

**DESIGN, MANUFACTURE, SUPPLY, TESTING, COMMISSIONING AND
TRAINING OF 24 Nos. OF STANDARD GAUGE CARS FOR AIRPORT METRO EXPRESS
PROJECT**

TENDER 'RS14 Dev.'

Addendum No. 2

Tender Document: Tender 'RS14 Dev.': Addendum No. 2

Part, Section, Description, Clause, Location etc.	Amendments				
<ul style="list-style-type: none"> • Volume 1 • Notice of Invitation to Tender • Page 4 of 8 	<p><u>Replace</u> “</p> <table border="1" data-bbox="475 447 1409 512"> <tr> <td>Last date of issuing addendum and DMRC's response to queries</td> <td>01.10.2019</td> </tr> </table> <p>”</p> <p><u>With</u> “</p> <table border="1" data-bbox="475 625 1409 772"> <tr> <td>Last date of issuing addendum and DMRC's response to queries</td> <td>Before last date & time of submission of tender on https://eprocure.gov.in/eprocure/app</td> </tr> </table> <p>”</p>	Last date of issuing addendum and DMRC's response to queries	01.10.2019	Last date of issuing addendum and DMRC's response to queries	Before last date & time of submission of tender on https://eprocure.gov.in/eprocure/app
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<ul style="list-style-type: none"> • Volume 1 • Initial Filter Evaluation Criteria • (A) Filter of Application-Checklist • Note No. 9 	<p><u>Replace</u> “</p> <p>Propulsion Equipments (Traction Converter Inverter, Auxiliary Converter Inverter and Traction Motor) shall be developed indigenously with ‘Local content’ defined under public procurement Order, 2017 having minimum ‘Local content’ of 50% as per mandatory conditions/guidelines issued by MoHUA vide letter dated 31.07.2018 from a reputed manufacturer of the Propulsion Equipment, who must have designed and Manufactured Propulsion Equipment for Metro/LRT/Sub-urban EMUs/trainsets rolling stock.</p> <p>”</p> <p><u>With</u> “</p> <p>Propulsion Equipments (Traction Converter Inverter, Auxiliary Converter Inverter and Traction Motor) shall be developed/manufactured indigenously with ‘Local content’ defined under public procurement Order, 2017 having minimum ‘Local content’ of 50% as per mandatory conditions/guidelines issued by MoHUA vide letter dated 31.07.2018 from a reputed manufacturer of the Propulsion Equipment, who must have designed and Manufactured Propulsion Equipment for Metro/LRT/Sub-urban EMUs/trainsets rolling stock.</p> <p>”</p>						

<ul style="list-style-type: none"> • Volume 1 • Instructions to Tenderers • Clause No. : A1.9.2 • Page 7 of 36 	<p><u>Replace</u> “ Tenderer at the time of tendering shall be required to provide self-certification that Propulsion Equipments (Traction Converter Inverter, Auxiliary Converter Inverter and Traction Motor) shall be developed indigenously with 'Local content' defined under public procurement Order, 2017 having minimum 'Local content' of 50% as per mandatory conditions/guidelines issued by MoHUA vide letter dated 31.07.2018. Tenderer shall also provide details of the location(s) at which the Local Value Addition is proposed to be achieved. (Refer FORM OF TENDER – APPENDIX FT-17) (Absence of self certificate shall make tenderer disqualify for this tender) ”</p> <p><u>With</u> “ Tenderer at the time of tendering shall be required to provide self-certification that Propulsion Equipments (Traction Converter Inverter, Auxiliary Converter Inverter and Traction Motor) shall be developed/manufactured indigenously with 'Local content' defined under public procurement Order, 2017 having minimum 'Local content' of 50% as per mandatory conditions/guidelines issued by MoHUA vide letter dated 31.07.2018. Tenderer shall also provide details of the location(s) at which the Local Value Addition is proposed to be achieved. (Refer FORM OF TENDER –APPENDIX FT-17) (Absence of self certificate shall make tenderer disqualify for this tender) ”</p>
<ul style="list-style-type: none"> • Volume 1 • Form of Tender • Appendix FT-17 • Page 30 of 34 	<p><u>Replace</u> “ We hereby jointly and severally certify that Propulsion Equipments (Traction Converter Inverter, Auxiliary Converter Inverter and Traction Motor) shall be developed indigenously with 'Local content' defined under public procurement Order, 2017 having minimum 'Local content' of 50% as per mandatory conditions/guidelines issued by MoHUA vide letter dated 31.07.2018. ”</p> <p><u>With</u> “ We hereby jointly and severally certify that Propulsion Equipments (Traction Converter Inverter, Auxiliary Converter Inverter and Traction Motor) shall be developed/manufactured indigenously with 'Local content' defined under public procurement Order, 2017 having minimum 'Local content' of 50% as per mandatory conditions/guidelines issued by MoHUA vide letter dated 31.07.2018. ”</p>

<ul style="list-style-type: none"> • Volume 2 • Special Condition of Contract • Clause no. 34 (b) 	<p><u>Replace</u> “ Tenderer at the time of tendering shall be required to provide self-certification that Propulsion Equipments (Traction Converter Inverter, Auxiliary Converter Inverter and Traction Motor) shall be developed indigenously with 'Local content' defined under public procurement Order, 2017 having minimum 'Local content' of 50% as per mandatory conditions/guidelines issued by MoHUA vide letter dated 31.07.2018. Tenderer shall also provide details of the location(s) at which the Local Value Addition is proposed to be achieved. (Refer FORM OF TENDER – APPENDIX FT-17) (Absence of self certificate shall make tenderer disqualify for this tender)”</p> <p><u>With</u> “ Tenderer at the time of tendering shall be required to provide self-certification that Propulsion Equipments (Traction Converter Inverter, Auxiliary Converter Inverter and Traction Motor) shall be developed/manufactured indigenously with 'Local content' defined under public procurement Order, 2017 having minimum 'Local content' of 50% as per mandatory conditions/guidelines issued by MoHUA vide letter dated 31.07.2018. Tenderer shall also provide details of the location(s) at which the Local Value Addition is proposed to be achieved. (Refer FORM OF TENDER –APPENDIX FT-17) (Absence of self certificate shall make tenderer disqualify for this tender)” ”</p>
<ul style="list-style-type: none"> • Volume 1 • Instructions to Tenderers • Clause no. A.9 	<p><u>Replace</u> “ For any increase in quantity, Employer may exercise the option on any date before one year of the scheduled delivery of last train sets. ”</p> <p><u>With</u> “ For any increase in quantity, Employer may exercise the option on any date before six months of the scheduled delivery of last train sets. ”</p>

<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 1.3.1 • Page 6 of 80 	<p><u>Replace</u> “ At present, DMRC has 8 trains supplied by CAF for the existing Airport Express line. In order to have uniformity of spares/equipment with respect to the existing Rolling Stock for the section, the contractor shall supply rolling stock with items having similar specifications. ”</p> <p><u>With</u> “ At present, DMRC has 8 trains supplied by CAF for the existing Airport Express line. In order to have uniformity of spares/equipment with respect to the existing Rolling Stock for the section, the contractor shall endeavor to supply rolling stock with items having similar performance specifications. ”</p>
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 1.3.2 • Page 6 of 80 	<p><u>Replace</u> “ In case the contractor proposes to use a different make/type of equipment/subsystem other than that provided in the existing Rolling Stock for the Airport Express line, the contractor shall submit their proposal to DMRC for approval. ”</p> <p><u>With</u> “ Deleted ”</p>
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 4.1.1 (ii) • Page 40 of 80 	<p><u>Replace</u> “ The sections and plates shall be joined together by MIG type welding. If possible, such as for roof and underframe parts for example, automatic welding systems shall be used. For the remaining parts a semi-automatic system shall be used. ”</p> <p><u>With</u> “ The sections and plates shall be joined together by MIG type or other appropriate type welding proven for such designs. If possible, such as for roof and underframe parts for example, automatic welding systems shall be used. For the remaining parts a semi-automatic system shall be used. ”</p>
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 4.1.1 (xi) • Page 41 of 80 	<p><u>Replace</u> “ The carbody structure shall be designed, calculated and tested to achieve a service life of at least 30 years under normal operating conditions. ”</p> <p><u>With</u> “ The carbody structure shall be designed, calculated and constructed to</p>

	achieve a service life of at least 30 years under normal operating conditions. ”
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 4.1.6 (iii) • Page 42 of 80 	<p><u>Replace</u> “ (1 ± c)g vertical (Where c=2 at the ends and c=0.5 at the centre of the car). The sizing of the joint between the different units and the carbody shall be executed following the guidelines in standard UIC 566 and the recommendations of report ORE B106 RP-3. ”</p> <p><u>With</u> “ (1 ± c)g vertical (Where c=2 at the ends and c=0.5 at the centre of the car). The sizing of the joint between the different units and the carbody shall be executed following the guidelines in standard UIC 566 and EN12663. ”</p>
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 5.5.2 • Page 48 of 80 	<p><u>Replace</u> “ Axle bearings shall have a minimum life rating of 3 million kilometers. ”</p> <p><u>With</u> “ Axle bearings shall be of a proven type. The roller bearings shall have a minimum life rating of 3 million kilometers when computed in accordance with the method given in ISO 281/1. ”</p>
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 5.5.3 • Page 48 of 80 	<p><u>Replace</u> “ The axle journal diameter shall be 130mm. ”</p> <p><u>With</u> “ Deleted ”</p>
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 5.8.3 • Page 49 of 80 	<p><u>Replace</u> “ The levelling system for the secondary suspension for each car shall consist of three valves. Minimum two valves shall be located in one bogie (one for each airspring). ”</p> <p><u>With</u> “ The levelling system for the secondary suspension for each car shall consist of four valves. Minimum two valves shall be located in one bogie (one for each airspring). ”</p>

<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 5.10.3 • Page 50 of 80 	<p>Add following after 5.10.3</p> <p>“</p> <p>5.11 Dynamic Requirements</p> <p>5.11.1 Suspension characteristics shall be selected so as to avoid resonance between the various elements of the vehicle system including the car body. Bogie and body frequencies shall be suitably separated.</p> <p>5.11.2 All vehicles shall be so designed that no part of the car shall infringe the Kinematic Envelope at any speed up to 135 kmph.</p> <p>5.11.3 The bogie suspension, in conjunction with the car body, shall be designed to enable cars to operate satisfactorily on track with the maximum specified track twist along with the maximum track twist on the transition curve. The maximum off loading of wheels ‘$\Delta Q/Q$’ shall not exceed 50% of nominal wheel load in both inflated and deflated conditions up to maximum permissible speed during oscillation trials. Wheel unloading test for twisted track shall be carried out as per clause 4.1.3.4 of EN 14363. For this purpose, bogie twist shall be taken as per clause 4.1.3.4. The bogie twist and body twist will be combined as per Figure 2 of EN 14363. The maximum limit of wheel unloading permitted for this test is 0.6. All hydraulic dampers and anti roll bar have to be disconnected before the test. Measurement of static wheel force would be carried out as per clause 4.5 of EN 14363 under tare and fully loaded condition. The wheel forces for each wheel, each bogie and each axle shall be recorded for each type of coach and checked for acceptability.</p> <p>5.11.4 The axle yaw stiffness, and the rotational resistance of the complete bogie shall be such that lateral flange forces generated when negotiating the track alignments for the route specified are not so high as to lead to excessive rail wear and wheel flange wear and noise, but shall be sufficient to obviate bogie or wheel set hunting. The design of primary elasticities and other suspension systems should be such as to minimize lateral and vertical quasi-static forces in curves.</p> <p>5.11.5 The Contractor shall submit calculations to confirm that the derailment quotient Y/Q over a period of 1/20 second shall not exceed 1.0 at rail-wheel level under the most adverse conditions, where Y & Q are the instantaneous lateral force on the wheel flange and the instantaneous vertical load on that wheel tread respectively. The computer simulation would be carried out as per Annexure B of EN 14363.</p> <p>5.11.6 The bogie rotational resistance (X factor) test under inflated and deflated and tare and fully loaded conditions would be carried out on each type of coach at the manufacturers works, as per Para 4.4 of EN 14363. The judgement criteria shall also be as per EN 14363.</p> <p>5.11.7 Sway test shall be carried out by contractor as per para 4.3 in standard EN 14363:2005. Method 1 (section 4.3.3.1 in EN 14363:2005) shall be adopted.</p> <p>5.11.8 Vehicle Dynamic Analysis of Bogie: A Dynamic Analysis, to evaluate the running behavior of the</p>
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	<p>vehicle with the proposed bogie design, shall be carried out by means of theoretical calculations applying multi-body simulation techniques. Proven validated software shall be used. The following parameters, at the minimum, shall be evaluated / analyzed.</p> <ul style="list-style-type: none"> (i) Natural frequencies of the suspension. (ii) Stability of the vehicle. (iii) Bogie frame accelerations (iii) $\Delta Q/Q$ for the track twist. (iv) Bogie rotational resistance. (v) Wheel wear index at the tread and flange. (vi) Derailment quotient Y/Q. (vii) Carbody accelerations. (viii) Ride Index (ix) Curving capability and any tendency to hunt. <p>The Contractor shall submit a proposal covering the scope of the analysis and the model for review by the Engineer.”</p>
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 6.1.8 • Page 51 of 80 	<p><u>Replace</u> “ The nominal Main Reservoir Pipe air pressure shall be 10 bar. The nominal air pressure for all pneumatic air controls shall be 5.5 bar. ”</p> <p><u>With</u> “ The nominal Main Reservoir Pipe air pressure and nominal air pressure for all pneumatic air controls shall be decided during design stage. Contractor shall provide the details to engineer for review and approval during design stage. ”</p>
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 8.1.9 • Page 58 of 80 	<p><u>Add the following after ERTS clause no. 8.1.9</u> “ 8.1.10 Harmonics emitted by the train and complete fleet operating in the system, including feed extended zone shall be compatible with the voltage distortion limits specified in IEC 61000-3-6 & IEEE 519-1992, 2014 and shall be validated as type test. ”</p>
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 9.1.3 • Page 61 of 80 	<p><u>Replace</u> “ The Auxiliary converter shall be fed from a transformer secondary winding. The Auxiliary converter shall be independent of the propulsion system, i.e. it should still available in case of a failure of the traction converter. A battery charging unit shall be integrated into the ACU. ”</p> <p><u>With</u> “ The Auxiliary converter shall be fed from a transformer tertiary/secondary winding. The Auxiliary converter shall be independent of the propulsion system, i.e. it should still available in case of a failure of the traction converter. A battery charging unit shall be/shall not be</p>

	<p>integrated into the ACU.</p> <p>”</p>		
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 9.1.7 • Page 61 of 80 	<p><u>Replace</u></p> <p>“</p> <p>The units shall be cooled by forced air. The externally mounted fans and the air duct shall be integral parts of the onboard converter. The heat sinks shall be partitioned so that the individual modules can be easily removed and replaced.</p> <p>”</p> <p><u>With</u></p> <p>“</p> <p>The units shall be natural cooled / cooled by forced air. For forced air type cooling, the externally mounted fans and the air duct shall be integral parts of the onboard converter. The heat sinks shall be partitioned so that the individual modules can be easily removed and replaced.</p> <p>”</p>		
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 9.2.1 • Page 61 of 80 	<p>Add the following after clause no. 9.2.1</p> <p>“</p> <p>Note: The contractor can also propose any other international standard already accepted by DMRC/any other Indian metro for auxiliary converter.</p> <p>”</p>		
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 9.2.1 • Page 62 of 80 	<p><u>Replace</u></p> <p>“</p> <table border="1" data-bbox="475 1146 1409 1272"> <tr> <td data-bbox="475 1146 943 1272"> <p>UL 94-V0</p> </td> <td data-bbox="943 1146 1409 1272"> <p>Test for Flammability of Plastic Materials for Parts in Devices and Appliances</p> </td> </tr> </table> <p>”</p> <p><u>With</u></p> <p>“</p> <p>Deleted</p> <p>”</p>	<p>UL 94-V0</p>	<p>Test for Flammability of Plastic Materials for Parts in Devices and Appliances</p>
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<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 9.3.5 • Page 62 of 80 	<p><u>Replace</u></p> <p>“</p> <p>The battery charger unit shall be consists of a DC/DC converter which shall be connected to the stabilised DC-link. A high frequency transformer shall be used to ensure the galvanic isolation of the battery output.</p> <p>”</p> <p><u>With</u></p> <p>“</p> <p>The battery charger unit shall be of either DC/DC converter type or AC/DC rectifier type. A suitable transformer shall be used to ensure the</p>		

	galvanic isolation of the battery output. ”
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 9.8.3 • Page 63 of 80 	<p><u>Replace</u> “</p> <p>In addition the power semiconductors shall be protected against transient over-voltages by a varistor (MOV) in the input filter. ”</p> <p><u>With</u> “</p> <p>If applicable for proposed equipment design, the power semiconductors shall be protected against transient over-voltages by a varistor (MOV) in the input filter. ”</p>
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 9.9.3 • Page 63 of 80 	<p><u>Replace</u> “</p> <p>The fans shall be mounted on the opposite sides and shall be equipped with a coarse filter. ”</p> <p><u>With</u> “</p> <p>In case of forced air cooling type is proposed, the fans shall be mounted on the opposite sides and shall be equipped with a coarse filter ”</p>
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 9.11.1 • Page 64 of 80 	<p><u>Replace</u> “</p> <p>The battery shall be of adequate capacity , in the event of the failure of the main electric supply, provide power to the following for the duration specified as per NFPA 130 and/or EN 45545:</p> <p style="padding-left: 40px;">(i) Saloon lighting in emergency, (ii) Headlight and side marker lights, (iii) All train control, communication and emergency equipment. ”</p> <p><u>With</u> “</p> <p>The backup battery shall utilise a sufficient number of cells to ensure that it is capable of:</p> <p style="padding-left: 40px;">i. Maintaining full DC loads when the train runs over neutral sections of the overhead line.</p> <p style="padding-left: 40px;">ii. Supply emergency load for at least 60 minutes (with doors open and close every two minutes) in case of failure of battery charger or its supply with the battery charged to a level as expected during service but not better than 80% of its full capacity. Contractor shall also demonstrate that at any time of service, stage of charge shall not be less than 80%, before the voltage level at any device falls below 30 percent of nominal voltage Non-essential load shall be shed after 30 seconds of failure of battery charge supply. This feature shall be</p>

	demonstrated during testing.”
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 9.11.1 • Page 64 of 80 	<p><u>Add following after ERTS clause no. 9.11.1</u></p> <p>“</p> <p>9.11.2 Emergency loads shall include, but need not be limited to:</p> <ul style="list-style-type: none"> i. Emergency lighting. ii. All exterior lights. iii. Ventilation fans but not air conditioning. iv. Communication systems including public address, passenger emergency alarm, surveillance system and train radio. v. Propulsion and brake controls. vi. Door controls. vii. TCMS. viii. Electric horn. ix. Driving console indicators, lighting and interlocking. x. ATP train borne equipment. <p>”</p>
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 11.3 • Page 67 of 80 	<p><u>Replace</u></p> <p>“</p> <p>The air-conditioning system shall provide a high rate of renewed air, maintenance of constant temperature and take in to account the frequent door opening and passenger density. A temperature of 25° C and relative humidity (RH) of 60% is considered to be comfortable in summer and monsoon. In winter a temperature of 18° C shall be maintained.</p> <p>”</p> <p><u>With</u></p> <p>“</p> <p>The air-conditioning system shall provide a high rate of renewed air, maintenance of constant temperature and take in to account the frequent door opening and passenger density. A temperature of 25° C and relative humidity (RH) of 60% is considered to be comfortable in summer and monsoon. In winter a temperature of 18° C shall be maintained. The external environment conditions shall be same as listed in table 13.3 (HVAC unit test criteria) of ERTS.</p> <p>”</p>
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 11.4 • Page 67 of 80 	<p><u>Replace</u></p> <p>“</p> <p>In the event of failure of air-conditioning unit/units, there shall be an arrangement for forced ventilation of the vehicles.</p> <p>”</p> <p><u>With</u></p> <p>“</p> <p>In the event of the failure of both HVACs on a car, an emergency ventilation system shall operate automatically to admit fresh air</p>

	<p>directly into the car to maintain the required oxygen level in accordance with ASHRAE 62. The induction of outside fresh air shall not be less than 10m³/h/person, under AW4 loaded train conditions. The emergency ventilation fans in the saloon shall be fed from the battery supply in the event of non-availability of SIV supply.</p> <p>”</p>
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 13.10.5 • Page 74 of 80 	<p><u>Replace</u></p> <p>“</p> <p>A load deflection test and accelerated ageing tests shall be performed to demonstrate that the spring rate of the primary suspension system and the creep rate for the materials used are within the design limits.</p> <p>”</p> <p><u>With</u></p> <p>“</p> <p>A load deflection test shall be performed to demonstrate that the spring rate of the primary suspension system for the materials used are within the design limits.</p> <p>”</p>
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 13.21.1 (iv) (a) • Page 74 of 80 	<p><u>Replace</u></p> <p>“</p> <p>The package unit (mounted on a DM car) shall be tested in a climate laboratory capable of simulating the ambient temperature and applicable heat and humidity loads.</p> <p>”</p> <p><u>With</u></p> <p>“</p> <p>The package unit shall be tested in a climate laboratory capable of simulating the ambient temperature and applicable heat and humidity loads.</p> <p>”</p>
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 13.21.3 • Page 78 of 80 	<p><u>Replace</u></p> <p>“</p> <p>Insulation resistance tests under all weather conditions shall be undertaken on all equipment, using a 1kV d.c. Megger tester. The resistance reading shall in no case be less than 100MΩ.</p> <p><u>With</u></p> <p>“</p> <p>Insulation resistance tests under all weather conditions shall be undertaken on all equipment, using a IR tester suitable for the equipment as specified in the relevant EN or IEC. The resistance reading shall in no case be less than 100MΩ.</p> <p>”</p>
<ul style="list-style-type: none"> • Volume 3 • ERTS • Clause no. 13.21.4 • Page 78 of 80 	<p><u>Replace</u></p> <p>“</p> <p>The equipment shall withstand a high potential difference of 2kV for a duration of one minute.</p> <p>”</p>

	<p><u>With</u> “ The equipment shall withstand a high potential difference of 2kV for a duration of one minute or as per relevant IEC. ”</p>
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