

 सत्यमेव जयते	RESEARCH DESIGNS & STANDARDS ORGANIZATION Manaknagar, Lucknow – 226011
Document No: QMS-16:2014 TDG 0045	
Document Title : Item Specific guidelines & Schedule of Technical Requirements for manufacture and supply for Spring Steel Rounds	

1.0 Amendment History:

S. No.	Amendment Date	Version	Reasons for Amendment
1.	01.12.2001	0	First issue under new documentation system
2	July 2014	QMS-16:2014 (Rev. 01)	Amendment in Specification and quality improvement
32022	TDG 0045 Ver. '0'	Amendment in Specification and quality improvement

2.0 Purpose:

This document is based on IRS Specification for ~~Spring Steel Rounds to serial no. WD-04-HLS-94~~ Elastic Rail Clips S.No.T-31- 2021 (Fifth Revision) issued by RDSO. The purpose is to specifically define the technical requirement for manufacture & supply of Spring Steel Rounds of dia. 20.64 & 23mm to grade 55Si7 to IS: 3195.

3.0 Scope of Application

This document shall be applicable for manufacturing & supply of Spring Steel Rounds for dia. 20.64mm & 23mm.

4.0 Procedure / Details

Procedure/details are annexed.

5.0 Referenced Documents:

1. Indian Railway Standard specification for Elastic Rail Clips S.No.T-31- 2021 (Fifth Revision)
2. ISO Apex Documents of RDSO

6.0 Referenced Documents of External Origin

None.

7.0 Associated Records

None.

8.0 Responsibility and Authority

Activity	Responsible	Approver	Supporting	Consulted	Informed
Creation, maintenance of this document	Director/Track Design-IV	ED/Track-II	DD/ AIE/ ADE	M&C Dte.	All approved vendors through website
Compliance of directives contained in this document	DD/XEN/AIE/ ADE/ARO	Director/Track Design-IV	-		-
Requirement of deviation from this directive	ED/Track-II/ Director/Track Design-IV	PED/INFRA-I	DD/ AIE/ ADE	M&C Dte.	-

Abbreviations

PED/INFRA-I	Principal Executive Director/INFRA-I
ED/Track Design-II	Executive Director/Track Design-II
RDSO	Research Designs & Standards Organization
DD	Dy. Director
AIE	Assistant Inspecting Engineer
ADE	Assistant Design Engineer

A. **ITEM SPECIFIC GUIDELINES**

1.0 The process of approval will involve following steps / activities.

- i) Vendor seeking fresh registration shall register online on RDSO Website www.rdsso.indianrailways.gov.in. & <https://www.ireps.gov.in>.
- ii) Submit duly filled-in online fresh application form along with vendor registration charges as applicable at the time of submission.
- iii) Upload the document as mentioned at online vendor registration portal along with Quality Assurance Programme (QAP) and legal documents.
- iv) After downloading application / proforma along with documents & charges verification, it will be scrutinized by concerned Directorate and if details are found satisfactory, the works unit of the firm will be visited for Technical Capability Assessment.
- v) If any shortcomings are observed during the visit, the same will be conveyed to the firm for their compliance.
- vi) After clearance of STR, the firm would be advised to start trial production and to submit internal test results in formats as per Quality Assurance Programme (QAP) for manufacture and testing. If the internal test results are found satisfactory, the firm would be advised for drawl of samples manufactured in presence of RDSO official from their works.
- vii) A total number of 02 samples of length 350mm shall be drawn from the works of the firm by RDSO representative and shall be sealed. The sealed bag shall be sent to RDSO by the firm's representative within a reasonable time period. The sample shall be tested for chemical analysis, hardness, depth of decarburization, freedom from surface defects, inclusion rating and microstructure.
- viii) If the samples pass all the tests as stipulated above, including fulfilling the criteria laid down by Railway Board / ISO documents then firm shall be considered for inclusion in the developmental vendor category of "Vendor Directory" for spring steel round to 55Si7 grade to IS:3195.

B. SCHEDULE OF TECHNICAL REQUIREMENTS FOR APPROVAL OF FIRMS TO MANUFACTURE SPRING STEEL ROUNDS

- 1.0 SCOPE:** The schedule of technical requirements cover the norms for manufacturing of Spring Steel Rounds of grade 55Si7 to IS: 3195 required for manufacturing of Elastic Rail Clips used on PSC sleeper. ~~required for hot coiled helical springs used on mainline coaches, EMU stock, locomotives and freight stock.~~
- 2.0 REQUIREMENTS:** The vendors seeking approval shall comply all the below mentioned requirements.
- 2.1 MANUFACTURING FACILITIES:**
- 2.1.1 Minimum one Electric Arc furnace or Basic Oxygen steel making furnace of nominal capacity of 20T with adequate capacity transformer with eccentric bottom tapping or slag free tapping arrangement shall be available.
 - 2.1.2 The process of steel melting shall be computerized or panel controlled or with any other suitable method of control to ensure proper operational control throughout the process.
 - 2.1.3 Oxygen lancing facilities during primary melting to assist melting and bring down 'c' and 'P' to desire level to achieve final composition after ladle refining.
 - 2.1.4 Steel making can be through virgin route or through melting of suitable scrap so as to have required chemistry of end product.
 - 2.1.5 One Electromagnetic segregator may be available for segregation of scrap for classifying magnetic/nonmagnetic, for estimation of correct yield and removal of undesirable scrap to control trace elements.
 - 2.1.6 Adequate handling facilities at all the shops shall be available in the form of overhead cranes, forklifts etc.
 - 2.1.7 Demarcated storage area for storing Ferro Alloys shall be available.
 - 2.1.8 Communication/ Announcement system shall be available for easy operation with quick coordination with various shops.
 - 2.1.9 One ladle Refining Furnace for heating the liquid metal must be available with inert Gas Purging. It shall have suitable alloy addition systems to achieve close chemistry range.
 - 2.1.10 CaSi cored wire feeding machine (Roller type with flipping types spools) shall be available for achieving improvement in fluidity of steel while casting.
 - 2.1.11 One Vacuum degassing station with watering pumps and steam ejectors or mechanical pumps for achieving desired vacuum level <1 millibar shall be available.
 - 2.1.12 One Bloom / Billet caster for casting blooms/billets of any shape of planned size to be rolled into rounds satisfying the Min. 16: 1 reduction ratio.
 - 2.1.13 Electro Magnetic Stirrer to control segregation and achieve sound 'Macro' in blooms/billets should be available.

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- 2.1.14 2 Nos. Oxy-Acetylene Gas cutting facility on each side of bloom casting shall be available for cutting billets/blooms after solidification.
- 2.1.15 Swing grinding machines/ Centro Maskin grinding machines to grind surface of billets for removing surface defects shall be available.
- 2.1.16 Melt chemistry shall be checked spectrographically through a vacuum emission spectrometer installed in close proximity to steel making shop. In case chemical Laboratory is situated far away from melting shop, arrangement to pass the samples pneumatically shall be available.
- 2.1.17 Immersion type Pyrometer control devices shall be available for measuring the temperature of the molten metal.
- 2.1.18 Arrangement for drying of ingredients of furnace charge and ladle additions shall be available.
- 2.1.19 Weighing facilities for ingredients and additives charges into furnace and ladle shall be available.
- 2.1.20 Drying arrangement for ladle and its accessories shall be available.
- 2.1.21 Minimum one continuous walking beam/walking Hearth/Pusher type reheating furnace with temperature control for heating of blooms/billets before rolling shall be available.
- 2.1.22 2 hi/ 3 hi reversible or continuous rolling mill with adequate strands, with suitable cooling bed shall be available.
- 2.1.23 A fully equipped machine shop for 'rolls' and 'guides' grooving shall be available.
- 2.1.24 An online flue gas analyser or computerized control mechanism on rolling mill reheating furnace shall be available to control furnace atmosphere. Alternately furnace atmosphere shall be checked & monitored at regular intervals by offline flue gas analyser.
- 2.1.25 For effecting supplies in heat treated conditions, Bogie Hearth / Roller Hearth / Rectangular Electric Bell Type heat treatment Furnace with temperature controllers to accommodate min. 6 meter length bars for carrying out normalizing/ annealing / stress relieving should be available.
- 2.1.26 Skew Roll / Press straightening machine shall be available for straightening the bars to close tolerance.
- 2.1.27 Band saw/abrasive cutting machine for fixed length cutting bars at desired tolerances shall be available. Flame gas cutting is prohibited.

2.1 TESTING FACILITIES:

A separate laboratory room, which shall be well lit, clean and properly ventilated and provided with easilymaintainable floor and platform should be available at the works.

1. A vacuum emission spectrometer/Optical Emission Spectrometer with state of art facilities for verifying all elements specified in the standard.

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2. Wet chemical lab /Spectrometer to test all input raw material shall be available.
3. Hydrogen, Nitrogen, Oxygen Gas analysers shall be available to assess the limits of such detrimental gases in the melt.
4. Pickling facility for macro examination by acid etching with suitable heating arrangements shall be available for blooms/billets/rolled products.
5. Sulphur printing facilities/Macro etching facilities shall be available for assessing internal quality of Blooms/billets/rolled products.
6. Facilities for tensile test and Charpy impact test shall be available.
7. Hardness tester with standard test pieces shall be available for measuring the hardness.
8. Eddy current/ magnetic particle testing machines shall be available for testing full length of bars for detecting surface/ sub surface defects.
9. Ultrasonic testing facilities for checking the internal quality of billets /blooms.
10. One microscope with min. 400X along with computerized image analyser and photographic arrangement shall be available.
11. Sample preparation facilities like cutting, polishing, along with Bakelite mounting of samples shall be available.
12. Min. one oven for heating the rolled products shall be available along with water/ oil quenching facilities for carrying out hardenability test.
13. Weighing, bunding, strapping and labeling facilities shall be available.
14. Adequate test benches for carrying out detailed inspection of rolled products shall be available.
15. Standard charts of inclusion content (IS 4163/ ASTM E-45), grain size (IS 4748/ASTM E-112), macro levels (ASTM E-381) shall be available for display.
16. A storage area exclusively for storing material offered to RDSO shall be available.
17. All measuring instruments like tape, micrometer, verniers etc. shall be calibrated at regular frequency.
18. Adequate master samples for determining chemistry of samples shall be available.
19. Adequate steel letter punches/stamps for punching marking materials particulars like Heat No., Manufacturer's name, grade of steel etc should be available.
20. Facilities for dye-penetrant testing/magnetic particle testing shall be available for detecting surface/sub surface defects.

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2.3 QUALITY CONTROL REQUIREMENTS:

- 2.3.1 There should be a system to ensure the traceability of the product from raw material stage to finished product stage. This system should also facilitate to identify the raw material composition from the finish product stage.
- 2.3.2 Ensure that there is a Quality Assurance Plan for the product detailing various aspects available as per requirements ~~detailed in Guidelines for Vendor Approval (Registration) QM-G-7.1-3 Ver. (latest)~~ of this documents.
- 2.3.3 There should be at least one full time metallurgist having a minimum bachelor's degree in relevant field with 5 years experience. He should be free from day-to-day production, testing and quality control responsibility. He should be mainly responsible for development of a product, analysis of products, control over raw material, corrective action in case of difficulties in achieving the parameters.
- 2.3.4 Ensure that the in-charge of the Quality Control Section is having a qualification of minimum bachelor's degree in the relevant field. He should be actively involved in day-to-day activities of quality control / stage inspection/compliance of QAP etc.
- 2.3.5 The firm should have acquired ISO: 9001:2008 series certification and the product for which an approval is sought should be broadly covered in the scope of the certification of manufacture and supply.
- 2.3.6 The Quality manual of the firm should clearly indicate at all stages the control over manufacturing and testing of the said railway product.
- 2.3.7 Proper analysis should be done on monthly basis to study the rejection at various internal stages and should be documented.
- 2.3.8 All the relevant specifications, drawing and IS standards (latest) should be available with the firm.
- 2.3.9 Adequate covered area for storage of final product, awaiting inspection should be available.
- 2.3.10 Ensure that proper record of complaints received from users (Railways) is being maintained and corrective action is taken.

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Annexure - C

C. PROFORMA FOR TECHNICAL CAPABILITY ASSESSMENT / FOR MANUFACTURE AND SUPPLY OF ERC

(To be filled in by the firm in triplicate. Attach extra sheets wherever necessary)

1.0	SECTION – I : GENERAL INFORMATION (For record purpose only)	
1.1	Name of the Firm	
1.2	Address	
	(a) Head Office	
	(b) Works	
	(c) Location of Workskm fromRly. 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 / MSME 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 relevant 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 or 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	

SECTION – II: TECHNICAL INFORMATION

(Availability of plant & machinery as indicated by manufacturer should be verified by assessment official) Indicate the availability of following against each item parawise

1	Electric Arc furnace or Basic Oxygen steel making furnace: nominal capacity of 20T with adequate capacity transformer with eccentric bottom tapping or slag free tapping arrangement shall be available.	
2	Oxygen lancing facilities	
3	One Electromagnetic segregator	
4	Overhead cranes, forklifts etc.	
5	Communication/ Announcement	
6	One ladle Refining Furnace with inert Gas Purging	
7	CaSi cored wire feeding machine (Roller type with flipping types spools)	
8	One Vacuum degassing station: (with watering pumps and steam ejectors or mechanical pumps for achieving desired vacuum level <1 millibar)	
9	One Bloom / Billet caster	
10	Electro Magnetic Stirrer	
11	4 Nos. Oxy-Acetylene Gas cutting	
12	Swing grinding machines/ Centro Maskin grinding machines	
13	Spectrometer with a vacuum emission	
14	Pyrometer Immersion type	
15	Weighing facilities and ladle	
16	Drying arrangement	
17	Continuous walking beam/walking Hearth/Pusher type	
18	Reheating furnace with temperature control	
19	2 hi/ 3 hi reversible or continuous rolling mill with adequate strands, with suitable cooling bed.	
20	A fully equipped machine shop	
21	An online flue gas analyser or computerized control mechanism on rolling mill reheating furnace	
22	Skew Roll / Press straightening machine shall be available for straightening the bars to close tolerance	
23	Band saw/abrasive cutting machine for fixed length cutting bars at desired tolerances shall be available. Flame gas cutting is prohibited.	

	Infrastructure for testing	
24	A vacuum emission spectrometer/Optical Emission Spectrometer with state of art facilities for verifying all elements specified in the standard.	
25	Wet chemical lab /Spectrometer to test all input raw material shall be available.	
26	Hydrogen, Nitrogen, Oxygen Gas	
27	Pickling facility for macro examination by acid etching with suitable heating arrangements shall be available for blooms/billets/rolled products	
28	Sulphur printing facilities/Macro etching facilities shall be available for assessing internal quality of Blooms/billets/rolled products.	
29	Facilities for tensile test and Charpy impact test	
30	Hardness tester with standard test pieces	
31	Eddy current/ magnetic particle testing machines	
32	Ultrasonic testing facilities	
33	One microscope with min. 400X along with computerized image analyser and photographic arrangement	
34	Sample preparation facilities like cutting, polishing, along with Bakelite mounting of samples	
35	Min. one oven for heating the rolled products along with water/ oil quenching facilities for carrying out hardenability test.	
36	Weighing, bunding, strapping and labeling facilities	
37	Adequate test benches for carrying out detailed inspection of rolled products	
38	Standard charts of inclusion content (IS 4163/ ASTM E-45), grain size (IS 4748/ASTM E-112), macro levels (ASTM E-381)	
39	All measuring instruments like tape, micrometer, verniers etc	
40	Adequate master samples for determining chemistry of samples	
41	Adequate steel letter punches/stamps for punching marking materials particulars like Heat No., Manufacturer's name, grade of steel etc	
42	dye-penetrant testing/magnetic particle testing	

	SECTION - III : EXPERIENCE (For record purpose only)	
43	Indicate various types of items being manufactured in the work site and the name of the agency / client for whom it is being manufactured.	
44	Give details of important orders executed in the past 3 years :	
45	Please specify current orders in hand	
46	Whether the firm is already registered with RDSO for other P. way items. If so, name the item supported by documents	
47	Whether the firm is 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.	
48	Indicate annual turnover of the firm:	
	DECLARATION:	
49	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.	
50	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.	
51	We also declare that our concern has not been black listed by Railway/Railway Board/ RDSO for business with the Railways.	
52	We hereby undertake that all our equipments for manufacturing and testing as listed above shall be maintained in good working condition at all time.	
53	We hereby declare that the contents and the instructions of "ISO Apex Documents of RDSO" have been read and understood by us and our firm shall agree to abide by all the stipulations laid therein	
		Signature of Firm's Rep. Name in full of signing authority Status in the firm Stamp of the firm