GOVERNMENT OF INDIA
(Ministry of Railways)

SPECIFICATION FOR CLAY GRAPHITE TAPERED INGATE SLEEVE

(Type B & Type D)

Issued by

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

Rajni Gupta	9/5/15	9.5.15	9/5/15
CME	CWE/W	Dy CME/Mfg	SSE/D
APPROVED	REVIEWED	VERIFIED	PREPARED

SPECIFICATION FOR CLAY GRAPHITE TAPERED INGATE SLEEVE

1.0 SCOPE

The specification covers the design, manufacture and supply of Clay Graphite Tapered Ingate Sleeve to Rail Wheel Factory, Yelahanka, Bangalore - 560 064, Karnataka State, India as per instructions and conditions of contract and tender papers.

2.0 GENERAL DESCRIPTION

Clay Graphite Tapered Ingate Sleeve of the Type B or D is as given in Drawing No. RWF/SK/MW-393, RWF/SK/MW-394 or WAP/SK/MW-282 latest alteration. The Clay Graphite Tapered Ingate Sleeve shall be fired/baked in controlled reducing atmosphere. The kilns shall have control mechanism to achieve uniform heating at a controlled rate as established by the manufacturer's firing schedule. The Clay Graphite Tapered Ingate Sleeves have to be encased in a suitable reducing medium like graphite, calcined petroleum coke during firing so as to avoid oxidation.

3.0 JOB REQUIREMENT

During the assembly of the mould for casting steel railway wheels, the Clay Graphite Tapered Ingate Sleeve is required to be fixed in the graphite drag against the taper at a pressure of 52-56 kg/cm^2. The ingate sleeve is retained in this position using ingate-retaining ring. It is functioning as ingate track for molten metal in the range of 1500- 1610 °C. The ingate shall have adequate thermal shock resistance and should resist the reaction with molten steel flowing through it at a temperature range of 1500 – 1610 °C. It must be machinable and strong enough to withstand the pressure of stopper during plunge down (shut off) upto 45 psi (3.16 kg/cm^2). As the mould is reused, after each casting the ingate is reamed by using grinding stone for proper seating of the clay graphite stopper in the stopper seat.

4.0 TECHNICAL CHARACTERISTICS

4.1 The typical chemical composition listed below is only for the guidance of the manufacturer. An alternate chemical composition is also acceptable if the sample is passed in acceptance criteria under Clause No.8.0.

Constituent		Typical Value in %
Silica (Total)	(SiO_2)	30
Titania	(TiO_2)	0.6
Alumina	(Al_2O_3)	17
Iron Oxide	(Fe_2O_3)	1
Calcia	(CaO)	0.2
Magnesia	(MgO)	0.1

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Potassium Oxide	(K_2O)	0.5
Sodium Oxide	(Na_2O)	0.2
Carbon	(C)	40
Free Moisture Content	(FM)	0.1
Ash Content		58

4.2 Physical properties:

Characteristics	Requirements	Test Method
Apparent Porosity	35 % max	IS 1528
Bulk Density	1.6 gm/cm^3 min	IS 1528
Breaking Load (Circumferential)	10.5 kN min	–

4.3 Samples for physical property tests shall be selected as per clause 4.4 and if all the samples from the first sampling lot pass, the lot shall be treated as passed. If any of the sample fails in any of the property mentioned under 4.2, double the number of samples shall be selected from the same lot and tested. If the entire samples passed, then the lot shall be treated as passed.

4.4 Sampling Norms for physical tests:

Lot Size in Numbers	No. of Samples
Up to 500	1
501 - 1000	2
1001 - 1500	3
Above 1500	4

5.0 Visual Inspection & Dimensional check

Sampling Norm : GIL II, IS 2500 (Pt. 1) Latest revision

Acceptance Criteria :AQL 6.5, IS 2500(Pt.1) latest revision

6.0 THERMAL SHOCK RESISTANCE TEST (Field test at RWF)

Only one sample shall be randomly selected from the supply to conduct the thermal shock resistance test as given below:

A cylindrical portion of 150 mm height is cut from the selected sample ingate and heated to 300 -350°C. This ingate sample is kept on a sand bed and molten metal at a temperature range of 1610 – 1520°C is poured into it. It is examined after 15 seconds. The ingate sample should not show any crack. In case the sample gets cracked, two more samples are tested and both should not show any crack. If any of the samples shows crack(s), lot shall be treated as rejected.

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7.0 MANUFACTURER'S TEST CERTIFICATE (MTC)

The supplier shall submit the MTC for the test results as per the clause 4.1, 4.2 and 5.0 to RWF along with the details of test, batch identification, etc.

8.0 ACCEPTANCE CRITERIA

The supply shall be accepted only after it meets the requirement of clause 4.2, 5.0 and 6.0

9.0 LIFE EXPECTED

When used in standard operating condition at RWF, average expected life of each ingate sleeve shall be 26 heats excepting the damage due to operating factors.

10.0 PACKING & STORAGE

Clay Graphite Ingate Sleeve shall be supplied in cardboard boxes with suitable partitions to avoid damage during handling, transit and stocking. The ingates shall be stored in dry area to avoid ingress of moisture.

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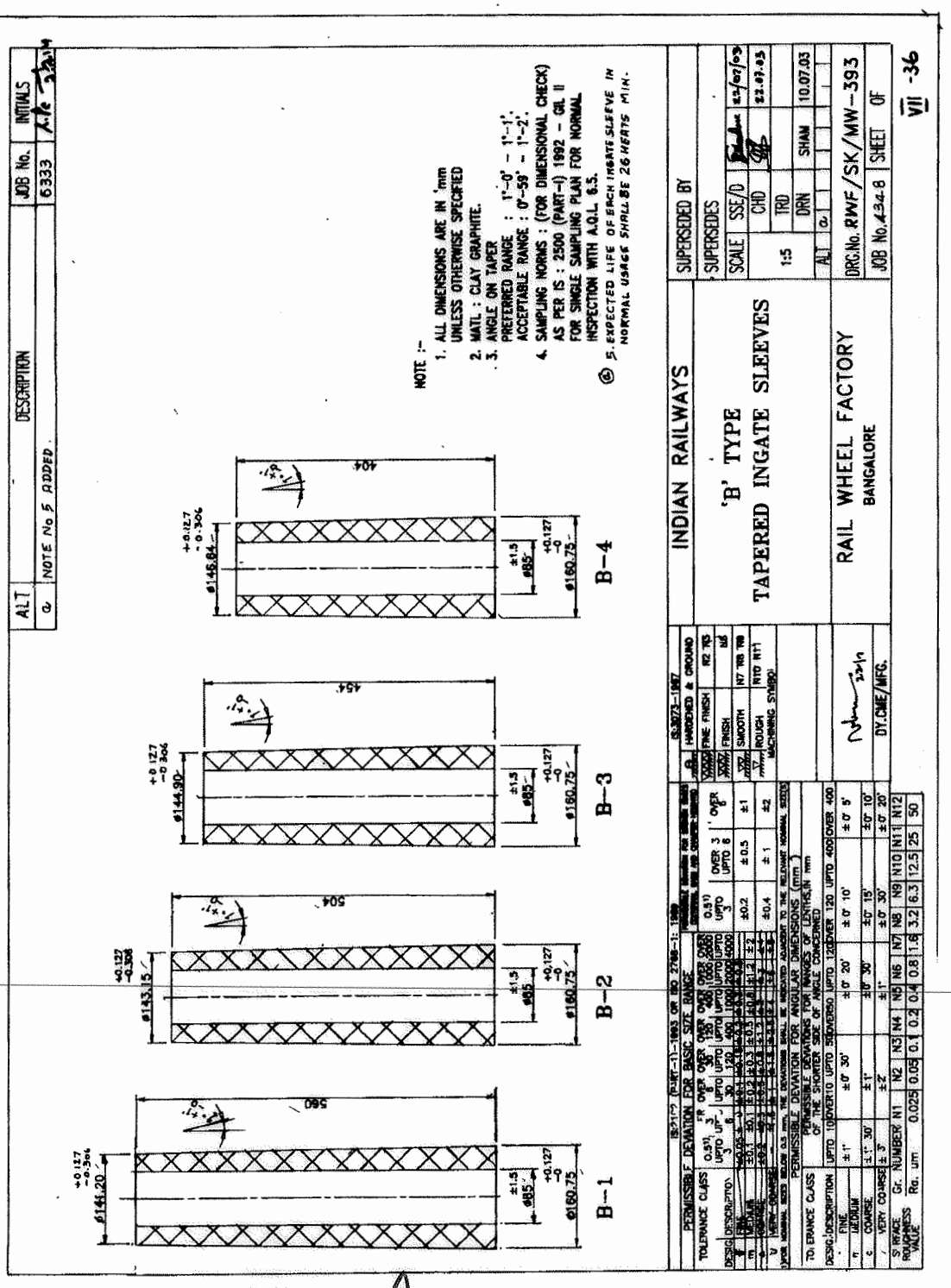

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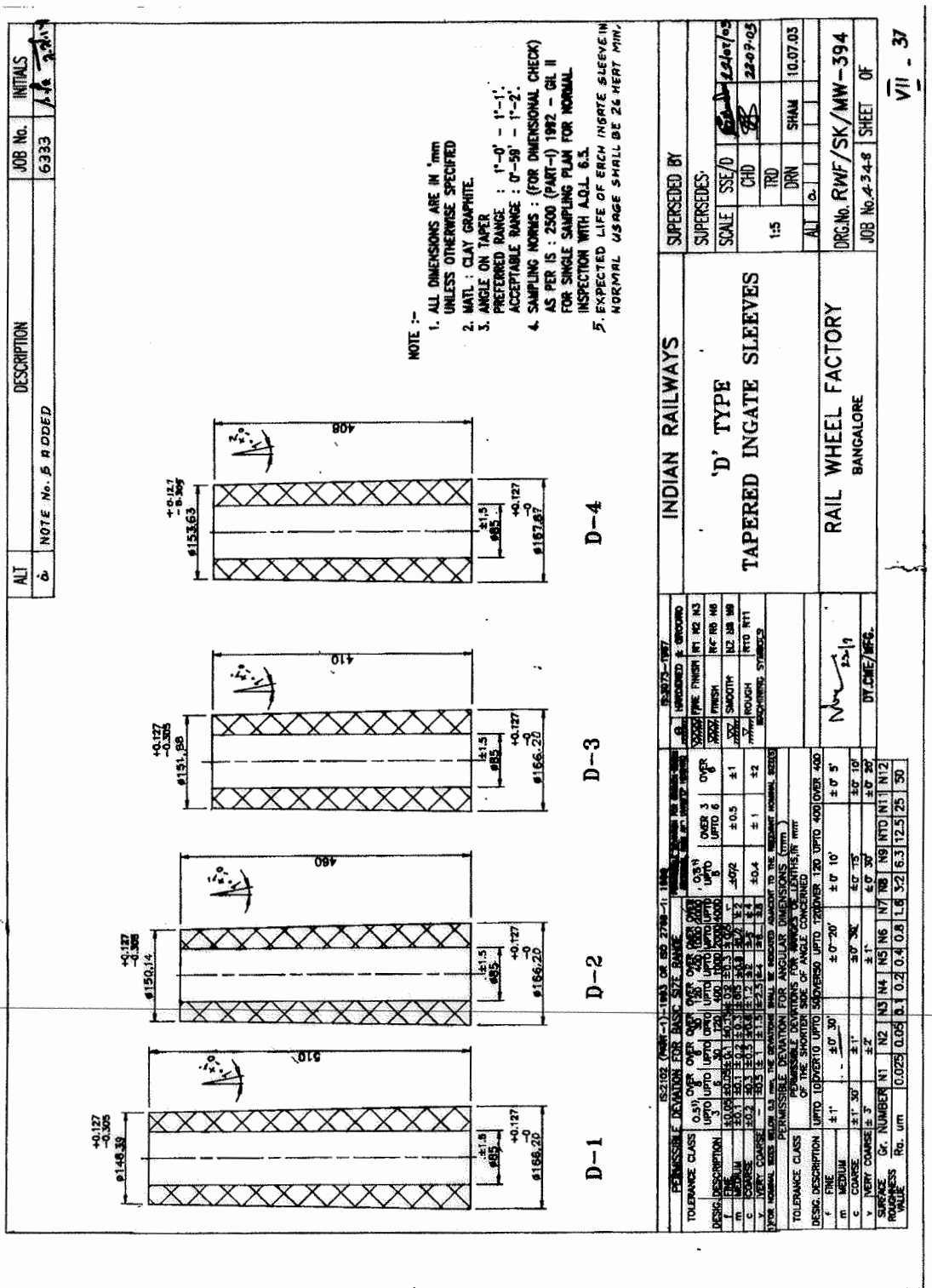

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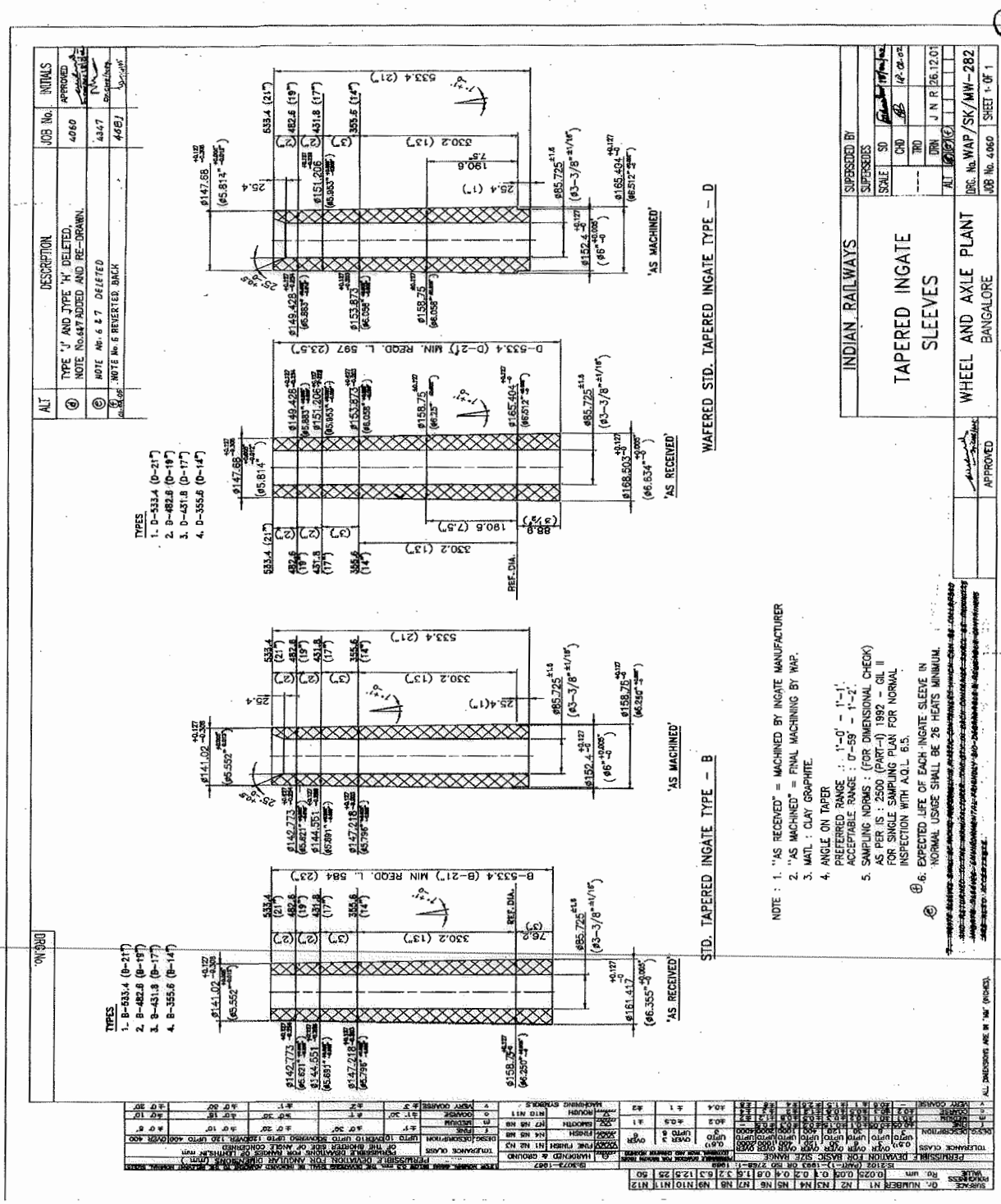

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