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| ISO9001:2008 | Document No: QC-G-7.1-12 | Version No: 2.0 | Date Effective: 10.12.2010 |
| Document Title: Item Specific guideline for manufacture and supply of FISH PLATES AND FISH PLATE BARS | | | |



RESEARCH DESIGNS & STANDARDS ORGANIZATION

Manaknagar, Lucknow – 226011

Document No: QC-G-7.1-12

Document Title : Item Specific guideline for manufacture and supply of fishplates and fishplate bars

1.0 Amendment History:

| S. No. | Amendment Date | Version | Reasons for Amendment |
|--------|----------------|---------|--|
| 1. | 01.09.2010 | 1.0 | First issue under new documentation system |
| 2. | 10.12.2010 | 2.0 | Amendment in Specification and quality improvement |

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2.0 Purpose :

This guideline covers all technical requirement for manufacture and supply of fish plates and fish plate bars used for vendor Development /vendor registration/reassessment of vendor. This guideline replaces the provisions of earlier guidelines issued on the subject i.e. QC-G-7.1-12 rev '1' and QC-G-7.1-28 rev '1'

3.0 Scope of Application

This shall be applicable for initial capability assessment, periodic reassessment for extension of approval, up-gradation of vendors and maintaining their approved list. In case of any variation between the procedure/provision given in the work instruction and that in this 'Item-specific guidelines', the latter shall prevail. The competent authority wherever referred to in this document shall mean Executive Director, Quality Assurance Civil Dte.

4.0 Procedure / Details

Procedure/details is annexed.

5.0 Referenced Documents

| S.No. | Document Name | Document No. |
|-------|---|---------------------------|
| 1. | IRS Specification for fish plates and fish plate bars | IRS :T-I/66 & IRS :T-6/65 |

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/QAC | ED/QAC | DD/XEN/AIE/ARO | Track Design Dte. & M&C Dte. | All vendors/ concerned through website |
| Compliance of directives contained in this document | DD/XEN/AIE/ARO | Director/QAC | Respective staff | - | - |
| Requirement of deviation from this directive | Director/QAC | ED/QAC | DD/XEN/AIE/ARO | Track Design Dte. & M&C Dte. | All vendors/ concerned through website |

9.0 Abbreviations

| | |
|-------|--|
| QA | Quality Assurance. |
| QAC | Quality Assurance Civil. |
| ED/QA | Executive Director/Quality Assurance Civil |
| RDSO | Research Designs & Standards Organisation |
| DD | Dy. Director |
| XEN | Executive Engineer |
| AIE | Assistant Inspecting Engineer. |
| ARO | Assistant Research Officer |

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Annexure

ITEM SPECIFIC GUIDELINES FOR ASSESSMENT/ REASSESSMENT FOR MANUFACTURE OF FISH PLATES AND FISH PLATE BARS AS PER IRS SPECIFICATION

Fishplates are to be procured from RDSO approved sources. In this context directorate operating procedure of Quality Assurance Directorate is to be followed for assessment / re-assessment / approval of the firms.

1. Firms shall be approved for specified type of fish plates only and shall be classified in the following two categories:

- | | |
|----------------------------------|--------------------------------|
| (i) Fish plate bar manufacturers | (ii) Fish plates manufacturers |
|----------------------------------|--------------------------------|

(i) Firms for manufacture of fishplate bars:

In this case, firm will procure billets of required specification along with the test certificate of the same from the approved suppliers of billets. The preferable size of billets shall be 150mmX150mm. Railway Board vide letter Nos. Track/21/2008/0701/7 dated 10.10.2008 and 20.03.2008 has approved procurement of raw material (steel billets) for rolling of Fish Plate Bar from plants Identified by JPC, Kolkata and from sources approved by Q.A. Mechanical Directorate of RDSO respectively. List of sources for manufacture and supply of steel billets for rolling fish plate bars (meeting the requirements of IS:1875) as approved by QA Mech. Dte. has been included as Annexure-II of Vendor Directory of QA Civil Directorate. Vendor Directory and corrections slips issued by QA Mechanical Directorate may be referred to for current list of vendors.

The list of integrated steel plant identified by Joint Plant committee Kolkata and approved by Railway Board as source for procurement of billets for rolling Fish Plate Bars and Metal Liner bars is included as Annexure –III of Vendor Directory of QA Civil Directorate.

They should have his own mechanical testing facilities and spectrographic analyser facility appoved. by RDSO for chemical testing to ensure the quality fish plate bars as per IRS Specification. Every fishplate bars shall be legibly marked with the firm's initials as approved by RDSO, the two digits of the month and last two digit of the year of manufacture of the fish plate bar and heat no. etc below:

FI-XX-YY-DN-RS-ZZ

| | | |
|----|---|--|
| FI | = | Firm's initials |
| XX | = | two digits of the month of manufacture |
| YY | = | two digits of the year of manufacture |
| DN | = | Drawing No. |
| RS | = | Rail Section |
| ZZ | = | Heat No. |

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These markings except heat no. of letters/digits shall be rolled atleast 15mm in height and 1mm above the surface at the bottom of non fishing side of fishplate at the spacing not exceeding 400 mm centre to centre of the identification mark so that each fish plate contains complete identification mark when manufactured. The heat no. can be hot stamped.

(ii) Firms for manufacture of fish plates:

This category is further classified in the four sub-categories as below:

- (i) Fish Plates,
- (ii) Joggled fish plates
- (iii) Special Fish Plates (used in glued insulated rail joints)
- (iv) Combination fishplates

In this case, firm will procure fish plate bars of required specification, along with the test certificate of the same, from the RDSO approved fish plate bar suppliers. The firm should have own mechanical testing facilities to test the finished fishplates as per IRS Specification and own chemical testing facilities or tie up with RDSO approved/NABL accredited / Govt. owned Spectrographic laboratory. Fishplate bars procured from RDSO approved firms should have the identification marks of the fish plate bar suppliers as approved by RDSO as indicated in 2(i) above. The fish plates shall also be legibly marked with the initial of the firm manufacturing fish plates as approved by RDSO and the two digits of the months and last two digits of the year of manufacture of fish plate at the cross section of one end of fish plate by punching letter/digits of size not less that 15mm in height.

2. A firm can be approved for both the categories mentioned above (i.e. for manufacture of fish plates and for manufacture of fish plate bars) provided they fulfill the requirement laid down for each categories. As per latest instructions of Rly. Board, new firms to be developed shall be for both the categories i.e. manufacture of fish plates and fish plate bars.
3. Firm approaching for approval in both the categories/ sub-categories mentioned above shall be required to submit the same required proforma and necessary initial assessment charges. In case the firm approaches for approval in both the categories at one stage, the initial assessment charges shall be payable once only. However, in case a firm approved in one category approaches for approval in another category/ sub-category, the firm shall be required to apply afresh by submitting the required proforma and the necessary initial assessment charges again.
4. Firm approaching for approval in any of the categories/ sub-categories mentioned above shall be required to submit two sets of gauges for each drawing such as profile gauge/templates, Go- No Go gauges for hole checking, nipple gauges and other checking gauges alongwith drawings in 1:1 scale for approval of RDSO alongwith gauges checking charges. All the gauges shall be made of stainless steel.
5. **Fishplate bars manufacturer:** After approval of gauges / templates, the firm will undertake rolling of fish plate bars for heaviest and typical in profile of rail section i.e. for 60 kg rail section to drg. no. RT-5916 and for 52 kg rail section to drg. no. RT-

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5915 in the presence of RDSO representative (at least 20 Nos. of bars). For other drawings of same rail section, firm requires to submit the sets of rollers for verification of RDSO representative at their firm's premises. Bars will be inspected in respect of their chemistry, metallurgy and geometry, strictly with respect to specification (as per stipulations in IRS Specification to be read along with their all corrigendum issued till date) and drawings in force on date.

6. **Fishplate manufacturer** : After approval of gauges / templates, the firm will undertake manufacture of fish plate in the presence of RDSO representative to make prototype fishplates (at least 20 Nos. fishplates of each category i.e. Fish Plates, Joggled fish plates, Special Fish Plates, Combination fishplates) for heaviest and typical in profile of rail section as below.

- (i) Fish Plates : 60 kg, RT-5916 (20Nos.) and for 52 kg, RT-5915(20 Nos.)
- (ii) Joggled fish plates: 60 kg, RT-5849 (20Nos.) and for 52 kg, RT-5848(20 Nos.)
- (iii) Special Fish Plates: 60 kg, RT-5843 (20Nos.) and for 52 kg, RT-671(20 Nos.)
- (iv) Combination fishplates: 60 kg- 52 kg, RT-696-699 (20 Nos.)

These will be inspected in respect of their chemistry, metallurgy and geometry, strictly with respect to specification (as per stipulations in IRS Specification to be read along with their all corrigendum issued) till date and drawings in force on date.

7. The firm will be requested to assemble the prototype fishplates so as to make out independent fish plates joints as per requirement of track. The finished product will be inspected for their proforma fitment also.
8. The method of dye penetration test will be accepted in terms of provisions of documents issued by M & C Dte. of RDSO for this test (Ref- M & C/NDT/105, Material used in liquid penetration examination- 2001)
9. Initially firm will be accorded approval in the list of "Part-II suppliers" after assessment of manufacturing, testing facilities and satisfactory testing of product as per relevant procedure for respective items. Manufacturer will be considered for up-gradation in the list of "Part-I Suppliers" as per criteria specified in latest 'General Guidelines for Vendor Approval'.
10. The criteria for consideration for up-gradation to Part-I suppliers (minimum quantity) is given at Annexure-A. The standard technical requirement (STR) for manufacture of fish plates and fish plate bars is given at Annexure-B. The format for enlistment (Proforma for Technical capability/assessment for manufacture and supply of fish plates-General and technical in information) is given at Annexure-C. These are in addition to criteria specified in 'General Guidelines for Vendor Approval'.

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Annexure-A

**CONSIDERATION (MINIMUM QUANTITY)
FOR UPGRADATION TO "PART-I SUPPLIER"**

| S. No. | Item | Quantity | Remarks |
|--------|------------------------|------------|--|
| 1. | Fishplate bars | 500 MT | 10 MT of material of at least two heats in two installments shall be inspected by RDSO. The sampling size shall be as specified in the specification. |
| 2. | Fishplates | 10000 Nos. | 500 nos. of each type of fish plates in minimum two installments (Preferably of equal size of lots) will be inspected initially by RDSO. In case of Combination fishplates this quantity will be 100 nos. and future inspection would be done by Railway /RITES. The sampling size shall be as specified in the specification. |
| | Joggled fish plates | 5000 Nos. | |
| | Special fishplates | 5000 Nos. | |
| | Combination fishplates | 1000 Nos. | |

Note : For consideration of quantity of Fishplate bars supplied, Manufacturer's test certificate for supply of Fishplate bars to RDSO approved Fishplate manufacturers and inspection certificate of the inspecting agency for supply of inspected Fishplates shall be considered against the supply of Fishplate bars.

Annexure-B

SCHEDULE OF TECHNICAL REQUIREMENT (STR) FOR MANUFACTURE OF FISH PLATES / FISH PLATE BARS

For manufacture of Fish Plate / Fish Plate Bars as per IRS Specification and approved drawing following facilities are required with the minimum capacity specified:

| SN | Item | Requirements as per STR (Minimum size) | Fishplates Bars | Fishplate/ Special Fishplate | Joggled Fishplate | Combina- tion Fishplate |
|----------|--|---|--------------------|------------------------------------|----------------------|-------------------------------|
| A | Manufacturing Facilities | | | | | |
| 1. | Rolling Mill | 12 inches rolling mill with 5 stands | R | NR | NR | NR |
| 2. | Pre-heating furnace | (i) 5ft x30ft oil or gas fired, continuous type | R | NR | R | NR |
| | | (ii)5ft x10ft oil or gas fired furnace for joggled fishplate | NR | NR | R | NR |
| 3. | Oil storage tank | Suitable capacity if oil fired furnace is used (Approx. 30 KL for fishplate bars) | R | NR | R | NR |
| 4. | Straightening machine | 100 T hydraulic/ mechanical power press or 50 T Friction Screw Press | NR | R | R | R |
| 5. | Straightening machine | Facility of Straightening bar in semi hot condition | R | NR | NR | NR |
| 6. | Milling Machine | Vertical milling m/c of 150 mm cutting and 300 mm bed size | NR | NR | NR | R |
| 7. | Cutting machine | Any Power Saw/ Band saw m/c 03 nos. in total | R | R | R | R |
| 8. | Drill machine | Minimum 01 No. 4 Spindle Hydraulic multiple radial drilling machine 40mm and 04 Nos. single Spindle drilling machine 40mm | NR | R | NR | R |
| 9. | Hole Chamfering | Chamfering tool along with different size of bits of sufficient capacity & hardness | NR | R | NR | R |
| 10. | Joggling and Punching Facility | Power Presses of sufficient capacity to punch 4 holes in a single stroke and for joggling | NR | NR | R | NR |
| 11. | Temperature measurement in pre-heating furnace | Digital pyrometer/ thermocouple for each furnace to measure temperature upto 1200° C for each furnace | R | NR | R | NR |
| 12. | Heat Treatment Furnace | Heat Treatment Furnace for Normalisation of sufficient capacity upto min. 1000° C | R | NR | R | NR |
| 13. | Pyrometer / Thermometer for H.T. Furnace | Digital pyrometer/ thermocouple to measure temperature upto min. 1000° C | R | NR | R | NR |

| B Tool Room Facilities | | | | | | |
|-------------------------------|--|---|----|---|----|---|
| 1. | Lathe Machine | Spacing of Jaws to be 8 inches | R | R | R | R |
| 2. | Shaper | 24 inches | R | R | R | R |
| 3. | Surface Grinder | As per requirement | R | R | R | R |
| 4. | Bench Grinder | As per requirement | R | R | R | R |
| 5. | Pencil Grinder | As per requirement | R | R | R | R |
| C Testing Facilities: | | | | | | |
| 1. | Chemical test facilities | In house duly calibrated Spectrometer | R | - | - | - |
| | | A set of chemical lab for Chemical analysis of min. size of 15'X10' with platforms having testing facility of C, Si, Mn, S, P etc. or RDSO approved/Govt owned/NABL Accredited Spectrometer Lab | - | R | R | R |
| 2. | Dye Penetration Test / Magnetic particle Test Facility | Complete dye Penetrant test Kit/ Magnetic particle testing equipment | R | R | R | R |
| 3. | Physical Lab/ Inspection Room | Well neat & clean minimum size of 20'X 15' along with platforms | R | R | R | R |
| 4. | Ultimate Tensile Machine | 60T, UTM along with suitable arrangements of extensometer grips and Mandrels for UTS, YS, | R | R | R | R |
| 5. | Bend Test Facility | EI % & Bend Test | R | R | NR | R |
| 6. | Hardness Tester | Computerised Brinell Hardness Tester, Capacity 3000 Kgs (as per Annex-B-I) | R | R | R | R |
| 7. | Surface Plate | Minimum 1.0 m X 1.0 m size | NR | R | R | R |
| 8. | Steel Scale | One 12" & one 1.0 m long | R | R | R | R |
| 9. | Vernier callipers | One 12" with least count up to 0.02 mm | R | R | R | R |
| 10. | Fitment Test facility | Sufficient Rail pieces section wise along with fitting | NR | R | R | R |
| 11. | Filler gauge | Set of filler gauge | NR | R | R | R |
| 12. | RDSO approved gauges and 1:1 template drawings | Minimum two sets of each template, nipple gauge, Go-No-Go etc. made of Stainless Steel | R | R | R | R |
| 13. | Metallurgical Microscope | 100 X magnification with facility of eye piece for grain size comparison availability of grain size charts | R | R | R | R |
| 14. | Micro polishing Machine | Facilities with Polishing reagents like Chromium Oxide or Diamond Paste | R | R | R | R |
| 15. | Weighing machine | ISI brand weighing machine weighing upto 100Kg. | R | R | R | R |
| 16. | Any Porcelain / acid resistant container | For Macro etching in hot condition for any surface defect | R | R | R | R |

Annexure B-I

Technical Specification for computerized Brinell Hardness Tester Capacity 3000Kgs

1. Description:

Computerized Brinell Hardness Testing Machine with Load Capacity of 3000 Kgs. having camera to capture image of indentation with minimum following features –

- Indentation Image with auto date and time from system
- Identification mark of Sample under Testing
- Measurement of Hardness in Auto and Semi Auto mode along with manual measurement.
- Saved Image can be used for rechecking hardness of sample afterwards.
- PC based compatible with windows features

2. Purpose:

To take hardness of ferrous material on Brinell Scale.

3. Technical Requirement:

| S.No. | Description | Units | Requirement |
|-------|-------------------------|-------|---------------|
| 1. | Total loads | Kgf | 3000 |
| 2. | Magnification of object | - | 2X and higher |
| 3. | Max. Test height | mm | 200 |
| 4 | Scale least count | mm | .01 |
| 5 | Measurement range | mm | 1-6 |
| 6 | Indentor | mm | 10 |

4.0 Additional Facility in Software

The software system should be capable of preserving the indentation image in computer memory. The software should facilitate auto incorporation of date and time of testing from computer memory and this data should be in-editable.

3. Other Requirement:

NABL certified standard test blocks with hardness range of about 175 HBA.

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Annexure-C

**QUALITY ASSURANCE CIVIL DIRECTORATE
RESEARCH DESIGNS & STANDARDS ORGANIZATION
LUCKNOW**

**Proforma for Technical Capability Initial Registration / Reassessment for
manufacture, Supply of Fish Plate Bars & Fish Plates**

Fish Plate Bars / Fish Plates to Drg. Nos. : _____

Specifications Nos.:-

- (i) Fish Plates – IRS T-1-66 (up to & including Cor. No. 6 of Jul 92 and latest if any)
- (ii) Fish Plates Combination– IRS T-6-65(up to & including Cor. No. 2 of Jul.70and latest if any)

Notes:-

- (i) To be filled in by the firm in duplicate. Attach extra sheet wherever necessary. No para should be left blank.
- (ii) All manufacturing and testing facilities to be available in the unit.
- (iii) All enclosures to be signed by the authorized official of the firm.

GENERAL INFORMATION

1. Section - I :

1.1 Name of the firm :-----

1.2 Address:

(a) Head office :-----

(b) Works :-----

(c) Distance of Works in Km. :-----

(d) Nearest Railway Station. :-----

1.3 Factory Area (in Sq.m.)

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- (a) Covered :-----
- (b) Uncovered :-----
- (c) Is the factory site in your name or on rental basis? :-----
(Support with documents).
- 1.4 (a) Telephone / Fax Numbers:
 - (i) Head office Telephone :-----
Fax :-----
 - (ii) Works' premises. Telephone :-----
Fax :-----
- (b) E-mail Address :-----
- 1.5 Power availability:
 - (a) Capacity allotted in general :-----
 - (b) Stand-by generator & its capacity (if available) :-----
 - (c) Name the part / 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/supervisions. :-----
(Their number names, qualification & service experience)
 - (c) Laboratory in-charge whether full or part time :-----
(Indicate his/her name, qualifications & service experience)
 - (d) Inspection & quality control staff :-----
(Give their names, qualification & service experience).
 - (e) Workmen:
 - (i) Highly skilled :-----
 - (ii) Semi skilled :-----
 - (iii) Un-skilled :-----

TECHNICAL INFORMATION

2. Section-II

2.1 Manufacturing Facilities

- (i) Rolling Mill (For Fish Plate Bars only) : -----
(Indicate size & no. of stands)
- (ii) Pre-heating Furnace (For Bars and joggled fishplates) :-----
(Indicate size, fuel to be used & type whether continuous or not).
- (iii) Straightening Machines :-----
(Indicate capacity & type of power press)
- (iv) Forging & Punching Presses(For joggled fishplates) :-----
(Indicate capacity & type of power press)
- (v) Vertical milling machine (available or not):-----
(Sizes of cutter, bed size for combination fishplates).
- (vi) Cutting Machines :-----
(Indicate the type of machine and its nos.).
- (vii) Drill machine :-----
(Indicate No. of spindles & its size)
- (viii) Chamfering tool along with different size of :-----
bits of sufficient capacity & hardness
- (ix) Oil storage Tank (For Pre-heating/Re-heating) :-----
(Indicate its size)
- (x) Heat treatment Furnace for normalisation :-----
- xi) Temperature measurement :-----
(For pre-heating / Heat treatment furnace.)
(Indicate its type & range of temperature).
- (xii) Source of procurement of raw material. :-----

2.2 Toolroom Facilities:

- (i) Lathe machine (Indicate the play of jaws) :-----
- (ii) Shaper (Indicate its size) :-----
- (iii) Surface Grinder, :-----
Bench Grinder
Pencil Grinder

2.3 Testing Facilities:

1. Chemical testing facilities :-----
 (i) In house duly calibrated Spectrometer
 (ii) A set of chemical lab for Chemical analysis of min. size of 15'X10' with platforms having testing facility of C, Si, Mn, S, P etc. or RDSO approved/Govt owned/NABL Accredited Spectrometer Lab
2. Dye penetration /Magnetic Particle test facility :-----
3. Physical lab / Inspection room of min. size of 15'X20':-----
4. Ultimate Tensile Machine
 a) Capacity :-----
 b) Make :-----
5. Bend Test Facility :-----
6. Hardness Tester (whether computerised or not)
 a) Capacity :-----
 b) Make :-----
7. Surface Plate (Size) :-----
8. Steel scale (Nos.,Size) :-----
9. Vernier callipers (Size & least count) :-----
10. Fitment Facility (Available or not) :-----
11. Filler gauge (Set, Available or not) :-----
12. Dimensional Check Facility :-----
 (RDSO approved gauges and 1:1 templates)
13. Metallurgical Microscope :-----
14. Micro polishing Machine & polishing reagents :-----
15. Weighing machine (whether ISI Brand or not) :-----
16. Porcelain / acid resistant container :-----

3.0 Storage:

- (i) Raw Material :-----
- (ii) Finished product :-----

EXPERIENCE

4.0 Section-III.

- 4.1 Indicate various types of items being manufactured. :-----
- 4.2 Indicate important customers for the last 3 years both Govt. & Non-Govt. (if any).
- 4.3 Indicate contract reference, item & quantity manufactured & supplied against important orders executed during past 3 years and inspecting agency for each :-----
 - (i) Govt. department :-----
(Central, State & A Govt. of India undertaking other than Railways)
 - (iii) Directly to the Railways. :-----
 - (iv) Outside important firms. :-----
- 4.4 Specify current order in hand on your firm (Indicate contract reference, client, item, quantity under manufacture & supply). :-----
- 4.5 Whether you are already registered with RDSO for other P.Way items? If so, the name, items & departments supported by documents. :-----
- 4.6 Indicate annual turn over of your company. :-----

5. 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 "**General Guidelines for Vendors Development**" effective from have been read and understood by us and our firm shall agree abide by all the stipulations laid therein.

Signature

Name in full of Signing Authority

Place :

Status in the Firm,

Date :

Stamp of the firm