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Rail Coach Factory, Kapurthala

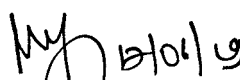
Dated 17.06.2019

MD35131

**Sub:** Issue of specification No. MDTS082 Rev04.

Please find enclosed a copy of following specification for information and necessary action:

S. No	Description	Specification No.
1.	Mechanical design technical specification of auto sliding doors for LHB type coaches	MDTS082 Rev04.

  
 (Abhey Priya Dogra)  
 Dy. CME/D-II

CQM      CPLE      CWE/Fur      CMM/ HSQ      CMM/TKJ      CWE/Shell

Dy.CMM/LHB/Fur.  
 Dy.CMM/Fur

Dy.CMM/G

CMT

Dy. CPLE-II

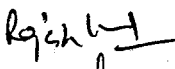
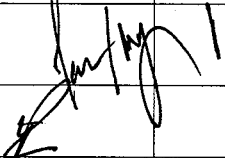
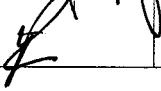
SSE/Filing Section  
 SSE/Library, Mech. Design  
 ✓ SSE Record (Original copy)  
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**Copy for kind information to:**

CDE  
 Dy.CME/D-1

**RAIL COACH FACTORY KAPURTHALA**  
**(MECHANICAL DESIGN DEPARTMENT)**

<b>SPECIFICATION</b>	<b>MECHANICAL DESIGN TECHNICAL SPECIFICATION OF AUTO SLIDING DOORS FOR LHB TYPE COACHES</b>	<b>MDTS082 REV-4 PAGE 1 OF 8 DT: 20.04.2019</b>
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NAME	DESIGNATION	SIGN	DATE	LEVEL
Rajesh Sharma	SSE/Fur			Prepared
Ravi Ranjan Kumar ABHEY PRIYA DOGRA	ADE/Fur DY. CME (D-1)			Agreed & Reviewed
Manish Bhimte	CDE			Approved

REV NO	DETAIL OF CHANGES	DATE
03	<ol style="list-style-type: none"> <li>1. Applicability for Vestibule Auto sliding door, Saloon Sliding Door for FAC and Bi-Folding lavatory doors eliminated. Applicability for NAC Hot Buffet coaches added.</li> <li>2. Clauses added for service/Operating conditions and AMOC.(clauses 3 and 9).</li> <li>3. Material En 31 specified for guide rod. (clause 4.1.8).</li> <li>4. Material of louvers for AC Entrance area doors of AC Chair Cars and Hot Buffet coaches changed from Aluminum to Stainless Steel. (clause 4.2.5).</li> <li>5. Sealing brushes specified in scope of supply. (clause 2.2).</li> <li>6. Material specification for Steel Sheets, Foam, Glass etc. added. (clauses 4.1.3, 4.1.7, 4.2.4, 4.2.6, and 4.3.3).</li> <li>7. Maximum force required for opening of doors reduced from 50 to 80 Newton's to 5 to 6 Kgs. (clause 4.1.17).</li> </ol>	17.10.2011
04	<ol style="list-style-type: none"> <li>1. The supplier shall give warranty for the complete system including individual parts against failing or proving unsatisfactory in service due to defective design, material or workmanship within 84 months from the date of supply or 72 months from the date of commissioning of coach, whichever is earlier and shall replace the same at his own cost and risk. (clause 8.1).</li> </ol>	20.04.2019

  
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**1. Scope :**

This specification covers the general and technical requirements of Auto sliding door assemblies for LHB type coaches.

- 1.1 The tenderer shall submit clause wise comments to this specification and Submit deviation in the offer, if any RCF reserve the right to summarily reject the offers submitted without clause wise comments.

**2. Scope of supply:**

2.1 General arrangement, mounting and scope of supply shall be as per following:

S. No.	Description	Mounting drawing	QPC	Remarks
1.	<b>Stainless steel single leaf auto sliding doors:</b>			
(a)	Auto sliding door, mounting for entrance to AC area of AC chair car	1 10113.0.22.135.001 alt 'Nil'	1	Set of Two Doors
(b)	Mounting arrangement of auto sliding doors for entrance to AC area of hot buffet car	LH56101	1	Set of Three Doors
(c)	Mounting arrangement of auto sliding Door for Non AC Hot Buffet Coach	LH56120	1	Set of One Door
2.	Mini pantry double leaf auto sliding door, mounting for AC Chair car, DD AC Chair car	1 10113.0.22.135.003 alt 'A'	1	Set of One Door

- 2.2 Four nos. sealing brushes as per drawing no. 3 10113.0.21.500.119 alt-A shall also be supplied with each door under 'a', 'b' and 'c' above under clause 2.1.

**3. Service/ Operating Conditions:**

The auto closing door system should function satisfactorily under the following operating conditions:

**3.1 Ambient conditions:**

- 3.1.1 -4°C to 55°C with 100% humidity and dust. Temperature variations can be quite high in the same journey or short period of time.
- 3.1.2 Altitude: Maximum 1000 meters.
- 3.1.3 Coaches may operate in areas where there may be continued exposure to salt laden air.

**3.2 Working conditions:**

- 3.2.1 Train speed : 160 KMPH (Max)
- 3.2.2 Vibration and Shocks:
- 3.2.2.1 Maximum longitudinal acceleration : 5.0g
- 3.2.2.2 Maximum vertical acceleration : 3.0g
- 3.2.2.3 Maximum lateral acceleration : 1.0g

  
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3.2.2.4 Frequency and amplitude: Sinusoidal form of vibration, the frequency 'f' lies between 1 Hz and 100 Hz and their amplitude 'a' expressed in mm is given as function of 'f' by the equation.

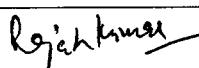
$$a = 25/f \quad \text{for values of 'f' between 1 and 10 Hz}$$

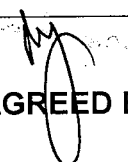
$$a = 25/f^2 \quad \text{for values of 'f' between 10 and 100 Hz}$$

#### 4. Technical Requirements:

##### 4.1 General technical requirements:

- 4.1.1. Auto closing sliding door shall have smooth running, without jerks and low noise operation.
- 4.1.2 Time delay device shall be provided to increase the closing time of door at the end of the closing stroke. It shall take about 10-20 secs. before closing. The time delay device shall be adjustable. Movement shall be very slow at the last part of the closing stroke.
- 4.1.3. Stainless steel to RDSO/Spec.-C-K:201, X5CrNi1810 or AISI:304 shall be used for construction of stainless steel parts where material grade of stainless steel has not specified.
- 4.1.4. The door shall have pleasant and good-looking appearance. Door leaf of stainless steel single leaf auto sliding door should be in Brushed Stainless steel surface finish with PVC laminated and door leaves of Al mini-pantry double leaf auto sliding door should be anodized to minimum 25µm thickness of coating.
- 4.1.5. Sealing shall be provided to prevent ingress of dust/dirt/moisture in all gaps except normal opening of the door and ventilation provided on the door. (Both in closed and open position).
- 4.1.6. Suitable rubber packing with adequate softness and durable shall be provided at the end of door leaves to ensure that the passengers are not hurt during closing of the door.
- 4.1.7. Bearing sheet to material spec. RDSO/Spec.-C-K:201, X2CrNi12 (409 M) for upper guidance shall be powder coated as per IS:13871-93 Gr. A-& colour to RAL-7006.
- 4.1.8. Upper Guidance shall be provided with guide rod of En 31 material with the following:
  - a. Guide rod to be chrome plated to 20 to 25 micron, as approved by RCF.
  - b. Straightness= within 0.5 mm on 1 meter length.
  - c. Concentricity= ±2 micron.
  - d. Hardness= HRC 50 to 55.
  - e. Guide rod should be smooth buff finished (N3) after chrome plating. Finished diameter should be compatible with Linear Motion Bearings to ensure frictionless & shock free operation of the door.
- 4.1.9. Linear Motion Bearing of make IKO-LK-3050 of M/s Nippon Thompson Co. Ltd. Japan or HP3050 of M/s HPJ Japan with metallic cage (or as approved by RCF) shall be provided for stainless steel doors. Linear Motion Bearing of make IKO-LK-2550 of M/s Nippon Thompson Co. Ltd. Japan or HP2550 of M/s HPJ Japan with metallic cage (or as approved by RCF) shall be provided for mini pantry doors.

  
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- 4.1.10. Circlip fitted for Linear Motion Bearing may be selected so as it will not touch and graze guide rod during running of the door.
- 4.1.11. Stainless steel electrode of same composition as per table-3 of RDSO/SPEC.CK:201 to be used for welding.
- 4.1.12. All welded joints shall be grinded and burns to be removed.
- 4.1.13. All welding joints to be pickled and passivated.
- 4.1.14. All sharp edges and corners shall be rounded off.
- 4.1.15. All hardware items and assembly of stainless steel items (for which finish has not specified) shall have dull satin finish as per IS: 6911-1992 table 8 finish no.6.
- 4.1.16. Move mechanism should have been tested for endurance simulating actual working strokes on coach for 350000 continuous cycles. At the end of endurance test, there should not be any deterioration in performance of any component. The supplier should have their own auto closing test stand with digital counter for above-mentioned endurance test. Supplier should submit the test result to RCF along with prototype. Alternatively supplier shall get the door tested from a reputed firm/laboratory for endurance testing and shall submit a certificate to RCF in this regard.
- 4.1.17. The maximum force necessary for opening the door shall be 5 to 6 Kgs. The supplier should have their own arrangement for measuring the force necessary for opening the door and shall submit a certificate along with prototype.
- 4.1.18. Fire characteristics of the unit shall be as per appendix-6 of UIC 564 (2).
- 4.1.19. Weight of complete door assembly shall not exceed the following:

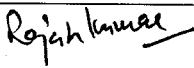
<b>S. No.</b>	<b>Description</b>	<b>Weight per door assembly</b>
1.	For Stainless steel single leaf auto sliding door for entrance to AC area of AC chair car including Hot buffet coach.	60 Kgs.
2.	Mini pantry double leaf Auto sliding door.	48 Kgs.


The supplier should have their own arrangement for measuring weight of complete door assembly and shall submit a certificate along with prototype.

- 4.1.20. Cross-sectional area available for ventilation in louvers shall be 0.124 sq. m (Approx.) for stainless steel single leaf auto sliding door and 0.082 sq. m (Approx.) for mini pantry double leaf auto sliding door. The supplier shall submit a certificate of actual cross-sectional area along with prototype.

#### **4.2 Construction of stainless steel single leaf auto sliding door for entrance to AC area of AC chair car and AC/ NAC hot buffet car:**

- 4.2.1. General arrangement of the door shall be as per their reference drawings.

  
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<b>Sr. No.</b>	<b>Item</b>	<b>Description</b>
4.2.2.	<b>Door Assembly</b>	A self contained module consisting of a single leaf sliding door, a move mechanism presenting manual opening and automatic closing, the upper and lower guides for sliding door leaf and the mounting frame into which this integral unit is assembled.
4.2.3.	<b>Module characteristic and mounting details</b>	The max. size and mounting details of modular unit shall be as per their reference drawing.
4.2.4.	<b>Door leaf</b>	Door leaf shall be made up of sandwich construction of stainless steel frame with stainless steel sheet of AISI 304 of 1 mm thick on both sides filled with rigid phenolic foam to: 1S:13204-1991 density 30 Kg/M <sup>3</sup> inside the door leaf. Supplier shall submit P.O. specific WTC from OEM in support to this.
4.2.5.	<b>Louvers</b>	Stainless steel louvers shall be fitted on the door with EPDM rubber profile to MDTS:030 (in black colour, shore hardness 65±5).
4.2.6.	<b>Glass</b>	8 mm thick laminated safety transparent glass as per IS: 2553 (part-1)-1990, Type-c and Quality-AA shall be fitted on the door with EPDM rubber profile to MDTS:030 (in black colour, shore hardness 65±5 ).
4.2.7.	<b>Door handle</b>	The door shall be provided with D-type stainless steel handles on both sides of the door leaf as per drawing no. LA56140.
4.2.8	<b>Locking</b>	Door shall be provided with a square key lock, which shall be operated from both inside and outside (Both in opened and closed position).
4.2.9	<b>Lower Guidance</b>	'T' type lower guidance's shall be provided as per RCF drawing nos. LD56143 and LD56144.
4.2.10	<b>Upper Guidance and move mechanism</b>	Upper Guidance and move mechanism shall be as per reference drawing.

#### 4.3. Construction of mini pantry double leaf auto sliding door:

4.3.1. General arrangement of the door shall be as per drawing no 1 10113.0.22.135.003 alt 'A'

<b>Sr. No.</b>	<b>Item</b>	<b>Description</b>
4.3.2.	<b>Door Assembly</b>	A self contained module consisting of a double leaf sliding door, a move mechanism presenting manual opening and automatic closing, the upper and lower guides for sliding door leaves and the frame into which this integral unit is assembled.
4.3.3.	<b>Door leaf</b>	Door leaves shall be made up of sandwich construction of Al

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		extrusion with 2 mm thick Al sheet (Gr. 31000 H2) on both sides filled with rigid phenolic foam to IS:13204-1991 density 30 Kg/M <sup>3</sup> inside the door leaf.
4.3.4.	<b>Door handle</b>	The door shall be provided with internal stainless steel handle and aluminum casting handles on the exterior of door leaves.
4.3.5.	<b>Locking</b>	<ul style="list-style-type: none"> <li>• Door shall be provided with a square key lock, which shall be operated from both inside and outside (Both in opened, and closed position)</li> <li>• Provision shall be made for pad locking from outside of the door leaves.</li> </ul> (As shown in drawing no. 1 10113.0.22.135.014)

**5. Marking:**

The supplier shall fix metallic stickers on each door mentioning name of the supplier and month and year of manufacture and supply of the door to RCF. These stickers shall not be visible to the passengers easily.

**6. Mechanical strength requirements:**

6.1. The passenger coaches running on Indian Railways are designed for a service life of 30 years. The door is to be developed and assembled accordingly.

**7. Resistance to vermin:**

Selection of the materials (insulation, sealant, rubber etc.) should be done with due consideration to their resistance to vermin (e.g. termites).

**8. Warranty:**

- 8.1 The supplier shall give warranty for the complete system including individual parts against failing or proving unsatisfactory in service due to defective design, material or workmanship within 84 months from the date of supply or 72 months from the date of commissioning of coach, whichever is earlier and shall replace the same at his own cost and risk. Date of dispatch of the coach from RCF shall be taken as the date of commissioning of the coach.
- 8.2 However items used in the system will have an on site warranty of 10 years against corrosion.
- 8.3 In the event of 'non-satisfactory performance' of any of the items as indicated above, supplier will have to replace the same at his own expense and also bear the cost involved in transportation, handling and replacement of each items.

**9. Annual Maintenance and Operation Contract (AMOC):**

- 9.1 The supplier must express his willingness to enter into an Annual Maintenance and Operation Contract with Railways for a 3 years period after expiry of guarantee period. Indian Railways and tenderer will separately or mutually decide terms of this AMOC.
- 9.2 RCF reserves the right to reject the offers received without separate quote for AMOC.

  
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9.3 Tenderer shall ensure availability of all spares for a period of minimum 10 years from the date of commissioning. This shall be irrespective of the fact. whether the tenderer has stopped manufacture of the door to the design supplied to IR.

10. **Recommended spare parts detail required for 5 years:** The offer shall include recommended list of spare parts required for day to day maintenance of the auto sliding door equipments and spares in the form of kit for various sub-assemblies for the maintenance at the time of POH. The list shall give the batch number/part number, quantity and price of each component.

**11. Documents to be submitted by supplier for prototype approval:**

The following documentation for the assemblies of the door is to be prepared by the supplier for submission along with the prototype assembly:

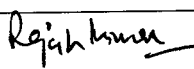
- 11.1. A set of drawings with complete details of material specification/make consisting of drawings and parts lists.
- 11.2. Complete maintenance manual including trouble shooting and dismantling instructions in paper and electronic form with:
  - 11.2.1. Recommended maintenance schedule,
  - 11.2.2. Any special tool required.
- 11.3. WTC for material will be submitted with prototype.

**12. Testing of prototype and regular production assemblies:**

- 12.1 The supplier shall supply one prototype of door along with the documents indicated above for approval before commencing bulk supply. The prototype and drawings shall be examined from all viewpoints and this shall be fitted on the coach/mock-up for checking the smooth running and proper fitment/functioning of the door. Supplier shall incorporate changes suggested by RCF in the prototype as well as bulk supply. The bulk manufacture shall be undertaken only after the approval of prototype.
- 12.2. **Fire Test:** The door shall be tested for fire retardance as per appendix-6 of UIC-564. The supplier shall test the fire retardance as per UIC-564 and shall supply a test report from a reputed laboratory in this regard. This clause is applicable for first supply of a supplier. However, RCF shall have the right to repeat prototype approval process in subsequent order also. In this regard, RCF decision shall be final.

**13. Up gradation of design:**

Supplier may offer alternate design of doors for all the above or any of the above clauses with a view to upgrade the design. The supplier in such case shall give clause wise justification. Doors having lower weight shall be preferred. Specification details may be deviated from those specified above, if sufficient technical justification is available. However, RCF's decision on all such matters shall be final.

  
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## 14. List of applicable drawings:

S. No.	Description	Drawing No.
<b>Applicable drawings for stainless steel single leaf auto sliding doors:</b>		
1.	Saloon sliding door mounting	1 10113.0.22.135.001
2.	Passenger room door, WE1. complete	1 10113.0.22.135.010
3.	Passenger room door, WE2. complete	1 10113.0.22.135.011
4.	Sealing brush	3 10113.0.21.500.119
5.	Upper guidance, WE2. complete	856.001
6.	Upper guidance, WE1. complete	837.001
7.	Guide rail side	LD56143
8.	Guide rail main	LD56144
9.	Base plate	LA56132
10.	Handle tube assembly (L.H.)	LA56133
11.	Handle tube assembly (R.H.)	LA56134
12.	Stainless steel seamless tube	LA56135
13.	Stainless steel hex, socket hd. special grub screw	LA56136
14.	special stud	LA56137
15.	Saloon sliding door handle	LA56140
16.	Mounting arrangement of auto sliding doors for entrance to AC area of AC hot buffet car	LH56101
17.	Auto sliding door for entrance to AC area of AC hot buffet car R.H.	LH56105
18.	Auto sliding door for entrance to AC area of AC hot buffet car L.H.	LH56106
19.	Shim	LH56107
20.	Bearing sheet R.H.	LH56108
21.	Bearing sheet L.H.	LH56109
22.	Auto sliding door for entrance to AC area of AC hot buffet car R.H.	LH56116
23.	Bearing sheet R.H.	LH56118
24.	Mounting arrangement of auto sliding doors for entrance to non AC area of hot buffet car	LH56120
<b>Applicable drawings for mini pantry double leaf auto sliding door</b>		
25.	Sliding door, pantry mounting	1 10113.0.22.135.003
26.	Pantry door, complete	1 10113.0.22.135.014
27.	Upper guidance, complete	838.001
28.	Door leaf right, complete	838.002
29.	Door leaf left, complete	838.003
30.	Lower guidance	838.004
31.	Lower guidance	838.005

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