

SCHEDULE OF TECHNICAL REQUIREMENTS FOR MANUFACTURING AND SUPPLY OF “STAINLESS STEEL PIPE FITTINGS” FOR THREE PHASE ELECTRIC LOCOMOTIVES

ISSUED BY

CHITTARANJAN LOCOMOTIVE WORKS
CHITTARANJAN-713331
WEST BENGAL

Approved By	Signature
PCEE	Digitally signed by R YADAV Date: 2023.04.18 18:52:05 +05'30'

Recommended By	Signature
CEE/D&D	Digitally signed by AVIJIT CHAKRABORTY Date: 2023.04.06 19:17:52 +05'30'

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Digitally signed by MANOJ KUMAR SAGAR Date: 2023.02.15 12:05:09 +05'30'	Digitally signed by ALOKE KUMAR CHAKRABORTY Date: 2023.02.15 12:31:01 +05'30'	Digitally signed by SYAMA PRASAD PATRA Date: 2023.02.15 15:12:39 +05'30'
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Signature Not Verified
 Digitally signed by ALOKE KUMAR CHAKRABORTY
 Date: 2023.04.19 12:24:12 IST
 Reason: IREPS-CRIS
 Location: New Delhi

1.0 NAME OF THE ITEM:- Stainless Steel Pipe fittings for three phase electric locomotives.

2.0 APPLICATION:-

This STR prescribes the requirements for stainless steel pipe fittings with double ferrule for compressed air transmission for braking purpose in three-phase electric locomotives (WAG-9/WAG-9H/WAG-9HC, WAP-7 & WAP-5). Operating air pressure may be as high as 11.5 Kg/cm². Normal air pressure is 10 Kg/cm².

SCOPE:-

The Schedule of Technical Requirements (STR) is issued to serve as a guide to manufactures (called the “firm” hereafter) and should be read in conjunction with the relevant drawings and specifications with latest Revisions / Alterations. The technical requirements are meant to serve as guidelines only and are not exhaustive. The firm should satisfy themselves having complied with the requirements of drawings and STR. List of relevant Drawings/ specifications is listed as Annexure-I.

Wherever lacking, existing CLW approved sources must also upgrade their facilities to fulfill the requirements of this STR within a period of One year from date of issue of this STR.

GENERAL REQUIREMENTS:-

The firm should have currently valid latest ISO-9000 certification issued by an approved agency of the International Accreditation Forum (IAF) with the activity desired clearly mentioned in the scope of certification.

A system of regular submission of rejection details of material giving rejection rate, cause of rejection, corrective action taken etc. on quarterly basis should be followed by firm.

The firm must have system of documentation in respect of rejection at customer end, warranty replacement and failure of item supplied by them during service.



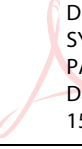
The firm shall have all latest relevant Standards like IS, DIN, BS etc. pertaining to product specification.

The firm shall have system of recording the plant, machinery and control equipment remaining out of service, nature of repairs done etc.

The testing & measuring equipment shall be duly calibrated and the validity of calibration should be current and verified by physically checking the calibration certificate issued by Calibration Agency from whom it was calibrated. Calibration shall be done by NABL accredited labs whose accreditation is valid on the date of calibration.

Firm should have adequate no. of trained personnel for after sales network.

Whenever there is any change with respect to approved QAP, the same shall be promptly submitted to CLW for approval.

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MANOJ KUMAR SAGAR  Digitally signed by MANOJ KUMAR SAGAR Date: 2023.02.15 12:05:21 +05'30'	ALOKE KUMAR CHAKRABORTY  Digitally signed by ALOKE KUMAR CHAKRABORTY Date: 2023.02.15 12:31:19 +05'30'	SYAMA PRASAD PATRA  Digitally signed by SYAMA PRASAD PATRA Date: 2023.02.15 15:13:25 +05'30'
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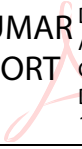

QUALITY ASSURANCE PLAN (QAP):-

The firm shall prepare a Quality Assurance Plan (QAP) before approval is sought and submit the same as part of compliance of this STR. The QAP shall be a comprehensive document covering the following aspects.

- (i) Details of Quality Control Organization of the firm along with key personnel engaged in the QC function.
- (ii) Qualification log sheet of the personnel manning the quality control set up.
- (iii) Process flow chart indicating process of manufacture of an individual product or for a family of products for which the process is same.
- (iv) Details of Sub-Vendors:
 - The name of item for which sub-vendor is approved.
 - The name of approving agency.
 - Quality manual submitted by sub-vendor to primary vendor.
 - The sub vendor to have all the requisite infrastructure of manufacturing and testing facilities, preferably under one roof. The sub-vendor to broadly meet with all the technical requirements laid down in this STR.
 - The primary vendor is following periodical inspection schedule for sub-vendor strictly.
 - ISO Certification details of sub-vendor also.
 - The sub-vendor is also liable for assessment by CLW.
- (v) Firm shall have long term contract agreement with their sub-vendors for outsourced activities.
- (vi) Inspection and testing plan of
 - (a) Incoming Material as per format in Annexure-IV, Clause-2
 - (b) Process (stage inspection) as per format in Annexure-IV, Clause-3
 - (c) Product (Final inspection) as per format in Annexure-IV, Clause-5
- (vii) All the formats used for recording inspection results.
- (viii) System of traceability, traceability diagram linking traceability from raw material stage to internal check and finally lot offered for inspection.
- (ix) All internal checks to be carried out during manufacturing shall be summarized and furnished. List of documents to be maintained for these internal checks; that need to be signed by inspecting official before issue of Inspection Certificate shall also be furnished.

(x) QAP Format :-

QAP must be submitted in the form of single document indicating name of the firm and page no. 'X' of 'Y' on each page. Each page should be signed by Quality Control in-charge. The approved QAP must be a controlled document and a quality record of ISO 9001:2008 or latest quality control system of the firm. A certificate to this effect shall be provided along with the QAP by the firm. The QAP shall be submitted in duplicate. Details of these aspect are described in the subsequent paragraphs. The QAP shall be approved by CLW and shall form basis of approval process.

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MANOJ KUMAR SAGAR  Digitally signed by MANOJ KUMAR SAGAR Date: 2023.02.15 12:05:37 +05'30'	ALOKE KUMAR CHAKRABORTY  Digitally signed by ALOKE KUMAR CHAKRABORTY Date: 2023.02.15 12:31:36 +05'30'	SYAMA PRASAD PATRA  Digitally signed by SYAMA PRASAD PATRA Date: 2023.02.15 15:13:50 +05'30'
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1 QUALITY CONTROL ORGANISATION:-

The complete organizational setup of the Quality Control Key personnel and official along with their qualification and experience should be furnished.

The Quality Control Organization should be headed by a senior level official having degree in engineering who shall directly report to plant in charge.

2 INCOMING MATERIAL:-

A complete bill of material indicating all input material items required for manufacturing of the products, governing specification and their sources of supplies as approved by the firm should be furnished.

Raw material shall be procured from CLW/RDSO approved sources wherever applicable or from reputed suppliers if no CLW/RDSO source is specified. Documentary proof of purchase and test certificate of each component shall be maintained and produced.

Record of each sub-supplier clearly showing the quantity purchased and rejected as well as cases of late delivery, if any shall be kept.

Incoming raw material shall be 100% inspected by Quality Control Department of the firm for any defect and deviation. The test results of incoming raw material with references to test certificate issued by the supplier and the results of internal tests carried out by the firm for verification may be submitted as part of QAP.

3 PROCESS OF MANUFACTURING:-

Complete process flow chart covering all steps of process of manufacture for an individual product (or for a family of product if the process is same), including the process flow of outsourced activities along with its integration with main process, shall be clearly enlisted as part of QAP.




The following details of machine used for all the steps of machining operations should be included.

- Make, model and commissioning date of the machine.
- Accuracy.
- Details of machining operations.

Machining process should be such that all critical dimensions are final. Vague language like available or will install is not acceptable.

Details of jigs and fixtures used during manufacture should be furnished along with the manufacturing process wherever used.

List of typical Machinery & Plant, testing and measuring instruments required for manufacture is mentioned in Annexure-II & III. The list is for general guidance only and manufacturing operation shall be submitted and got approved by the firm as a part of QAP.

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4 INSPECTION AND TESTING PLAN:-

Testing setup should be available in the firm's own premises capable of testing the equipments as specified in the relevant technical specification. Vague language like available or will install is not acceptable.

Complete Inspection and Testing Chart covering all steps of process of manufacture for an individual product including final inspection should be clearly enlisted as part of QAP.

The following details of Testing / Measuring instruments / Equipments / Tools / Jigs / Fixtures used for all the steps of measurement and testing operations should be included:

- Make and Model of the equipment
- Name of the manufacturer
- Accuracy
- Capacity or Range
- Date of Calibration
- Due date of calibration
- Agency of Calibration

The accuracy and capacity of the testing and measuring equipments shall be adequate to meet the requirements of the specification and drawing.

Stage inspection detailing inspection procedure, inspection parameters and method of testing / test procedure including sample sizes for destructive and non-destructive testing. Record of test results of stage inspection should be available and furnished.




List of typical Testing and measuring instruments required for manufacture is mentioned in Annexure-III. The list is for general guidance only. However, the specific Testing & measuring instruments, gauges used by the firm will also form part of QAP and shall be submitted.

5 FORMAT TO BE SUBMITTED WITH QAP:-

Format to be submitted with QAP is enclosed as Annexure – IV. Firms shall fill these formats keeping in view Para 5.0.

STORAGE FACILITY:-

- Adequate Dust free, clean and non-humid environment for storage of raw material and finished product separately.
- Adequate Dust free, clean and non-humid environment for product assembly area.
- Adequate Stacking / Handling tables and racks in above storage area.

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ANNEXURE-I

LIST OF DRAWINGS, SPECIFICATIONS & STANDARDS:-




1. CLW Specification/Drawings:-

- CLW/MS/3/053 Alt. latest for WAG-9HC/WAP-7.
- CLW/MS/10/015 A Alt. latest for WAP-5.

2. Relevant standard:-

- ASTM A108 Gr. 1018
- ASTM A276 SS 316
- ASTM A269 SS 316
- ASTM A105
- ISO 7/1
- ISO 228/1
- CLW Spec. MS/3/029

3. All Specification of Raw materials and Testing should be as per current version.

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ANNEXURE-II


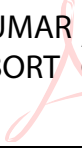

LIST OF MACHINERY AND PLANT:-

SN.	Name of Machinery & Plant	Capacity/Rating	Essential/Optional
1	CNC Lathe M/C	Standard	Essential
2	CNC Milling M/C	Standard	Essential
3	Shearing M/C	Standard	Essential
4	Buffing M/C	Standard	Essential
5	Grinding M/C	Standard	Essential
6	Thread Cutting Machine	Standard	Essential
7	Air delivery compressor	Standard	Essential
8	Bench Vice	Standard	Essential
9	Swaging Machine	Standard	Essential
10	Laser Marking Machine	Standard	Essential
11	Vibration/Ultrasonic cleaning machine	Standard	Essential
12	Forging facility	Standard	Optional
13	Zn plating facility	Standard	Optional
14	Surface and case hardening facility	Standard	Optional

DRAWING & DESIGN SETUP:-

SN.	Details	Capacity/Rating	Essential/Optional
1	Drafting Software	AutoCAD, Latest version	Essential
2	Solid Modeling Software	SOLIDWORKS or Equivalent software, Latest version	Essential
3	Finite Element Analysis software	ANSYS or equivalent software, Latest version	Optional

Note : All optional activity or Machinery & Plant facility may be outsourced.

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ANNEXURE-III




LIST OF MEASURING EQUIPMENTS:-

SN.	Name of Measuring & Testing Equipment	Capacity/Rating	Essential/Optional
1	Inside Micrometer & Outside Micrometer	Standard	Essential
2	Vernier Caliper	Standard	Essential
3	Scale	Standard	Essential
4	Thread gauge	Standard	Essential
5	Profile Projector	Standard	Essential
6	Dial gauge	Standard	Essential
7	Surface roughness test machine	Standard	Essential
8	Plating thickness gauge	Standard	Essential
9	Surface hardness testing equipment	As per CLW specification	Essential

LIST OF TESTING FACILITY:-

SN.	Name of Measuring & Testing Equipment	Capacity/Rating	Essential/Optional
1	Pneumatic pressure test setup	As per CLW specification	Essential
2	Hydrostatic test set up	As per CLW specification	Essential
3	Vacuum test set up	As per CLW specification	Essential
4	Temperature cycling test set up	As per CLW specification	Essential
5	Tensile Test	As per CLW specification	Essential
6	Hydrostatic Burst Test Setup	As per CLW specification	Essential
7	Vibration test setup	As per CLW specification	Optional
8	Pressure Impulse cum vibration test setup	As per CLW specification	Optional
9	Flexure fatigue test	As per CLW specification	Optional
10	Neutral Salt spray test setup	As per CLW specification	Optional
11	Salt Mist Test Set up	As per CLW specification	Optional
12	Raw material test facility	As per CLW specification	Optional
13	Intra-Granular Corrosion Test Setup	As per CLW specification	Optional
14	Repeated assembly test setup	As per CLW specification	Essential
15	Case hardness measurement facility	As per CLW specification	Optional

Note : All optional measuring & testing facility may be outsourced to Govt. Approved/ RDSO Approved Lab.

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ANNEXURE-IV

FORMATS TO BE SUBMITTED WITH OAP

1. Organization specific to the product

Description	Name of person with contact no.	Qualification	Experience	
			Field	Year
(a)	(b)	(c)	(d)	(e)
Design in-charge				
Production in-charge				
Quality Inspection in-charge				

2. Incoming Material Control




Subject/ Product/ Process	Sample size & its frequency of Inspection	Parameter of inspection	Mode of inspection/ Equipments used	Acceptance limit/criteria/specified value as per Drg./Spec.
(a)	(b)	(c)	(d)	(e)

Document Reference	Record Format No.	Action in case of rejection
(f)	(g)	(h)

3. Process Control

(i) Proposed M&P

Sl. No.	Process/ Activity	Work Instruction Ref.	Machine Details					In-house/ Out source
			Lead parameter	Make	Model	Comm. Dt.	Accuracy	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)

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4. Stage Inspection/Test Plan




Subject/Product/ Process	Instrument/Jig & Fixture test bench used	Inspection stage	Parameter for Inspection	Sample size & its frequency of inspection	Document Reference
(a)	(b)	(c)	(d)	(e)	(f)

Acceptance Limit/criteria/specified Value as per Drg./Spec.	Inspection Agency	Record format No.	Action in case of rejection
(g)	(h)	(i)	(j)

5. Product Control

Subject/ Product/ Process	Instrument/Jig & Fixture test bench used	Parameter for inspection	Sample size & its frequency of inspection	Document Reference	Acceptance Limit/ Criteria/specified Value as per Drg./ Spec.
(a)	(b)	(c)	(d)	(e)	(f)

Inspection Agency	Record Format No.	Action in case of rejection
(g)	(h)	(i)

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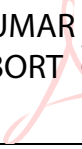

6. Calibration Plan

Instrument Description	Serial No.	Make	Model	Year of procurement	Capacity/ Range	Accuracy	Periodicity of calibration
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)

Calibration Agency	Record Format No.
(i)	(j)

7. Approved Sources for Raw materials/Consumables

Raw Material/ Consumable	Specification/ Standard	Source with address	Whether source is controlled by CLW/RDSO/Others
(a)	(b)	(c)	(d)

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