



**भारत सरकार
रेल मंत्रालय**

**GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS**

**बड़ी लाइन डीज़ल इलेक्ट्रिक लोकोमोटिव के ट्रैक्शन मोटर के इन्डफिटिंग का
शिडयूल ऑफ़ टेकनिकल रिक्वायरमेन्ट**

**SCHEDULE OF TECHNICAL REQUIREMENTS
FOR TRACTION MOTOR END FITTING OF BG_DIESEL
ELECTRIC LOCOMOTIVES**

**विशिष्टिकरण संख्या चा०य० ०.२४०२.०८ (संशोधन - ०१)
सितम्बर, २००५**

**SPECIFICATION NO. MP-0.2402.08 (Revision -01)
September, 2005**

**अनुसंधान अभिकल्प एवं मानक संगठन
मानक नगर, लखनऊ - २२६०११**

**RESEARCH DESIGNS & STANDARDS ORGANISATION
MANAK NAGAR, LUCKNOW - 226011.**

SCHEDULE OF TECHNICAL REQUIREMENTS FOR TRACTION MOTOR END FITTINGS OF BG DIESEL ELECTRIC LOCOMOTIVES

1.0 SCOPE:

- 1.1 This specification covers the technical requirement for the procurement of traction motor end fittings for TM 165M, TM 4906 and TM 4907 of BG diesel electric locomotives.
- 1.2 The specification no. MP.0.2402.08, Aug 1992 was issued for the procurement of traction motor end fittings for TM 165M, TM 4906 and GE 752 of BG diesel electric locomotives. As per the decision taken during 38th DMG meeting, audit was conducted by RDSO along with bearing manufacturers, at diesel sheds, diesel POH shops and also at BHEL to look various aspect of bearing fitment. Bearing end fittings are as critical as the bearings and the dimensions should be maintained very accurately. RDSO is standardizing the drawings for end fittings.
- 1.3 To incorporate the above the specification has been revised.

2.0 GOVERNING SPECIFICATIONS:

2.1 For materials:

IS: 1079 – 1994 (Fifth Rev.) – Hot rolled carbon steel sheets and strips-specification.

IS: 1875-1992 (Fifth Rev.) – Carbon steel billets, blooms, slabs and bars for forgings – specification.

IS: 1030-1998, (Fifth Rev.) – Carbon steel castings for general engineering purposes – specification.

IS: 513 – 1994, (Forth Rev.) – Cold rolled low carbon steel sheets and strips – specification.

IS: 1570-1979, Part- II, (First Rev.) - Schedules for wrought steels carbon steels (unalloyed steels)

IS: 2062-1999 (Fifth Rev.) - Steel for general structural purposes – specification

2.2 For tests:

IS: 1500-1983 (Second Rev.) – Method for brinell hardness test for metallic materials.

IS: 1499-1977 (First Rev.) - Method for Charpy impact test (V- notch) for metals.

IS: 1599-1985 (Second Rev.) - Method for bend test.

IS: 1608-1995 (Second Rev.) - Mechanical testing of metals – tensile testing.

2.3 For supply of metallurgical materials:

IS: 1387-1993 (Second Rev.) - General requirements for the supply of metallurgical materials.

2.4 For dimensional tolerances:

IS: 3739-1987 (First Rev.) - Dimensional tolerances for carbon and constructional steel products.

3.0 DIMENSIONS AND TOLERANCE:

The end fittings shall conform to the following drawings for dimensions, tolerances and finish –

Sr. No.	COMPONENTS	RDSO Drg. No.	MATERIAL SPECIFICATIONS
1.	Outer bearing cap PE for TM 165M, TM 4906 and TM 4907	SK.DP- 3786	Drain cover – IS: 1079-1994(Fifth Rev.) Gr. –O Outer bearing cap -IS: 1875-1992 (Fifth Rev), Class-II
2.	End shield PE for TM 165M and TM 4906	SK.DP- 3787	Cast steel- IS: 1030-1998 (Fifth Rev.), Gr.230-450
3.	Bearing locking plate washer C.E for TM 165M, TM 4906 and TM 4907	SK.DP- 3788	IS: 513-1994, (Forth Rev.), Gr.- DD
4.	Flinger pinion end PE for TM 165M, TM 4906 and TM 4907	SK.DP- 3789	IS: 1875-1992 (Fifth Rev), Class I
5.	Retaining collar PE for TM 165M, TM 4906 and TM 4907	SK.DP- 3790	IS: 1570,Part-II, Gr.- C-30

Sr. No.	COMPONENTS	RDSO Drg. No.	MATERIAL SPECIFICATIONS
6.	Bearing sleeve PE for TM 165M, TM 4906 and TM 4907	SK.DP- 3791	IS: 1570-1979, (First Rev.), Part-II, Gr.- C-30
7.	Inner bearing cap C.E for TM 165M, TM 4906 and TM 4907	SK.DP- 3792	Rib IS: 2062-1999, (Fifth Rev.) Cast steel- IS: 1030 – 1998 (Fifth Rev.), Gr.230-450
8.	End shield C.E for TM 165M, TM 4906 and TM 4907	SK.DP- 3793	Cast steel- IS: 1030-1998(Fifth Rev.), Gr.230-450
9.	Inner bearing wiper C.E for TM 165M, TM 4906 and TM 4907	SK.DP- 3794	IS: 1570-1979, (First Rev.), Part-II, Gr.- C-30
10	Inner bearing cap PE for TM 165M, TM 4906 and TM 4907	SK.DP- 3795	Cast steel- IS: 1030-1998 (Fifth Rev.), Gr.230-450
11.	Outer bearing cap C.E for TM 165M, TM 4906 and TM 4907	SK.DP- 3796	IS: 1875-1992 (Fifth Rev), Class I
12.	Distance piece C.E for TM 165M, TM 4906 and TM4907	SK.DP- 3804	IS: 2062-1999 (Fifth Rev.) Gr. A/ Fe410WA
13.	End shield P.E for TM 4907	SK.DP- 3803	Cast steel- IS: 1030-1998 (Fifth Rev.), Gr.230-450
14	Locking plate C.E for TM 165M, TM 4906, TM 4907	SK.DP- 3845	IS: 1875-1992 (Fifth Rev), Class IV

4.0 MATERIAL SPECIFICATION:

- 4.1 The end fittings shall be manufactured from normalized carbon steel forgings as per Clause 3.0 of this specification.
- 4.1.1 In case the manufacturer proposes to supply cast or fabricated end fittings, the same can be accepted with the prior approval of the RDSO, although forgings shall be preferred. The material used for cast or fabricated end fittings shall be chosen so that none of the specified properties in this specification are compromised. The forging shall be manufactured from killed steel produced by the open hearth, electric or any other approved process.
- 4.2 General requirements relating to the supply of material shall conform to IS: 1387-1993 (Second rev) 'General requirements for the supply of metallurgical materials '.

- 4.3 Rough machining of the forgings shall be carried out in case of procurement of forgings by the purchaser. In case finished component is procured by the purchaser, machining shall be done in suitable sequence approved by the purchaser.
- 4.4 Steel bars shall be supplied in grade – 2, round hot rolled steels conforming to IS: 3739- 1987' Dimensional tolerances for carbon and alloy constructional steel (first revision)'
- 4.5 steel forging shall be supplied to the dimensions specified in the drawing of rough machined endfittings to be provided by the purchaser.
- 4.6 In case finished endfittings are procured by the purchaser, the supplier shall ensure that forgings used for manufacture shall confirm to all the clauses of this specifications.

5.0 CHEMICAL COMPOSITION:

The permissible variation in chemical composition and ladle analysis of steel shall conform to the respective requirements given in clause 3.0 of this specification.

6.0 HEAT TREATMENTS:

Forgings shall be supplied in 'As forged' or 'As forged normalized' condition (880 – 910 deg.C) to give the mechanical properties as per respective specification given in clause 3,0 of this specification.

7.0 FREEDOM FROM DEFECTS:

The steel forgings shall be free from internal and surface defects such as seams, laps and injurious imperfections.

8.0 SAMPLING FOR MECHANICAL TESTS:

- 8.1 Unless otherwise agreed, for the purpose of mechanical tests, the sample shall be tested for each cast and heat treatment batch.
- 8.2 If the product is continuously heat treated, the sampling for mechanical tests shall be as agreed to between the purchaser and the manufacturer.

9.0 MECHANICAL PROPERTIES:

The test piece after being heat treated as per clause 6.0 shall show the following properties in the longitudinal direction upto a ruling section of 300 mm. Properties for thicker sections shall be subjected to agreement between the purchaser and the supplier.

9.1 Tensile Test:

The tensile test shall be carried out in accordance with IS: 1608- 1995 (Second Rev.) 'Method for tensile testing of steel products'. The test pieces shall be machined lengthwise from each test sample selected according to IS: 1875- 1992. The tensile properties shall conform to the requirements given in Table 2 of IS: 1875- 1992 for a 100 mm ruling section are as under:

Tensile strength (Min.)	- 430 N/sq. mm (44 kgf / sq. mm)
Yield strength (Min.)	- 230 N/sq. mm (23.5 kgf / sq. mm)
Elongation percent on a gauge length $5.65 \sqrt{50}$ (Min.)	- 24

9.2 Hardness:

The test pieces shall have Brinell hardness as under when tested in accordance with IS: 1500 – 1983 'Method for brinell hardness test for metallic materials (second revision)'.

BHN (for a 100 mm ruling section) – 120

9.3 Charpy Impact Value (U-Notch):

The test pieces shall show the following minimum charpy impact values when tested as per IS: 1499- 1977 (first revision) on a 2 mm U-Notch 'Method for Charpy impact test (U-Notch) for metals'.

Charpy Impact value (Min.) – Upto & including 100 mm Ruling section	47 Joules (6.0) kgf.m/sq.cm
Above 100 mm and upto 300 mm ruling section (Min.)	- 43 Joules (5.5) kgf.m/sq.cm

9.4 Bend Test:

Bent test shall be carried out in accordance with IS: 1599- 1985(Second Rev.) 'Method for bend test for steel products other than sheet, strip, wire and tube).'

9.5 If required by the purchaser, the following tests shall be conducted as per relevant standard subject to approval by purchaser;

10.0 INSPECTION:

Upon prearrangement the purchaser shall have free entry, at all time when work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the material ordered under the specification. The manufacturer shall afford the inspector, free of charge, all reasonable facilities and necessary assistance to satisfy him that the material is being furnished in accordance with these specifications. Final acceptance of all purchased material shall be made at purchaser's premises.

In general inspection of the end fitting shall be in accordance with IS: 1387 – 1967 (First revision) 'General requirements for the supply of metallurgical materials '

11.0 TEST CERTIFICATES:

Three copies of test certificates shall be supplied unless otherwise stated on the order. The following details shall be furnished in the test certificate;

- I) Dimensional inspection
- II) Detail of heat treatment
- III) Chemical composition
- IV) Results of mechanical tests
- V) Results of additional tests called for in the drawing/ order.

12.0 PACKING AND MARKING:

Finished end fittings shall be suitably packed to prevent corrosion and damage during transit. Machined surface shall be properly protected with anticorrosive compounds.