RAIL COACH FACTORY, KAPURTHALA

MD35131 Date: 20 10 2010

Sub: Issue of specification no. MDTS:210 Rev-00.

Please find enclosed specification no. MDTS:210 Rev-00 pertaining to 'Technical specification for supply, installation and commissioning of vestibule double leaf automatic sliding door for stainless steel Double Decker coaches'

For information and necessary action at your end.

20/10/10
(Pardeep Sharma)
SME/Dev-1

ACMT

Dy CPLE-III, Dy CQM-1, Dy CME/Fur

SSE/LIB. DESIGN

SSE/Record (With original specification)

SSE/Design/RCF/TKJ

Copy for kind information: (Without enclosure)

Dy CME/D-1

CDE

CQM, CEDE, CEE, CPLE, CWE/Fur, CWE/Shell, CMM/HSQ, CMM/TKJ

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Issue/ Rev	Detail of changes	Date
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1. Scope :

This specification covers the general and technical requirements of vestibule double leaf automatic sliding doors for Broad Gauge High speed stainless steel double decker coaches.

2. Scope of supply:

Supply, installation and commissioning of automatic sliding door as per drawing no. LD56202 along with followings:

2.1. Two nos. of door leafs.

2.2. Complete mechanism for satisfactory operation.

2.3. Required controls and circuitry.

2.4. Fire barrier frame.

2.5. Lower guidance's along with enclosure.

2.6. Any item considered necessary during prototype approval.

3. Service/Operating Conditions:

The automatic door system should function with full efficiency 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. Power supply:

3.2.1. 110 V AC (Max. 175 watts per door) supply is available in the coach with variation from 90-140 V with 15% ripple. If the system is to operate at input voltage of 110 V / 24 V DC, converter of following reputed make only should be used: i.e. M/s Siemens, M/s Bombardier, M/s Kaushal, Japan or M/s ABB and shall be provided alongwith the system by the firm.

3.2.2. Up to 175 watts total will be made available for one door.

3.3. Working conditions:

3.3.1. Train speed : 160 KMPH (Max)

3.3.2. Vibration and Shocks:

3.3.2.1. Maximum longitudinal acceleration : 5.0g

3.3.2.2. Maximum vertical acceleration : 3.0g

3.3.2.3. Maximum lateral acceleration : 1.0g

3.3.2.4. 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.

$a = 25/f$ for values of `f` between 1 and 10 Hz

$a = 25/f^2$ for values of `f` between 10 and 100 Hz

3.4. **Pneumatic Supply:**

3.4.1. Air supply can be made available at 6 Kg/cm² for the door system, if needed. Air consumption value per cycle per door shall not exceed 200 ml in such case. The tendrer shall submit air consumption of their system per cycle (of opening + closing) per door and shall submit test certificate to its verification along with prototype.

3.4.2. Air supply will not be available in some conditions of operation, such as prolonged shut down of locomotive, disruption in input air supply to door system, coach undergoing maintenance in depot etc. Under these conditions door should act as auto closing door with smooth operation, opening force should not increase more then 5 Kg.

4. Eligibility Criteria:

4.1. Tenderer should be an OEM for the offered design.

4.2. Tenderer should have supplied such automatic doors for railway coaches in the past. Satisfactory performance report from the users should also be enclosed alongwith the offer.

4.3. The tenderer should enclose list of infrastructure, M & P and specific test equipment required for manufacture and testing of doors.

4.4. Tenderer should submit clause wise comments to this specification and RCF reserves the right to summarily reject the offer without the same.

4.5 Tenderer should offer for AMOC for 3 years after expiry of warranty as per clause 12 of this specification. Tenderer should provide price breakup of AMOC clearly

specifying schedule of replacement of spares, must change spares, price of each spare and labour cost etc. in case offer received without AMOC with above details then RCF reserves the right to reject the offer.

5. Functional Requirements:

5.1. Door should be opened through door handle. Pulling/Pushing action on handle, performed in the normal opening of the manual door, should initiate the automatic opening of the door leaves. Fitment of door handle should be quite rigid and sturdy in view of abuse expected from passenger.

5.2. Once the opening of the door is initiated, it should complete the opening stroke.

5.3. After completing the opening stroke, closing shall start automatically only after a pause of 5-7 seconds or after disappearance of the obstructions in the doorway only.

5.4. Once closing starts, it should complete its closing stroke in normal operation. After the closing stroke is completed, door should remain in the closed position, unless opening action is initiated.

5.5. Opening and Closing of doors shall be automatic and time for each opening and closing stroke should be between 3 to 4 sec. or as approved by CDE/RCF.

5.6. Movement of the door shall be slower at the end of closing stroke for last 200 mm.

5.7. When the door leaf meets an obstruction in the passage during closing stroke, the door should open fully immediately and pause for 5-7 seconds and then start its closing operation.

5.8. In case of failure of electrical or pneumatic supply or controls or both, door should work as manual opening auto closing door. This means that in such case if the door is opened manually then it should close automatically. In such a case, functional feature as explained in para 5.7 to 5.10 may not work.

5.9. During closing stroke, it should be possible to open the door manually in case system of obstacle detection as explained above does not work or there is no power or pneumatic supply.

5.10. For any reason of mal functioning in electronic or pneumatic system, there should be no chance that passengers should get entrapped in the coach. Tenderer should certify the

reliability of the door system.

5.11. Door should remain in closed condition during normal train running and shall not move open up owing to centrifugal force experienced or curvatures or under normal vibrations.

6. Technical Requirements:

6.1. **General technical requirements:**

6.1.1. Move mechanism may be electrical/mechanical/pneumatic/hydraulic or a combination of these.

6.1.2. Automatic sliding doors shall have smooth running, without jerks and low noise operation. Manual opening force shall not be more than 4-5 kg.

6.1.3. Sealing shall be provided to prevent ingress of dust/dirt/moisture in all gaps except normal opening of the door. (Both in closed and open position).

6.1.4. Suitable rubber packing with adequate softness and durability shall be provided at the end of door leaves to ensure that the passengers are not hurt during closing of the doors.

6.1.5. The doors shall have pleasant and good looking appearance and door leaf should be in Brushed Stainless steel surface finish.

6.1.6. Move mechanism should have been tested for endurance simulating actual working strokes on coach for 350000 (three hundred & fifty thousand) continuous cycles. At the end of endurance test, there should not be any deterioration in performance of any component. The supplier shall get the doors tested from a reputed firm/laboratory or with required setup at his own premises for endurance testing and shall submit a certificate to RCF in this regard. Alternatively supplier should have their own automatic test stand with digital counter for above mentioned endurance test and should submit the test result to RCF alongwith prototype.

6.1.7. The maximum force necessary for opening the door manually shall not be more than 5 kg when measured with a spring balance of 0-10 kg.

6.1.8. Fire characteristics of the unit shall be as per appendix-6 of UIC 564 (2).

6.1.9. Weight of complete door assembly as per above scope of supply must not exceed

100 Kgs.

6.2. **Construction:**

Sr. No	Item	Description
6.2.1.	**Door Assembly**	A self contained module consisting of two leaves of sliding door, an automatic move mechanism actuating automatic opening and closing, the upper and lower guides for sliding door leaves and the mounting frame into which this integral unit is assembled. Anti-fire materials shall be used in vestibule double leaf automatic sliding door in order to guarantee the fire resistance, as well as acoustic and thermal insulation feature and to insulate the coach object.
6.2.2.	**Module character-istic and mounting details**	• The max. size of modular unit shall be: 2300 mm (length) x 70 mm (width) x 2080 mm (height) and there shall be 650 mm (length) x 135 mm (width) x 200 mm (height) envelop for move mechanism in the middle portion to accommodate control accessories on the door operating mechanism. • Clear opening of the door shall be at two positions of door opening 1. 675 mm (width)X 1960 mm (height) for Double Decker chair car. 2. 770 mm (width)X 1960 mm (height) for other coaches.
6.2.3.	**Door leaf**	• 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 IS:13204-1991 density 30 Kg/M^3 inside the door leaf. As per para 4.2.5 of UIC-564-2 OR, the end doors shall be fire prevention door i.e. in case of fire, spreading of fire, smoke and heat shall be avoided for 15 minutes, so that fire is prevented from developing in adjacent rooms. • In the lower part, the door leaves shall be equipped by sliding blocks

		made by Teflon (Material used for its feature of anti-friction and good reaction to the fire. Which interest the lower guidance 'T' shaped.)
6.2.4.	**Glass**	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 stainless steel frame. Alternatively other railway standards can be acceptable subject to approval of CDE/RCF. Complete copy of the proposed standard should be submitted along with the tender.
6.2.5.	**Door handle**	The door shall be provided with stainless steel tubular handles equipped with movement sensors on both sides of the door leaf. Inner side door handles shall also be used for locking (including pad locking) and external handles shall be filled with locking device.
6.2.6.	**Fire barrier frame**	• The fire barrier frame is an important element for the fire resistance and insulation. • Fire barrier frame shall be composed by stainless steel profile and it houses some special bars of silicate calcium, which stressed by the temperature of a possible fire, expand up to 6 times their own volume sealing, in this way the free passage remaining between the shutters and the head wall of the vehicle. • These ones also house the horse hairs brushes which keep the insulation and which are used as sealing surface for the rear gaskets installed on the shutters. • Fire barrier frame is as per drawing nos. LW56357 and LW56358. • A locking device shall be placed inside the stainless steel special external handles that lock the doors (closed) when a 100 ° C environment temperature is generated by fire.
6.2.7.	**Locking**	• Door shall be provided a square key lock which shall be operated from both in side and out side (both in opened and closed position with provision of locking the door in open position for standard

		opening 770 mm and for reduced opening 675 mm. • Separate pad locking must be possible from inside by introducing a special shaft in the handles. • This special shaft provided for locking from inside should be connected with a stainless steel chain of adequate length to prevent loss /pilferage. The other end of the chain should be fixed with the right side door leaf. • Arrangement may be made to lock both the door leaves simultaneously to prevent the frequent breakage of belt of move mechanism.
6.2.8.	**Lower Guidance**	'T' type lower guidance's alongwith encloser as per drawing nos. LW56354, LW56355 and LW56356 shall be provided. Alternate design is also acceptable subject to approval of CDE/RCF.
6.2.9.	**Upper guide & move mechanism**	• Maximum space for upper guide and move mechanism shall be 2300 mm (length) x 70 mm (width) x 200 mm (height) with provisions specified in Sr no. 6.2.2 above to accommodate control accessories of the door operating mechanism.

7. Training :

The supplier shall provide training to RCF and Zonal Railway maintenance personnel (against each P.O.) in installation, operation trouble shooting, repairs and preventive maintenance of the automatic door system at his own cost. Min. 3 days training shall be imparted at base depot to at least two technicians of each primary depot where coaches fitted with these doors are being maintained.

8. 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 doors to RCF. These stickers shall not be visible to the passengers easily. Notices for user and maintenance personnel shall also be supplied for fixing in the coach, as decided between the supplier and consignee.

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9. Interface Requirements:

9.1. **Interface with the car body:**

The fixing dimensions, tolerances and mounting arrangement of doors shall be as per drawings indicated at clause 2 of this specification.

9.2. **Pneumatic Interfaces:**

9.2.1. The compressed-air system of the vehicle provides air at a maximum pressure of 6 Kg/cm² from feed pipe of air brake system through a 75 ltr capacity reservoir (For LHB coaches)

9.2.2. The supplier, if required, should provide suitable air filter cum lubricator.

10. Mechanical strength requirements:

10.1. Door shall meet the mechanical strength requirements as per UIC 566. Supplier shall supply a certificate from a reputed laboratory in this regard.

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

10.3. 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).

11. Warranty:

11.1. The supplier shall give warranty for the complete or part of door, for failing or proving unsatisfactory in service due to defective design, material or workmanship within 36 months from the date of regular supply or 24 months from the date of commissioning the coach. Date of dispatch of the coach from RCF shall be taken as the date of commissioning of the coach.

11.2. However items used in the system will have an on site warranty of six years against corrosion.

11.3. 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.

12. Annual Maintenance and Operation Contract (AMOC):

12.1. 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.

12.2. RCF reserves the right to reject the offers received without separate quote for AMOC.

12.3. 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 doors to the design supplied to IR.

13. 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 automatic 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.

14. Documents to be submitted by supplier for prototype approval:

14.1. The following documentation for the assemblies of the doors are to be prepared by the supplier for submission along with the prototype assembly:

14.2. A set of drawings consisting of drawings and parts lists.

14.3. Clearly organized instructions for mounting and adjusting the door, changing the door and wearing parts.

14.4. Complete maintenance manual including trouble shooting and dismantling instructions in paper and electronic form with:

14.4.1. Recommended maintenance schedule.

14.4.2. Any special tool required.

15. Testing of prototype and regular production assemblies:

15.1. 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 view points and this shall be fitted on the coach/mock-up for checking the smooth running and proper fitment/functioning of the doors. 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.

15.2. **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 certificate from a reputed laboratory in this regard.

Test report of fire behavior of a door according to standard ISO:834, document no. 132581 total 13 pages is enclosed herewith for reference only.

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.

16. List of enclosed drawings and documents for reference:

S. No.	Description	Drawing No.
1.	Mounting arrangement of vestibule double leaf automatic sliding door	LD56202
2.	Door left complete	LW56351
3.	Door right complete	LW56352
4.	Door mechanism complete	LW56353
5.	Guide rail side	LW56354
6.	Guide rail middle	LW56355
7.	Guide rail encloser	LW56356
8.	Vertical sealing frame complete	LW56357
9.	Upper sealing frame complete	LW56358
10.	Locking pin internal	LW56359
11.	Right door sheet	LW56360
12.	"C" Channel assembly	LW56361
13.	Handle	LW56362
14.	Back piece for handle	LW56363
15.	Bottom strip	LW56364
16.	Gasket male door R.H.	LW56365
17.	Glass clamp inner	LW56366

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18.	Glass clamp outer	LW56367
19.	Gasket glass	LW56368
20.	Glass	LW56369
21.	Rail guide bottom	LW56370
22.	Rubber pad bottom	LW56371
23.	Screw female for handle	LW56372
24.	Screw male for handle	LW56373
25.	Wiper gasket side	LW56374
26.	Left door sheet	LW56375
27.	Gasket female	LW56376
28.	Gasket fixing plate	LW56377
29.	"C" channel top	LW56378
30.	"C"channel door-1	LW56379
31.	"C" channel gasket female	LW56380
32.	"C" Channel gasket male	LW56381
33.	"C"channel wiper gasket	LW56382
34.	"C"channel door-2	LW56383
35.	"C"channel door glass frame	LW56384
36.	"C"channel bottom	LW56385
37.	Locking pin external	LW56386
38.	Mounting plate	LW56387
39.	"C" Channel assembly for door right complete	LW56476
40.	Channel assembly	LW56521
41.	Stopper complete	LW56522
42.	Channel for stopper	LW56523
43.	Flat for stopper	LW56524
44.	Test report of fire behavior of a door according to standard ISO:834 total 13 pages	Document no. 132581

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