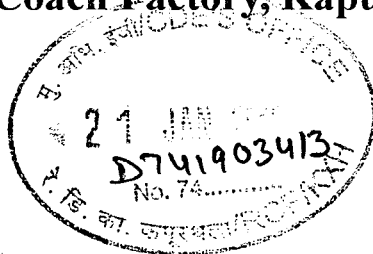


Rail Coach Factory, Kapurthala

MD46231



Dated: 20.01.2020

Subject: Issue of Technical specification No. MDTS 26337 Rev-00 for (AL FR HPL SHEET).

Please find enclosed a copy of Technical specification No. MDST 26337, Rev-00 for information and necessary action at your end.

Specifacaton No. **MDTS 26337 Rev-00**

Schedule of Technical /infrastructure Requirements for AL fire retardent HPL sheet.

Records to be updated accordingly.

PK LUTHRA
ADE/S&B

CQM, CPLE, CWE(SHELL) CMM/HSQ, CMT, DY. CPLE-III

SSE/RECORD (with original specification)

SSE/LIB. DESIGN

SSE/DESIGN/RCF/TKJ

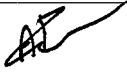
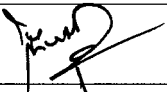


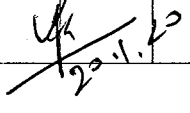
copy for kind information to:

CDE

SPECIFICATION
MDTS-26337
REV-NIL


TECHNICAL
SPECIFICATION FOR
AL.FR.HPL SHEET FOR LHB
COACHES

MDTS:26337,REV.00
PAGE: 1 OF 9
DATED: 13.01.2020

Name	Designation	Signature	Date	Level
AJAI PAL SINGH	SSE/BODY SHELL			Prepared
P.K.LUTHRA	ADE/S & B		16.01.20	Agreed
KAMAL KUMAR	Dy CME/D-1			Reviewed
 M.R.BHIMTE	CDE			Approved

Issue/REV.	Detail of changes	Date
Rev. 00	NA	13.01.2020


Prepared by


16/01/20
Agreed by

SPECIFICATION MDTS-26337 REV-NIL	TECHNICAL SPECIFICATION FOR AL.FR.HPL SHEET FOR LHB COACHES	MDTS:26337,REV.00 PAGE: 2 OF 9 DATED: 13.01.2020
---	--	---

SECTION-A

Foreword:

This schedule is intended to cover the technical requirements/provisions relating to materials construction, parameters and testing requirements of AL FR HPL sheet .It does not include all the necessary provisions of the contracts.

This schedule draws reference to some of the relevant IS:2 specifications. Latest versions of these specifications shall be taken as references.

For the purpose of deciding whether a particular requirement of the schedule is complied with the final value observed or calculated expressing the results of a test of analysis shall be rounded off in accordance with spec. with latest revision.

1. Scope

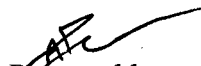
The standard covers general requirement and method of testing of AL-FR-HPL Sheets which are used inside the LHB designed coaches consists of two sections I.e Section-A and Section-B, Section-A covers the technical requirements,method of sampling and tests of AL FR HPL sheet and Section-B covers infrastructure requirements of manufacture, testing and quality control. Sheet size shall be 1220mm X 2440mm with enormous colour range as desired by consignee/mentioned in P.O. description.

2. Definitions

For the purpose of this standard, the following definition applies-

AL-FR-HPL Sheet: A sheet consisting of layers of fibrous sheet material (for example paper impregnated with thermosetting resins and bonded together by means of heat and a pressure of at least 20MPa), a layer on one side having.08mm thick Aluminium Foil Design with colours as required/ indented by the consignee.

Aluminium Fire Retardant High Pressure Laminated Sheet as defined in this part is made from core layers impregnated with phenolic resins mixed with fire retardant chemicals and a surface layer of Aluminium Foil.


Prepared by


Agreed by

SPECIFICATION MDTS-26337 REV-NIL	TECHNICAL SPECIFICATION FOR AL.FR.HPL SHEET FOR LHB COACHES	MDTS:26337,REV.00 PAGE: 3 OF 9 DATED: 13.01.2020
---	--	---

3. Requirements

3.1. Material:

The material will have one side Aluminium Foil Surface & other side as required by the consignee or given an appropriate treatment to promote adhesion to the base material.

3.2. Colour and Surface Finish:

The colour and pattern of AL-FR-HPL Sheet can be of wide range as ordered/ Indented by the consignee. The surface finish shall be Suede Finish.

3.3. Workmanship:

The AL-FR-HPL Sheet is generally smooth, free from surface defects, local deformation and other visual defects.

3.4. Machining Test:

When operation are carried out for installation, the AL-FR-HPL sheets shall be capable of being sawn, milled, drilled and tapped without splitting or cracking.

3.5. The sheet shall be sufficiently robust to withstand the normal handling during assembly on coaches. The sheets do not crack or fracture when worked on by ordinary wood working tools or machinery.

3.6. The sheet shall be available in different colours, design and pattern as per requirement of Railway.

3.7. The Thickness, length and width of sheets will be agreed between the purchaser and the manufacturer but the maximum width can be 1220mm & maximum length can be 2440mm. The tolerances is ± 10 mm for width and length.


Prepared by


Agreed by

SPECIFICATION MDTS-26337 REV-NIL	TECHNICAL SPECIFICATION FOR AL.FR.HPL SHEET FOR LHB COACHES	MDTS:26337,REV.00 PAGE: 4 OF 9 DATED: 13.01.2020
---	--	---

4. Tests

The physical properties of AL-FR-HPL Sheet shall be tested for the following requirements as per tested method given against them on Table 1 and Table 2.

TABLE-1

Sr. No	Property	Value Required	Test Method
1	Appearance	No Surface Defect	EN:438
2	Flatness	60mm/M (Max Deviation)	EN:438
3	Straightness of Edge	1.5mm/M(Max)	EN:438
4	Squareness of rectangular finished part	1.5mm/M(Max)	EN:438
5	Permitted variations of thickness		IS:2046-95 Table-5
6	Resistance to surface wear	Index No. 3	IS:2046-95 Annexure-C
7	Resistance to Scratching	Index No. 3	IS:2046-95 Annexure-L
8	Impact Strength	Grade 2 to 4	EN:438
9	Resistance to immersion in boiling water	Grade 3 to 4	EN:438
10	Resistance to Staining	Grade 4 to 5	EN:438
11	Resistance to Dry Heat at 180°C	Degree-5	IS:2046-95 Annexure-E
	Appearance		
	Gloss Other		
12	Dimensional Stability at 20°C	Less than 0.30%	IS:2046-95 Annexure-G
13	Density(gm/cm ²)	1.4±0.3	Appendix A
14	Flexural Strength	90Mpa(min)	IS:13411-92 Annexure F
15	Resistance to Spread of Flame	Class A	Appendix 4 of UIC 564-2 OR
16	Resistance to Colour Change	Grade 4 to 5	EN:438
17	Resistance to Steam	Grade 3 to 4	EN:438
18	Deterioration of visibility due to smoke	Class A	Appendix 15 of UIC 564-2 OR
19	Limiting Oxygen Index	Min 32%	IS:13360 Part 6 Sec-19:2001
20	Toxicity	HL3	EN-45545

Prepared by

Agreed by

SPECIFICATION MDTS-26337 REV-NIL	TECHNICAL SPECIFICATION FOR AL.FR.HPL SHEET FOR LHB COACHES	MDTS:26337,REV.00 PAGE: 5 OF 9 DATED: 13.01.2020
---	--	---

TABLE-2

Fire Worthiness Properties as per EN45545-2			
<u>1.</u>	<u>Smoke generation: Determination of optical Density by a Single Chamber Test (Ds4 Maximum Dimensionless).</u>	<u>HL3</u>	<u>ISO 5659-2 T10.01 specified in EN 45542-2:2013(R1)</u>
<u>2.</u>	<u>Smoke generation: Determination of optical Density by a Single Chamber Test (VOF4)</u>	<u>HL3</u>	<u>ISO 5659-2 T10.01 specified in EN 45542-2:2013(R1)</u>
<u>3.</u>	<u>Gas analysis in the smoke chamber EN ISO 5659, using FTIR technique (CITG at 4min & CITG at 8min).</u>	<u>HL3</u>	<u>ISO 5659-2 T10.01 specified in EN 45542-2:2013(R1)</u>
<u>4.</u>	<u>Heat Release Rate</u>	<u>HL3</u>	<u>ISO 5660-1</u>

5. Sampling and criteria for conformity-

The sampling and criteria for conformity is as given in clause 8, 9 and 10 of IS: 2045-95. Any sample sheet failing in one or more requirements of the specification is termed as defective. No defective sheet will be found in the ample lot to be considered as conforming to the specification.

6. No of test:

All the tests given in Table-1 and Table-2 are acceptance tests, except type tests.

TYPE TESTS:


The test of Dimensional Stability at 20°C, Resistance to Dry heat 180°C, Resistance to Colour change, Smoke generation determination of optical density by a single chamber test (DS4 Max. Dimensionless), Smoke generation determination of optical density by a single chamber test (VOF4) and Gas analysis in the smoke chamber using FTIR technique. These tests shall be done once in a year.

7. FIRST ARTICLE INSPECTION/PROTOTYPE:

7.1 First article inspection will be done by CDE/RCF or its authorized agency.

Successful tenderer would be required to submit quality assurance plan (QAP) and all relevant documents required for FAI. including special process. First article inspection exclusively to be performed for special process i.e. Bonding.


Prepared by


Agreed by

SPECIFICATION MDTS-26337 REV-NIL	TECHNICAL SPECIFICATION FOR AL.FR.HPL SHEET FOR LHB COACHES	MDTS:26337,REV.00 PAGE: 6 OF 9 DATED: 13.01.2020
---	--	---

7.2 First article inspection of AL FR HPL Sheet to be carried out after passing above one special process.

7.3 After passing above two FAI's Bulk supply will be made after First article approved by CDE/RCF.

7.4 FAI (First Article Inspection) shall be carried out as per requirement of ISO/TS 22163:2017.

7.5 External provider shall carryout FAI as per ISO/TS22163:2017 requirement prior to submission of documents to RCF, Kapurthala.

7.6 Validation of all Special process (including outsourced Special Process) shall be carried out as per requirement of ISO/TS22163:2017.

7.8 Firm has to fulfill all the requirements of IRIS to ISO/TS22163:2017.

7.9 Approval from RCF to be obtained for rectification of non-conformance. Such rectified products to be identified separately during delivery.

7.10 Special process monitoring records to be maintained and submitted to RCF as required. Bonding should be carried out by qualified personnel only. Process parameters to be maintained as per validated special process.

8. Marking

8.1 Each AL-FR-HPL Sheet will be marked suitably with indelible ink as shown in RDSO\Sk.88143 with latest alteration.

9. Packing

The material will be supplied in packages as agreed to between the purchaser and the supplier to avoid transit damage.

10.Warranty:

10.1 The tenderer shall give warranty for AL FR HPL Sheet failing or proving unsatisfactory in service due to defective design, material or workmanship within 7 Yrs from the date of supply or 6 Yrs from the date of fixing of AL FR HPL sheet whichever is earlier.


Prepared by


Agreed by

SPECIFICATION MDTS-26337 REV-NIL	TECHNICAL SPECIFICATION FOR AL.FR.HPL SHEET FOR LHB COACHES	MDTS:26337,REV.00 PAGE: 7 OF 9 DATED: 13.01.2020
---	--	---

Appendix A

Density

The test specification of about 100 cm³ shall be weighed correctly to 0.1 gm. And its dimensions measured. The length and width shall be measured to an accuracy of ±0.5 mm and thickness shall be measured at 6 random places widely spaced on the test specimen and average value shall be considered for calculation of volume. The weight of the test piece in grams divided by its volume in cm³ gives the density.

Three test specimens shall be subjected to this test and average value taken for consideration as given in table-1.

SECTION- B

1. Scope

This section covers the infrastructural requirements for manufacture of AL-FR-HPL sheets for use in LHB new design coaches

2. Plant, Machinery and Infrastructure Requirements

- 2.1 Firm shall have adequate space and a covered area with cemented floor to accommodate the following.
 - a) Damp free place for storage of raw materials
 - b) Independent manufacturing area for AL-FR-HPL sheets.
 - c) Inspection area..
- 2.2 Firm shall have heated dryer.
- 2.3 Firm shall have Steam Boiler and Thermic Fluid boiler of adequate capacity.
- 2.4 Firm shall have Vessel for resin and glue manufacturing.
- 2.5 Firm shall have hydraulic press with die arrangement to manufacture AL-FR-HPL sheets of adequate margin of trimming
- 2.6 Firm shall have cutting power press/machine.
- 2.7 Firm shall have Sanding Machine along with dust collection unit and control panel.
- 2.8 Firm shall have Air Compressors


Prepared by

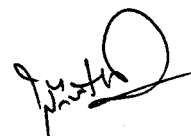

Agreed by

SPECIFICATION MDTS-26337 REV-NIL	TECHNICAL SPECIFICATION FOR AL.FR.HPL SHEET FOR LHB COACHES	MDTS:26337,REV.00 PAGE: 8 OF 9 DATED: 13.01.2020
---	--	---

3. Testing Facilities

- 3.1 Firm shall Electronic/Chemical Balance.
- 3.2 Firm shall Tensile strength testing machine.
- 3.3 Firm shall hot water vessel (With specimen holder).
- 3.4 Firm shall have Water vessel (with specimen Holder).
- 3.5 Firm shall have Resistance to surface wear machine.
- 3.6 Firm shall have Impact Testing Machine.
- 3.7 Firm shall have Dimensional Stability machine(conditioning/ Humidity chamber).
- 3.8 Firm shall have Hot Air oven (Drying Oven)- (Cap. 250±2°C).
- 3.9 Firm shall have Hot plate.
- 3.10 Firm should have the apparatus required for testing resistance to dry heat.
- 3.11 Firm shall have the apparatus required for testing resistance to steam.
- 3.12 Firm shall have the apparatus required for testing resistance to colour change in xenon arc light and enclosed carbon arc light.
- 3.13 Firm shall have at least one number Gloss meter.
- 3.14 Firm shall have in house facilities for conducting test for Resistance to spread of flame, Limiting Oxygen Index, Smoke Test, Toxicity and Heat Release Rate.
- 3.15 Firm shall have the following instruments.
 - a) Vernier Calipers with digital display.
 - b) Micrometers with digital display.
 - c) Measuring Scale
 - d) Measuring Tape
 - e) 90° Angles
 - f) Flatness Table
 - g) Thermometer
 - h) Hydrometer.


Prepared by


Agreed by

4. Quality Control Requirements

- 4.1 Firm shall have acquired ISO:9001-2000 certification and the product for which the approval is sought is broadly covered in the scope of the certification for manufacture and supply.
- 4.2 Firm shall have a quality manual for ISO:9001-2000 which clearly indicates at any stage the control over manufacturing and testing of the said railway product.
- 4.3 the firm shall have a system to ensure the traceability of the product from raw material stage to finished product stage. The system also facilitates to identify the raw material composition from the finished product stage.
- 4.4 firm shall be ensured that there is a Quality assurance Plan for the product detailing the following various aspects:
- Organization Chart
 - Process flow Chart
 - Stage Inspection details from raw materials stage to finish product stage
 - Various parameters are checked and level of acceptance of such parameters indicated and method to ensure control over them.
 - Disposal system of rejected raw material and components.
- 4.5 The firm shall be ensured that proper analysis is being done on monthly basis to study the rejections at various internal stages and it is documented.
- 4.6 The firm shall have the latest versions of all the relevant specifications & IS standards.


5. Documentation


Firm shall be maintained following documents/records:

- 5.1 A well documented Quality Plan.
- 5.2 Incoming raw materials register with test certificates references of suppliers and internal test results.
- 5.3 Stage inspection results including finished products results.
- 5.4 Records of Internal rejection and its analysis & action plan.
- 5.5 Records of final products inspection by external agencies, Non conformity reports and case analysis as well as action taken thereof.
- 5.6 Records for maintenance of dies/moulds.
- 5.7 Ensure that proper systems are available for dealing with customer complaint.

6. Work Force

Firm shall have adequate skilled staff to look after the production and shall have well Experienced and qualified/trained staff in the Lab to ensure the best quality


Prepared by


Agreed by