Chennai Metro Rail Limited
Tender Description: Design, Manufacture, Supply, Testing, Commissioning of Standard Gauge Metro Rolling Stock (78 cars) and Training of Personnel
Tender No. CMRL/PHASE II/SYS/ARE03A/2020
Tender ID: 2021_CMRL_662041_1

Addendum No. 01

S. No.	Part / Section	Clause No.	Original Bid Condition	Revised Bid Condition
1	Part 2/ Section VI	1.1	Acceptable design standards for this contact are International Standards (UIC), IEC standards, European Standards (EN), British Standards (BS), Japanese Standards (JIS), French Standards, American Standards Bureau of Indian Standards (BIS). Any other standards the Contractor wishes to substitute must first be confirmed and approved by CMRL.	Acceptable design standards for this contact are International Standards (UIC), IEC standards, European Standards (EN), British Standards (BS), Japanese Standards (JIS), French Standards, American Standards **and** Bureau of Indian Standards (BIS). Any other standards the Contractor wishes to substitute must first be confirmed and approved by CMRL.
2	Part 2/ Section VI	1.3.6	The at-grade, underground and elevated sections have ballast less track in mainline and Ballasted track in in depots.	The at-grade, underground, Madhavaram Depot and elevated sections have ballast less track and Ballasted track in Poonamalle depot. The cars shall be designed to meet the performance requirement given in ERTS Section 2.14 of this specification. The track gauge is 1435mm.
3	Part 2/ Section VI	1.3.7	Pilot Train The Pilot 3-car train shall be supplied as per the delivery schedule of the contract. Clearance for dispatch of the Pilot trains will be granted, only after successful completion of tests at the Manufacturing facility, to the entire satisfaction of the CMRL. Should any modification / alteration based on results of the tests on the Pilot be required, Contractor will be obliged to carry out necessary modifications at no additional charge on all trains. In case of any contradiction in the requirements noted in different chapters of ERTS, the specifications noted in the chapters dealing with specific sub-systems shall prevail over the specifications noted in other chapters.	Pilot Train The Pilot 3-car train shall be supplied as per the delivery schedule of the contract. Clearance for dispatch of the Pilot train will be granted, only after successful completion of tests at the Manufacturing facility, to the entire satisfaction of the CMRL. Should any modification / alteration based on results of the tests on the **Pilot train** be required, Contractor will be obliged to carry out necessary modifications at no additional charge on all trains. In case of any contradiction in the requirements noted in different chapters of ERTS, the specifications noted in the chapters dealing with specific sub-systems shall prevail over the specifications noted in other chapters.
4	Part 2/ Section VI	2.14.3.2	For a normal operation of service brake (nominal 1 m/s2) on level track from maximum speed, the rake shall brake to a standstill from 80km/h in 247m (+0, - 10%) under any Loading Conditions up to AW4 The Contractor shall demonstrate by calculations the minimum adhesion level, required to achieve the stopping distance. Reaction times (dead times of control electronics) are excluded in the measurement of the stopping distance. Reaction time should be less than 300 ms.	For a normal operation of service brake (nominal 1 m/s2) on level track from maximum speed, the rake shall brake to a standstill from 80km/h in 247m (+0, - 10%) under any Loading Conditions up to AW4 The Contractor shall demonstrate by calculations the minimum adhesion level, required to achieve the stopping distance. **Upon receipt of signal to Brake Control Unit, the application of service brake time should be less than 300 ms.** Reaction times (dead times of control electronics) are excluded in the measurement of the stopping distance.
5	Part 2/ Section VI	2.15.9.8	If wheel spin is detected in any individual axle basis, the traction equipment shall reduce power to the concerned motors of the axle. When wheel spin is corrected in any individual axle traction power shall be gradually increased to meet performance requirements per axle basis.	If wheel spin is detected in any individual axle basis, the traction equipment shall reduce power to the concerned **specific** motor of the axle. When wheel spin is corrected in the individual axle, traction power shall be gradually increased to meet performance requirements per axle basis.
6	Part 2/ Section VI	2.17.3.4. (a)	a. During Stationary condition the specified limits shall be met with all auxiliary loads operating simultaneously and shall be considered during test for noise measurement.	a. During Stationary condition, the specified limits shall be met with all auxiliary **equipment** loads operating simultaneously and shall be considered during test for noise measurement.

S. No.	Part / Section	Clause No.	Original Bid Condition	Revised Bid Condition
7	Part 2/ Section VI	2.26.1. (iv)	(iv) The train shall be designed to prevent fire propagation through the use of fire barriers in the floor, and in walls at the sides and ends and fire-resistant equipment housings. The vehicle floor shall provide a fire barrier of 30 minutes duration tested in accordance with EN45545 Part 1 to 7 (Category 4-A, Hazard level HL3) latest editions or better equivalent standard.	(iv)The train shall be designed to prevent fire propagation through the use of fire barriers in the floor, and in walls at the sides and ends and fire-resistant equipment housings. **The flammable materials will be tested according to EN45545-2 requirements.** The vehicle floor shall provide a fire barrier of 30 minutes duration tested in accordance with EN45545 Part 1 to 7 (Category 4-A, Hazard level HL3) latest editions or better equivalent standard.
8	Part 2/ Section VI	3.2		**Remove reapeated Sentence:** "Collision posts (if used) may be of stainless steel or LAHT steel to satisfy the strength requirements."
9	Part 2/ Section VI	3.4.5.2		**New Clause Inserted (Clause No.: 3.4.5.2)** **Cables and Pipes Entries Seal:** To prevent entry and ensure fool proof protection against water, dust, humidity, insulation damage/ failure, fire, vibrations, temperature variations, pull tension, noise as well as rodents etc. and increasing life of cable/ equipment, all the cables and pipe transits in all cars including rooftop shall be sealed with a suitable EPDM (Ethylene Propylene Diene Monomer) based cable and pipe sealing system. Sealing and Protection application area shall be identified and got approved from Engineer during design stage. Suitable cable transit system with EPDM should be used for holding/ retention of running power cables and control cables, HT cables at underframe.
10	Part 2/ Section VI	5.3.3	The Operator’s seating area, standing area and control arrangements shall permit the operator to carry out train operation tasks from both seating & standing position only	The Operator’s seating area, standing area and control arrangements shall permit the operator to carry out train operation tasks from both seating & standing positions ~~**only**~~.
11	Part 2/ Section VI	5.8.1	Each emergency operator’s desk shall be provided with an electrical warning horn with both high decibel and low decibel features.	Each emergency operator’s desk shall be provided with an electrical warning horn **or Electrically operated pneumatic horn** with both high decibel and low decibel features.
12	Part 2/ Section VI	6.5.6	Passenger door close circuits shall have two circuits specific to each side of the car. One circuit shall monitor closing & opening of all doors per each side of the car. Another circuit shall monitor Locking & Un-locking of all doors per each side of car. Both Door control circuits of each train side shall be designed to be totally independent from each other and shall be independent from both door control circuits of opposite side of train, ensuring that failure of any door control circuit on one train side shall not affect the door operation on other train side.	Passenger door **control** circuits shall have two circuits specific to each side of the car. One circuit shall monitor closing & opening of all doors per each side of the car. Another circuit shall monitor Locking & Un-locking of all doors per each side of car. Both Door control circuits of each train side shall be designed to be totally independent from each other and shall be independent from both door control circuits of opposite side of train, ensuring that failure of any door control circuit on one train side shall not affect the door operation on other train side.
13	Part 2/ Section VI	9.4.10	9.4.10 For maintenance purpose, there shall be additional by-pass ground switch in auxiliary converter inverter box duly interlocked with safety locks. Contractor shall submit the detail document for Engineer's review during design stage. (CDRL 9-24) 9.4.9 Smoke detectors / Heat detectors/LHD/other better heat detection systems shall be provided inside the Auxiliary Converter Inverter boxes, battery charger and in Battery Charger box. The status shall be linked to TCMS and communicated to RSC consoles of OCC, BCC & DCCs as Audio and Visual Alarms. Smoke and Heat detection system referred in ERTS Section 2.26 shall be complied.	9.4.10 For maintenance purpose, there shall be additional by-pass ground switch in auxiliary converter inverter box duly interlocked with safety locks. Contractor shall submit the detail document for Engineer's review during design stage. (CDRL 9-24) ~~**9.4.9**~~ Smoke detectors / Heat detectors/LHD/other better heat detection systems shall be provided inside the Auxiliary Converter Inverter boxes, battery charger and in Battery Charger box. The status shall be linked to TCMS and communicated to RSC consoles of OCC, BCC & DCCs as Audio and Visual Alarms. Smoke and Heat detection system referred in ERTS Section 2.26 shall be complied

S. No.	Part / Section	Clause No.	Original Bid Condition	Revised Bid Condition
14	Part 2/ Section VI	10.3.4	A pantograph auto-drop function which shall drop the pantograph automatically when excessive height is detected shall be provided. An indication shall be provided to the train and RSC consoles of OCC, BCC & DCC when this function has been operated. During pantograph entanglement with OHE catenary, there shall be an indication to the train operator and RSC consoles of OCC, BCC & DCC.	A pantograph auto-drop function which shall drop the pantograph automatically when excessive height is detected shall be provided. An indication shall be provided to the train **operator** and RSC consoles of OCC, BCC & DCC when this function has been operated. During pantograph entanglement with OHE catenary, there shall be an indication to the train operator and RSC consoles of OCC, BCC & DCC.
15	Part 2/ Section VI	10.11.21	Contractor shall hire a reputed Power system analysis Design Consultant with the approval of CMRL and provision shall be made for arranging minimum three presentations by design Consultant to CMRL	Contractor shall hire a reputed Power system analysis Design Consultant with the approval of CMRL and provision shall be made for arranging minimum three presentations by design Consultant to CMRL. **The Role of the Power System analysis Design consultant is as below but not limited to,** • **Power system Design Analysis shall be performed for all Corridors of Phase 2 considering 138 trains of 3 car configuration.** • **Power system Design Analysis consultant along with Rolling Stock contractor shall Interface with Railway Electrification, Power Supply contractor to comply the Design requirements of CMRL Phase 2 project.** • **The proposed consultant shall be an ISO certified consultant having past experience in Power System Analysis.**
16	Part 2/ Section VI	10.13.18	Traction motor rotor design shall be of copper material.	Traction motor rotor shall be Copper or **Aluminium** material.
17	Part 2/ Section VI	11.2.7	The bogie systems shall safely function at all speeds up to and including the safe design speed as defined in ERTS clause 2.14.1 without any loss of stability, under all conditions of track and wheel and car wear on the system as defined in ERTS Section 2.	The bogie systems shall safely function at all speeds up to and including the safe design speed as defined in ERTS clause 2.14.1 without any loss of stability, under all conditions of **track and Wheel wear** on the system as defined in ERTS Section 2.
18	Part 2/ Section VI	11.4.2	Provision shall be made in the bogie design to compensate for "creep" and keep the bogie properly leveled and trammeled.	Add below line to clause no.: 11.4.2 **JIS E 4206 & EN 13913 Standards or any other International standard can be followed by the contractor.** Provision shall be made in the bogie design to compensate for "creep" and keep the bogie properly leveled and trammeled.
19	Part 2/ Section VI	11.4.13.5	The contractor shall submit calculations to confirm that ride index lateral and vertical shall not exceed 2.75 under all normal operating conditions for worn-out cars operated on rundown track conditions (CDRL 11-7)	**The contractor shall submit calculations to confirm that ride index lateral and vertical shall not exceed 2.5 under all normal operating conditions for new cars and new track, and shall not exceed 3 under all normal operating conditions for worn-out cars operated on rundown track conditions (CDRL 11-7)**
20	Part 2/ Section VI	11.4.13.6	Bogie swing tests shall be conducted in accordance with ERTS clause 17.5.2.12 between interface of motor car and trailer car to verify the required degree of rotation (horizontally and vertically) and that cables and hoses are clear from any pinching, chafing and stretching,	Bogie swing tests shall be conducted in accordance with ERTS clause 17.5.2.12, **IEC 61133 and EN14363 or any other equivalent International standard shall be followed for** interface of motor car and trailer car to verify the required degree of rotation (horizontally and vertically) and that cables and hoses are clear from any pinching, chafing and stretching.

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21	Part 2/ Section VI	11.9.15	The Contractor shall provide and install a way side automatic wheel profile measuring system at a suitable location in CMRL maintenance depot, where the rakes are expected to be maintained. The cost of the system shall be deemed to be included in the quoted price. The equipment details shall be submitted to CMRL during Pre-final design stage, for approval The Contractor shall provide and install a way side Hot Axle measuring system in each corridor at a suitable location in consultation with CMRL. The cost of the system shall be deemed to be included in the quoted price. The equipment details shall be submitted to CMRL during Pre-final design stage for approval.	The Rolling Stock Contractor shall **interface with depot equipment contractor regarding** way side automatic wheel profile measuring system at a suitable location in CMRL maintenance depot, where the rakes are expected to be maintained. ~~The cost of the system shall be deemed to be included in the quoted price. The equipment details shall be submitted to CMRL during Pre-final design stage, for approval~~ The Contractor shall provide and install a way side Hot Axle measuring system in each corridor at a suitable location in consultation with CMRL. The cost of the system shall be deemed to be included in the quoted price. **2 Nos of equipment shall be supplied by the Contractor which will be installed in Corridor 4 network. Location details will be confirmed by CMRL during Design Execution phase.** The equipment details shall be submitted to CMRL during Pre-final design stage for approval.
22	Part 2/ Section VI	11.11.1	The bogies shall be fitted with an oil type wheel flange lubrication system of proven design in metro application. The system shall lubricate the wheel flanges while negotiating curves. The purpose of the wheel flange lubrication system shall be to reduce wear of wheel & track / rail and reduce squealing noise in curves.	STICK type Wheel flange lubricators of a proven design in EMU metro application shall be provided. Provision for fitment of Stick type WFL shall be provided for all Axles and Lubricators shall be provided for 50% of the Axles. The system shall lubricate the wheel flanges while negotiating curves. The purpose of the wheel flange lubrication system shall be to reduce wear of wheel & track / rail and reduce squealing noise in curves.
23	Part 2/ Section VI	12.4.1.a	The time required to charge up to full main reservoir line pressure of any rake consist with all reservoirs and equipment at zero pressure, shall be less than ten (10) minutes and full air suspension inflation shall be achieved in a further five (5) minutes.	When TWO (2) compressors are operated, the time required to charge up to full main reservoir line pressure of any rake consist with all reservoirs and equipment at zero pressure, shall be less than ten (10) minutes and full air suspension inflation shall be achieved in a further five (5) minutes. When ONE (1) compressor is operated, the time required to charge up to full main reservoir line pressure of any rake consist with all reservoirs and equipment at zero pressure, shall be less than twenty (20) minutes and full air suspension inflation shall be achieved in a further ten (10) minutes.
24	Part 2/ Section VI	12.6.7.3	The electric regenerative brake shall be independent for each Motor Car and faults on one car shall not adversely affect the braking performance on the other car. Each Bogie of the rake Car shall have independent Brake Electronics with independent Electro Pnuematic brake control. Detection wheel slip / wheel slide and its protection control shall be per individual axle based.	The electric regenerative brake shall be independent for each Motor Car and faults on one car shall not adversely affect the braking performance on the other car. Each Bogie of the rake shall have independent Brake Electronics with independent Electro Pnuematic brake control. Detection of Wheel slip **&** Wheel slide and its protection control shall be per individual axle based.
25	Part 2/ Section VI	12.7.2	The associated EP brake unit shall be of the energize-to-release type during Emergency Brake and energize-to-apply for other friction brake and shall contain all the pneumatic items necessary to control all applications of the friction service brakes and emergency brakes on that car.	The associated EP brake unit shall be of the energize-to-release type during Emergency Brake and energize-to-apply for other friction brakes and shall contain all the pneumatic items necessary to control all applications **and release** of the friction service brakes and emergency brakes on that car.

S. No.	Part / Section	Clause No.	Original Bid Condition	Revised Bid Condition
26	Part 2/ Section VI	13.13.6	All the interior and exterior cameras shall support for a video resolution of 1920x1080 HD and minimum 30 frames per second, minimum illumination of 0.3 lux (color), iris control, minimum 90 dB wide dynamic range (WDR) and Power Over Ethernet (POE) compliant. Cameras shall be of proven design in railway applications. The recordings from these cameras must be clear in dark, daytime, night-time and in all hours of operation even in case of non-availability of any exterior lighting. All the train cameras shall be Infra-red type or latest better type. Camera and Recorder sw shall comply CCTV Industry standards like onvif.	All the interior and exterior cameras shall support for a video resolution of **minimum** 1920x1080 HD and minimum 30 frames per second, minimum illumination of 0.3 lux (color), iris control, minimum 90 dB wide dynamic range (WDR) and Power Over Ethernet (POE) compliant. Cameras shall be of proven design in railway applications. The recordings from these cameras must be clear in dark, daytime, night-time and in all hours of operation even in case of non-availability of any exterior lighting. All the train cameras shall be Infra-red type or latest better type. Camera and Recorder sw shall comply CCTV Industry standards like onvif.
27	Part 2/ Section VI	19.32.2		**New Clause Inserted (Clause No.: 19.32.2)** **Rubber Items:** All rubber hoses, connecting pipes etc. used in pneumatic circuit shall not be required to be replaced before 5 years or major overhaul which ever later. The rubber/ rubber- metal components used in suspensions shall not be replaced before 12 years or during major overhaul of the equipment, whichever is later. All rubber hoses shall be steel reinforced for better life and reliability.
28	Part 2/ Section VI	19.51.18		**New Clause Inserted (Clause No.: 19.51.18)** **Earthing** An earth fault detection system shall be proposed by the Contractor for review. Protective devices shall also prevent fires resulting from short circuits, or other electrical defects.
29	Part 2/ Section VI	19.51.19		**New Clause Inserted (Clause No.: 19.51.19)** The Earth Concept shall such that requirement in audio frequencies used in signalling track circuits is met.
30	Part 2/ Section VI	19.51.20		**New Clause Inserted (Clause No.: 19.51.20)** All electrical circuits shall be fully insulated from the superstructure on both the positive and negative sides and the super-structure shall not be used as any portion of an earth return circuit.
31	Part 2/ Section VI	19.51.21		**New Clause Inserted (Clause No.: 19.51.21)** Earth fault protection shall be provided on control, auxiliary and traction power circuits, so that it shall be possible to continue operation for a limited period even where there is one earth fault on the circuit. For this purpose, the earthing of the circuits may be provided through the coils of earth fault detection relays and the supply battery.
32	Part 2/ Section VI	19.51.22		**New Clause Inserted (Clause No.: 19.51.22)** All electrical and electronic equipment shall be protected against surge or transient voltages caused by switching (internal or external to the Rolling Stock), lightning discharges and line voltage disturbances by the provision of suitable filters or surge suppressors.

S. No.	Part / Section	Clause No.	Original Bid Condition	Revised Bid Condition
33	Part 2/ Section VI	19.52.12.i		**New Clause Inserted (Clause No.: 19.52.12.i)** **(i) Features of Relays and Sockets:** a. All relays must have a transparent cover to ensure visual inspection and must be equipped with LED based visual indication for coil activation. b. All relays must be mounted in a socket ensuring easy swapping of relays in the installation without the use of any tools. The socket or relays must be equipped with a retaining clip or snap lock ensuring proper mechanical installation under IEC 61373 conditions. c. The relay sockets shall be suitable for panel, rail or front mounting style. The wire connection shall be twin connection per relays pin with spring terminal.
34	Part 2/ Section VI	19.52.12.ii		**New Clause Inserted (Clause No.: 19.52.12.ii)** **(ii) Relay Testing Kit:** a. Contractor shall provide two no. of portable Relay Testing Kit in each of the two Depots under quoted cost as per GA5 list to quickly identify the relay condition. It shall be capable of testing instantaneous and timer relays on correct functionality (no jammed contacts), minimum operating voltage, contact quality, operating time and delay time. b. The relay testing kit shall be suitable for various types of relays used in the Rolling Stock and shall also be able to electrically clean relays contacts.

S. No.	Part / Section	Clause No.	Original Bid Condition	Revised Bid Condition
35	Part 2/ Section VI	19.52.12.iii		**New Clause Inserted (Clause No.: 19.52.12.iii)** **(iii) Extension of Relay base:** a. Contractor shall provide two no. of tools in each of the two Depots under quoted cost as per GA5 list for extension of each type relay base (i.e. duplicating all the relay pins) for unattended system monitoring (measurement of current and voltage) without affecting the train electrical system in any way. b. The tool for extension of relay base of all type of relays shall be able to fit in tightly packed relay panels and small cabinets. It shall operate unattended once fitted in electrical cabinets, enabling normal passenger operating service. The tool kit consists of: i. A Test Block -which shall be put between existing relay socket and the plug-in relay. ii. Break-Out Box – All the relay pins from the Test Block shall be wired to this box for the duplication of iii. relay pins. iv. Data Monitoring and Logging Device –which shall be connected to Break-Out Box for the monitoring of relay pins (i.e. measurement of voltage, current etc.).
36	Part 2/ Section VI	19.52.12.iv		**New Clause Inserted (Clause No.: 19.52.12.iv)** **(iv) Dummy Relay (test switch):** a. The Contractor shall provide a dummy relay (test switch) for each relay type in each of the two depots b. under quoted cost as per GA5 list for testing, commissioning and fault finding purpose. The Plug-in test switch shall be able to simulate relay operation in an electrical installation, with latchable manual c. operation and voltage presence indicator.

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<tr><th>S. No.</th><th>Part / Section</th><th>Clause No.</th><th>Original Bid Condition</th><th>Revised Bid Condition</th></tr>
<tr><td>37</td><td>Part 2/ Section VI</td><td>19.54.3</td><td></td><td>New Clause Inserted (Clause No.: 19.54.3)

Electronic component

Electronic equipment shall comply with IEC 60571 and additionally type tested for,

(i) Dry heat test: The dry heat test shall be conducted for class T3 and temperature shall be considered 80oC against 70oC specified in IEC/EN. An extra performance check at 95°C shall also be carried out for 10 minutes over temperature value. LCD/LED display units may be tested at 70oC and an extra performance check at 85°C shall also be carried out for 10 minutes over temperature value

(ii) Salt Mist test (ST3 category)
(a) Cyclic Humidity tests (IEC 60571).
(b) Dust and sand test & Mold growth tests: The tests shall be done as per IEC 60068 & IEC 60721. The dust settlement rate shall be taken as 6gm/m2/day and dust particle size shall not be larger than 100 microns.</td></tr>
<tr><td>38</td><td>Part 2/ Section VI</td><td>20.6.5</td><td><table><tr><th>Resource</th><th>Spare Capacity</th></tr><tr><td>Memory</td><td>50%</td></tr><tr><td>Disk Storage</td><td>50%</td></tr><tr><td>Communication Links/Ports</td><td>50%</td></tr><tr><td>Input/Output Capacity</td><td>20%</td></tr></table></td><td><table><tr><th>Resource</th><th>Spare Capacity</th></tr><tr><td>Memory</td><td>50%</td></tr><tr><td>Disk Storage</td><td>50%</td></tr><tr><td>Communication Links/Ports</td><td>50%</td></tr><tr><td>Input/Output Capacity</td><td><s>20%</s>
Min. 10% (End of DNP)</td></tr></table></td></tr>
<tr><td>39</td><td>Part 2/ Section VI</td><td>Appendix 'C': 12.4 (Table)</td><td>2. Fire Load
(RS Contractor) RS Contractor shall provide the details of:
-train design heat release rate
-fire growth rate and curve
-heat of combustion
-soot yield
-CO yield
(TVS Contractor)TVS Contractor shall obtain the necessary inputs for the Fire Load parameters to verify and validate the Tunnel Ventilation System design and TVF/OTE fan capacities</td><td>2. Fire Load
(RS Contractor) RS Contractor shall provide the details of:
-train design heat release rate
-fire growth rate and curve
-heat of combustion
-soot yield
-CO yield
material composition for the train walls, train floor and the seats.
(TVS Contractor)TVS Contractor shall obtain the necessary inputs for the Fire Load parameters to verify and validate the Tunnel Ventilation System design and TVF/OTE fan capacities</td></tr>
<tr><td>40</td><td>Part 2/ Section VI</td><td>Appendix 'C': 12.4 (Table)</td><td>3. Heat Release</td><td>3. Auxiliaries Heat Release</td></tr>
<tr><td>41</td><td>Part 2/ Section VI</td><td>10.11.15</td><td>Two trains on each line shall be instrumented with separate Power Quality measuring instruments, data acquisition systems and power analyser (with provision for permanent installation and shall have necessary in-built software/analysis tool) to measure, record and analyse the power quality parameters.</td><td>FOUR trains shall be instrumented with separate Power Quality measuring instruments, data acquisition systems and power analyser (with provision for permanent installation and shall have necessary in-built software/analysis tool) to measure, record and analyse the power quality parameters.</td></tr>
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S. No.	Part / Section	Clause No.	Original Bid Condition	Revised Bid Condition
42	Part 2/ Section VI	11.11.2	The design of WFL system shall ensure precise & cyclic application of lubricant on the flange of the wheel(s) so that the lubrication application is uniformly distributed on the flange surface without any excess deposition on the contact surface. There shall be no flow of lubricant on the tread / braking surface under any circumstances. The system shall be designed to minimize oil and air consumption. Single tube system shall be preferred. The nozzles shall be designed to protect against choking / clogging due to dust. There shall be no movable part in the nozzle. The design shall permit optimized control of oil spray in curved track by suitably modulating the spraying cycles and quantity of oil in the spray. The spray cycle as above shall be programmable and shall be fine-tuned during field trials and performance of wheels during DLP. The programming tools shall be supplied to CMRL (one set for each depot).	The design of WFL system shall ensure precise & cyclic application of lubricant on the flange of the wheel(s) so that the lubrication application is uniformly distributed on the flange surface without any excess deposition on the contact surface. The design shall ensure that NO lubricant on the tread / braking surface under any circumstances. Single tube system shall be provided. The lubricant shall be non-polluting and biodegradable. There shall be no degradation of braking performance due to Wheel Flange Lubricator. The contractor shall provide TWO sets of WFL profile checking tool, the cost of the system shall be deemed to be included in the quoted price.
43	Part 2/ Section VI	11.11.3	The spray of oil shall be time controlled as well as distance controlled. The actuation and spray cycle and quantity shall be decided by the location and degree of the curve which shall be communicated to the system by a suitable sensor or other means. Status of WFL system shall be available in TCMS. It shall be possible to isolate the equipment through TCMS in case of any defect / malfunction.	The contractor shall ensure that the proposed WFL system complies EN 16028 or any other equivalent International Standard