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**SPECIFICATION FOR
 DRIVE ASSEMBLY COMPONENTS FOR USE ON WAP-5
 3-PHASE ELECTRIC LOCOMOTIVES
 OF INDIAN RAILWAY
 ENCLOSURES:
 ANNEXURE: 'A'**

SPECIFICATION NO.:CLW/MS/10/003 ALT. '4'
ISSUE DATE: 09.06.1999

ISSUED BY:
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DETAILS OF ALTERATIONS

S. No.	Date of Amendment	Alt. No.	Description	Reason	Authority
1.	01.02.2002	1	Para 10 for Hardwares added.	The name of hardware suppliers added to achieve the proper quality.	Sd/- Dtd. 04.02.2002
2.	02.07.2003	2	Item Sl. No. 47 & 48 added.	Item added in accordance with Bombardier's Drg. No. IA011-00233, Rev. - I.	Sd/- Dtd: 02.07.2003
3.	29.10.2009	3	Cross section size of O-rings was $\varnothing 5$ for Item no. 28,29 & 31 to 35 and for Item no. 30 it was $\varnothing 9$.	Size of O-rings increased by 1mm to prevent leakage in Gear case vide design change sheet no. ELDD/WAP-5/Bogie/011, dtd: 29.10.2009.	Sd/- Dtd: 29.10.2009
4.	10.02.2010	4	Shim for gear case pinion face (0.1 & 0.05 mm thick) Qty./Loco 16 nos. each under sl. no. 49 & 50 included.	Shims required for maintaining backlash of gear case vide approval note no. ELDD/3754, dtd: 05.02.10.	Sd/- Dtd: 18.02.2010

Specification has been digitized and all alterations have been incorporated.

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TECHNICAL SPECIFICATION FOR DRIVE ASSEMBLY COMPONENTS FOR USE IN WAP-5, 3-PHASE ELECTRIC LOCOMOTIVES.

1. SCOPE:

This specification covers the technical requirements, manufacture, inspection & packaging of drive assly. components for use on WAP-5 electric locos.

2. SCOPE OF SUPPLY:

Quantity one (1) set shall comprise of the quantity per Loco for all items as indicated at Annexure-'A'.

3. CLIMATIC AND ENVIRONMENTAL CONDITIONS:

- 3.1 Maximum atmospheric temperature :
a) Under Sun : 70°C
b) In shade : 50°C
- 3.2 Humidity : 100% saturation during rainy season.
- 3.3 Reference site conditions:
a) Ambient temp. : 0°C Min., 47°C Max.
b) The contractor will indicate the expected temperature rise under reference site conditions.
c) Humidity : 60%
d) Altitude : 160m above mean sea level.
- 3.4 Rainfall : Very heavy in certain areas.
- 3.5 Atmosphere during hot weather : Extremely dusty and desert terrain in certain areas.
- 3.6 Coastal area :
Components will be designed to work in coastal areas in humid and in salt laden atmosphere.
- 3.7 Vibration :
The Components of the Drive Assembly will be designed to withstand vibrations and shocks encountered in service as specified in corresponding I.E.C publications unless otherwise prescribed.

4. GENERAL:

The components of Drive assembly shall generally conform to the material specifications & dimensions as specified on the relevant drawing mentioned against each item. Equivalent IS: or BS: standard for the material can also be used with prior approval of purchaser. All the hardware's shall be supplied in Zinc plated condition unless otherwise specified.

5. INSPECTION AND ACCEPTANCE:

- 5.1 Inspecting authority of the purchasers shall have free access to the works of manufacturer at all times during manufacture. He shall be free to inspect the component at any stage, to reject any material which does not conform to the terms of this specification.

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- 5.2 Machined components from the lot shall be selected for checking of its bore diameter, width, dimensions and appearance. Components showing any sign of cracks or harmful defects shall not be accepted. Sample inspection plan shall be supplied by the tenderer for approval of the purchaser.
- 5.3 Any deviation in the dimensions nominated on the relevant drawing shall not be accepted.
- 5.4 Casting items shall be subjected to radiographic or other methods of non-destructive inspection with approval of the purchaser.
- 5.5 After inspection, the inspector shall affix his stamp/seal on the inspected material as a token of the items passed by him.

6. MARKING:

Each item except hardwares shall have clear readable marking on one of its side face. The following shall be as follows:

- a) Manufacturer's Name/Trade Mark
- b) Year of Manufacture.
- c) Drg. No. & Specification No.

7. QUALITY ASSURANCE: As per ISO:9000.

8. GUARANTEE:

The manufacturer/Supplier shall have guarantee for all the items for their satisfactory performance for the period of 5 yrs. from putting into revenue service or 6 yrs. from supply whichever is earlier. All aspects of workmanship and material will be covered by this guarantee.

9. PACKING AND DELIVERY:

- 9.1 The components shall be prepared and packed in such a manner as will properly protect them from damage or deterioration during transit and storage prior to installation. The storage period of at least 24 months shall be considered.
- 9.2 The protected packing shall be suitable for transport and storage under tropical conditions of high temperature, high humidity, heavy rain fall and fungus conducive and dusty environments.
- 9.3 The type of protection against corrosion shall be decided by the supplier depending on the packing material used under proper storage conditions. The anti-corrosive treatment shall be effective for at least 6 (six) years in order to ensure a satisfactory functioning of the components.
- 10. Make of Hardwares:** Hardwares covered in this specification shall be any of following make:
- a) UN-BRAKO (PRECISION FASTENERS)
 - b) G.K.W
 - c) LAXMI PRECISION
 - d) SUNDARAM FASTENERS (TVS)

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ANNEXURE-'A'

SPECIFICATION NO. CLW/MS/10/003 : DRIVE ASSEMBLY COMPONENTS

Sl. No.	Description	Drg. No.	Qty./Loco	Material	Specn.	Ref. Assly. Drg. No.
1.	Bearing cap piece complete	IA011-00223	4	-	-	IA011-00233/12
2.	Labyrinth ring pinion complete	IA011-00221	4	-	-	IA011-00233/13
3.	Distance ring pinion machined	IA016-00347	4	-	-	IA011-00233/14
4.	Intermediate gear shaft complete	IA011-00229	4	-	-	IA011-00233/23
5.	Cap piece intermediate shaft complete	IA016-01111	4	-	-	IA011-00233/24
6.	Distance ring intermediate Gear machined	IA016-01112	4	-	-	IA011-00233/25
7.	Oil seal intermediate Gear machined	IA016-01113	8	-	-	IA011-00233/26
8.	Cap piece of main gear complete	IA011-00228	4	-	-	IA011-00233/32
9.	Oil seal main gear machined	IA011-00226	8	-	-	IA011-00233/33
10.	Labyrinth ring main gear complete	IA011-00227	8	-	-	IA011-00233/34
11.	Thrust collar main gear complete	IA011-00224	8	-	-	IA011-00233/35
12.	Outer labyrinth ring main gear complete	IA011-00225	8	-	-	IA011-00233/36
13.	Cap piece of main gear complete	IA011-00228	4	-	-	IA011-00233/37
14.	Socket head cap screw M16 x 2Px40 long -12.9	-	356	ALLOY STEEL	IS:2269	IA011-00233/50

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15.	Socket head cap screw M12x1.75P x60 lg x 30 thd - 12.9	-	96	ALLOY STEEL	IS:2269	IA011-00233/51
16.	Socket head cap screw M12x1.75P x 35 lg x30 thd - 12.9	-	128	ALLOY STEEL	IS:2269	IA011-00233/52
17.	Socket head cap screw M10x25 - 8.8	-	64	ALLOY STEEL	DIN:7984	IA011-00233/53
18.	Locking screw M6x16 -10	182-000720	128	-	-	IA011-00233/56
19.	Cap screw M6 x10 -4.8 (Galv)	-	8	STEEL	DIN:84	IA011-00233/57
20.	Lock washer VS 16	182-00361/005	356	-	-	IA011-00233/60
21.	Lock washer VS 12	182-00361/004	224	-	-	IA011-00233/61
22.	Lock washer VS 10	182-00361/003	64	-	-	IA011-00233/62
23.	Machined washer- 10.5 (Zn plated)	-	64	STEEL	IS:2016	IA011-00233/63
24.	Machined washer- 13 (Zn plated)	-	224	STEEL	IS:2016	IA011-00233/64
25.	Sealing washer 60 dia x 68 dia x 2.5 thk	-	12	Cu	DIN:7603	IA011-00233/65
26.	Sealing washer 27 dia x 32 dia x 2 thk	-	4	Cu	DIN:7603	IA011-00233/66
27.	Sealing washer 12 dia x 16 dia x 1.5 thk	-	12	Cu	DIN:7603	IA011-00233/67

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28.	'O' Ring I/D 205x6	-	4	NBR 70	DIN:3771/ ISO:3601	IA011-00233/70
29.	'O' Ring I/D 240x6	-	4	NBR 70	DIN:3771/ ISO:3601	IA011-00233/71
30.	'O' Ring I/D 135x9	-	4	NBR 70	DIN:3771/ ISO:3601	IA011-00233/72
31.	'O' Ring I/D 143x6	-	4	NBR 70	DIN:3771/ ISO:3601	IA011-00233/73
32.	'O' Ring I/D 440x6	-	8	NBR 70	DIN:3771/ ISO:3601	IA011-00233/74
33.	'O' Ring I/D 390x6	-	8	NBR 70	DIN:3771/ ISO:3601	IA011-00233/75
34.	'O' Ring I/D 290x6	-	8	NBR 70	DIN:3771/ ISO:3601	IA011-00233/76
35.	'O' Ring I/D 220x6	-	8	NBR 70	DIN:3771/ ISO:3601	IA011-00233/77
36.	Breather Cap R ½"	IA012-00450	12	-	-	IA011-00233/80
37.	Oil sight Glass R 2"	IA012-00449	4	-	-	IA011-00233/81
38.	Hex Head Sealing plug G 2" (Galv.)	-	8	STEEL	DIN:910	IA011-00233/82
39.	Magnetic sealing plug R ¾"	IA012-00448	4	-	-	IA011-00233/83
40.	Plug screw M16 (Zn plated)	IB012-00753	8	-	-	IA011-00233/84
41.	Cap screw M12x20 – 8.8 (Galv.)	-	12	STEEL	DIN:7984	IA011-00233/85
42.	Oil Indication label RMO.	IA012-00457	4	-	-	IA011-00233/92
43.	Slotted head self tapping screw 'B' M4x6 (Galv.)	-	32	STEEL	DIN:7513	IA011-00233/93
44.	Cover cap for oil sight glass	IA012-00459	4	-	-	IA011-00233/2
45.	Socket hd. Cap screw M16x40x2P - 12.9	-	60	ALLOY STEEL	DIN:6912	IA011-00233/54

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46.	Spring pin dia. 4x28	-	8	SPRING STEEL	ISO:8752	IA011-00233/58
47.	Distance ring (shim) for pinion, 0.2 mm thick	IA012-00986	4	STEEL	-	IA011-00233/86
48.	Distance ring (shim) for pinion, 0.1 mm thick	IA012-00985	4	STEEL	-	IA011-00233/87
49.	Shim for gear case pinion face (0.1 mm thick)	1210-01.413- 016 REF.1	16	BRASS	-	IA011-00233/88
50.	Shim for gear case pinion face (0.05 mm thk.)	1210-01.413- 016, REF.2	16	BRASS	-	IA011-00233/89

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