INDIAN RAILWAYS

TECHNICAL SPECIFICATION
OF
SCHARFENBERG COUPLERS AND DRAW GEAR
FOR
EMU, DEMU AND MEMU ROLLING STOCKS FOR INDIAN RAILWAY"
BROAD GAUGE (1676 mm)

S. No.	Month/Year of issue	Revision	Page No.	Details of Revision
1.	October, 2016	Amendment-1	--	To include the ISO document QO-D-7.1-1 new sub clause under 1. (IV) added under clause no. 1 of Scope.
2.	November, 2024	Revision–02	Cover page, 2 & 4	1. Cover page change with specification name 2. DEMU and MEMU stock added in para 1. (i) and revised ISO clause. 3. Warranty clause added as new para 5. 4. Clause no. 1(vii), 2.(ix), 4.2, 4.3,9 &10 added. 5. Clause no. 4 renumbered as 4.1 6. Clause no. 6 (earlier 5) is revised

ISSUED BY

RESEARCH DESIGNS AND STANDARDS ORGANISATION

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1. SCOPE:

i) This specification covers the design, manufacture and supply of Scharfenberg Couplers and Draw Gear for 4-car AC or 3-car DC EMU, DEMU and MEMU Stock.

ii) The coupling and draw gear arrangement at the outer ends of each 4-car/3-car units shall be suitable for fitting of Scharfenberg Automatic Coupler that meet the requirements given in Appendix 'A'. These end couplers shall be suitable for coupling with AC/DC Locomotives provided with screw coupling and side buffers either by using special transition Gear (Adopter) or by removing the automatic head and replacing by pot and draw screw.

iii) All intermediate couplers in the 4-car /3-car units shall be of the semi-permanent type.

iv) The contractor shall develop a design based on sound engineering practice and submit general arrangement and working drawings and all technical data to concerned railway organization or Coach builders and to RDSO/Lucknow for approval before commencing manufacture.

v) This specification is intended to include everything requisite to the manufacture of the coupler, notwithstanding that everything required may not be mention herein.

vi) All the provisions contained in RDSO's ISO procedures laid down in document no. QO-D-8.1-11 dated 14.10.2024 Ver-3.0 (Title: "Vendor-changes in approved status") and subsequent version /amendments thereof, shall be binding and applicable on the successful vendor/ vendors in the contacts floated by Railways to maintain quality of products supplied to Railways.

2. GENERAL DESIGN FEATURES:

(i) The fixing of coupler to underframe shall be by bolts/welding the fixing arrangement and underframe cutaways shall be identical for all couplers (end and intermediate).

(ii) The draft gear housing shall e capable of taking either rubber springs or ring springs, and identical spring's packs shall be used for both end and intermediate couplers.

(iii) The draft/buffing springs shall be of natural or synthetic rubber or blend thereof available in India.

(iv) The attachment of the draw hook to the draft gear shall be designed so that it can be conveniently replaced by automatic Scharfenberg heads, without alteration to any other part of the coupler or draft gear.

(v) The location of the pivot pin centre line of couplers shall not exceed 707 mm from headstock face, and should preferably be the same for both end and intermediate couplers.

(vi) The distance between the headstocks of adjacent coaches shall be 800 mm when semi-permanent couplers are fitted, and not less than 964 mm for the end couplers when fitted with automatic heads.

(vii) The semi-permanent couplers shall be provided with arrangement for coupling of brake pipes. If required provision should also be made for coupling of electrical cables for which 76 electrical contacts should be catered for.

(viii) The Air Brake connections shall fulfil the requirements given in Appendix 'B'.

(ix) For casted components, the material used for coupler shall be High strength steel casting to AAR M- 201 Grade 'E' standard. However equivalent or superior grade are permitted in case of alternate manufacturing processes.

(x) CHEMICAL COMPOSITION-(in case of AAR M-201 Grade 'E')

(a) The percentage by weight of different elements in Grade 'E' steel of specification M-201 shall not exceed the following limits:

Carbon, (Max. %) = 0.32

Manganese,(max. %) = 1.85
Phosphorus, (max. %) = 0.04
Sulphur, (max. %) = 0.04
Silicon, (max. %) = 1.50
Hardness = 241-311

Note: Other alloying element may be added in order to improve the strength requirement.

(b) HEAT TREATMENT: Heat treatment process shall be done as per AAR M-201, Grade 'E' steel specification (latest version). AAR M-201 Grade E or as per mandated ASTM/CEN practice for alternate materials so that properties at par or better to AAR M 201 grade E can be achieved.

3. MAIN REQUIREMENTS:

i) The couplers shall have a rated draft capacity of not less than 34 tonnes and buff capacity not less than 800 m-kg. The stroke of Buffing Gear shall be restricted to 75 mm and the Sill Pressure shallnot exceed 50,000 kg. under buffing impacts of 800 m-kg intensity.

ii) The couplers shall allow coupled coaches to negotiate curves of radius 152.4 metres and shall be capable of passage in either direction over standard 1 in $8^{1/2}$ turnouts, and shall function satisfactorily with a 75 mm difference in headstock heights of adjacent coaches.

iii) The coupler shall be tight lock and shall not develop slack in service.

4. TESTS:

4.1 The coupler assembly excluding the rubber draft gear shall withstand tensile loads of 70 tonnes and compressive loads of 100 tonnes without any permanent deformation and tensile or compressive loads of 150 tonnes without fracture.

4.2 OEM/Supplier should have a well-established quality control system and organizational set up to ensure adequate quality at all stages of manufacture.

4.3 The vendor should have all testing facilities for items being manufactured in-house to facilitate testing of items during acceptance tests.

5. WARRANTY:

The vendor shall, at his cost, replace the couplers and associated components failing prematurely or proving unsatisfactory in service for reasons attributed to defective/ faulty design, defective material or poor workmanship within a period of 36 months from the date of fitment or 48 months from the date of supply whichever is earlier. This warranty shall survive, notwithstanding the fact that the coupler may have been inspected, accepted and payment thereof may by the purchaser.

6. CONTRACTORS' RESPONSIBILITY:

The Contractor shall assist the coach builders in the fitting, testing and commissioning of these couplers and shall be responsible for their satisfactory working, and for any failure due to defective design or materials for a period of 36 months from the date of fitment or 48 months from the date of supply whichever is earlier. He shall replace free of cost all parts damaged or found defective during the period of guarantee.

The Contractor shall be responsible for the execution of the contract strictly in accordance with the terms of this specification and the Standard Conditions of Contract as may be applicable.

7. INSTRUCTIONAL MANUALS:

The Contactor hall supply repair manuals, instructional booklets and spare parts list for these couplers.

8. CONTRACT DRAWINGS:

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The list of contract drawings for Scharfenberg couplers and their assemblies is given in Appendix 'C'.

9. MAINTENANCE OF COUPLERS:

OEM/Supplier shall provide detailed instructions for day-to-day and workshop maintenance and shall include the following**.**

9.1 Detailed work content of various inspection/maintenance practices including procedure for assembly and fitment of couplers. The work content of each schedule shall also be intimated.

9.2 OEM/Supplier shall specifically advise criteria for replacement of components of couplers during maintenance.

9.3 OEM/Supplier shall supply min. 10 (Ten) copies of Maintenance Manuals for every supply of 500 (five hundred) couplers to PURCHASER and subsequently whenever revised. A soft copy of the Maintenance manual shall also be submitted.

10. MARKING:

Each item under scope of supply shall be embossed/punched clearly with unique numbers along with manufacturer logo and year of manufacture for traceability.

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APPENDIX 'A' TO SPECIFICATION NO. 61-B-36 (REV. -02)

ADDITIONAL REQUIREMENTS FOR FITMENT OF AUTOMATIC SCHARFENBERG COUPLER HEADS

1. The automatic head when fitted shall be generally to Scharfenberg Drg. 40.672(0).
2. Automatic coupling heads shall provide for automatic coupling of brake pipes and have provision for subsequent fitting of automatic electrical contacts.
3. The automatic heads shall be capable of uncoupling through hand operated lever. This lever shall givea visual indication of the coupler position and may be set in the open, neutral or closed position. The lever shall be easily accessible for operation and shall allow for fitting of pneumatic release from driver's cab at a later date.
4. Automatic coupling shall take place satisfactorily when coaches are brought together at speeds between 1 km/h and 5 km/h.
5. The gathering range shall be 75 mm. Vertically on either side and 284 mm horizontally on either side of centre line of the coupler.
6. It should be possible to couple Scharfenberg automatic heads with standard IRS draw hooks through a transition gear adaptor Schaku automatic /IRS draw hook which should be obtainable on demand.

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APPENDIX 'B' TO SPECIFICATION NO. 61-B-36 (REV. -02)

NOTES ON BRAKE REQUIREMENTS FOR AUTOMATIC COUPLERS (WITH AIR CONNECTIONS)

a) Brake pipe connection to be 1" B.S.P.-working pressure 4.922 kg/cm^2

b) Main reservoir connection to be 3/4" B.S.P. – working pressure 7.031 kg/cm^2

c) Brake pipe to be closed only at uncoupled ends.

d) Main reservoir pipes to be closed only at uncoupled ends.

e) In the event of an unwanted uncoupling between coaches the brake pipe connection on both halves of the train must be vented to the atmosphere. The main reservoir should preferable (but not essentially) seal on both halves of the train under these circumstances.

f) Provision must be made on the couplers adjacent to the Driving Cabs of the control trailers and the motor coach for a connection (1/2" or 3/8" B.S.P.) to the brake pipe pressure switch. This connection must be taken from the brake pipe contained within the coupler. Thus the pressure switch at both ends of the train will be subjected to the atmospheric pressure but at all intermediate points down the train will be subjected to brake pipe pressure.

g) As there will be relative movement between the coupler and the main frame flexible hose connections will be required for the brake pipe, the main reservoir pipe and (where fitted) the pressure switch pipe.

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APPENDIX 'C' TO SPECIFICATION NO. 61-B-36 (REV. -02)

LIST OF DRAWINGS FOR SCHARFENBERG COUPLER AND THEIR ASSEMBLIES

1. Semi-permanent Intermediate Coupler End 'A'	40.586(0)
a) Rubber Draft Gear	40.586.06 (2)
b) Bearing Bracket	40.586.07(3)
2. Semi-permanent Intermediate Coupler End 'B'	40.586(0)
Rubber Draft Gear	40.586.06 (2)
Bearing Bracket	40.586.07(3)
3. Fully Automatic Coupler	40.572(0)
a) Automatic Coupler Head	40.663(1)
i) Coupler Head	40.640.01(1)
ii) Air Pipe Coupling for main air reservoir pipe	40.370.04 (1)
iv) Air pipe coupling with valve for brake pipe assembly	40.663.03(2)
v) Stem with spring Sleeve	40.371.02(3)
b) Draw & Buff Gear	40.588 (0) s
i) Rubber Draft Gear	40.586.06(2)
ii) Bearing Bracket with support	40.588.07(2)
iii) Centering carrier	10.1000.10 (2)

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