SCHEDULE OF TECHNICAL REQUIREMENTS FOR MANUFACTURE & SUPPLY OF SILICONE BASED RESIN COMBINATION FOR VACCUM PRESSURE IMPREGNATION (VPI) {(SILICON IMPREGNATING RESIN AND ITS FILLER/AUXILIARY MATERIAL (IF ANY)} OF 3-PHASE TRACTION MOTOR TYPE 6FRA- 6068 & 6FXA-7059 OF ELECTRIC LOCOMOTIVES

May'2021

ISSUED BY

TRACTION MOTOR DEPARTMENT
CHITTARANJAN LOCOMOTIVE WORKS
CHITTARANJAN.713331
WEST BENGAL

Approved by		
PCEE 31.05.2021		
Prepared by	**Reviewed by**	**Recommended by**
27/05/21	27/5/21	27.5.21
SSE/D&D/TMDO	**Dy. CEE/TMD**	**CEE/TM**

ALTERATION/REVISION SHEET FOR MANUFACTURE & SUPPLY OF SILICONE BASED RESIN COMBINATION FOR VACCUME PRESSURE IMPREGNATION (VPI) {(SILICON IMPREGNATING RESIN AND ITS FILLER/AUXILIARY MATERIAL(IF ANY)} OF 3-PHASE TRACTION MOTOR TYPE 6FRA- 6068 & 6FXA-7059 OF ELECTRIC LOCOMOTIVES OF ELECTRIC LOCOMOTIVES

Sl. No.	Alteration No.	Authority	Description	Initial	Date

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1. **Scope:-**The Schedule of Technical Requirements mentioned here under is issued to serve as a guideline to the manufacturers and should be read in conjunction with specification No. HTZW 23507 (or latest). The firm should satisfy themselves about having complied the requirements of the Specification and the Schedule of Technical Requirements. The Technical Requirements are meant to serve as guideline only and are not exhaustive. The firm should have currently valid ISO certification including the subject item under its range of manufacture.

2. Reference :-

SN	DESCRIPTION & C&D No.	Drg.No./Specification
1.	Silicon Impregnating Resin SILRES H 62C or Equivalent for 3-phaseTM type 6FRA-6068 & 6FXA-7059. C&D no. 5716/010,5816/018	HZN 2582 & 2583(or latest)
2	Auxiliary Material-38, C&D no. 5716/012,5816/019	HZLK 6050002(or latest)

3. General Requirement :-The firm should be certified to ISO 9001 by an agency accredited by NABCB.

4. Production Capacity: -Annual production capacity calculation for the full production range must be given on the basis of time required for each process.

5. **Desired aspect in QAP:** -Original QAP to be submitted by the vendor induplicate as a separate bound booklet and QAP has to be specific for each product as per page – 4 of 6.

6. **M&P, Testing and Measuring instrument: -** List of typical M&P required for manufacture, testing and measuring instruments furnished in page 5 of 6&6 of6 is for general guidance only and actual manufacturing operations, specific testing & measuring instruments shall be submitted and get approved by the firm as a part of QAP.

7.Internal Quality Control System:-

7.1 The manufacturer shall procure all the raw materials from standard brand preferably from RDSO /CLW approved sources along with test certificates and sources should be available as and when asked for. If RDSO/CLW sources are not available then raw material from reputed firm shall be procured along with proper test certificates.

7.2Quality Assurance Process of incoming materials, manufacturing process used for the subject items including type test, supply criteria covering specn. acceptance norms , agency if tested from outside lab, format of records etc.

7.3 Detailed process flow chart indicating process of manufacture and individual product.

7.4 The testing and measuring equipments and validity of calibration should be current andCalibration Certificate issued by the calibration agency (NABL/GOVT approved) should be maintained.

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7.5 Relevant Standards like IS/BS/IEC/ASTM/IEEE etc. shall be available with the firm.

QAP to be submitted by the vendor shall cover the following aspects:-

1. Index pages.
2. Copy of ISO 9001 certificate from NABCB registered body.
3. Organisation Chart clearly bringing out the quality control set up.
4. Qualification of the personnel manning only the quality control set up.
5. List of M&P, testing and measuring facilities.

A. All Plant & Machinery, testing and measuring instruments are to be filled up as per following format.

	Description of plant & machinery &etc	Make (Name of manufacturer & country)	Year of Installation	Capacity/ Range	Quantity	Accuracy

6. Process flow chart indicating step by step process of manufacture of an item or a family of items for which the process is same.
7. Details of sub- vendors:-

Name of item	**Sub vendors**	**ISO status**	**Inspection plan of sub vendor**

The sub-vendor should have all the requisite infrastructure of manufacturing and testing facilities preferably under one roof.

8. Quality Assurance System – Inspection and testing plan with formats to be filled up for:-

- Incoming material
- Process Control
- Product Control

This must be furnished in the following format:-

Subject/ Product/ Process	**Sample size & its frequency of Inspection.**	**Parameters of Inspection**	**Mode of Inspection/ Equipment Used**	**Acceptance Limit/criteria/ Specified value as per Drg./Specn.**	**Format No. where record will be kept**

Notes: 1.Sample formats used for recording must be submitted.

2. General ISO 9001 documents not to be submitted.
3. Firm must not depend only on TC for incoming material.
4. Record of SN (8) above shall be checked during inspections at firm's premises.
5. QAP has to be specified for each product.

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Details of Machinery & Plants

SN	M&P	Purpose
1	Mixer/ Dispenser	Production of Silicone Impregnating Resin and its Filler/ Auxiliary Material at different stages. Note: M&Ps should be of required capacity/capability and size as per production target/procedure.
2	Reactor	
3	Compressor Chiller unit	
4	Sigma Mixer	
5	Tray Dryer Oven	
6	Stacker	
7	Container Sealing Machine	
8	DG Set	
9	Material Handling Trolley	
10	Metering Pump	

Details of Testing Equipment

General Measuring & Testing facilities:

SN	Details of Measuring & Testing facilities	Range & Capacity
1	Tensile testing machine	0-25KN, LC-2KN
2	Shore A Hardness tester	0-100 HV, LC-0.1HV
3	B.D.V. tester/ High Voltage Tester	0-20 KV, LC±1%
4	Electronic balance	0-200gms
5	Brooke Field Viscosity Meter	----
6	Digital Refracto Meter *	1-2
7	Laboratory Oven	0-250°C LC-±1°C %
8	Gel time test setup	---
9	Flammability Chamber	UL 94 V0
10	Million Mega Ohm meter	$1X10^{12}$ ohm
11	Hydrometer	0.7-1
12	Tracking Resistance*	---
13	Sealed Tube Test set up (for testing reactions with other insulating items)	---
15	Laboratory VPI Tank with Vacuum and Temp Control	---
16	Relative Temperature Index /TGA Thermal Rating test Set up*	---

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SN	Details of Measuring & Testing facilities	Range & Capacity
17	Digital Physical balance	0-20 Kg
18	Micrometer	0-25mm LC-0.01mm
19	Digital Vernier Calliper	0-100mm LC-0.01mm
20	Laboratory Distillation Plant	---

***Optional can be tested from NABL accredited lab**

Note: Vague language like available or will install is not to be considered. CLW reserves the right to cancel capacity assessment without any prior intimation.

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