

Annex 4: Amendments to the technical specification for interoperability relating to the ‘operation and traffic management’ subsystem of the rail system in the European Union (Annex to Commission Regulation (EU) 2015/995)

1. The Appendix D ‘Elements the infrastructure manager has to provide to the railway undertaking for the Route Book and for the train compatibility over the route intended for operation’ is replaced by the following:

‘Appendix D

Elements for the train compatibility over the route intended for operation and for the Route Book

Appendix D.1

Elements for the train compatibility over the route intended for operation

Note: The vehicle information concerning the parameters indicated with * on the table below are also to be taken into account by the railway undertaking for the train composition, as defined in the section 4.2.2.5.2.

Route compatibility check interface	Vehicle information	Route information available in Register of Infrastructure (RINF) or provided by Infrastructure Manager
Traffic loads and load carrying capacity of infrastructure *	Design mass: <ul style="list-style-type: none"> - in working order; - under normal payload; - under exceptional payload. Maximum design speed; Static axle load: <ul style="list-style-type: none"> - in working order; - under normal payload; - under exceptional payload. Vehicle length; The position of the axles along the unit (axle spacing). Static compatibility check for Wagons: Permissible payload for different line categories according to TSI WAG.	1.1.1.1.2.4 Load capability; 1.1.1.1.2.4.1 National classification for load capability.
	Note: The static and dynamic compatibility checks shall be performed according to the procedures provided by the infrastructure manager.	
Gauging *	Vehicle gauge : <ul style="list-style-type: none"> - Reference profiles for which the vehicle was authorised; - other gauges assessed. 	1.1.1.1.3.1.1 gauging; 1.2.1.0.3.4 gauging.
	Note: It is expected that geometry of particular points (e.g. section of tunnel, bridges) is covered by the reference profile declared in RINF. In duly justified cases, discussion between Infrastructure Manager and Railway Undertaking might be needed for checking these specific points.	
Vertical radius	Minimum vertical: <ul style="list-style-type: none"> - convex curve radius capability; - concave curve radius capability. 	1.2.2.0.3.3 Minimum radius of vertical curve (Concern siding).

Route compatibility check interface	Vehicle information	Route information available in Register of Infrastructure (RINF) or provided by Infrastructure Manager
Train detection systems *	Type of train detection systems for which the vehicle has been designed and assessed.	1.1.1.3.7.1 Type of train detection system.
	Note: In duly-justified cases, tests and/or checks could be done after authorisation, involving Railway Undertaking and Infrastructure Manager.	
Hot axle box detection	Axle bearing condition monitoring (hot axles box detection);	1.1.1.1.7.4 Existence of trackside Hot axle box detection;
	Identification of trackside hot axle box detection when applicable; Generation of trackside hot axle box detection when applicable.	1.1.1.1.7.5 Trackside Hot axle box detection TSI compliant: (Y/N), If No: - 1.1.1.1.7.6 Identification of trackside hot axle box detection; - 1.1.1.1.7.7 Generation of trackside hot axle box detection; - 1.1.1.1.7.8 Localization of trackside hot axle box detection; - 1.1.1.1.7.9 Direction of measurement of trackside hot axle box detection.
Note: If the network(s) of the area of use is composed by only one type of trackside hot axle box detector, no route compatibility check is needed.		
Running characteristics	Combination(s) of maximum speed and maximum cant deficiency to which the vehicle was authorised (operational envelope that the vehicle has been assessed for); Rail inclination.	1.1.1.1.4.2 Cant deficiency; 1.1.1.1.2.5 Maximum permitted speed; 1.1.1.1.4.3 Rail inclination.
Wheelset	Wheel set gauge.	1.1.1.1.4.1 Nominal track gauge; 1.2.1.0.4.1 Nominal track gauge.
Wheelset	Minimum in-service wheel diameter.	1.1.1.1.5.2 Minimum wheel diameter for fixed obtuse crossings.
Wheelset	Type of changeover facilities to which the vehicle is designed for.	1.2.0.0.0.5 Geographical location of Operational Point; 1.2.0.0.0.4.1 Type(s) of track gauge changeover facility (ies).
Minimum curve*	Minimum horizontal curve radius capability.	1.1.1.1.3.7 Minimum radius of horizontal curve; 1.2.2.0.3.2 Minimum radius of horizontal curve.

Route compatibility check interface	Vehicle information	Route information available in Register of Infrastructure (RINF) or provided by Infrastructure Manager
Braking*	<p>At maximum service brake: Stopping distance, Maximum deceleration, for the load condition 'design mass under normal payload' at the design maximum speed.</p> <p>For general operation, in addition to the above data: brake weight percentage (λ).</p>	<p>1.1.1.3.11.1 Maximum braking distance requested;</p> <p>1.1.1.1.3.6 Gradient profile;</p> <p>1.1.1.1.2.5 Maximum permitted speed;</p> <p>1.1.1.1.6.1 Maximum train deceleration;</p> <p>1.1.1.3.11.2 Availability by the IM of additional information mentioned in the section 4.2.2.6.2.(2): (Y/N);</p> <p>If yes:</p> <p>1.1.1.3.11.3 Reference of the document(s) to be indicated in RINF.</p>
	<p>For General operation: covered by Railway Undertaking safety management system using the CSM on risk assessment. See clause 4.2.2.6 and OPE TSI application guide clause 6.</p> <p>For pre-defined formation: Comparison of the declared stopping distance and maximum train deceleration between Rolling Stock and the intended route for each load condition per design maximum speed.</p>	
Braking	<p>Thermal capacity:</p> <ul style="list-style-type: none"> - Reference case of TSI; - if no reference case is indicated, thermal capacity expressed in terms of: <ul style="list-style-type: none"> o Speed; o Gradient; o Distance; o Time (if distance is not indicated) 	<p>1.1.1.1.3.6 Gradient profile;</p> <p>1.1.1.1.2.5 Maximum permitted speed.</p>
Braking *	Maximum gradient on which the unit is kept stationary by the parking brake alone (if the vehicle is fitted with it).	<p>1.1.1.1.3.6 Gradient profile;</p> <p>1.2.2.0.3.1 Gradient for stabling tracks.</p>
Magnetic track brake	Possibility of preventing the use of the magnetic brake (only if fitted with magnetic brake).	1.1.1.1.6.3 Use of magnetic brakes.
	Note: where magnetic brake is allowed, the infrastructure manager shall provide the conditions of its use.	
Eddy current track brake	Possibility of preventing the use of the eddy current brake (only if fitted with eddy current brake).	1.1.1.1.6.2 Use of eddy current brakes.
	Note: where Eddy current track brake is allowed, the infrastructure manager shall provide the conditions of its use.	

Route compatibility check interface	Vehicle information	Route information available in Register of Infrastructure (RINF) or provided by Infrastructure Manager
Weather conditions	Temperature range.	1.1.1.1.2.6 Temperature range.
Weather conditions	Snow, ice and hail condition.	1.1.1.1.2.8 Existence of severe climatic conditions.
Acceleration allowed at level crossing	Acceleration profile (acceleration=f (speed)).	1.1.1.1.7.2 Existence of level crossings; 1.1.1.1.7.3 Acceleration allowed at level crossing.
Voltages and frequencies	Energy supply system : - Nominal voltage and frequency; - Type of contact line system; - Umin2; - Umax2.	1.1.1.2.2.1.1 Type of contact line system; 1.1.1.2.2.1.2 Energy supply system (Voltage and frequency); - 1.1.2.2.1.2.1 Energy supply system TSI compliant (Y/N) if No: ○ 1.1.1.2.2.1.3 Umin2 (lowest non permanent voltage) according to EN 50163; ○ 1.1.1.2.2.1.4 Umax2 (highest non permanent voltage) according to EN50163.
Regenerative brake	Possibility of preventing the use of the regenerative brake (only if fitted with regenerative brake).	1.1.1.2.2.4 Permission for regenerative braking.
Current limitation	Electric units equipped with power or current limitation function. Note: TSI-compliant Rolling Stock with a maximum power higher than 2MW are equipped with current or power limitation.	1.1.1.2.5.1 Current or power limitation on board.
Pantograph*	Maximum current at standstill per pantograph for each DC systems the vehicle is equipped for.	1.1.1.2.2.3 Maximum current at standstill per pantograph.
Pantograph	Height of interaction of pantograph with contact wires (over top of rail) for each energy supply system the vehicle is equipped for.	1.1.1.2.2.5 Maximum contact wire height; 1.1.1.2.2.6 Minimum contact wire height.
Pantograph	Pantograph head for each energy supply system the vehicle is equipped for.	1.1.1.2.3.1 Accepted TSI compliant pantograph heads; 1.1.1.2.3.2 Accepted other pantograph heads.
Pantograph	Material of pantograph contact strip the vehicle may be equipped with for each energy supply system the vehicle is equipped for.	1.1.1.2.3.4 Permitted contact strip material.

Route compatibility check interface	Vehicle information	Route information available in Register of Infrastructure (RINF) or provided by Infrastructure Manager
Pantograph*	Mean contact force curve.	1.1.1.2.5.2 Contact force permitted.
Pantograph*	Number of pantographs in contact with the overhead contact line (OCL) (for each energy supply system the vehicle is equipped for); Shortest distance between two pantographs in contact with the OCL (for each energy supply system the vehicle is equipped for; for single and, if applicable, multiple operation) (only if number of raised pantographs is more than 1); Type of OCL used for the test of current collection performance (for each energy supply system the vehicle is equipped for) (only if number of raised pantographs is more than 1).	1.1.1.2.3.3 Requirements for number of raised pantographs and spacing between them, at the given speed.
Pantograph	Automatic dropping device (ADD) fitted (for each energy supply system the vehicle is equipped for).	1.1.1.2.5.3 Automatic dropping device required.
Tunnel	Fire safety category.	1.1.1.1.8.10 Fire category of rolling stock required; 1.1.1.1.8.11 National fire category of rolling stock required; 1.2.1.0.5.7 Fire category of rolling stock required; 1.2.1.0.5.8 National fire category of rolling stock required.
Vehicle length*	Vehicle length.	1.2.2.0.2.1 Usable length of siding; 1.2.1.0.6.4 Usable length of platform.
Platform height and Access and egress	Platform heights for which the vehicle is designed.	1.2.0.6.4 Height of platform.
ETCS	ETCS System Compatibility.	1.1.1.3.2.9 ETCS System Compatibility.
ETCS	Cryptographic keys used for the protection of data transmitted via radio.	Provided by IM (Not in RINF).
ETCS*	Train Integrity.	1.1.1.3.2.8 Train integrity confirmation from on-board necessary for line access.
GSM-R	Radio System Compatibility Voice.	1.1.1.3.3.9 Radio System Compatibility Voice.
GSM-R	Radio System Compatibility Data.	1.1.1.3.3.10 Radio System Compatibility data.

Route compatibility check interface	Vehicle information	Route information available in Register of Infrastructure (RINF) or provided by Infrastructure Manager
GSM-R	SIM Card GSM-R Home Network.	1.1.1.3.3.5 GSM-R networks covered by a roaming agreement.
GSM-R	Support of public frequencies SIM Card GSM-R Home Network.	1.1.1.3.3.6 Existence of Roaming to public networks; 1.1.1.3.3.7 Details on Roaming to public networks; 1.1.1.3.3.8 No GSM-R coverage.
GSM-R	Use of Group ID 555.	1.1.1.3.3.4 Need of Group 555.
Class B	Class B train protection legacy system.	1.1.1.3.5.3 Train protection legacy systems.
Class B	Class B radio legacy system.	1.1.1.3.6.1 Radio legacy system.

Appendix D.2

Elements the Infrastructure Manager has to provide to the Railway Undertaking for the Route Book

Number	Route Book
1	Generic information regarding the IM
1.1	IM's Name
2	Maps and Diagrams
2.1	Map: schematic overview including
2.1.1	Line sections
2.1.2	Principal locations (stations, yards, junctions, freight terminals)
2.2	Line diagram
2.2.1	Indication of running lines, loops catch/trap points and access to sidings
2.2.2	Principal locations (stations, yards, junctions, freight terminals) and their position relative to the line
2.2.3	Location, type and name of all fixed signals relevant for trains
2.3	Station/Yard/Depot diagrams
2.3.1	Name of location
2.3.2	Type of location passenger terminal, freight terminal, yard, depot
2.3.3	Location, type and identification of fixed signals that protect danger points
2.3.4	Identification and plan of tracks, including switches
2.3.5	Identification of platforms
2.3.6	Length of platforms

Number	Route Book
2.3.7	Height of platforms
2.3.8	Curvature of platforms
2.3.9	Identification of loops
3	Specific Line Segment information
3.1	General Characteristics
3.1.1	Line segment extremity 1
3.1.2	Line segment extremity 2
3.1.3	Lineside indications of distance (frequency, appearance and positioning)
3.1.4	Maximum permissible speed(s)/Speeds according to allocated path timetable
3.1.5	Any other information the driver shall be aware of
3.1.6	Specific geographical information required on the local infrastructure
3.1.7	Means of Communication with the traffic management/control centre in normal, degraded and emergency situation
3.2	Specific Technical Characteristics
3.2.1	Gradient percentage
3.2.2	Gradient location
3.2.3	Tunnels: fire safety categorisation and tunnel-related data in clause 4.2.1.2.2.1c
3.2.4	Non-stopping areas: identification, location, type
3.2.5	Industrial risks – locations where it is dangerous for the driver to step out
3.2.6	Locations of areas designated for testing the sanding device (if existing)
3.3	Energy subsystem
3.3.1	Energy supply system (voltage and frequency)
3.3.2	Maximum train current
3.3.3	Restriction related to power consumption of specific electric traction unit(s)
3.3.4	Restriction related to the position of Multiple Traction unit(s) to comply with contact line separation (position of pantograph)
3.3.5	Location of neutral sections
3.3.6	Location of areas that must be passed with lowered pantographs.
3.3.7	Conditions applying with regard to regenerative braking
3.3.8	Maximum current at standstill per pantograph
3.4	Control-Command and Signalling subsystem
3.4.1	Need for more than one system active simultaneously
3.4.2	Special conditions to switch over between different class B train protection, control and warning systems

Number	Route Book
3.4.3	Special technical conditions required to switch over between ERTMS/ETCS and Class B systems
3.4.4	Special instructions (location) to switch over between different radio systems
3.4.5	Permissibility to use Eddy-current brake
3.4.6	Permissibility to use magnetic brake
3.5	Operation and Traffic Management subsystem
3.5.1	Operating language