

SCHEDULE 4

STEEL ROLL SRM300/R20

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DRG NO.: 20. ST.115.02.160/11 SL.NO.: 01 RADIUS-R: R20

TDC NO: TDC/TE/MFG-06 REV.NO:04/DATED: 26.08.2010

Product : **SRM ROLLS**

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Revision Record	04 – Clause 3.4 : modified Clause 7.1 : liquid penetrant test details added Clauses 6.0 – 11.0 rearranged & renumbered to 6.0 – 10.0 Clause 8.0 : modified		

1.0 PRODUCT:

Sl.No.	Equipment / Product	Drg. No.	Drg. Rev. No.
1.	Steel Roll SRM 300	20.ST.115.02.160	AS PER LATEST ENQUIRY / PURCHASE ORDER
2.	Steel Roll SRM 380	20.ST.115.01.157	

2.0 APPLICATION:

Used in Stretch Reducing Mill Stands - for Hot Rolling of Seamless Steel Tubes in Temperature 850 - 900 Deg.C

3.0 MATERIAL:

- DIN 1.2201 – X165Cr.V12 (OR) SAE J438(70) D2 (OR) IS:3748-1990 XT160Cr12**
- Conduct Ultrasonic Test on Raw Material after proof machining in accordance with SA 388.
- Acceptance Standard in accordance with AM 203.2(c), ASME Sec VIII Div.2.
- Chemistry : As per drawing
Original mill test certificate shall be provided. Otherwise copy of original mill test certificate and test report from **NABL accredited lab** for chemical check on sample from the procured material shall be provided.

4.0 DIMENSIONS AND TOLERANCE:

Shall be as per Drawing

5.0 HEAT TREATMENT:

Sl.No.	Process	Detail
1.	Stress Relieving	650-705 Deg.C 2 Hours / 25mm Soaking Slow cooling to 500 Deg.C Air Cool
2.	Hardening	980-1025 Deg.C 1 Hour / 25mm Soaking
3.	Oil Quenching	80 Deg.C (Servo Quench 11)
4.	Tempering – I	470-580 Deg.C 3-4 Hrs. Soaking Air Cool to Hand-warm Temperature (about 50 Deg.C)
5.	Tempering – II	530-550 Deg.C 1 Hour / 25mm Soaking

6.0 INSPECTION & TESTING:**6.1 DIMENSIONAL INSPECTION :**

Dimensional inspection shall be carried out by the supplier and report for the same shall be sent along with the supplies – Acceptance as per drawing.

Air gap to be checked using template and the same shall be given by SSTP/BHEL on placement of order

BHEL, Tiruchirapalli-620014	SSTP / Tool Engineering	Technical Delivery Conditions	
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6.2 MECHANICAL TESTING:

1. Hardness Test as per **DIN EN ISO 6508-1** FOR X165CrV12 - Acceptance as per Drawing.
2. Hardness Test as per **SAE J438(70)** for D2 - Acceptance as per Drawing.
3. Hardness Test as per **IS:3748-1990** for XT160Cr12 - Acceptance as per Drawing.

7.0 NON-DESTRUCTIVE TEST :

7.1. Liquid Penetrat Test :

To be conducted on entire surface after finish machining as per **ASTM E165** and shall be certified by **NDT Level II qualified personnel as per SNT-TC-1A.**

Acceptance standards : All surfaces to be examined shall be free of,

1. Relevant linear indications,
2. Relevant rounded indications greater than 3/16 inch (5 mm)
3. Four or more relevant rounded indications in a line separated by 1/16 inch (1.5 mm) or less, edge to edge.

8.0 TEST CERTIFICATE/REPORT :

Following test certificates shall be sent with Materials.

PO No., component name, TDC NO. and drawing no. shall be mentioned where ever applicable.

Traceability data like Heat / Melt No. & job Sl. No. shall be provided in all the reports.



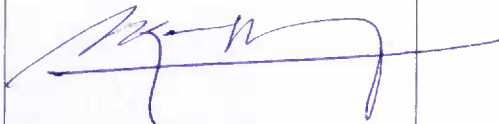
1. Raw Material Chemistry (**Clause 3.4**)
2. Hardness (**Clause 6.2**)
3. Temperature-Time-Recorder Graph for the Heat Treatment Cycle followed
4. Ultrasonic Test Report for Raw Material (**Clause 3.2 & 3.3**)
5. Liquid Penetrant Test (**Clause 7.1**)
6. Dimension Report (**Clause 6.1**)

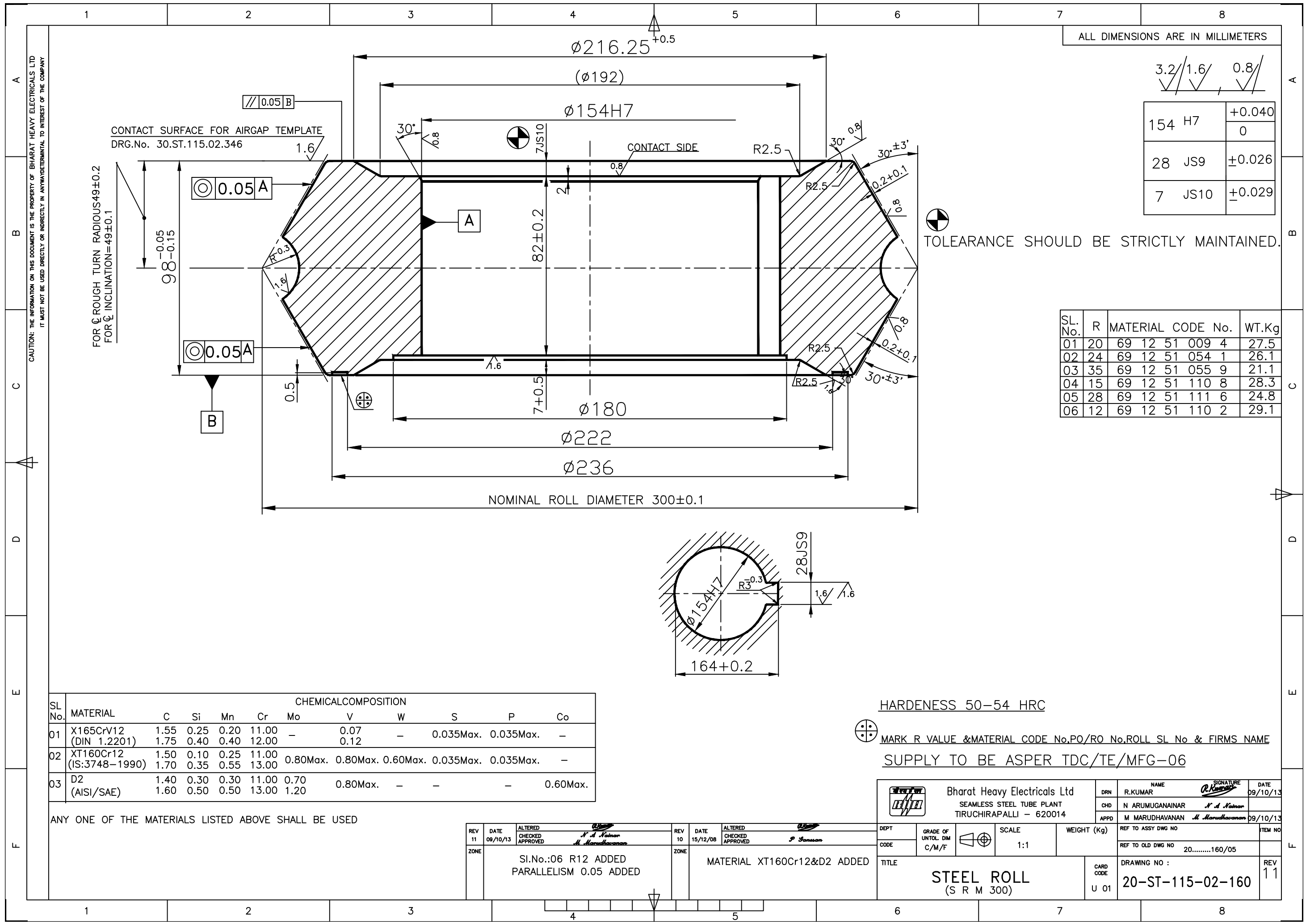
9.0 MARKING:

The marking shall be done on the job as shown in the Drawing.

10.0 PRESERVATION & PACKING :

1. Supply with rust preventive coating which shall be dry after application and removable by common solvents.
2. Pack suitably to avoid transit & handling damages

Prepared By	Reviewed By	Approved By
 DM / TE	 DGM / QA&C	 AGM / TE



ALL DIMENSIONS ARE IN MILLIMETERS

154 H7	+0.040 0
28 JS9	±0.026
7 JS10	±0.029

TOLEARANCE SHOULD BE STRICTLY MAINTAINED.

SL. No.	R	MATERIAL CODE No.	WT.Kg
01	20	69 12 51 009 4	27.5
02	24	69 12 51 054 1	26.1
03	35	69 12 51 055 9	21.1
04	15	69 12 51 110 8	28.3
05	28	69 12 51 111 6	24.8
06	12	69 12 51 110 2	29.1

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SL No.	MATERIAL	CHEMICAL COMPOSITION									
		C	Si	Mn	Cr	Mo	V	W	S	P	Co
01	X165CrV12 (DIN 1.2201)	1.55 1.75	0.25 0.40	0.20 0.40	11.00 12.00	-	0.07 0.12	-	0.035Max.	0.035Max.	-
02	XT160Cr12 (IS:3748-1990)	1.50 1.70	0.10 0.35	0.25 0.55	11.00 13.00	0.80Max.	0.80Max.	0.60Max.	0.035Max.	0.035Max.	-
03	D2 (AISI/SAE)	1.40 1.60	0.30 0.50	0.30 0.50	11.00 13.00	0.70 1.20	0.80Max.	-	-	-	0.60Max.

ANY ONE OF THE MATERIALS LISTED ABOVE SHALL BE USED

HARDENESS 50-54 HRC

MARK R VALUE & MATERIAL CODE No, PO/RO No, ROLL SL No & FIRMS NAME

SUPPLY TO BE ASPER TDC/TE/MFG-06

REV 11	DATE 09/10/13	ALTERED CHECKED APPROVED	<i>N. A. Nairan</i>	REV 10	DATE 15/12/08	ALTERED CHECKED APPROVED	<i>P. Suresan</i>
SI.No.:06 R12 ADDED PARALLELISM 0.05 ADDED				MATERIAL XT160Cr12&D2 ADDED			

Bharat Heavy Electricals Ltd SEAMLESS STEEL TUBE PLANT TIRUCHIRAPALLI - 620014		DRN	R.KUMAR	NAME	<i>R. Kumar</i>	DATE	09/10/13
CHD	N ARUMUGANAINAR	APPD	M MARUDHAVANAN	SIGNATURE	<i>M. Marudhavanan</i>	DATE	09/10/13
DEPT	C/M/F	SCALE	1:1	WEIGHT (Kg)	REF TO ASSY DWG NO	ITEM NO	
TITLE	STEEL ROLL (S R M 300)		CARD CODE	U 01	REF TO OLD DWG NO	20.....160/05	
					DRAWING NO :	20-ST-115-02-160	REV 11