भारत सरकार – रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ – 226011
Tele/Fax : 2465754 & 42226 (Rly)
e-mail : dse4group@gmail.com

सत्यमेव जयते

Government of India - Ministry of Railways
Research, Designs & Standards Organization,
LUCKNOW - 226011

No. EL/3.1.35/12 (Elastic Ring)

As signed

**प्रधानमुख्य विद्युत अभियंता,**

1. मध्य रेलवे, मुम्बई सीएसटी–400 001
2. पूर्व मध्य रेलवे, हाजीपुर–844 101
3. पूर्वतटीय रेलवे, चन्द्रषेखरपुर, भुबनेश्वर–751 023
4. पूर्व रेलवे, फेयर्ली प्लेस, कोलकाता–700 001
5. उत्तर मध्य रेलवे, ब्लाक ए–2, सुबेदारगंज इलाहाबाद– 211 033
6. उत्तररेलवे, बड़ौदा हाऊस, नई दिल्ली–110 001
7. उत्तर पश्चिम रेलवे जयपुर– 302006
8. उत्तर पूर्व रेलवे गोरखपुर– 273001
9. दक्षिण मध्य रेलवे, रेल निलयम, सिकंदराबाद–500 371
10. दक्षिण पूर्व मध्य रेलवे, बिलासपुर– 495 004
11. दक्षिण पूर्व रेलवे, गार्डेनरीच, कोलकाता–700 043
12. दक्षिण रेलवे, पार्क टाउन, चेन्नई–600 003
13. दक्षिण पश्चिम रेलवे हुबली–580020
14. पश्चिम मध्य रेलवे, जबलपुर–482 001
15. पश्चिम रेलवे, चर्चगेट, मुम्बई– 400 020
16. पूर्वोत्तर सीमांत रेलवे, पान्डुपोर्टरोड, मालीगॉव, गुवाहाटी, असम–781012
17. चित्तरंजन रेल इंजन कारखाना, चित्तरंजन– 713 331
18. बनारस रेल इंजन कारखाना वाराणसी. 221004
19. पटियाला रेल इंजन कारखाना पटियाला 147003

**Principle Chief Electrical Engineers,**

1. Central Railway, Mumbai, CST-400 001.
2. East Central Railway, Hazipur-844 101.
3. East Coast Railway, Chandrashekharpur, Bhubaneshwar-751 016.
4. Eastern Railway, Fairlie Place, Calcutta-700 001.
5. North Central Railway, Block-A, Subedarganj, Allahabad- 211 033.
6. Northern Railway, Baroda House, New Delhi-110 001.
7. North Western Railway, Jaipur- 302 006
8. North Eastern Railway, Gorakhpur-273001
9. South Central Railway, Secunderabad-500 071.
10. South East Central Railway, Bilaspur-495 004.
11. South Eastern Railway, Garden Reach, Kolkata-700 043.
12. Southern Railway, Park Town, Chennai-600 003.
13. South Western Railway, Hubli- 580020
14. West Central Railway, Jabalpur-482 001.
15. Western Railway, Churchgate, Mumbai-400 020
16. North East Frontier Railway, Pandu Port Road, Maligaon, Guwahati, Assam 781012 331
17. Chittaranjan Locomotive Works, Chittaranjan-713
18. Banaras Locomotive Works, Varanasi-221 004
19. Patiala Locomotive Works, Patiala, Punjab- 147003

**Sub:** Issue of Schedule of Technical Requirement (STR) no. RDSO/2023/EL/STR/0096 (Rev.'1').

RDSO has revised (STR) no. RDSO/2023/EL/STR/0096 (Rev.'1') for Manufacturing, testing and quality control of Elastic ring used on three phase drive electric locomotives (WAP5, WAP7 & WAG9). Copy of the revised (STR) no. RDSO/2023/EL/STR/0096 (Rev.'1') is attached herewith for your kind reference and record please.
Revised STR is also uploaded on RDSO website which can be downloaded from following path:

**www.rdso.indianrailways.gov.in---->Specifications / drawings-----> Loco, EMU & Power supply----> list of specification for loco & other ----> Master list of STR ------> (STR) no. RDSO/2023/EL/STR/0096 (Rev.'1')**

25.02.25

**(Nirdosh K. Gupta)**
**for Director General/Elect**

**Encl:** Copy of Final STR no. RDSO/2023/EL/STR/0096 (Rev.'1')

**Copy to:**

1. M/s Acla Werke GmbH,Frankfurter STR, 142-190,
   KOLN D-51065, Germany
   Email id:-info@acla-werke.de

   through Indian agent:-
   M/s R.S. Technologies,Merlin Infinite, Unit No. 912,
   Block-DN, 9th Floor, Plot No. 51, Sector-V, Salt Lake, Kolkata-700091. Email id:- rstechnologies3@gmail.com

2. M/s Avadh Rail Infra Ltd.,
   D-12, Industrial Area, Amausi, Lucknow- 226008.
   Email id :- avadhrubber@gmail.com

3. M/s Sequoia safety products Pvt. Ltd.,4, pocket-1, Jasola,
   New Delhi-110015.
   Email id:-skumar@sequoia-safety.com,info@sequoia-safety.com

4. M/s Prag Industries (India) Pvt. Ltd, E-7 Talkatora Industrial Estate, Lucknow-226011.
   Email id:- corporate@praggroup.com

5. M/s Electroplast
   1/34 South side G.T. Road, Industrial Area Ghaziabad, Uttar Pradesh – 201001

6. M/s NU Cork Products Private Limited
   B-504, 5th Floor, Ansal Chamber-1 Bikaji Cama Place New Delhi,
   Email id:- railway@nucork.in,info@nucork.in

7. M/s Soni Rollers Private Limited
   4, Princep Street DHARMATALA Kolkata, West Bengal - 700072, India.
   Email id:- sonirollers@gmail.com

8. M/s Aryan Exporters (P) Ltd. B-1,Industrial Area Amausi Lucknow , Uttar Pradesh - 226008, India.
   Email id:- mail@aryanexp.com,aryanexp@gmail.com

9. M/s Vajra Rubber Products Private Limited Konathukunnu P.O. Irinjalakuda Thrissur, Kerala - 680123, India.
   Email id:- projects@vajrarubber.com

10. INTERNATIONAL SWITCHGEARS PVT LTD-MOHALI
    Plot No E-132,133,134 and E-158,, INDUSTRIAL AREA PHASE 7,FOCAL POINT, Mohali, SAS Nagar, MOHALI, Punjab, PinCode-160062, India.
    Email id:- isg.rsr@gmail.com

It is advised to download the revised STR through above path and submit the compliance of STR within 06 months. Further, firms are advised to submit the day wise test plan at the earliest.

25.02.25

**(Nirdosh K. Gupta)**
**for Director General/Elect**

सत्यमेव जयते

**GOVERNMENT OF INDIA**
**MINISTRY OF RAILWAYS**

# SCHEDULE OF TECHNICAL REQUIREMENTS FOR ELASTIC RING USED ON THREE PHASE DRIVE ELECTRIC LOCOMOTIVES (WAP5, WAP7 & WAG9)

**STR No. RDSO/2023/EL/STR/0096 (Rev.'1')**

**February 2025**

| Approved by | Signature |
|---|---|
| PED/PS&EMU | |

**ELECTRICAL DIRECTORATE**
**RESEARCH DESIGNS AND STANDARDS ORGANISATION**
**LUCKNOW-226011**

| Prepared by | Checked by | Issued by |
|---|---|---|
| JE/D | SSE/D | DSE/MECH |

## Status of Revision

| S.N. | Date of Revision | Page No. | Revision | Reasons for Revision |
|---|---|---|---|---|
| 1. | 0 | 0 | 0 | 0 |
| 2 | 25.02.2025 | 4 | 1 | Correction of Typographical error in clause no.3.2 of STR No.RDSO/2023/EL/STR/0096(Rev.'0') |

## INDEX

# SCHEDULE OF TECHNICAL REQUIREMENTS FOR ELASTIC RING USED ON THREE PHASE ELECTRIC LOCOMOTIVES (WAP5, WAP7 & WAG9)

## 1.0 SCOPE:

1.1 This STR specifies the requirements to be met by vendors (hereafter called firm) to manufacture; test and supply Elastic ring used in the traction link of WAP5/WAP7/WAG9 type of three phase Electric Locomotives. The Traction link of the locomotive is providing a connection between the bogie and the locomotive body. The Traction link is situated between two pivot points, one on the locomotive under frame, the other on the end transom of the bogie, permitting lateral movement but restraining longitudinal movement. A pivot head, situated at each end of the Traction link, has an elastic ring of pliable material between the pivot post and head. The Elastic ring is secured to the pivot head by an outer retaining ring and a retaining plate bolted to the post. All tractive and braking forces between locomotive body and its bogies are transferred through the Traction link.

1.2 Drawing details of Elastic Ring is as below:

RDSO Drawing No. SKEL 4717 (Alt-4) or latest For WAP5/ WAP7/ WAG9 Electric Locomotives:

## 2.0 GENERAL REQUIREMENTS:

2.1 The firm should satisfy themselves having complied with the requirements of the specification, drawing and Schedule of Technical Requirements.

2.2 The manufacturer shall have adequate space and covered area with material handling facility of adequate capacity covering the following:

i. Raw material storage
ii. M&P
iii. T&P
iv. Packing facilities.
v. Storage of finished product.

2.3 Firm shall have all the latest relevant specifications, drawings and IS standards.

2.4 The firm shall have a system of documentation in respect of rejection at customer end, warranty replacement and failure of item supplied by them during service.

## 3.0 INCOMING RAW MATERIAL:

3.1 Firm shall have covered area with adequate space for storage of raw material. The covered area should be free from dampness and humidity.

3.2 The vendor shall obtain the raw material for cast polyurethane and manufacturing technology/process from one of the following reputed cast polyurethane manufacturers: Covestro, BASF, Cargill, DowDupont, Lanxess, Mitsui Chemicals, Shell International, Stepan Company, Repsol, Lonza Group, Huntsman, Crompton Chemical Corporation, Acla-Werke GmbH,Bayer. Documentary proof of understanding/agreement in this regard and test certificate shall be maintained and submitted along with QAP.

3.3 Manufacturing process in accord with requirement of specification (RDSO/2007/EL/SPEC/0053 latest revision) approved by above mentioned reputed cast

polyurethane manufacturers from whom firm is obtaining raw material needs to be submitted with QAP.

3.4 A record of each sub-supplier clearly showing the quantity purchased and rejected, if any shall be kept and will be produced as and when required.

## 4.0 MANUFACTURING REQUIREMENTS:

4.1 M&P as per list in Annexure-I required for manufacturing should be available with the firm. However, details of M&P used for actual manufacturing operations and any specific M&P used by firm should be submitted to RDSO as part of QAP for approval.

4.2 Molds used for manufacturing of Elastic ring, should be measured for their accuracy for various dimensions and profile at least on weekly basis or after a production of 500 pieces, whichever is earlier and the observations should be recorded.

4.3 System should be exists to check the dimensional accuracy of the mold before its use, if it is being used after a gap of considerable time period.

## 5.0 TESTING AND MEASURING REQUIREMENTS AND STAGE INSPECTION:

5.1 Testing facilities and Measuring instruments as per list in Annexure-II & III respectively should be available with the firm. However, details of Testing & measuring instruments/equipments, gauges used for actual requirements and any specific testing & measuring instruments/equipments, gauges used by firm should be submitted to RDSO as part of QAP for approval.

5.2 A controlled atmosphere laboratory to maintain standard temperature and humidity for testing.

## 6.0 QUALITY CONTROL REQUIREMENTS:

6.1 Firm should possess valid ISO 9001 certificate for manufacture of same/similar item at his works address.

6.2 The Quality Manual of the firm should clearly indicate at any stage the quality control over manufacturing and testing of the said railway product.

6.3 The firm shall have a well-defined Quality Assurance Plan (QAP) prepared as per latest ISO guidelines for manufacturing of the product and shall submit the same for approval by RDSO. A complete process Flow Chart covering all steps of manufacture and testing of the product shall be clearly listed.

6.4 There should be separate in-charge of the Quality Control Section with adequate qualification and experience. He should be actively involved in day to day activities of quality control/stage inspection/compliance of QAP etc.

6.5 All the testing and measuring instruments must be regularly calibrated for which the firm must have documented calibration procedure in the QAP. The firm may have in house calibration capability or services of NABL accredited agency may be taken.

6.6 There should be a system to ensure the traceability of the product from raw material stage to finished product stage.

6.7 Ensure that the system exists for proper quality check of raw material and the record is available detailing receipt particulars, quantity, quality inspection details etc.

6.8 Ensure that proper analysis is being done on monthly basis to study the rejection at various internal stages and it is documented.

6.9 Ensure that adequate and proper covered area for storage of final product, awaiting inspection and dispatch is available and earmarked.

6.10 Ensure that proper record of complaints received from users (railways) is being maintained & corrective action is taken.

## Annexure-I

### LIST OF MACHINERY AND PLANTS

| SN | Equipment/Machinery | Quantity (at least) |
|---|---|---|
| 1. | Microprocessor/PLC controlled Polyurethane casting machine with precise temp. control | 1 |
| 2. | Facility for machining to match the finished dimensions | 1 |
| 3. | Polishing & buffing grinder | 1 |
| 4. | Temperature and humidity controlled chamber for post curing | 1 |
| 5. | Hot air oven (upto 150°C) for pre heating of polymer | 1 |
| 6. | Air compressor | 1 |
| 7. | Vacuum pump | 1 |

## Annexure-II

### LIST OF TESTING FACILITIES

1. Tensile testing machine having capacity of minimum 5 kN and a least–count of maximum 0.05 kN.
2. Universal testing machine with digital load indicator and Load cell having capacity of minimum 200 kN and a least–count of maximum 1 kN.
3. Rebound resilience tester for testing of sample as per ISO 3400.
4. Hot air oven with temperature & time recorder: for checking resistance to ageing of elastic ring.
5. Suitable compression set apparatus for checking of Compression set characteristics of sample as specified in ISO 3400.
6. Specific gravity tester for checking of specific gravity of sample as per product specification.
7. Hydrolysis machine for hydrolysis testing of sample as per ISO 3400.
8. Load deflection testing fixture.

## Annexure-III

### LIST OF MEASURING INSTRUMENTS

1. Shore hardness tester: 0-100 shore A.
2. Surface roughness tester with stand.
3. Electronic weighing machine.
4. Digital Vernier calliper: 0-300mm
5. Radius gauge: 1-15mm
6. Dial gauge(least count of 0.01mm) with stand placed on surface table
7. Inside Micrometer/ Bore gauge
8. Outside Micrometer