Annex 1 List of Parameters and Requirements for Placing in Service Light Rail Vehicles

Parameter Number	Parameter
01.00	**General Arrangements**
01.01	General data/ vehicle characteristics (payload, seating, speed, power, etc.)/ multiple operation arrangements
01.02	Weight concept
01.03	Dimensions (general arrangement drawings)
01.04	Declaration on absence of hazardous materials
02.00	**Running Dynamics**
02.01	Evaluation of quasistatic and dynamic effects of guidance function; Declaration of geometric wheel/rail interface, etc.
02.02	Independent Professional Review report on running dynamics
03.00	**Structure (design loads, fatigue life approach)**
03.01	Structural integrity, Structural integrity of bodyshell, frame
03.02	Structural integrity of bogie/ running gear
03.03	Structural integrity of wheelset (axle/ wheel/ axlebox/ bearing)
03.04	Structural integrity of coupling and drawgear
03.05	Structural integrity of intervehicle connections
03.06	Structural integrity of Crashworthiness (impact absorption tram-tram or tram-road vehicle, controlled failure, occupant protection, pedestrian protection, component securing)
03.07	Structural integrity of Component attachment
03.08	Structural integrity of Underframe impact protection (ballast, debris etc.)
03.09	Structural integrity Frontal impact protection (windscreen and cab structure/ fairing)
03.10	Structural integrity Fitting of internal and external glazing (including aerodynamic effects)
03.11	Structural integrity Fitting of doors/ hatches/ gangways (including aerodynamic effects)
03.12	Structural integrity Structural integrity of pantograph
03.13	Structural integrity Obstacle deflector/bodycatcher
03.14	Structural integrity Miscellaneous components not included in items above
03.15	Independent Professional Review report on structure
04.00	**Braking System**
04.01	General description of overall braking system performance
04.02	Service brake
04.03	Brake blending, electric and dynamic brakes
04.04	Holding brake
04.05	Rollback prevention
04.06	Parking brake
04.07	Emergency braking
04.08	Safety braking
04.09	WSP
04.10	Magnetic track brakes
04.11	Sanding
04.12	Independent Professional Review report on braking system
05.00	**Powered Systems**
05.01	Electric traction power supply (design, electrical interface, regenerative braking)
05.02	Earthing/ bonding /return current
05.03	Electric system (MCB ratings, protection, etc.)
05.04	Battery (load shedding, battery box ventilation, protection, isolation devices)
05.05	Pneumatic system (air supply, filtering, etc.)
05.06	Hydraulic system
05.07	Combustion engines, fuel system, power train
05.08	Isolation devices of powered systems
06.00	**Fire Safety**
06.01	Materials (fire resistance, smoke and toxic emissions): Listing of materials and quantities (non-metallic parts list/ materials inventory), test certificates
06.02	Fire barriers: Cab/saloon, inter-carriage, interior/exterior interfaces of vehicle bodyshell, HVAC and ventilation suppression
06.03	Fire barriers: Barriers to powered systems

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Parameter Number	Parameter
06.04	Management of fires in service: Protection of essential equipment and systems/ support to short-term movement with declared fire on board/ support to evacuation/ operational procedures for emergencies
06.05	Fire detection & suppression: Detection
06.06	Fire detection & suppression: Suppression
06.07	Portable fire-fighting equipment: Fire detection & suppression
06.08	Overall fire performance and concept of evacuation; including description of concept
06.09	Independent Professional Review report on overall fire performance and concept of evacuation
07.00	**Train Control & Monitoring Systems**
07.01	General concept of systems and functions; Including intervehicle control and multiple unit operation
07.02	Safety-related functions of train control & monitoring systems; Detailed design, safety evaluation of train control and monitoring system (electrics, electronics, software and/or hardware)
07.03	Power supply to safety-related train control functions; Load shedding, individual MCBs, etc.
07.04	DSD/ DVD; Driver Safety Device/ Driver Vigilance Device
07.05	Independent Professional Review report on train control
08.00	**Vehicle Interior**
08.01	Lighting; Normal and emergency lighting arrangements and levels, emergency lighting duration, load shedding concept
08.02	Passive safety of interior design
08.03	Passenger area human factors; Mobility-impaired passenger needs, handholds, seating arrangements, aisles
08.04	Luggage storage provisions
08.05	Signage, labels and indicators, etc.
08.06	Heating, ventilation & air conditioning; HVAC arrangement, ventilation, emergency ventilation arrangement and duration of supply
08.07	CCTV
08.08	Safety and emergency equipment
09.00	**Access & Egress**
09.01	Staff access/egress; External staff doors, cab-saloon doors
09.02	Passenger access/egress; External passenger doors, mobility-impaired passenger needs
09.03	Passenger access/egress; Passenger area emergency access/egress
09.04	Inter-vehicle connectors; Gangways, treadplate/ bridging plate arrangements etc.
09.05	Independent Professional Review report on access & egress system
10.00	**Driver Cab**
10.01	Cab access/egress, cab side windows
10.02	Cab emergency access/egress
10.03	Driver cab human factors; Seating arrangement, control desk arrangement
10.04	Driver cab Occupational Health & Safety incl. noise
10.05	Driver cab safety equipment
10.06	Driver cab signage
10.07	Visibility: Field of vision, absence of optical interference
10.08	Visibility: Windscreen wash-wipe system, demisters, sun visors
10.09	Driver cab HVAC
11.00	**Audibility/Visibility**
11.01	Headlights/ tail lights/indicators/hazards warning lights/brake lights/marker lights, etc.
11.02	Audible warning devices
11.03	Livery; Vehicle visibility at distance, mobility-impaired passenger needs.
12.00	**Communication Systems**
12.01	Cab to control (radio)
12.02	Cab to cab to crew intercom
12.03	Passenger to control
12.04	Public address
12.05	Emergency communication devices
12.06	Passenger information displays: Scrolling/moving message displays

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Parameter Number	Parameter
12.07	Passenger information displays: Fixed signage
13.00	**Vehicle Interfaces**
13.01	General: Declaration of compatibility with infrastructure & operations
13.02	General Operational restrictions, route restrictions
13.03	Coupling & drawgear: Geometric position, gathering range on prescribed alignment
13.04	Coupling & drawgear: Mechanical coupling interface (incl. inter-vehicle coupling of trainsets)
13.05	Coupling & drawgear: Electrical interface
13.06	Infrastructure Interface: Track/ alignment interface criteria
13.07	Infrastructure Interface: Free movement of bogies, gangways, etc. based on alignment criteria
13.08	Infrastructure Interface: Gauge clearance
13.09	Infrastructure Interface: Platform interface, mobility-impaired passenger needs, powered steps/bridging plates
13.10	On-road operations: Pedestrian protection, cab-end features
13.11	On-road operations: Road traffic/roadway user interface
13.12	Signalling systems: Installation of on-board signalling/traffic management equipment
13.13	Signalling systems: Functional testing of on-board signalling/traffic management equipment
13.14	Signalling systems: Criteria to ensure operation of infrastructure-based signalling/traffic management equipment
13.15	Event recorder
13.16	Traction power supply: Voltage range
13.17	Traction power supply: OCS geometric interface
13.18	Traction power supply: Return power generation
13.19	EMC & harmonics: Compatibilty with operating environment, signalling system, and other railways
13.20	EMC & harmonics: Special locations
13.21	EMC & harmonics: Credible fault conditions
13.25	Provisions for Vehicle rescue: Giving/ receiving assistance, emergency coupling arrangements & limitations, compatibility with re-railing processes and equipment
13.26	Environment: Resistance to environmental factors
13.27	Environment: Noise
13.28	Environment: Emissions
14.00	**Provision for Operation**
14.01	Occupational Health & Safety: Operations
14.02	Provisions for Operations: Operationing Manuals / Conditions / Requirements
14.03	Provisions for Operations: Signs and labels, vehicle ID number, etc.
15.00	**Provision for Maintenance**
15:01	Occupational Health & Safety: Maintenance
15:02	Provisions for Maintenance: Maintenance Facilities Interfacing, Maintenance Manuals / Conditions / Requirements
16:00	**On Track Machines (in addition to the relevant paramters above)**
16:01	Visibility, markings: Body colour, markings, stickers / labels specific to OTM
16:02	Occupational Health & Safety: Access/ egress to working positions, protection of staff in working positions, human factors, noise and vibration, visibility, manuals / instructions for operation
16:03	Functional and operational requirements for working in the vicinity of operational running lines: Additional signal/traffic management devices, limitations of working area/ range
16:04	Safety against derailment in working mode
16:05	Safety against rollover/ tilting in working mode
16:06	Braking system in working mode
16:07	Environment: Noise in working mode
16:08	Environment: Management of lubrication, hydraulic fluids and other potentially critical materials
16:09	Interface to infrastructure in working mode: Assessment on forces onto track/ trackbed/ structures (via griprails, support wheels, etc.), vibration into trackbed or structures
16:10	EMC in working mode
16:11	Lighting of working area
16:12	Electrical protection in working mode: To include interfaces to OCS
16:13	Management (securing, limitation) of out-of-gauge equipment