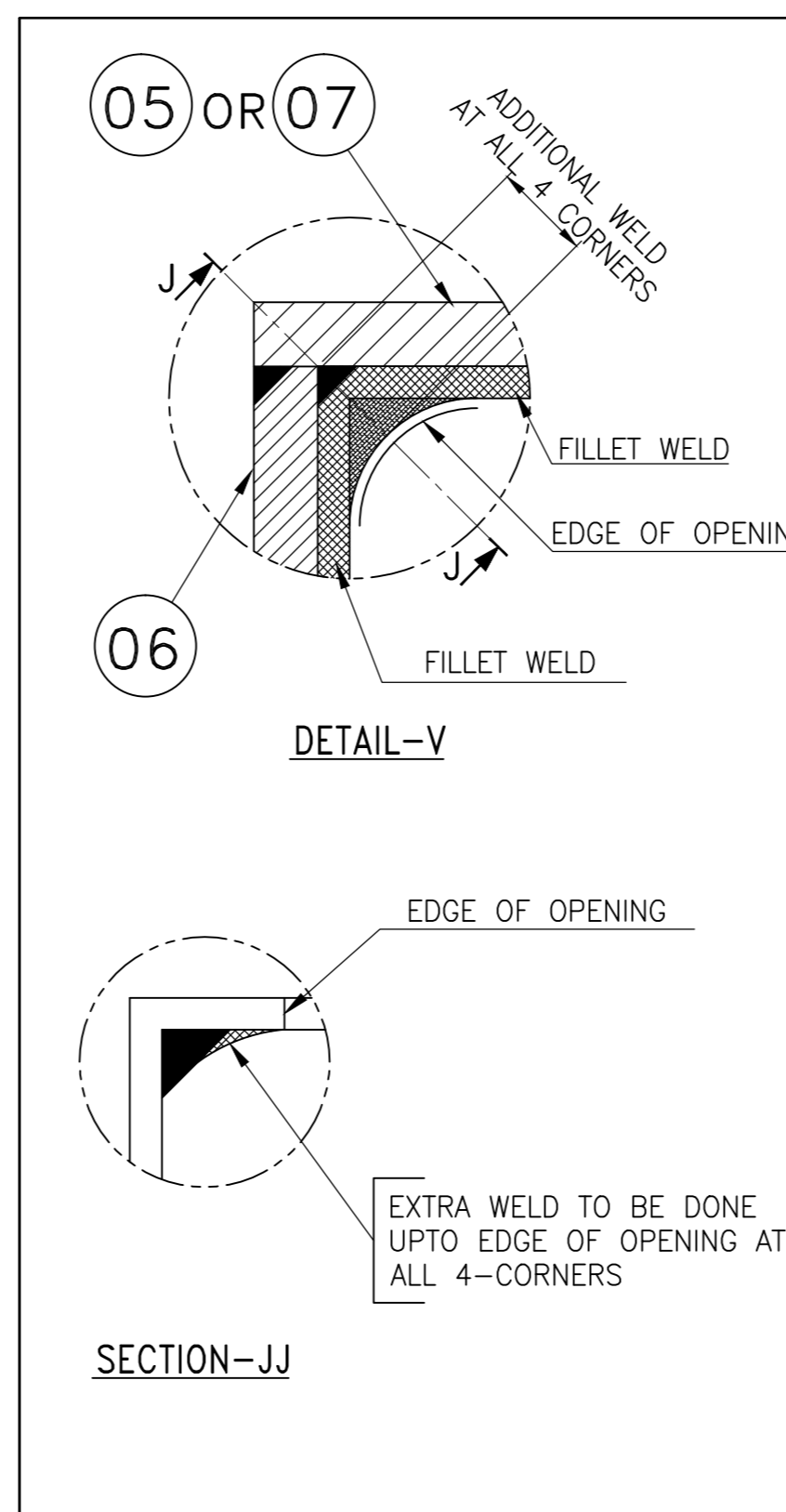
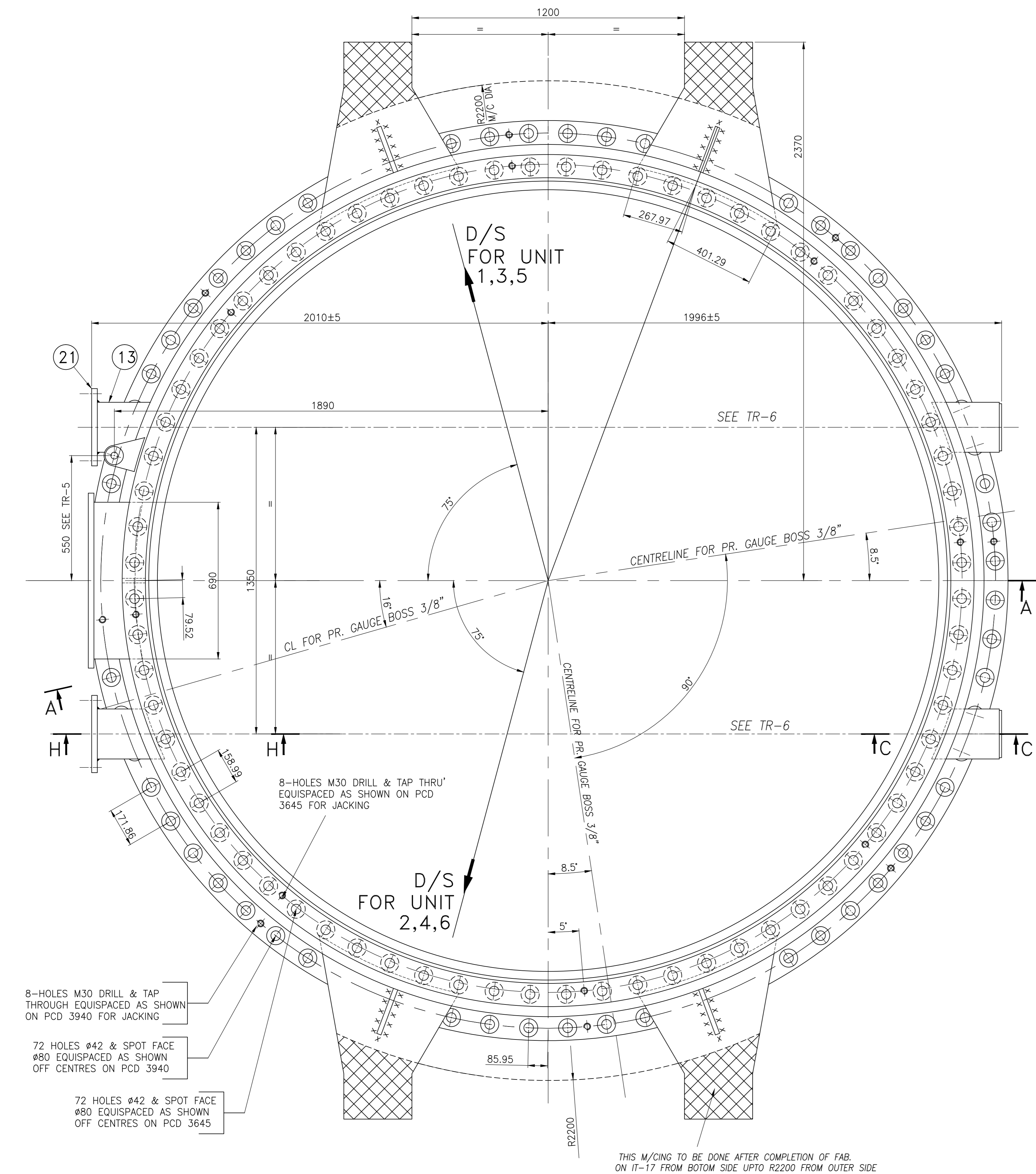
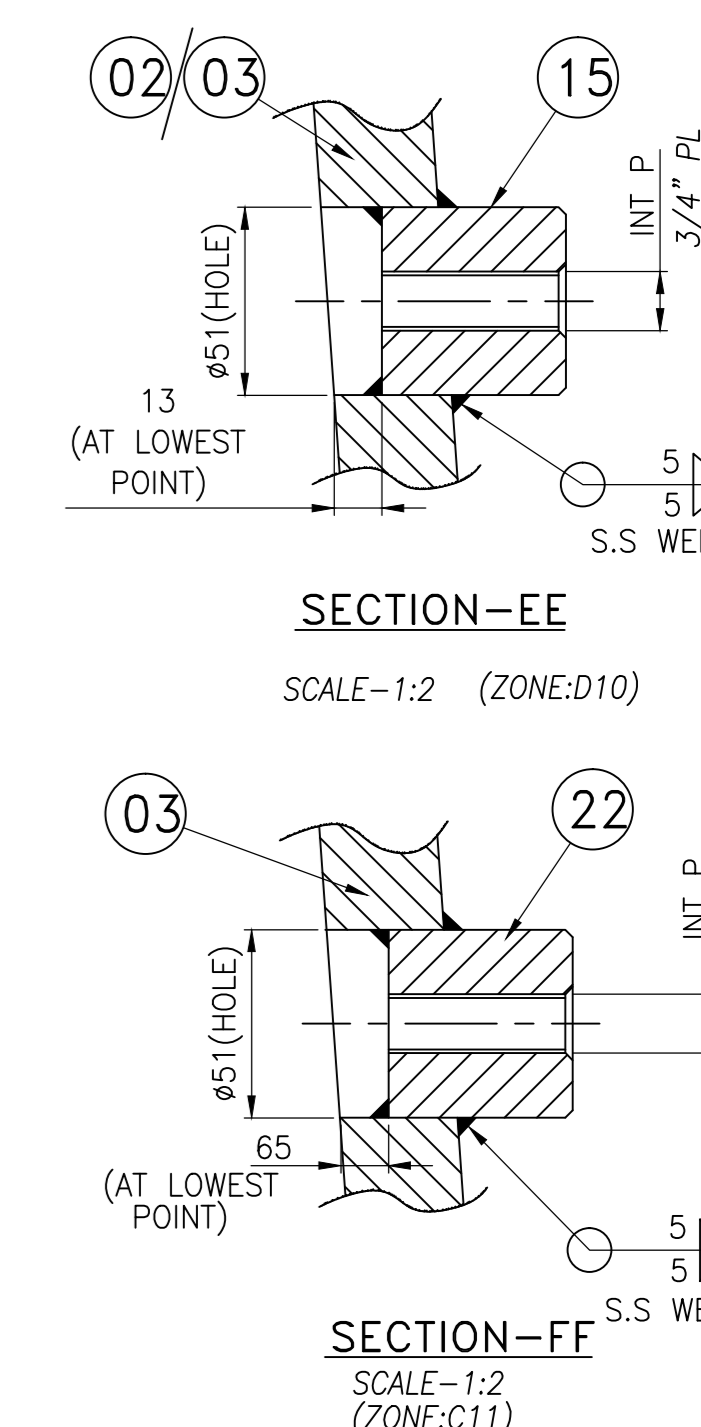
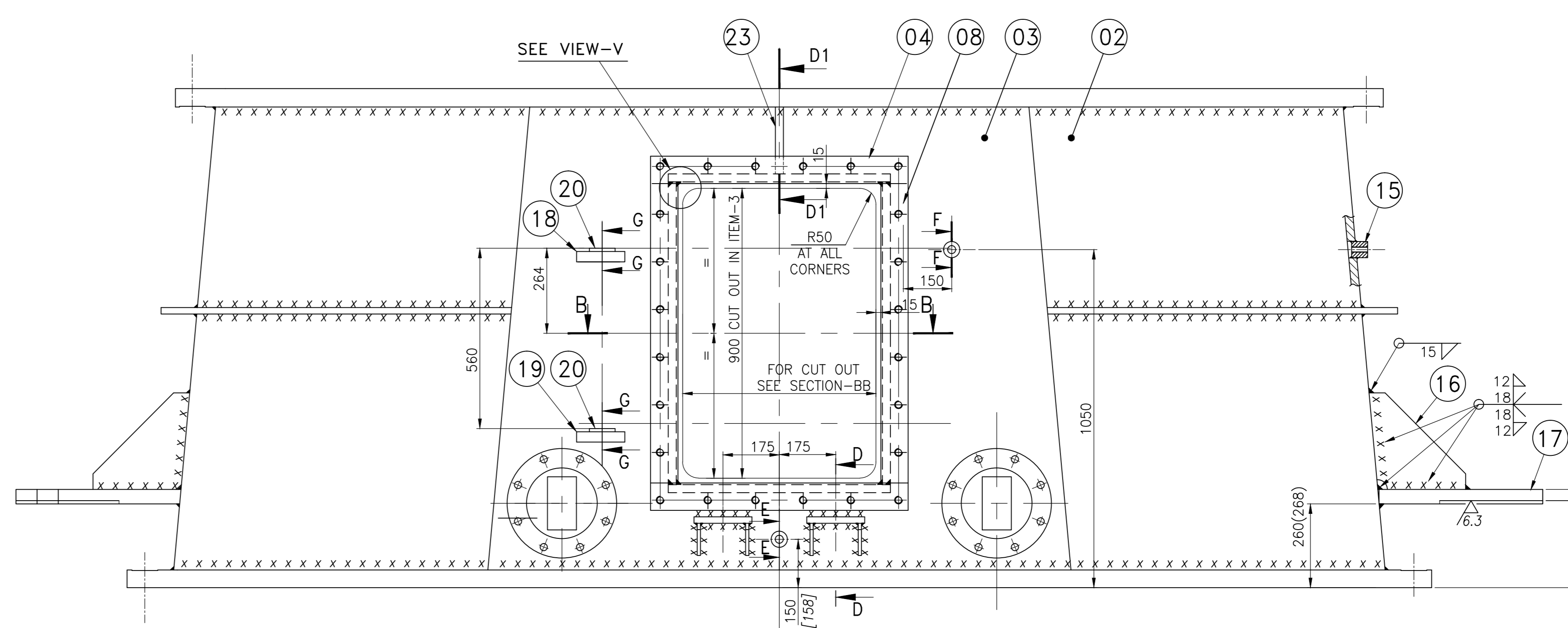
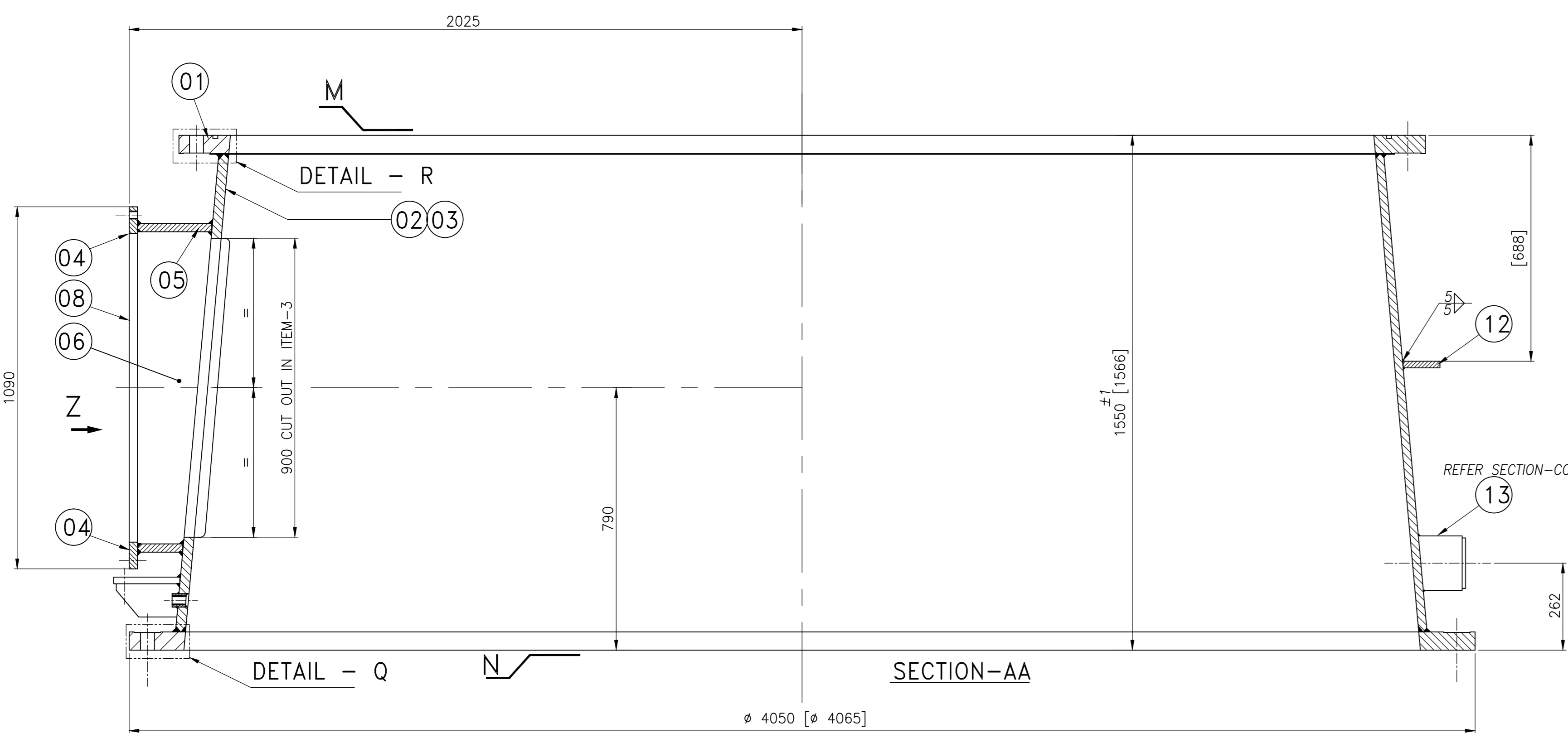
REV. NO.
00

NO. OF SHEETS
2

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REF. DRG. NO. 20881 10102 0 'ON' 980
SHEET NO. 01 OF 02
DATE 10/3/13

2081 1010Z 0'ON 18802



- TECHNICAL REQUIREMENTS**
- WELDING TO BHSL STD. A0622101 AS FOLLOWS.
 - WELD OF IT 01 & 02, 03 AND 02, 03 & 11 SHALL BE AS PER CAT. II WITH DEPTH OF INSPECTION BY U.T. WELD SIZE-5 mm.
 - REST OF WELD TO GRADE III.
 - MANHOLE FRAME ITEM-04 TO 08, & ASSOCIATED ITEMS 09,10 & 15, 18 TO 22 TO BE WELDED AFTER S.R.
 - STRESS RELIEVING TO BE CARRIED OUT AS PER BHSL SPCL. BPO640299 & SUBSEQUENT SHOT BLASTING TO BE CARRIED OUT. S.R. OF MANHOLE FRAME TO BE CARRIED OUT ALONG WITH DOOR DWG NO-1201011881.
 - MANHOLE DOOR OPENING IN CONE (ITEM 03) TO BE CUT-OFF ONLY AFTER PROOF ASSY OF MANHOLE FRAME & SUB ASSY OF ITEMS INDICATED IN THE DWG 1201011881 "MANHOLE DOOR" WITH CONE. THE MANHOLE DOOR OPENING IS TO BE CUT WITH MINIMUM POSSIBLE FLAME CUTTING. THE OFF-CUT FROM CONE (ITEM 03) TO BE USED FOR DOOR. MANHOLE FRAME IS TO BE FINALLY WELDED ONLY AFTER PROOF ASSY AND CUTTING OF MANHOLE OPENING.
 - HINGE PLATES ITEM 18 & 19 AND HINGE LUGS OF DOOR ARE TO BE WELDED AFTER ENSURING PROPER ALIGNMENT BY ASSEMBLY OF ROOF (IT. NO.-50 OF DWG 02010118801) AND CHECKING OF FREE MOVEMENT OF MAN HOLE DOOR.
 - PAIR OF "Y" SHAPED CUTOUTS SHOWN IN VIEW-Q SHALL BE COLLINEAR AS THESE ARE MEANT FOR INSERTION OF SINGLE I-BEAM THROUGH EACH PAIR OF CUTOUTS.
 - RIBS & STIFFENERS CAN BE CUT SUITABLY ON ASSY. IF REQUIRED.
 - DIMENSIONS SHOWN WITHIN () BRACKETS ARE FABRICATED DIMENSIONS.
 - PAINT AND PROTECT WELDS AS PER PROD. STD. HT 00005 AS FOLLOWS-
 - EXTERNAL SURFACES TO CAT. F.
 - SURFACES MARKED "M", "N", AND THREADS TO CAT. G.
 - INTERNAL SURFACES AS FOLLOWS
 - 2-COATS (TOTAL 400 MICRONS) OF HIGH BUILD COAL TAR EPOXY RESIN PAINT (CAT. C).
 - TAPER BORES AT TOP & BOTTOM ENDS AS SHOWN IN DETAIL U & S. SHALL BE MACHINED AND BLENDED WHILE ON VERTICAL BORING MACHINE TO THE MAXIMUM EXTENT POSSIBLE. TILL IT DOES NOT DIG INTO WELD. THIS IS TO REDUCE CHIPPING AND GRINDING.
 - MARKED DIAMETERS AT THE TWO ENDS SHALL BE CONCENTRIC WITHIN 0.5.
 - FACES "M" & "N" SHALL BE PERPENDICULAR TO AXIS WITHIN 0.5.
 - REMOVE ALL BURRS AND SHARP EDGES.
 - ADDITIONAL CHECKS CALLED IN QA PLAN SHALL BE CARRIED OUT.

ITEM NO.	REMARKS	VAR. NO.	ALTERNATED	DATE	ZONE	DESCRIPTION	DRAWING NO.	MATL. CODE	UNIT WT.	NO. OF
23	TOP RIB 25 TK					AA 1011819155		3.7	01	
22	BOSS 3/8"					AA 10119		0.65	03	
32 TK.	21					AISI 304		14.0	02	
10 TK.	20					AA 1011808072		0.4	02	
32 TK.	19					AA 1011808170		4.3	01	
32 TK.	18					AA 1011808170		6.5	01	
45 TK.	17					AA 1011808200		85.0	04	
20 TK.	16					AA 1011808137		8.0	04	
16 TK.	15					AA 10108		0.55	03	
16 TK.	14					AA 1011808110		4.3	02	
20 TK.	13					AA 10455		12.5	04	
20 TK.	12					AA 1011808137		171.0	01	
63 TK.	11					AA 10108		1130.0	01	
10 TK. TRIM TO SUIT	10					AA 1011808072		1.3	04	
20 TK.	09					AA 1011808137		5.5	02	
32 TK.	08					AA 1011819171		16.0	02	
25 TK.	07					AA 1011819155		20.0	01	
25 TK.	06					AA 10119		39.0	02	
25 TK.	05					AA 10119		32.0	01	
32 TK.	04					AA 1011819171		16.0	02	
02	03					AA 10119		655.0	01	
02	02					AA 10119		545.0	05	
63 TK.	01					AA 10119		864.0	01	

VAR. NO.	REMARKS	VAR. NO.	ALTERNATED	DATE	ZONE	DESCRIPTION	DRAWING NO.	MATL. CODE	UNIT WT.	NO. OF
28	CARD TYPE-3									
28	CARD TYPE-1									

ADDITIONAL INFORMATION: FAB WT. = 6340.0 kg

STATUS OF DRAWING: U

DISTRIBUTION OF PRINTS: HFE-2, WTM(P)-1, WTM-4, THX-1, FEM-7

DEPT. CODE: 402

UNIT. DMS. GR. NO. 20101 18801

SCALE: 1:10

WEIGHT(K.G.) 5750.0

REF. TO ASSY. DRG. 0 20101 18801

ITEM NO. 22

TITLE: LOWER D.T. CONE

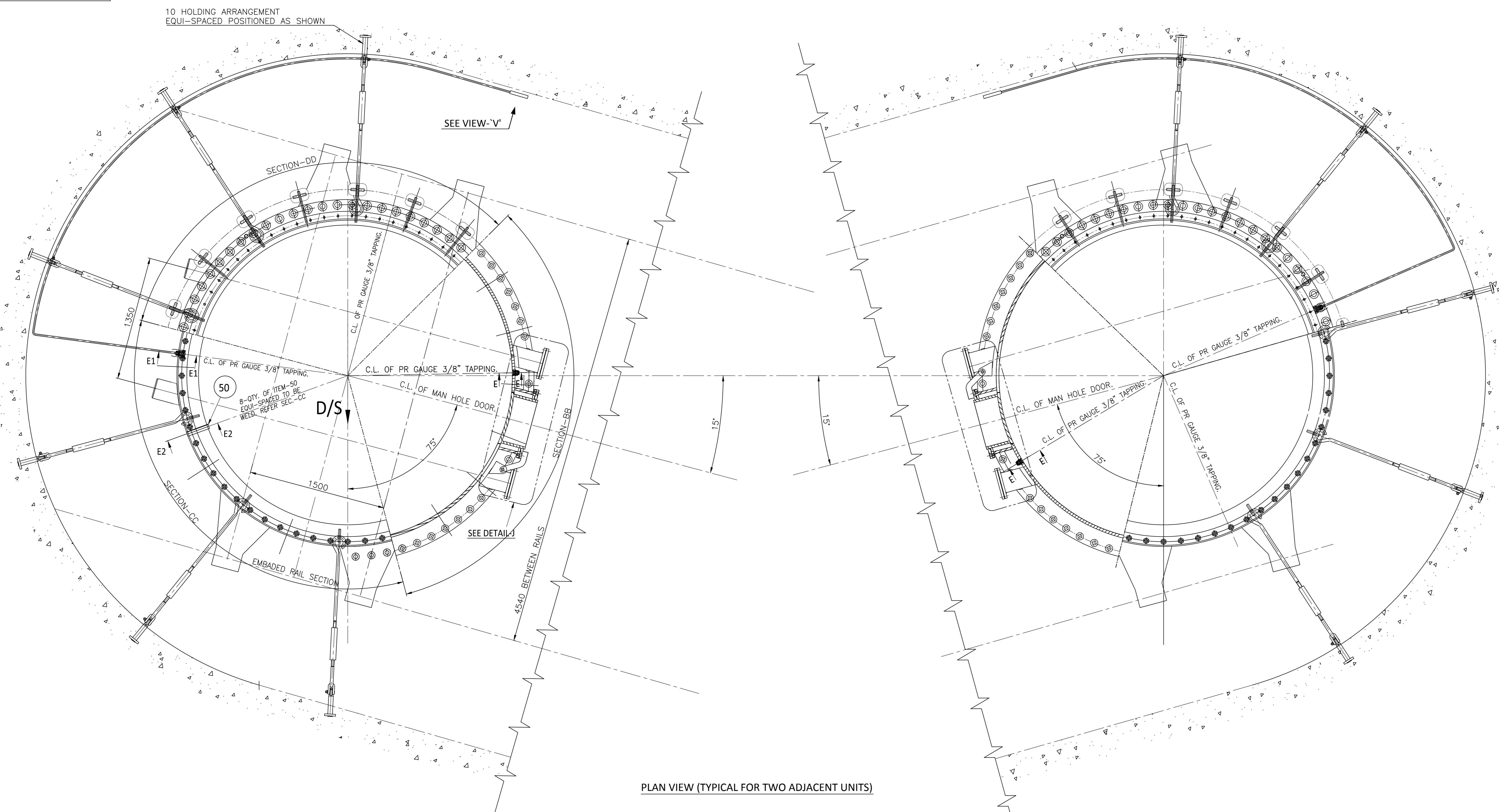
DRAWING NO. 0 20101 18802

SHT. NO. 1

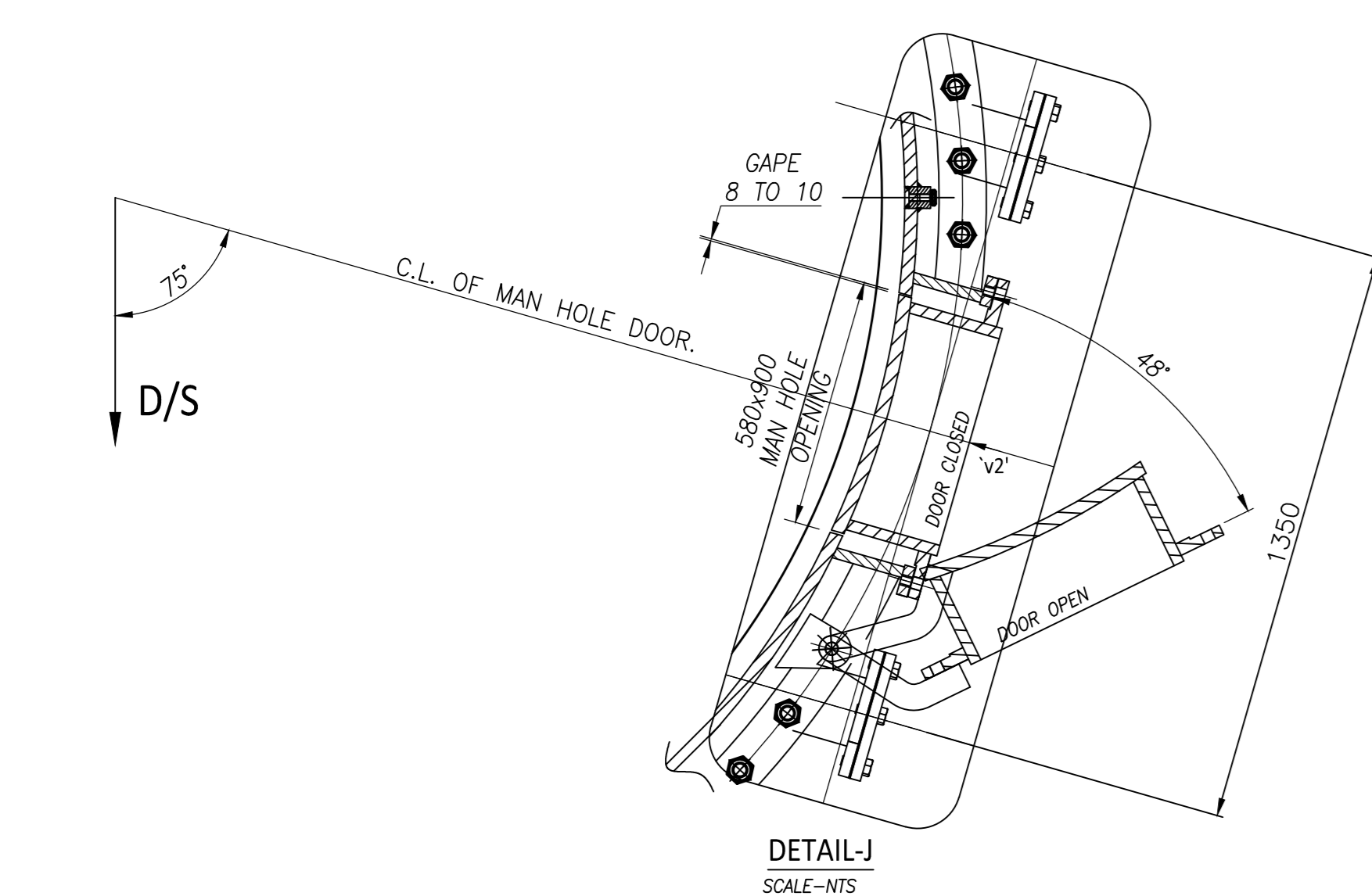
NO. OF SHT. 2

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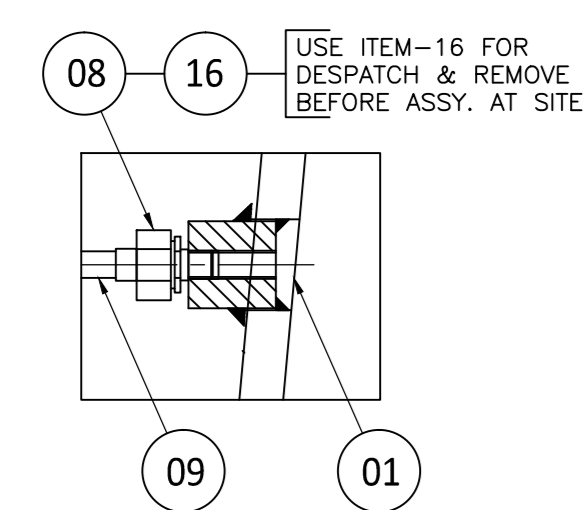
1088T 1020Z 0 'ON 1940



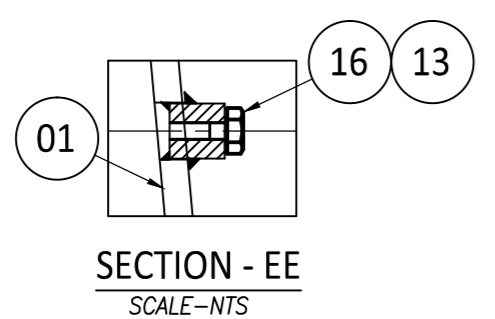
PLAN VIEW (TYPICAL FOR TWO ADJACENT UNITS)



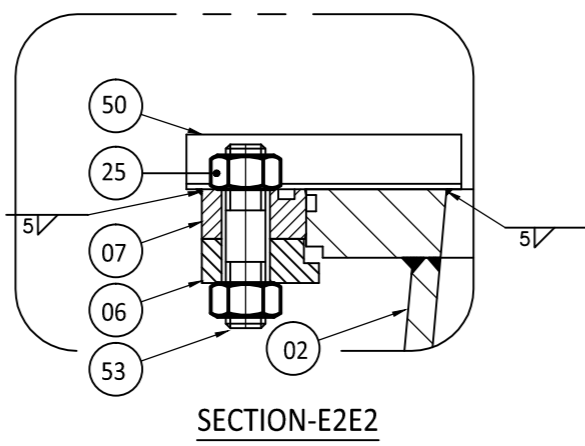
DETAIL-J
SCALE-NIS



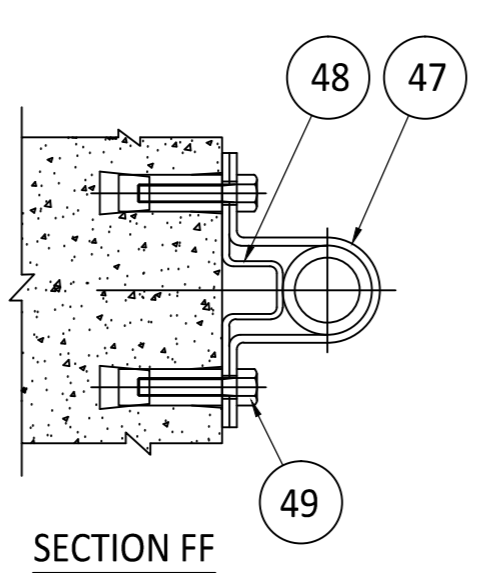
SECTION - E1E1
SCALE-NIS



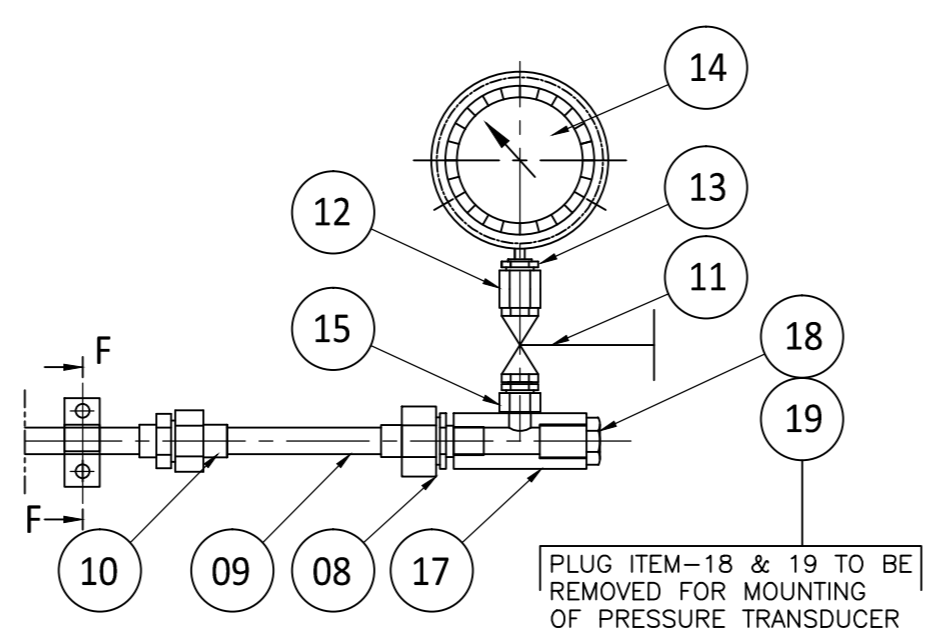
SECTION - EE
SCALE-NIS



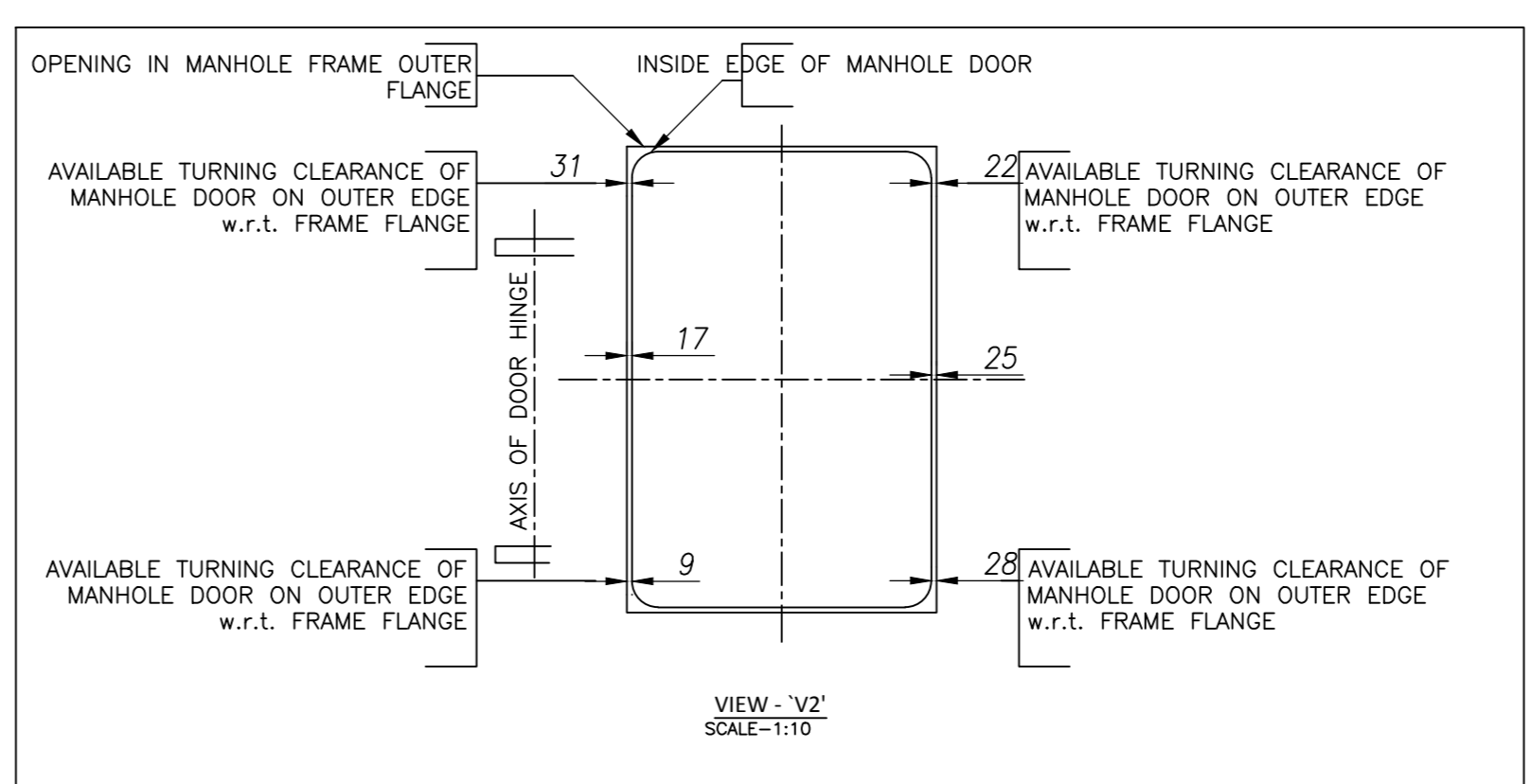
SECTION-E2E2
(SCALE-NIS)
(FOR TRANSPORTATION)



SECTION FF
SCALE-NIS



VIEW-V
SCALE-NIS



VIEW-V2
SCALE-1/16

TECHNICAL REQUIREMENTS :-

- STEPS IF ANY, DUE TO MISALIGNMENT OF BUTTING EDGES TO BE BLENDED BY WELDING & GRINDING.
- ALL WELDS IN WATER PATH TO BE GROUND FLUSH / BLENDED.
- WELDING TO BE AS PER BHSL STD. AA 0622101.
- DOWELLING MENTIONED IN DETAIL H IN SHT.1 IS TO BE DONE AFTER ASSEMBLY.
- CENTRALISE ID OF DISMANTLING RING IT.07 W.R.T. OD OF MIDDLE CONE IT.2 BEFORE DOWELLING IT TO UPPER CYLINDER IT.4. THE RADIAL GAP SHOULD NOT EXCEED 0.6 mm.
- BEFORE ASSEMBLY OF I-BEAMS, OPEN VALVE IT.22 TO ENSURE THAT THERE IS NO WATER ABOVE THAT LEVEL.
- FOR WELDING AT SITE, REFER TABLE FOR TYPE OF WELDING ELECTRODES TO BE USED ACCORDING TO THE MATERIAL OF ITEMS BEING WELDED.

TABLE FOR WELDING ELECTRODES

SL. NO.	WELDING BETWEEN	MATERIAL 1	MATERIAL 2	TYPE OF ELECTRODE
1.	ASTM 516 Gr.70 / M.S.	ASTM 516 Gr.70 / M.S.	ASTM 516 Gr.70 / M.S.	AWS E-7018
2.	ASTM240 Gr.415 / S.S.	ASTM240 Gr.415 / S.S.	ASTM240 Gr.415 / S.S.	AWS E-308L
3.	ASTM 516 Gr.70 / M.S.	ASTM240 Gr.415 / S.S.	ASTM240 Gr.415 / S.S.	AWS E-309L

ITEM NO.	DESCRIPTION	QTY	UNIT	MATERIAL	REMARKS	REV.
053	COUPLING STUD M36	4	20101 18801	03	M.S.	1.2
052	RUBBER CORD				AA 5984407132	3.2
051	SPLIT PIN				AA7171089240	0.03
050	DOOR HING ROD	4	20101 18807		S.S.	4.20
049	RAWL BOLT M6				BP9013001181	0.10
048	PIPE SUPPORT	4	20101 14107		WT STOCK	0.10
047	PIPE CLIP	4	20101 14106		MS	0.20
046	RUBBER CORD				AA 5984407124	9.0
045	STRIP				BP1011715996	0.03
044	DOWEL	4	20101 18806		MS	0.12
043	STAY M30 RH	4	20101 18805		SS	8.30
042	TURN BUCKLE	3	23029 49022		MS	11.5
041	DEE SHACKLE 3.2T				AA7248105066	2.60
040	EYE BOLT M24				AA7248101052	1.14
039	ANCHOR ROD	3	20208 17802		MS	6.70
038	JACKING SCREW	3	20301 15218		H.T.S.	4.50
037	LOCK NUT SPECIAL	3	20301 15219		S.S.	1.20
036	BOSS	3	20301 15217		S.S.	3.40
035	HEX SS BOLT	4	20101 18601	002	M.S.	4.40
034	HEX SS BOLT	4	20101 18601	001	S.S.	0.30
033	BLANK FLANGE	4	20101 18606		MS	17.0
032	HEX NUT M20 SS				BP9013532446	0.06
031	HEX SS BOLT	4	20101 18601	003	WT STOCK	0.26
030	CAF JOINTING SHEET				AA2151703053	0.30
029	HEX SCREW SS M24	4	20101 18804	01	AA21503	0.4
028	JACKING SCREW SS M24	4	20101 18803	02	S.S.	0.5
027	JACKING SCREW M30	4	20101 18803	01	S.S.	0.9
026	COUPLING STUD M36	4	20101 18801	02	S.S.	1.8
025	HEX NUT M36	4	20101 18802		S.S.	0.3
024	COUPLING STUD M36	4	20101 18801	01	S.S.	1.6
023	ADAPTOR PIPE 3/4" BSP	4	20101 18805			0.60
022	GLOBE VALVE 20NB				BP9053500774	2.0
021	COPPER WASHER 3/4"				BP9023531515	0.01
020	HEX. STEEL PLUG				BP7242399041	0.01
019	COPPER WASHER 1/2"				BP9023531507	0.01
018	HEX BRASS PLUG				BP7242399041	0.05
017	ADAPTOR 3-WAY	4	20101 14108			0.04
016	HEX BRASS PLUG				BP7242399033	0.03
015	ADAPTOR EXT 3/8" BSP				BP9023531744	0.04
014	PRESSURE GAUGE.	3			WT STOCK	0.02
013	CU. WASHER				BP9023531493	0.01
012	DAMPER FOR PRESSURE GAUGE	3			WT STOCK	0.050
011	3/8" BSP VALVE FOR PRESSURE GAUGE	3			BP9053533010	1.80
010	STRAIGHT COUPLING				WT STOCK	0.30
009	10NB SEAMLESS CS PIPE	2			WT STOCK	11
008	MALE STUD COUPLING	3			AA10455	0.30
007	DISMANTLING RING	2	20101 18801		BP9023530942	408
006	CLAMPING RING (IN HALVES)	3	20101 18801		ASTM A 516 Gr.70	315
005	MANHOLE DOOR 25 TK	1	20101 18804		ASTM A 516 Gr.70	396
004	UPPER CYLINDER 25 TK	1	20101 18803		ASTM A 516 Gr.70	Kg XXXX
003	TOP DT CONE (SS) 25 TK	1	20101 18801		ASTM A 516 Gr.70	Kg 3100
002	MIDDLE DT CONE 25 TK	1	20101 18802		ASTM A 516 Gr.70	Kg 3650
001	LOWER DT CONE 25TK	0	20101 18802		ASTM A 516 Gr.70	Kg 5750

ADDITIONAL INFORMATION: W.P. NO. - 3200192202 TO 3200482022

STATUS OF DRAWING: U

DISTRIBUTION OF PRINTS: HTE-2 THX-1 WTM-5

PROJECT: 6X170MW PUNATSANGCHHU-II HEP

CUSTOMER: PHPA-II, BHUTAN

CONSULTANTS: WAPCOS LIMITED, GURGAON

CENTRAL ELECTRICITY AUTHORITY, NEW DELHI

CONTRACTOR: BHARAT HEAVY ELECTRICALS LTD. BHOPAL

SCALE: 1:20 & AS STATED

WEIGHT (KG): 15145.0

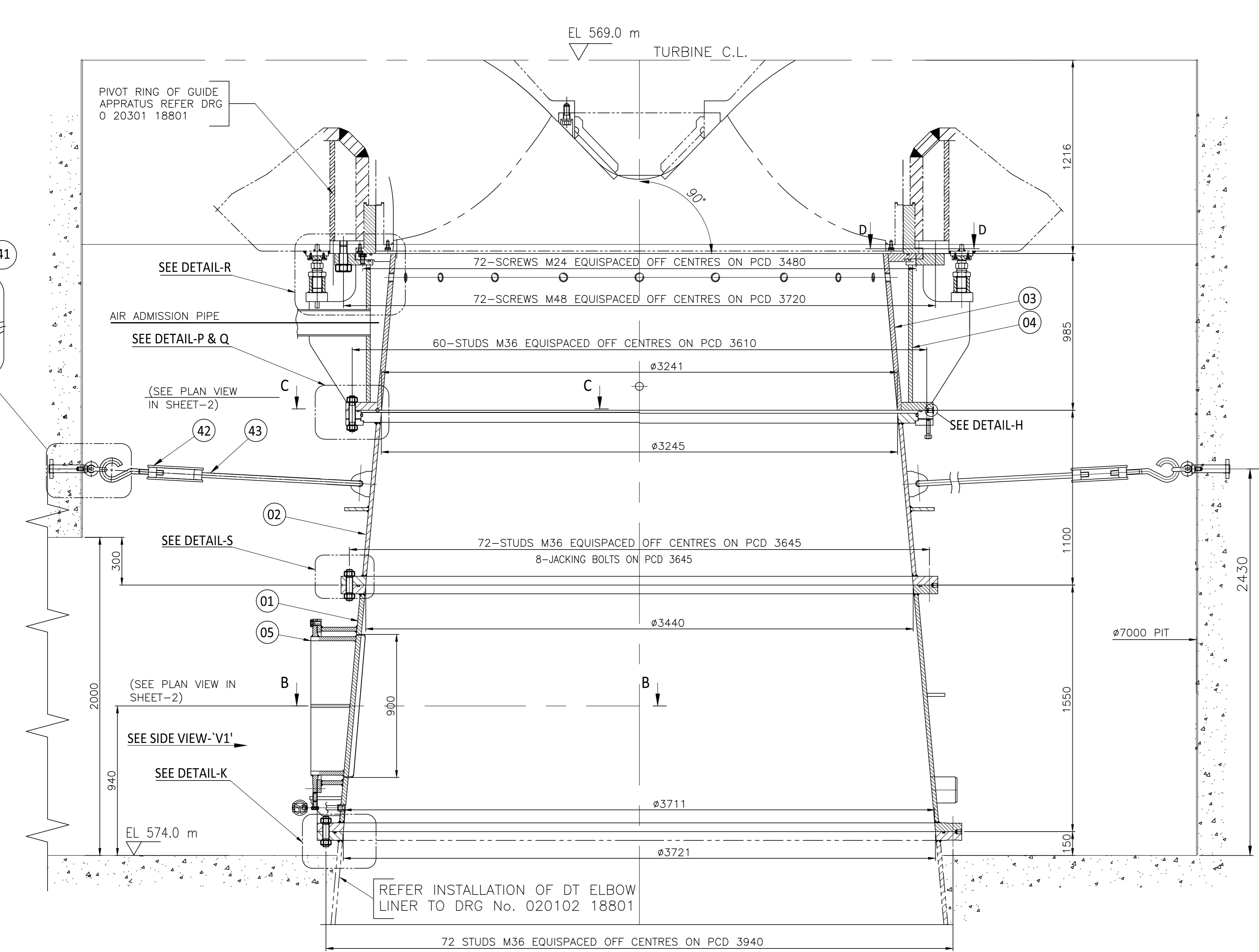
REF. TO ASSY. DRG.

ITEM NO. OF REV. NO. OF SHEET: 53 00

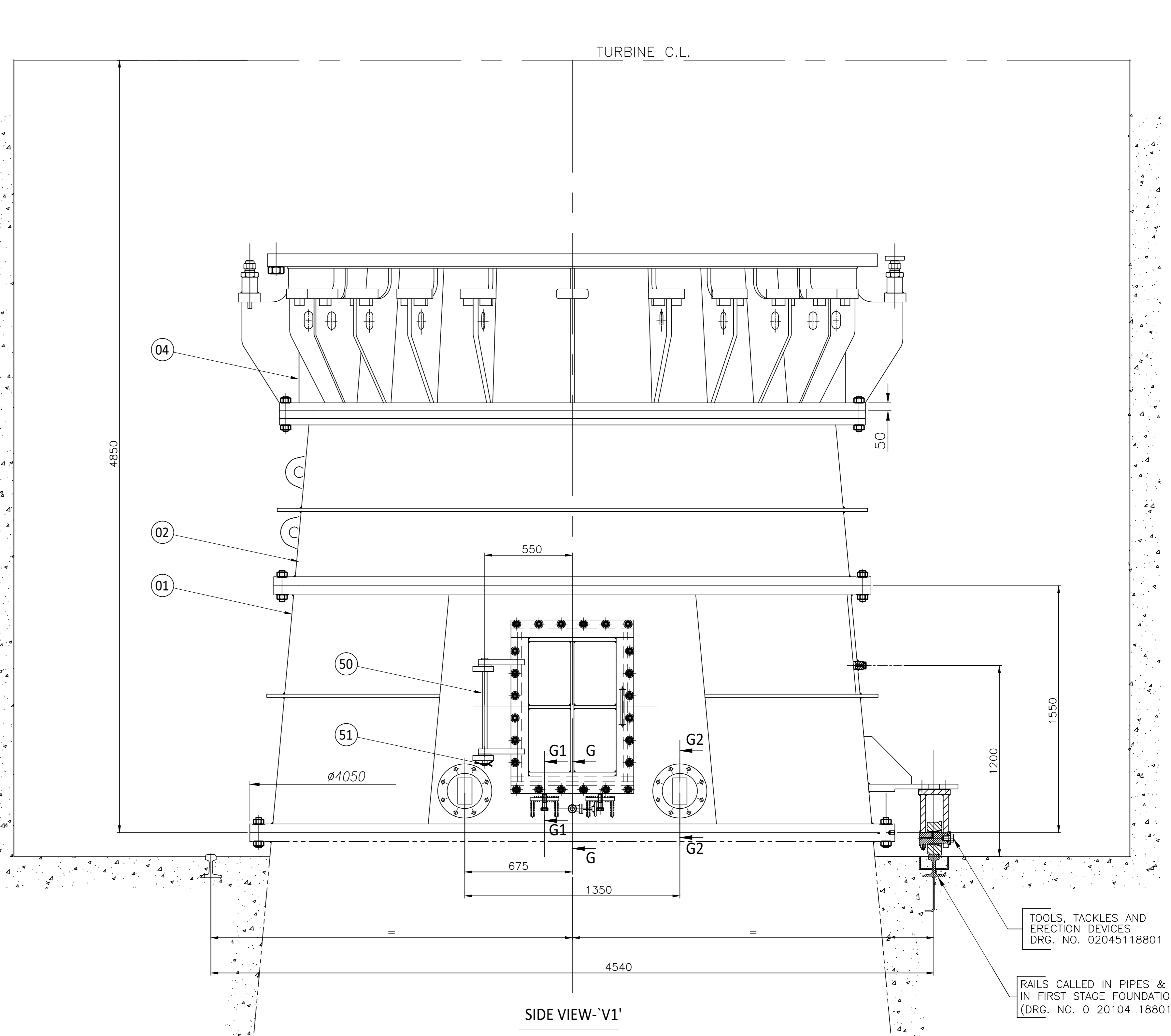
DRAWING NO.: 0 20101 18801

TITLE: INSTALLATION OF D.T.CONE

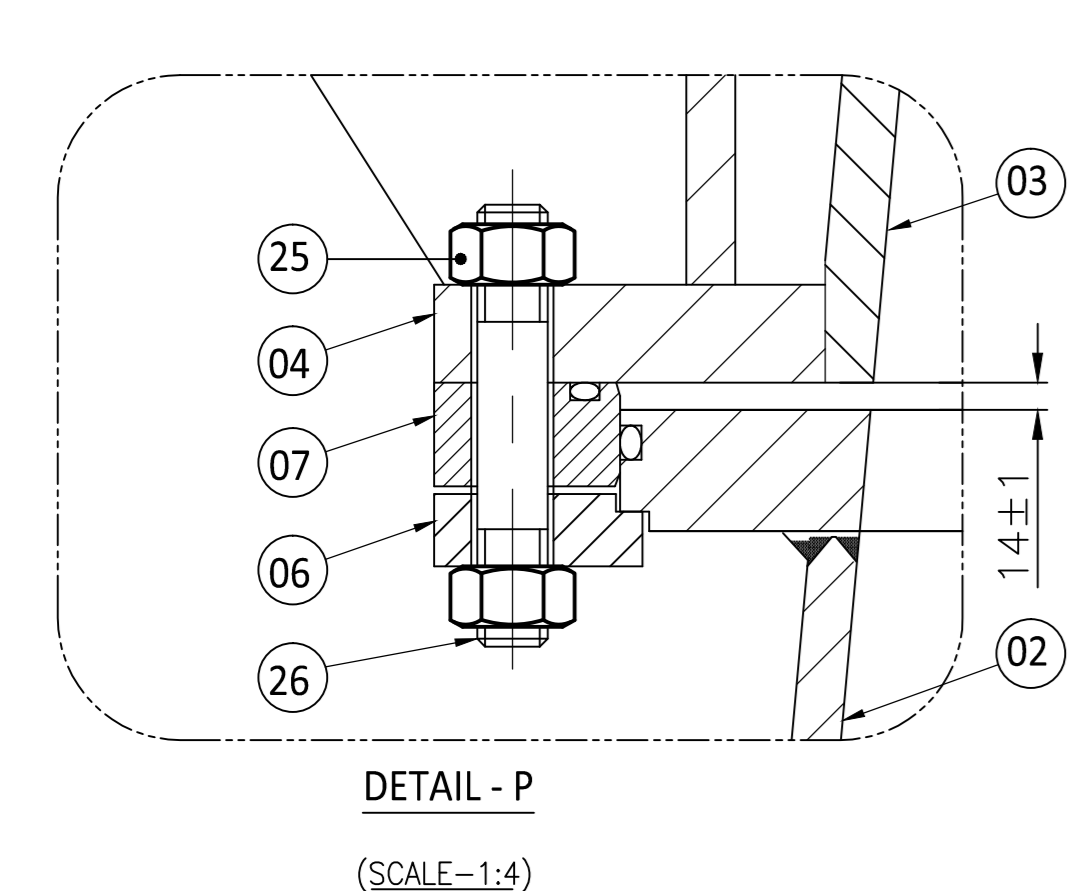
REV.	DATE	ALTERED CHECKED APPD.	ZONE	REV.	DATE	ALTERED CHECKED APPD.	ZONE	REV.	DATE	ALTERED CHECKED APPD.	ZONE



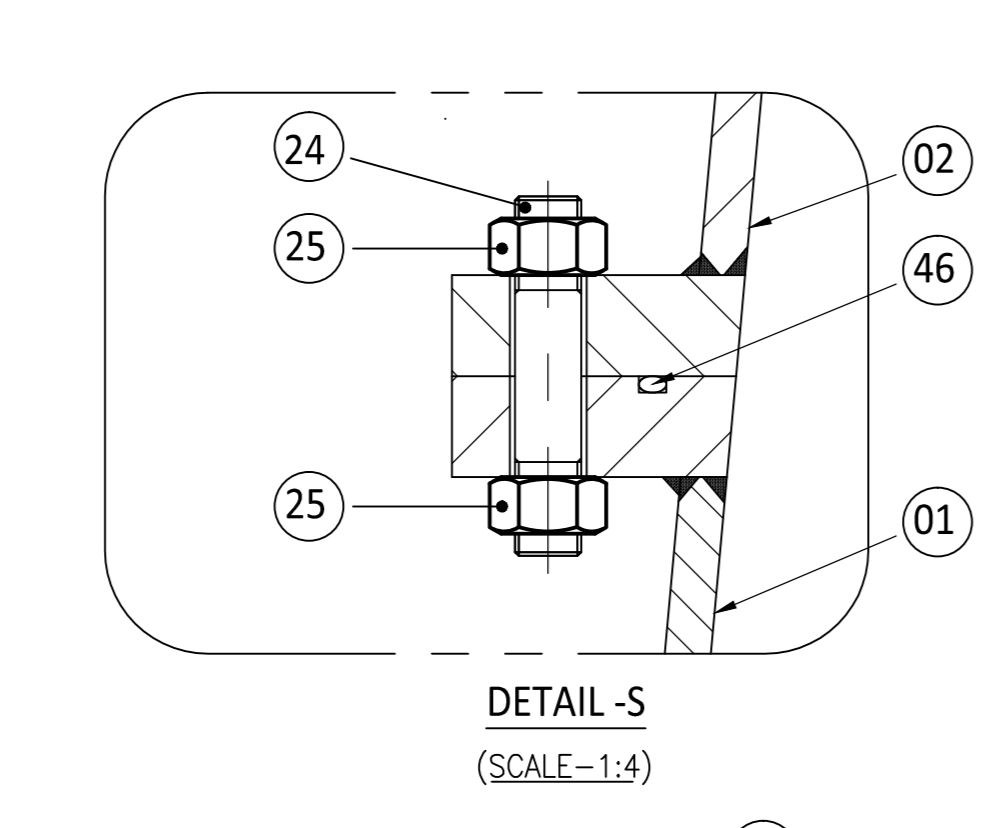
SECTION A-A
SCALE 1:20



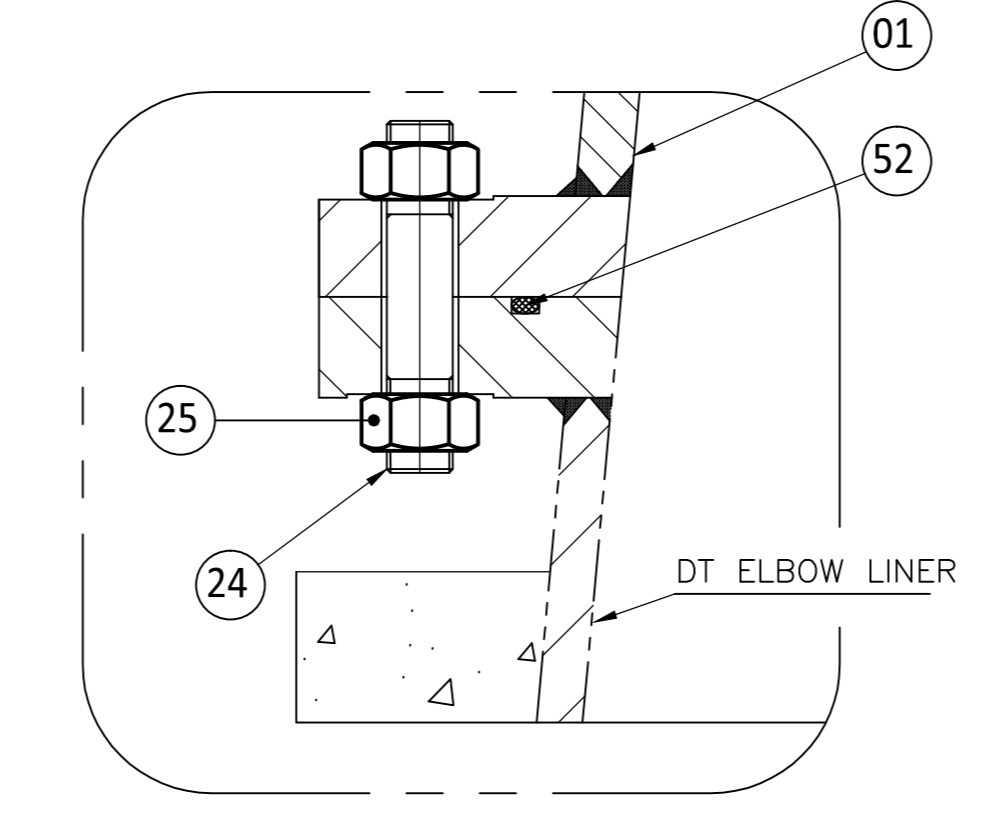
SIDE VIEW - V1'



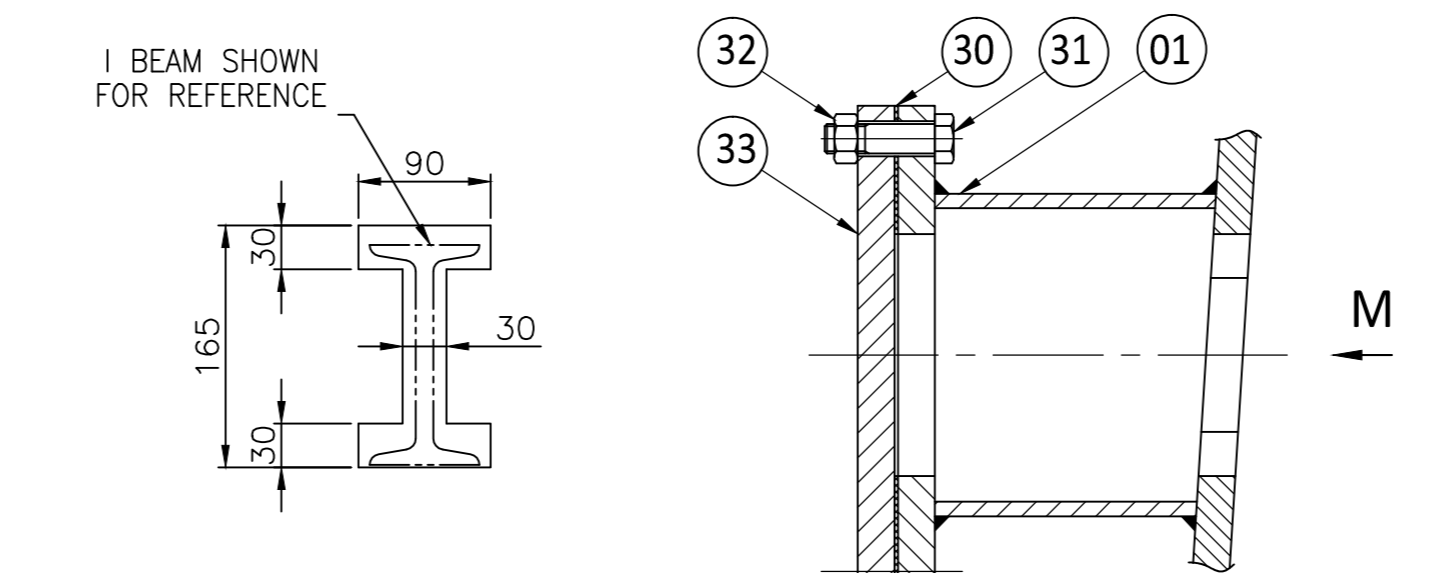
DETAIL - P
(SCALE-1:4)



DETAIL - S
(SCALE-1:4)

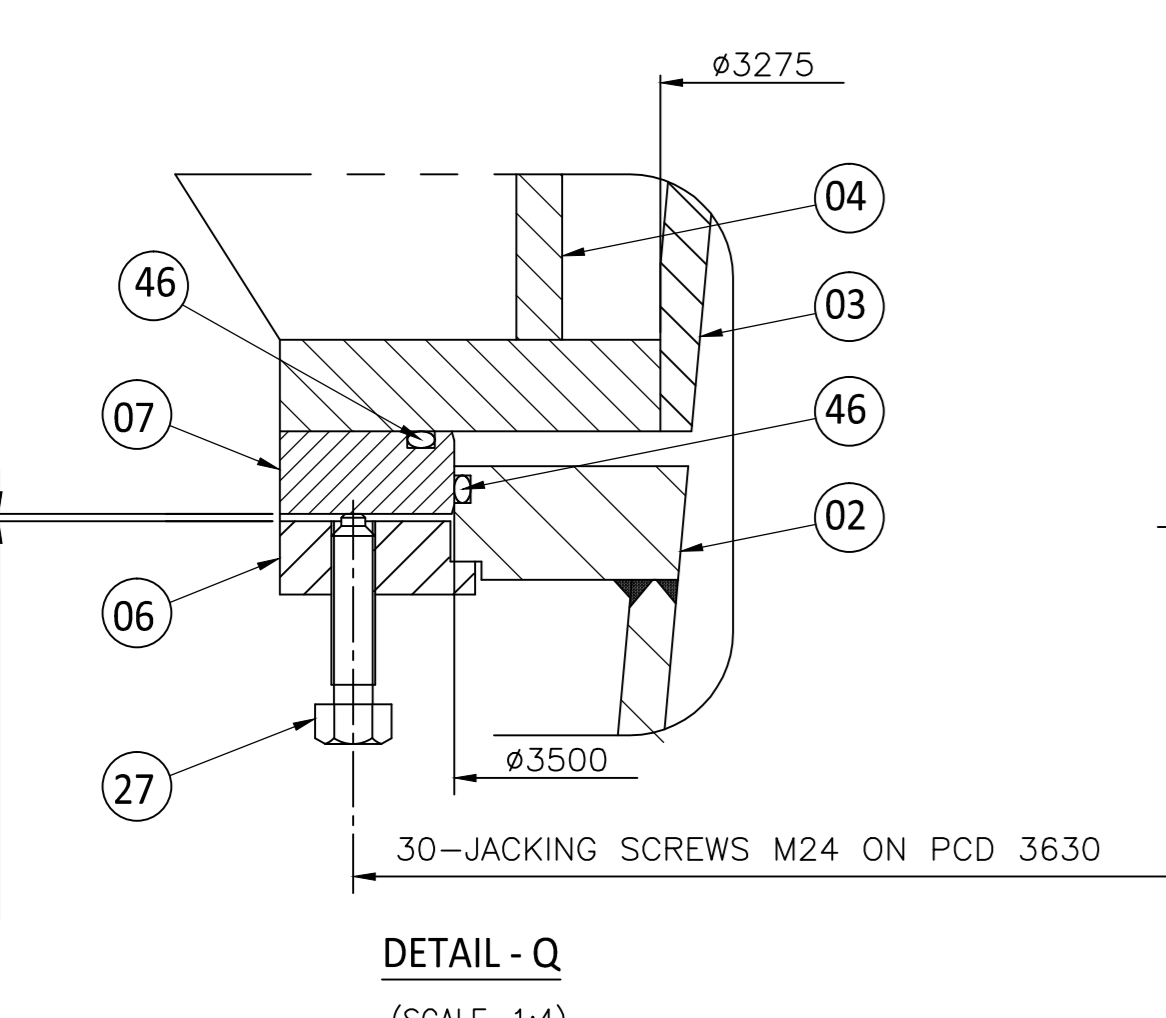


DETAIL - K
(SCALE-1:4)

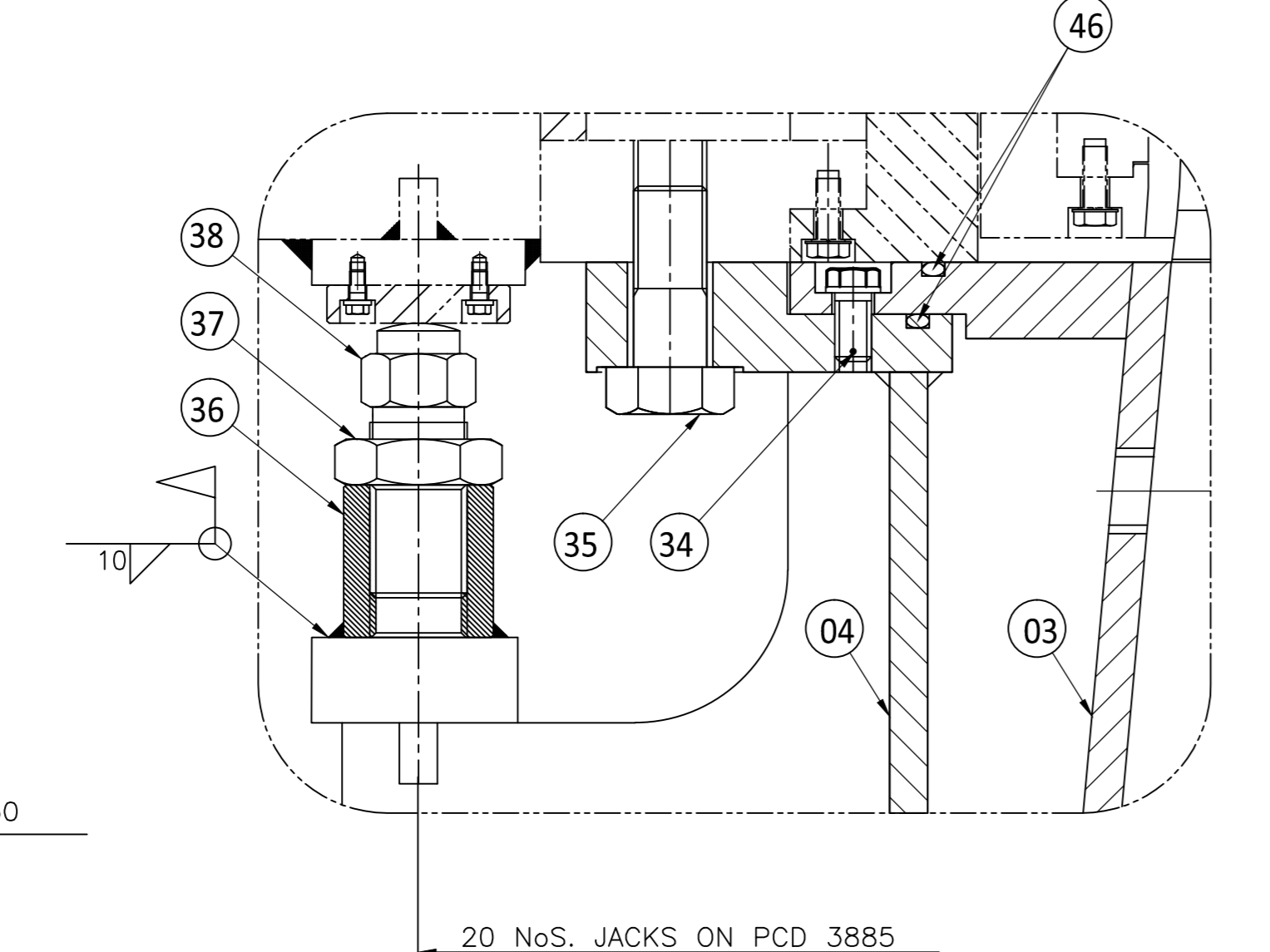


VIEW - M
SCALE 1:5

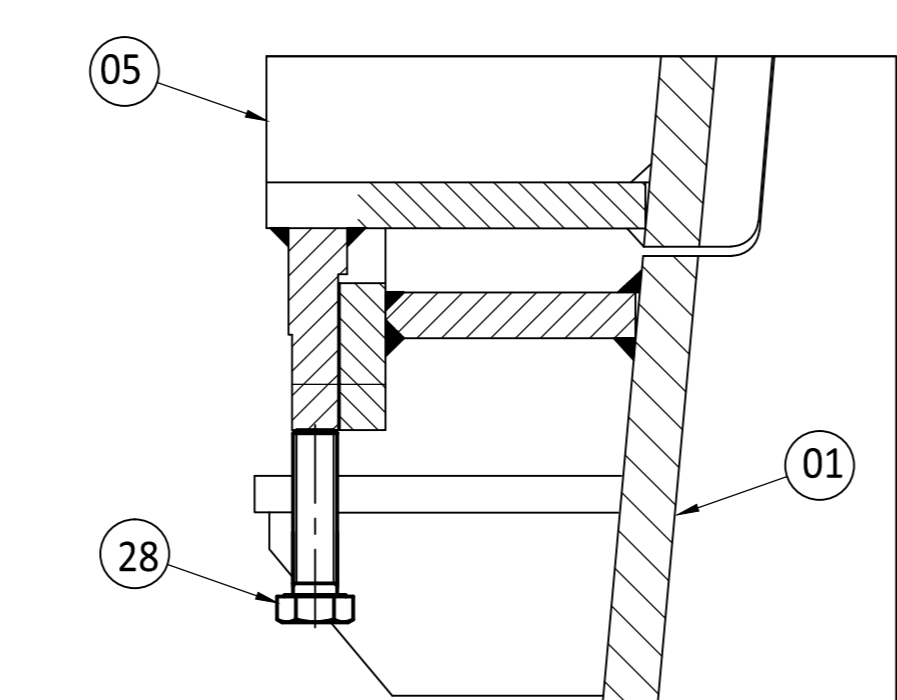
SECTION - G2G2
SCALE 1:5



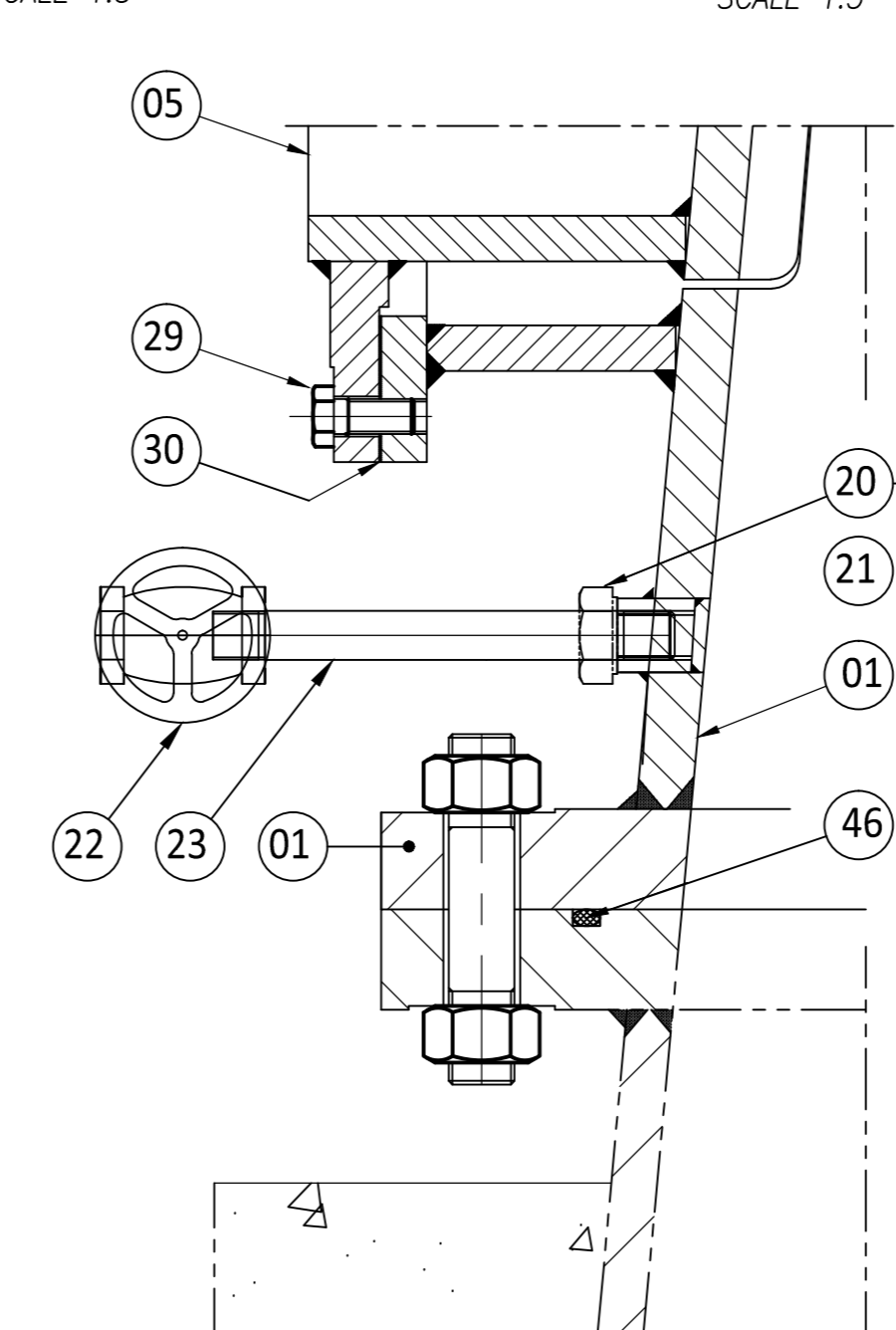
DETAIL - Q
(SCALE-1:4)



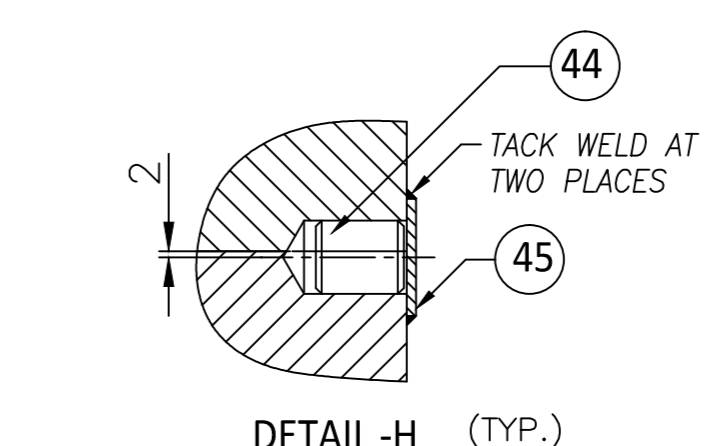
DETAIL - R
(SCALE-1:4)



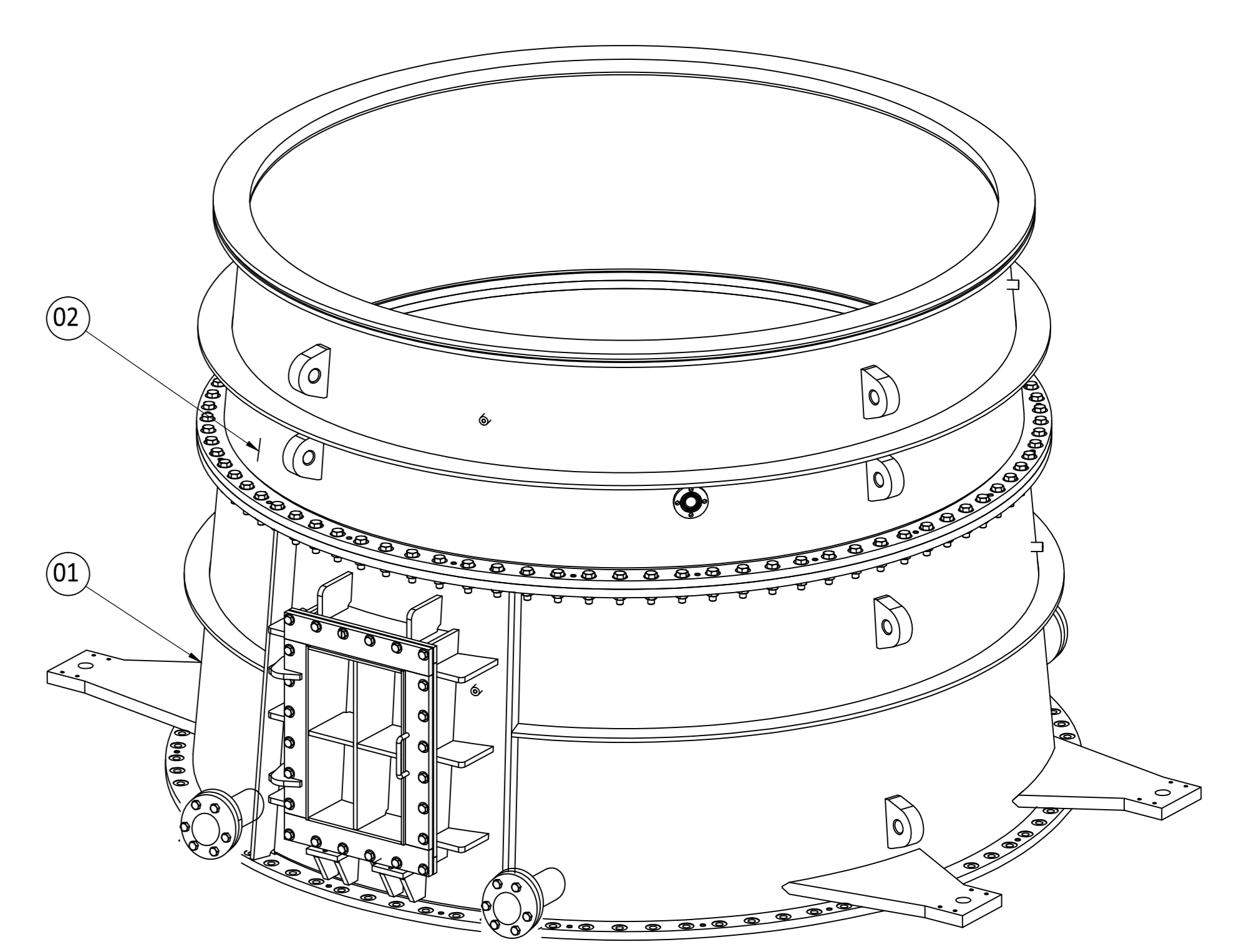
SECTION - G1G1
SCALE 1:5



SECTION - GG
SCALE 1:5



DETAIL - H (TYP.)



ISOMETRIC VIEW

NOTE : IF AFTER ASSEMBLY GAP BETWEEN IT.07 AND IT.06 IS NOT AVAILABLE GRINDING OF IT.06 IS TO BE DONE TO ACHIEVE THE GAP

3-RADIAL HOLES 90° APART DRILL AND REAM ± 0.02 X 35 DEEP BETWEEN FLANGES EACH OF (1)(2)(3) BELLOW
(1). UPPER CYLINDER & DISMANTLING RING
(2). MIDDLE CONE & LOWER CONE
(3). LOWER CONE & EMBEDDED CONE

ADDITIONAL INFORMATION W.D. NO. 32001K20202		PROJECT	6X170MW PUNATSANGCHHU-II HEP		
STATUS OF DRAWING U		CUSTOMER	PHPA-II, BHUTAN		
DISTRIBUTION OF PRINTS HTE-2 THX-1 WTM-5 FBM-7		CONSULTANTS	WAPCOS LIMITED, GURGAON		
CONTRACTOR		CENTRAL ELECTRICITY AUTHORITY, NEW DELHI			
SUB-SUPPLIER/VENDOR		BHARAT HEAVY ELECTRICALS LTD. BHPAL			
DRN	DCD	CHK	APP	DATE	NO. OF SHEETS
AK	AK	AK	AK	20.3.13	16
AK	AK	AK	AK	20.3.13	16
AK	AK	AK	AK	20.3.13	16
SCALE		1:15 & AS STATED		REF. TO ASSY. DRG.	ITEM NO. OF SHEET
TITLE		INSTALLATION OF D.T.CONE		DRAWING NO.	REV.
				0 20101 18801	00
				SHEET NO.	NO. OF SHEETS
				1	2