

## MTO

Project No. : 120800-803  
 Client : Dangote Oil Refining Company  
 Consultant : EIL  
 Eqpt. No. : 133-RB-1003

Ref. : 120800-803/MTO/FOR-03  
 Rev. : 0  
 Date : 27-02-2017

For Dimensions, refer sketch "120800-803-FOR03"

**Notes :**

- 1 Material : SA-336 Gr. F11 Cl.3
- 2 The material shall meet all the requirements of ASME Section II Part A Edition 2015.
- 3 Forgings shall meet all the requirements of API RP 934-C [Latest Edition].
- 4 The forging shall be supplied in normalized & tempered condition or in quenched & tempered condition. Minimum tempering temperature shall be 15°C greater than simulation PWHT temperature.
- 5 The forgings shall be fine grained & vacuum degassed
- 6 The following additional chemical requirements shall also be met by heat analysis.  
 $X\text{-bar} = (10P + 5Sb + 4Sn + As) / 100 \leq 15 \text{ ppm}$ , where P, Sb, Sn and As are in ppm.  
 Additionally, C = 0.15 wt % max, P = 0.007 wt % max, S = 0.007 wt % max, Cu = 0.20 wt % max and Ni = 0.30 wt % max.
- 7 Product analysis shall be carried out and reported in the material test certificates.
- 8 Simulation heat treatment of test coupons of the forgings shall be carried out according to the cycle given below.  
 Rate of Heating: 56°C/hr (maximum) above 300°C  
 Temperature: 680 ± 10°. C  
 Holding Time:  
 1.Min PWHT: 210 minutes  
 2.Max PWHT: 630 minutes  
 Rate of Cooling: 56°C/hr (maximum) upto 300°C
- 9 All the mechanical tests shall be reported for the following.
  - 1) As Supplied
  - 2) As Supplied + Minimum PWHT Condition
  - 3) As Supplied + Maximum PWHT Condition
- 10 All forgings shall be impact tested at -18°C as per ASME Sec VIII Div 1 [Edition 2015]. The minimum impact energy shall be 54 J average of three specimens and 27 J minimum for a single specimen.  
 Number of test shall be carried out considering 1 set of 3 specimens per test condition.  
 Test specimens shall be taken from normal to the direction of greatest elongation and at 1/2 T location.  
 Percentage shear fracture shall meet 25% minimum. Lateral expansion shall also be reported.
- 11 All forgings shall be ultrasonically examined with 100% scanning in accordance with paragraph 3.3.4 of ASME Sec VIII Div 2 [Edition 2015].
- 12 Entire surfaces of forgings including welding edges shall be magnetic particle examined in accordance with para 7.5.6 of ASME Sec VIII Div 2 [Edition 2015] after finish machining.
- 13 Room temperature Tensile test shall be performed. 2 test per forging (taken at 180° apart) of each size in each heat and heat treatment charge shall be performed. Test specimen shall be taken at 1/2T location in tangential direction. Acceptance criteria shall be as per SA-336 of ASME Sec II Part A [2015 Edition].
- 14 The hardness shall not exceed 200 BHN. Hardness test shall be performed on each tensile test specimen prior to tensile testing using Brinell, Vickers or Rockwell Methods.
- 15 Repair by welding is not permitted.
- 16 Forging shall be supplied in fully machined condition. Vendor shall submit forging sketches for Godrej approval. Manufacturing activities should start only after approval of sketches by Godrej.
- 17 Forgings shall be legibly stamped or stenciled showing grade no. and item no. with "low stress stamp". Certification and Marking shall be in accordance with SA-336 of ASME Section II Part A [Edition 2015].
- 18 Inspection: Material test reports shall be in accordance with EN 10204 Type 3.2 (Lloyds/TUV Nord/BV).

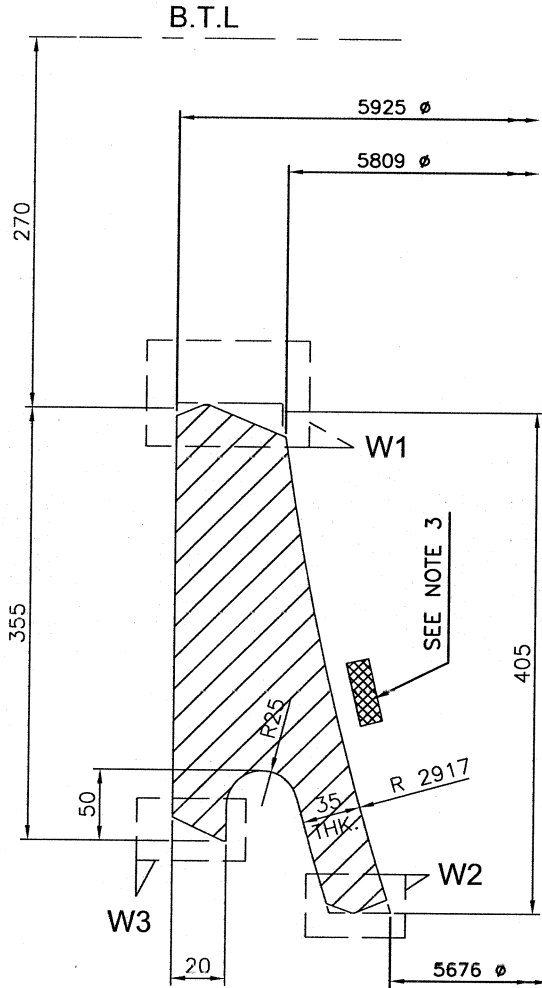
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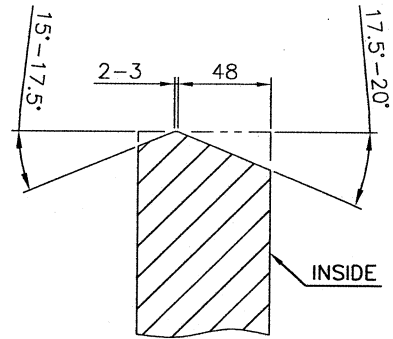
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**NOTES:**

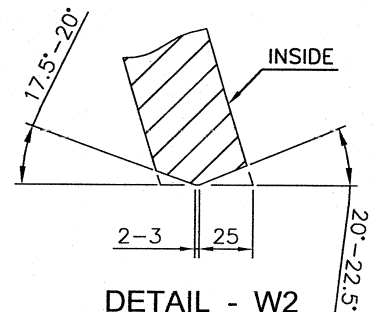
- 1) ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
- 2) FOR GENERAL NOTES, REFER 120800-803/MTO/FOR-03.
- 3) TENSION TEST SPECIMEN IN ADDITION TO THOSE REQUIRED BY MATERIAL SPECIFICATION SHALL BE TAKEN IN THE DIRECTION PARALLEL TO THE AXIS OF THE HUB AS PER CLAUSE NO 3.10 OF ASME SEC VIII, DIV 2, [2015 EDITION] AND THE TEST RESULTS SHALL BE REPORTED.



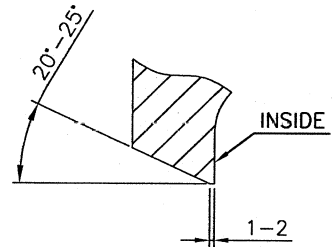
**DETAIL OF Y-RING**



**DETAIL - W1**




**DETAIL - W2**



**DETAIL - W3**

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ITEM CODE: YRING3

SCALE NTS	TITLE: <u>DETAILS OF Y-RING</u>	MATERIAL SA-336 GR F11 CL 3	QUANTITY 1 NO.
EQPT. NO: <u>133-RB-1003</u>		PROJECT NO.: 120803	
CLIENT: EIL /DANGOTE		DRAWN: PPK, DATE: 27/02/17, CHECKED: PPK, DATE: 27/02/17, APPROVED: MP, DATE: 27/02/17	
 <b>Godrej &amp; Boyce Mfg. Co. Ltd.</b> Process Equipment Division		DRG. NO.: 120800-803-FOR03 SHT. 1 OF 1 REV.0	