



SPECIFICATIONS FOR CONVERSION BY RING ROLLING

CENTRAL FOUNDRY FORGE PLANT
BHEL, RANIPUR, HARDWAR

NO.	FTECH/ SSBS RING
DATE	20/02/2014
REV	00
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1.0 Description :

This specification governs the quality requirements steels rings (Grade GX4CrNi13-4) ring rolled on ring rolling machine from ingots/ cake supplied by CFFP.

2.0 Scope of Work :

2.1 The supplier is to convert the ingots/ cake size to the rings by ring rolling operation. The item for ring rolling and the cake size are mentioned as below:

SNo	Delivery after Ring Rolling & machining				CFFP Bloom/ Cake		
	OD (mm)	ID (mm)	Thickness (mm)	Wt. (Kg)	Dia (mm)	Length (mm)	Wt. (Kg)
1	3310 ^{+5/-0}	2970 ^{+0/-5}	260 ^{+5/-0}	3425	750 ^{+5/-0}	1350 ^{+10/-0}	4680

2.2 Delivery Condition of the item: CFFP supplied cake / bloom/ Ingot will be return after ring rolling, subcritical annealing and rough machining.

3.0 Chemical Composition :

Actual chemical composition of the item will be intimated to supplier before sending the material for ring rolling operation. However, the chemistry of the cake/ blooms will be within the limits given below:

(All figures are in %)

Grade		C	S	P	Si	Mn	Ni	Cr	Mo
ASTM 743M	Min.	---	----	----	---	0.50	3.50	11.50	0.40
CA 6NM	Max.	0.06	0.030	0.030	1.00	1.00	4.50	14.00	1.0

4.0 Process :

Heating For Forging: Due care will be taken in loading the forging in the reheating Furnace. Care should be taken to avoid flame impingement on the ingots/ cakes/ bloom. The heating rate should be selected in such a way that cracks due to excessive thermal shock will not occur. Sufficient soaking time will be given to ensure uniform temperature is obtained across the cross section of Forging. Overheating and Burning during heating is not acceptable.

5.0 Forging and Ring Rolling :

The Upsetting/indenting/Punching must be carried out on hydraulic forging press of sufficient capacity. Ring Rolling operation shall be carried out on Continuous Ring Rolling machine. End Temperature of Rolling operation must be reported and shall lie in the range of 900-800°C.

Reduction ratio achieved in each forging operation may also be furnished. Actual dimensions and ovality if any after ring rolling shall be measured and recorded.



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6.0 Heat Treatment:

After Ring rolling slow cool to 650°C and Hold at 650°C for 6 hrs
Raise temperature @ 40 C/Hrs to 1010°C Min and hold at this temperature for 5 hrs followed by air cool to 95°C
Immediately charge in furnace and Hold at 100°C – 150°C for 4 hrs
Heat to 610°C and hold for 7 hrs followed by air cool.

7.0 Hardness :

Hardness of each forging shall be measured on minimum of three place 120° apart on both ends of the ring. The difference between three values for the rings shall not exceed 20 BHN.

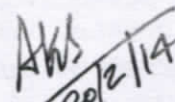
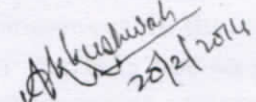

8.0 Inspection :

- i. Heat Treatment charts.
- ii. Dimension. The Ring rolling forging must be free from cracks and overlapping.
- iii. Random verification of chemistry (spectro analysis), after completion of process, will done by CFFP-inspector.
- iv. CFFP Reserves the right to witness the process at supplier work's.

9.0 Marking and Packing :

Before sending the Ring Rolled forging to CFFP following to be punched on each forging

- i. Forge Number
- ii. Heat Number
- iii. Item name

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