

K.K.ENGINEERING

QUALITY ASSURANCE PLAN

Name of Project :- Construction of 5M wide public FOB connecting east and west of Prabhadevi / Parel station across central railway track at KM 07/04-06

Reference No. QAP No : QAP/PEPL/KK/CR/Parel FOB/01 Rev 0 Date 11/09/2024

Annexure-1 Quality Assurance Plan for Fabrication Work

QUALITY ASSURANCE PLAN FOR FABRICATION OF STEEL GIRDER

Name of Project Construction of 5M wide public FOB connecting east and west of Prabhadevi / Parel stations across central railway track at Km 07/04-06.

C.A. No. CR/BBY/Civil/2024/0063

Drawing no. G.M. W BB /10553

Client CENTRAL RAILWAY

Contractor K.K.ENGINEERING

Inspection Agency Konkan Railway Corporation Ltd

Fabricator M/S PRODUCTIVE ENGINEERS (I) PVT. LTD.

Sr.No	Component / Operation	Characteristic Check	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, structural section	a. Identification and co-relation with mill Test certificate from supplier e.g., SAIL, TISCO, IISCO etc.	Mill T.C. and tests required by Central Railway from Govt./NABL approved lab.	Challan, Mill T.C. & Govt./NABL report	Satisfactory test report of Lab	KRCL	100%	Fabricator's Record.	IS:2062-2011, IS 4923-1997 (Reaffirmed 2009) and Grade as per contract agreement/as per approved drawings	Structural Steel Shall be procured from primary manufacturers as per contract agreement only.
		b. Physical Conditions i.e. pitting, rusting, rolling defects, straightness etc.	Visual	—	Complete Visual Inspection	KRCL	100%	Fabricator's Record.	As per IS 2062-2011	Raw Material Clearance shall be done by Central Railway /KRCL
		c. Mechanical tests as per IS 2062-2011 UTS, YS, %Elongation and bend test*	Lab test at Govt./NABL approved laboratory.	Challan, Mill T.C.	Satisfactory test report of lab	KRCL	Heat / Cast No. wise as per IS 2062-2011	Fabricator's Record.	As per IS 2062-2011	*As applicable
		d. Charpy Impact Test for plates of thickness 12mm and above*	Lab Test at Govt./NABL approved lab.	Challan, Mill T.C.	Satisfactory test report of lab	KRCL	Heat / Cast No. wise as per IS 2062-2011	Fabricator's Record.	As per IS 2062-2011	*As applicable
		e. Chemical test as per IS 2062-2011	Lab Test at Govt./NABL approved lab.	Challan, Mill T.C.	Lab test report	KRCL	Heat / Cast No. wise as per IS 2062-2011	Fabricator's Record.	As per IS 2062-2011	
		f. Ultrasonic test for 12 mm and above thick plates as per IS 4225 or ASTM-SA 435/435M	By ASNT Level-II operator	Challan, Mill T.C.	UT Test Reports	KRCL	100 % Verification of UT reports/MTC and Random witness by KRCL	Fabricator's Record.	IS 4225 or ASTM SA435/435M	*If the plates are UT tested at source, random UT testing to be done at workshop.



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भायखला, मध्य रेल,
Assistant Divl. Engineer (Wks.)

SR.DEN (Estate) CSMT

18/9/24

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		Dimension	Measurement	Challan	Measurement of dimension	KRCL	100%	Fabricator's Record.	As per IS 2062-2011 & IS 1852	
1.2	HSFG Fasteners (Bolts,Nuts & Washer/DTI Washers)	Dimension	Visual/ measurement	Challan	Verification of Reference document	KRCL	100% record review of MTC & random testing.	Fabricator's Record	1) Bolt: IS 1367(Part II) & BS-111 revision VII & Property classes as per relevant Drg. & EN 14399 PART 1-10	HSFG Bolt, Nut & Washers to be procured from RDSO approved firm.
		As per specification Mechanical and Chemical Testing	Lab Test at NABL approved lab	Challan, Mill T.C. & Govt./NABL report						
1.3	Paint & Aluminium Wire *	Verification of Manufacturer's Test Certificate, Inspection Certificate, Challan	Visual	Verification of reference documents	Each Batch	KRCL	Each Batch	Fabricators Record	IRS B1-2001 & As per contract agreement	Paint Material to be procured from reputed firm, which has supplied Paints with similar specifications to railway work. *AI =99.50% as per IS 2590
		Tests as per Specification for Paint & Aluminium Wire	Challan, MTC and Govt./NABL report	Challan, Mill T.C./NABL test report	Lab test report	KRCL	100 % record review of MTC & random Testing	Fabricators Record		
1.4	Welding consumables	As per specification and as approved by RDSO and Any test required at GOV/NABL approved Lab	Visual & Verification of MTC & Lab Test Report	Challan, manufacturers test certificates.	Verification of Reference document	KRCL	Verification of MTC and Review of NABL Lab TC	Fabricator's Record.	RDSO Specifications IRS B1-2001, IRS M-39, IRS M-46 & IRS M-28	Welding Consumable to be procured from RDSO approved Firm.
1.5	Stud (If applicable)	Visual Inspection, dimensions inspection	Visual, Mechanical & Chemical	Approved Fabrication Drawing and WPSS	100% Visual inspection & verification of dimension by gauge and test record	KRCL	Review of MTC and Sampling for NABL Testing	MTC Test Reports & Fabricator report	Approved Fabrication Drawing, IS 9595-96, IRSB1-2001 and codes as applicable Instructions issued by Railway Board also to be followed.	Random Testing In NABL Lab.

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BYCULLA, C.Rly.

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						Inspecting Agency	Extent of Inspection			
2.0 Manufacturing Process										
a)	Layout	Dimension	Measurement with calibrated steel tape & gauges	Approved drawings	Measurement of Dimension.	KRCL	100%	Inspection report of Inspection Official	Relevant IS/IRS code & Approved Drawings	Layout at workshop and clearance by KRCL. * If the fabrication is being carried out by CNC machines, approval of jigs/fixtures/ layout not applicable
b)	Templates & gauges	Dimension, Intersection lines, pitch, gauge, dia of holes & no. of holes	Measurement with calibrated steel tape & gauges	Approved drawings	Measurement of Dimension.	KRCL	100%	Inspection report of Inspection Official	Relevant IS/IRS code & Approved Drawings	
c)	Cutting/ Straightening/ Edge preparation	Dimension free from defects	Visual/ measurement	Approved drawings	Visual & Measurement of Dimensions	KRCL	100%	Inspection report of Inspection Official & fabricators record.	IRS B-1-2001 & IS 1852-85	Stage inspection by KRCL
d)	Fit up of Components & Joints	Dimension	Measurement with calibrated steel tape and gauges.	Approved drawings	Measurement of Dimension.	KRCL	100%	Inspection report of Inspection Official	Relevant IS/IRS code & Approved Drawings	Clearance by KRCL



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						Inspecting Agency	Extent of Inspection			
3 Welding										
a)	WPSS	Review of WPSS	Verification	As per IRS-B1-2001, IS 9595-96, WBC -2001	Verification of Reference document	KRCL	Review	Fabricator's Record.	As per IRS-B1-2001, IS 9595-96, WBC -2001	Only RDSO / KRCL/Central Railway Approved Welder to be engaged in the job.
b)	WPQR	Witnessing of established WPSS & Witnessing of Welder Qualification test	Visual & NDT at approved lab	As per Code Requirement	Verification of Reference document	KRCL	100%	Fabricator's Record.	IS:7310(I)	Only RDSO / KRCL/Central Railway Approved Welder to be engaged in the job.
c)	Pre-heating	Measurement of Temperature	Visual with Thermal Chalk	As per approved WPSS	Verification of Reference document	KRCL	Random	Inspection report of Inspection Official & fabricator's record.	IRS B1-2001	
d)	Baking of electrode, Flux	To have moisture free Electrodes & Flux	Visual checking of electrode & heating	As per Manufacturers recommendation	Verification of Reference document	KRCL	Random	Inspection report of Inspection Official & fabricator's record.	IRS B1-2001	
e)	Selection of correct electrodes & flux	Reference to WPSS	Visual	As per approved WPSS	Verification of Reference document	KRCL	Random	Inspection report of Inspection Official & fabricator's record.	As per list of vendors approved by RDSO	

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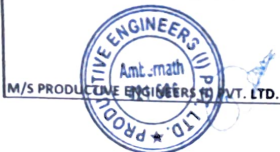
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						Inspecting Agency	Extent of Inspection			
f)	Current condition	Measurement of Amp & Voltage	Visual with Ammeter & Voltmeter	As per approved WPSS	Verification of Reference document	KRCL	Random	Inspection report of Inspection Official & fabricator's record.	IRS-B1-2001	
g)	Sequence of welding	To control distortion	Visual	As per Approved WPSS	Verification of Reference document	KRCL	Random	Inspection report of Inspection Official & fabricator's record.	IRS-B1-2001	
h)	Provision of run on & run off plates	To avoid crater defects	Visual	As per IRS-B1-2001	Verification of Reference document	KRCL	100%	Inspection report of Inspection Official & fabricator's record.	IRS-B1-2001	
4	Inspection of Shop welding	a) For Fillet Weld: Visual, D.P. Test, Fillet Size, Root Penetration, Leg Length, Throat thickness, etc. b) For Butt Weld RT/UT Test, as applicable.	Visual, Gauge & Macro Etching.	Approved drg. & WPSS	Visual Inspection & Verification of dimension by gauges	KRCL	100%	Fabricator's record.	Relevant IS/IRS Code, Approved Drg. & WBC-2001	
4.1	Stud Welding (If Applicable)	Visual inspection, dimensions inspection, ring test and bend test etc. as applicable, for good penetration & crack free weld.	Test as mentioned in BS 115 (Latest Revision)	Approved Fabrication Drawing and WPSS	100% Visual inspection & verification of dimension by gauge and test record	KRCL	100%	Test Reports & Fabricator report	Approved Fabrication Drawing, IS 9595-96, IRSB1-2001 and codes as applicable instructions issued by Railway Board also to be followed.	
5.0	Trial Assembly	a) Camber on Jack b) Dead Load deflection (If applicable) c) Dimensions d) Fairness of holes e) Temporary fasteners f) Infringement g) Butting of compression edges	Visual & Dimensional	Approved. Drg.	dimensional check of Control Assembly	KRCL	One complete span	Inspection Report of Inspection Official & Fabricator's Record	IRS B1-2001	Clearance by KRCL/Central Railway



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						Inspecting Agency	Extent of Inspection				
6.0	Component Inspection	As per approved drawing	Visual & Dimensional	Approved Drg.	Complete dimensional check	KRCL	All Girders	Inspection report of inspecting officials, fabricator's records	IRS B1-2001	Clearance by KRCL/Central Railway	
7.0	Surface Preparation by shot blasting & Metalizing	Surface Condition after Blasting	Visual Checking with reference to surface preparation	Approved Fabrication Drawing, IRS B1-2001 & Contract Agreement	Verification of stage clearance record	KRCL	100% by fabricator & Random By KRCL	Fabricator's Record.	IRS: B1-2001 Appendix VII IS: 6586 IS: 5905 IS: 2590	Clearance shall be given by KRCL/Central Railway	
		Surface Finish after Metalizing	Visual Checking		Verification of stage clearance record	KRCL	100% by fabricator & Random By KRCL				
		DFT Checking	Measurement		Verification of stage clearance record	KRCL	Minimum One reading per Sqm.				Measurement Record
8.0	Cleaning & Painting Etch Primer (1 coat), Zinc chrome primer (1 coat), Aluminium Paint (2 coat)	Surface condition before painting	Visual checking	Approved Fabrication Drawing, IRS B1-2001 & Contract Agreement	Verification of stage clearance records	KRCL	100% by fabricator & Random By KRCL	Fabricators record	IRS B1-2001 IS:104, IS:51, IS: 2339, IS: 5666 6, Approved drawing and Contract agreement	*Clearance shall be given by KRCL/Central Railway. * Final Dispatch of components to Bridge sites shall be done after verifying shipping marks	
		Surface finish after painting	Visual checking		Verification of stage clearance records	KRCL	100% by fabricator & Random By KRCL				Fabricators record
		DFT Checking	Measurement		Verification of stage clearance record	KRCL	Minimum One reading per Sqm.				
9.0	Final Dispatch	Shipping Mark on all Components as per Approved Fabrication drawings	Visual	Fabricator's Record		KRCL	Random	Approved Fabrication Drawing & Fabricator's record	Approved Fabrication Drawing & Clause 42, 42 and 44 of IRS - B1 - 2001 and codes referred in these		

Note: Internal inspection shall be carried out by fabricator/contractor before raising the inspection call to KRCLUC/Rly

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