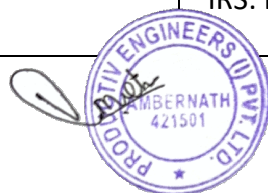


**QUALITY ASSURANCE PLAN (QAP) FOR FABRICATION OF COP COLUMN, CROSS GIRDER, CROSS BRACINGS & CANOPY**

**PART A (DETAILS OF WORK)**

SN	Item	Details
1	Name of Work	Jogeshwari(AT): - New coaching terminal for platform returning Mail/Express trains
2	Zonal Railway jurisdiction	WESTERN RAILWAY, MUMBAI DIVISION. – Construction (GatiShakti)
4	Contractor Agency	<b>M/s. GIRIRAJ CIVIL DEVELOPERS LIMITED.</b> 2 <sup>nd</sup> Floor , Nine square Building, Ramdas sutrale Marg, Off. Chandavarkar Lane, Borivali West, Mumbai 400092.
5	Fabricating Agency	<b>M/s. PRODUCTIVE ENGINEERS (I) PVT LTD.</b> Plot No. B-31, Anand Nagar, MIDC, Opp. ASB International, Ambarnath (E) - 421506
6	Inspecting Agency	WESTERN RAILWAY Construction (GatiShakti)
7	QAP No.	GCDL/JOS AT/COP/QAP/001
8	LOA No. & date	GSU-MMCT-2022-23-ENGG-08 Dt. 21-03-2023
9	Completion date as per Contract Agreement/LOA	As per LOA - 21.05.2024, Extended Upto – 31.12.2025
10	Scope of fabrication	COP Columns, Cross Girder, Cross Bracing & Canopy
11	Scope of fabrication in MT	Approx 2000 MT
12	GAD	PCE No.- e-31565-HQ/1-D(2)
13	Structural Drawing	JOS/GCDL/2023/184-02-002
14	Specifications	IRS-B1-2001, IRS Welded Bridge Code, BS 130, IS: 2062-2011, IS: 4225, ASTM SA-435, IS: 1852, IS:5905, IS: 2590, IS: 9595, IS: 4353, IS: 7310, IS: 7307, BS-110, BS-111, IRS: M-39, IRS: M-28, IRS: M-46 & Contract Agreement



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<b>PART B - QAP</b>										
Sl. No.	Component /Operations	Characteristics 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	<b>RAW MATERIAL</b>									
1.1	<b>Steel Plates and other Structural Steel Section</b>	Identification and Co-relation with Mill Test Certificates from suppliers e.g., SAIL, TISCO, JSPL, JSW, RINL	As per mill T.C. and tests required by INSPECTION AGENCY from approved Laboratory/ Govt. approved Laboratory/ NABL/ NABCB	Challan, Mill T.C.	Verification of reference documents	Western Railway	100%	Fabricator's Record	1) Steel Plates: IS 2062:2011 Grade E250, Quality BR as mentioned in the respective approved drawing. 2) Rolled Sections or any other structural steel member: IS 2062:2011 Grade E250, Quality BR as mentioned in the respective approved drawing. 3) Plates 12mm & above thick, plates are fully killed/normalised or control cooled.	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.



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		Physical Condition i.e.- Pitting, rusting, straightness , rolling defects etc.	Visual	IS2062: 2011	Complete Visual Inspection	Western Railway	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	3. Raw Material clearance shall be done by INSPECTION AGENCY as per prevailing instructions issued from Railway Board.  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 material for re-rollers is mostly billets & ingots it has to be ISI marked as per IS-2830.
		<b>Mechanical Test</b> as per IS-2062: 2011 UTS, YS, %EL, Bend Test	Lab test at approved laboratory/ Govt. approved Laboratory/ NABL/ NABCB	MTC & Lab Test Report	Lab Test Report	Western Railway	Heat / Cast No. Section wise as per IS: 2062-2011	Govt./NABL 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.	
		<b>Charpy Test</b> at 0° C for plates 12 mm thick and above	Lab test at approved laboratory/ Govt. approved Laboratory/ NABL/ NABCB	MTC & Lab Test Report	Lab Test Report	Western Railway	Heat / Cast No. Section wise as per IS: 2062-2011	Govt./NABL Lab Test Report		



		<b>Chemical Analysis</b> as per IS 2062-2011	Lab test at approved laboratory/ Govt. approved Laboratory/ NABL/ NABCB	MTC & Lab Test Report	Lab Test Report	Western Railway	Heat / Cast No. section wise as per IS 2062-2011	Govt./NABL Lab Test Report	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.	Checked by Railway
		<b>Ultrasonic test</b> for 12mm and above thick plates as per IS-4225/ ASTM SA-435/435M	By ASN level-II operator	MTC	Ultrasonic Test Report	Western Railway	100%	Fabricator's record	IS-4225 or ASTM SA-435/435M and codes referred in it as per applicability	
		Dimension	Measurement With calibrated steel tape	Challan & MTC	Measurement of dimension		100%	Fabricator's Record & Inspection Agency record	IS 2062: 2011 or other relevant codes referred in it as applicable	



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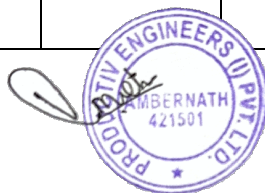
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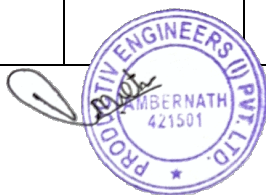
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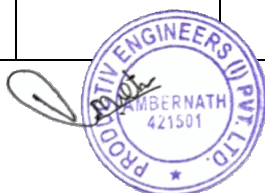
1.2	HSFG Bolting Bolts with DTI Washers	Dimensions	Visual / Measurement	Challan and Manufacturer's Test Certificate	Verification of reference Documents		As per BS-111 (Latest Revision)	Fabricator's Record	As per BS-111 (Latest Revision) HSFG bolting assemblies shall meet the criterion not only for individual components such as bolts, nut, washers, & DTI washers as mentioned in relevant EN 14399 codes but also meet the criterion for HSFG bolting assembly along with DTI washer so that designed preload is achieved in HSFG bolting assembly when tightened properly.	Procure from RDSO-approved Vendor only. Only HSFG Bolting assemblies with DTI washers as per A&C no. 11 of IRS B1-2001 & BS-111 and relevant EN 14399 series codes referred in these are to used. Test at the approved lab. Suitable for the purpose shall be done as per instruction of inspecting agency which is responsible for passing of the material
		Mechanical & Chemical properties	T.C. And tests required from Govt./NABL/NABCB approved lab as per BS-111 (Latest revision)	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	Western Railway	Each Batch	Manufacturer's Test Certificate	IRS B1-2001, IS:5666, IS:51, IS:104, IS:2339 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 Inspection Agency. Paints/primers to be procured from approved vendors by RDSO (RDSO approved available). Paints/primers should be RDSO approved Brand
		Tests as per specification	Lab test at approved laboratory Govt. approved Laboratory/NABL/NABCB	Challan, Manufacture's Test Certificate	Verification of Reference Documents					



1.4	Al/Zn wire	Properties of Aluminum/Zinc 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	Western Railway	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 Inspection Agency which is responsible for passing of the material.
		Tests as per specification	Lab test at approved laboratory Govt. approved Laboratory/ NABL/ NABCB	Challan, Manufacture's Test Certificate	Verification of Reference Documents		Random	Lab Test Report		
1.5	Welding Consumables	As Per Specification and approved WPSS	Any Test as required	Challan & Manufacturer's Test Certificate	Verification of reference Documents	Western Railway	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	As per specification and WPSS Consumable should be of RDSO approved brands/vendors
1.6	Stud	Visual Inspection, dimensions inspection	Test as mentioned in BS 115 (Latest Revision)	Approved Fabrication Drawings and WPSS	100 % Visual inspection & verification of dimension by gauge and test record	Western Railway	100%	Fabricator's record	Approved Fabrication Drawing, IS 9595-96, IRSB1-2001 and codes as applicable instructions issued by Railway Board also to be followed.	
2.0	Manufacturing Process									
2.1	Layout	Dimension	Measurement with calibrated steel Tape	Approved Drawings	Measurement of dimensions	Western Railway	100%	Inspection Report of Inspection officials	Approved fabrication Drawings and relevant IS/IRS codes.	Clearance by inspecting agency with help of master plates if required.



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
2.2	<b>Master Plates</b>	Dimension, intersection line, pitch, gauge, Dia. of holes & No. of holes.	Measurement with calibrated steel Tape & gauges.	Approved Drawings	Measurement of dimensions	Western Railway	100%	Record for Master Plates on Performa same as of Appendix I (1) Performa given in IRS B1-2001	Approved fabrication drawings, IRS B1-2001 and BS-110 (Latest revision)	
2.3	<b>Preparatory work such as Cutting, Straightening, Edge Preparation, Marking, Drilling, Fit up, Pre-assembly, End finishing</b>	Dimension, freedom from defects	Visual / Measurement with master plates and templates. Also with calibrated steel tape & gauges.	Inspection Report of Inspection officials & fabricator's record	Visual & Measurement of dimensions	Western Railway	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 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
3.0	Welding									
3.1	WPSS	Approval of WPSS	Verification	IS 9595-96, IRS B1-2001, IRS WBC-2001 and codes referred in these codes as applicable	Verification Reference Documents	Western Railway	100%	Fabricator's Record	Approved fabrication Drawing, IS 9595-96, IRS B1-2001, IRS WBC-2001 and codes referred in these codes as applicable. Instruction issued by Railway board also to be followed.	Welding to be performed following the different specification and parameters mentioned in WPSS approved by Inspection Agency.
3.2	WPQR	1. Witnessing of established WPSS. 2. Witnessing of Welder Qualification test	Visual DT and NDT at approved laboratory Govt. approved Laboratory/ NABL/ NACCB	As per Codal Requirement	Verification of Reference Documents	Western Railway	100%	WPQR Sheet to be recorded in presence of Inspection Agency	IS 7307 (Part-1), IS 7310 (Part-1), IRS B1-2001, IRS WBC-2001 and codes referred in these codes as applicable	Only Inspection Agency Certified welders to be engaged in the job



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3.3	<b>Preheating</b>	Measurement of Temperature	Visual with thermal Chalk or Infrared Thermometer	Approved WPSS	Verification of Reference Documents	Western Railway	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	<b>Baking of Electrode , flux</b>	To have moisture free electrode and flux	Visual check of Electrodes and heating	As per Manufacture's Recommendation	Verification of Reference Documents	Western Railway	100%	Inspection Report of Inspection officials & fabricator's record	IRS B1-2001 and other applicable codes.	--
3.5	<b>Selection of Correct Electrodes &amp; flux</b>	Reference to WPSS.	Visual	As per Approved WPSS	Verification of Reference Documents	Western Railway	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	As per WPSS and other codes applicable, Consumable should be of RDSO approved brands/Venders
3.6	<b>Current Condition</b>	Measurement of Amp. / Voltage	Visual with Ammeter and Voltmeter	As per Approved WPSS	Verification of Reference Documents	Western Railway	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	As per WPSS and other codes applicable.
3.7	<b>Sequence of Welding</b>	Controlling Distortion	Visual	As per Approved WPSS	Verification of Reference Documents	Western Railway	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	<b>Provision of Run-on and Run-off Plates</b>	To avoid crater defects	Visual	As per Approved WPSS	Verification of Reference Documents	Western Railway	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	-



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
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	Western Railway	100%	Fabricator's Record.. (For dye penetration test& macro Etching)	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 INSPECTION AGENCY and Welders approved by Inspection Agency. This is to be ensured by Contractor.



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5.0	<b>Inspection of first span in assembled condition</b>	a) Overall length b) Bearing centers c) Height d) Girder Centers e) Squareness f) Verticality g) Camber on Jack (if provided in drawing.) h) Dead Load deflection (Camber without Jack if provided in drawing) i) Dimension j) Fairness of Holes k) Temporary fasteners l) Any Infringement m) Butting of compression members	Visual & Dimensional	Approved Drawings	Complete Dimensional Check of Assembly	Western Railway	100%	Inspection Report of Inspection officials & fabricator's record	IRS B1-2001, IRS WBC-2001 and applicable codes referred in these codes. Approved drawings.	1. Clearance by Inspection Agency 2. Assembly shall be done in Workshop of fabricator only. Fabricator shall ensure that sufficient space is available in workshop for assembly before finalizing the order of fabrication for a particular span.
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6.0	<b>Inspection of Component</b>	i) Overall length ii) Bearing centers iii) Height iv) Girder Centers v) Squareness vi) Verticality vii) Camber if provided in drawing viii) Dimension ix) Fairness of Holes x) Butting of compression flanges xi) components completeness	Visual, Dimensional & Structural	Stage clearance Record	Verification of Stage clearance Record	Western Railway	100%	Inspection Report of Inspection officials & fabricator's record	IRS B1-2001, IRS WBC-2001 and applicable codes referred in these codes.	1. All spans are to be checked in leaf assembled condition.  2. Clearance to be given by Inspection Agency.  3. Clearance to be given by inspecting agency the clearance for welding as per Annexure -2 (B1)  4. Full components of one span or more than one span still be offered for inspecting agency part span should not be offer for inspection to inspecting agency.
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7.0	Surface Preparation by 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	Western Railway	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	Clearance to be given by Inspection Agency as per Annexure II (B1)
		Surface finish after metalizing	Visual checking	Approved Fabrication Drawing & IRS - B1-2001 and codes referred in these	Verification of Stage clearance Record	Western Railway	Random	Fabricator's Record		
		DFT checking	Measurement	Approved Fabrication Drawing & IRS - B1-2001 and codes referred in these	Verification of Stage clearance Record	Western Railway	Minimum one reading per square meter	Measurement Record		



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8.0	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	Western Railway	100% by fabricator & random by zonal railway	Fabricator's Record	Clause 39.2.1 and appendix VII of IRS B1-2001, IS: 5666, IS:51, IS:104, IS: 2339 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	Western Railway	do	Fabricator's Record		
		DFT checking	Measurement	Approved Fabrication Drawing & IRS - B1-2001 and codes referred in these	Verification of stage clearance records	Western Railway	Minimum one reading per square meter	Measurement Record		
9.0	Final dispatch including packing, shipping mark & 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		Western Railway	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

**Notes:-**

1. Inspecting agency as decided vide guidelines & Annexure – 2 of BS -130.
2. Approved laboratory in this QAP means NABL/NABCB accredited Lab ( Ref : ED/B&S/RDSO letter CBS/PBEJ/Reg dated 10.7.2017
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.
4. All fabricators record/register as per approved QAP are to be duly signed by the representative project executing agency as well as fabricator.
5. All work all fabrication related record/register to be preserved by project executing agency for further reference.

