

SOUTH WESTERN RAILWAY

directing such alteration, modification, substitution, addition, omission or change shall have been given by the CE/CN/BNC, prior to the commencement of the work or part of work nor shall the contractor be entitled to any payment for or in respect of any sub alteration, modification, substitution, addition, omission or change may have been actually made and executed and no course of conduct shall be taken to be a waiver of the obligation and conditions hereby imposed.

ADDITIONAL SPECIAL TECHNICAL CONDITIONS FOR FABRICATION OF WELDED STEEL GIRDERS

Fabrication Process:

- 1) The contractor shall make his own arrangement at his cost for the full scale templating on high level steel/concrete platform under covered shed and making of steel template hereafter referred as masters of each and every component type. The Railway will supply no steel in this connection. The templates used throughout the work shall be of steel and will be used for making jigs and subsequent checking and repairs to jigs only. Work of fabrication shall be done as per IRS specification No. B-1 2001 and IRS welded Bridge Code 2001.
- 2) In the case of any conflict between conditions described hereunder and various specifications to be followed as mentioned in the contract document at various places these conditions shall prevail over all conditions mentioned elsewhere.

Work of fabrication shall be done as per IRS Welded Bridge Code -2001 which is enclosed.

Electrodes shall conform to IRS Specification No. M-28. The filler wire and flux combination of submerged arc welding shall conform to IRS Specification No. M-39.

Before starting, the work contractor shall submit detailed welding procedure sheet. The welding procedure sheet shall include specifications of the parent metal and electrodes and /or wire flux combination Voltage/Amperage, wire feed speed, travel speed etc.

Location, sizes, actual lengths and details i.e. from joint, angle between fusion faces, gap between parts etc. of welds.

Welding procedure like welding /sequence, pre-heating, post-heating etc.

Ability of the operator / welders employed by the contractor to produce welds of the required strength.

The above procedure shall be approved by the Railway/RDSO before commencement of the work.

The tolerances in manufacture of the girders shall be as per special fabrication tolerances as applicable to welded girders as laid down in IRS Specification No. B-1/2001.

WELDING PROCEDURE :

- 1) Provision of IS-823-1964 and IS-4353-1967, shall generally be followed, as applicable, for welding procedure, details of workmanship, correction of weld faults, peeling, painting, etc. In case, any of the provisions contained therein contravene the

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Radiographic Test :

- 1) All Butt welds shall be examined by appropriate Radiographic or any other equally effective method as specified in the drawing or procedure sheet.

Dye Penetration Test :

- 1) Other weld may be examined by Radiographic or any other non-destructive method like dye penetration test, Magnaflux and / or any other method at the discretion of the Inspecting Authority.

Welding Parameters :

- 1) Contractor has to keep a record of welding parameters piece wise, component wise and span wise.

INSPECTION AND PROGRESS REPORT

- The raw material and fabrication work shall be inspected by RDSO or Railway through their authorized Railway Engineer for which free accommodation and inspecting facilities will have to be provided by the contractor. The work of fabrication in contractor's fabrication shop will at all times be open for inspection by the Railway or their authorized agents. Before dispatch of fabricated steelwork from the shop, they will be inspected in the contractor's workshop by the Railway or their agent who will thereafter issue inspection certificates. The tests will be carried out at contractor's cost. All facilities as required for carrying out the inspection will be provided free of cost by the contractor including those requiring the services of outside agencies & all measuring tools, gauges, template etc. A well built hand railed stair case is required to be provided at any time.
- Any defects noticed during inspection in the execution of the work shall be rectified or replaced by the contractors at their own cost. The decision of the Railways or its inspecting agency as to the existence of defect, the manner in which the defective work to be rectified or replaced shall be final, conclusive and binding on the contractors. No extra claim, whatsoever, shall be entertained for the cost of such rectification or replacement.
- The progress of fabrication of steelwork as well as execution of all works shall be subject to periodic review by the Railway Administration.
- The contractors shall provide all facilities to the Railway's representative to make periodical detailed assessment of the progress of the works. Such information and progress reports as may be called for by the Railway and at such intervals as specified shall also be made available.

SURFACE TREATMENT FOR BRIDGE GIRDERS (RIVETED/WELDED)

General

- No component to be given any surface treatment without component being passed and embossed by Railway's Authorised Inspecting Agency.
- Surface cleaning, for components not to be metallised, will be done by using mechanised wire brush and / or shot blasting and the application of the paint can be done either manually with brushes or by mechanical means to the satisfaction of the Engineer. No painting work will be permitted during the monsoon period from June to September.

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Specification for metallising with sprayed Aluminium on bridge girders

SURFACE PREPARATION:

The surface shall be thoroughly cleaned and roughened by compressed air blasting or centrifugal blasting with a suitable abrasive material (steel grits) in accordance with clause 3 of IS-6586. Immediately, before spraying it shall be free from grease, scale, rust moisture or other foreign matter. It shall be comparable in roughness with a reference surface produced in accordance with Appendix-A of IS: 5905 to Sa 2-1/2 and shall provide an adequate key for the subsequent sprayed metal coating.

METAL SPRAYING.

The metal spraying shall be carried out as soon as possible after surface preparation but in any case within such period that the surface is still completely clean, dry and without visible oxidation. If deterioration in the surface to be coated is observed, by comparison with a freshly prepared metal surface of similar quality which has undergone the same preparation, the preparation treatment should be repeated on the surface to be coated.

The wire method shall be used for the purpose of metallising, the diameter of the wire being 3mm or 5mm. Specified thickness of coating shall be applied in multiple layers and in no case less than 2 passes of the metal spraying unit shall be made over every part of the surface. At least one layer of the coating must be applied within 4 hours of blasting and the surface must be completely coated to the specified thickness within 8 hours of blasting.

- (a) **PURITY OF ALUMINIUM:** The aluminium to be used for spraying shall be 99.5% aluminium conforming to IS:2590.
- (b) **APPEARANCE OF THE COATING:** The surface of the sprayed coating shall be of uniform texture and free from lumps, coarse areas and loosely adherent particles.
- (c) **THICKNESS OF THE COATING:** The nominal thickness of the coating shall be 150 microns.
The minimum local thickness shall not be less than 110 microns at isolated location.

SHOP PAINTING

Any oil, grease or other contamination should be removed by thorough washing with a suitable thinner until no visible traces exist and the surfaces should be allowed to dry thoroughly before application of paint. The coatings may be applied by brush or spray. If sprayed, pressure type spray guns must be used. One coat of wash primer to IS: 5666-1970 shall be applied first. After 4 to 6 hours of the application of the wash primer, one coat of Zinc chromate primer to IS:104-1979 with the additional provision, that zinc chromate to be used in the manufacture of primer shall conform to type 2 of IS: 51-1998 shall be applied. After hard drying of zinc chrome primer, one coat of aluminium paint to IS: 2339-1963 (Brushing or spraying as required) shall be applied.

SITE PAINTING

After the steel work is erected at site a second covering coat of aluminium paint to IS: 2339-1963 (Brushing or spraying as required) shall be applied after touching up the primer and the cover coat given in the shop if damaged in transit.

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ELCOMETER:

Minimum two digital Elcometer will have to be provided by the contractor at his own cost for determination of metalising / painting thickness and on completion of the work, the same will be handed over to Railway without any cost. One of the digital Elcometer will have measuring range of 0 – 100 micron & other will have a measuring range of 50-250 micron.

ADHESION:

The sprayed metal coating shall be subject to an adhesion test using the following method:-

"Using a straight edge and hardened steel scriber which has been ground to a sharp 30 degree point, scribe two paralleled lines at a distance apart equal to approximately 10 times the average coating thickness. In scribing the two lines, apply enough pressure on each occasion to cut through the coating to the base metal in a single stroke."

If any part of the coating between the lines breaks away from the base metal, it shall be deemed to have failed the test.

Components, which have been rejected, shall have the defective sections blasted clean of all sprayed metal prior to re-spraying sections blasted clean of all sprayed metal prior to re-spraying. Where the rejection has been solely due to too thin a coating, sprayed metal of the same quality may be added if the surface has been kept dry and is free from visible contamination.

TRANSPORTATION OF GIRDERS & GIRDER COMPONENTS:

No components is to be transported to site without being rendered surface treatment as described above.

The contractor has to transport with loading/unloading and stacking all the fabricated material including loose fittings with his own truck/trailer, tools, plants & machinery and labour etc. at his own cost.

Contractor will have to make his own arrangement at his own cost for

motorable approach road.

The contractor has to arrange wooden Gutaka / Sleepers to keep the material at least 12" above the ground level.

The contractor has to take all precautions during transportation/loading/unloading/ stacking to avoid damage to fabricated material. If any damage to any of the members is caused, the particular components will be rejected by the Engineer-In-Charge at site or his representative. Any material found damaged during transit and/or unloading will be stacked separately & damaged portion shall be marked by white paint. Contractor will have to organize rectification/replacement of all such defective component at his own cost to the entire satisfaction of the Engineer or his Authorised Representative.

All trucks/trailers are to be loaded in such capacity as to ensure safe transport of fabricated materials.