

Standard QAP

<u>MODEL QUALITY ASSURANCE PLAN (QAP) FOR FABRICATION OF COMPOSITE I-GIRDER TYPE ROB OF RDSO STANDARD DRAWINGS</u>		
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<u>PART-A (DETAILS OF WORK)</u>		
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S.No.	Item	Details
1	Name of Project	
2	Project falls into Zonal Railway jurisdiction of	
3	Executing organization of the agreement (i.e. Zonal Railway/ Railway PSU/NHAI or any other government agency)	
4	Contractor Agency (Name and address)	
5	Fabricating Agency (Name and address)	
6	Inspecting Agency	
7	QAP No.	
8	Agreement No./LOA No.	
9	Date of Agreement/LOA	
10	Completion date as per Agreement/LOA	
11	Scope of fabrication (in no. of spans and tonnage)	
12	Applicable RDSO Drawing No.	
13	Any other relevant detail	

PART B - MODEL QAP

Sl. No.	Component / Operations	Characteristic to be checked	Frequency & type of check	Reference Document	Fabricators Quality Control	Inspection Details		Type of record	Acceptance Criteria	Remarks
						Inspecting agency	Extent of Inspection			
1	2	3	4	5	6	7	8	9	10	11
1.0	RAW MATERIAL									
1.1	Steel Plates and other Structural Steel Section	Identification and Co- relation with Mill Test Certificate from Supplier. Source / Brand of steel to be decided as per prevailing instructions issued from Railway Board.	As per Mill Test Certificate & test required by Inspection Agency from approved Laboratory**.	Challan, Mill T.C.	Verification of reference documents	As per clause 8.6 of guidelines	100%	Fabricator's Record	1) Steel Plates: IS 2062:2011 Grade E250 or E350, Quality B0 as mentioned in the respective approved drawing. 2) Plates 12mm and above thick, Plates are fully killed/normalized or control cooled. 3) Rolled Sections or any other structural steel member: IS 2062:2011 Grade E250 or E350, Quality B0 as mentioned in the respective approved drawing.	1. Grade and Quality of Steel Plates, structural section to be same as mentioned in the respective approved drawings 2. For other details of structural steel plates and structural section A&C no. 5 of IRS-B1: 2001, IS 2062-2011 and codes referred in these shall be complied as applicable. 3. Raw Matererial clearance shall be done by an authority as mentioned under clause 8.6 of these guidelines. 4. Material

										produced by re-rolling finished products (virgin or used or scrap), or by rolling material for which the metallurgical history is not fully documented or not known, are not acceptable. Since the starting material for re-rollers is mostly billets, ingots, it has to be ISI marked as per IS 2830.
		Physical Condition i.e.- Pitting, rusting, straightness, rolling defects etc.	Visual	--	Complete Visual inspection		100%	Fabricator's Record	A&C no. 5 of IRS-B1: 2001, IS 2062-2011 and codes referred in these shall be complied as applicable	
		Mechanical Test as per IS- 2062:2011 UTS,YS,%EL,Bend Test	Lab test at approved laboratory**	-	Lab Test Report		-	-	Table 2 along with notes below and other relevant clauses of IS- 2062- 2011 and codes referred in it, for quality and grade of steel as mentioned in respective drawings as applicable.	
		Charpy Test at 0 ° C for plates 12 mm thick and above	Lab test at approved laboratory**	-	Lab Test Report		Heat / Cast no section wise as per IS	-		

							2062-2011			
		Chemical Analysis as per IS 2062-2011	Lab test at approved laboratory**	-	Lab Test Report		Heat / Cast no section wise as per IS 2062-2011	-	Table 1 along with notes below and other relevant clauses of IS- 2062-2011 and codes referred in it, for quality and grade of steel as mentioned in respective drawings as applicable.	
		Ultra sonic test for 12mm and above thick plates as per IS-4225/ASTM SA-435/435M	By ASN level-II operator	-	Lab Test Report		100%	-	IS-4225 or ASTM SA-435/435M and codes referred in it as per applicability	
		Dimension	Measurement	Challan	Measureme nt of dimension		100%	Fabricator's Record & Inspection Agency record	IS 2062: 2011 or other relevant codes referred in it as applicable	

1.2	HSFG Bolting Assemblies with DTI washers	Dimensions	Visual / Measurement	Challan and Manufacturer's Test Certificate	Verification of reference Documents	As per clause 8.6 of guidelines	As per A&C no. 11 of IRS B1-2001 and relevant EN 14399 series codes referred in it	Fabricator's Record	1. HSFG bolting assemblies shall meet the criterion not only for individual components such as bolts, nut, washers and DTI washers as mentioned in relevant EN 14399 codes but also meet the criterion for full HSFG bolting assembly along with DTI washers so that designed preload is achieved in HSFG bolting assembly when tightened properly.	1. Only HSFG Bolting assemblies with DTI washers as per the A&C no. 11 of IRS B1-2001 and BS Report no. 111 (Rev. 6) and relevant EN 14399 series codes referred in these are to be used. 2.HSFG Bolting assemblies is to be procured from RDSO approved vendors only 3. Test at the approved laboratory suitable for the purpose shall be done as per the instruction of the inspecting agency which is responsible for passing of the material
		Mechanical & Chemical properties	Lab Test at approved laboratory**.	Manufacturer Test Certificate	Verification of reference Documents					
1.3	Paints and Primers	Verification of Manufacturer's Test Certificate, Inspection Certificate, Challan	Visual	Challan , Manufacture's Test Certificate	Verification of Reference Documents	As per clause 8.6 of guidelines	Each Batch	Manufacture's Test Certificate	IRS B1-2001, IS:51, IS:104, IS:2339, IS:5666 and applicable codes referred in these codes	1. Paints to be procured from vendors approved by RDSO. 2.Test at the approved

		Tests as per specification	Lab Test at approved laboratory**.	Challan , Manufacture's Test Certificate	Verification of Reference Documents		Random	Lab Test Report		laboratory suitable for the purpose shall be done as per the instruction of the inspecting agency which is responsible for passing of the material
1.4	Aluminium wire	Properties of Aluminium wire such as Dia, class and purity as mentioned in appendix-VII of IRS B1-2001	Review of reference documents with material	Challan , Manufacture's Test Certificate	Verification of Reference Documents	As per clause 8.6 of guidelines	Each Batch	Manufacture's Test Certificate	IRS B1-2001, IS:2590 and applicable codes referred in these codes	Test at the approved laboratory suitable for the purpose shall be done as per the instruction of the inspecting agency which is responsible for passing of the material
		Tests as per specification	Lab Test at approved laboratory**.	Challan , Manufacture's Test Certificate	Verification of Reference Documents		Random	Lab Test Report		
1.5	Welding Consumables	As Per Specification and as approved by RDSO	Any Test as required	Challan & Manufacturer's Test Certificate	Verification of reference Documents	As per clause 8.6 of guidelines	As per requirement	Fabricator's record	IRS Welded Bridge Code 2001, IRS M28, IRS M39, IRS M46 and other applicable codes referred in these codes and specifications	Consumable should be of RDSO approved Brand/Vendors

1.6	Stud	1. Identification and co-relation with Manufacturer's test certificate 2. Physical Condition of material- Pitting, Rusting, Straightness, dimensions or any defect and cracks 3. Dimensions of Stud	Visual and dimension verification	Challan & Manufacturer's Test Certificate	Verification of reference Documents	As per clause 8.6 of guidelines	Random	Fabricator's record	BS Report no. BS-115 (Revision 1), ISO 13918 and applicable codes referred in these codes and guidelines.	1. Material should be as per SD1 of ISO 13918 2. Manufacture's ID should be embossed in every piece 3. Test at the approved laboratory suitable for the purpose shall be done as per the instruction of the inspecting agency which is responsible for passing of the material
		Chemical and Mechanical properties	Lab Test at approved laboratory**	Challan & Manufacturer's Test Certificate	Verification of reference Documents		Random	Lab Test Report		

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						Inspecting agency	Extent of Inspection			
1	2	3	4	5	6	7	8	9	10	11
2.0	Manufacturing Process									
2.1	Layout of Components, Joints, Cross frame, diaphragm and any other member as applicable	Dimension	Measurement with calibrated steel Tape.	Approved Drawings	Measurement of dimensions	Inspecting Agency*	100%	Inspection Report of Inspection officials	Approved fabrication Drawings# and relevant IS/IRS/IRC codes.	Clearance by Inspecting agency with the help of Master Plates if required.
2.2	Preparatory work such as Cutting, Straightening, Edge Preparation, Marking, Drilling, Fit up, Pre-assembly, End finishing	Dimension, freedom from defects	Visual / Measurement with calibrated steel tape, gauges, templates etc.	Inspection Report of Inspection officials & fabricator's record	Visual & Measurement of dimensions	Inspecting Agency*	100%	Inspection Report of Inspection officials & fabricator's record	Approved fabrication drawings#, IRS B1-2001, IS-1852-85 and codes referred in these codes as applicable	--

Sl. No.	Component / Operations	Characteristic checked	Frequency & type of check	Reference Document	Fabricators Quality Control	Inspection Details		Type of record	Acceptance Criteria	Remarks
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1	2	3	4	5	6	7	8	9	10	11
3.0	Welding									
3.1	WPSS	Review of WPSS	Verification	IS 9595-96, IRS B1-2001, IRS WBC-2001 and codes referred in these codes as applicable	Verification Reference Documents	Inspecting Agency*	100%	Fabricator's Record	Approved fabrication Drawings#, IS 9595-96, IRS B1-2001, IRS WBC-2001 and codes referred in these codes as applicable. Instructions issued by Railway Board also to be followed.	1. Welding to be performed following the different specification and parameters mentioned in WPSS approved by Inspecting Agency 2. For details of Stud Welding refer BS 115 (Revision 1)

3.2	WPQR	1. Witnessing of established WPSS. 2. Witnessing of Welder Qualification test	Visual ,DT and NDT at approved laboratory**	As per Codal Requirement	Verification of Reference Documents	Inspecting Agency*	100%	WPQR Sheet to be recorded in presence of Inspecting agency	IS 7307 (Part-1), IS 7310 (Part-1), IRS B1-2001, IRS WBC-2001 and codes referred in these codes as applicable	1. Only Inspecting Agency certified welders to be engaged in the job 2. For Details of Stud Welding refer BS 115 (Revision 1)
3.3	Preheating	Measurement of Temperature	Visual with thermal Chalk or Infrared Thermometer	Approved WPSS	Verification of Reference Documents	Inspecting Agency*	Random	Inspection Report of Inspection officials & fabricator's record	IS 9595-96, IRS B1-2001, IRS WBC-2001 and codes referred in these codes as applicable	--
3.4	Baking of Electrode , flux	To have moisture free electrode and flux	Visual check of Electrodes and heating	As per Manufacture's Recommendation	Verification of Reference Documents	Inspecting Agency*	100%	Inspection Report of Inspection officials & fabricator's record	IRS B1-2001	--

3.5	Selection of Correct Electrodes & flux	Reference to WPSS IRS class etc.	Visual	As per Approved WPSS	Verification of Reference Documents	Inspecting Agency*	100%	Inspection Report of Inspection officials & fabricator's record	IRS Welded Bridge Code 2001, IRS M28, IRS M39, IRS M46 and other applicable codes referred in these codes and specifications	Refer Para 1.5 of this QAP
3.7	Current Condition	Measurement of Amp./Voltage	Visual with Ammeter and Voltmeter	As per Approved WPSS	Verification of Reference Documents	Inspecting Agency*	Random	Inspection Report of Inspection officials & fabricator's record	IS 9595-96, IRS B1-2001, IRS WBC-2001 and codes referred in these codes as applicable	--
3.8	Sequence of Welding	Controlling Distortion	Visual	As per Approved WPSS	Verification Reference Documents	Inspecting Agency*	Random	Inspection Report of Inspection officials & fabricator's record	IS 9595-96, IRS B1-2001, IRS WBC-2001 and codes referred in these codes as applicable	--
3.9	Provision of Run-on and Run-off Plates	To avoid crater defects	Visual	As per Approved WPSS	Verification Reference Documents	Inspecting Agency*	100%	Inspection Report of Inspection officials & fabricator's record	IS 9595-96, IRS B1-2001, IRS WBC-2001 and codes referred in these codes as applicable	--

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1	2	3	4	5	6	7	8	9	10	11
4.0	Inspection of Welding	For Fillet Welds- Visual, D.P. Test, Fillet Size, Penetration, Leg length, Throat thickness etc.	Visual, Gauge and Macro etching	Approved fabrication Drawings# & WPSS	Visual Inspection & Verification of Dimension by Gauge	Inspecting Agency*	100%	Fabricator's Record	Approved fabrication Drawings#, IRS B1-2001, IRS WBC-2001 and codes referred in these codes as applicable	1. Clearance by Inspecting agency 2. It is to be ensured during fabrication process that fabrication has been done as per the WPSS approved by Inspecting agency and Welders approved by inspecting agency.
5.0	Stud welding	Visual Inspection, Dimension Inspection, Ring Test and Bend Test etc. as applicable, for good penetration & crack free weld.	Test as mentioned in BS 115 (Revision 1)	Approved Fabrication Drawing# and WPSS	100% Visual Inspection & Verification of Dimension by gauge and Test record	Inspecting Agency*	100%	Test Reports & Fabricator's Report	Approved Fabrication Drawing#, WPSS, WPQR, BS 115 (Revision 1) and other relevant codes referred in it and in approved drawings	1. Details of inspection of automatic stud welding shall be maintained as per annexure I of BS-115 (Revision 01) 2. Clearance to be given by Inspecting agency
6.0	First span Inspection									

6.1	Trial Assembly	a) Overall length b) Bearing centres c) Height d) Girder Centres e) Squareness f) Verticality g) Camber on Jack h) Dead Load deflection (Camber without Jack) i) Dimension j) Fairness of Holes k) Temporary fasteners l) Any Infringement m) Butting of compression flanges	Visual & Dimensional	Approved Drawings	Complete Dimensional Check of Trial Assembly	Inspecting Agency*	First span	Inspection Report of Inspection officials & fabricator's record	IRS B1-2001, IRS WBC-2001 and applicable codes referred in these codes.	1. Clearance by Inspecting agency 2. Trial assembly shall be done in Workshop of fabricator only. Fabricator shall ensure that sufficient space is available in workshop for trial assembly before finalizing the order of fabrication for a particular span.
6.2	Dismantled component inspection	1. Component completeness after dismantling, 2. To find out that dismantled components are free from Elongation of holes, Tearing of edges or other defects.	Visual, Dimensional & Structural	Stage clearance Record	Verification of Stage clearance Record	Inspecting Agency*	100%	Inspection Report of Inspection officials & fabricator's record	IRS B1-2001, IRS WBC-2001 and applicable codes referred in these codes.	Clearance to be given by inspecting agency including the clearance for welding as per Annexure 2.

7.0	Inspection of Components- 2nd span and onwards	a) Component completeness b) Dimensions c) Fairness of holes d) Verticality e) Butting of compression flange f) Squareness g) Overall length h) Height	Visual, Dimensional & Structural	Stage clearance Record	Verification of Stage clearance Record	Inspecting Agency*	100%	Inspection Report of Inspection officials & fabricator's record	IRS B1-2001, IRS WBC-2001 and applicable codes referred in these codes.	1. Clearance to be given as per Annexure -2. 2. 2nd span and onwards, each girder to be offered in leaf assembled condition. 3. Full Components of one span or more than one span shall be offered for inspection of inspecting agency. Part spans should not be offered for inspection of inspecting agency.
8.0	Surface Preparation by Shot Blasting & Metalizing	Surface condition after blasting	Visual checking with reference to surface preparation	Approved Fabrication Drawing# & IRS - B1-2001 and codes referred in these	Verification of Stage clearance Record	Inspecting Agency*	100% by fabricator & Random by Zonal Railway *	Fabricator's Record	IRS B1-2001 Appendix- VII IS: 6586, IS:5905, IS:2590 and codes referred in these codes	1. Clearance shall be given as per Annexure-2. 2. No need for metalizing and painting on top side of I-Beam before welding of Stud Shear Connector 3. If required for corrosion protection, the steel surface duly fitted with studs shall be aluminium metallised after welding of studs and their inspection is over. However, the same shall not be
		Surface finish after metalizing	Visual checking	Approved Fabrication Drawing# & IRS - B1-2001 and codes referred in these	Verification of Stage clearance Record	Inspecting Agency*	100% by fabricator & Random by Zonal Railway *	Fabricator's Record		

		DFT checking	Measurement	Approved Fabrication Drawing# & IRS - B1-2001 and codes referred in these	Verification of Stage clearance Record	Inspecting Agency*	Minimum one reading per square meter	Measurement Record		Painted (Please refer BS 115 Rev. 1)
9.0	Cleaning & Painting	Surface condition before painting	Visual checking with reference to surface preparation	Approved Fabrication Drawing# & IRS - B1-2001 and codes referred in these	Verification of stage clearance records	Inspecting Agency*	100% by fabricator & Random by Zonal Railway *	Fabricator's Record	Clause 39.2.1 and appendix VII of IRS B1-2001, IS: 104, IS:51, IS: 2339, IS: 5666, BS-111 and applicable codes referred in these codes	
		Surface finish after painting	Visual checking	Approved Fabrication Drawing# & IRS - B1-2001 and codes referred in these	Verification of stage clearance records	Inspecting Agency*	100% by fabricator & Random by Zonal Railway *	Fabricator's Record		
		DFT checking	Measurement	Approved Fabrication Drawing# & IRS - B1-2001 and codes referred in these	Verification of stage clearance records	Inspecting Agency*	Minimum one reading per square meter	Measurement Record		

	Final Dispatch including packing, Shipping mark and loading etc.	1. Shipping Mark on all Components as per Approved Fabrication drawings# 2. Fixing of Inscription Plate 3. Packing 4. Loading	Visual	Fabricator's Record		Inspecting Agency*	Random	Approved Fabrication Drawing# & Fabricator's record	Approved Fabrication Drawing# & Clause 42, 43 and 44 of IRS - B1-2001 and codes referred in these	Site Painting is to be done after assembly and erection of girder on site as per IRS B1-2001
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Notes:

- 1** * Inspection Agency as decided vide guidelines and Aneexure -2.
- 2** ** Approved laboratory in this QAP means NABL/NABCB Accredited Lab. (Ref: ED/B&S/RDSO letter CBS/PBEJ/Reg dated 10.07.2017.)
- 3** # "Fabrication drawings" shall be made on the basis of approved structural drawing if required as per the provisions of para 1.2 of IRS B1-2001. Fabrication work is to be undertaken on the basis of these fabrication drawings only after approval of Engineer in charge of project. Also on the completion of work, contractor should supply the "Completion Drawing" along with alteration if any.