



COMPLIANCE REPORT FOR EMPLOYERS REQUIREMENT: TECHNICAL SPECIFICATIONS

Contents	Description	Complied	Not Complied	Remarks
Chapter 1 Introduction	1.1 Scope			
	1.2 Prototype Train			
Chapter 2 General Requirements	2.1 General			
	2.2 Interface activities			
	2.3 Quality Assurance			
	2.4 System Safety Assurance			
	2.5 Hazard Analysis			
	2.6 Fail safe design			
	2.7 Reliability, Availability & Maintainability – General			
	2.8 Reliability requirement			
	2.9 Reliability demonstration			
	2.10 Availability requirements			
	2.11 Availability demonstration			
	2.12 Maintainability requirements			
	2.13 Maintainability demonstration			
	2.14 Maintenance			
	2.15 Electro- magnetic compatibility - General			
	2.16 Electro- magnetic compatibility – Requirements			
	2.17 Electro- magnetic compatibility – demonstration			
	2.18 Noise and Vibration			
	2.19 Fire Performance			
	2.20 Fire detection system			
	2.21 Life cycle cost			
Chapter 3 – Design & Performance requirements	3.1 Scope			
	3.2 Proven design			
	3.3 Basic design philosophy & requirements			
	3.4 Design management & Control			
	3.5 System integration process			
	3.6 Interface management			
	3.7 Design submission requirements			

Chapter 3 – Design & Performance requirements	3.8 Design review			
	3.9 Employers design audit			
	3.10 Climatic & environmental conditions			
	3.11 Flood proofing			
	3.12			
	3.13 Line profile			
	3.14 Track structure parameters			
	3.15 Track tolerances			
	3.16 Platform interface			
	3.17 Current collection system			
	3.18 Signaling system			
	3.19 Telecommunication system			
	3.20 Kinematic envelope			
	3.21 Train performance			
	3.22 Performance requirements			
	3.23 Emergency operating condition			
	3.24 Specific energy consumption			
Chapter 4 – Vehicle body	4.1 General			
	4.2 Mockup general			
	4.3 Static vehicle profile			
	4.4 Materials			
	4.5 Car weight & Passenger capacity			
	4.6 Car body strength			
	4.7 Equipment an equipment mounting			
	4.8 Crashworthiness			
	4.9 Underfloor equipment mounting			
	4.10 Couplers & draft gear			
	4.11 Car exterior			
	4.12 Driving car front end exterior			
	4.13 Train operator’s driving console			
	4.14 Saloon interior			
	4.15 Inter car gangways			
	4.16 Car roof & Roof mounted equipments			
	4.17 Design of exhaust air path			
	4.18 Obstruction deflection & derailment detection device			

Chapter 5 - Bogies	5.1 General requirement & Features			
	5.2 Dynamic requirements			
	5.3 Bogie Construction – Bogie frame			
	5.4 Bogie Construction – Primary & Secondary suspension			
	5.5 Bogie to Body connection			
	5.6 Bogie strength			
	5.7 Bogie mounted equipments			
	5.8 Finite element analysis			
	5.9 Motor suspension			
	5.10 Gear box & Coupling			
	5.11 Wheels, Axles & Axle boxes			
	5.12 Bogie brake equipments			
	5.13 Automatic train control equipment mounting			
	5.14 Wheel flange lubrication equipment			
	5.15 Maintainability			
Chapter 6 – Pneumatics Air Supply & Brake System	6.1 General			
	6.2 Air compressor & 3 Phase 415 V induction motor drive			
	6.3 Auxiliary Compressor			
	6.4 Air drier & Filtration			
	6.5 Reservoirs			
	6.6 Pressure Governors & Switches			
	6.7 Pipe system			
	6.8 Pressure gauges			
	6.9 Leveling Valve system			
	6.10 Front automatic coupling actuating equipment			
	6.11 Ancillary Pneumatic devices			
	6.12 Isolation of defective equipment			
	6.13 Brake system			
	6.14 Electric regenerative brake & electric / pneumatic brake blending			
	6.15 Parking brake			
	6.16 Emergency braking			
	6.17 Brake control system			
	6.18 Jerk limitation for service brake			

Chapter 6 – Pneumatics Air Supply & Brake System	6.19 Brake operating timing			
	6.20 Brake control under rescue operation			
	6.21 Failure management			
	6.22 Wheel slide protection			
	6.23 Monitoring			
	6.24 Documentation			
Chapter 7 – Door & Door control system	7.1 General			
	7.2 Passenger saloon door			
	7.3 Front end emergency door / detrainment door			
	7.4 Cab side door			
	7.5 Saloon to cab door			
	7.6 Door leaf construction			
	7.7 Platform screen door			
	7.8 Passage way sliding door for first class car			
Chapter 8 – HV & Propulsion equipment	8.1 High voltage & Propulsion configuration			
	8.2 High voltage power collection			
	8.3 25kV Vacuum circuit breaker & Earthing switch			
	8.4 Lightning arrester			
	8.5 25kV Potential transformer – Explosion proof			
	8.6 AC Current transformer			
	8.7 Main transformer			
	8.8 25kV Cable with HV bushing & T connector			
	8.9 Power converter Inverter			
	8.10 AC Traction motor			
	8.11 Neutral section detector			
Chapter 9 – Auxiliary Supply equipment	9.1 Auxiliary supply system			
	9.2 Auxiliary converter inverter			
	9.3 Battery charger			
	9.4 Backup batteries			
	9.5 Battery box			
	9.6 Inverter for HVAC ventilation			
Chapter 10 – Train control management system	10.1 General			
	10.2 TCMS architecture			
Chapter 10 – Train	10.3 Data acquisition			

control management system	10.4 Control features			
	10.5 Driving control interface			
	10.6 Self diagnostic features			
	10.7 Fault diagnostic features			
	10.8 Troubleshooting directory			
	10.9 Maintenance tools			
	10.10 Recording features			
	10.11 Way side wireless communication system			
	10.12 Energy consumption measurements			
	10.13 TCMS – OCC Interface			
Chapter 11 – Heating ventilation & Air conditioning	11.1 General			
	11.2 Design criteria cooling & heating capacity			
	11.3 Heating system			
	11.4 Roof mounted package units			
	11.5 Air ducts & diffusers			
	11.6 HVAC unit compressor			
	11.7 Condenser & evaporator coil			
	11.8 Piping			
	11.9 Electrical control cubicle			
	11.10 Control equipment			
	11.11 Emergency inverter			
	11.12 Operator's cab air conditioning			
	11.13 Earth fault protection			
Chapter 12 – Electrical & control equipment	12.1 General			
	12.2 Train control & operational principles			
	12.3 Train line electrical connections			
	12.4 Control equipment			
	12.5 Wires & cables			
	12.6 Indication circuit			
	12.7 Circuit protection & earthing system			
	12.8 Lighting system			
	12.9 Interior illumination system			
	12.10 Cab equipment			
	12.11 Auxiliary machines & drives			
Chapter 13 –	13.1 Train communication			

Communication system	equipment			
	13.2 OCC to train operator & on-train public address communication			
	13.3 Passenger & OCC alarm			
	13.4 On-train public address			
	13.5 Cab to cab mode			
	13.6 Automatic voice announcement system			
	13.7 Passenger Information system			
	13.8 Operation of passenger information & automatic announcement system			
	13.9 Passenger Saloon surveillance system			
	13.10 PAPIS & PSSS test			
	13.11 Interface			
	13.12 Set-up facilities for PA-PIS & PSSS			
Chapter 14 – Material & workmanship	14.1 General			
	14.2 Material			
	14.3 Welding			
	14.4 Corrosion			
	14.5 Fasteners			
	14.6 Enclosures			
	14.7 Wiring & Cabling			
	14.8 Terminal & cable termination			
	14.9 Electrical creepage & clearance			
	14.10 Protection & earthing			
	14.11 Circuit design			
	14.12 Electronic equipment			
	14.13 Microprocessors & Software based equipment			
	14.14 Software			
	14.15 Printed circuit board & connectors			
	14.16 Integrated circuits			
	14.17 Labels			
	14.18 Lubricants			
	14.19 Painting			
	14.20 Rubber items			
	14.21 Cables & Pipes			
Chapter 15 –	15.1 General			

Inspection Tests & Trials	15.2 Inspections			
	15.3 Inspection hold points			
	15.4 Test planning & procedure			
	15.5 Obligatory tests on prototype			
	15.6 Integrated testing & Commissioning			
	15.7 Service trials			
	15.8 Special test			
	15.9 Vehicle body shell			
	15.10 Bogie test			
	15.11 Passenger saloon door type test			
	15.12 Passenger saloon door routine test			
	15.13 Saloon to cab door type test			
	15.14 Compressor & Motor test			
	15.15 Brake equipment type test			
	15.16 Complete brake system type test			
	15.17 Complete brake system routine test			
	15.18 Propulsion system type test			
	15.19 Auxiliary system type test			
	15.20 TCMS type test			
	15.21 Roof mounted HVAC package type test			
	15.22 Complete car HVAC system type test			
	15.23 HVAC system routine test			
	15.24 Emergency operation			
	15.25 Noise & Vibration verification			
	15.26 Fire performance verification			
	15.27 EMC Testing			
	15.28 Integrated testing with Signaling & Train control & Telecommunications contractors			
	15.29 Type test witness			