

## **SCHEDULE 3**

### **STEEL ROLL SRM380/R40 (20-157/08)**

STEEL ROLL SRM380 - R40

DRG. NO. : 20-ST-115-01-157/08 SL. NO. : 01.R40

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.



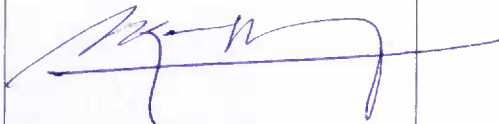
1. Raw Material Chemistry (**Clause 3.4**)
2. Hardness (**Clause 6.2**)
3. Temperature-Time-Recorder Graph for the Heat Treatment Cycle followed
4. Ultrasonic Test Report for Raw Material (**Clause 3.2 & 3.3**)
5. Liquid Penetrant Test (**Clause 7.1**)
6. Dimension Report (**Clause 6.1**)

**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

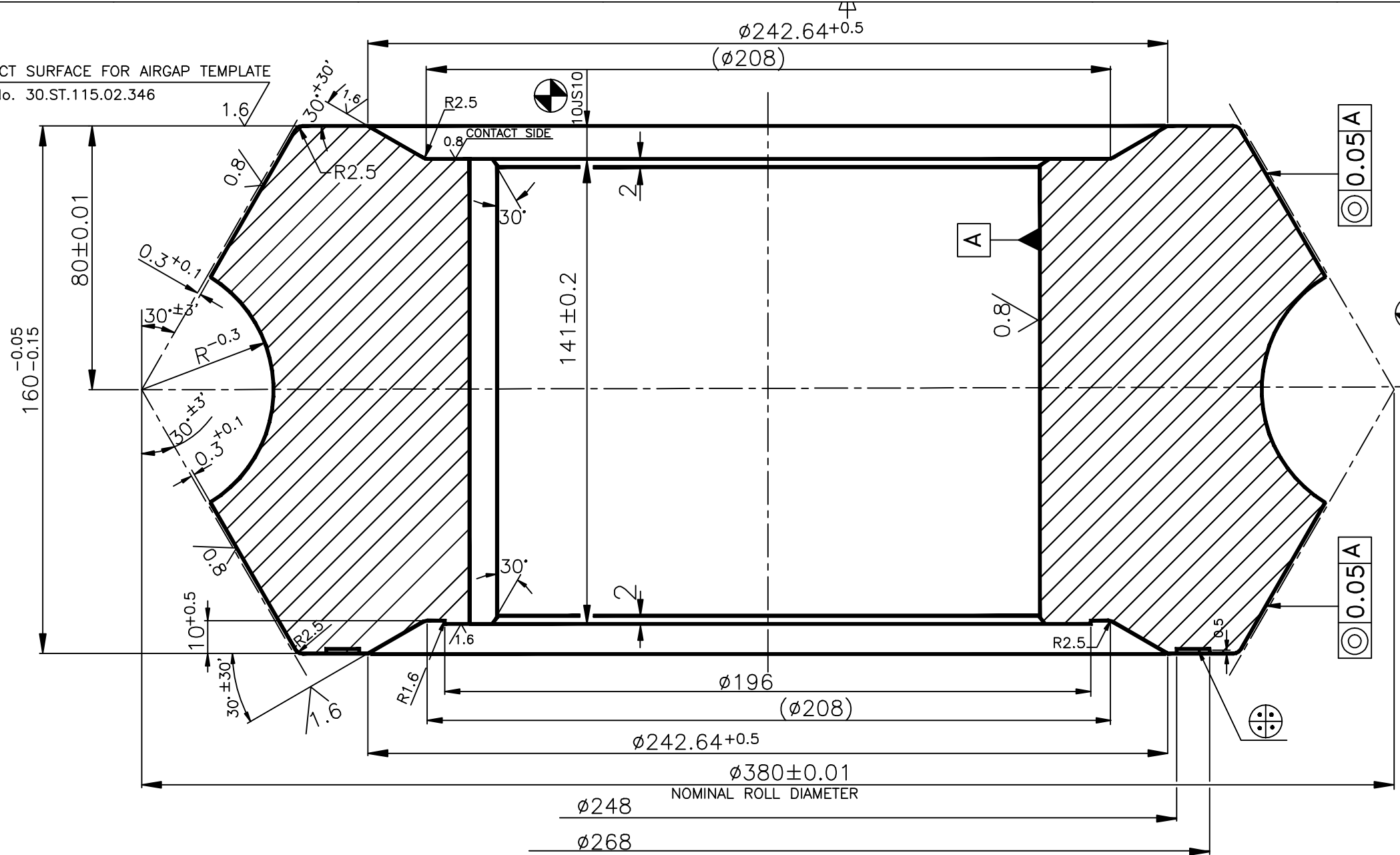
Prepared By	Reviewed By	Approved By
 DM / TE	 DGM / QA&C	 AGM / TE

CAUTION: THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LTD  
IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY MANNER DETERMINAL TO INTEREST OF THE COMPANY

ALL DIMENSIONS ARE IN MILLIMETERS

CONTACT SURFACE FOR AIRGAP TEMPLATE  
DRG No. 30.ST.115.02.346

3.2/1.6/0.8/



165 H7	+0.040
	0
30 JS9	+0.026
	-0.026
10 JS10	+0.029
	-0.029

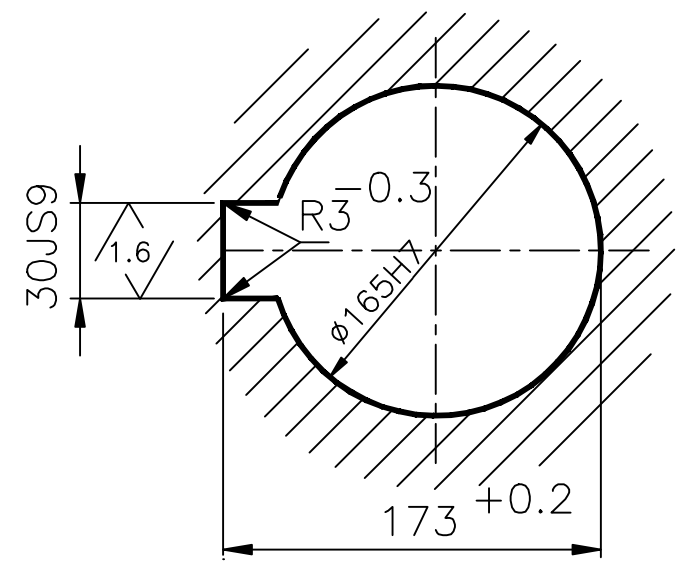
TOLERANCE SHOULD BE STRICTLY MAINTAINED.

SL. No.	R	MATERIAL CODE No.	WT.Kg
01	40	69 11 11 056 4	69.51
02	45	69 11 11 006 8	64.88
03	50	69 11 11 007 6	60.25
04	60	69 11 11 055 6	49.52
05	35	69 11 11 110 8	71.50

SL. No.	MATERIAL	CHEMICAL COMPOSITION									
		C	Si	Mn	Cr	Mo	V	W	S	P	Co
01	X165CrV12 (DIN1.2201)	1.55	0.25	0.20	11.00	-	0.07	-	0.035Max.	0.035Max.	-
		1.75	0.40	0.40	12.00	-	0.12	-	0.035Max.	0.035Max.	-
02	XT160Cr12 (IS:3748-1990)	1.50	0.10	0.25	11.00	0.80Max.	0.80Max.	0.60Max.	0.035Max.	0.035Max.	-
		1.70	0.35	0.55	13.00	0.80Max.	0.80Max.	0.60Max.	0.035Max.	0.035Max.	-
03	D2 (AISI/SAE)	1.40	0.30	0.30	11.00	0.70	0.80Max.	-	-	-	0.60Max.
		1.60	0.50	0.50	13.00	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 08	DATE 15.12.08	ALTERED R.KUMAR	DEPT	GRADE OF UNTOL DIM C/M/F	SCALE 1:1	WEIGHT (Kg)	REF TO ASSY DWG NO	ITEM NO
APPROVED			XT160Cr12&D2MATERIAL ADDED		Bharat Heavy Electricals Ltd SEAMLESS STEEL TUBE PLANT TIRUCHIRAPALLI - 620014		DRN R.KUMAR	DATE 11.07.11
					S.KARUPPASAMY		CHD	
					APPD		REF TO OLD DWG NO 0107048-10.302	
TITLE STEEL ROLL (S R M 380)						CARD CODE U 01	DRAWING NO : 20.ST.115.01.157	REV 08