

ISO 9001:2015	Document No: TDG 0018	Version No: 1.0	Date Effective: 00.00.2024
<b>Document Title:</b> Item Specific Guidelines & Schedule of Technical Requirements for manufacture of Fabricated Curved Switches and Fabricated Crossings			



## RESEARCH DESIGNS & STANDARDS ORGANISATION

Manak Nagar, Lucknow – 226011

**Document No. : TDG 0018 (Version 1.0)**

**Document Title:** Item Specific Guidelines & Schedule of Technical Requirements for manufacture of Fabricated Curved Switches and Fabricated Crossings

### 1.0 Amendment History:

S. No.	Amendment Date	Version	Reason for Amendment
1.	01.12.2001	0.0	First Issue under new documentation system.
2.	00.00.2024	1.0	<ol style="list-style-type: none"> <li>In Para-3 (i.e. <b>Scope of Application</b>) 'Initial capability assessment' is changed to 'Fresh vendor registration', a word 'approved list of vendor' is modified from 'approved list' and the line 'The competent authority wherever referred to in this document shall mean Executive Director, Quality Assurance Civil Dte', is deleted.</li> <li>Table-8 (i.e. Responsibility and Authority) and Table-9 (i.e. Abbreviations) are revised.</li> <li>1 :20 &amp; 1:16 is added in addition 1:12 &amp; 1:8½ Fabricated Curve Switch in the heading, ITEM SPECIFIC GUIDELINES FOR ASSESSMENT / QUALITY AUDIT OF FIRMS MANUFACTURING and Para -1 , Para-2, Para-5 under thereof.</li> <li>Planning Machine requirement to be replaced with CNC Plano Milling Machine (i.e. 'Optional' in phased manner).</li> <li>Electronic dimensional measurements with auto recording facility is added in this document at Minimum Facilities &amp; Machineries required.</li> <li>New Para added in Item Specific Guidelines for minimum quantity for up gradation of the firm from developmental vendor to Approved vendor.</li> <li>New Para added in Section –III: Declaration.</li> </ol>

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## 2.0 Purpose:

This guideline covers all technical requirements for manufacture and supply of Fabricated Curved Switch and Fabricated Crossings used for Initial capability assessment / Fresh vendor registration / Quality Audit of Vendor. These guidelines replaces the provisions of earlier guidelines issued on the subject TDG 0018, 0019 & 0020 Rev. '0'.

## 3.0 Scope of Application:

This shall be applicable for Initial capability assessment / Fresh vendor registration, Quality Audit, Up-gradation of Vendors and maintaining their Vendor list. In case of any variation between the procedure / provision given in the work instructions and that in this 'Item Specific Guidelines', the later shall prevail. The competent authority wherever referred to in this document shall mean Executive Director Track – II / Principal Executive Director, Infra-I.

## 4.0 Procedure / Details: Procedure / details are annexed.

## 5.0 Referred Document:

S. No.	Document Name	Document No.
1.	Indian Railway Standard Specification for Fabricated Switches and Crossings, Welded/Heat Treated Crossings and Switch Expansion Joints (SEJ)	IRS: T-10-2023 (latest revision)

## 6.0 Referred 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	ED/Track Design-II / Director/Track Design-III	PED/Infra-I	DD/AIE/ ADE	M&C Dte.	All vendors / concerned through website
Compliance of directives contained in this document	DD/AIE/ADE	Director/ Track Design-III	-	-	-
Requirement of deviation from this directive	ED/Track Design-II / Director/Track Design-III	PED/ Infra-I	DD/AIE/ ADE	M&C Dte.	All vendors / concerned through website

## 7.0 Abbreviations:

PED/ Infra-I	Principal Executive Director/ Infrastructure-I.
ED/ Track Design-II	Executive Director/ Track Design-II
RDSO	Research Designs & Standards Organisation
M&C Dte.	Metallurgical & Chemical Directorate
DD	Deputy Director
AIE	Assistant Inspecting Engineer
ADE	Assistant Design Engineer

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## **Item Specific Guidelines for Initial capability assessment / Fresh vendor registration, Quality Audit of vendor for manufacturing of 1:20, 1:16, 1:12 and 1:8.5 Fabricated Curved Switches**

In addition to the “ISO Apex document (latest version) of RDSO “ the following specific guidelines shall also be applicable for Initial capability assessment / Fresh vendor registration, Quality Audit of vendors for manufacturing 1:20, 1:16, 1:12 and 1:8.5 Fabricated curved switches.

- 1) Vendor list shall be maintained for variants of 1:20, 1:16, 1:12 and 1:8.5 Fabricated curved switches.
- 2) For the purpose of fresh approval of vendor for manufacturing of Fabricated curved switches, the vendor shall be required to manufacture Prototype sets of Fabricated curved switches for any of the design / drawing (variant) comprising of two sets-one set of left hand and one set of right-hand Fabricated curved switch complete. One set of switches shall consist of two tongue rails, two stock rails and all components as per Part List of the respective drawing. Prototype approval for the other variants shall be carried out subsequently as and when offered by the vendor.
- 3) For the purpose of Quality Audit of the vendor for Fabricated curved switches, one sample set of Fabricated curved switch (either left hand or right hand switch) of any design/ drawing (variant) can be offered for inspection, provided vendor is approved for that variant.
- 4) The gauges shall be approved / revalidated at the time of inspection of infrastructural facilities during Fresh vendor registration / Quality audit of the firm.
- 5) The inspection gauges and Prototype sets shall be required to be approved by RDSO for each design of Switches on order before regular production.
- 6) For up gradation of the vendor from “Developmental vendor” to “Approved vendor”, the minimum quantity of Fabricated curved switches of any design/ drawing (variant) is required i.e. 75 sets, and as per ISO Apex documents of RDSO.

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**Minimum Facilities & Machineries required for manufacture of Fabricated Curved Switches  
and Fabricated Crossings**

**(Schedule of Technical Requirements)**

S.N.	Description	Minimum Capacity	Minimum Quantity
1	Covered Area	-	1500 m <sup>2</sup>
2	Gantry Crane facilities	4 T	1 No.
3	Circular band saw	900 mm dia.	1 No.
4	Hydraulic horizontal bending / straightening machines	350-500 T	1 No.
5	Radial drill	32 mm dia.	1 No.
6	Shapers	600 mm stroke	<del>3 Nos.</del> 1 No.
7	Planing machines	i) 13 m stroke	1 No.
		ii) 8.5m stroke	1 No.
		iii) 5m stroke	1 No.
	Plano- Milling machine	iv) 5m stroke	1 No.
	CNC Plano- Milling machine* (optional)	v) 13 m stroke	1 No.
8	Universal Testing Machine	40 T (minimum)	1 No.
9	Charpy impact testing machine	-	1 No.
10	<del>Hardness tester Poldi / Rockwell</del> Hardness testers a) Brinell Hardness testing machine / Rockwell Hardness testing machine b) Poldi	-  BHN hardness tester with ball size 2.5 to 10 mm dia.  -	<del>1 No.</del>  1 No.  1 No.
11	Compressor with riveting arrangement	-	One complete set including furnace & riveting gun etc.
12	CO <sub>2</sub> / Mig welding equipment	-	One complete set with approved brand of welding wires
13	Jigs & fixtures for drilling stock & tongue rails for switches <del>&amp; fabricated crossings.</del>	-	At least one set for each item separately
14	Assembly & Inspection Bay	-	A separate area to be dedicated with proper levelled floor
15	Chemical lab OR Spectrometer	For Chemical Analysis of MS, Medium & Low alloy steel OR Spectrometer having vacuum emission CCD/PMT with printing facilities should be available for carrying out chemical analysis	1 Unit installed in house for wet chemical analysis OR 1 No. Spectrometer
16	Non-destructive testing facilities	i) USFD	1 No.
		ii) D.P. test	1 No.
		iii) Magnaflux	1 No.
		iv) Metallurgical Microscope	1 No.
		v) Polishing Machine.	1 No.
17	Dedicated area with all above machines installed in proper flow line	-	1500 m <sup>2</sup>
18	Coordinate Measuring Machine (CMM) Electronic Dimensional measurements with auto recording facility	Adequate for measurement of Tongue rail machining from ATS to JOH/ critical points (as per drawing)	1 No.

\* The CNC Plano milling machine shall be installed and shall be in working order at the firm's premises in India to

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handle thick web and stock rails in the required length (minimum table length of 13m) in one setup for milling operation along all x, y & z axes without handling/ re-handling of rails involved in fabrication of tongue and stock rails. The firm shall furnish complete details of this machine such as performance characteristics, machining length, number of milling heads, make & photographs etc.

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## ASSESSMENT PERFORMA FOR APPROVAL OF MANUFACTURE (FRESH / RENEWAL) OF FABRICATED CURVED SWITCHES

(To be prepared in duplicate)

### SECTION-I: GENERAL INFORMATION

1. Name of the firm :

2. Postal address of :

2.1. Head office :

2.2. Works :

3. Telephone No. (with STD Code):

3.1. Head office :

3.2. Works :

4. E-mail address :

4.1. Head office :

4.2. Works :

5. Description of works:

5.1. Total land area (in Sq. meters) :

5.2. Total covered area (in Sq. meters) :

5.3. Different sub-units:

5.4. A fully dimensioned plan of the works showing covered area and different shops shall be enclosed :

5.5. Special features, if any:

6. Number of personnel employed (category-wise)

6.1. Managerial :

6.2. Supervisory :  
(Enclose list of Managers / Technical Supervisors)

6.3. Skilled / Artisans :

6.4. Unskilled :

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7. Hours of working :

8. Weekly off day :

9. State whether the firm is already in Vendor List for supply of Fabricated Switches. If so, please give details of last approval.

9.1. Letter dated and issued by

9.2. Date of expiry of validity of approval.

10. Details of important orders executed in past for switches :

10.1. To other important firms / companies / undertakings.

10.2. Directly to Railways.

## SECTION II: TECHNICAL INFORMATION

1. Production capacity-

i) Per month

ii) Per year

iii) ~~Type of Stores / Items which the firm is capable of manufacturing:-~~

2. Type of Stores / Items which the firm is capable of manufacturing:

3. Crane facilities                      No. of cranes                      Make of crane                      capacity

3.1 EOT Crane-

3.2 Mobile Crane-

3.3 Jib Crane-

4. Total Power Availability (in kVA / kW )

a) From the State Electricity Board or other regular source (Enclose a copy of current electricity bill).

b) From own stand by generating sets (Also give make, capacity and other details of each generating set).

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**5. Machines (For manufacturing of Fabricated curved switches and related components)**

S. No.	Name of Machine	No. of Machine	Make of the Machine	Size & capacity of Machine
5.1	Circular band Saw			
5.2	Radial Drill			
5.3	Hydraulic Bending Machine (Horizontal 350 T & to 500T)			
5.4	Plano-Milling Machine having stroke of 5m			
5.5	Shapers			
5.6	Pillar Drills			
5.7	Grinding Machine			
5.8	Portable Grinders			
5.9	Power Hammer			
5.10	Forging Press			
5.11	Forming Press			
<del>5.12</del>	<del>Slide chair straightening machine</del>			
<del>5.13</del> 5.12	Oil Fired / Coal Fired / Induction Furnaces for rivets			
<del>5.14</del> 5.13	Electric welding sets (CO2 / Mig welding set) with RDSO approved brand of welding wires			
<del>5.15</del> 5.14	Gas-welding / Gas cutting Facilities(Including preheating arrangements)			
<del>5.16</del> 5.15	Jim Crow			
<del>5.17</del> 5.16	<del>Planning machines/ CNC Plano-Milling machine (optional) having stroke of 5m, 8.5m &amp; 13m.</del> i) Planning machines having stroke of 5m, 8.5m & 13m. ii) CNC Plano-Milling machine (optional) having stroke of 13m.			
<del>5.18</del> 5.17	Air-compressor			
<del>5.19</del> 5.18	Pneumatic riveting Gun for 1:12 or flatter angle switches.			
<del>5.20</del> 5.19	Coordinate Measuring Machine (CMM) Electronic Dimensional measurements with auto recording facility			

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6. ~~7.~~ Testing Equipment / facilities Nos. Make Size / Capacity

6.1 ~~7.1~~ Ultrasonic test of rails

6.2 ~~7.2~~ Magnaflux

6.3 ~~7.3~~ Tensile testing machine (UTM Machine)

6.4 ~~7.4~~ Polishing Machine

6.5 ~~7.5~~ Hardness testing machine

i) Poldi

ii) Brinell / Rockwell

6.6 ~~7.6~~ Charpy Impact testing machine

6.7 ~~7.7~~ Lab for finding out the chemical composition of any sample.

6.8 ~~7.8~~ Other NDT facilities (DP test etc.)

7. ~~8.~~ Handling facilities (It should be mentioned whether there is proper facilities for handling of finished switches & crossings)

8. ~~9.~~ Jigs and fixtures

8.1 ~~9.1~~ Drilling Jigs (for switches)

Name of the Jigs

No. of Jig

Drg. No.

8.1.1 ~~9.1.1~~ Tongue Rail Drilling Jig

8.1.2 ~~9.1.2~~ Stock Rail Drilling Jig

8.1.3 ~~9.1.3~~ Check Rail Drilling Jig

8.1.4 ~~9.1.4~~ Drilling jigs for stretcher bars

8.1.5 ~~9.1.5~~ Drilling jigs for slide chairs

8.1.6 ~~9.1.6~~ Drilling jigs for Bearing Plates

8.1.7 ~~9.1.7~~ Drilling jigs for Brackets

8.1.8 Drilling jigs for Tie plate

8.2 ~~9.3~~ Bending Jigs & Fixtures

8.2.1 ~~9.3.1~~ Jig & fixture for Tongue Rail (for switches)

8.3 ~~9.5~~ Other Fixtures

Fixtures for planning of-

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8.3.1 ~~9.5.1~~ Tongue Rail Head Machining (for switches)

8.3.2 ~~9.5.2~~ Tongue Rail Flange Machining (for switches)

8.3.3 ~~9.5.3~~ Check Rail Machining (for switches)

~~9.5.8 Fixtures for machining of bearing plates (for switches)~~

~~9.5.9 Fixtures for multiple drilling of slide chair base holes (for switches)~~

~~9.5.10 Fixtures for drilling of Slide Chair Lug Hole (for switches)~~

8.3.4 ~~9.5.11~~ Fixtures for Drilling (for switches)

~~9.5.12 Brackets (for switches)~~

~~9.5.13 Lugs (for switches)~~

~~9.5.14 Fixtures for Drilling of Special Chairs (for switches)~~

8.3.5 **Fixtures for Drilling of Tie plate**

#### 9. ~~10.~~ Checking Gauges

Drawings of relevant inspection gauges for checking dimensions of switches, ~~crossings~~ & check rails etc including components shall be made available along with relevant gauges to inspecting agency at the time of ~~Assessment / Reassessment~~ **Initial approval / Quality Audit.**

#### 10. ~~11.~~ Assembly of Switches

It should be mentioned that how much leveled area is provided for the assembly 'Switches'.

#### 11. ~~12.~~ Leveling -Jogan for laying the full turnout.

It should be mentioned whether there is sufficient leveled space for laying the turnout, it should also be mentioned that there are facilities for track gauge, Jim Crow, Crow Bar, Spirit level, hammer etc.

~~13. Railway siding facilities.~~

#### 12. ~~13.~~ A fully dimensioned plan of the works showing locations of various equipment and facilities for the manufacture of Fabricated curved switches flow line indicating location of various operations during manufacture in proper sequence and storage facilities for finished products and dispatch may please be enclosed.

#### 13. ~~15~~ **QUALITY ASSURANCE**

13.1 ~~15.1~~ Does the factory has any established quality assurance programme as per ISO-9000:2015 series. If yes, please enclose a copy of the ISO-9000:2015 certificate.

13.2 ~~15.2~~ Detail of quality assurance organization, Name of key personal, their qualification, designations and position in overall management structure (Enclose organizational chart for quality control)

13.3 ~~15.3~~ Quality control testing facilities laboratory equipment available to be listed along with the make, year of procurement and commissioning.

13.4 ~~15.4~~ Calibration of laboratory / test equipment / gauge. (Enclose copy of calibration

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certificate).

13.5 15.5 Frequency of calibration.

13.6 15.6 Source of procurement of raw materials / bought outs and steps taken to ensure their quality.

13.7 15.7 Brief details of manufacturing process as relevant to the items for which registration is sought (Switches).

13.8 15.8 Details of inspection / checks done on material during various stages of the above manufacturing process (Enclose copy of QAP).

13.9 15.9 Has the acceptable value for the parameters inspected during the above stages checks been laid down? If yes, the action taken if value of the parameters inspected does not meet the desired laid down value.

13.10 15.10 System for documentation of the results of the above stage check.

14. 16 Whether one sample set of switches ready for inspection during Quality Audit (Report to be submitted by inspecting official).

15. 17 Whether the firm is possessing officially issued prints of relevant drawings and specifications.

### SECTION - III: DECLARATION

- (i) 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.
- (ii) 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.
- (iii) We also declare that our concern has not been black listed by Railway, Railway Board / RDSO for business with the Railways.
- (iv) We hereby undertake that all our equipments for manufacturing and testing as listed above shall be maintained in good working order at all times.
- (v) We hereby declare that the contents and the instructions of latest ISO Apex Documents has been read and understood by us and our firm shall abide by all the stipulated laid therein.
- (vi) We hereby undertake to maintain the record of the procurement of any raw material for production of Fabricated Curve Switch, supply of Fabricated Curve Switch and disposal of scrap of Fabricated Curve Switch in the proper format.

Signature

Name in full of Signing Authority

Status of the Vendor

Place :

Date :

Stamp of the firm

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