

MTO

Project No.	: 120800-803	Ref.	: 120800-803/MTO/SRN-02
Client	: Dangote Oil Refining Company	Rev.	: 1
Consultant	: EIL	Date	: 13-04-2017
Eqpt. No.	: 133-RB-1002		

For Dimensions, refer sketch "120800-803-SRN02"

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: 165 minutes
2.Max PWHT: 990 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 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).

Rev 1: Note 8 Revised. Sketch revised as Marked

ASME**MASTER COPY**

Made By:  MK

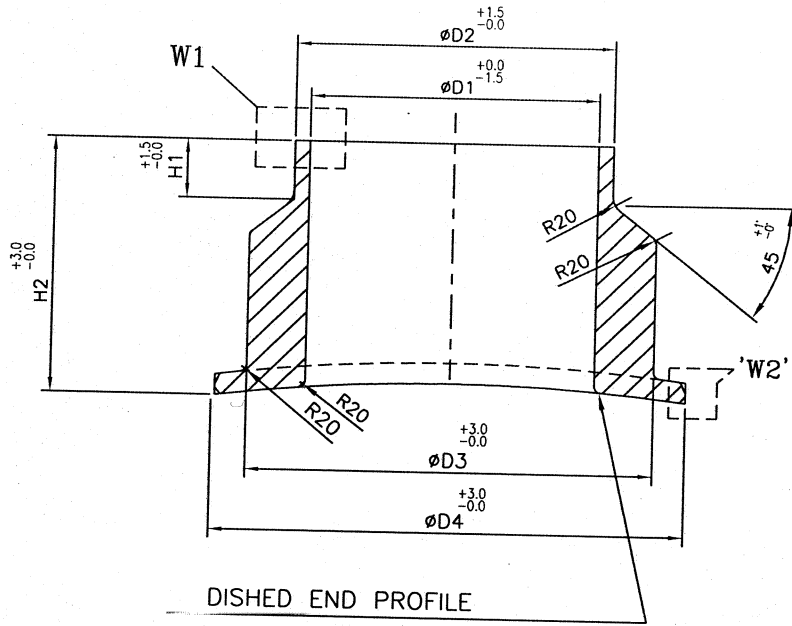
Page no. 1 of 1


Approved By: PK

REV.	DATE	DESCRIPTION	ALTD	CHKD.	APPD.	REV.	DATE	DESCRIPTION	ALTD	CHKD.	APPD.
1	13/04/17	SKETCH REVISED AS MARKED	MK	PPK	MP						

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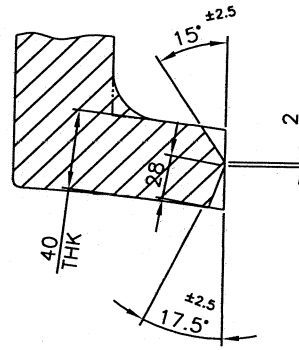
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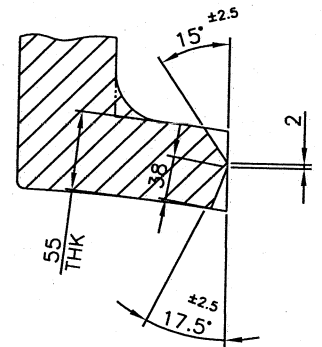
DISHED END PROFILE
TO SUIT R 2919.5 SPHERICAL

**DETAIL 'W1'
AS FOLLOWS**

FLANGES	FIG	ASME
<24"	8/9	B 16.5
>24"	1	B 16.47



**DETAIL 'W2'
FOR SR NO 2**



**DETAIL 'W2'
FOR SR NO 1,3**

3	N2	712	762	952	1052	50	375	SRN03R1	1
2	N3A-D	193.68	219.08	323.68	424	50	235	SRN02	4
1	M1	977	1049	1217	1317	146	486	SRN01	1
SR. No.	NOZZLE MARK	D1	D2	D3	D4	H1	H2	ITEM CODE	QTY.

SCALE: NTS
TITLE: DETAILS OF SRN
EQUIPMENT NO: 133-RB-1002

MATERIAL
SA336 GR.F11 CL.3

QUANTITY
REFER
TABLE

CLIENT: DANGOTE OIL REFINING COMPANY

PROJECT NO.: 120802

Godrej
Godrej & Boyce Mfg. Co. Ltd.
Process Equipment Division

DRAWN	DATE	CHECKED	DATE	APPROVED	DATE
MK	08/03/17	PPK	08/03/17	MP	08/03/17

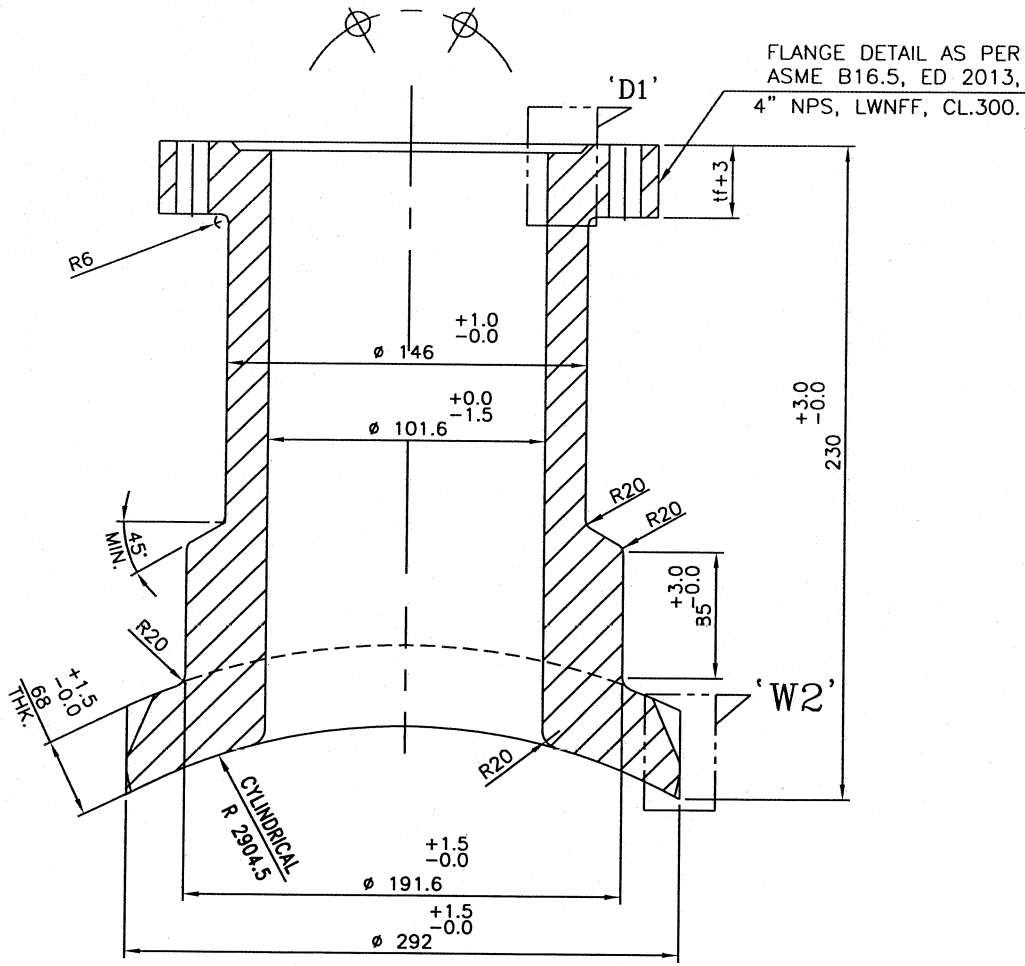
DRG. NO.:120800-803-SRN02 SHT. 1 OF 9 REV.1

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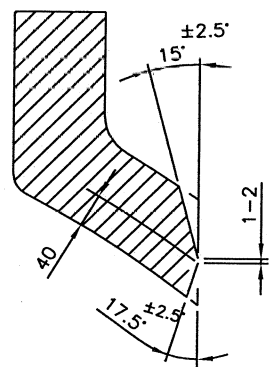
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1.	13/04/17	ENTIRE SKETCH REVISED	MP	PPK	MP						

NOTES:-

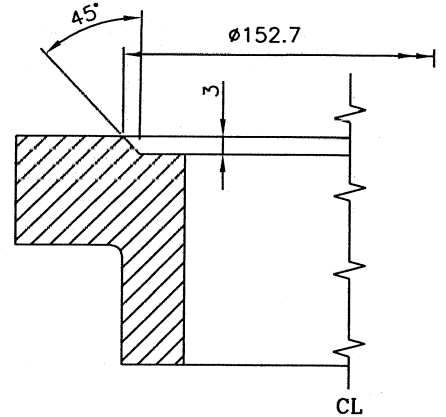
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DETAIL OF NOZZLES N7 Δ



WELD DETAIL 'W2'



WELD DETAIL 'D1'

SR NO : 04
ITEM CODE: SRN04R1

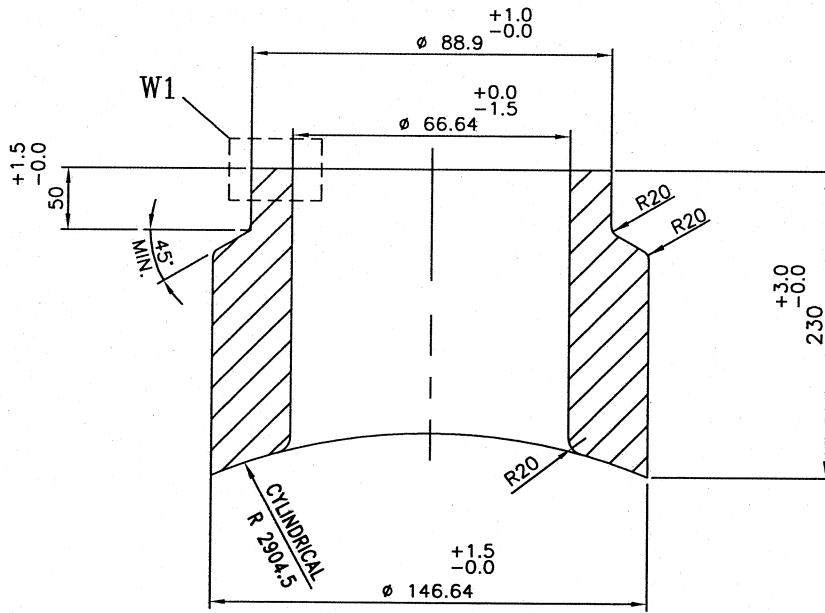
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CLIENT: DANGOTE OIL REFINING COMPANY		PROJECT NO.: 120802					
<p>Godrej & Boyce Mfg. Co. Ltd. Process Equipment Division</p>		DRAWN	DATE	CHECKED	DATE	APPROVED	DATE
		MK	08/03/17	PPK	08/03/17	MP	08/03/17
		DRG. NO.:120800-803-SRN02		SHT. 2 OF 9		REV.1	

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DETAIL OF NOZZLES N6 & N10

DETAIL 'W1'
 SHALL BE AS PER
 FIG 8/9 OF ASME 16.5

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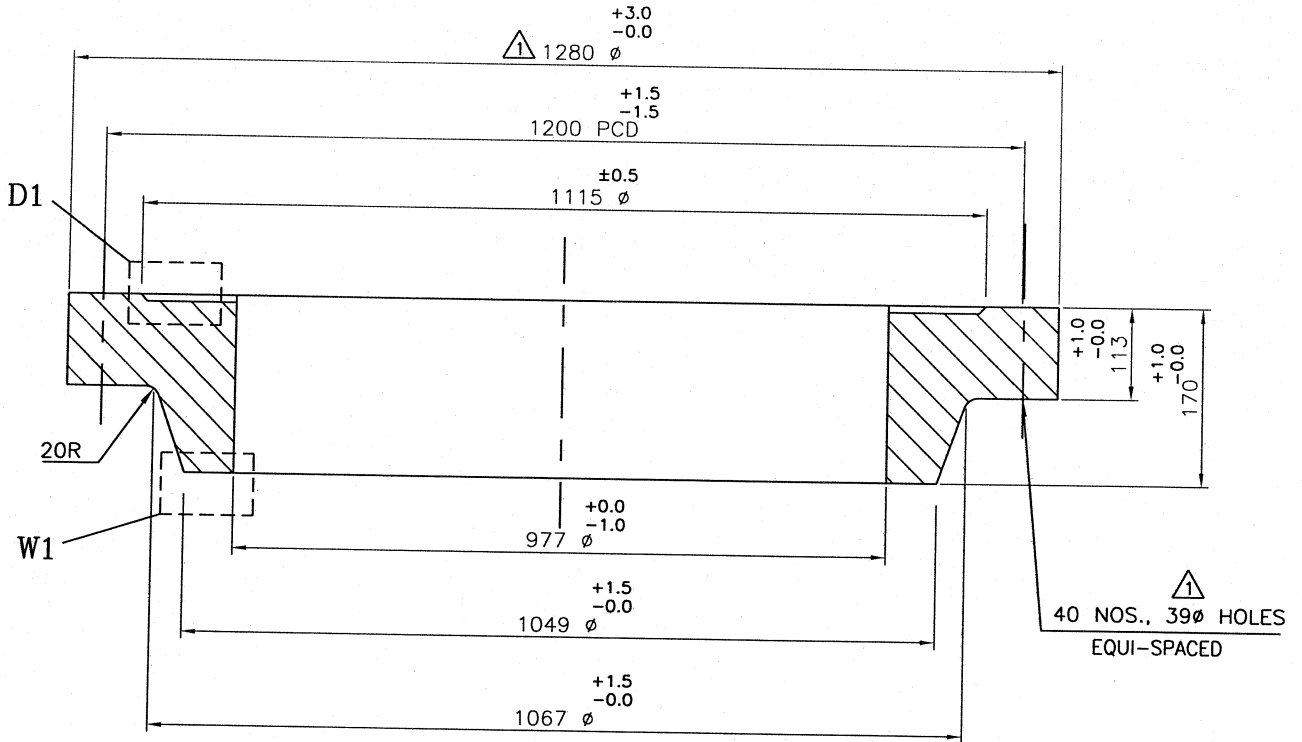
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 ITEM CODE: SRN05

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CLIENT: DANGOTE OIL REFINING COMPANY		PROJECT NO.: 120802					
 Godrej & Boyce Mfg. Co. Ltd. Process Equipment Division		DRAWN	DATE	CHECKED	DATE	APPROVED	DATE
		MK	08/03/17	PPK	08/03/17	MP	08/03/17
		DRG. NO.:120800-803-SRN02		SHT. 3 OF 9		REV.0	

REV.	DATE	DESCRIPTION	ALTD	CHKD.	APPD.	REV.	DATE	DESCRIPTION	ALTD	CHKD.	APPD.
1	13/04/17	SKETCH REVISED AS MARKED	MK	PPK	MP						

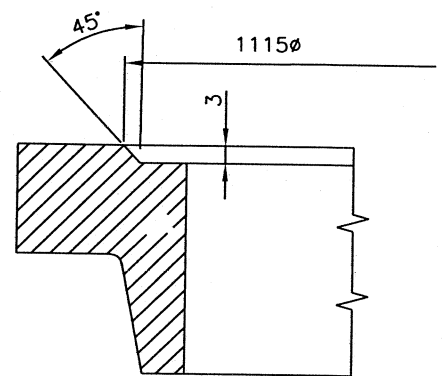
NOTES:-

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DETAIL OF NOZZLES M1

DETAIL 'W1'
 SHALL BE AS PER
 FIG 1 OF ASME B 16.47



WELD DETAIL 'D1'

SR NO : 06
 ITEM CODE: SRN06R1

SCALE: NTS	TITLE: DETAILS OF SRN EQUIPMENT NO: 133-RB-1002	MATERIAL SA336 GR F11 CL3	QUANTITY 01
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CLIENT: DANGOTE OIL REFINING COMPANY

PROJECT NO.: 120802

Godrej
 Godrej & Boyce Mfg. Co. Ltd.
 Process Equipment Division

DRAWN	DATE	CHECKED	DATE	APPROVED	DATE
MK	08/03/17	PPK	08/03/17	MP	08/03/17

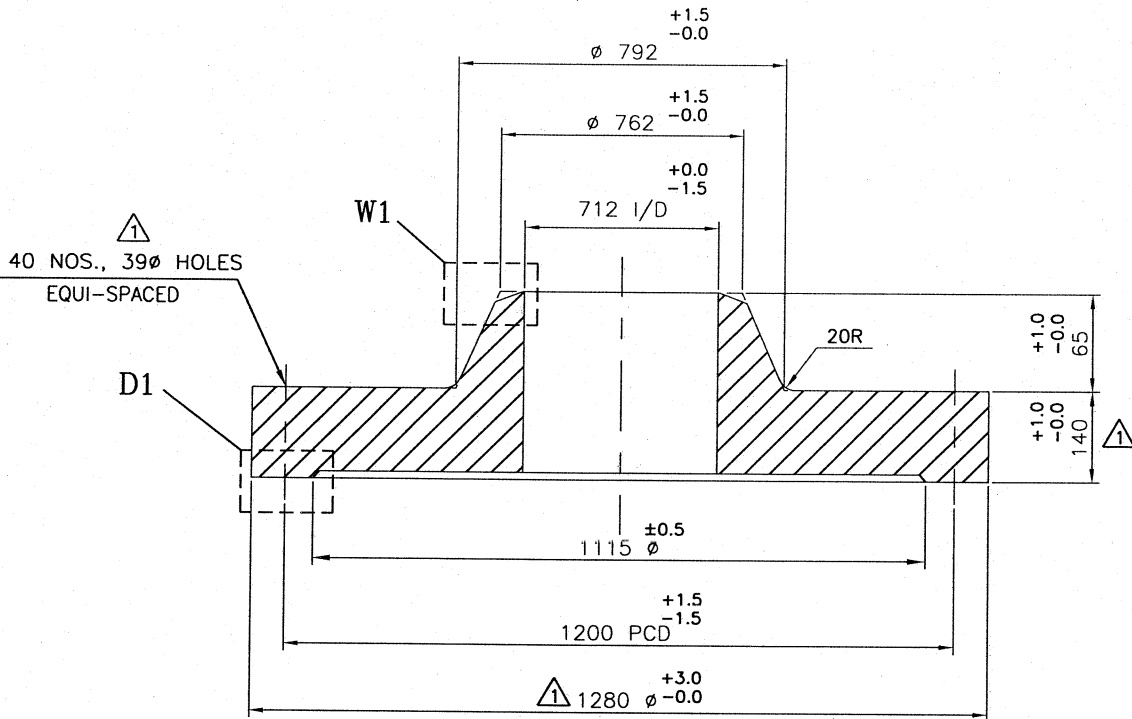
DRG. NO.:120800-803-SRN02 SHT. 4 OF 9 REV.1

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1	13/04/17	SKETCH REVISED AS MARKED Δ	MK	PPK	MP						

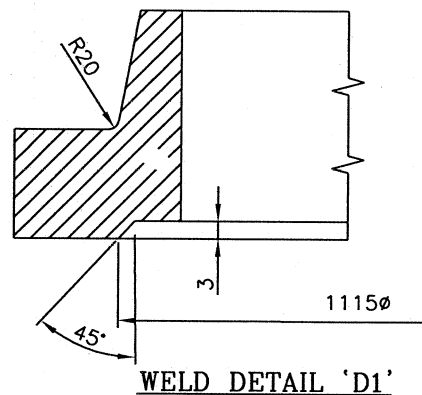
NOTES:

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DETAIL OF NOZZLE M1 REDUCING FLANGE

DETAIL 'W1'
SHALL BE AS PER
FIG 1 OF ASME B 16.47



SR NO: 07
ITEM CODE: SRN07R1

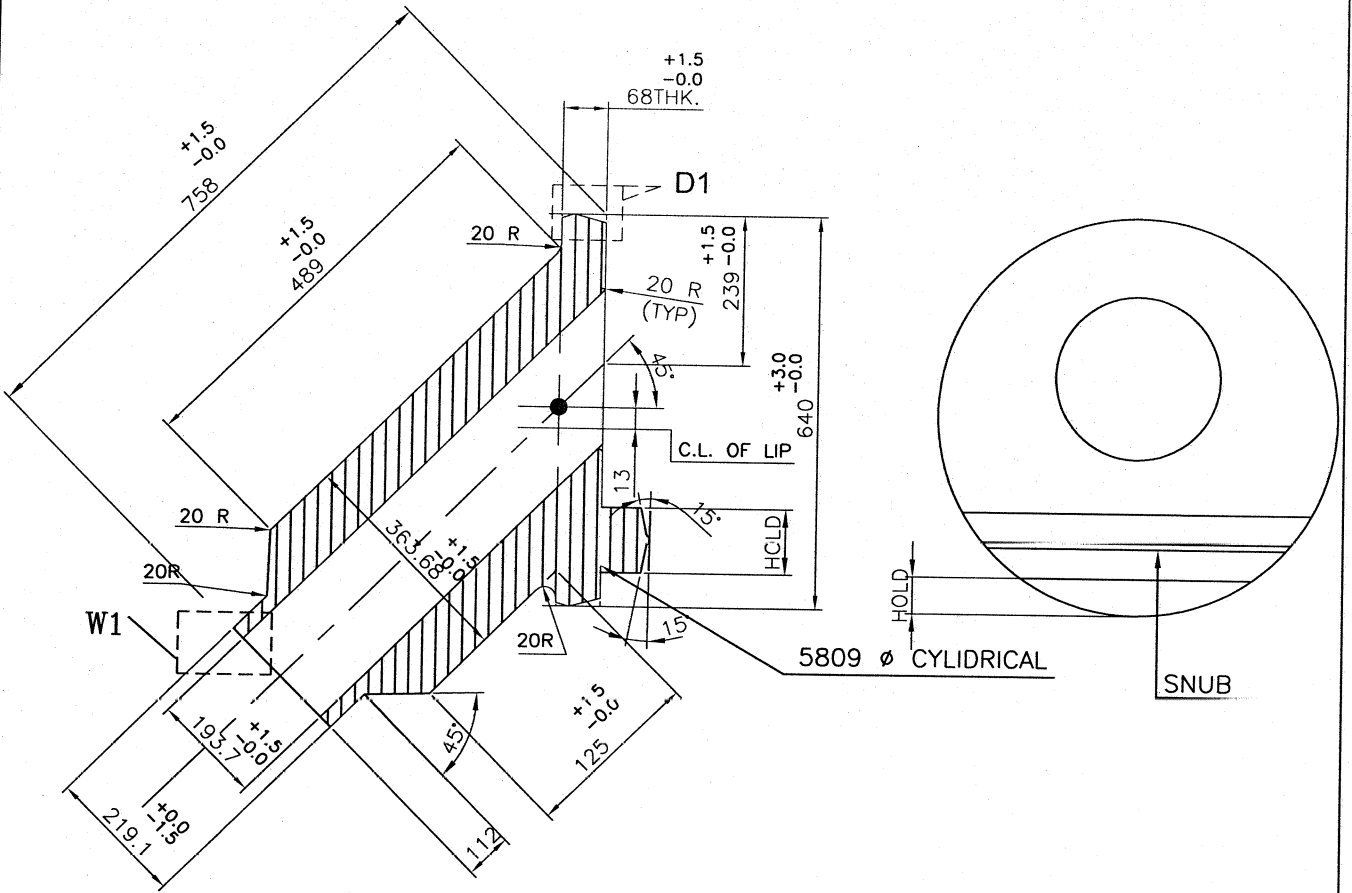
SCALE: NTS	TITLE: DETAILS OF REDUCING FLANGE EQUIPMENT NO: 133-RB-1002	MATERIAL SA336 GR F11 CL3	QUANTITY 01				
CLIENT: DANGOTE OIL REFINING COMPANY		PROJECT NO.: 120802					
 Godrej & Boyce Mfg. Co. Ltd. Process Equipment Division		DRAWN MK	DATE 08/03/17	CHECKED PPK	DATE 08/03/17	APPROVED MP	DATE 08/03/17
		DRG. NO.:120800-803-SRN02		SHT. 5 OF 9		REV.1	

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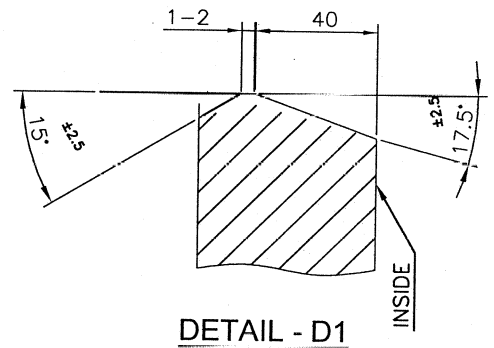
NOTES:-

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DETAIL OF NOZZLES N4A-D

DETAIL 'W1'
SHALL BE AS PER
FIG 8/9 OF ASME 16.5



DETAIL - D1

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SR NO: 08
ITEM CODE: SRN08

SCALE: NTS	TITLE: DETAILS OF SRN EQUIPMENT NO: 133-RB-1002	MATERIAL SA336 GR F11 CL3	QUANTITY 04				
CLIENT: DANGOTE OIL REFINING COMPANY		PROJECT NO.: 120802					
 Godrej & Boyce Mfg. Co. Ltd. Process Equipment Division		DRAWN MK	DATE 08/03/17	CHECKED RPK	DATE 08/03/17	APPROVED MP	DATE 08/03/17
		DRG. NO.: 120800-803-SRN02		SHT. 6 OF 9		REV. 0	

REV.	DATE	DESCRIPTION	ALTD	CHKD.	APPD.	REV.	DATE	DESCRIPTION	ALTD	CHKD.	APPD.
1.	13/04/17	ITEM DELETED	MP	PPK	MP						


NOTES:-

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DELETED

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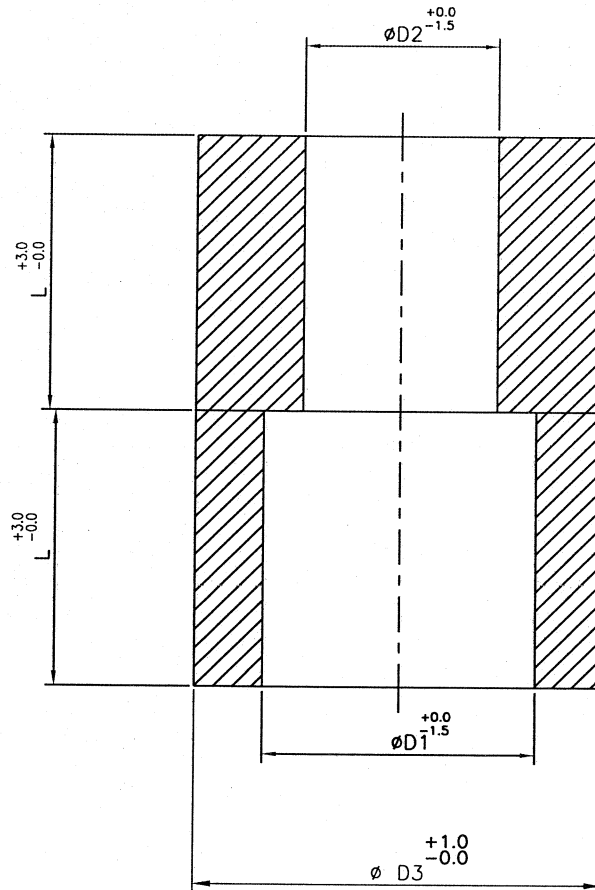
SR NO: 09
ITEM CODE: SRN09R1

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CLIENT: DANGOTE OIL REFINING COMPANY		PROJECT NO.: 120802						
 Godrej & Boyce Mfg. Co. Ltd. Process Equipment Division		DRAWN	DATE	CHKD.	DATE	APPROVED	DATE	
		MK	08/03/17	PPK	08/03/17	MP	08/03/17	
		DRG. NO.:120800-803-SRN02				SHT. 7 OF 9		REV.1

REV.	DATE	DESCRIPTION	ALTD	CHKD.	APPD.	REV.	DATE	DESCRIPTION	ALTD	CHKD.	APPD.

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10	N1-VERTICAL SPOOL 1	712	706	762	175	SRN10	1
SR. NO.	NOZZLE MARK	D1	D2	D3	L	ITEM CODE	QTY.

SCALE: NTS	TITLE: DETAILS OF SRN EQUIPMENT NO: 133-RB-1002	MATERIAL SA336 GR F11 CL3	QUANTITY REFER TABLE
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CLIENT: DANGOTE OIL REFINING COMPANY

PROJECT NO.: 120802

Godrej
Godrej & Boyce Mfg. Co. Ltd.
Process Equipment Division

DRAWN	DATE	CHECKED	DATE	APPROVED	DATE
MK	08/03/17	PPK	08/03/17	MP	08/03/17
DRG. NO.:120800-803-SRN02			SHT. 8 OF 9		REV.0

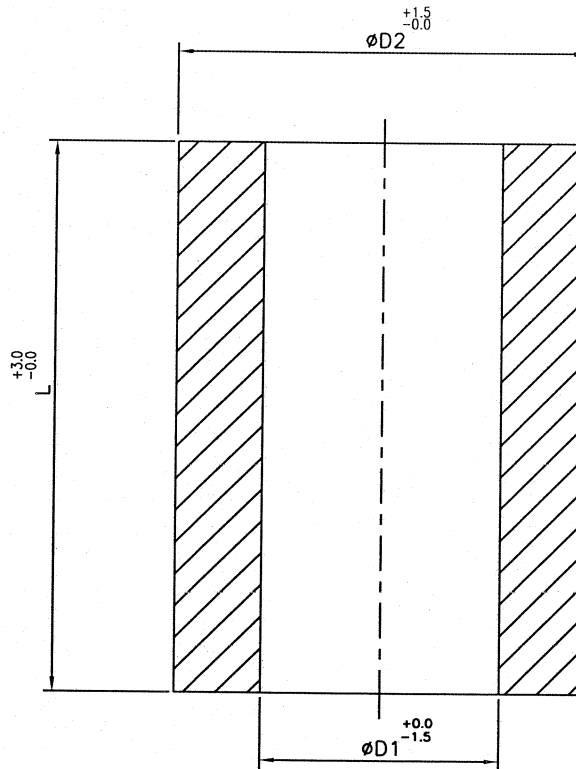
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1	13/04/17	SKETCH REVISED AS MARKED Δ	MK	PPK	MP						

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16	N8, N9 -NECK	66.64	88.90	250	SRN16	2
15	N3A-D - SPOOL 2	193.68	219.08	745	SRN15	4
14	N3A-D - SPOOL 1	193.68	219.08	825	SRN14	4
13	N2-HORIZONTAL SPOOL	712	762	785	SRN13	3
12	N2-VERTICAL SPOOL	712	762	250	SRN12	1
11	N1-HORIZONTAL SPOOL	706	762	Δ 400	SRN11R1	1
SR. NO.	NOZZLE MARK	D1	D2	L	ITEM CODE	QTY.

SCALE: NTS	TITLE: DETAILS OF SRN EQUIPMENT NO: 133-RB-1002	MATERIAL SA336 GR F11 CL3	QUANTITY REFER TABLE				
CLIENT: DANGOTE OIL REFINING COMPANY		PROJECT NO.: 120802					
 Godrej & Boyce Mfg. Co. Ltd. Process Equipment Division		DRAWN	DATE	CHECKED	DATE	APPROVED	DATE
		MK	08/03/17	PPK	08/03/17	MP	08/03/17
		DRG. NO.: 120800-803-SRN02		SHT. 9 OF 9		REV. 1	