

EuroSpec



EuroSpec Common IDs



Specification EuroSpec Common IDs

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© SNCF-VOYAGEURS, Rail Delivery Group (RDG), Deutsche Bahn (DB),
Nederlandse Spoorwegen (NS), Österreichische Bundesbahnen (ÖBB),
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Table of Contents

1	Foreword	4
2	Introduction	5
3	Scope	7
4	Normative References	7
5	Terms, definitions and abbreviations	8
6	Specifications	10
7	Appendix	11
8	Bibliography	11

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Version	Date	Change
void	void	void

1 FOREWORD

EuroSpec is a group of European train operating companies providing harmonised product specifications for use in train procurement and refurbishment.

The main target is to align train operator's needs in order to reduce the whole life cycle cost of the train, shorten the delivery time and speed up the innovation cycle and the deployment of innovations.

The benefits of EuroSpec:

- Increase of reliability by sharing good practice and experience;
- Simplification of the tender process in time and cost as a result of fewer variations in requirements between tenders;
- Standardised products and cost reduction due to harmonisation of train operators' requirements;
- Reduction of diversity in request to the industry for more competitive and mature products;
- To provide to the industry free "Customer needs" for their future R&D program, through requirements that are not yet fulfilled by existing product nor solution.
- To promote through our common requirements to the industry the availability of information required for improving operation performance and ensuring long term sustainability of our assets, supporting open interfaces.

The EuroSpec specifications comprise merged functional and product basic requirements. All EuroSpec specifications focus on technical aspects based on lessons learned and on foreseen developments.

A EuroSpec specification is a voluntary specification designed to be used within the European region. The primary field of application is the European rolling stock domain and all associated interfaces.

Regarding the hierarchy this common specification can be positioned as follows, in order of prevalence:

- EN standards
- UIC Codes (leaflets)
- EuroSpec Specifications
- Company Specifications

2 INTRODUCTION

This document is a voluntary specification, produced by SNCF-VOYAGEURS, Rail Delivery Group (RDG), Deutsche Bahn (DB), Nederlandse Spoorwegen (NS), Österreichische Bundesbahnen (ÖBB) and Schweizerische Bundesbahnen (SBB).

Individual companies may choose to mandate it through internal instructions/procedures or contract conditions.

Purpose of this document

This document provides a voluntary specification for “Common IDs” for use by companies in the rail sector if they so choose.

The purpose of this document is to provide a common specification for “Common IDs” in rolling stock between train operators. This document is to replace individual company specific functional requirements and constitutes a common reference being used for tendering and verification.

Application of this document

- This specification is voluntary. Individual companies may however elect to mandate all or part of its use through company procedures or contract conditions. Where this is the case, the company concerned must specify the nature and extent of application.
- Specific compliance requirements and dates of application have therefore not been identified since these will be the subject of the internal procedures or contract conditions of those companies that choose to adopt this standard.

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3 SCOPE

This specification is applicable for electrical multiple units (EMUs).

This specification is an add-on to the Technical Specifications of Interoperability (TSI). In addition to this specification additional operator specific specifications might be defined. The specification contains requirements at rolling stock level i.e. the EMU and at system- and subsystem level and its interfaces and unifies the requested performances of the different operators.

The EuroSpec Common IDs addresses common requirements that are raised to manage technical risks and addresses functions where a certain value needs to be specified.

Additionally, the EuroSpec Common IDs tries to reduce the requirements that are repeated in different parts of the specification.

This specification shall be used as a check list/aide memoire on system and on subsystem level to ensure that the common needs of train operating companies are considered.

This specification is not intended to block innovation or to prevent improvement. For this purpose, each requirement is followed by a rationale.

If applicable, the requirements are referenced to the EN 15380 structure. It is foreseen that more requirement sets and European standards will make use of this common reference structure.

If a certain value needs to be specified, this value is marked by a “\$\$” in the requirement text and the value is explained in a comment for the reader. Examples for typical values are given in the comments, if possible.

This specification aims to reduce the risk that common needs of European train operating companies are overlooked during the design of the EMU.

4 NORMATIVE REFERENCES

The following referenced documents are indispensable for the application of this document. ENs are developed by CEN¹ or CENELEC² ISO by ISO and BS by British Standards Institute. UIC leaflets are developed by UIC³ and are made available from their members.

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

LOC&PAS TSI 1302/2014/EU.	Technical specification for interoperability relating to the 'rolling stock – locomotives and passenger rolling stock' subsystems of the rail system in the European Union
SRT TSI 1303/2014/EU	Technical specification for interoperability relating to 'safety in railway tunnels' of the rail system of the European Union
BS 7976-1	Pendulum Testers: Specification
EN 12299	Railway Applications – Ride Comfort for Passengers – Measurement and Evaluation
EN 15528	Railway applications - Line categories for managing the interface

¹ Comité Européen de Normalisation / European Committee for Standardization - www.cen.eu

² Comité Européen de Normalisation Électrotechnique / European Committee for Electrotechnical Standardization - www.cenelec.eu

³ Union internationale des chemins de fer / International Union of Railways - www.uic.org

	between load limits of vehicles and infrastructure
EN 15273-2	Railway applications - Gauges. Rolling stock gauge
EN 15663	Railway applications - Vehicle reference masses
EN 16404:2016	Railway applications - Re-railing and recovery requirements for railway vehicles
EN 50125-1	Railway applications - Environmental conditions for equipment. Rolling stock and on-board equipment
EN 50343	Railway applications - Rolling stock - Rules for installation of cabling
EN 50338	Railway Applications - Power supply and rolling stock - Technical criteria for the coordination between power supply (substation) and rolling stock to achieve interoperability
EN ISO 3095	Acoustics - Railway applications - Measurement of noise emitted by railbound vehicles
EN ISO 3381	Acoustics - Railway applications - Measurement of noise inside railbound vehicles
ISO 14040:	Environmental management - Life cycle assessment - Principles and framework
ISO 22628	Road Vehicles - Recyclability and recoverability - Calculation method
UIC 612-1	Rolling stock configurations and main activated functions for EMU/DMU, locomotives and driving coaches
UIC 779-11	Determination of railway tunnel cross-sectional areas on the basis of aerodynamic considerations
	EuroSpec specification "Parking Noise", 1st edition, published in 2019
	EuroSpec specification "Toilet System", 2nd edition, published in 2014
UNIFE 495	Product Category Rules for Rail EMUs
	Railway Industry Substance List, http://www.unife-database.org

5 TERMS, DEFINITIONS AND ABBREVIATIONS

TSI	Technical specification for interoperability
EN	EuroNorm
ISO	International Standardization Organisation
BS	British Standards
UNIFE	Union des Industries Ferroviaires Européennes (European Rail Supply association)

Capacity Class	Classification for an EMU with a certain capacity
EMU	A self-propelled, electric trainset that is composed of at least one vehicle or of at least two permanently coupled vehicles with a cab at each end of the trainset.
DCO	Driver Controlled Operation
TCMS	Train Control & Management System
Passing Speed	The sum of the speed of the EMU and of the speed of a passing train.

6 SPECIFICATIONS

This chapter describes the requirements and their objectives. For several requirements verifications are included. Verification describes how compliance to the requirement will be verified.

Definitions and further clarifications applying to this specification can be found in the document “EuroSpec Requirements Management” at www.eurospec.eu.

The columns of the specification are summarised as follows:

ID

Unique Identification of the requirement.

Requirement classification

Importance and legal status of the requirement to the project To differentiate between the requirements with regard to relevance and legal status like Requirement (RE - mandatory), Design Recommendation (DR), Optional Requirement (OR), Operators’ Choice (CH) or Information (INFO).

Requirement-text

Description of the requirement in chapters.

For the structure of the chapters, please see EN 15380-5 (system breakdown), EN 15380-4 (list of functions) & EN 15380-5 annex A (non-functional attributes).

Rationale

Reason to state the requirement.

Comment for the reader: Description of value to be specified

Indication for the reader about the value that is to be specified, if the description of the value is not clear from the requirement text.

Product element EN 15380-2

Link between requirement and the product element of the EN 15380-2.

Change since last release

First release.

Verification

Verification type and point of time.

ID	Requirement classification	Requirement-text For structure, refer to EN 15380-5 (system breakdown), EN 15380-4 (list of functions) & EN 15380-5 annex A (non-functional attributes)	Rationale	Comment for the reader: Description of value to be specified	Product element EN 15380-2	Change since last release	Verification				
							Offer of Tenderer(s)	Design Review	First Article Inspection (FAI) of components	First Integration Inspection (FI)	Hand-over
Common.001	--	AA System			N/A	new					
Common.002	--	High level requirements			N/A	new					
Common.003	OR	The ability for interworking with subsets of existing designs of rolling stock should be demonstrated, recognising the aspirations for the long-term use of the rolling stock	As an operator, I want to operate multiple tractions so that I can form longer trains.		N/A	new	--	Design Review	--	Analysis	--
Common.004	OR	The EMU [add if necessary the capacity class] shall have at least \$\$ passengers seats.	As an operator, I want to offer the specified capacity to achieve the earnings, I expect.		N/A	new	--	Design Review	Demonstration	--	--
Common.005	RE	The EMU shall be able to operate in both driving directions without restrictions.	As an operator, I want to operate trains in both directions without having to turn around the EMU.		N/A	new	--	Simulation	--	--	--
Common.006	OR	The EMU shall be able to operate in multiple with up to \$\$ EMUs of capacity class \$\$.	As an operator, I want to operate multiple tractions so that I can compile longer trains.	\$\$ capacity class: A project specific definition of versions of the EMU classified by passenger capacity.	N/A	new	--	Design Review	Demonstration	--	--
Common.007	OR	The EMU shall be able to operate in multiple with up to \$\$ EMUs of the existing EMUs type \$\$.	As an operator, I want to operate multiple tractions so that I can compile longer trains.	\$\$ EMU type: The unambiguous name of an existing EMU which is not part of the project.	N/A	new	--	Design Review	Demonstration	--	--
Common.008	OR	The EMU shall be able to operate in tilting mode at increased speed on the following network and on the following lines: [project specific list]	As a customer, I want to buy trains that are able to operate in tilting mode on the specified network		N/A	new	--	Design Review	Type Test	--	--
Common.009	RE	The EMU shall be able to operate on the following network and on the following lines: [project specific list]	As a customer, I want to buy trains that are able to operate on the specified network		N/A	new	--	Design Review	Type Test	--	--
Common.010	OR	The EMU shall be designed for general operation according to the LOC&PAS TSI 1302/2014/EU.	As an operator, I want to operate the EMU together with existing rolling stock that is designed for general operation.		N/A	new	--	Design Review	Type Test	--	--
Common.011	OR	The EMU shall enable the purchaser to form trains in random arrangements.	As an operator, I want to form trains in random arrangements so that I do not need to turn around EMUs or to change the order of the EMUs.		N/A	new	--	Design Review	Demonstration	--	--
Common.012	RE	The EMU shall have a driver's cab at each end.	As an operator, I want to operate trains in both directions without having to turn around the EMU.		N/A	new	--	Design Review	Demonstration	--	--
Common.013	INFO	The product described in this specification is an electric multiple unit (EMU).			N/A	new	--	Design Review	Demonstration	--	--
Common.014	OR	The supplier shall achieve all approvals to put the EMU into commercial service from the relevant safety authorities.	As a customer, I want to buy trains that are ready to operate.		N/A	new	--	Design Review	Type Test	--	--
Common.015	--	B Carry and protect passengers, train crew and load			N/A	new					
Common.016	OR	The EMU [add if necessary the capacity class] shall have places for \$\$ standing passengers in addition to the seated passengers.	As an operator, I want to offer the specified capacity to achieve the earnings, I expect.		N/A	new	--	Design Review	--	--	--
Common.017	RE	The EMU shall have at least \$\$ passenger seats in first class.	As an operator, I want to offer the specified capacity to achieve the earnings, I expect.		N/A	new	--	Design Review	--	--	--
Common.018	RE	While in operation, the EMU shall enable passengers to walk the whole length of the passenger accessible areas of each EMU.	As a transported person, I want to walk through the EMU so that I can find the place, I like, without waiting for the next scheduled stop.		N/A	new	--	Design Review	--	--	--
Common.019	RE	If the fire detection system detects a fire and when there is no staff present, the EMU shall send a message to a landside contact defined by the purchaser.	As an operator, I want to be sure to be informed about detected fires, so that I can minimise the damage.		N/A	new	--	Design Review	--	Type Test	--
Common.020	--	C Provide appropriate conditions to passenger, train crew and load			N/A	new					
Common.021	RE	For all EMU types when running at maximum speed in the open and on a reference track as defined in ISO 3095 "Acoustics - Railway applications - Measurement of noise emitted by railbound vehicles", auxiliary systems (including air conditioning) running and all doors closed, noise levels measured inside the saloon area of EMUs shall not exceed $L_{pAeq,T} = \$\$$ dB(A). Measurements shall be carried out in accordance with EN ISO 3381 "Acoustics - Railway applications - Measurement of noise inside railbound vehicles".	As a transported person, I want to drive in a quiet train to have a comfortable journey.	\$\$: level to be specified, appropriate values need to consider the operating conditions, the maximum speed on the rolling stock concept.	N/A	new	--	Simulation	--	Type Test	--
Common.022	RE	For all EMU types when stationary, with traction supply available, auxiliary systems (including air conditioning) running and all doors closed, noise levels measured inside the saloon area of EMUs shall not exceed $L_{pAeq,T} = \$\$$ dB(A). Measurements shall be carried out in accordance with EN ISO 3381.	As a transported person, I want to sit in a quiet train to have a comfortable journey. The noise TSI only defines the following values: - exterior noise (running & standstill) - interior noise in the driver's cab	\$\$: level to be specified, appropriate values from experience may be: - 62 dB(A), from experience on the continent - 65 dB(A), from experience in GB The achievable values may differ due to the smaller vehicle gauge in GB.	N/A	new	--	Simulation	--	Type Test	--
Common.023	CH	The A-weighted equivalent continuous sound pressure level ($L_{pAeq,20s}$) inside the vestibule shall not exceed 80 dB(A)	As a transported person, I want to drive in a quiet train to have a comfortable journey.		N/A	new	--	Simulation	--	Type Test	--

ID	Requirement classification	Requirement-text For structure, refer to EN 15380-5 (system breakdown), EN 15380-4 (list of functions) & EN 15380-5 annex A (non-functional attributes)	Rationale	Comment for the reader: Description of value to be specified	Product element EN 15380-2	Change since last release	Verification				
							Offer of Tenderer(s)	Design Review	First Article Inspection (FAI) of components	First Integration Inspection (FII)	Hand-over
Common.024	RE	For pressure sealed trains, the pressure change in tunnels shall be below the limit values defined in Appendix F (Section F4) of UIC Fiche 779-11 "Determination of railway tunnel cross-sectional areas on the basis of aerodynamic considerations"	Changes in pressure can affect a person's health and a value of 10 kPa is quoted in the TSIs as a maximum pressure variation over the whole tunnel transit. However, for comfort purposes the lower levels specified should be applied		N/A	new	--	Simulation	--	Type Test	--
Common.025	OR	In tunnels the change of pressure should be in accordance with appendix A.2 of UIC 779-11 "Determination of railway tunnel cross-sectional areas on the basis of aerodynamic considerations", to suit the type of train proposed and the route it will use	Changes in pressure can affect a person's health and a value of 10 kPa is quoted in the TSIs as a maximum pressure variation over the whole tunnel transit. However, for comfort purposes the lower levels specified should be applied		N/A	new	--	Simulation	--	Type Test	--
Common.026	CH	For non-pressure sealed trains, the pressure change in tunnels shall be below the following limit values, measured inside the passenger and staff accessible part: - \$\$ kPa in 4s in extreme cases - \$\$ kPa in 4s in normal cases for a single trainset Extreme case is defined as the rare case of two trains passing in a double track tunnel at a critical point resulting in the most severe pressure change. Normal case is defined as a single train set transiting a single bore tunnel.	Changes in pressure can affect a person's health and a value of 10 kPa is quoted in the TSI as a maximum pressure variation over the whole tunnel transit. However, for comfort purposes the lower levels specified should be applied	\$\$: Give pressure change in kPa (2 figures) The following values may be appropriate: - 4.0 kPa in 4s in extreme cases - 2.5 kPa in 4s in normal cases for a single trainset EN 14067-5:2011 and UIC 779-11 use slightly higher values: - 4.5 kPa in 4s in extreme cases - 3.0 kPa in 4s in normal cases for a single trainset	N/A	new	--	Design Review	Type Test	--	--
Common.027	DR	The EMU shall not degrade public mobile data and voice signals in its interior.	Connectivity is important now and limiting these signals is a degradation of the customer travel experience		N/A	new	--	Simulation	--	Type Test	--
Common.028	--	DB Provide external access (acc. to EN 15380-4)			N/A	new					
Common.029	RE	While a coupled train consisting of \$\$ EMUs capacity class \$\$ and \$\$ EMUs capacity class \$\$ is standing at a platform with a useable length of \$\$ m, passengers shall be able to board and leave the EMU at all passenger entrances.	As an operator, I want to provide passenger access at the specified platform length, so that the specified scheduled stops can be made.	\$\$: Give numbers, capacity class and platform length	N/A	new	--	Simulation	--	Type Test	--
Common.030	RE	Passenger entrances shall be situated on both sides of the EMU.	As an operator, I want to provide passenger access at both sides of the EMU, so that the specified scheduled stops can be made.		N/A	new	--	Design Review	--	--	--
Common.031	--	EB Enable coupling and uncoupling			N/A	new					
Common.032	RE	When a trainset is to be separated into 2, the EMU shall enable the driver to uncouple the trainset in maximum \$\$ s, measured from the beginning of the last rotation of the wheels to the end of the first rotation of the wheels of one of the new trains after the separation procedure including all operational tasks e.g. brake tests.	As an operator, I want to change the train formation in the specified time, so that the train is able to adhere to the specified schedule.	\$\$: Give time in seconds	N/A	new	--	Design Review	--	Type Test	--
Common.033	RE	When two trains are to be coupled together, the EMU shall enable the driver to couple the train in maximum \$\$ s, measured from contact of the coupler faces to the end of the first rotation of the wheels after the coupling procedure including all operational tasks e.g. brake tests.	As an operator, I want to change the train formation in the specified time, so that the train is able to adhere to the specified schedule.	\$\$: Give time in seconds	N/A	new	--	Calculation	--	Type Test	--
Common.034	--	F Provide energy			N/A	new					
Common.035	RE	There shall be no adverse effects on passenger facing equipment or need for on-train staff intervention in normal operation after passing through neutral sections	Sometimes, once a supply is removed, the equipment returns to a start mode (e.g. HVAC) or needs resetting. The aim of this requirement is that the equipment continues in the mode it was in when the supply was removed		N/A	new	--	Calculation	--	Type Test	--
Common.036	--	G Accelerate, maintain speed, brake and stop			N/A	new					
Common.037	OR	While being in operation in the [add current supply system, e.g. AC 25 000 V 50 Hz] network in [add country] the EMU shall be able to operate with a speed of \$\$ kph. Train speed shall be measured - on a flat straight track - at operational mass under normal payload according to EN 15663 "Railway applications - Vehicle reference masses" - at a head wind of 10 kph	As an operator, I want to operate the EMU with the specified power supply.	\$\$: Give maximum operating speed in k	N/A	new	--	Design Review	--	Type Test	--
Common.038	--	H Provide train communication, monitoring and control			N/A	new					
Common.039	RE	Critical levels of consumables (e.g. fuel, washer fluid etc.) that would prevent normal operation of the train should be flagged to the driver when they reach an agreed minimum level.	This permits replenishment to be planned and reduces the risk of train delay or cancellation		N/A	new	--	Design Review	--	Type Test	--
Common.040	OR	Critical levels of consumables (e.g. fuel, washer fluid etc.) that would prevent normal operation of the train should be advised to the Control room when they reach an agreed minimum level.	This permits replenishment to be planned and reduces the risk of train delay or cancellation		N/A	new	--	Design Review	--	Type Test	--
Common.041	DR	The EMU shall have an intelligent power management system such that equipment runs only when necessary and on-board systems are only energised as required.	This approach not only minimises energy consumption, but also ensures that noise and emission is minimised and the service life of sub-systems extended		N/A	new	--	Design Review	--	Type Test	--

ID	Requirement classification	Requirement-text For structure, refer to EN 15380-5 (system breakdown), EN 15380-4 (list of functions) & EN 15380-5 annex A (non-functional attributes)	Rationale	Comment for the reader: Description of value to be specified	Product element EN 15380-2	Change since last release	Verification				
							Offer of Tenderer(s)	Design Review	First Article Inspection (FAI) of components	First Integration Inspection (FII)	Hand-over
Common.042	RE	The EMU shall be able to switch from "Switched on" according to UIC612-1 "Rolling stock configurations and main activated functions for EMU/DMU, locomotives and driving coaches" to "In Service" according to UIC612-1 in maximum \$\$ s.	As an operator, I want the driver to be able to switch on the train in the specified time, so that the working time is minimised.		N/A	new	--	Design Review	--	Type Test	--
Common.043	RE	When a train is changing its direction of running, the EMU shall enable the driver to change the direction of running in maximum \$\$ s, measured from the beginning of the last rotation of the wheels to the end of the first rotation of the wheels. Non-technical operational tasks e.g. walking to the other cab, are excluded.	As an operator, I want to change the running direction of the train in the specified time, so that the train is able to adhere to the specified schedule.	\$\$: Give time in seconds	N/A	new	--	Design Review	--	Type Test	--
Common.044	RE	The train shall not be able to move, relative to the platform, once it has come to a stop and doors are enabled and shall only be able to move again once door interlock is achieved	This is to ensure safety at the Passenger-Train Interface by preventing train movement whilst the train doors are enabled. A suitable over-ride would need to be provided		N/A	new	--	Design Review	--	Type Test	--
Common.045	--	J Support and guide the train on the track			N/A	new					
Common.046	DR	A Mean Comfort Index shall be no worse than 1.5 measured on a route defined reference track over the full range of EMU speed, as defined in EN 12299 "Railway Applications – Ride Comfort for Passengers – Measurement and Evaluation"	As an operator, I want to limit acceleration so that I can offer a comfortable ride.		N/A	new	--	Design Review	--	Type Test	--
Common.047	RE	A Mean Comfort Index shall be no worse than 2.5 measured at any point along the saloon over the full range of EMU speed, as defined in EN 12299 "Railway Applications – Ride Comfort for Passengers – Measurement and Evaluation"	As an operator, I want to limit acceleration so that I can offer a comfortable ride.		N/A	new	--	Simulation	--	Type Test	--
Common.048	RE	The EMU shall be compliant to EMU gauge \$\$ according to EN 15273-2 "Railway applications - Gauges. Rolling stock gauge"	As a customer, I want to buy trains that are able to operate on the specified network	\$\$: gauge - code according to EN 15273	N/A	new	--	Simulation	--	Type Test	--
Common.049	--	K Integrate the EMU into the complete system railway			N/A	new					
Common.050	RE	The EMU shall be compliant with all requirements, that are marked as "requirement (RE)" or "design recommendation (DR)", of EuroSpec specification "Parking Noise", 1st edition, published in 2019.	The noise limits at standstill, required by the noise TSI are considered to be too high for practical use in central and western Europe. The noise limits for running EMUs, required by the TSI, are considered to be adequate.		N/A	new	--	Design Review	--	FII	--
Common.051	--	+01 Reliability, Availability, Maintainability (RAM)			N/A	new					
Common.052	DR	Electrical equipment (at the Line Replaceable Unit level) shall have a modular, open architecture (based on the application of Internet Protocol (IP) communications functionality) using open source software.	As a purchaser of spare parts, I want to be able to develop sources for spare parts independently from the train manufacturer, so that i can profit from competition in procurement.		N/A	new	--	Simulation	--	Type Test	--
Common.053	RE	Cabling shall be in accordance with EN 50343 "Railway applications - Rolling stock - Rules for installation of cabling".	As an operator, I want to have a safe and reliable electrical installation, to minimise the repairs, I may have to perform.		N/A	new	--	Design Review	--	Demonstration	--
Common.054	RE	The EMU shall be able to run at least \$\$ km between maintenance activities apart from daily checks.	As an operator, I want to maximise the availability of the EMU, to reduce the number of EMUs, I have to buy.		N/A	new	--	Design Review	--	Demonstration	--
Common.055	--	+02 Safety			N/A	new					
Common.056	RE	The manufacturer shall consider the risk of "train surfing" in his risk analysis.	As an operator, I want to discourage "train surfing" on the whole exterior of the train including the exterior doors, in order to prevent the loss of life.		N/A	new	--	Design Review	--	Demonstration	--
Common.057	DR	Exterior features of rolling stock shall be designed to minimise persons riding or climbing on them	This is to prevent irresponsible members of the public from "train surfing", whilst the train is in motion or using the jumper cables as a makeshift ladder to reach the EMU roof, whilst stationary in a platform.		N/A	new	--	Design Review	--	--	Certification
Common.058	RE	The torque tightening strategy shall consider the management of the torque associated with maintenance activities	As an operator, I want to have a safe and reliable fasteners, to minimise the repairs, I may have to perform.		N/A	new	--	Design Review	--	Demonstration	--
Common.059	RE	There shall be a defined strategy for the management of torque-tightening of critical fasteners	As an operator, I want to be sure that fasteners are torque tightened correctly during manufacturing.		N/A	new	--	Design Review	Demonstration	Demonstration	--
Common.060	--	+03 Security			N/A	new					
Common.061	RE	The manufacturer shall coordinate the deployed access control system for operation and maintenance with the purchaser.	As an operator, I want to coordinate the access control system with the supplier, either to be able so use my existing system (e.g. keys type xyz) or to decide a new system together with the supplier.		N/A	new	--	Design Review	Demonstration	Demonstration	--
Common.062	--	+05 Life Cycle Cost (LCC)			N/A	new					
Common.063	DR	Provision for the adoption of alternative power generation and energy storage should be made	As an operator, I want to be able to install a different power generation and energy storage system at a later stage during the life cycle of the EMU to be able to adapt to future requirements.		N/A	new	--	Calculation	--	Type Test	--
Common.064	RE	Electrical wiring identification labels (idents) shall withstand normal wear and tear without significant physical degradation in order to remain legible for the life of the rolling stock.	Faded or lost idents cause delays in fault finding while cables are traced and increases the risk of maintenance errors		N/A	new	--	Design Review	--	Type Test	--

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							Offer of Tenderer(s)	Design Review	First Article Inspection (FAI) of components	First Integration Inspection (FII)	Hand-over
Common.065	DR	The mass of the EMU shall be optimised to deliver the lowest whole life cost to the "railway system".	Mass reduction through intelligent / innovative design is clearly beneficial, but this should not be pursued as an end in itself.		N/A	new	--	Calculation	--	Type Test	--
Common.066	--	+07 Physical limits			N/A	new					
Common.067	RE	The EMU shall be able to accommodate an exceptional payload for standing passengers in passenger and catering areas according to EN 15663 "Railway applications - Vehicle reference masses" equivalent to \$\$ kg per m ² .	As an operator, I want to offer the specified capacity to achieve the earnings, I expect.	\$\$: Give payload in kg.	N/A	new	--	Design Review	--	--	--
Common.068	OR	The EMU shall have a length of maximum \$\$ mm measured as the length over buffers or length over coupler faces.	As an operator, I want to specify the maximum length of the train, so that I can use existing maintenance infrastructure.		N/A	new	--	Design Review	--	Type Test	--
Common.069	RE	The EMU shall have route availability \$\$ according to EN 15528 "Railway applications - Line categories for managing the interface between load limits of vehicles and infrastructure" or a route availability corresponding to a lower weight.	As a customer, I want to buy trains that are able to operate on the specified network	\$\$: route availability according to EN 15528	N/A	new	--	Design Review	--	Type Test	--
Common.070	RE	The manufacturer shall calculate all masses in the different load cases of the EMU according to EN 15663 "Railway applications - Vehicle reference masses".	As an operator, I want to control the weight of the train, to reduce energy consumption and to use existing maintenance infrastructure.		N/A	new	--	Calculation	--	Type Test	--
Common.071	RE	The manufacturer shall define the weight tolerances such that the specified weight is not exceeded in any load case.	As an operator, I want to control the weight of the train, to reduce energy consumption and to use existing maintenance infrastructure.		N/A	new	--	Design Review	--	Type Test	--
Common.072	OR	When in load case "Operational mass in working order" (MVO) according to EN 15663 "Railway applications - Vehicle reference masses", the EMU shall have a maximum weight of \$\$ kg.	As an operator, I want to control the weight of the train, to reduce energy consumption and to use existing maintenance infrastructure.	\$\$: maximum "Operational mass in working order"	N/A	new	--	Design Review	--	Demonstration	--
Common.073	--	+11 Environmental condition			N/A	new					
Common.074	DR	Hoses and underframe cabling should be designed and routed to reduce their susceptibility to damage caused by the build-up of snow and ice, any resultant increase in mass and from snow and ice falling elsewhere from the train.	Ice can be picked up and cause damage and the mass of snow and ice can fatigue or break hoses and cabling		N/A	new	--	Design Review	--	--	--
Common.075	RE	Critical systems (e.g. warning horns [including heating them and preventing snow ingress]; cab and passenger doors; windscreen wipers; DCO cameras (known as On-train Camera / Monitor System); couplers and head, tail and marker lights) shall be protected from the effects of the build-up of snow and ice.	Snow can be drawn into the systems via the louvers causing clogging, overheating and equipment failure		N/A	new	--	Design Review	--	Demonstration	--
Common.076	RE	Equipment ventilation louvers should be designed so that airflow is not adversely reduced by the dynamic effects of snow and ice.	Snow can be drawn into cooling systems via the louvers causing clogging, overheating and equipment failure.		N/A	new	--	Design Review	--	Demonstration	--
Common.077	RE	Equipment ventilation louvers, radiators or their filters should be designed so that airflow is not adversely reduced by the accumulation of debris and dust.	Dust, pollen and seed heads can be drawn into cooling systems via the louvers or radiators causing clogging of them or their filters leading to overheating and equipment shut-down		N/A	new	--	Design Review	--	Type Test	--
Common.078	DR	Rolling stock systems shall be designed to operate reliably under all foreseeable environmental conditions expected to be experienced during the design life of the rolling stock.	Rolling stock of the future needs to be designed to provide more resilience to foreseeable extremes of heat, rainfall and cold with respect to the impact of climate change and the associated predictions of more frequent instances of extreme weather conditions.		N/A	new	--	Calculation	--	Type Test	--
Common.079	DR	Suitable protection shall be provided for vulnerable electrical equipment to prevent the ingress and build-up of dirt, moisture, snow or sea-water.	The drawing of contaminated air through cabinets can lead to clogging and flashovers.		N/A	new	--	Design Review	--	Demonstration	--
Common.080	DR	The below-solebar area of the rolling stock should be as smooth and continuous as possible.	Reduction of the under-pressure below the train reduces the vulnerability to a build-up of snow and ice, which can not only affect performance but also acts as a significant obstacle to undertaking maintenance inspections. It also creates problems when trains encounter warmer conditions in the course of their journey, resulting in ice falling from the train at speed, with the associated risk of damage and injury.		N/A	new	--	Calculation	--	Type Test	--
Common.081	OR	The EMU shall be able to operate without loss or reduction of functions in height range A2 (up to 2000 m above sea level) according to EN 50125-1 "Railway applications - Environmental conditions for equipment. Rolling stock and on-board equipment".	As an operator, I want to be able to use the train in the specified weather conditions, to be able to offer a reliable train service.		N/A	new	--	Design Review	--	Type Test	--
Common.082	RE	The EMU shall be able to operate without loss or reduction of functions in severe snow, ice and hail conditions according to LOC&PAS TSI 1302/2014/EU clause 4.2.6.1.2.	As an operator, I want to be able to use the train in the specified weather conditions, to be able to offer a reliable train service.		N/A	new	--	Design Review	--	Analysis	--

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Common.083	RE	The EMU shall be able to operate without loss or reduction of functions in temperature range T1 (-25 °C to +40 °C) according to EN 50125-1 "Railway applications - Environmental conditions for equipment. Rolling stock and on-board equipment".	As an operator, I want to be able to use the train in the specified weather conditions, to be able to offer a reliable train service.		N/A	new	--	Design Review	--	Analysis	--
Common.084	--	+12 Environmental protection			N/A	new					
Common.085	OR	A description of how "design-for-disassembly principles" are used, including issues such as the marking of plastics and avoiding the blending of materials, shall be provided.	The blending of materials can make recycling of components costly and complex, or even impossible		N/A	new	--	Design Review	--	Type Test	--
Common.086	RE	An "End of Life Manual", detailing the disassembly, identification and segregation methods and showing the disposal methods for each component, shall be provided.	This information is required to demonstrate the whole life environmental impact for the train design		N/A	new	--	Design Review	--	Analysis	--
Common.087	RE	An "Environmental Product Declaration" in line with UNIFE 495 "Product Category Rules for Rail EMUs" or other externally verified certification shall be provided.	This information is required to demonstrate the whole life environmental impact for the train design		N/A	new	--	Design Review	--	Demonstration	--
Common.088	OR	An environmental impact assessment for the rolling stock's entire life, in accordance with "ISO 14040: Environmental management. Life cycle assessment - Principles and framework", shall be undertaken.	Rail is an environmentally sustainable means of transport, and has a major role to play in encouraging modal shift from less sustainable modes. However, it does have environmental impacts which need to be considered at the design stage for the entire life of the rolling stock.		N/A	new	--	Design Review	--	Analysis	--
Common.089	RE	An inventory of all materials by type, including their mass, shall be provided	As an operator, I want to be able to sort the materials to be recycled to have foreseeable costs for recycling.		N/A	new	--	Design Review	--	Analysis	--
Common.090	RE	Confirmation shall be provided that rolling stock and spare parts do not incorporate any materials which are restricted in the area of use.	The use of restricted materials can make recycling of components costly and complex, or even impossible.		N/A	new	--	Design Review	--	Analysis	--
Common.091	RE	End of life recyclability and recovery targets, based on the terms defined in ISO 22628 "Road vehicles - Recyclability and recoverability - Calculation method", shall be provided.	This information is required to enable future operators and maintainers of the EMUs concerned to meet their legal obligations in managing the risks associated with any hazardous materials.		N/A	new	--	Design Review	--	Analysis	--
Common.092	RE	Hazardous materials shall be listed by part number, quantity, location, etc and a risk assessment provided to justify their use.	This information is required to enable future operators and maintainers of the EMUs concerned to meet their legal obligations in managing the risks associated with any hazardous materials.		N/A	new	--	Design Review	--	Analysis	--
Common.093	RE	The percentage weight of the rolling stock comprising recycled content shall be provided.	This information is required to enable future operators and maintainers of the EMUs concerned to meet their legal obligations in managing the risks associated with any hazardous materials.		N/A	new	--	Design Review	--	Analysis	--
Common.094	RE	The EMU shall be free from any substance listed in the "Railway Industry Substance List" of UNIFE in category "Prohibited (in Area of Restriction)", abbreviation "P(AR)" The Railway Industry Substance List" may be downloaded on: http://www.unife-database.org .	As an operator, I want to reduce the whole life environmental impact of the train.		N/A	new	--	Design Review	--	Simulation	Certification
Common.095	RE	The manufacturer shall provide the assessment of all substances listed in the "Railway Industry Substance List" of UNIFE in category "Declarable for Assessment", abbreviation "D(FA)" that are present in the EMU. The Railway Industry Substance List" may be downloaded from http://www.unife-database.org .	As an operator, I want to reduce the whole life environmental impact of the train.		N/A	new	--	Design Review	--	Analysis	--
Common.096	--	+17 Operating performance			N/A	new					
Common.097	RE	The EMU shall have automatic couplers at both ends.	As an operator, I want to change the train formation without manual coupling, so that the train is able to adhere to the specified schedule.		N/A	new	--	Design Review	--	Analysis	--
Common.098	CH	The EMU shall have external gangways that are usable for passengers at both ends of the EMU.	As a transported person, I want to walk through the train so that I can find the place, I like, without waiting for the next scheduled stop.		N/A	new	--	Design Review	--	--	--
Common.099	RE	When passing another train in a tunnel, the EMU shall be able to operate at a passing speed of \$\$ kph.	As an operator, I want to avoid speed restrictions, so that I am able to run trains on time.	\$\$. Give speed in kph (2 figures)	N/A	new	--	Design Review	--	Simulation	Certification
Common.100	RE	When passing another train outside a tunnel, the EMU shall be able to operate at a passing speed of \$\$ kph.	As an operator, I want to avoid speed restrictions, so that I am able to run trains on time.	\$\$. Give speed in kph (2 figures)	N/A	new	--	Design Review	--	--	--
Common.101	OR	The manufacturer shall conduct jacking type tests for recovery purposes according to EN 16404:2016 "Railway applications - Re-railing and recovery requirements for railway vehicles" chapter 9 "validation".	As an operator, I want to be sure to be able to jack the EMU in a suitable way, so that further damage will be avoided.		N/A	new	--	Design Review	--	Type Test	--
Common.102	--	+19 Rescue and recovery			N/A	new					

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Common.103	OR	To facilitate rescue of stranded trains an "emergency - limited functionality" mode of communication between the stranded and rescue train should be considered. As a minimum this would provide: - Emergency brake, - Full service brake application, - Traction Control, - Door Control and Interlock, - Crew to Crew Communication, - Public Address, - Passenger Communication Emergency Alarm	This enables the failed train to remain suitable for passenger-use with limited operational restrictions, until reaching a suitable location to be taken out-of-service, taking into account the passenger environment.		N/A	new	--	Design Review	--	Type Test	--
Common.104	--	+20 Power distribution and management			N/A	new					
Common.105	RE	A load shedding strategy in the event of perturbation and loss of main electrical supply shall be proposed and agreed.	This should consider for how long systems such as lighting, air-conditioning, ventilation, toilets, internal emergency signposting, announcement system, Wi-Fi and communication system are kept available from auxiliary supplies (e.g. batteries) in order to maximise the essential services.		N/A	new	--	Design Review	--	Type Test	--
Common.106	--	+21 Energy consumption			N/A	new					
Common.107	DR	Energy consumption data for a specified train diagram with agreed input parameters shall be provided	This enables like-for-like comparisons of energy consumption to be made between trains		N/A	new	--	Simulation	--	--	--
Common.108	--	+23 Operational conditions			N/A	new					
Common.109	OR	The EMU shall be classified as category B rolling stock according to the Loc & Pas TSI 1302/2014/EU and according to the SRT TSI 1303/2014/EU.	As a customer, I want to buy trains that are able to operate on the specified network		N/A	new	--	Design Review	--	Analysis	--
Common.110	OR	The EMU shall be able to operate in tunnels with a length of up to \$\$ km.	As a customer, I want to buy trains that are able to operate on the specified network		N/A	new	--	Design Review	--	--	Certification
Common.111	--	+24 Maintenance provisions			N/A	new					
Common.112	DR	The train design philosophy shall be that no in-situ bonding is required to maintain or repair the rolling stock, with all Line Replaceable Units (LRUs) being mechanically attached to the rolling stock.	There have been instances where depot-replaced items e.g. windows, have subsequently become detached in-service. Additionally, this process can mean trains remaining out of service as a result of the time required for bonding which may be extended by uncontrolled depot conditions		N/A	new	--	Design Review	--	--	Certification
Common.113	OR	Consumables shall be easy to replenish / discharge without the need to position the rolling stock over a depot pitted road and it shall be possible to completely replenish / discharge such systems from either side of the EMU at both platform and track level.	Not all depots have pits. Sometimes replenishment at stations or in sidings is required		N/A	new	--	Design Review	--	Demonstration	--
Common.114	CH	Interfaces for replenishing consumables should be in accordance with a recognised standard.	Standardised connections ensure interoperability Standard connectors for fuel and water exist.		N/A	new	--	Design Review	--	Demonstration	--
Common.115	RE	It should be possible to connect shore supplies from both platform and track level.	Some operators currently struggle to access such connections for example, electrical, mechanical and pneumatic, when EMUs are stabled adjacent to platforms		N/A	new	--	Design Review	--	Type Test	--
Common.116	INFO	Light maintenance is defined as maintenance activity that has a maintenance interval of less than \$\$ years.	As an operator, I want to maximise the availability of the EMU, to reduce the number of EMUs, I have to buy.		N/A	new	--	Design Review	--	Analysis	--
Common.117	RE	The purchaser shall have the possibility to complete all planned heavy maintenance activities during a timeframe of \$\$ hours.	As an operator, I want to maximise the availability of the EMU, to reduce the number of EMUs, I have to buy.		N/A	new	--	Design Review	--	Analysis	--
Common.118	RE	The purchaser shall have the possibility to complete all planned light maintenance activities during a timeframe of \$\$ min.	As an operator, I want to maximise the availability of the EMU, to reduce the number of EMUs, I have to buy.		N/A	new	--	Design Review	--	Analysis	--
Common.119	RE	The purchaser shall have the possibility to complete the following unplanned maintenance activities during a timeframe of \$\$ min: - replace side window - replace front - replace front fairing - replace passenger seat - \$\$	Set a realistic time frame for specific activities. If necessary, split requirement to set more than one time frame.		N/A	new	--	Design Review	--	Analysis	--
Common.120	INFO	Timeframes for maintenance start, when the maintenance work on the EMU begins and end with the beginning of the readiness for operation.	As an operator, I want to maximise the availability of the EMU, to reduce the number of EMUs, I have to buy.		N/A	new	--	Design Review	Type Test	--	--
Common.121	--	BA car body			BA Vehicle Body	new					
Common.122	--	BB Car body shell			BA Vehicle Body	new					
Common.123	OR	Exterior surfaces shall be coated to facilitate the easy removal of graffiti	As an operator, I want to maximise the availability of the EMU, to reduce the number of EMUs, I have to buy.		BA Vehicle Body	new	--	Simulation	--	--	--

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Common.124	RE	All retention devices on exterior equipment covers and access panels shall be obvious when they are not engaged.	As an operator, I want to be sure that retention devices are properly engaged, so that safety critical incidents are avoided.		BA Vehicle Body	new	--	Design Review	--	--	--
Common.125	OR	Exterior equipment covers and access panels shall be fitted with secondary retention devices such that panels cannot open in service.	As an operator, I want to be sure that retention devices are properly engaged, so that safety critical incidents are avoided.		BA Vehicle Body	new	--	Design Review	Demonstration	--	--
Common.126	DR	The orientation to show open or locked of all retention devices on exterior equipment covers and access panels shall be consistent throughout the train.	As an operator, I want to be sure that retention devices are properly engaged, so that safety critical incidents are avoided.		BA Vehicle Body	new	--	Design Review	Type Test	--	--
Common.127	RE	While operating with an annual mileage of \$\$ km the carbody structure shall have a life expectancy of at least \$\$ years.	As an operator, I want to maximise the availability of the EMU, to reduce the number of EMUs, I have to buy.	\$\$ Give distance in km & time in years	BA Vehicle Body	new	--	Design Review	Type Test	--	--
Common.128	--	BF windscreens			CB Window	new					
Common.129	DR	When testing the effectiveness of windscreen wipers all contaminants likely to end up on the windscreen should be tried.	Certain suppliers have not tested for real detritus, for example squashed and sun-baked flies.		CB Window	new	--	Design Review	Demonstration	--	--
Common.130	OR	Windscreen wipers shall have a variable speed setting, including an intermittent setting.	This will reduce the need for drivers to operate the wiper control when continuous operation is not required.		CB Window	new	--	Design Review	Type Test	--	--
Common.131	RE	Windscreen wipers shall remain effective throughout the design speed range of the rolling stock.	Dynamic effects on the windscreen wiper systems need to be considered to ensure windscreen wipers remain effective.		CB Window	new	--	Design Review	Type Test	--	--
Common.132	--	CA doors/loading			NA Doors, entrances	new					
Common.133	--	CB external doors			NB External Doors	new					
Common.134	DR	Passenger entrances shall have a clear height of at least ... mm.	As an operator, I want to provide the specified height of passenger entrances so that the stopping times at scheduled stops will be met.		NB External Doors	new	--	Design Review	--	--	--
Common.135	RE	Passenger entrances shall have a clear width of at least ... mm.	As an operator, I want to provide the specified width of passenger entrance so that the stopping times at scheduled stops will be met.		NB External Doors	new	--	Design Review	Type Test	--	--
Common.136	--	CC internal doors			NC Internal Doors	new					
Common.137	CH	Interior doors shall have a clear height of at least ... mm.	As a transported person, I want to have a certain clear height in the EMU to be able to pass through the interior without knocking my head.		NC Internal Doors	new	--	Design Review	Demonstration	--	--
Common.138	--	DA guidance			N/A	new					
Common.139	--	DB running gear			EA Running gear	new					
Common.140	DR	Axles should be protected to prevent damage as a result of ballast thrown up caused by ice falling from trains.	Ice falling from a train can cause ballast to be thrown up damaging axles and wheels. Similarly, frozen ballast can also be picked-up and snowball causing damage to axles and underframe equipment.		EA Running gear	new	--	Design Review	Certification	--	--
Common.141	RE	While operating with an annual mileage of \$\$ km the running gear shall have a life expectancy of at least \$\$ years.	As an operator, I want to maximise the availability of the EMU, to reduce the number of EMUs, I have to buy.	\$\$ Give distance in km & time in years	EA Running gear	new	--	Design Review	--	--	--
Common.142	--	EA interiors			N/A	new					
Common.143	--	BB Arrange interior space			N/A	new					
Common.144	OR	The EMU shall have \$\$ toilet systems per \$\$ passenger seats.	As a transported person, I want to be able to use the toilet without having to wait.		N/A	new	--	Design Review	Demonstration	--	--
Common.145	--	C Provide appropriate conditions to passenger, train crew			N/A	new					
Common.146	--	+01 Reliability, Availability, Maintainability (RAM)			N/A	new					
Common.147	OR	All interior glazing and glass panels should be fitted with protective film ensuring that it can be subsequently removed and replaced without the removal of panels.	To protect the passenger facing side of bodyside windows, glazed panels and draught screens from damage and ensure the film can be changed easily by maintenance staff.		N/A	new	--	Design Review	--	--	--
Common.148	DR	Interior fixtures should be graffiti-resistant to an agreed standard.	This makes cleaning easier and helps to maintain their appearance for longer.		N/A	new	--	Design Review	Demonstration	--	--
Common.149	OR	Interior labels and protective film and coverings shall be designed to prevent damage by passengers.	The picking of edges of labels and coverings means they will look unsightly and have to be changed		N/A	new	--	Design Review	--	--	--
Common.150	DR	Interior panels should be designed to be as damage resistant as possible.	This makes cleaning easier and helps to maintain their appearance for longer.		N/A	new	--	Design Review	--	--	--
Common.151	DR	Passenger facing interior hard and soft surfaces shall maintain their appearance in accordance with the agreed cleaning regime.	This makes cleaning easier and helps to maintain their appearance for longer.		N/A	new	--	Design Review	--	--	--
Common.152	DR	Tamper-proof fastenings should be used to secure panels.	As an operator, i want to make vandalism more difficult, to reduce the number of repairs.		N/A	new	--	Design Review	--	--	--
Common.153	DR	The risk of vandalism should be considered to guide the amount of protective film or anti-graffiti measures required.	This makes cleaning easier and helps to maintain their appearance for longer.		N/A	new	--	Design Review	--	--	--

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Common.154	DR	The train interior shall be designed to prevent the build-up of dirt and dust in inaccessible places.	This helps to eliminate crevices that are hard to reach and clean, with unused spaces filled and radiused corners provided where surfaces meet, e.g. between panels and floors.		N/A	new	--	Design Review	Demonstration	--	--
Common.155	--	+04 Health protection			N/A	new					
Common.156	RE	Crevices where sharp objects, such as hypodermic needles, could be concealed, shall be avoided.	To avoid the associated risk of injury to passengers, maintenance and cleaning staff.		N/A	new	--	Design Review	Demonstration	--	--
Common.157	--	EB floors, stairways and vestibules			CC Floor	new					
Common.158	--	+04 Health protection			CC Floor	new					
Common.159	RE	The floor coverings shall be slip-resistant to an agreed standard, e.g. a pendulum test value of 30 to BS 7976-1 "Pendulum Testers: Specification". Specification and the effect of wear shall be considered when making this assessment.	Experience, particularly in relation to the operation of trains with hard floors, is that some flooring materials can become slippery when wet, resulting in passenger accidents due to slipping.		CC Floor	new	--	Design Review	--	--	--
Common.160	RE	The pooling of water on floors shall be prevented.	This minimises the risk of wet floors creating a slipping hazard.		CC Floor	new	--	Design Review	Demonstration	--	--
Common.161	--	EC compartments			N/A	new					
Common.162	--	BB Arrange interior space			N/A	new					
Common.163	RE	Interface points for seats and tables with the EMU floor shall be avoided.	This facilitates easier cleaning and improves security by making it easier to identify any suspect devices.		N/A	new	--	Design Review	--	--	--
Common.164	DR	Seat covers should be made from an easily maintained material.	As an operator, I want to maintain a pleasant looking and clean interior.		N/A	new	--	Design Review	Demonstration	--	--
Common.165	OR	Seat cushions should have features that minimise damage from knives etc.	This prevents seats being slashed and giving access to seat foam which could provide a fire source.		N/A	new	--	Design Review	Type Test	--	--
Common.166	RE	The distance between the front edges of the seats in first class in vis-à-vis arrangement shall be at least \$\$ mm.	As a passenger, I want to have a comfortable seat to enjoy my ride.	\$\$: Give distance in mm Please also check EuroSpec specification "seat comfort"	N/A	new	--	Design Review	Demonstration	--	--
Common.167	RE	The EMU shall have at least \$m³ luggage space per passenger seat.	As a passenger, I want to have a reasonable place for my luggage.	\$\$: give space in m³	N/A	new	--	Design Review	Demonstration	--	--
Common.168	RE	The EMU shall not have tip up seats in first class areas.	As a passenger, I want to have a comfortable seat to enjoy my ride.		N/A	new	--	Design Review	Demonstration	--	--
Common.169	CH	The passenger seats in first class shall be arranged in 2 + 2 arrangement with a central aisle.	As a passenger, I want to have a comfortable seat to enjoy my ride.		N/A	new	--	Design Review	Demonstration	--	--
Common.170	CH	The passenger seats in second class shall be arranged in 2 + 2 arrangement with a central aisle.	As a passenger, I want to have a comfortable seat to enjoy my ride.		N/A	new	--	Design Review	Analysis	--	--
Common.171	OR	The proportion of row seating shall be maximum \$\$ % of the total number of seats in first class.	As a passenger, I want to have a comfortable seat to enjoy my ride.		N/A	new	--	Design Review	Analysis	--	--
Common.172	OR	The proportion of row seating shall be maximum \$\$ % of the total number of seats in second class.	As a passenger, I want to have a comfortable seat to enjoy my ride.		N/A	new	--	Design Review	Demonstration	--	--
Common.173	OR	The proportion of seats that are not tip up seats and that are arranged in vis-à-vis seat arrangement shall be at least \$\$ % of the total number of passenger seats of the EMU.	As a passenger, I want to have a comfortable seat to enjoy my ride.		N/A	new	--	Design Review	Type Test	--	--
Common.174	OR	The proportion of seats that are not tip up seats shall be at least \$\$ % of the total number of passenger seats of the EMU.	As a passenger, I want to have a comfortable seat to enjoy my ride.		N/A	new	--	Design Review	Type Test	--	--
Common.175	OR	The proportion of tip up seats shall be maximum \$\$ % of the total number of passenger seats of the EMU.	As a passenger, I want to have a comfortable seat to enjoy my ride.		N/A	new	--	Design Review	Type Test	--	--
Common.176	RE	The seat pitch in first class for airline style seating shall be at least \$\$ mm.	As a passenger, I want to have a comfortable seat to enjoy my ride.	\$\$: Give distance in mm Please also check EuroSpec specification "seat comfort"	N/A	new	--	Design Review	--	--	--
Common.177	RE	The seat pitch in first class for facing seat arrangement shall be at least \$\$ mm.	As a passenger, I want to have a comfortable seat to enjoy my ride.	\$\$: Give distance in mm Please also check EuroSpec specification "seat comfort"	N/A	new	--	Design Review	--	--	--
Common.178	RE	The seat pitch in second class for row seating shall be at least \$\$ mm.	As a passenger, I want to have a comfortable seat to enjoy my ride.	\$\$: Give distance in mm Please also check EuroSpec specification "seat comfort"	N/A	new	--	Design Review	Demonstration	--	--
Common.179	RE	The seat pitch in second class for vis-à-vis arrangement shall be at least \$\$ mm.	As a passenger, I want to have a comfortable seat to enjoy my ride.	\$\$: Give distance in mm Please also check EuroSpec specification "seat comfort"	N/A	new	--	Design Review	Demonstration	--	--
Common.180	--	C Provide appropriate conditions to passenger, train crew and load			N/A	new					

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							Offer of Tenderer(s)	Design Review	First Article Inspection (FAI) of components	First Integration Inspection (FII)	Hand-over
Common.181	CH	The A-weighted equivalent continuous sound pressure level (LpAeq,20s) inside the passenger seating area shall not exceed 75 dB(A) Passenger seating area is defined as the area, where passengers stay during normal passenger operation, excluding vestibules.	As a transported person, I want to drive in a silent train to have a comfortable journey.		N/A	new	--	Design Review	Type Test	--	--
Common.182	OR	Each fixed passenger seat shall have a power socket. Power sockets at passenger seats shall be usable for passengers.	As a passenger, I want to charge my mobile devices.		N/A	new	--	Design Review	--	--	--
Common.183	DR	Power sockets at passenger seats shall be visible to a passenger who is sitting on the respective seat.	As a passenger, I want to charge my mobile devices.		N/A	new	--	Design Review	Type Test	--	--
Common.184	DR	Power sockets at passenger seats shall be positioned so that a passenger who is sitting on the respective seat, is able to plug in their device.	As a passenger, I want to charge my mobile devices.		N/A	new	--	Design Review	--	--	--
Common.185	RE	Power sockets at passenger seats shall provide the respective type of socket and voltage that is compatible with the networks for household power supply in the countries where the EMU is operating.	As a passenger, I want to charge my mobile devices.		N/A	new	--	Design Review	Type Test	--	--
Common.186	--	ED toilets, sanitary system			DD Sanitary facilities	new					
Common.187	--	+01 Reliability, Availability, Maintainability (RAM)			DD Sanitary facilities	new					
Common.188	DR	The toilet system shall be compliant with all requirements, that are marked as "design recommendation (DR)", of EuroSpec specification Toilet System", 2nd edition, published in 2014.	As an operator, I want to have a reliable toilet, to avoid an unexpected lack of comfort.		DD Sanitary facilities	new	--	Design Review	--	--	--
Common.189	RE	The toilet system shall be compliant with all requirements, that are marked as "requirement (RE)" of EuroSpec specification Toilet System", 2nd edition, published in 2014.	As an operator, I want to have a reliable toilet, to avoid an unexpected lack of comfort.		DD Sanitary facilities	new	--	Design Review	--	--	--
Common.190	--	+02 Safety			DD Sanitary facilities	new					
Common.191	OR	Protective caps on consumable replenishment connectors e.g. Controlled Emission Toilet (CET) tank caps shall be fitted with secondary retention devices, the design of which, shall be of sufficient strength to withstand the dynamic forces should the cap become loose in service.	There have been instances of caps being left off and breaking away, causing damage, jamming in pointwork or creating a risk of injury		DD Sanitary facilities	new	--	Design Review	Type Test	--	--
Common.192	--	EF HVAC			LA Air conditioning	new					
Common.193	--	+20 Power distribution and management			N/A	new					
Common.194	OR	A separate method of heating, to supplement that provided by waste heat from the diesel engine, shall be provided.	This would enable an acceptable on-board temperature to be achieved more quickly. This is particularly important for driving cabs where departure may be delayed until an acceptable temperature is achieved		N/A	new	--	Design Review	Type Test	--	--
Common.195	--	EG driver's cab			N/A	new					
Common.196	RE	The driver's TCMS display shall show relevant information under normal and train fault conditions, using easily understood terminology.	Information for the driver is important, but it is essential that it is only relevant to the situation. It is expected that more in-depth information will be provided for depot staff or control as necessary		N/A	new	--	Design Review	Demonstration	--	--
Common.197	--	FB interior lighting			KC Interior Lighting Equipment	new					
Common.198	RE	The minimum brightness in passenger areas shall be at least \$\$ lux.	As an operator, I want to provide a pleasant and welcoming interior.		KC Interior Lighting Equipment	new	--	Calculation	--	--	--
Common.199	RE	Interior lighting shall use lamps in light emitting diode (LED) technology.	LED technology offers energy savings, longer life and whole life cost		KC Interior Lighting Equipment	new	--	Design Review	Type Test	--	--
Common.200	--	FC exterior lighting			KB Exterior lighting Equipment	new					
Common.201	RE	Head lights, marker lights and tail lights shall use lamps in light emitting diode (LED) technology.	As an operator, I want to minimise maintenance costs.		KB Exterior lighting Equipment	new	--	Design Review	--	--	--
Common.202	--	GA energy supply			N/A	new					
Common.203	--	+21 Energy consumption			N/A	new					
Common.204	RE	Electrically powered rolling stock shall be capable of providing energy use data of an integrity level suitable for billing.	Currently energy charges are calculated crudely. By having accurate recording of use, the true cost of energy used can be calculated and paid for.		N/A	new	--	Design Review	Type Test	--	--
Common.205	RE	Means to measure and report fuel consumption rates of diesel engine trains should be provided.	This can be used to identify engine issues, to improve reliability and availability.		N/A	new	--	Design Review	Type Test	--	--
Common.206	--	+23 Operational conditions			N/A	new					

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Common.207	CH	When one of the following power systems according to DIN EN 50338 "Railway Applications - Power supply and rolling stock - Technical criteria for the coordination between power supply (substation) and rolling stock to achieve interoperability" is available, the EMU shall draw its energy from the respective system: \$\$	As an operator, I want to specify the power supply system to use the EMU as intended.	\$\$: Choose power systems from the following list: - AC 15 000 V 16,7 Hz from the overhead contact line - AC 25 000 V 50 Hz from the overhead contact line - DC 3 000 V from the overhead contact line - DC 1 500 V from the overhead contact line - DC 750 V from the third rail	N/A	new	--	Design Review	Type Test	--	--
Common.208	--	GC auxiliary energy			HA Auxiliary operating equipment	new					
Common.209	--	+01 Reliability, Availability, Maintainability (RAM)			HA Auxiliary operating equipment	new					
Common.210	DR	Air supplied by the train shall be clean, dry and free of oil.	This will slow the deterioration of components and limit the likelihood of freezing in cold weather.		HA Auxiliary operating equipment	new	--	Design Review	Type Test	--	--
Common.211	RE	External electrical connectors (plugs and sockets including jumper plugs and cables) shall be designed to operate reliably for the life of the rolling stock.	Electrical faults on existing rolling stock are frequently associated with poor connections or water ingress into plugs and sockets.		HA Auxiliary operating equipment	new	--	Design Review	Type Test	--	--
Common.212	--	+05 Life Cycle Cost (LCC)			HA Auxiliary operating equipment	new					
Common.213	DR	Auxiliary power supplies shall provide sufficient spare capacity for the life of the rolling stock.	This permits flexibility for the future installation of, for example, ERTMS and other additional equipment that may be required to support future business needs.		HA Auxiliary operating equipment	new	--	Design Review	Type Test	--	--
Common.214	--	HA propulsion and braking			N/A	new					
Common.215	--	GC Provide deceleration and keep the train at standstill			N/A	new					
Common.216	RE	For rolling stock with electric traction the ability to brake regeneratively shall be provided.	The strategy for all parts of the rail network is to accept regeneration. If the infrastructure is not regenerated at service introduction, a facility is to be provided on the train to disable it.		N/A	new	--	Design Review	Type Test	--	--
Common.217	RE	If the EMU changes between different modes of braking (brake blending) and if the speed of the EMU is more than 10 kph, the EMU shall have a maximum jerk rate max. da/dt of maximum 0.6 m/s ³ .	This is to ensure a comfortable ride and to ensure the safety of standing passengers. This was a value used by British Rail and is still considered appropriate.		N/A	new	--	Design Review	Type Test	--	--
Common.218	RE	The train consist should be capable of re-distributing the braking demand throughout the train in the event that the brakes on a bogie are isolated.	As an operator, I want to keep brake performance in degraded mode as high as possible, to minimise service disruptions.		N/A	new	--	Design Review	Type Test	--	--
Common.219	--	GD Improve adhesion			MB Sanding equipment	new					
Common.220	DR	When designing and locating the sand hopper the height / size / shape / location of its filling orifice for replenishing sand shall be considered for accessibility.	This is to ease filling, reduce manual handling and reduce mess.		MB Sanding equipment	new	--	Design Review	Type Test	--	--
Common.221	DR	Trace Heating of key parts of the sanding system should be provided.	Sand is an essential aid to traction and braking. Wet sand clogs pipes and could lead to train cancellation. Heated sand boxes can prevent this.		MB Sanding equipment	new	--	Design Review	Type Test	--	--
Common.222	OR	The fitting of variable rate sanders in accordance with GMRT2461 should be considered.	The research has shown this to be very effective particularly in autumn.		MB Sanding equipment	new	--	Design Review	Type Test	--	--
Common.223	--	+05 Life Cycle Cost (LCC)			MB Sanding equipment	new					
Common.224	RE	While operating with an annual mileage of \$\$ km the traction equipment shall have a life expectancy of at least \$\$ years.	As an operator, I want to maximise the availability of the EMU, to reduce the number of EMUs, I have to buy.	\$\$: Give distance in km & time in years	MB Sanding equipment	new	--	Design Review	--	Type Test	--
Common.225	--	HB propulsion			N/A	new					
Common.226	--	+01 Reliability, Availability, Maintainability (RAM)			N/A	new					
Common.227	OR	Propulsion systems shall be designed such that that when one system fails, the remaining systems compensate to maintain train performance.	Automatic enhancement of the performance of remaining functional propulsion packages minimises the performance impact of a propulsion package failure for the train concerned and so reduces the resulting impact on service punctuality.		N/A	new	--	Design Review	Type Test	--	--
Common.228	DR	The amount of redundancy provided by the propulsion system shall take account of the demonstrated service reliability of existing equivalent systems.	As the network becomes increasingly congested, it is increasingly important to ensure system resilience. It is therefore essential that a failure of an individual sub-system on a train causes as little service disruption as possible.		N/A	new	--	Design Review	Type Test	--	--
Common.229	OR	The propulsion system shall be designed to avoid single point failures.	As the network becomes more congested, it is increasingly important to ensure system resilience. It is therefore essential that a failure of a single component on a train causes as little service disruption as possible.		N/A	new	--	Design Review	Type Test	--	--
Common.230	--	+19 Rescue and recovery			N/A	new					
Common.231	DR	Propulsion systems shall be designed to be capable of meeting the operator requirements to rescue a completely failed train	As an operator, I want to be able to rescue a failed train with the EMU, to keep service disruption to a minimum.		N/A	new	--	Design Review	Type Test	--	--

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Common.232	--	JA information and communicaiton			PA Information facilities	new					
Common.233	--	JC on-board train information			PA Information facilities	new					
Common.234	--	CF Provide public address, passenger information,			PA Information facilities	new					
Common.235	OR	The seat reservation system should include the wheelchair space(s).	As an operator, i want to offer the same service to wheelchair users as to other passengers.		PA Information facilities	new	--	Design Review	Type Test	--	--
Common.236	OR	Coach and seat identification, to assist with seat reservation location, should be provided on the exterior of the EMU adjacent to the entrance doors.	This enables passengers to be more efficiently directed towards their reserved seats.		PA Information facilities	new	--	Design Review	Type Test	--	--
Common.237	OR	For live seat reservation systems, the means to reserve a specific seat by text message during a journey should be provided.	Existing electronic seat reservation systems make it difficult for passengers without reservations to identify which seats are unreserved. The time taken to check the information for each seat, delays train boarding and therefore increases station dwell times. Informing of non-working reservation systems advises passengers more efficiently rather than relying on train crew. Removing reservations for stations that have been called at helps passengers identify seats that have become available.		PA Information facilities	new	--	Analysis	--	--	--
Common.238	OR	Seat reservation indications should be removed from the display, for example, five minutes after departure from the reservation starting station or on approach to the next station stop.	As an operator, i want to show free seats to the passenger.		PA Information facilities	new	--	Design Review	Type Test	--	--
Common.239	OR	The messages displayed on the Passenger Information Systems shall only be sent from authenticated devices, i.e. it must prevent unauthorised messages being displayed.	Instances of inappropriate messages on scrolling displays have been known.		PA Information facilities	new	--	Design Review	Type Test	--	--
Common.240	OR	The number / letter of the EMU in the train consist shall be displayed on the exterior of the relevant EMU, in a position that is readily visible to passengers when boarding.	As a passenger, I want to be able to find a specific coach in the train.		PA Information facilities	new	--	Design Review	Type Test	--	--
Common.241	CH	The Passenger Information System shall broadcast accurate, real-time, information via the on-board audio / visual system.	As a passenger, I want to know, if I arrive on time.		PA Information facilities	new	--	Design Review	Type Test	--	--
Common.242	CH	The Passenger Information System shall broadcast information via a train borne Wi-Fi network to be provided for use by passengers using a personal Wi-Fi device.	As a passenger, I want to use my mobile device to assess Passenger Information System data.		PA Information facilities	new	--	Design Review	Type Test	--	--
Common.243	CH	The Passenger Information System shall broadcast updates to specific interactive locations in the train for ad-hoc use by passengers.	As a passenger, I want to know, if I arrive on time.		PA Information facilities	new	--	Design Review	Type Test	--	--
Common.244	CH	The Passenger Information System shall have an interface with the EMU Selective Door Operation system.	As a passenger, I want to know, on what side of the EMU, the doors will open.		PA Information facilities	new	--	Design Review	Type Test	--	--
Common.245	CH	The Passenger Information System shall show accurate real-time intermodal / interchange running information; particularly at times of disruption.	As a passenger, I want to know about my connections.		PA Information facilities	new	--	Design Review	Type Test	--	--
Common.246	CH	The Passenger Information System shall show estimated times of arrival at stopping points en-route.	As a passenger, I want to know, if I arrive on time.		PA Information facilities	new	--	Design Review	Type Test	--	--
Common.247	OR	The Public Address system should be zonal.	This would permit the traincrew to select the EMUs in the train consist to which announcements would be made. It is anticipated that this would be useful for broadcasting specific messages in, say, first class passenger saloons or on train services which divide en-route.		PA Information facilities	new	--	Design Review	--	--	--
Common.248	OR	Where an electronic seat reservation system is out of use a means to advise passengers should be provided.	As an operator, I want to have a back-up-system for the seat reservation system.		PA Information facilities	new	--	Design Review	--	--	--
Common.249	OR	Where an electronic seat reservation system is provided, it should be possible to remotely upload and display seat reservations prior to passengers boarding the train.	As an operator, I want to update the seat reservation live, to give up to date information to the passengers.		PA Information facilities	new	--	Design Review	--	Type Test	--
Common.250	OR	Where an electronic seat reservation system is provided, unreserved seats should be readily identifiable to passengers entering the passenger saloon from both ends of the EMU.	As an operator, I want to update the seat reservation live, to give up to date information to the passengers.		PA Information facilities	new	--	Design Review	--	Type Test	Certification
Common.251	--	CG Provide surveillance (for passenger or load)			PA Information facilities	new					
Common.252	RE	Where CCTV is fitted, system capabilities, in terms of image quality, data storage space and data retention time, shall be stated.	The use for which the images may be used may influence the recording rate and for how long the images are available		PA Information facilities	new	--	Design Review	--	--	--
Common.253	RE	CCTV that provides coverage of passenger accessible areas, including areas used for storage of luggage, cycles etc, but excluding toilets, shall be provided.	CCTV can be used to deter anti-social behaviour and be submitted as evidence following incidents. If luggage storage areas are also covered, passengers are more likely to use them		PA Information facilities	new	--	Design Review	--	Type Test	--
Common.254	--	HG Provide diagnostics			JC Indicating, recording, display devic	new					
Common.255	RE	If a failure in the propulsion systems occurs, the diagnostics system shall report this change of status to the driver.	As a driver, I want to know if part of the propulsion system has failed, so I can adapt my way of driving such that the impact on the journey is minimised.		JC Indicating, recording, display devic	new	--	Design Review	--	Type Test	Certification

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Common.256	--	+05 Life Cycle Cost (LCC)			JC Indicating, recording, display device	new					
Common.257	OR	The seat reservation display should be of a modular design to accommodate changes to seating layout.	The intent here is to allow saloons to be easily reconfigured without complex and costly alterations being required to the seat reservation indicators.		JC Indicating, recording, display device	new	--	Design Review	--	Type Test	Certification
Common.258	--	+24 Maintenance provisions			JC Indicating, recording, display device	new					
Common.259	OR	Passenger Information System systems should be designed to facilitate fault identification by having a "maintenance mode" where all the visual displays cycle through a self-test message and the audio system repeats sounds e.g. count 1 - 30 or repeatedly "ping" all the speakers.	As an operator, I want to find errors in the Passenger Information System as fast and easily as possible.		JC Indicating, recording, display device	new	--	Design Review	--	--	Certification
Common.260	--	JE ticketing system			PA Information facilities	new					
Common.261	--	H Provide train communication, monitoring and control			PA Information facilities	new					
Common.262	CH	A means of passenger-counting shall be provided on a proportion of EMUs to achieve a better match between passenger demand and provision of capacity.	As an operator, I want to know the actual passenger occupation of my service to be able to amend my operation.		PA Information facilities	new	--	Design Review	--	--	Certification
Common.263	CH	A means of passenger-counting shall be provided on all EMUs to give real-time loading information, enabling passengers to be guided to the locations on platforms where space is available, so reducing station dwell times.	As an operator, I want to reduce dwell time to be able to operate the train on schedule.		PA Information facilities	new	--	Design Review	--	--	Certification
Common.264	--	KA train control			N/A	new					
Common.265	--	KB train control and monitoring system (TCMS)			N/A	new					
Common.266	--	+01 Reliability, Availability, Maintainability (RAM)			N/A	new					
Common.267	OR	A master / slave concept for the Train Control & Management System (TCMS) data bus, using a second TCMS bus, should be provided.	The objective is to create systems redundancy without introducing the additional weight and complexity associated with a relay switched system as a backup system.		N/A	new	--	Design Review	--	Type Test	Certification
Common.268	RE	A TCMS carrying vital / critical data shall have these functions protected by being separated from other train borne systems and have a secure architecture.	As an operator, I want to have a secure TCMS system, to avoid being hacked.		N/A	new	--	Design Review	--	Type Test	--
Common.269	OR	Provision should be made for drivers, and other members of train crew, to isolate defective essential equipment through the TCMS.	Any requirement for the driver or train crew to pass through a train, or exit the train to walk on the track, to isolate equipment introduces significant safety risk and delay.		N/A	new	--	--	--	--	--
Common.270	--	LA coupling and interconnection			N/A	new					
Common.271	RE	Manual couplers shall comply with LOC&PAS TSI 1302/2014/EU clause 4.2.2.2.3. bullet point b).	As an operator, I want to be able to couple the EMU to vehicles that have a manual coupling system to be able to haul the EMU for maintenance and rescue purposes.		N/A	new	--	Design Review	--	--	Certification
Common.272	RE	Automatic couplers shall comply with LOC&PAS TSI 1302/2014/EU clause 4.2.2.2.3. bullet point a-2), even when the maximum speed of the EMU is less than 250 kph and/or when the EMU is splittable or intended for general operation.	As an operator, I want to be able to couple the EMU to vehicles that have an automatic type 10 coupler to be able to haul the EMU for maintenance and rescue purposes.		N/A	new	--	Design Review	--	--	--
Common.273	--	LB consist coupling			SA Vehicle linkage devices	new					
Common.274	RE	Coupler systems with retractable 'nose cone' covers should ensure that trains can only be coupled once the covers have been opened.	Frequent attempted coupling activities have occurred with the covers not being retracted or opened causing damage, consequent delays and subsequent loss of availability.		SA Vehicle linkage devices	new	--	Design Review	--	Type Test	--
Common.275	DR	The end coupler shall function reliably in difficult environmental conditions (e.g. snow and ice; dead flies or other contamination), taking into account the anticipated frequency of coupling operations Design features that may be appropriate include: - Protection of the coupler when not in use. - Automatic heating of the electrical head to prevent the build-up of ice. - Protection of the pneumatic and electrical connections by a tight cover when not coupled. - Features to ensure that the coupler pocket remains free from the build-up of snow and ice. - Locating electrical heads to prevent ingress of de-icing fluids, melting snow and ice draining from the mechanical head.	This ensures that infrequently used couplers are available when needed and frequently used ones are kept clean.		SB Automatic coupling devices	new	--	Design Review	Type Test	--	--

7 APPENDIX

The Excel document EuroSpec Common IDs with all attributes is available on request (see contact on website).

8 BIBLIOGRAPHY

Technical specification for interoperability	Technical specification for interoperability relating to the rolling stock subsystem of the trans-European conventional rail system referred to in Annex II (1) to Directive 2008/57/EC (2011/291/EU – published 26/05/2011)
BS 8887 series:	Design for manufacture, assembly, disassembly and end-of-life processing (MADE)
EN 14067-5	Railway applications - Aerodynamics - Part 5: Requirements and test procedures for aerodynamics in tunnels
EN 15380-5	Railway applications - Classification system for railway vehicles - Part 5: System Breakdown Structure (SBS);
EN 15380-4	Railway applications - Classification system for railway vehicles – Part 4: Function groups;
UIC 779-11	Determination of railway tunnel cross-sectional areas on the basis of aerodynamic considerations

EuroSpec

“EuroSpec” stands for European Specifications for railway rolling stock. The activity is an initiative of several European train operating companies (TOC). The main focus is on trains consisting of self-propelled carriages, using electricity as the motive power (EMU).

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