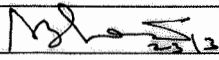
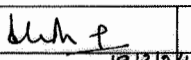
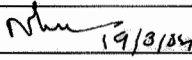
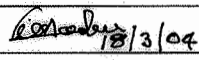


GOVERNMENT OF INDIA
(Ministry of Railways)

**SPECIFICATION FOR
25.4_{mm} DIA COPPER COATED
GRAPHITE ELECTRODE FOR
ARC GOUGING
(PL No. 7698 0637)**

Issued by

MECHANICAL DRAWING OFFICE
RAIL WHEEL FACTORY
YELAHANKA, BANGALORE-560 064
I N D I A

			
CME	CWE/Mfg. 19/3/04	Dy. CME/Mfg	SSE/D
APPROVED BY	REVIEWED BY	VERIFIED BY	PREPARED BY

Specification of 25.4 mm dia. Copper Coated Graphite Electrode for Arc Gouging

1.0 **Scope:**

1.1 This specification covers the design and manufacture and supply of Copper Coated Graphite Electrode to Rail Wheel Factory, Yelahanka, Bangalore-560064, Karnataka, India.

2.0 **General Description:**

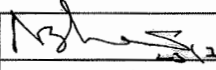
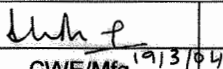
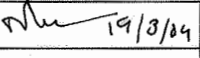
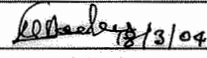
2.1 Copper Coated Graphite Electrode for Arc Gouging as per enclosed Drawing No. RWF/SK/MW-303, Alt. 'c'

3.0 **Job Requirement:**

3.1 Copper Coated Graphite Electrodes are required to remove the Riser stubs from the Cast Steel Wheel in such a manner that Stubs do not protrude excessively, and the wheel is not gouged.

4.0 **Technical Data:**

- 4.1 Material : Graphite with Copper coating.
- 4.2 Dimensions : As per Drawing given in Clause 2.1
- 4.3 Two consecutive electrodes must fit snugly for un-interrupted working. All the electrodes in the whole lot should have interchangeability as far as fitting of male in female socket is concerned. Suitable taper may be given on tip and the hole if so desired to achieve this purpose.
- 4.4 Density of Electrode (without Copper Coating) : 1.65 gm/cm³ min.
- 4.5 Density of Electrode (with Copper Coating) : 1.90 gm/cm³ (Approx.)
- 4.6 Specific resistance Without Copper Coating Excluding tip length. : 2.5 x 10⁻³ Ohm cm(Max.)

			
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- 4.7 Straightness over nominal length : Variation in straightness should not exceed 0.005 times, the nominal length i.e., ½% of nominal length.
- 4.8 Current carrying capacity : 2250 amps DC (min) during Arc gouging (Normal operating range 1800-2250 amps).
- 4.9 Thickness of Copper Coating : 0.20 mm min.

5.0 **Performance Parameters:**

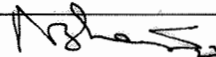
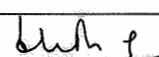
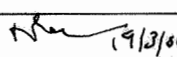
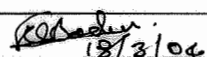
- 5.1 Expected consumption of Electrode : 0.75 per 'BOXN' Wheel, max.
- 5.2 Expected time for Sprue washing 1 wheel under normal operating condition : 2 minutes
- 5.3 The Electrode joints should not get red hot in use, nor should they cause damage to the electrode holder due to overheating.
- 5.4 The Electrode should not split or crack while in use.

6.0 **Inspection:**

- 6.1 The specification mentioned at 4.4 to 4.6 are only for manufacturing guidance, and the manufacturer shall furnish Test Certificate giving the values for his product. The firm must guarantee the consumption rate of 0.75 or less Electrode per Wheel (BOXN).
- 6.2 Parameters under clauses 4.8, 4.9, 5.1, 5.2, 5.3 and 5.4 will be validated during field tests.

7.0 **Acceptance:**

- 7.1 All the parameters except those specified for field test will be checked at firm's premises.

		 (9/3/04)	 (8/3/04)
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7.2 The field test shall be done at RWF on samples drawn from each lot supplied.

Lot size : 5000 or part thereof

Sample size : 300

7.3 The material will be accepted only after satisfactory completion of tests at 7.1 and 7.2.

7.4 The average Consumption of electrode per wheel for each lot will be based on the trials done on the sample size specified in Clause 7.2. This average consumption will be used for working out penalties detailed in Clause 7.5.

7.5 RWF reserve the right to accept consignment where consumption exceeds the maximum specified in Clause 5.1. Acceptance of such consignment will be with application of penalty as specified in the special conditions of contract.

8.0 Packing:

8.1 The electrodes shall be wrapped in packing paper and then packed in cardboard boxes of 20 (twenty) electrodes each. The packing shall be such that no damage/deterioration takes place during handling, transit and storage.

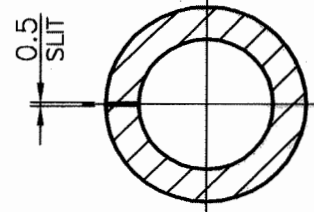
9.0 Destructive Test:

Sampling Norm : 4 pieces

Acceptance criteria : All Four should pass.

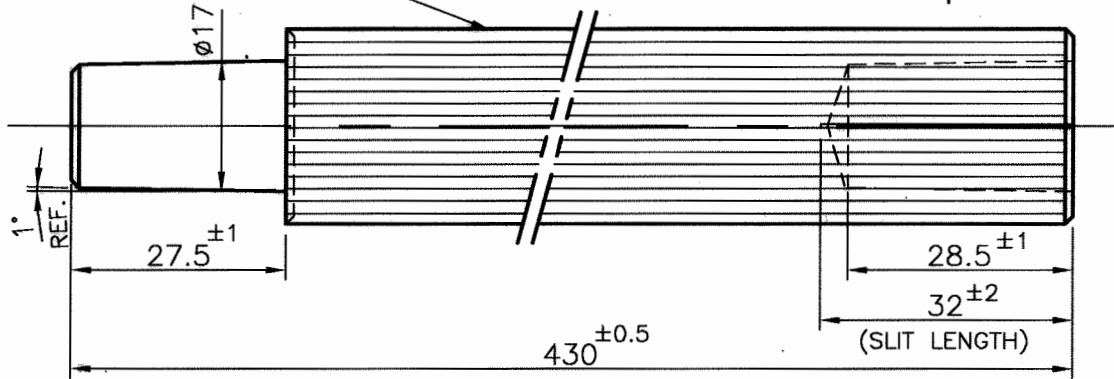
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ALT	DESCRIPTION	JOB No.	APPROVED
©	DRAWING REVISED & REDRAWN	4515	<i>M</i> 19/3



SECTION - 'AA'

SURFACE COATED WITH 0.2 mm THICK COPPER
& 0.1 mm DEEP FLUTING ON 1 mm PITCH (APPROX.)



NOTE:-

1. ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE SPECIFIED
2. DIMENSIONS FOR TIP & HOLE ARE ONLY FOR GUIDANCE
3. PERFECT FIT AND INTERCHANGABILITY OF ALL THE ELECTRODES IN THE LOTS IS THE ULTIMATE REQUIREMENT
4. TAPER SHALL BE GIVEN ON TIP AND THE HOLE FOR TIGHT FITTING OF ELECTRODE

IS:2102 (PART-1)-1993 OR ISO 2768-1: 1989

TOLERANCE CLASS		PERMISSIBLE DEVIATION FOR BASIC SIZE RANGE								PERMISSIBLE DEVIATION FOR BROKEN EDGES (EXTERNAL RADI AND CHAMFER HEIGHTS)		
DESIG.	DESCRIPTION	0.5) ¹ UPTO 3	OVER 3 UPTO 6	OVER 6 UPTO 30	OVER 30 UPTO 120	OVER 120 UPTO 400	OVER 400 UPTO 1000	OVER 1000 UPTO 2000	OVER 2000 UPTO 4000	0.5) ¹ UPTO 3	OVER 3 UPTO 6	OVER 6
f	FINE	±0.05	±0.05	±0.1	±0.15	±0.2	±0.3	±0.5	-	±0.2	±0.5	±1
m	MEDIUM	±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2	±0.4	±1	±2
c	COARSE	±0.2	±0.3	±0.5	±0.8	±1.2	±2	±3	±4	±0.4	±1	±2
v	VERY COARSE	-	±0.5	±1	±1.5	±2.5	±4	±6	±8	±0.4	±1	±2

1) FOR NOMINAL SIZES BELOW 0.5 mm, THE DEVIATIONS SHALL BE INDICATED ADJACENT TO THE RELEVANT NOMINAL SIZE(S)

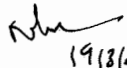
TOLERANCE CLASS		PERMISSIBLE DEVIATIONS FOR ANGULAR DIMENSIONS (mm)					
DESIG.	DESCRIPTION	PERMISSIBLE DEVIATIONS FOR RANGES OF LENGTHS, IN mm OF THE SHORTER SIDE OF ANGLE CONCERNED					
		UPTO 10	OVER 10 UPTO 50	OVER 50 UPTO 120	OVER 120 UPTO 400	OVER 400	
f	FINE	±1°	±0° 30'	±0° 20'	±0° 10'	±0° 5'	
m	MEDIUM	±1° 30'	±1°	±0° 30'	±0° 15'	±0° 10'	
c	COARSE	±3°	±2°	±1°	±0° 30'	±0° 20'	
v	VERY COARSE						

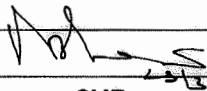
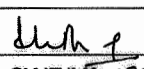
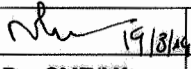
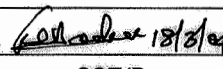
SURFACE ROUGHNESS VALUE	Gr. NUMBER	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12
	Ra. um	0.025	0.05	0.1	0.2	0.4	0.8	1.6	3.2	6.3	12.5	25	50

INDIAN RAILWAYS		REF.
ASSEMBLY		SUPERSEDED BY
Ø25.4 COPPER COATED GRAPHITE ELECTRODE FOR ARC GOUGING		SUPERSEDES
RAIL WHEEL FACTORY		SCALE SSE/D <i>Sham</i> 08/3/04
BANGALORE		1:1 CHD
APPROVED <i>M</i> 19/3/04 DY.CME/MFG		DRN SHAM 08.03.04
APPROVED		ALT. ©
		DRG No. RWF/SK/MW-303

JOB No.4515

AMENDMENT SHEET

Alt	Date	Cl. No	Description	Job No	Sign
'g'	08.03.2004	3.2	Deleted Relocated at cl.5.3.	4515	 19/3/04
		4.9	Deleted, Relocated at cl.5.4.		
		7.4	Electrode consumption and penalty clause added.		
		4.4	Density of electrode changed from 1.65g/cc min +/-0.1g/cc to 1.65g/cc min.		
		4.5	Density of Electrode (with Cu coating) Changed from 1.90 +/-0.1g/cc to 1.90 g/cc Approx.		
		8.0	Packing condition specified.		
9.0	Deleted. Drawing modified to indicate Copper coating.				

			
CME	CWE/Mfg. 19/3/04	Dy. CME/Mfg	SSE/D
APPROVED BY	REVIEWED BY	VERIFIED BY	PREPARED BY