

Specn. No. RDSO/2006/EL/SPEC/0043 (Rev '0')



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**GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS**

**PROCUREMENT SPECIFICATION FOR WHEEL SET
FOR
ELECTRIC LOCOMOTIVES**

JULY - 2006

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**RESEARCH DESIGNS AND STANDARDS ORGANISATION
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Material Description and specification

- A. Wheel set of WAG5 locos (suspension roller bearing suitable for TAO-659 gear ratio 15:62) complete with MSU and bearings, bull gear, axle box with bearings as per following drawings and specification.**

Equipment		Description	Drawing No.	Specification no.
Wheel set for WAG-5 loco (suitable for TAO-659 TM)	1.	Wheel and axle assembly	KPA's Drg. No. ER/KPA/ELA/WL-068	Wheel specn. no. IRS-R-34 (2003) Axle specn. no. R-43-92
		Mod. Axle (for TAO-659 with roller bearing)	SKEL - 4511 & SKEL - 4516	- do -
		Solid rolled wheel	CLW Drg. No. 01/1/11/17	Wheel specn. no. IRS-R-34 (2003)
		Axle box with roller bearing	KPA's Drg. No. ER/KPA/EL/AB-151 (Ref NEI's drawing no. 92-4271C) ER/KAP/EL/AB-152 (Ref FAG's drawing no. 901-02-101)	
	2.	MSU General arrangement of motor suspension unit for traction motor type TAO-659 -	SKEL 4510	Tech specification no. E-7/20
	3.	Gear (62 t)	RDSO Drg. No. SKDL-4455	MP.0.2800.09 Rev '02' - June'2005

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B. Wheel set of WAG5 locos (suspension roller bearing suitable for TAO-659 gear ratio 17:77) complete with MSU and bearings, bull gear, axle box with bearings as per following drawings and specification.

Equipment		Description	Drawing No.	Specification no.
Wheel set for WAG-5 loco (suitable for TAO-659 TM)	1.	Wheel and axle assembly	KPA's Drg. No. ER/KPA/ELA/WL-068	Wheel specn. no. IRS-R-34 (2003) Axle specn. no. R-43-92
		Mod. Axle(for TAO-659 with roller bearing)	SKEL – 4511 & SKEL - 4516	- do -
		Solid rolled wheel	CLW Drg. No. 01/1/11/17	Wheel specn. no. IRS-R-34 (2003)
		Axle box with roller bearing	KPA's Drg. No. ER/KPA/EL/AB-151 (Ref NEL's drawing no. 92-4271C) ER/KAP/EL/AB-152 (Ref FAG's drawing no. 901-02-101)	
	2.	MSU - General arrangement of motor suspension unit for traction motor type TAO-659 –	SKEL 4510	Tech specification no. E-7/20
	3.	Gear (77 t)	RDSO Drg. No. DDO-299	MP.0.2800.09 Rev '02' – June'2005

C. Wheel set of WAG5 locos (suitable for Hitachi Traction Motor, gear ratio (18:64) complete with MSU and bearings, bull gear, axle box with bearings as per following drawings and specification

Equipment		Description	Drawing No.	Specification no.
Wheel set for WAG-5 loco (suitable for Hitachi motor)	1.	Wheel and axle assembly	KPA's Drg. No. ER/KPA/ELA/WL-068	Wheel specn. no. IRS-R-34 (2003) Axle specn. no. R-43-92
		Solid rolled wheel	CLW Drg. No. 01/1/11/17	- do -
		Axle box with roller bearing	KPA's Drg. No. ER/KPA/EL/AB-151 (Ref NEI's drawing no. 92-4271C) ER/KAP/EL/AB-152 (Ref FAG's drawing no. 901-02-101)	
	2.	General arrangement motor suspension unit	Hitachi Drg. No. IOP701-897	
	3.	Gear (64 t)	RDSO Drg. No. SKDP-3459	MP.0.2800.09 Rev '02' – June'2005

D. Wheel set of WAG7 locos complete with MSU and bearings, bull gear, axle box with bearings as per following drawings and specification

Equipment		Description	Drawing No.	Specification no.
Wheel set for WAG-7 loco	1.	Wheel, axle, axle box arrangement (Hitachi TM - 15250A)	CLW's Drg. No. 06/1/11/1	Wheel specn. no. IRS-R-34 (2003) Axle specn. no. R-43-92
		Solid rolled wheel	CLW's Drg. No. 01/1/11/17	--do--
		Axle box assembly	CLW's Drg. No. 06/1/11/4	
	2.	General arrangement motor suspension unit	Hitachi Drg. No. IOP701-897	
	3.	Gear(65 t)	RDSO Drg. no. SKDL-4372	MP.0.2800.09 (Rev '02') – June'2005

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E. Wheel set of WAP4 locos complete with MSU and bearings, bull gear, axle box with bearings as per following drawings and specification.

Equipment		Description	Drawing No.	Specification no.
Wheel set for WAP-4 loco	1.	Axle For 630KW TM Arrangement(Axle roller bearing type)	CLW's Drg. No. 03/2/11/47	Wheel specn. no. IRS-R-34 (2003) Axle specn. no. R-43-92
		Roller bearing Axles box for flexi coil locos	CLW's Drg. No. 03/1/11/7	
		Solid rolled wheel	CLW's Drg. No. 01/1/11/17	Wheel specn. no. IRS-R-34 (2003)
	2.	General arrangement motor suspension unit	CLW's Drg. No. IOP701-897	
	3.	Gear(58)	RDSO Drg. no. SKDL-4355	MP.0.2800.09 Rev '02' – June'2005

F. Wheel set of WAG9 locos (gear ratio 21:107) complete with MSU and bearings, bull gear, axle box with bearings as per following drawings and specification.

Equipment		Description	Drawing No.	Specification no.
Wheel set for WAG-9 loco	1.	Wheel set axle	ABB's Drg. No. IB.011.00170 Rev 3 (668-111.01-01) Sheet 1	Wheel specn. no. IRS-R-34 (2003) Axle specn. no. R-43-92
		Wheel set	ABB's Drg. No. IB.011.00249 Rev 3 (668-111.01-00)	
		Wheel	ABB's Drg. No. IB.011.00171 Rev 2 (668-111.01-02)	Wheel specn. no. IRS-R-34 (2003)
		Axle box complete with blank cover	ABB's Drg. No. IB.011.00176 Rev 8	
		Axle box complete with earth contact	ABB's Drg. No. IB.011.00182 Rev 7	
	2.	Gear (107 teeth)	RDSO's Drg. No. SKDP-3848	MP.0.2800.19 Rev '0'
	3.	MSU- Suspension Tube	CLW Drg.no: 1209-01.011-018 Alt 8	CLW Spec .NO: CLW/MS/3/052 Alt.3
		Nose suspension Drive assembly	CLW Drg.no: 1209-01.111-004 Alt 3	CLW Spec .NO: CLW/MS/3/049 Alt.4

G. Wheel set of WAG9 locos (gear ratio 15:77) complete with MSU and bearings, bull gear, axle box with bearings as per following drawings and specification.

Equipment		Description	Drawing No.	Specification no.
Wheel set for WAG-9 loco	1.	Wheel set axle	ABB's Drg. No. IB.011.00170 Rev 3 (668-111.01-01)	Wheel specn. no. IRS-R-34 (2003) Axle specn. no. R-43-92
		Wheel set	ABB's Drg. No. IB.011.00249 Rev 3 (668-111.01-00)	
		Wheel	ABB's Drg. No. IB.011.00171 Rev 2 (668-111.01-02)	Wheel specn. no. IRS-R-34 (2003)
		Axle box complete with blank cover	ABB's Drg. No. IB.011.00176 Rev 8	
		Axle box complete with earth contact	ABB's Drg. No. IB.011.00182 Rev 7	
	2.	Gear (77 teeth)	RDSO's Drg. No. SKDP-3435	MP.0.2800.19 Rev '0'
	3.	MSU- Suspension Tube	CLW Drg.no: 1209-01.011-018 Alt 8	CLW Spec .NO: CLW/MS/3/052 Alt.3
		Nose suspension Drive assembly	CLW Drg.no: 1209-01.111-004 Alt 3	CLW Spec .NO: CLW/MS/3/049 Alt.4

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H. Wheel set of WAP7 locos (gear ratio 20:72) complete with MSU and bearings, bull gear, axle box with bearings as per following drawings and specification.

Equipment		Description	Drawing No.	Specification no.
Wheel set for WAP-7loco	1.	Wheel set axle	ABB's Drg. No. IB.011.00170 Rev 3 (668-111.01-01)	Wheel specn. no. IRS-R-34 (2003) Axle specn. no. R-43-92
		Wheel set	ABB's Drg. No. IB.011.00249 Rev 3 (668-111.01-00)	
		Wheel	ABB's Drg. No. IB.011.00171 Rev 2 (668-111.01-02)	Wheel specn. no. IRS-R-34 (2003)
		Axle box complete with blank cover	ABB's Drg. No. IB.011.00176 Rev 8	
		Axle box complete with earth contact	ABB's Drg. No. IB.011.00182 Rev 7	
	2.	Gear (72 teeth)	RDSO's Drg. No. SKDP-3474	MP.0.2800.19 Rev '0'
	3.	MSU- Suspension Tube	CLW Drg.no: 1209-01.011-018 Alt 8	CLW Spec .NO: CLW/MS/3/052 Alt.3
		Nose suspension Drive assembly	CLW Drg.no: 1209-01.111-004 Alt 3	CLW Spec .NO: CLW/MS/3/049 Alt.4

SPECIAL TERMS, CONDITIONS & GUIDELINES TO TENDERERS

1.0 Details of items:

Tenderers should submit their rate/tenders for –

- i) Wheel set complete fitted with MSU and bearings, bull gear and axle box with bearing.
- ii) Transportation, packing and forwarding charges to the nominated destination for each of the items.

- 1.1 Purchaser reserves the right to order any one/some/all the items as per description. The order can be placed either for entire or part quantity for any items.
- 1.2 Railways also reserve the right to increase/decrease the ordered quantity by 30%, if required.
- 1.3 Tenderers must submit their offer separately in two sealed envelopes. The first part of the bid, marked as packet 'A' will contain all the technical details of the assemblies/items as well as their past credentials along with testing facilities and also the technical man power. The second part, marked as packet 'B' will contain the commercial details including the rate of all the cost elements. However, both the part of the offer duly sealed would be in one more sealed cover as per practice in vogue.
- 1.4 The offer should be valid for 180 days from the date of opening of the technical offer. However, any price variation clause based on the raw materials cost should be mentioned separately and explicitly. The base price index should also be mentioned.
- 1.5 All the raw materials, items, spares and components required for manufacturing/equipping of all the assemblies should be arranged / purchased by the tenderers irrespective of any reference in this regard in any specifications or drawings as mentioned above from approved sources of CLW/RDSO only. In case there is no approved source of CLW or RDSO for any of the components/items tenderers should obtain RDSO's clearance for procuring such items from other sources.

2.0 Drawings/Specifications:

- 2.1 All the drawings and specifications as mentioned for individual items should be followed. The above drawings and specifications are main/assembly drawings. The part drawing numbers are given in the drawing for sub-assembly/assemblies. For any clarifications or queries with respect to drawings, specifications, sources of items and discrepancy if any may be sought from Sr. Executive Director Standards Electrical or Director Standard Electrical-1, RDSO.

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- 2.2 Drawings for items/components as referred to in the assembly/sub-assembly drawings mentioned in the specn. should be obtained on payment from Dy. CEE/Design/CLW for CLW's/ABB drawing, Dy. CEE/P&D, E. Railway/Kanchrapara Workshop for KPA's drawing and RDSO for RDSO's drawing.
- 2.3 The latest alterations/modifications in all the relevant drawings/specifications should be followed by all the Tenderers.
- 2.4 The prospective vendor should acquaint himself with the various items, equipments, testing methods and other facilities required by visiting Electric Loco Sheds, workshops dealing with the POH of electric locomotives.
- 3.0 **Infrastructures & Credentials:**
- 3.1 Tenderers should have minimum facilities of infrastructure, manufacturing, testing and quality control requirements as given in annexure I for wheel set.
- 3.2 Along with technical offer, the details of infrastructural facilities as given in relevant STR, organization, man power available with the tenderer shall be enclosed with technical bid. This includes details of machinery and plants, jigs and tools, testing facilities, lab facilities for raw materials testing, measuring tools and instruments and qualification of man power available with them.
- 3.3 Tenderers must submit their Quality Assurance Programme (QAP) for complete process of manufacturing of assemblies including testing. The QAP would be approved by RDSO.
- 3.4 Tenderers must submit their credentials for supply of same or similar items to various Railway Units. The details of supplies should be given along with proof of purchase orders and delivery details (copy of receipt note/inspection note etc).
- 4.0 **Sub-vendors:**
- 4.1 The details of activities where tenderer would take assistance from others should also be furnished.
- 4.2 In all such cases the QAP of sub-vendors should also be submitted as a part of QAP of the tenderer.
- 5.0 **Inspection:**
- 5.1 The inspection of wheel sets will be done 100%.
- 5.2 Testing of above items can be arranged at the premises of the tenderer or their sub-vendors/agencies of repute/Govt. approved.

- 5.3 At the time of inspection the bill of materials (BoM) indicating the source of supply, internal test certificate etc would also be shown to the Inspecting Authority. A record to this effect should be maintained by the tenderers.
- 5.4 Tenderers should provide free of cost all the facilities required for testing of all the items.
- 5.5 Railways reserve the right for carrying out any surveillance inspection at any stage in the premises of tenderers as well as in its sub-vendor during any stage of manufacturing/assembly.
- 5.6 Railways reserve the right to reject any sub-assembly, equipment, spares and items during the stage inspection if not found conforming to the drawing/specn. The decision of Railways would be final in this respect.
- 5.7 During the course of various stages of inspection approved QAP of the tenderers will be followed. For any deviation from the QAP, changes in material, testing procedure, process will have to be informed by the tenderers well in advance and should be approved by RDSO.
- 5.7 The inspection of 1st wheel set of each type will be carried out by RDSO or agency authorised by RDSO and balance by inspecting agency nominated by purchaser.
- 5.8 All the cost incurred for testing including from outside agencies would be borne by the tenderers.
- 6.0 **Delivery:**
- 6.1 Tenderers should clearly give their delivery schedule as follows –
 - a) Date of commencement of supply.
 - b) The rate of supplies per month.
 - c) The date of completion of the supply of total quantity as per order.
- 6.2 All the sub-assemblies/assemblies should be properly packed to avoid damage during transit.
- 6.3 The transportation of wheel set including safe transshipment and unloading in good condition at the nominated consignee should be responsibility of the tenderers. Any damage occurred during transportation will be on tenderers account.
- 6.4 Delivery would only be deemed as completed after receipt of all material at the consignee's end in good condition.
- 6.4 The Tenderer would ensure the insurance cover for all the items during transit as per the cost given in the final purchase order. The cost of insurance will be borne by the tenderer.
- 6.5 Tenderers should quote for delivery upto destination.

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7.0 Field Trials:

- 7.1 Railways reserve the right to put 1st lot or 10% of the total ordered quantity or minimum 6 nos. of the wheel set for field trials for 3 months.
- 7.2 The field trials would be conducted by the nominated consignee along with the representative of the tenderers.
- 7.3 Various parameters like temperature rise, clearances and other conditions as per specifications would be monitored, recorded and jointly signed by the consignee and the tenderers for further evaluation and records.
- 7.4 During the course of field trials, the delivery would not be deemed as completed.
- 7.5 The decisions made on the observations during the field trials by the Railways would be final and binding to the tenderers.

8.0 Warranty/Guarantee:

- 8.1 Warranty/Guarantee of wheel set for 24 months from the date of commissioning or 30 months from the date of supply whichever is earlier is to be given by the tenderer.
- 8.2 The guarantee would cover free replacement of all the items/spares against any defect due to poor quality of materials or bad workmanship.
- 8.3 The warranty repairs and replacement of items should be done by the tenderers in its own premises or at the consignees end if permitted by the Railways.
- 8.4 After the warranty repairs, the successful warranty repairs would be certified by the consignee and its decision would be final.

9.0 Terms of payment:

- 9.1 Payment shall be made after receipt of materials in good condition at consignee's end as per clause 6.0. Along with the bill valid ITCC and STCC, inspection certificate, copy of challan duly received by the consignee (not below JA grade officer of Railways) should be submitted.

10.0 Liquidated damage for delay in completion:

If the tenderers fail to execute and complete the work within the time as specified in the purchase order/agreement except in so far as the delay is on purchasers account, the tenderer shall accept the levy of liquidated damages as per extent IRS condition of contract.

11.0 Other terms & conditions:

In general the contract will be governed by the IRS terms & conditions of stores contract.

Annexure I**MINIMUM REQUIREMENT OF INFRASTRUCTURE AND MANUFACTURING FACILITIES FOR WHEEL SET**

1. Axle turning lathe (CNC) with grinding and polishing facilities of sufficient capacity.
2. Axle Journal Turning and burnishing (AJTB) lathe
3. Wheel disc boring machine /vertical turret lathe.
4. Wheel press (hydraulic press) machine of 400 t capacity.
5. Surface wheel lathe.
6. EOT crane 5 tonne and 1 tonne capacity.
7. Induction heater/oil bath heater for fitment of bearing.
8. Proper jigs and fixtures for handling wheel disc, suspension tube and wheel set.
9. Measuring instruments for checking dimension/clearances and wheel profile, surface finish etc.
10. Material handling facilities like fork lifter, mobile crane of adequate capacity.
11. Testing facilities like ultrasonography of axle, wheel disc.
12. Dust free environment/cover space for bearing storage and handling.
13. Sufficient covered space for assembly of wheel set.

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