

**RAIL COACH FACTORY, KAPURTHALA**

MD35131

Dated : 11.10.2021

**Sub.: Notification for clause no. 7.4 & 7.6 in Spec. no. MDTS 089 Rev-04.**

As per approval of competent authority, a waive off for clause no. 7.4 & 7.6 from Spec. no. MDTS 089 Rev-04 is granted till issue of new revision of the specification.

This is for kind information and necessary action please.

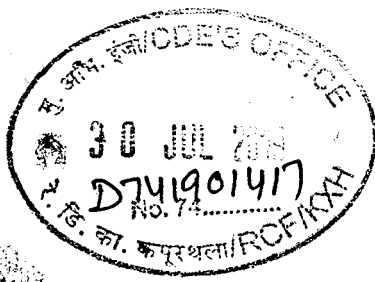
  
Dy. CME/Design-2

CQM	CPLE	CWE(Fur)	CMM/HSQ	CMM/TKJ
Dy. CMM/Fur/LHB	Dy. CMM/G	Dy. CPLE-III	CMT	

SSE/Lib. Design

SSE/Records

Copy for kind information to:  
CDE



Rail Coach Factory, Kapurthala

MD35131

Dated: 10.07.2019

**Sub: Issue of MDTS 089 Rev-04.**

**Ref: Railway board letter no. 2007/M(C)/137/16/XI Pt.**

Please find enclosed a copy of MDTS 089 Rev-04 dated 30.05.19 for your kind information and necessary action at your end.

**Specification No: MDTS 089 Rev-04**

**{Schedule of technical requirements for sealed window glass unit for Alstom-LHB design coaches}**

*10/07/19*  
DY CME/D2

CQM, CPLE, CWE/FUR, CWE/SHELL, CMM/HSQ, CMT, DY. CPLE-II

✓ SSE/ Records (with original specification)

SSE/Lib. Design,

SSE/DESIGN/RCF/TKJ

Copy for kind information to:

CDE

Dy CME/D1

# RAIL COACH FACTORY, KAPURTHALA





(MECHANICAL DESIGN DEPARTMENT)

## SCHEDULE OF TECHNICAL REQUIREMENTS FOR SEALED WINDOW GLASS UNIT FOR ALSTOM-LHB DESIGN COACHES

MDTS 089

REV.- 04

DATED : 30.05.2019

NAME	DESIGNATION	SIGNATURE	DATE	LEVEL
Ashok Prajapati	SSE/Design		30.05.19	Prepared
Ravi Ranjan	ADE/Furnishing		30.05.19	Agreed
Abhey Priya Dogra	DY.CME/D-II		30.05.19	Reviewed
M.Bhimte	CDE		7.6.19	Approved

Issue/Rev	Details of Changes			Date
Rev-04	S.No.	Clause no.	Description	30.05.2019
	1.	2 (i)	Sun control film added	
	2.	3(1)	Note modified (details of desiccant provided)	
	3.	3.3	EN673 specification for window glass unit deleted	
	4.	3.4	Note modified	
	5.	7.1	Note modified (Water head of 1m added for sealing of glass unit)	
	6.	7.4	Long term moisture test added	
	7.	7.5	Spark emission spectroscopy test method added	
	8.	7.6	Test for durability & physical attributes of edge seals added.	

PREPARED BY 

AGREED BY 

SPECIFICATION MDTS:089 REV:04	Technical Specifications for Sealed Window Glass Unit for ALSTOM-LHB design Coaches	Page 1 of 3 Dated: 30/05/19
----------------------------------	---	--------------------------------

## 1.0 Scope:

This specification covers the general and technical requirements and method of sampling and testing of sealed window glass unit to be used in the ALSTOM-LHB Design Coaches.

## 2.0 Applicability:

The Sealed Glass Unit shall be of the following configuration:

- i) Outer laminated glass 8.38 mm thick (4 mm Float glass + 0.38 foil(PVB) + 4 mm Float glass + Sun control film).
- ii) Gap - 6 mm Filled with Krypton/Argon gas.
- iii) Inner glass - 4 mm toughened glass.

Quantity per coach required and drawing applicable shall be described by RCF at the time of placement of order depending upon feasibility of the sealed window glass unit on the type of coach used.

## 3.0 Material Requirements:

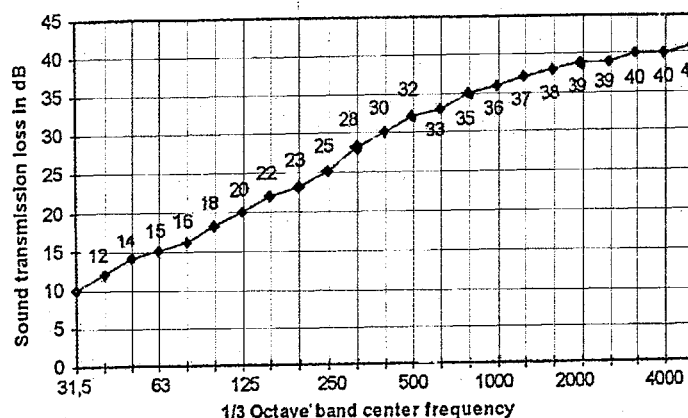
- 3.1. The Aluminium frame (spacer) between the glasses shall be anodized in natural/black colour. The acceptable limit of thickness of anodic coating on aluminium frame is to be minimum 4 microns. Firm should submit WTC along with supply from OEM of Aluminium frame (spacer). The aluminium spacer with single joint should be hollow in construction & shall have perforations for breathing on the side facing the gas gap. The desiccant used shall be molecular sieve which should contain Aluminium Oxide ( $Al_2O_3$ ) approximately 40% by volume & Silicon Oxide ( $Si_2O_3$ ) of 60% by volume. Uniform and smooth bending of Aluminium spacer should be ensured at the corners using suitable technique.
- 3.2. Butyl rubber based and polysulphide adhesive shall be used for hermetically sealing of the unit (Two sheets of glass separated by a metal spacer). This should not age with time and it should remain flexible to withstand the normal temperature variations expected on AC coaches.
- 3.3. The window glass unit shall meet the following characteristics as per EN410:-
 

Light Transmittance	$\geq 42\%$
Reflection	$\leq 30\%$
- 3.4. For lavatory type windows, the outer laminated glass shall be provided with non transparent layer e.g. white layer.

Prepared By

Agreed By

- 3.5. Outer edge of the sealed windows glass unit shall be smooth.
- 3.6. Sound transmission loss R for window in dB per 1/3 octave band is to be higher than or equal to the following values



- 3.7. Tolerances on overall thickness of sealed window glass unit assembly is to be taken as +1 and -0.5 mm.

#### 4.0 Approval of advance sample:

- 4.1. The supplier shall be required to submit the details of manufacturing process and test certificates. Testing shall generally be carried out as per clauses 7. In addition, tests as specified in IS:2553 Pt-1 shall also be carried out
- 4.2. The supplier shall be required to furnish following information along with the sample submitted for inspection.
- The expected life of sealed window unit.
  - Life of desiccant.

#### 5.0 Sampling of sealed window unit:

- 5.1. Five per cent but not less than 5 units shall be selected at random from each lot. Each of units selected from a lot shall be inspected for dimensional tolerances, thickness, cracks, warp and finish.
- 5.2. The samples from lots selected in clause 5.1 passing inspection as mentioned in clause 5.1 shall be tested as per procedure laid down in clause 7.

Prepared By

Agreed By

SPECIFICATION MDTS:089 REV:04	Technical Specifications for Sealed Window Glass Unit for ALSTOM-LHB design Coaches	Page 3 of 3 Dated: 30/05/19
----------------------------------	---	--------------------------------

- 5.3. If any sample passes inspection/testing as per clauses 5.1 and 5.2 the whole lot shall be accepted. If any of the sample does not pass the requirement of either of these clauses, the whole lot shall be rejected.

## 7.0 Test for sealing of unit:

The following tests shall be carried out on the sealed window unit.


- 7.1. Place the sealed window glass unit inside the water in fully submerged condition in a pressure head of not less than one meter. Leave it for one hour. Take out and observe for presence of water in the air gap area of the glass unit. There should not be any leakage of water inside. If any leakage is found, the test sample shall not be subjected to further tests.
- 7.2. Take a small cup of copper having 60 mm diameter at base. Fill it with mixture dry ice and acetone. Place it with over the top of sealed window glass unit for about 8-10 minutes. Remove the cup and observe the formation of moisture on the unit. No condensation should be observed after the cup is removed. This test may be carried out at 4-5 different locations. The temperature of dry ice and acetone mixture should be within -35 to -45 degree C.
- 7.3. The testing of anodising on aluminium frame between glasses (spacer), if required, is to be carried out as per IS:8375-1977.
- 7.4. The unit shall be tested against "Long Term Moisture Test" as per EN 1279 part 2.
- 7.5. The unit shall be tested for Inert Gas with Spark Emission Spectroscopy method. The unit shall have at least 95% Inert Gas at atmospheric pressure inside the gas cavity.
- 7.6. The edge seal strength shall pass the test as per EN 1279-4:2002

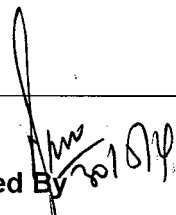
## 8.0 Packing conditions:

- 8.1. Sealed window unit is a fragile material. It should be ensured that mode of packing is such that possibility of breakage during transit & handling is eliminated.

## 9.0 Marking:

- 9.1. Manufacturer's name should be indelibly marked on the upper right hand corner of toughened glass on each window glass unit.

  
Prepared By

  
Agreed By