



**Government of India  
Ministry of Railways**

**DOCUMENT NO. QC-G- 7.1-3, Ver. '1'**

ITEM SPECIFIC GUIDELINES  
AND SHEDULE OF TECHNICAL REQUIREMENT FOR ELASTIC  
RAIL CLIP Mk-III & ERC-J

**Quality Assurance Civil Directorate**

**RESEARCH DESIGNS & STANDARDS ORGANISATION  
MANAK NAGAR, LUCKNOW – 226011**

Page 2 of 14	EFFECTIVE FROM 09.03.2012	DOCUMENT NO. QC-G-7.1-3, Ver.'1'
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**a. ITEM SPECIFIC GUIDELINES**

- i) In addition to the procedure for vendor approval given in the 'General Guidelines for vendor development' the following specific guidelines shall also be applicable to vendors seeking approval for manufacture of Elastic Rail Clips Mk-III & ERC - J:
- ii) In accordance to the "General guidelines for vendor development" works of the firms shall be assessed by physical verification. If it is found acceptable after assessment, the firm shall be allowed to submit two sets of inspection gauges (for dimensional checking of product) along with the QAP in duplicate for approval of RDSO. After approval of inspection gauges and QAP, the firm shall submit requisition for drawl of samples along with internal test results carried out by the firm on trial samples. If internal test results are found acceptable, sample clips shall be drawn from works of the firm.
- iii) A total number of 14 samples shall be drawn from the works of the firm by RDSO representative and shall be sealed. This sealed bag shall be sent to RDSO by the firm's representative within a reasonable period. The samples shall be subjected to various Civil Engineering tests stipulated in IRST – 31 i.e. for dimensions, toe-load, flat bearing area, application deflection test on eight clips and stress test on at least 4 clip having higher toe-loads. The balance six clips shall be tested for chemical analysis, hardness, depth of decarburization, freedom from surface defects and inclusion rating.
- iv) If the samples passes all the tests as stipulated above, the firm shall be considered for inclusion in Master list of approved vendor for ERC Mk-III in part – II category as per criteria laid down in General lines for vendor development with instruction that after getting the raw material inspected and passed by RDSO, the inspection of atleast initial quantity of 20,000 Nos. clips (in at least two installments preferably of equal size) will be done by RDSO.
- v) The inspection of these 20,000 Nos. clips shall be done by RDSO officials in at least two (02) installments, preferably of equal size. In case clips are found satisfactory for above quantity, balance quantity shall be inspected by consignee zonal railway otherwise further more quantity in the multiple of 10,000 Nos. shall be inspected by RDSO till stabilization of the product is achieved by the firm. For this maximum two additional chance or as decided by competent authority will be given to the firm. In such case consignee Zonal Railway shall however be informed for making necessary amendments to the relevant contract clause.
- vi) If development of firm is considered against developmental order, name of the firm shall be considered for inclusion in Master list of approved vendor for ERC Mk-III in part –II category only after firm has completed the supply of ordered quantity after inspection and passing by RDSO after successful development.

**b. SCHEDULE OF TECHNICAL REQUIRMENTS FOR APPROVAL OF FIRMS TO MANUFACTURE ELASTIC RAIL CLIPS Mk-III & ERC-J**

1. **SCOPE:** The schedule of technical requirements covers the norms for manufacture of elastic rail clip.
2. **REQUIREMENTS:** The vendors seeking approval shall comply all the below mentioned requirement.

**A) MANUFACTURING FACILITIES:**

- i. **Space:** Sufficient covered area with proper ventilation should be available for manufacturing and testing facilities. Space for storage of raw material, cut bars, heating furnace, power press for forming clips, quenching tank, tempering furnace and for storage of finished products should be earmarked clearly.
- ii. **Raw Material:** The as rolled bars to be used for manufacture of ERC Mk-III and ERC-J shall be stored heat wise separately so that they do not get mixed up.
- iii. **Power Press:** Power press with sufficient capacity to cut the as rolled bars should be available. Two or three supports depending upon length of the rolled bars should be available near the cutting press, to hold bars such that their end squareness is maintained within 1 mm.
- iv. **Bench Grinder:** Bench grinder should be available near the cutting press to ground any sharp edges/ burrs from the cut bars.
- v. **Gauge for checking length of cut bars:** Go/No Go gauge should be available to check the correctness of nominal length of cut bars within + 1.5 mm and – 0 mm.
- vi. **Racks:** Sufficient pigeonhole racks to store the cut rods heat wise should be available near the heating furnace.
- vii. **Heating furnace:** Indirect heating type heating furnace should be available. It may be rotary hearth or walking beam type. An automatic temperature control device and continuous temperature recorder should also be fitted with it.
- viii. **Power Press for forming clip:** Power press of sufficient capacity fitted with the required dies should be available for formation of clips installed near the heating furnace such that the time taken between taking out the heated bars to forming the clips and then dipping them in oil quenching bath can be completed within 20 seconds. Necessary die checking templates should also be available at the works for checking the wear and tear of the dies.
- ix. **Scale blower:** There should be an arrangement for blowing off scales from the dies fitted into the clip forming press. For this purpose a compressor with sufficient capacity should be available.
- x. **Oil quenching tank:** Oil-quenching tank of adequate length, width and depth should be available fitted with a conveyor belt passing through the oil. The speed of the conveyor belt shall facilitate the clip to be in oil for at least 12 minutes. Facility for cooling the oil along with continuous temperature recorder should be available such that the temperature of oil does not exceed 70<sup>0</sup> Centigrade. Oil

tank should also be fitted with a mechanical stirrer to maintain uniform temperature of oil through out the tank.

- xi. Tempering furnace: The tempering furnace may be oil fired tunnel type fitted with a conveyor system or it may be electrical well/batch type. The former class of furnace shall be fitted with thermo-couples to sense the temperature at three points along its length to ensure the constant temperature zone along length of the furnace. The speed of the conveyor should facilitate the clip to be in tempering furnace for minimum period of 50 minutes. The furnace shall be fitted with an automatic temperature control device and continuous temperature recorder. The latter class of the furnace (electrical) shall have an arrangement or free circulation of hot air and fitted with automatic temperature control device and continuous temperature recorder. For loading the clips into the furnace, only tree type bucket or suitable arrangement, which permits free air circulation around the clips, shall be available.
- B) TESTING FACILITIES:** All measuring and testing equipments shall be installed in a separate laboratory room, which shall be well lit, clean and properly ventilated and provided with easily maintainable floor and platform should be available at the works.
- i) **Chemical Testing:** Necessary equipment should be available in the laboratory for carrying out chemical analysis to determine the carbon, sulphur, phosphorus, silicon and manganese percentage in the material else the firm should possess a no objection certificate from RDSO approved/ NABL Accredited/ Government owned spectro source for carrying out chemical analysis of their material spectrographically as and when required by them within specified time frame. In such case distance of spectro lab from firms work should be not more than 100 km for sake of smooth working/ inspection.
- ii) **Hardness tester:** Two hardness testing machines along with standard test blocks duly calibrated should be available in the firms' laboratory to test the hardness of raw and finished material.
- iii) **Proving ring:** Two proving rings of sufficient capacity should be available for use with the toe load test arrangement available in laboratory. These should be duly calibrated through National Physical Laboratory or through NABL/NTH approved laboratory.
- iv) **Toe load testing arrangement:** For toe load testing arrangement as per RDSO drawing should be available at the works. Toe load can also be measured through a duly calibrated UTM machine.
- v) **Gauges and application & deflection test fixture:** Two sets of valid approved Inspection gauges (for dimension checking) and application & deflection test fixtures as per RDSO drawing should be available at the firms' premises. Angle-checking fixtures as per RDSO drawing should also be available.
- vi) **Microscope & Polishing machine:** A microscope of at least magnification 100x and a polishing machine with all necessary items like diamond pest etc shall be available to check & prepare samples for inclusion rating, depth of decarburization and grain size.

Page 5 of 14	EFFECTIVE FROM 09.03.2012	DOCUMENT NO. QC-G-7.1-3, Ver.'1'
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- vii) **Inclusion rating and grain size charts:** Necessary charts for reading inclusion rating and grain size also should be available in the laboratory duly displayed in a glass frame.
- viii) **Tool room cum die making/repair shop facility:** Necessary tools and machines such as grinding machine, cutting machine, lathe machine etc. should be available in the tools room.
- ix) **Calibration of test equipments:** All the test equipments shall be periodically checked and calibrated. The frequency of calibration for Hardness testing Machine, UTM and proving ring shall be once in a year. Inspection Gauges and application & deflection test fixtures shall be produced before RDSO for approval three months in advance before expiry of approval validity at the time of reassessment as per General Guidelines for vendor approval. Details of Calibration and due date shall normally be displayed on the equipments in the form of stickers issued by Calibration agency. Calibration of equipments other than Inspection gauges shall be got done from Government laboratory or from labs accredited by NABL or NTH or Regional Test Centers.
- x) Firm shall possess Plant & Machineries detailed in **Annexure A and submit details of same** on enclosed format given as **Annexure B-I & B-II** in their QAP.

**C) QUALITY CONTROL REQUIREMENTS:**

1.0 There should be a quality control system for manufacturing process of product commencing from raw material stage. The QAP for the product should cover all the requisite information as per General guidelines and also on following aspects.

- i) Organizational Chart
- ii) Process Flow Chart
- iii) Methodology of Process Control
- iv) Details of Plants and machinery including its size and other details as per STR
- v) Details of calibration of testing/ measuring instruments.

2.0 All the relevant specifications and IS Standards should be available with the firm.

- D) GENERAL:** Sufficient manpower like managers, supervisor, laboratory-in-charge, quality control person and workmen should be available. They should possess necessary qualification depending upon the scope of their works. All the approved firms should possess a valid ISO-9001 Certificate. The firm should maintain records as per QAP approved by RDSO. The firm should possess all the referred specifications/ drawings as referred to in the specification for elastic rail clips IRST – 31. The firm should also possess the General guidelines for vendor development, issued by QA Civil Dte. of RDSO/Lucknow.

**Annexure A**

**Summarized List of plant and machineries and testing equipments**

SN.	Name of Item	Minimum Quantity/ Number required	Details/ to be Submitted
<b>A</b>	<b>MANUFACTURING FACILITIES</b>		
1	Power Press	One Power press of sufficient capacity for cutting of bars.	Capacity in Tonnes
2	Heating furnace	One indirect heating furnace of sufficient capacity equipped with temperature controller, temperature indicator & temperature recorder	Size: Length x width x height
3	Power Press for forming clip	One/ two Power press of sufficient capacity for clip formation fitted with dies and blower for blowing off scales.	Capacity in Tonnes
4	Oil quenching tank	One oil quenching tank fitted with conveyised system, stirrer, oil cooling arrangement and attached with temperature indicator & temperature recorder.	Size: Effective length x width x depth
5	Tempering furnace	One oil fired tunnel type fitted with conveyor system or electrical well/batch type attached with temperature indicator & temperature recorder	Size: Effective length x width x height or Diameter, depth and their Nos.
6	Bench Grinder	One	Capacity in RPM or H.P. & Nos.
<b>B</b>	<b>TESTING FACILITIES</b>		
1	<b>Chemical Testing</b>	One complete Set of chemical lab for chemical analysis	Apparatus in nos.
	i) Carbon and Sulphur apparatus complete with accessories ii) Muffle Furnace iii) Analytical balance with weight box Grade 'A' iv) All necessary laboratory apparatus v) IS codes & standards vi) Solutions for titration analysis for determination of silicon, Manganese and phosphorus.	OR  Consent from the RDSO approved /NABL/Government Owned Spectro laboratory for carrying out chemical analysis. Distance between spectro lab from firms work should be not more than 100 km.	
<b>C</b>	<b>MEASURING AND TESTING EQUIPMENT</b>		
1	Hardness tester	Two Nos.	Rockwell or HB Sr. No.
2	Toe load testing arrangement		
	a) As per RDSO drawing No. EDO/T-2135 or	One (Min)	. Nos.
	b) UTM	One (Min)	Make: Sr. No. Capacity in Ton/ KN/Kgf
3	Proving Ring	Two Nos	Capacity in Ton/KN Sr. No.
4	Microscope, magnification x 100	One	Magnification
5	Polishing machine single disc	One	Capacity in RPM or H.P

SN.	Name of Item	Minimum Quantity/ Number required	Details/ to be Submitted
	with leveller		
6	Surface plate	Two min., One (18"x18" Min) in inspection Room & One (12"x12" Min) near cutting press	Size: Length x with
7	Height gauge fitted with vernier	One	Sr.No. & Range
8	Bevel protector	One	Sr.No. & Range
9	Vernier caliper	Two (of 0.02mm accuracy)	Sr.No. & Range
10	Tri-square	One	Sr.No. & size
11	Set of filler gauge	One	Sr.No.
12	Length checking gauge	One Go-No Go gauge for checking of length of cut pieces	Sr.No.
13	Application & deflection test fixture	Two	Nos.
14	Inclusion rating charts.	One complete set	Nos.
15	Angle checking fixture as per drg. no. RDSO/T-3935 (Latest Alt.)	One	Nos.
16	Inspection Gauges	Two sets RDSO Approved	Nos.
17	Gauges/ Templates	Two sets of working gauges	Nos.

Note: All temperature indicators, recorders, thermocouples & other equipments shall be calibrated once in a year or earlier if found unsatisfactory during working

**Annexure B-I****LIST OF PLANT & MACHINERY**

Sl. No.	Name of the Equipment/ Machine	Manufactured By/ Model No.	Quantity /Nos.	Capacity/ Size	Unique Sl. No. of Machine	Year of procurement	Documents establishing Ownership	Year of Manufacture

**Undertaking:**

1. We undertake to inform RDSO through FAX followed by confirmation copy through courier / Speed post if any machinery is removed from firm's premises even for repair. We shall inform RDSO when machine is brought back and made operational.
2. We undertake that if at any time after approval is accorded, some machinery is found deficient without intimation to RDSO action against our firm can be taken by RDSO as per extant policy.

Place :  
Date :

Signature  
Name in full of Signing Authority  
Status in the Firm  
Stamp of the firm



**Annexure B-II**

**LIST OF TESTING/MEASURING INSTRUMENT**

Sl. No.	Name of the Equipment/ Machine	Manufactured By/ Model No.	Quantity /Nos.	Capacity/ Size	Unique Sl. No. of Machine	Year of procurement	Documents establishing Ownership	Year of Manufacture

**Undertaking:**

1. We undertake to inform RDSO through FAX followed by confirmation copy through courier / Speed post if any machinery is removed from firm's premises even for repair. We shall inform RDSO when machine is brought back and made operational.
2. We undertake that if at any time after approval is accorded, some machinery is found deficient without intimation to RDSO action against our firm can be taken by RDSO as per extant policy.

Place :  
Date :

Signature  
Name in full of Signing Authority  
Status in the Firm  
Stamp of the firm

**Annexure C**

<p><b>c. <u>PROFORMA FOR TECHNICAL CAPABILITY ASSESSMENT FOR MANUFACTURE AND SUPPLY OF Elastic Rail Clips Mk-III/ ERC-J</u></b></p>
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(To be filled in by the firm in triplicate. Attach extra sheets wherever necessary)

**1 SECTION – I : GENERAL INFORMATION**

(For record purpose only)

- 1.1 Name of the Firm :-----
- 1.2 Address, Telephone & Fax No. :-----
  - (a) Head Office :-----
  - (b) Works :-----
  - (c) Location of Works .....km from .....Rly. Stn. :-----
- 1.3 Factory Area (Attach layout plan for factory premises). :-----
  - (a) Covered :-----
  - (b) Uncovered :-----
  - (c) Is the factory site in your name or on rental basis?  
( Support with documents) :-----
- 1.4 SSIC / NSIC Registration No. (Enclose copy) :-----
- 1.5 **Power Availability** :-----
  - (a) General allotted capacity :-----
  - (b) Standby generator and its capacity, if available :-----
  - (c) Name the party / person in whose name the power is sanctioned and your agreement with the party / person  
(Support with reasonable documents) :-----
- 1.6 Name of any other units located in the above premises :-----
- 1.7 Man – Power Management :-----
  - (a) Managerial Staff :-----
  - (b) Shop Floor Engineers / Supervisors :-----
  - (Their numbers with their qualifications and service experience) :-----
  - (c) Lab. Incharge whether full time of part time. :-----
  - (Indicate their names, qualification and service experience) :-----
  - (d) Inspection & Quality Control Staff. :-----
  - (Their nos., name, qualification and service experience) :-----
  - (e) Workmen :-----
    - (i) Highly Skilled :-----
    - (ii) Semi Skilled :-----
    - (iii) Un Skilled :-----

**2 SECTION – II : TECHNICAL INFORMATION**

(Availability of plant & machinery as indicated by manufacturer should be verified by assessment official)

**2.1 Infrastructure for production and production capability of Elastic Rail Clips Mk-III/ ERC-J:**

**2.1.1 Power Press:**

- (a) Their Numbers :-----
- (b) Capacity :-----
- (c) Make :-----
- (d) Attachment for blowing off scale from dies :-----

**2.1.2 Indirect Heating Furnace:**

- (a) Their Numbers :-----
- (b) Whether rotary hearth or walking beam :-----
- (c) Capacity :-----
- (d) Make :-----
- (e) Attachment for automatic temp. Control cum temp. indicator & continuous temperature recorder (indicate temp. range) :-----
- (f) Facility for bars to come out at required temperature :-----

**2.1.3 Oil Quenching Bath with Conveyor Belt:**

- (a) Size of Tank :-----
- (b) Type of Stirrer provided :-----
- (c) Volume capacity for Oil :-----
- (d) Heat Exchange facility (brief description) :-----
- (e) Auto. Temp. control device and continuous temperature recorder (indicate range of temp.) :-----

**2.1.4 Tempering Facility:**

- (a) Type of Tempering Furnace :-----
- i) Oil Fired Furnace :-----
- Is it conveyrised? :-----
- Is it provided with sensing devices at 3 places? (At entry, center & exit) :-----

Auto. Temp. control device and continuous temperature recorder (indicate range of temp.) :-----

- ii) Electrical Furnace :-----
- For loading the clips into the furnace, is suitable supporting arrangements exists for loading the clips into the furnace and to permit free circulation of air around the clips during tempering :-----

What is the approx. no. of clips which can be tempered at a time with the support arrangement to permit free circulation of air around the clips. :-----

- (b) Nos. and Size :-----
- (c) Auto. Temp. control device and continuous temperature recorder (indicate range of temperature) :-----

If the infrastructure is not yet installed, the date of placement of order against purchase of each of equipment should be mentioned. (Attach photocopy of such order). Expected date of commissioning should also be indicated.

- 2.1.5 Tool Room cum die making / repair shop facility: :-----
- 2.1.6 Source of Raw Material: :-----
- 2.1.7 Arrangement for storing the raw material heat wise. Describe briefly the arrangement: :-----
- 2.1.8 Arrangement for storing the finished clips heat wise and capacity to store the clips in numbers at a time: :-----
- 2.1.9 Rated production capacity planned for clips per shift per day. :-----

**2.2 Infrastructure for testing of Elastic Rail Clips Mk-III/ ERC-J:**

Nature of Test      Facility as required      Facility as available

- 2.2.1 Toe Load Test :-----
  - (A) Arrangement as per drg. No. EDO / T – 2135 :-----
  - (B) Proving Rings. Indicate No. capacity & date of calibration. (Enclose copy) :-----

2.2.2 Hardness test apparatus on RC, BHN / HV scale with standard test blocks and working literature. (In case of RC, test blocks of value 40 – 44 required) :-----

**2.2.3 Lab. Cum inspection room**

(a) Well lit, clean ad properly ventilated lab. Room with easily maintainable floor and platforms, Should be equipped with: :-----

- i Polishing machine with diamond paste; :-----
- ii Drawing (latest) duly stamped displayed; :-----
- iii Inclusion rating, grain size and microstructure charts duly enlarged and displayed; :-----
- iv Microscope x 100 magnification with eyepieces x 100 magnification for Depth of decarb and inclusion rating / grain size tests. :-----

**2.2.4 Chemical Composition Test**

- (a) Carbon & Sulphur apparatus with suitable chemicals for analyzing C, Si, Mn, S & P elements :-----
- (b) Muffle Furnace :-----
- (c) Analytical Balance :-----
- (d) Other apparatus for the chemical / metallurgical test lab. :-----

Or

Through Spectrographic facility approved by RDSO/ NABL (Consent letter to be attached). Distance between spectro lab from firms work should be not more than 100 km :-----

**2.2.5 (a) Depth of decarb test**

- i Microscope x 100 magnification :-----
- ii Diamond paste :-----

- iii Polishing paste :-----
- iv Inclusion rating & grain size charts :-----

**(b) Freedom from internal defects.** :-----

**(c) Inclusion Rating** :-----

**2.2.6 Other facilities**

- i Surface plate :-----
- ii Height gauge :-----
- iii Bevel protractor to read up to 5 minute angle (Min.) :-----
- iv Angle checking fixture as per drg. No. RDSO/T-3935. :-----
- v Vernier caliper to read up to 0.02 mm (Min.). :-----

2.2.7 Indian Standards Codes. As per clause 2.1 of IRST-31-92. Please list them. :-----

**3 SECTION - III : EXPERIENCE** (For record purpose only)

3.1 Indicate various types of items being manufactured in your works and the name of the agency / client for whom it is being manufactured. :-----

3.2 Indicate important customers for the last 3 years both Government and non-Government. if any, for information furnished in your reply to 3.1. :-----

3.3 Give details (contract reference, item and quantity manufactured and supplied of important orders executed in the past 3 years for the following. Indicate the inspecting agency for each: :-----

- (i) :-----
- (ii) :-----
- (iii) :-----

3.4 Please specify current orders in hand on your firm (Contract reference, client, item, quantity under manufacture and supply) :-----

3.5 Whether you are already registered with RDSO for other P. way items. If so, name the item supported by documents. :-----

3.6 Whether you are already registered with RDSO for items other than P. way items. If so, name the item and deptt. with which you are registered, support with documents. :-----

3.7 Indicate annual turnover of your company : :-----

Page 14 of 14	EFFECTIVE FROM 09.03.2012	DOCUMENT NO. QC-G-7.1-3, Ver.'1'
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**4 DECLARATION:**

- 4.1 We do hereby declare that the above particulars are correct and no discrepancy shall be found during actual investigation before and during execution of order on our firm.
- 4.2 Any change in the plant and machinery and change of place of office and of Works site shall be brought to the notice of RDSO for clearance and approval.
- 4.3 We also declare that our concern has not been black listed by Railway/Railway Board/ RDSO for business with the Railways.
- 4.4 We hereby undertake that all our equipments for manufacture and testing as listed above shall be maintained in good working order at all time.

Signature of Firm's Rep.

Name in full of signing authority

Status in the firm

Stamp of the firm