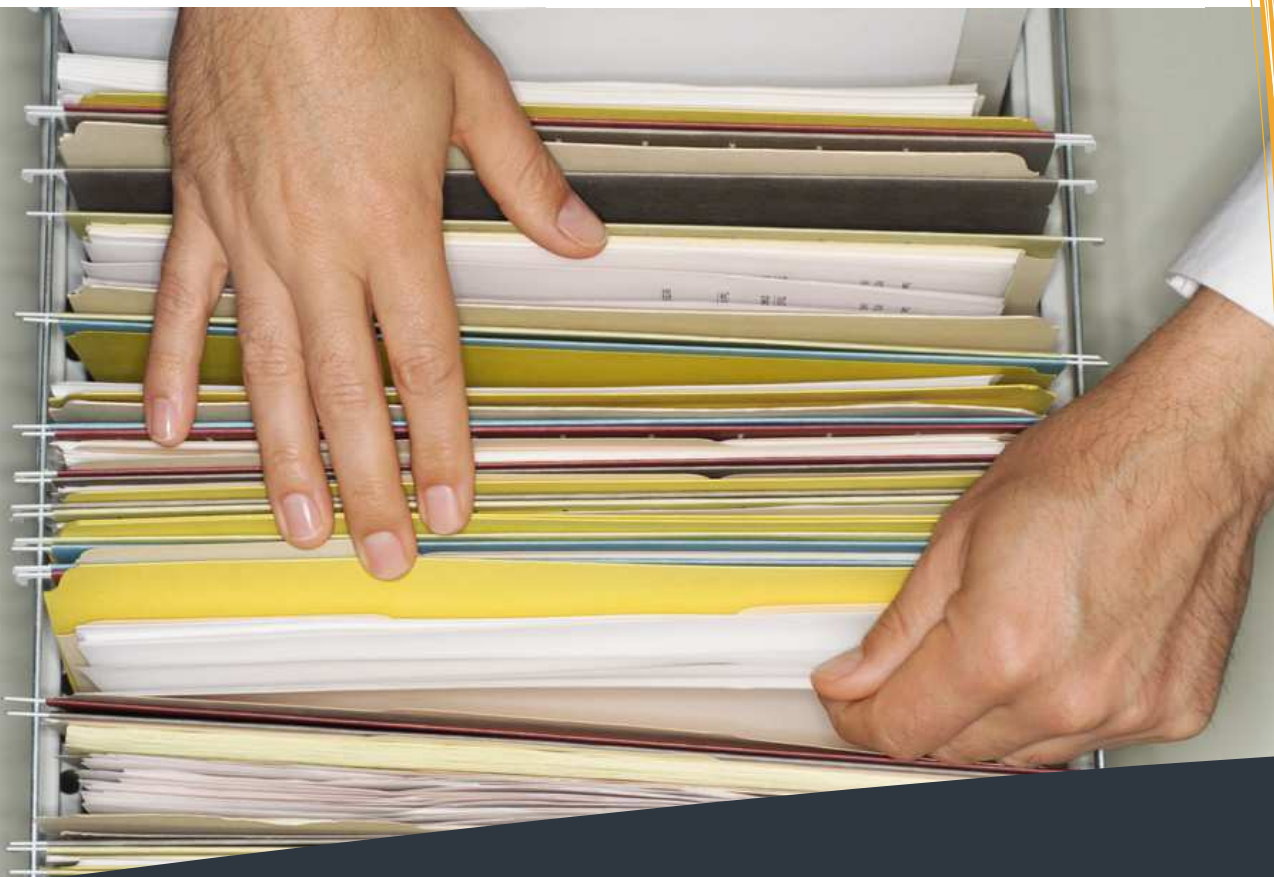


EuroSpec



Specification for the documentation of railway vehicles



ATOC



Mobility
Networks
Logistics



Specification for the documentation of railway vehicles

1st edition

Original language: English

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Paris, London, Munich (München), Utrecht, Copenhagen (København), Vienna (Wien), Bern

August 2014

Table of Contents

1	Scope	7
2	Normative References.....	7
3	Terms, definitions and Abbreviations.....	7
4	Specifications.....	8
5	Bibliography	15

Issue Record

Issue	Date	Comments	Source
V1	18-06-14		

List of open points / non-agreed items

No.	Chap.	Open point / non-agreed item	Finalisation

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 improve the reliability and quality of trains by using common and standardised functional and non-functional specification and verification methods.

The benefits of using EuroSpecs:

- 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.

The EuroSpec specifications comprise merged functional and product basic requirements. All EuroSpec specifications focus on technical aspects exclusively based on the existing national requirements.

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/ UNIFE Technical Recommendations (TecRecs)
- UIC Codes (leaflets)
- EuroSpec Specifications
- Company Specifications

Introduction

This document is a voluntary specification, produced by Société nationale des chemins de fer français (SNCF), Association of Train Operating Companies (ATOC), Deutsche Bahn (DB), Nederlandse Spoorwegen (NS), Danske Statsbaner (DSB), 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 on the " Specification for Documentation" for use by companies in the rail sector if they so choose.

Application of this document

- This specification is voluntary. Individual companies may however choose 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 specification.

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Approval and authorisation of this document

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1 SCOPE

This specification is applicable for all types of railway vehicles.

In order to operate and maintain railway vehicles over its lifetime it is necessary to obtain and maintain all relevant documents. The documents shall provide all information needed for safe operation, maintenance, repair, material management and modification of the vehicle. It is also used as a proof of compliance with (international) regulation for supervisory authorities and fulfills the mandatory documentation requirements, e.g. as defined in directive 2008/57/EU (Article 18). The purpose of this document is to provide a common specification for the documentation to be delivered by the supplier within the framework of rolling stock procurement.

This document replaces individual company requirements and constitutes a common reference being used for tendering and verification. Besides this scope specification additional operator specific specifications for the structure, content, format and exchange of these documents may be defined.

This specification is an add-on to the Technical Specifications of Interoperability (TSI). This specification is not intended to block innovation or to prevent improvement in documentation format and (data) exchange.

In future releases of this specification, it is intended to standardize content, format and exchange of the specified documents through (international) standards.

2 NORMATIVE REFERENCES

The following referenced documents are indispensable for the application of this document.

EuroNorms are developed by CEN¹ or CENELEC² and are made available from their members.

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

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

3 TERMS, DEFINITIONS AND ABBREVIATIONS

- 3.1 LRU Line Replaceable Unit. A modular component that is designed to be replaced quickly at an operating location.
- 3.2 SRU Shop replaceable unit. A SRU is a modular component that is designed to be repaired by a technician in a workshop. SRUs are similar in nature to line-replaceable units (LRUs), but rather than being complete functional units, represent component functions, such as circuit card assemblies, of a larger LRU.
- 3.3 FEM Finite Element Methods. Model used for the evaluation of structures and systems, providing an accurate prediction of a component's response subjected to thermal and structural loads
- 3.4 OEM Original Equipment Manufacturer
- 3.5 CSM Common Safety Method

4 SPECIFICATIONS

This chapter describes the list of essential documents required for maintenance and operation to be delivered by the supplier. Information on minimum content and purpose of each particular document is provided. In order to make the specification flexible to the specific needs on data structure and format requirements of the purchaser, the list of information given for each document may be adapted to specific requirements by agreement between purchaser and supplier.

The vehicle documentation to be delivered by the vehicle supplier is listed in the following table, where

- the column “Required Documentation” contains the title given to each particular document and the required documents.
- the column “Document Description” contains its purpose and a brief explanation of each document content, as a definition of it.
- the column “Required Standard” contains the applicable standards for each particular document. These standards contain the minimum set of elements of information to be included in each document. Please note! In case the referred TSI standard is not applicable for the purchased vehicle class it still is considered valid within the scope of this specification.

The documentation needs to be supplied according to the agreed documentation delivery plan; at the latest before the vehicle is ready to be put into service.

4.1 General Documentation				
#	Type	Required Documentation	Document Description	Required Standards
4.1.1.1	Document delivery	Documentation delivery plan	List of all documents' delivery date.	
4.1.1.2	Document delivery	Documentation delivery list	Each documentation delivery requires a documentation delivery note, containing an overview of all delivered documents including, file name, version, release date and authors.	
4.1.1.3	Document delivery	Documentation list	A continuously updated documentation list comprising all valid documents for the vehicle.	
4.1.1.4	Document delivery	Release note for changed documentation	Release note for each changed document, including a description of the changes and consequence analysis in accordance to the regulations and standards, e.g. CSM. It needs to be proven that all standards and regulations used for authorisation are still fulfilled after this change.	TSI 232/2008 4.2.10.1
4.1.2.1	Drawings and description of the vehicle and its	Component hierarchy and functional description. The last item	Comprehensive list of items (materials) which constitute parts of another one (bill of material). The hierarchy sets up the boundaries of the rolling stock by listing all the	TSI 232/2008 4.2.10.2.2 TSI 291/2011 4.2.12.3.2 TSI 321/2013 4.5.3

	components	(material) shall be a replaceable unit; line replaceable unit (LRU) and shop replaceable unit (SRU)	items belonging to the product structure of that rolling stock and using an appropriate number of discrete levels.	EN13460 5.4 Product structure EN 15380-2
4.1.2.2	Drawings and description of the vehicle and its components	Vehicle and systems description for all systems and components	Description and manuals of the train and its subsystems and components. Content and scope needs to be agreed upon.	TSI 321/2013 4.5.1
4.1.2.3	Drawings and description of the vehicle and its components	Arrangement drawings with parts list for each component	Drawing with parts list to ensure dismantling, repair and assembly of items. The parts list contains all related items (materials) and quantities; Software is also an item (material) on the parts list.	TSI 321/2013 4.5.1 EN13460 5.5 EN13460 5.6
4.1.2.4	Drawings and description of the vehicle and its components	Detail drawings / material documentation for each item on the parts list	Material information for material management and maintenance, e.g.: detail drawings, data sheets, material and electronic device descriptions.	TSI 321/2013 4.5.1 EN13460 5.5 EN13460 5.6
4.1.2.5	Drawings and description of the vehicle and its components	3D-Models	3D-Models for visualisation (e.g. to be used for training, electronic part catalogue and installation examinations)	
4.1.2.6	Drawings and description of the vehicle and its components	Electronic parts catalogue	Illustrated parts catalogue to give an easy and quick access to material information. It contains a breakdown structure, visuals with hotspots for navigation and material information.	
4.1.2.7	Drawings and description of the vehicle and its components	Drawing of systems (electrical, pneumatic, hydraulic and control-circuit diagrams)	Electrical, pneumatic, hydraulic and control-circuit diagrams necessary to explain the function and operation of the particular systems	TSI 291/2011 4.2.12.2 TSI 321/2013 4.5.1 EN13460 5.8 EN50155
4.1.2.8	Drawings and description of the vehicle and its components	Schematic circuit diagrams, connection diagrams and wiring diagrams	Schematic circuit diagrams, network diagrams, connection diagrams and wiring diagram to show the physical relationship of all the components, as well as the information needed to hardwire the circuit.	TSI 291/2011 4.2.12.3.2 TSI 232/2008 4.2.10.2.2 EN50155

4.1.2.9	Drawings and description of the vehicle and its components	Logic diagram	System control diagram to clarify the overall system logic.	EN13460 5.9
4.1.2.10	Drawings and description of the vehicle and its components	Description of the computerised on-board systems	Functional description of computerised on-board systems including descriptions of functionality, specification of interfaces and data processing and protocols.	TSI 291/2011 4.2.12.2 TSI 321/2013 4.5.1
4.1.3.1	Software documentation	Software documentation for all software on the vehicle and its related service software	Software documentation that explains how the software operates and how to use it, the documentation comprises: - software and service software descriptions - software development documentation - train software configuration list - software loading instruction - list of service software - software and service software manuals	EN50128 EN50155 11.2.2
4.1.4.1	Engineering information	FEM-Model	Delivery of the train FEM-Models	
4.1.5.1	Train file	Authorisation documentation and conformity declarations	All documents used to achieve the train type and infrastructure authorisation, including all referenced documents and conformity certificates.	TSI 57/2008 4. technical dossier national statutory regulations
4.1.5.2	Train file	Vehicle history book	Specific information for each vehicle and defined items, including: - weight balance with hypothesis on load conditions considered - axle load and spacing of axles - configuration list - purchased items verification and receiving report - test program report: commissioning report which demonstrates that an item is in compliance with specifications - certificates: specific safety and statutory regulations certificates for items (e.g. for lifting equipment, pressure vessels, HVAC, etc.).	TSI 291/2011 4.2.12.2 EN 13460 5.14 EN 13460 5.15 EN 13460 A.30

4.2 Documentation for operation				
#	Type	Required Documentation	Document Description	Required Standards
4.2.1.1	Emergency documentation	Lifting diagram and instruction	Descriptions of procedures and interfaces for lifting and jacking and related instructions.	TSI 232/2008 4.2.7.5 TSI 291/2011 4.2.12.5
4.2.1.2	Emergency documentation	Rescue related description	Descriptions of procedures for use of emergency measures and related necessary precautions to be taken, as e.g. use of emergency exits, entrance routes for emergency services, isolation of brakes, electrical earthing, towing, including a description of effects when the described emergency measures are taken, e.g. reduction of brake performance after isolation of brakes	TSI 291/2011 4.2.12.6
4.2.2.1	Manuals	Operation manual for each type of train personnel	Instructions for normal and degraded modes to reach a proper item function performance according to its technical specifications and safety conditions.	TSI 291/2011 4.2.12.4 TSI 321/2013 4.4 EN13460 5.2
4.2.3.1	Training documentation	Training documentation for train operation personnel	Documents to train the operational personnel to ensure safe operation	
4.3 Maintenance documentation				
#	Type	Required Documentation	Document Description	Required Standards
4.3.1.1	Maintenance documentation	Maintenance Documentation	<p>The maintenance documentation comprises all necessary documents to carry-out vehicle maintenance in terms of management and execution.</p> <p>It describes how maintenance activities shall be conducted and includes all necessary activities such as inspections, monitoring, tests, measurements, replacements, adjustments, repairs.</p> <p>Maintenance activities fall into:</p> <ul style="list-style-type: none"> — preventive maintenance; scheduled and controlled, — corrective maintenance. 	TSI 232/2008 4.2.10 TSI 291/2011 4.2.12.3 TSI 321/2013 4.5.2 TSI 57/2008 4. technical dossier

4.3.2.1	Maintenance description file	The maintenance design justification file	<p>The maintenance design justification file explains how maintenance activities are defined and designed in order to ensure that the rolling stock characteristics will be kept within permissible limits of use during its lifetime. The file shall give input data in order to determine the criteria for inspection and the periodicity of maintenance activities. The maintenance design justification file consists of:</p> <ul style="list-style-type: none"> - precedents, principles and methods used to design the maintenance of the vehicle, - utilisation profile (limits of the normal utilisation of the vehicle (e.g. km/month, climatic limits, authorised types of loads etc.) taken into account for the design of the maintenance), - tests, investigations, calculations carried out, - relevant data used to design the maintenance and origin of this data (e.g. return of experience or tests). 	<p>TSI 232/2008 4.2.10.2.1 TSI 291/2011 4.2.12.3.1 TSI 321/2013 4.5.2 EN60300-3-14</p>
4.3.2.2	Maintenance description file	Maintenance Plan	<p>Structured set of tasks in order to perform the maintenance including the activities, procedures and means to describe the level of maintenance operations. The description of this set of tasks includes:</p> <ul style="list-style-type: none"> - lists, schedules and criteria of all planned preventative maintenance operations, - lists and criteria of conditional preventative maintenance operations, - a list of relevant corrective maintenance operations, - maintenance operations depending on specific conditions of use. <p>Note: Some maintenance operations like overhauls and very major repairs may not be able to be defined at the moment when the vehicle is placed in service. In this case, the responsibility and the procedures to define such maintenance operations shall be described.</p>	<p>TSI 232/2008 4.2.10.2.2 TSI 291/2011 4.2.12.3.2 TSI 321/2013 4.5.3 EN60300-3-14</p>
4.3.2.3	Maintenance description file	Maintenance manuals for each maintenance operation listed in the maintenance plan	<p>Instructions intended to preserve an item and system in, or restore it to, a state in which it can perform a required function. It contains among others the following information:</p> <ul style="list-style-type: none"> - the list of the tasks to be carried out - the description of the maintenance activities - information about the limit values for components which shall not be exceeded in service, - specific tools and facilities including service software - materials and consumables required to undertake the task - necessary calibration and adjustment and tests and procedures to be 	<p>TSI 232/2008 4.2.10.2.2 TSI 291/2011 4.2.12.3.2 TSI 321/2013 4.5.3 EN13460, Chapter 5.3 EN60300-3-14</p>

			<p>undertaken after each maintenance operation before re-entry into service of the rolling stock</p> <ul style="list-style-type: none"> - disassembly/assembly instructions drawings necessary for correct assembly/disassembly of replaceable parts - personal protective safety provision and equipment - general requirements relative to mechanical, electrical, fabrication and other engineering competencies - environmental provision. 	
4.3.2.4	Maintenance description file	Lubrication map	Drawing showing position of each item lubrication point, with lubrication data and specifications.	EN13460 5.7
4.3.2.5	Maintenance description file	Trouble shooting (fault diagnosis) manual	Trouble shooting (fault diagnosis and isolation) manuals or facilities for all reasonably foreseeable situations, this includes functional and schematic diagrams of the systems or IT-based fault finding systems, cause and effect diagrams. The manuals shall give the link to the relevant corrective maintenance task.	TSI 232/2008 4.2.10.2.2 TSI 291/2011 4.2.12.3.2 TSI 321/2013 4.5.3
4.3.3.1	Material management information	Spare parts list	<p>The list includes all parts specified for changing on condition, or which may require replacement following electrical or mechanical malfunction, or which will foreseeably require replacement after accidental damage (e.g. windscreen).</p> <p>Interoperability constituents shall be indicated and referenced to their corresponding declaration of conformity</p>	TSI 232/2008 4.2.10.2.2 TSI 291/2011 4.2.12.3.2 TSI 321/2013 4.5.3
4.3.3.2	Material management information	Material information / identical parts information	Parts already in use by the customer shall be identified in the bill of material with the same material number. It also lists the OEM (original equipment manufacturer) material number.	
4.3.3.3	Material management information	Obsolescence management	Risk assessment for the availability of critical parts on the market during the vehicle life time.	EN60300-2 A1.6
4.3.4.1	Train configuration Data	Configuration files for each vehicle	Configuration files for each vehicle to enable (in particular but not only) traceability during maintenance activities. The content of the configuration file needs to be agreed upon.	TSI 321/2013 4.5.1 TSI 232/2008 4.2.10.2.2
4.3.5.1	Training documentation	Training documentation for maintenance personnel	Documents to train the maintenance personnel.	

4.4				
Decommissioning documentation				
#	Type	Required Documentation	Document Description	Required Standards
4.4.1.1	Decommissioning documentation	Disassembly instructions	Instructions with information, separately or in combination, on disassembly of the product and/or handling of any waste materials with due regard to safety and environmental considerations.	EN 82079 5.14.2
4.4.1.2	Decommissioning documentation	Recycling instructions	Where specific procedures are necessary for recycling of the product or its components, these needs to be specified in accordance with the appropriate legal requirements and/or standards.	EN 82079 5.14.3
4.4.1.3	Decommissioning documentation	Disposal instructions	Instructions with information for the user about waste disposal and environmental considerations. If the product contains any hazardous substance, or if any hazardous substance is supplied together with the product, the necessary information on its constituents and the correct disposal procedure needs to be given with due regard to safety and legal requirements.	EN 82079 5.14.4

5 BIBLIOGRAPHY

TSI 2008/232/CE DIRECTIVE 96/48/EC	technical specification for Interoperability of the trans-european high speed rail system
TSI /2011/291/EU DIRECTIVE 2008/57/EC	technical specification for interoperability relating to 'Rolling stock' subsystem for conventional rail 'Locomotives and passenger rolling stock'
TSI 2013/321 DIRECTIVE 2008/57/EC	technical specification for interoperability relating to the subsystem 'rolling stock — freight wagons'
EN13460	Maintenance – Documentation for maintenance
EN 13306	Maintenance – Maintenance terminology
EN 15380-2	Railway applications – Designation system for railway vehicles – Part 2: Product groups
EN 50155	Railway applications – Electronic equipment used on rolling stock
EN 50128	Railway applications – Communication, signaling and processing systems - Software for railway control and protection systems
EN 60300-3-14	Dependability management – Part 3-14: Application Guide – Maintenance and maintenance support
EN 82079	Preparation of instructions for use – Structuring, content and presentation – Part 1 general principles and detailed requirements

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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August 2014