



Tender No. 11/20

**For Examination of the Use of Mass
Transportation Electric Vehicles (MTEV) in Israel
TENDER CONDITIONS AND INSTRUCTIONS**

VOLUME E

**MTEV-Functional & Technical
Requirements**

1. Mandatory Requirements

1.1. General Requirements

- 1.1.1. The proposed MTEV, and its support systems must meet customary industry standards.
- 1.1.2. These may include, among others, structural requirements, safety means (including, but not limited to, with regard to other vehicles along its routes, to passengers in the process of boarding or deboarding, to passengers while travelling, etc.), environmental requirements (e.g. pollution levels, noise, HAZMAT (including hazardous radiation of various kinds), electromagnetic interference requirements, and others.
- 1.1.3. Furthermore, should the relevant Israeli standards, rules or regulations be more restrictive than the above, the proposed MTEV must either meet the latter or be easily adaptable to them.

1.2. Physical Characteristic

- 1.2.1. The expected MTEV's passenger's capacity is at least 200, of these at least 30 seated, according to the European AW3 capacity at 6 pax/sq.m¹.
- 1.2.2. The MTEV's physical length shall not exceed 35 meters
- 1.2.3. Car body external width shall not exceed 2.80 meters
- 1.2.4. Car maximum height 3.6m.
- 1.2.5. Vehicle shall have 100% Low floor.
- 1.2.6. Access shall meet the law and regulations to entertain the needs of handicapped passengers and shall not exceed door entrance height of 29-34cm.

1.3. Vehicle platform

- 1.3.1. The MTVE wheels will comply the DOT standard aimed at riding on conventional pavements, and will not require any physical underground, ground, side, or overhead infrastructure for its normal operation.

¹ Weight of empty, ready to run vehicle plus full seated load, including crew, plus standees at 6 passengers per 1 sq.m.

- 1.3.2. The air conditioning system should be able to provide a temperature difference of 20° C when the ambient temperature is 40° C at 80% humidity.
- 1.3.3. The vehicle will include a heating system which will allow the temperature to rise up to 25° degrees preferred heating by the A/C system.
- 1.3.4. Large windows made of safety double glazing glass; all passenger windows shall be dark with transparency (translucent light rays) of 20% to enhance thermal comfort.
- 1.3.5. Doors - Right hand side doors, at least one double doors 120 cm net width in each cabin to enable handicaps boarding as well as fast on/off loading of passengers
- 1.3.6. The floor shall be a continuous plane, except at the wheel housings and platforms.
- 1.3.7. The vehicle floor in the entrance and exit doors shall have a lateral slope not exceeding 2 deg. to allow for drainage.

1.4. Propulsion

- 1.4.1. The proposed MTEV will be electric propulsion based.
- 1.4.2. Drivetrain efficiency at least (η/j) 96%. The tenderer will attach a statement of manufacturer's general efficiency data.
- 1.4.3. Minimum distance range between battery re-charges should not be below 65km, while operating at full capacity, with A/C systems at max capability, and stopping frequently.
- 1.4.4. The average energy consumption shall be < 4 kWh/km.
- 1.4.5. Full normal charge for 65km drive must be achieved in 2 hours or less.
- 1.4.6. Fast charging capability
 - 1.4.6.1. Full Fast charging for 65 km ride may be achieved in 30 minutes max.
 - 1.4.6.2. Fast charging capability at interim stations, to provide for at least 30 km extra ride within less than 15 minutes.
- 1.4.7. Both assuming operation with air-condition and electric brake with recuperation under AW3 load
- 1.4.8. The MTEV performances will not be deteriorated by changing or severe weather conditions.

1.5. Road Behavior and Maneuverability

- 1.5.1. The vehicle should be able to exceed a speed of 70 km/h .

1.5.2. Minimum turning radius:

Turning radius	Maximum Lane Width
15 Meter	7.1 Meter
120 Meter	3.75 Meter

Note: in order to enable turns at limited spaced corners, rear cars will automatically follow the tracks of the leading car, to prevent “cutting corners”.

1.5.3. Climbing capability: 10% slope or higher.

1.5.4. Maximum acceleration, deceleration, and jerk parameters (in terms of m/sec^2) must meet industry acceptable and customary levels.

1.5.5. The suspension system shall permit a minimum wheel travel of 7 cm. jounce-upward travel of a wheel when the bus hits a bump (higher than street surface), and 7 cm. rebound-downward travel when the bus comes off a bump and the wheels fall relative to the body.

1.6. Technological requirements

1.6.1. The proposed MTEV must provide automatic communication, that will enable integration of various ITS systems including, but not limited to, automatic ticketing systems, passenger counting and real-time reporting, communication with operational centers, local PIS system, etc.

1.6.2. Enable At least 30 Charging Sockets, close to each seated passenger that will allow charging of mobile devices (USB socket or quick charge power adapter or any other standard that is at power up).

1.6.3. External Rear, front and side Sensors and cameras and Internal surveillance cameras.

1.6.4. Passenger counting detectors at all doors.

1.6.5. A monitoring system connected to the central computer of the vehicle capable of reading and storing various data about driver behavior and performance (acceleration, braking, sharp turns, etc.) as well as the condition of the MTEV’s systems.

1.6.6. The proposed MTEV must provide positioning GPS data.

1.6.7. The proposed MTEV must enable Wireless Internet Connection (Wi-Fi) at a browsing rate of at least 5 gigabytes download.

1.7. Safety and Regulation

1.7.1. The MTEV shall meet all Israeli laws and regulations, inter alia TRANSPORT REGULATIONS, 1961; PART E: BUSES and the current public bus service requirements, as stipulated by the Department of Transportation (MoT) and Maintenance Department of MoT, with special instructions and regulations for electric motorized buses and requirements for the Equal Rights for Persons with Disabilities Law, 1998 and regulations. Equal rights for people with disabilities (regulating access to public transport services), 2003.

1.7.2. In addition, the MTEV shall be required to meet ISO 6469-2:2018 Electrically propelled road vehicles — Safety specifications — Part 2: Vehicle operational safety, which specifies requirements for operational safety specific to electrically propelled road vehicles, for the protection of persons inside and outside the vehicle.

1.7.3. In order to ensure the proper and safe movement of the MTEV, it will be equipped with multiple positioning systems that will be used in parallel and/or one in lieu of the other (in case of failure).

1.8. Other requirements:

1.8.1. The noise level inside the passenger compartment and in the driver's, compartment shall not exceed 70 dBA at 50 KM/h drive without A/C operating and 75 dBA at 50 KM/h drive with A/C operating at 1.5 m height.

2. Optional Requirements

2.1. Self-Guided capabilities

2.1.1. The proposed MTEV must be self-guided ready, namely must be capable to fulfill its functions without driver's intervention.

- 2.1.2. These functions may include safe driving along its predetermined route, stopping at stations, collecting and offloading passengers, safe handling of doors, the operation of a Passenger Information System, etc. Track deviations will not exceed 5cm
- 2.1.3. For the removal of any doubt it is hereby clarified that while riding under self-guided conditions the MTEV must enable a manual intervention and overruling by a driver at any time.
- 2.1.4. The MTEV functionality and ability to drive self-guided will not be impaired by abnormal conditions such as clouds, dirt or water on the road, etc.

3. Trial Run Maintenance Requirements

3.1. General

- 3.1.1. In order to ensure smooth and continuous operation of the MTEV the Supplier will maintain, in Israel, an adequate supply of spare parts and tools, that will enable him to address and resolve all maintenance issues and system failures, within the appropriate time frames, such that scheduled Trial Runs of the MTEV bus will not be interrupted. In addition, the Supplier must have in his possession, in Israel, all that's necessary in order to immediately remove the MTEV bus, or parts of it, from the road, in cases it cannot drive on its own.

3.2. Preventive Maintenance:

- 3.2.1. It is the Supplier's responsibility to ensure an uninterrupted and continuous operation of the MTEV bus during the Trial Run. The Supplier will support such uninterrupted operation, among others, by performing all the necessary Preventive Maintenance tasks.
- 3.2.2. The Supplier will submit to the Company a Preventive Maintenance Manual, for their review and comment, at least three months prior to the commencement of the Trial Run. Should the Company question, comment, or request changes in the Preventive Maintenance procedures, the Supplier will respond by discussing the subject matter with the Company and acting according to their mutual determination.
- 3.2.3. Unless otherwise approved, in writing, by the Company, all Preventive Maintenance operations will be conducted during scheduled off-time of the MTEV bus.

3.3. Corrective Maintenance

- 3.3.1. It is the Supplier's responsibility to maintain a Corrective Maintenance team available during customary working hours in Israel (Sunday to Thursday, 08:00 to 17:00) as well as during all times of scheduled trial runs of the MTEV bus, and as necessary in order to conduct and complete Corrective Maintenance activities.
- 3.3.2. Critical Failures: critical failures are defined as failures that prevent the execution of planned trial runs. Such failures will be attended to, and repairs will start, within one hour of the time of failure. The repair work will be performed continuously, until completed.
- 3.3.3. Should critical failure prevent the MTEV bus from moving while on the road, such failures must be attended to immediately. In such cases the MTEV bus must be removed from the road, by means of towing, or otherwise, to a place where it will not interfere with, or endanger, people or vehicles, or interrupts the normal traffic flow. It is noted that such a location may be subject to the Police's approval.
- 3.3.4. In spite of the above, in cases where it is estimated by the Supplier that repair can be completed within two hours since the failure occurred, and subject to the Company's approval, corrective maintenance may be conducted on site where the failure occurred.
- 3.3.5. Non-Critical Failures are all failures that have not been defined as critical. Repair of non-critical failures will be conducted as soon as they are discovered, and while the MTEV bus is not in service (trial run). Should multiple non-critical failures occur, repair priority will be set by the Supplier, subject to the Company's approval.
- 3.3.6. It is emphasized that all maintenance work referred to in this Section 2 must be performed in a manner that will nullify interference with scheduled Trial Runs of the MTEV.

3.4. **Technical Literature in English:**

The supplier will provide the following literature 3 months before starting the trial: (can be supplied in digital format).

- 3.4.1. Driver's operation manual.
- 3.4.2. Service maintenance manual - noting all scheduled preventive maintenance works.
- 3.4.3. Workshop manual – describing all repair works of the MTEV.
- 3.4.4. Spare parts catalogue and price list.

- 3.4.5. List of special tools needed to maintain the MTEV.
- 3.4.6. List of diagnostic tools necessary for maintaining, trouble shooting and repairing the MTEV.
- 3.4.7. Training material for training a basic local maintenance team.
- 3.4.8. A list of all service products needed to maintain the MTEV, such as: oils, coolants, greases, A/C refrigerant etc.
- 3.4.9. Define the warranty granted to the MTEV for its body components, electric drive system components, battery packs, A/C units, all mechanical and 24V electric components, against rust, etc.

3.5. The supplier will ship to Israel, together with the MTEV prototype the following items:

- 3.5.1. All necessary special tools to maintain the MTEV during the trial period.
- 3.5.2. A suitable multi “legs” electric lift that will enable to host the MTEV during maintenance works.
- 3.5.3. All diagnostic computers and equipment.
- 3.5.4. An initial stock of fast-moving spare parts that are expected to be used during the trial period.
- 3.5.5. All that equipment and parts will belong to the supplier and exported from Israel at the end of the trail, unless otherwise will be agreed.
- 3.5.6. A team of experts that will be responsible to maintain the MTEV during the trial period.

