## Complete set of wear resistant rubber lining system for Wet Ball Mill

**1.0 APPLICATION**: Limestone grinding Wet Ball Mill 24.5 TPH 3260 of Flue Gas Desulfurization unit.

**2.0 TECHNICAL**:

This specification governs the procurement of complete set of wear resistant rubber lining system (SBR based rubber) for Wet Ball Mill. Set of liner shall include shell liner, feed end head liners, discharge end head liners along with necessary hardware for fixing arrangement.

Lifter bars have to be fastened to the shell by means of clamp block (which slide into the grooves provided at the underside of the lifter bars), washers and nuts. The fastening system shall be leak-proof and designed to utilize rubber flexibility to the maximum & 6 mm thick rubber backing shall be provided along with standard adhesive.

Diameter of mill shell (ID) 3200 mm

Length of mill shell 6000 mm

Technical properties of Rubber compound shall be as indicated below:

Hardness : 62 (±5) shore A

Tensile strength : 155 Kg/sq cm (minimum)

Elongation at break : 500-700%

Din abrasion loss : 80 mm^3 (maximum)

Specific gravity : 1.12 (±0.005)

Withstand temp. : below 80° C

pH of slurry : upto 11

Ball charge size 100 mm (maximum)

The mill dimensions are indicated in Annexure III. Lay out & pitching for fasteners of the liners shall be provided by the vendor. Two man-holes are provided at each end of the shell. Vendor shall supply suitable manhole doors lined with rubber liners such that the door can be removed without disturbing the other liners.

**3.0 GUARANTEES:**

3.1 The minimum guaranteed wear life shall be 8000 hours (without repair or reversal of liners) for the lime stone & water as specified in Annexure-I & II.

3.2 The supplier shall give back to back guarantee for wear life of liners as per terms and conditions of applicable contract.

3.3 Failure due to manufacturing defects (generally leading to breakage/catastrophic failure of liners elements) shall be replaced and installed immediately.

## 4. QUANTITY REQUIRED PER MILL

1) Complete set of liners for shell (with inspection door), Discharge Head, delivery head as per the drawing in Annexure III.
2) 6 mm back up rubber material with adhesive required for the same
3) Hardware for fastening of liners.

## 5. MANUFACTURING PROCESS AND QUALITY PLAN:

a. A detailed manufacturing process (along with the process control parameters) and manufacturing and test facilities data shall be submitted for review by BHEL.

b. Material used for the manufacture of the liners shall be specified along with the technical details. The details of the patented portion of the technology need not be provided, however the generic name of the proven patented technology along with the broad details shall be provided.

c. A Quality plan with stage wise inspection and acceptance criteria shall be submitted for approval by BHEL and/or customer.

d. The PROCESS CONTROL shall consist of 100% testing the quality of mixed compound in a Rheometer to ensure that each batch is consistent with the proper proportion of each ingredient of the compound so as to result in a correct and standard quality of product to give desired results in installations.

## 6. INSPECTION:

a. The inspection of liners will be as per the approved quality plan

b. Tests and inspection are to be conducted in the presence of BHEL/ customer representatives as per approved Quality plan. The representatives shall have free access at all times while the work on the contract is being performed. The supplier shall offer all the tools and tackles required for inspection to the inspection agency.

## 7. TEST CERTIFICATE:

All the liners shall be identified with a serial number. Supplier shall supply 3 copies of Test certificates with following information for each set:

1. BHEL order number.
2. Supplier's reference and name.
3. Batch Heat No.
4. Results of Hardness Test and all other tests or any other tests as per approved QAP.
5. Drawing no., Material Code.
6. Consignment/ Identification no.

## 8. PACKING:

Liners shall be suitably packed in metallic boxes set wise to prevent damage during transit. Metallic surfaces shall be properly protected with suitable anti-corrosive compound. Each package shall be legibly marked with following information.

1. BHEL Order No.
2. Consignment/ Identification No.
3. Set No.
4. Drawing no., Material Code
5. Weight in Kg
6. Suppliers Name

## 9. SUPERVISION & SERVICES:

Personnel for supervision for Erection and commissioning shall be deputed within a period of one week from the notice given by BHEL.

**TABLE FOR MATERIAL CODE**

| Var No. | Mill Type | Item Description | Material Code |
|---|---|---|---|
| 01 | 3260 | WBM LINERS 24.5 TPH WBM | BA9789152000 |

**List of Annexures**

| Annexure No. | Description | Remarks |
|---|---|---|
| **I** | LIMESTONE ANALYSIS / | |
| **II** | WATER ANALYSIS | |
| **III** | SHELL ASSY | |
| **IV** | Cheek with trunnion-DE | 06221500005-S00-R00 |
| **V** | Cheek with trunnion-NDE | 06221500006-S00-R00 |
| **VI** | Half Shell-DE | 06221500043-S00-R00 |
| **VII** | Half Shell-NDE | 06221500044-S00-R00 |

**RECORD OF REVISION**

| REV. NO | DATE | REVISION DETAILS | REVISED | APPROVED |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| | | |
|---|---|---|
| BHEL | PROJECT | TSGENCO BTPS 4X270 MW FGD |
| | FGD | WET LIMESTONE BASED FGD SYSTEM |
| | PARAMETERS | SELECTION PARAMETERS FOR WET BALL MILL |

## 1.0 BALL MILL & FEEDER SELECTION DATA

| S.NO | DESCRIPTION | DATA |
|---|---|---|
| 1.0 | WET BALL MILL (WBM) | |
| 1.1 | Number of wet ball mills | Two (1W + 1S) |
| 1.2 | Rated capacity of wet ball mill, kg/h | 24,500 |
| 2.0 | FEEDER | |
| 2.1 | Type of feeder | Gravimetric |
| 2.2 | Number of feeders | Two (1W + 1S) |
| 2.3 | Capacity of feeder, kg/h | 27,000 |

## 2.0 LIMESTONE ANALYSIS/CHARACTERISTICS

The following limestone property to be used designing Limestone grinding system

| Sl.No | Absorbent Composition | | Unit | Limestone | Note |
|---|---|---|---|---|---|
| 1. | Dolomite | | wt%-d | Not Detectable | |
| 2. | CaO | | wt%-d | 47-50 | |
| | In CaCO3 | | wt%-d | 83.88 to 89.00 | |
| 3. | MgO | | wt%-d | 0.9-3.8 | |
| 4. | Inert | $Cl_2$ | wt%-d | <0.015 | |
| | | $Al_2O_3$ | wt%-d | 1.19-2.1 | |
| | | $Si_2O_3$ | wt%-d | 2.1-4.5 | |
| | | $Fe2O_3$ | wt%-d | 0.45-1.0 | |
| | | $TiO_2$ | wt%-d | <0.02 | |
| | | $Na_2O$ | wt%-d | <0.16 | |
| | | $K_2O$ | wt%-d | <0.01 | |
| | | $P_2O_5$ | wt%-d | Traces | |
| | | LOI | wt%-d | 38.0-41.3 | |
| | | Total Sulphur | wt%-d | <0.1 | |
| | | $Mn_2O_3$ | wt%-d | <0.12 | |
| 5. | Density | | $kg/m^3$ | 1400 | For Volumetric Calculation |
| | | | $kg/m^3$ | 1700 | For Torque & Drive Calculation |
| | | | $kg/m^3$ | 2200 | For structural load calculation |
| 6. | Granule Size | | mm | ≤ 25 (100 %) | At limestone silo near to wet ball mill |
| 7. | Bond Index | | Kwh/Mt | 14.33 | |



| Project: TSGENCO BTPS 4X270 MW | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Rev 00 | | Rev 01 | | Rev 02 | |
| | | Sign | Date | Sign | Date | Sign | Date |
| Engineer | Kabilash | sd | 26.02.21 | | | | |
| Reviewer | P.Raju | sd | 26.02.21 | | | | |
| Approver | Naveen | sd | 26.02.21 | | | | |

| | | |
|---|---|---|
| | PROJECT | TSGENCO BTPS 4X270 MW FGD |
| | FGD | WET LIMESTONE BASED FGD SYSTEM |
| | PARAMETERS | SELECTION PARAMETERS FOR WET BALL MILL |

### 3.0 WATER ANALYSIS

The following water to be used during the grinding process of limestone in Lime stone grinding system (LGS)

| S.no | Constituents as CaCO3 | Unit | Value |
|---|---|---|---|
| 1. | Calcium | ppm | **136.5** |
| 2. | Magnesium | ppm | **52.0** |
| 3. | Sodium + Potassium | ppm | **76.6** |
| 4. | Iron | ppm | **0.00** |
| 5. | Total hardness | mg/l | **188.50** |
| 6. | **Total Cations** | **mg/l** | **265.10** |
| 7. | P-Alkalinity | mg/l | 0.00 |
| 8. | M-Alkalinity | mg/l | 140.77 |
| 9. | Bicarbonates | mg/l | 140.77 |
| 10. | Chlorides | ppm | 76.23 |
| 11. | SO4 | ppm | 46.50 |
| 12. | NO3 | ppm | 1.60 |
| 13. | EMA | mg/l | 124.33 |
| 14. | **Total anions** | **mg/l** | **265.10** |
| 15. | Silica(reactive) | ppm | 110 |
| 16. | pH @25 deg C | - | 7.5-8.0 |
| 17. | Turbidity (maximum) | NTU | 10 |
| 18. | Suspended Solids | mg/l | 10 |
| 19. | TDS Calculated | mg/l | 375.90 |
| 20. | Conductivity @ 25 deg C | uS/cm | 400 |
| 21. | TDS (given) | mg/l | 282.0 |
| 22. | Temperature | deg C | 25 |



| Project: TSGENCO BTPS 4X270 MW | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Rev 00 | | Rev 01 | | Rev 02 | |
| | | Sign | Date | Sign | Date | Sign | Date |
| Engineer | Kabilash | sd | 26.02.21 | | | | |
| Reviewer | P.Raju | sd | 26.02.21 | | | | |
| Approver | Naveen | sd | 26.02.21 | | | | |

### 4.0 PROCESS DATA (All the blank cells to be filled by the vendor)

| Stream no | <1> | <2> | <3> | <4> | <5> | <6> | <7> |
|---|---|---|---|---|---|---|---|
| **Fluid** | **Lump limestone** | **Limestone ball mill over flow** | **Hydro cyclone feed** | **Hydro cyclone underflow return** | **Process water to ball mill** | **Process water to mill tank** | **Limestone product slurry** |
| Total flow kg/h | 24500 | | | | | | |
| Total flow $m^3/h$ | | | | | | | |
| Temp °C | 45 | | | | 27 | 27 | |
| Solid wt.% | 100 | | | | 0 | 0 | 30 |

## 5.0 SCHEDULE OF GUARANTEES

| Sl. No | Description | | | Data |
|---|---|---|---|---|
| 1. | Rated capacity of Wet Ball Mill (WBM) | TPH | : | 24.5 |
| 2. | Rated capacity of gravimetric feeder | TPH | : | 27.0 |
| 3. | Power consumption at rated capacity # | kW | : | Bidder to Provide |
| 4. | Noise level at a distance of 1.0 meter from the equipment at site and 1.5 m above operating floor | dB(A) | : | ≤ 90 dbA(for ball mill)<br>≤ 85 dbA(for other equipments) |
| 5. | Maximum vibration (peak to peak amplitude at site) | microns | : | Bidder to Provide |
| 6. | Equipment Availability in % (avg. target 98%) Continuous for 120 days | | : | Bidder to Provide |
| 7. | Life of WBM wear parts | Hours | : | ≥8000 hours operation |
| 8. | Limestone output fineness at rated capacity | | : | ≥ 90% through 325mesh. |
| 9. | Guaranteed ball consumption | | : | Bidder to provide (<700 g per ton of ground limestone) |
| 10. | In the event PG test is unsuccessful, bidder shall take necessary remedial action at his cost & PG test shall be repeated | | : | Bidder to Confirm |

## 6.0 General Note:

1. POWER CONSUMPTION to be guaranteed corresponding to rated capacity of 24.50 TPH shall not exceed 905 KW.
   The following equipments are considered for calculating power consumption:
   1. Gravimetric feeder
   2. Wet ball mill
   3. HP trunnion Lube oil pump
   4. LP trunnion Lube oil pump
   5. Oil reservoir heater
   6. Mill circuit tank agitator
   7. Mill circuit tank pump
2. Refer BTPS Design memorandum for MOC and other technical details pertaining to wet ball mill and its accessories.
3. Instruments and valves to be provided as per the approved P&ID.
4. Wet ball mill and its accessories related P&ID will be will be included in input Transmittal after obtaining the approval from TSGENCO customer.
5. Mandatory Spares to be supplied as per contact requirement. (As per the recent MOM, there is a change in the scope of mandatory spares. Hence, Request HPEP to obtain latest mandatory spares list from PSM).

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

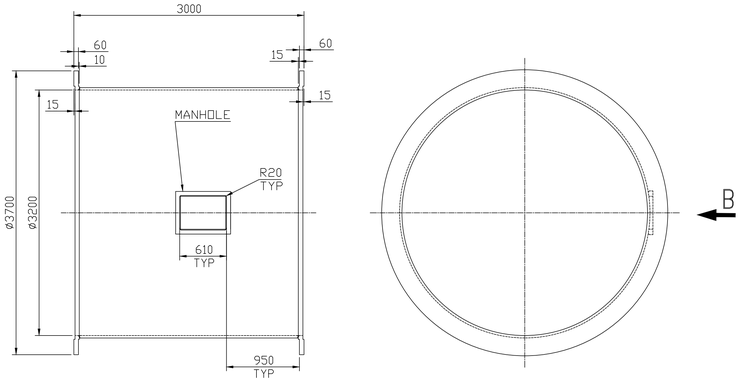
DRG. NO.



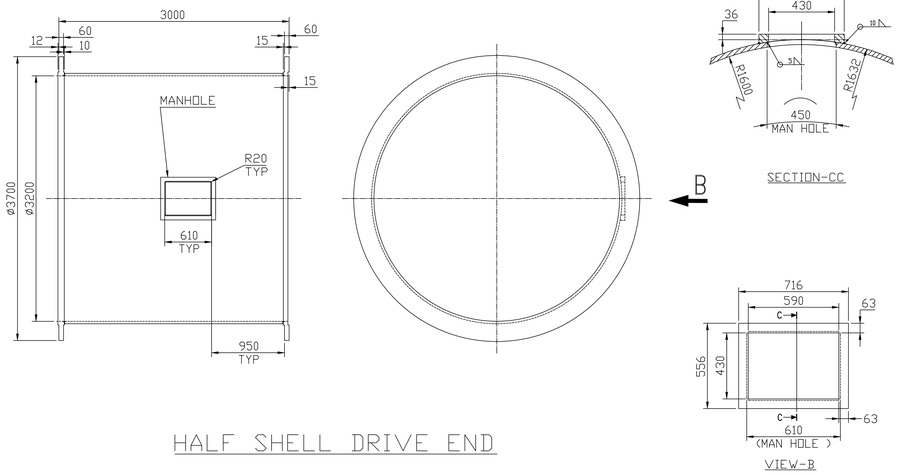
COMP. FILE NAME

REF. DRG. NO.

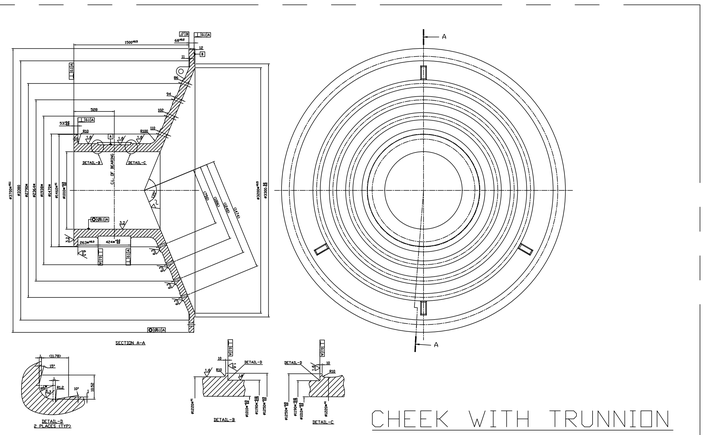
INVENTORY NO



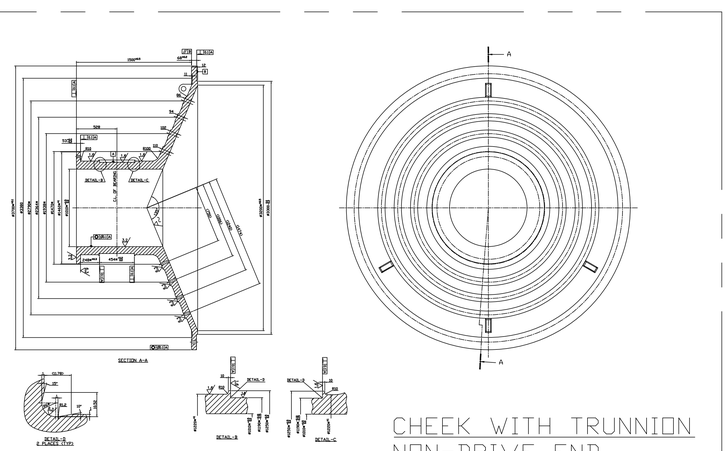

HALF SHELL NON DRIVE END



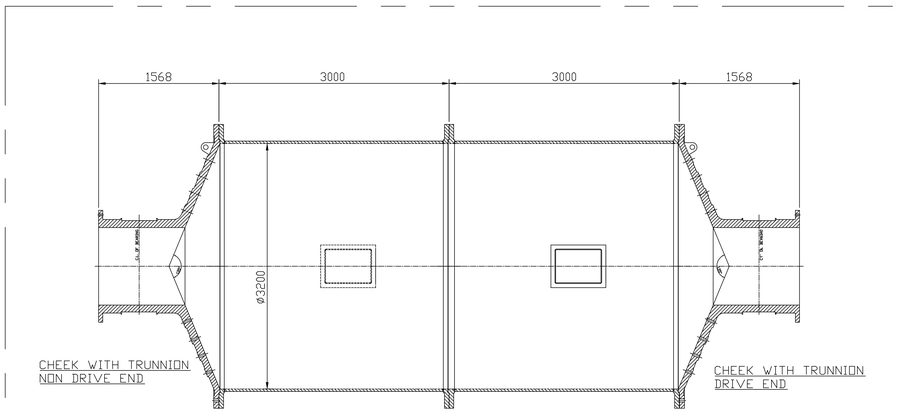

HALF SHELL DRIVE END




CHEEK WITH TRUNNION
DRIVE END




CHEEK WITH TRUNNION
NON-DRIVE END




CHEEK WITH TRUNNION
NON DRIVE END

CHEEK WITH TRUNNION
DRIVE END

SHELL NON DRIVE END

SHELL DRIVE END

# MILL BODY ASSEMBLY : WBM 3260

| ITEM NO. | DESCRIPTION | DRAWING NO. | VAR. NO. | RAW MATERIAL SIZE OR CASTING DRG. NO. OR FORGING DRG. NO. | MATERIAL CODE | NET WT. | GROSS WT. |
|---|---|---|---|---|---|---|---|
| | | | | | MATERIAL SPECN. | QUANTITY | |

THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED.

1. REF. TO HYD230261 FOR UNSPECIFIED TOLERANCES.
2. CHAMFER M/CD. SHARP EDGES 1.2 TO 1.0 AT 45°.
3. INTERNAL M/CD. CORNER RADII 1 TO 0.7
4. THE SURFACE ROUGHNESS WHERE-EVER NOT SHOWN SHALL BE TAKEN FROM THE SURFACE ROUGHNESS SHOWN OUT SIDE THE BACK SLASH GIVEN OR THE TOP MOST RIGHT CORNER OF THE DRG.

TYPE OF PRODUCT

NAME OF CUSTOMER/PROJECT

BHARAT HEAVY ELECTRICALS LIMITED
HYDERABAD

| | NAME | SIGN. | DATE | NO.OF VAR. |
|---|---|---|---|---|
| DRN. | | | | |
| CHD. | | | | |
| APPD. | | | | |

DEPT. 4460 | SCALE | WEIGHT (KG) | REF. TO ASSY DRG. | ITEM NO. | NO.OF ITEMS

CONT. PULV. ENGG.

TITLE

DRAWING NO. | REV.

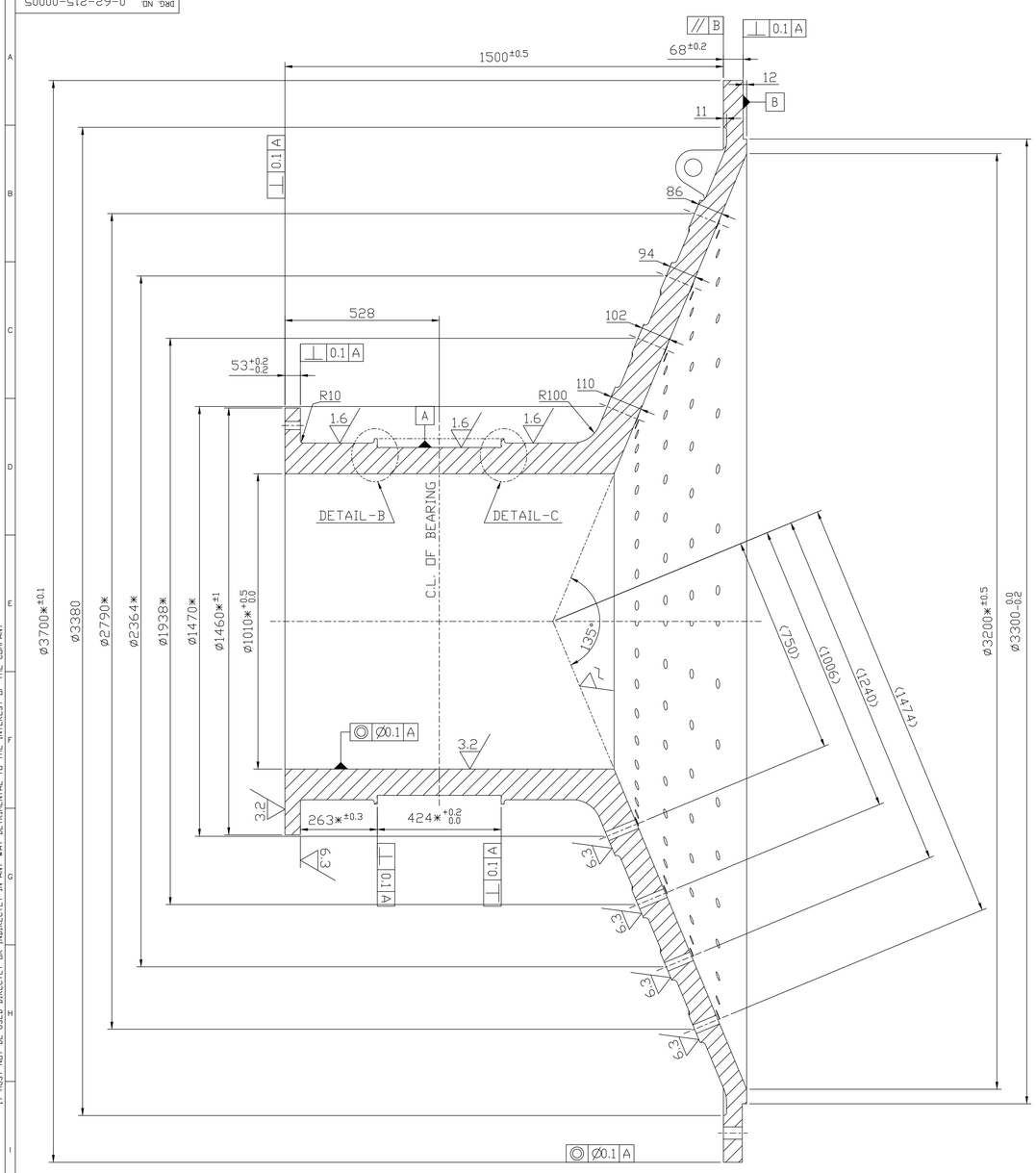
SHEET NO. | NO OF SHEETS

| REV. | DATE | ALTERED | CHECKED | APPROVED |
|---|---|---|---|---|
| ZONE | | | | |

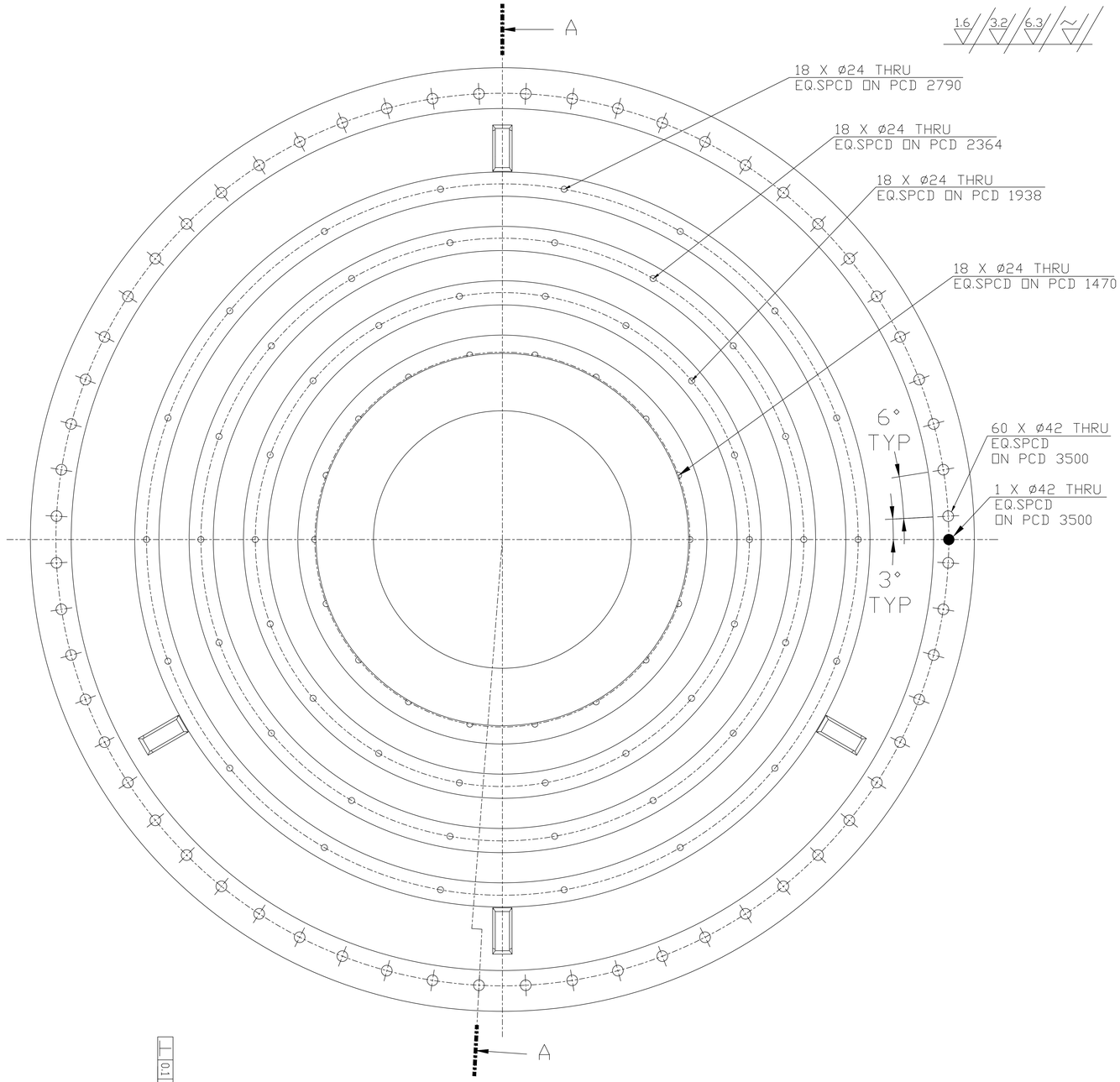
FIRST ANGLE PROJECTION

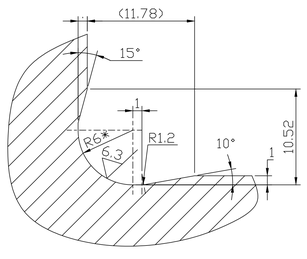
(ALL DIMENSIONS ARE IN mm)

DRG NO 0-62-215-00005

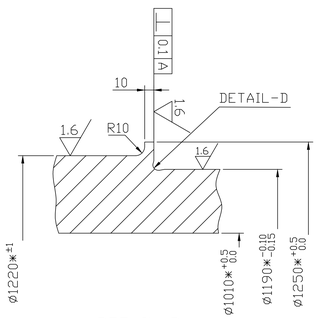



SECTION A-A

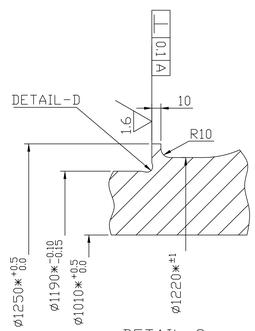



DETAIL-D
2 PLACES (TYP)




DETAIL-B




DETAIL-C

NOTES:

1. PAINT AS PER APPROVED PAINTING STANDARD FOR THE PROJECT.
2. FINAL DIMENSIONS TO BE MAINTAINED AS PER SECTION A-A, DETAILS B & C.
3. CRITICAL DIMENSIONS INDICATED WITH *.

| ITEM NO. | DESCRIPTION | DRAWING NO. | VAR. NO. | RAW MATERIAL SIZE OR CASTING DRG. NO. OR FORGING DRG. NO. | MATERIAL CODE | NET WT. | GROSS WT. |
|---|---|---|---|---|---|---|---|
| 01 | CHEEK TRUNNION R/M CASTING WITH LIFTING LUGS | 3-62-215-00XX | | | 9784.79 | | |
| | | | | | 01 | | |
| | | | | | MATERIAL SPECN. | QUANTITY | |

THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED.

1. REF. TO HY230261 FOR UNSPECIFIED TOLERANCES.
2. CHAMFER M/CD. SHARP EDGES 1.2 TO 1.0 AT 45°.
3. INTERNAL M/CD. CORNER RADII 1 TO 0.7
4. THE SURFACE ROUGHNESS WHERE-EVER NOT SHOWN SHALL BE TAKEN FROM THE SURFACE ROUGHNESS SHOWN OUT SIDE THE BACK SLASH GIVEN OR THE TOP MOST RIGHT CORNER OF THE DRG.

TYPE OF PRODUCT
NAME OF CUSTOMER/PROJECT WET BALL MILLS

BHARAT HEAVY ELECTRICALS LIMITED
HYDERABAD

| | NAME | SIGN. | DATE | NO.OF VAR. |
|---|---|---|---|---|
| DRN. | SHARIEF | | 24.02.22 | |
| CHD. | K.PAVAN | | 24.02.22 | |
| APPD. | AMAN | | 24.02.22 | |

| DEPT. | SCALE | WEIGHT (KG) | REF. TO ASSY DRG. | ITEM NO. | NO.OF ITEMS |
|---|---|---|---|---|---|
| 4460 | NTS | 9784.79 | | | |
| CODE | | | | | |
| PDEV. ENGG. | | | | | |

TITLE: CHEEK TRUNNION DE- ø3.2M

DRAWING NO. 0-62-215-00005 REV. 00

SHEET NO. NO OF SHEETS

| REV. | DATE | ALTERED | CHECKED | APPROVED |
|---|---|---|---|---|
| | | | | |

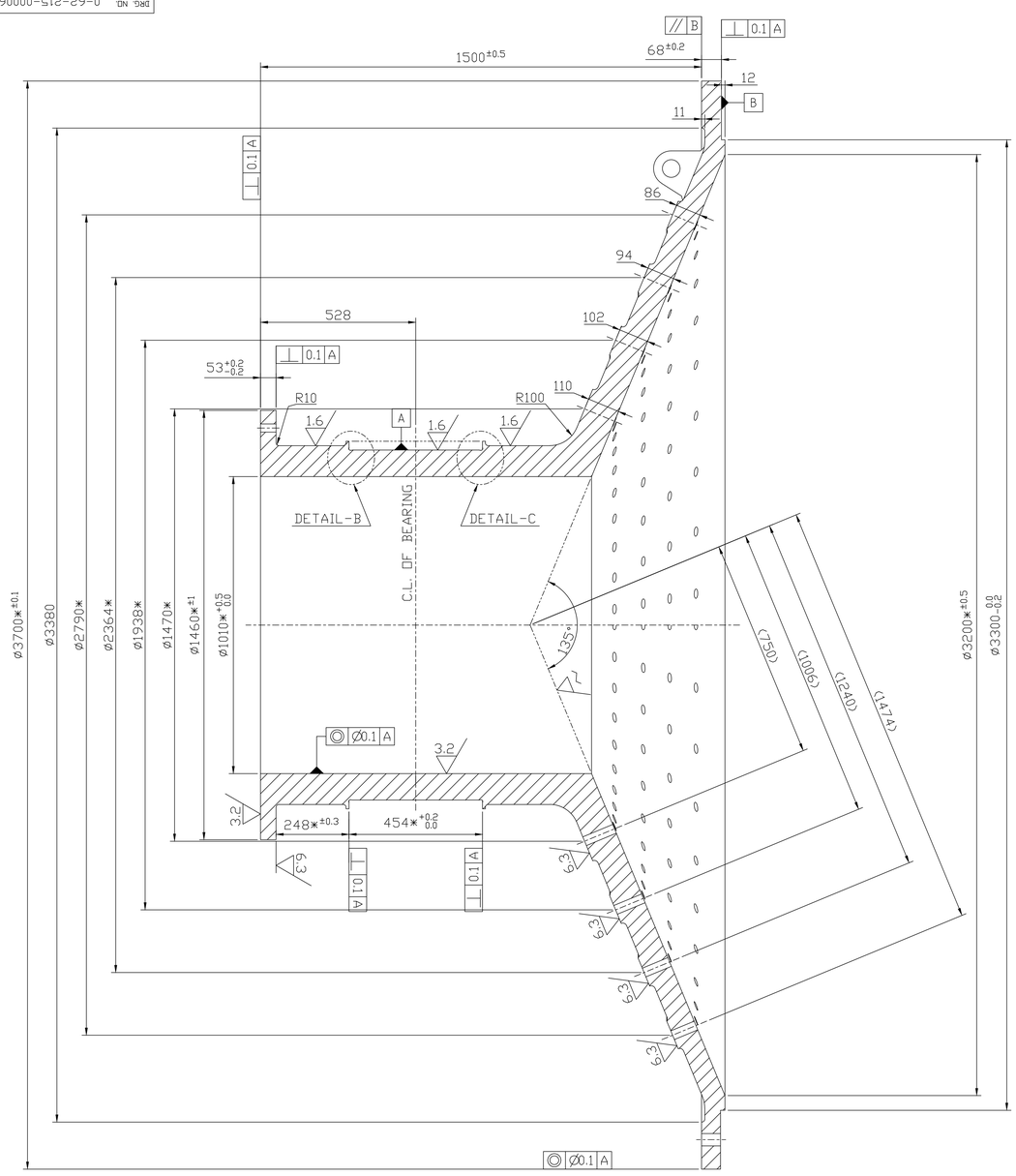


COMP. FILE NAME | REF. DRG. NO. | INVENTORY NO

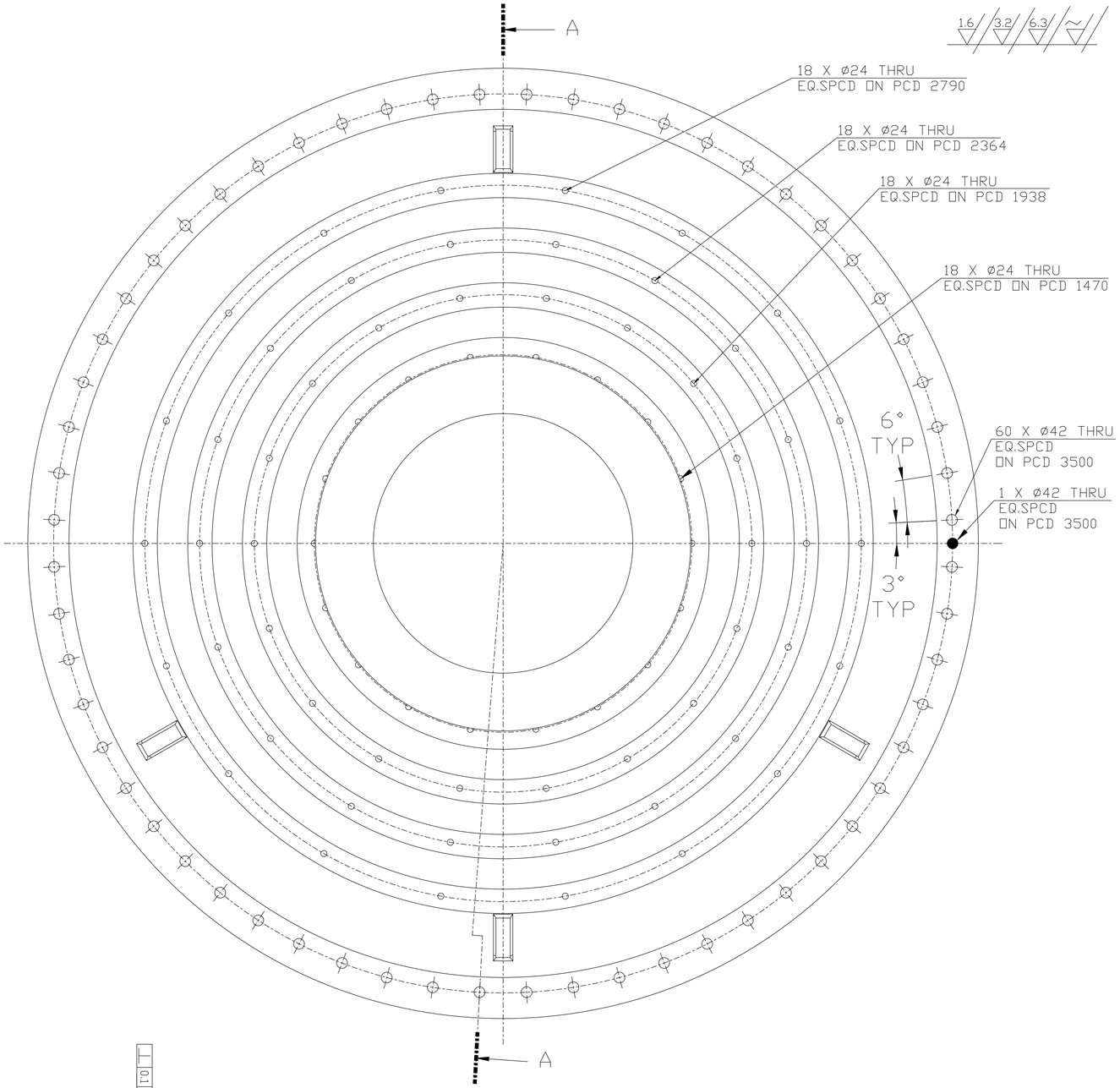
FIRST ANGLE PROJECTION

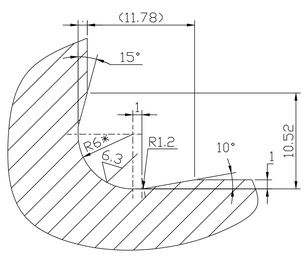
(ALL DIMENSIONS ARE IN mm)

DRG. NO. 0-62-215-00006

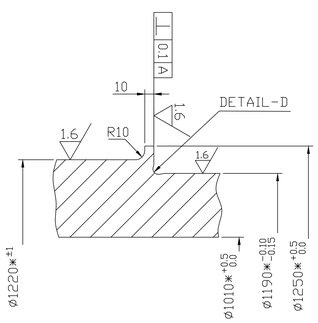



SECTION A-A

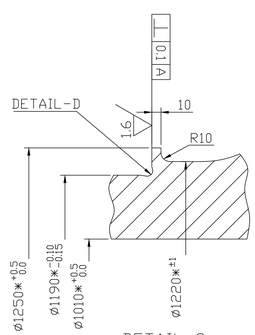



DETAIL-D
2 PLACES (TYP)




DETAIL-B




DETAIL-C

NOTES:

1. PAINT AS PER APPROVED PAINTING STANDARD FOR THE PROJECT.
2. FINAL DIMENSIONS TO BE MAINTAINED AS PER SECTION A-A, DETAILS B & C.
3. CRITICAL DIMENSIONS INDICATED WITH *.

| ITEM NO. | DESCRIPTION | DRAWING NO. | VAR. NO. | RAW MATERIAL SIZE OR CASTING DRG. NO. OR FORGING DRG. NO. | MATERIAL CODE | NET WT. | GROSS WT. |
|---|---|---|---|---|---|---|---|
| | | | | | | 9771.42 | |
| | | | | | | 01 | |
| 01 | CHEEK TRUNNION R/M CASTING WITH LIFTING LUGS | 3-62-215-000XX | | | MATERIAL SPECN. | QUANTITY | |

THE FOLLOWING CONDITIONS APPLY EXCEPT OTHERWISE STATED.

1. REF. TO HY0230261 FOR UNSPECIFIED TOLERANCES.
2. CHAMFER M/CD. SHARP EDGES 1.2 TO 1.0 AT 45°.
3. INTERNAL M/CD. CORNER RADII 1 TO 0.7
4. THE SURFACE ROUGHNESS WHERE-EVER NOT SHOWN SHALL BE TAKEN FROM THE SURFACE ROUGHNESS SHOWN OUT SIDE THE BACK SLASH GIVEN OR THE TOP MOST RIGHT CORNER OF THE DRG.

TYPE OF PRODUCT
NAME OF CUSTOMER/PROJECT WET BALL MILLS

BHARAT HEAVY ELECTRICALS LIMITED HYDERABAD

| | NAME | SIGN. | DATE | NO.OF VAR. |
|---|---|---|---|---|
| DRN. | SHARIFF | | 24.02.22 | |
| CHD. | K.PAVAN | | 24.02.22 | |
| APPD. | AMAN | | 24.02.22 | |

DEPT. 4460 | CODE PUDV. ENGG. | SCALE NTS | WEIGHT (KG) 9771.42 | REF. TO ASSY DRG. | ITEM NO. | NO.OF ITEMS

TITLE: CHEEK TRUNNION NDE- ø3.2M

DRAWING NO. 0-62-215-00006 REV. 00

SHEET NO. | NO OF SHEETS

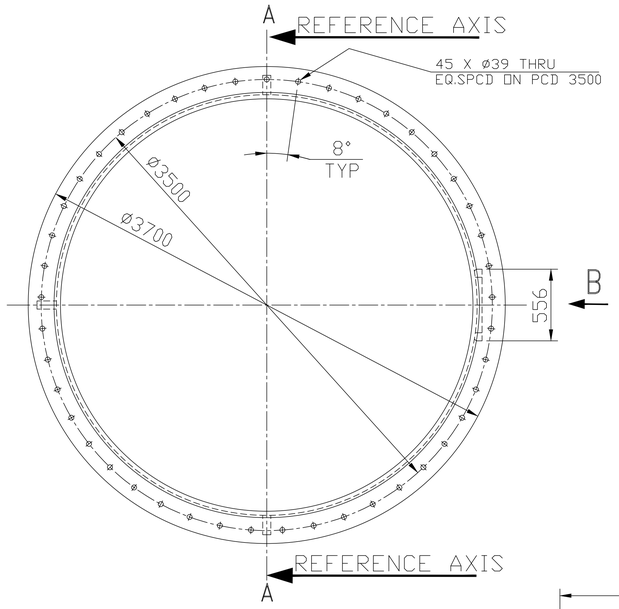
| REV. | DATE | ALTERED | CHECKED | APPROVED |
|---|---|---|---|---|
| ZONE | | | | |

COMP. FILE NAME | REF. DRG. NO. | INVENTORY NO

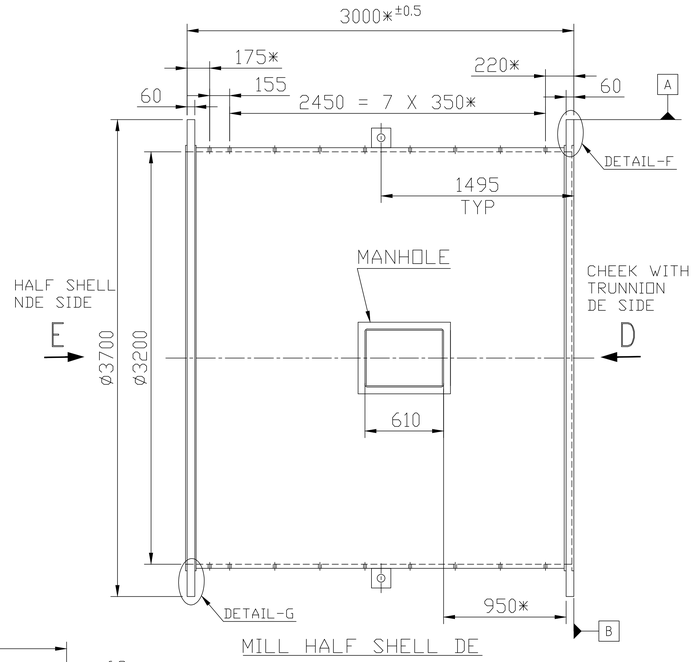
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

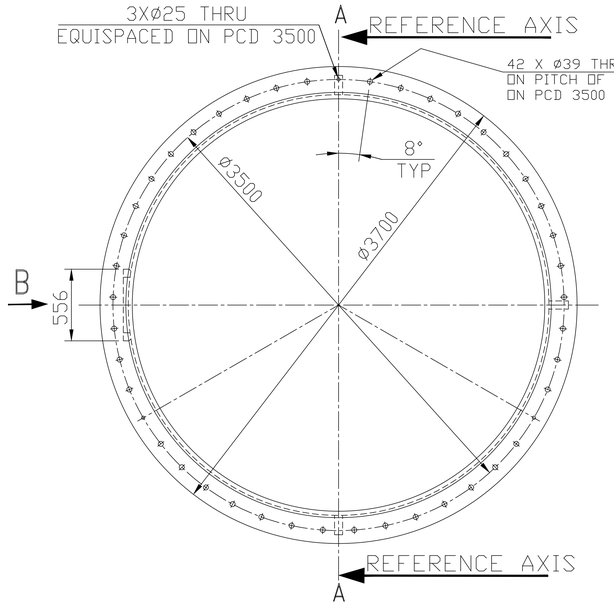
DRG. NO. 0-62-215-00043



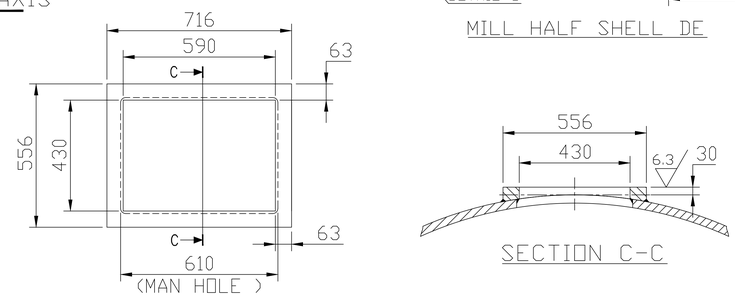

VIEW-E




MILL HALF SHELL DE



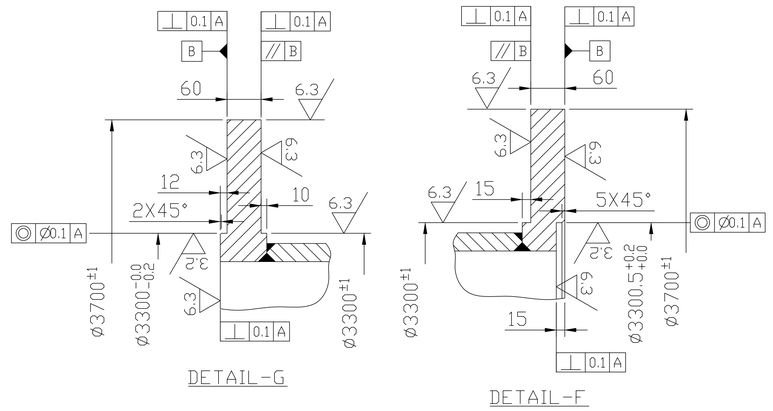

VIEW-D




VIEW-B

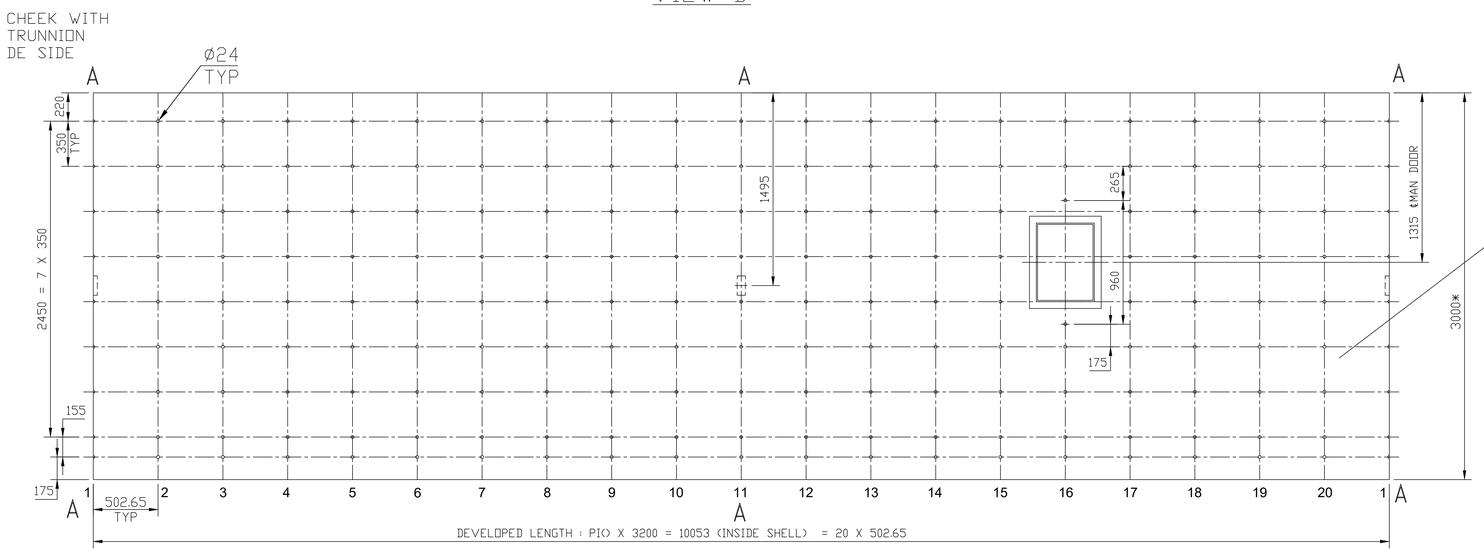



SECTION C-C




DETAIL-G

DETAIL-F




HALF SHELL
NDE SIDE

## DRILLING LAYOUT OF ø24 MM HOLES (179 Nos) ON HALF SHELL (DE) : PITCH DISTANCE OF 350 MM ALONG AXIS AND 18° ALONG CIRCUMFERENCE

## FLANGE MACHINING DETAILS

NOTES:

1. DRILL THE LINER HOLES (ø24 MM) AND HOLES ON SHELL FLANGES (ø 25 AND ø39 ) WITH REFERENCE TO A-A AXIS.THE POSITIONING DEVIATION OF LINER HOLES MUST NOT EXCEED ±1 MM.
2. ALL HOLES SHALL BE CHAMFERED BY 1MM AT 45° ON OUTSIDE OF SHELL.
3. CRITICAL DIMENSIONS ARE IDENTIFIED WITH '*'.
4. INSPECTION AS PER APPROVED QUALITY PLAN.

| ITEM NO. | DESCRIPTION | DRAWING NO. | VAR. NO. | RAW MATERIAL SIZE OR CASTING DRG. NO. OR FORGING DRG. NO. | MATERIAL CODE | NET WT. | GROSS WT. |
|---|---|---|---|---|---|---|---|
| | | | | | MATERIAL SPECN. | QUANTITY | |
| 01 | MILL SHELL FAB WITH LIFTING LUGS | 2-62-215-00024 | | | 12150 | | |
| | | | | | 01 | | |

NON-CAST PARTS:
(FABRICATED AND /OR MACHINED)

ALL DIMENSIONS ARE IN MILLIMETERS
TOLERANCES UNLESS OTHERWISE NOTED
X.XX ±0.40
X. & X.XX ±1.5 FOR DIM. 0-610 MM
X. & X.XX ±3.8 FOR DIM. 610-2440 MM
X. & X.XX ±6.3 FOR DIM. OVER 2440 MM

ANGULAR: ±0°30'

DRILLED HOLES: ø 0-25MM +0.25/-0.00 OVER 25 MM +0.50/-0.00

SURFACE TEXTURE: 25 MICRO METERS
ROUGHNESS AVERAGE-Ra

THIS DRAWING IS IN ACCORDANCE WITH ISO 1101
UNLESS OTHERWISE SPECIFIED, THE THREAD PITCH IS STANDARD COARSE.

TYPE OF PRODUCT: WET BALL MILLS
NAME OF CUSTOMER/PROJECT

BHARAT HEAVY ELECTRICALS LIMITED HYDERABAD

| | NAME | SIGN. | DATE | NO.OF VAR. |
|---|---|---|---|---|
| DRN. | SHARIFF | | 26.07.22 | |
| CHD. | K.PAVAN | | 26.07.22 | |
| APPD. | AMAN | | 26.07.22 | |

DEPT. 4460
CODE P.ULV. ENGG.
SCALE NTS
WEIGHT (KG) 12150
REF. TO ASSY DRG.
ITEM NO.
NO.OF ITEMS

TITLE: MILL HALF SHELL MACHINING-DE
DRAWING NO. 0-62-215-00043
REV. 00
SHEET NO.
NO OF SHEETS

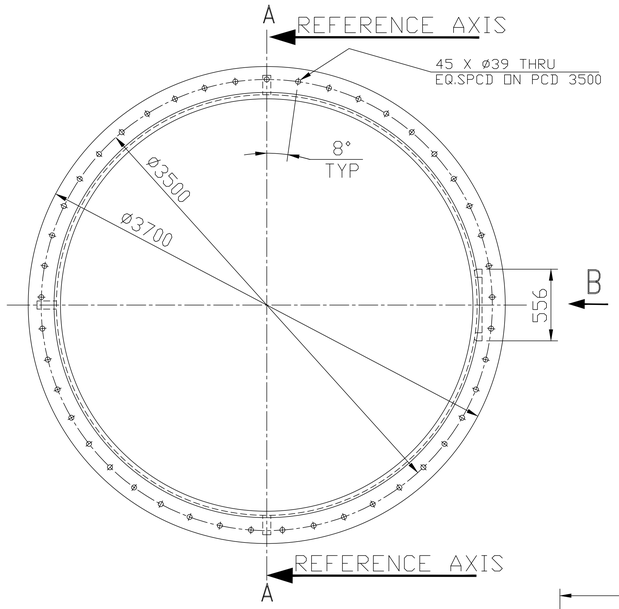
| REV. | DATE | ALTERED | CHECKED | APPROVED |
|---|---|---|---|---|
| ZONE | | | | |

REF. DRG. NO.
COMP. FILE NAME
INVENTORY NO

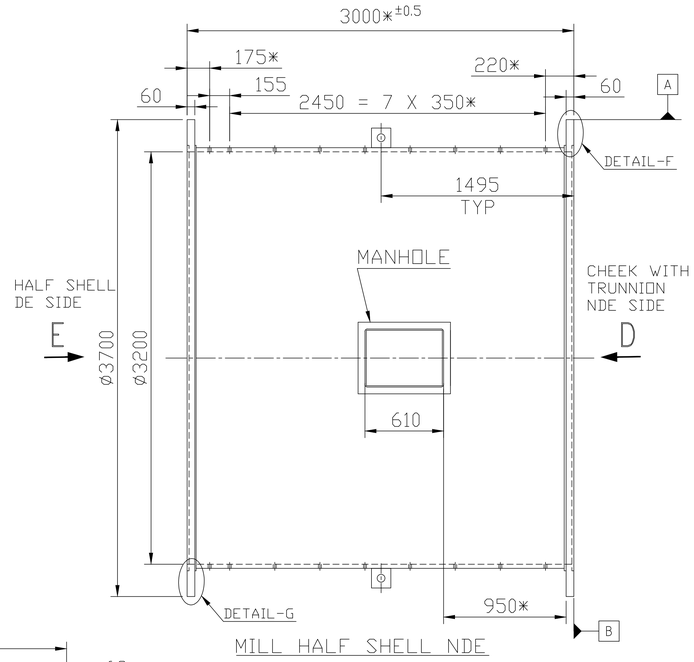
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

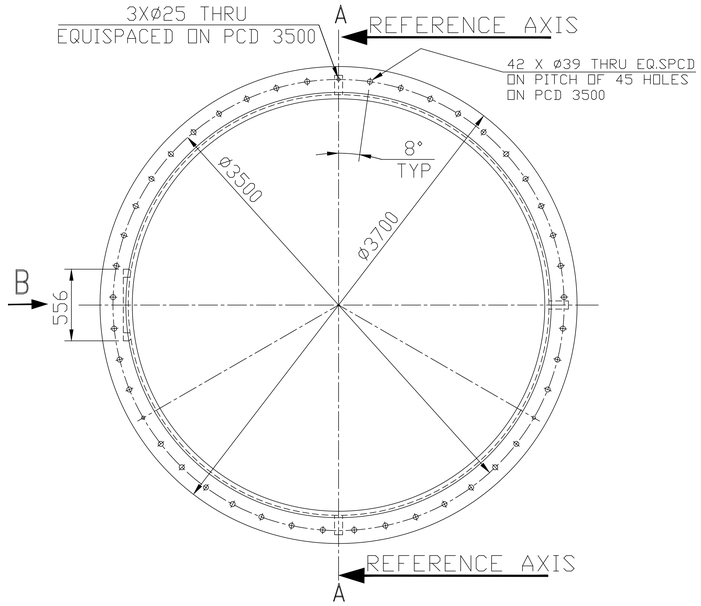
DRG. NO. 0-62-215-00044



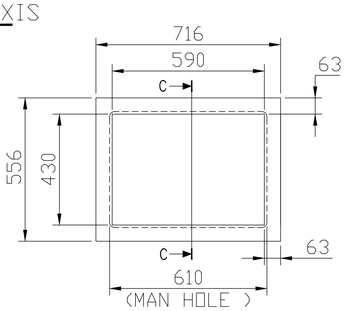

VIEW-E



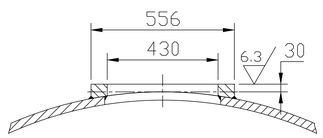

MILL HALF SHELL NDE



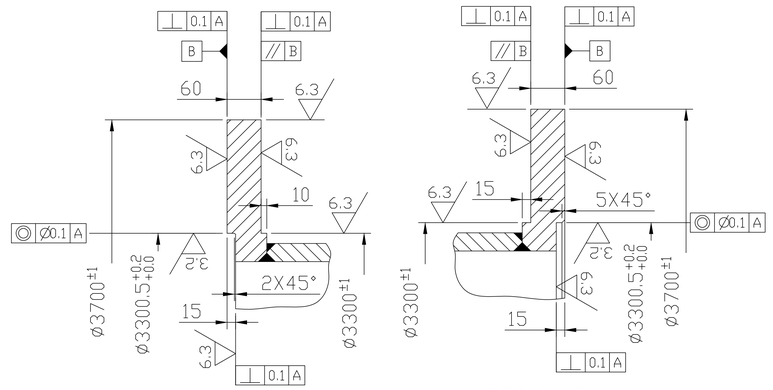

VIEW-D




VIEW-B

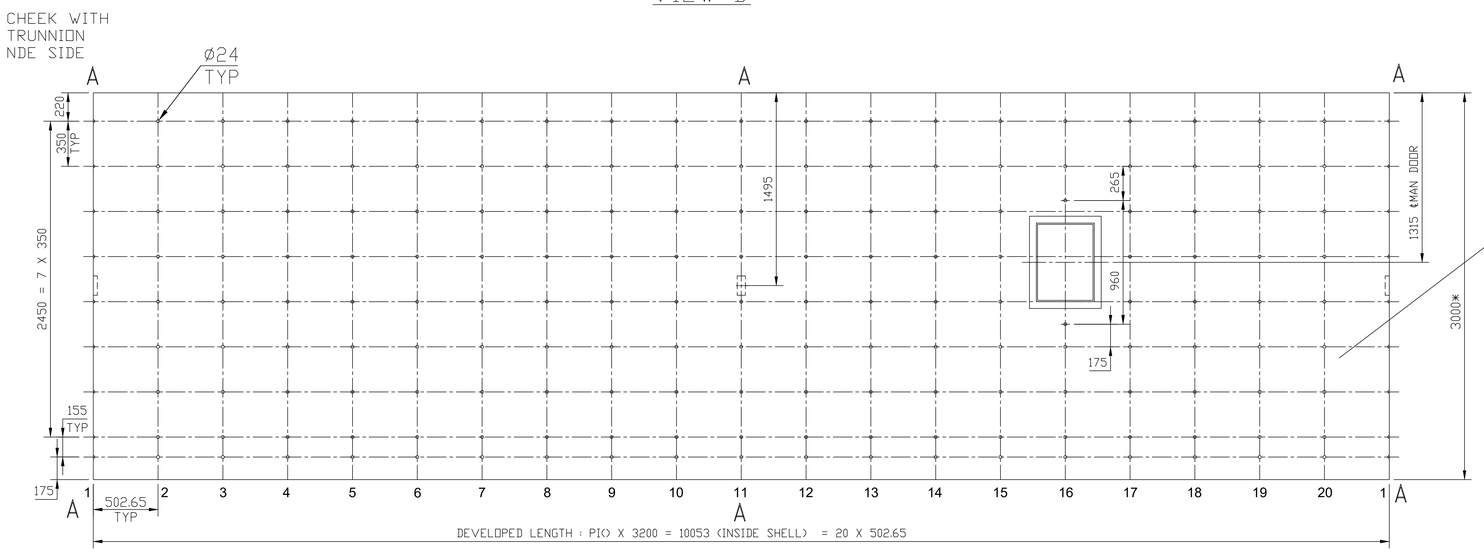


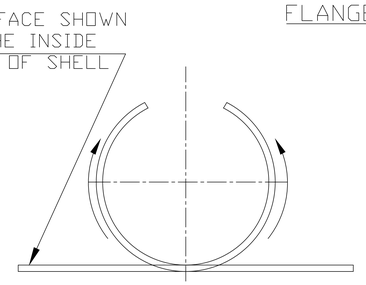

SECTION C-C




DETAIL-G DETAIL-F

FLANGE MACHINING DETAILS




NOTES:

1. DRILL THE LINER HOLES (ø24 MM) AND HOLES ON SHELL FLANGES (ø 25 AND ø39 ) WITH REFERENCE TO A-A AXIS.THE POSITIONING DEVIATION OF LINER HOLES MUST NOT EXCEED ±1 MM.
2. ALL HOLES SHALL BE CHAMFERED BY 1MM AT 45° ON OUTSIDE OF SHELL.
3. CRITICAL DIMENSIONS ARE IDENTIFIED WITH '*'.
4. INSPECTION AS PER APPROVED QUALITY PLAN.

DRILLING LAYOUT OF ø24 MM HOLES (179 Nos) ON HALF SHELL (NDE) : PITCH DISTANCE OF 350 MM ALONG AXIS AND 18° ALONG CIRCUMFERENCE

| ITEM NO. | DESCRIPTION | DRAWING NO. | VAR. NO. | RAW MATERIAL SIZE OR CASTING DRG. NO. OR FORGING DRG. NO. | MATERIAL CODE | NET WT. | GROSS WT. |
|---|---|---|---|---|---|---|---|
| | | | | | MATERIAL SPECN. | QUANTITY | |
| 01 | MILL SHELL FAB WITH LIFTING LUGS | 2-62-215-00024 | | | 12150 | | |
| | | | | | 01 | | |

| REV. | DATE | ALTERED | CHECKED | APPROVED |
|---|---|---|---|---|
| 01 | 26.07.22 | | SHARIFF | AMAN |

NON-CAST PARTS:
(FABRICATED AND /OR MACHINED)

ALL DIMENSIONS ARE IN MILLIMETERS
TOLERANCES UNLESS OTHERWISE NOTED
X.XX ±0.40
X. & X.XX ±1.5 FOR DIM. 0-610 MM
X. & X.XX ±3.8 FOR DIM. 610-2440 MM
X. & X.XX ±6.3 FOR DIM. OVER 2440 MM
ANGULAR: ±0°30'
DRILLED HOLES: Ø 0-25MM +0.25/-0.00 OVER 25 MM +0.50/-0.00
SURFACE TEXTURE: 25 MICRO METERS
ROUGHNESS AVERAGE-Ra
THIS DRAWING IS IN ACCORDANCE WITH ISO 1101
UNLESS OTHERWISE SPECIFIED, THE THREAD PITCH IS STANDARD COARSE.

TYPE OF PRODUCT: WET BALL MILLS
NAME OF CUSTOMER/PROJECT

BHARAT HEAVY ELECTRICALS LIMITED HYDERABAD

| | NAME | SIGN. | DATE | NO.OF VAR. |
|---|---|---|---|---|
| DRN. | SHARIFF | | 26.07.22 | |
| CHD. | K.PAVAN | | 26.07.22 | |
| APPD. | AMAN | | 26.07.22 | |

DEPT. 4460 | CODE PULV. ENGG. | SCALE NTS | WEIGHT (KG) 12120 | REF. TO ASSY DRG. | ITEM NO. | NO.OF ITEMS

TITLE: MILL HALF SHELL MACHINING-NDE

DRAWING NO. 0-62-215-00044 | REV. 00

SHEET NO. | NO OF SHEETS

REF. DRG. NO. | COMP. FILE NAME | INVENTORY NO