Department for Transport

National Technical Specification Notice
Operation and Traffic Management (OPE)

Issue 2

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Rail Interoperability – The Railways (Interoperability) Regulations 2011

Notice to all:

- Manufacturers and distributors of railway equipment
- Infrastructure managers and railway undertakings
- Railway infrastructure and train: builders, designers, operators, owners and managers
- Certifying authorities, approved bodies, designated bodies and notified bodies, recognised organisations and railway consultants

This Notice should be read with the Railways (Interoperability) Regulations 2011 and other relevant National Technical Specifications Notices (NTSNs). Unless otherwise defined, expressions used in this NTSN have the same meaning as in the Railways (Interoperability) Regulations 2011.

Summary

1. Objectives and target outcomes of rail interoperability in Great Britain

RIR 2011 supports the railway to function as one modern integrated system through rail equipment meeting common baseline requirements of technical compatibility, reliability and availability, accessibility, environmental protection, health, and safety (See Schedule 2 to RIR 2011 'Essential Requirements' for further details). By taking a long-term whole-system view, it seeks to progressively improve Britain's railway in the following ways:

- More consistently reliable, efficient and accessible services for rail customers;
- Reduced technical barriers for the railway to adapt to meet changing customer demand for passenger and freight services;
- Increased choice of potential rolling stock and service routes for operators;
- Reduced industry production, delivery and maintenance costs through use of standardised products and economies of scale;
- An open and competitive supply chain for rail projects;

- Increased potential for international passenger and international and domestic freight services;

- Reduced environmental impact.

2. Function of this National Technical Specification Notice (NTSN)

RIR 2011 requires new, upgraded or renewed rail vehicles, infrastructure and some components to meet minimum specifications linked to the six 'Essential Requirements' of interoperability: i.e. technical compatibility, reliability and availability, accessibility, environmental protection, health, and safety. NTSNs set these minimum specifications for different 'subsystems' of Great Britain's (GB) rail system, and key components defined as 'interoperability constituents'. In some cases, NTSNs codify international standards (e.g. European Standards set by CEN-CENELEC) or refer out to supplementary National Technical Rules to set these minimum requirements. NTSNs also set rules for third party assessment of conformity to the 'Essential Requirements', the placing of interoperability constituents on the GB market, and operation and maintenance of railway 'subsystems'.

This NTSN covers the Operation and Traffic Management subsystem (See article 1 'Scope' for details). See point 3.2 of this NTSN for a breakdown of the basic parameters corresponding to each of the six 'Essential Requirements' plus essential requirements specific to operation and traffic management.

3. How this NTSN should be read

This NTSN consists of two parts: the Articles and the Annex. The Articles set out information concerning scope, application and key definitions. The Annex sets the technical specifications, codified standards and assessment criteria for meeting the 'Essential Requirements' of RIR 2011.

Rail operators on the GB railway should check article 1 'Scope' and article 2 'Application' of this NTSN to identify whether they are legally obliged to apply requirements in the Annex.

4. Changes from Issue 1 published on 1 January 2021

NTSNs were created for EU Exit to take the place of EU regulations called Technical Specifications for Interoperability (TSIs). Issue 1 of the Operation and Traffic Management NTSN substantially reproduced Commission Regulation (EU) No 2019/773 – the OPE TSI – which applied in Britain until 31 December 2020.

Changes from Issue 1 to 2 of this NTSN primarily focus on sections where the OPE TSI was amended in 2023 by Commission Implementing Regulation (EU) 2023/1693 and sections where the British rail sector or Government identified a need for change and agreed solutions. Changes to technical content, including decisions on whether to maintain alignment with the Operation and Traffic Management TSI, were made on the principles that mandatory requirements in NTSNs should be strictly necessary for achieving

interoperability in GB, outcome focused where appropriate, supported by GB-focused analysis, and tested with those who will be obliged to apply them. To support use of the NTSN in line with these principles, Issue 2 also contains a substantial redraft of the Summary and Articles section to improve clarity, reflect Government NTSN policy, and align application with the objectives and target outcomes of rail interoperability in GB.

The core structure and format of the NTSN has not changed in this Issue 2 and still reflects that of the Operation and Traffic Management TSI. It still contains parts labelled as 'Open Points' or 'Specific Cases' where the 'Essential Requirements' are to be met either through application of bespoke requirements, supplementary National Technical Rules, or a choice of NTSN or National Technical Rule specifications.

There are also various provisions that are still labelled 'left intentionally blank'. This has been done to preserve consistency of clausal reference points within this NTSN and with other interfacing NTSNs, recognising that the changes from Issue 1 to 2 are limited to specific sections.

For the purpose of this NTSN, the implementation plan published in September 2016 continues to apply.

5. Relationship with rail safety obligations

Conformity to this NTSN to meet obligations under the RIR 2011 does not guarantee that safety obligations under the Railways and Other Guided Transport Systems (Safety) Regulations 2006, the Health and Safety at Work Act 1974, or other legislation pertaining to rail safety are met. Some NTSN specifications are intended to fulfill the safety 'Essential Requirement' of interoperability, ensuring a common baseline of safe design. However, meeting these requirements alone does not mean that a railway subsystem is safe. Rail safety law, which focuses on controlling risk 'as low as reasonably practicable' (ALARP) to assure system safety, requires entities making significant changes to the railway to apply the Common Safety Method for Risk Evaluation and Assessment in determining risk controls, and in all cases to identify hazards and apply appropriate mitigations for the circumstance. This may identify that additional or alternative measures to the standardised safety 'Essential Requirements' are needed to ensure the safety of the subsystem.

6. Relationship with other rail standards

Entities that are obliged to apply this NTSN may have other obligations concerning the application of standards covering the same topics. Within the context set out in article 1 'Scope' and article 2 'Application', this NTSN's mandatory requirements take precedence over all other rail technical standards covering the same topics, including those set by individual companies or cross-industry bodies, unless otherwise indicated within this NTSN's Annex (e.g. there is an applicable UK Specific Case or transitional provision), the National Implementation Plan for this NTSN, a formal exemption granted by the Department for Transport as 'competent authority' (See Summary subsection 7

'Exemptions from this NTSN', or – in the case of international rail services – the Convention Concerning International Carriage by Rail (COTIF) Uniform Technical Prescriptions (UTPs) apply.

7. Exemptions from this NTSN

The UK Government recognises that the specifications set in the Annex may not always be the most effective way of achieving the 'Essential Requirements' of RIR 2011 or its objectives and target outcomes. For example, cost benefit analysis, customer insights and safety risk assessments may identify that alternatives more appropriate to the project budget, value for money, customer need, and identified safety hazards and risks, can deliver the same intended result as an applicable NTSN provision. Government also recognises that technology may change faster than standardised requirements, necessitating flexibility to benefit from innovation.

Under regulation 14 of RIR 2011 'Exemption from need to conform with NTSNs (exemptions)', the Department for Transport as 'Competent Authority' has the power to exempt rail projects in scope of RIR 2011 from NTSN requirements in the following circumstances:

- The project is at an advanced stage of development (i.e. its *"planning or construction stage has reached a point where the impact of a change in technical specifications would present a significant legal, contractual, economic, financial, social or environmental impediment to the project concerned"*) or the project is the subject of a contract in the course of performance when the applicable NTSN is published.

- The project concerns the renewal or upgrading of an existing subsystem, where the loading gauge, track gauge, space between tracks or electrification voltage in the applicable NTSN is not compatible with those of the existing subsystem.

- Any proposed renewal, extension or upgrading of an existing subsystem where the application of an applicable NTSN would compromise the economic viability of the project or the compatibility of the project with the rail system.

- Following an accident or natural disaster, where the conditions for the rapid restoration of the network do not economically or technically allow for partial or total application of an applicable NTSN.

- A project which employs innovative solutions which either do not comply with the relevant NTSNs or to which the assessment methods in those NTSNs cannot be applied.

Under regulation 13 of RIR 2011 'Authorisation requirements for the renewal or upgrading of subsystems', the Department also has the power to decide whether an

authorisation to place into service is needed for an upgraded or renewed subsystem, and the extent to which NTSN requirements apply for authorisation.

Where projects identify that alternatives to this NTSN's requirements may better deliver the NTSN's intended outcomes in their circumstance without compromising safety or the interoperability of the railway, and one of the above circumstances applies, they should contact the Department to enquire whether an exemption may be possible. Exemption requests should be made in writing using the template published on Gov.uk and sent to interoperability@dft.gov.uk

Requests must cover the mandatory criteria in regulation 14A of RIR 2011 'Application for exemptions' and offer an evidence-based explanation of how proposed alternative arrangements would be at least as effective as the NTSN requirements in meeting the NTSN's objectives. They must also give due consideration to the 'Essential Requirements', objectives and target outcomes of Great Britain's rail interoperability framework. Where requests concern safety requirements, they must be accompanied by risk assessment evidence. Where they concern accessibility requirements, they must be accompanied by evidence from any equality impact assessments and consultation with user groups, including impacts on consistency of rail passenger or staff experience on the GB network.

Requests should be made at the earliest phase of a rail project, and not after completion of the design phase. In order to permit equal levels of due diligence, including consultation as appropriate, to make informed and balanced policy decisions on exemptions, applicants should allow four months for a decision from the Department for Transport.

Operation and Taffic Management
National Technical Specification Notice
Articles

Article 1

Scope

1. The geographic scope of this NTSN is the GB railway system (including conventional and high-speed mainline networks) and the UK section of the Channel Tunnel, except for parts named on the approved list of exclusions published by the Secretary of State pursuant to regulation 3(2)or described in regulation 3(5) of RIR 2011. TSIs continue to have direct effect in Northern Ireland.

Article 2

Application

1. This NTSN concerns the operation and traffic management subsystem of the GB rail system, as set out in the Annex.

2. This shall apply to the operation and traffic management subsystem of the GB rail system as defined in paragraph 2 of Schedule 3 to the RIR 2011 'Subsystems':

    - The procedures and related equipment enabling coherent operation of the various structural subsystems, during both normal and degraded operation, including in particular train composition and train driving, traffic planning and management.
    - The professional qualifications which may be required for carrying out cross-border services.

3. For the purpose of this NTSN, the implementation plan published in September 2016 continues to apply.

Article 3

Verification of conformity to this NTSN

1. The conditions to be complied with for verifying the interoperability in accordance with regulation 15 of the RIR 2011 'Essential requirements for project subsystems' shall be the applicable national technical rules in the following situations:

    a) in the specific situations referred to in point 7.2 of the Annex to this NTSN;
    b) with regard to the topics listed as open points and areas for national rules referred to in Appendix I of the Annex to this NTSN.

ANNEX

TABLE OF CONTENTS

1. INTRODUCTION

1.1. TECHNICAL SCOPE

The technical scope of this NTSN is defined in Article 2(2) of the NTSN.

1.2. GEOGRAPHICAL SCOPE

The geographical scope of this NTSN is defined in Article 1(1) of the NTSN.

2. DESCRIPTION OF SCOPE

This NTSN applies to the GB rail system, which includes NTSN conform and non-NTSN conform vehicles and fixed installations.

This NTSN relates to processes and procedures, as well as to physical elements of vehicles and fixed installations that are important for their operational function in the context of this NTSN and requirements applicable to staff executing safety-critical tasks.

The railway undertaking and the infrastructure manager shall ensure that all requirements of this NTSN become a relevant part of railway undertakings' and infrastructure managers' safety management system ('SMS') as required by the Railways and Other Guided Transport Systems (Safety) Regulations 2006[1].

2.1. STAFF AND TRAINS

Points 4.6 and 4.7 apply to those staff undertaking the safety-critical tasks associated with accompanying a train.

1 Directive 2004/49/EC of the European Parliament and of the Council of 29 April 2004 on safety on the Community's railways and amending Council Directive 95/18/EC on the licensing of railway undertakings and Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification (Railway Safety Directive). Implemented by the Railways and Other Guided Transport Systems (Safety) Regulations 2006. This EU legislation is EU derived domestic legislation under section 2 of the European Union (Withdrawal) Act 2018.

- Point 4.6.2 applies to train drivers without prejudice to point 8 of Annex VI to Directive 2007/59/EC of the European Parliament and of the Council[2].

- For those staff undertaking the safety-critical tasks associated with despatching trains and authorising train movements, recognition of professional qualifications and health and safety conditions may apply between the UK and other countries.

- For those staff undertaking the safety-critical tasks associated with the last preparation of a train before it is scheduled to cross a border(s) and work beyond any location(s) designated as the 'frontier' in the network statement of an infrastructure manager and included in its safety authorisation, point 4.6 shall apply while taking into account any recognition agreements between the UK and other countries in relation to point 4.7. The train will not be considered to be a cross-border service, if all the vehicles of the train crossing the state border cross it only to the 'frontier' location(s).

2.2. PRINCIPLES

This NTSN covers those elements of the rail 'operation and traffic management' subsystem, where there are operational interfaces between railway undertakings and infrastructure managers and where there is a particular benefit to interoperability.

Railway undertakings and infrastructure managers shall ensure that all requirements concerning rules and procedures as well as documentation are met by the establishment of the appropriate processes. The set-up of these processes is a relevant part of railway undertakings' and infrastructure managers' safety management system (hereinafter referred to as 'SMS') as required by Directive 2004/49/EC[3].The SMS itself is assessed by the safety authority before granting safety certificate/authorisation.

[2] Directive 2007/59/EC of the European Parliament and of the Council of 23 October 2007 on the certification of train drivers operating locomotives and trains on the railway system in the Community. Implemented by the Train Driving Licences and Certificates Regulations 2010. This EU legislation is EU derived domestic legislation under section 2 of the European Union (Withdrawal) Act 2018.

[3] Directive 2004/49/EC of the European Parliament and of the Council of 29 April 2004 on safety on the Community's railways and amending Council Directive 95/18/EC on the licensing of railway undertakings and Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification (Railway Safety Directive). Implemented by the Railways and Other Guided Transport Systems (Safety) Regulations 2006. This EU legislation is EU derived domestic legislation under section 2 of the European Union (Withdrawal) Act 2018.

2.3. APPLICABILITY TO EXISTING NON NTSN CONFORM VEHICLES AND INFRASTRUCTURE

While the majority of the requirements contained in this NTSN relate to processes and procedures, a number also relate to physical elements of vehicles and infrastructure that are important for their operational function in the context of this NTSN.

Those physical elements are specified in the structural NTSNs covering other subsystems than operation and traffic management. They have to be assessed according to the procedures defined in those NTSNs.

None of the provisions of this NTSN shall be used to justify a national rule under a structural NTSN.

3. ESSENTIAL REQUIREMENTS

3.1. COMPLIANCE WITH THE ESSENTIAL REQUIREMENTS

The GB rail system, its subsystems and their interoperability constituents shall meet the essential requirements set out in general terms in Schedule 2 of the Railways (Interoperability) Regulations 2011.

3.2. ESSENTIAL REQUIREMENTS — OVERVIEW

Clause	Clause Title	Safety					Reliability & Availability	Health		Environmental protection					Technical compatibility	Accessibility		Essential requirements specific to operation and traffic management			
		1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	1.2	1.3.1	1.3.2	1.4.1	1.4.2	1.4.3	1.4.4	1.4.5	1.5	1.6.1	1.6.2	2.6.1	2.6.2	2.6.3	2.6.4
4.2.1.2	Documentation for staff executing safety-critical tasks						X						X					X	X	X	
4.2.1.2.1	Rule Book						X						X					X		X	
4.2.1.2.2	Route Book																	X		X	
4.2.1.2.3	Train running information for drivers																	X	X	X	
4.2.1.2.4	Informing the driver in real time																	X	X	X	
4.2.1.3	Documentation for railway undertaking staff other than drivers						X											X		X	
4.2.1.5	Safety-related communications between train crew,						X											X	X	X	

Clause	Clause Title	Safety					Reliability & Availability	Health		Environmental protection					Technical compatibility	Accessibility		Essential requirements specific to operation and traffic management			
		1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	1.2	1.3.1	1.3.2	1.4.1	1.4.2	1.4.3	1.4.4	1.4.5	1.5	1.6.1	1.6.2	2.6.1	2.6.2	2.6.3	2.6.4
	other railway undertaking staff and staff authorising train movements																				
4.2.2.1	Train visibility	X																X		X	
4.2.2.1.1	General requirement	X																X		X	
4.2.2.1.2	Front end	X																X		X	
4.2.2.1.3	Rear end	X																X		X	
4.2.2.2	Train audibility	X											X					X		X	
4.2.2.2.1	General requirement	X																X		X	
4.2.2.2.2	Control	X																		X	
4.2.2.3	Vehicle identification						X											X		X	

Clause	Clause Title	Safety					Reliability & Availability	Health		Environmental protection					Technical compatibility	Accessibility		Essential requirements specific to operation and traffic management			
		1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	1.2	1.3.1	1.3.2	1.4.1	1.4.2	1.4.3	1.4.4	1.4.5	1.5	1.6.1	1.6.2	2.6.1	2.6.2	2.6.3	2.6.4
4.2.2.4	Safety of passengers and load																	X			
4.2.2.5	Route Compatibility and Train composition																	X			
4.2.2.5.1	Route Compatibility																	X			
4.2.2.5.2	Train composition																	X			
4.2.2.6	Train braking		X															X		X	
4.2.2.6.1	Minimum requirements of the braking system		X															X		X	
4.2.2.6.2	Braking performance		X															X		X	
4.2.2.7	Ensuring that the train is in running order		X															X		X	
4.2.2.7.1	General requirement																	X		X	

Clause	Clause Title	Safety					Reliability & Availability	Health		Environmental protection					Technical compatibility	Accessibility		Essential requirements specific to operation and traffic management			
		1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	1.2	1.3.1	1.3.2	1.4.1	1.4.2	1.4.3	1.4.4	1.4.5	1.5	1.6.1	1.6.2	2.6.1	2.6.2	2.6.3	2.6.4
4.2.2.7.2	Pre-departure data																	X		X	
4.2.2.8	Requirements for signal and lineside marker sighting														X			X			
4.2.2.9	Driver vigilance																	X			
4.2.3.1	Train planning		X																X	X	
4.2.3.2	Identification of trains																	X	X	X	
4.2.3.3	Train departure																	X		X	
4.2.3.3.1	Checks and tests before departure		X				X											X		X	
4.2.3.3.2	Informing the infrastructure manager of the train's operational status		X				X												X	X	

Clause	Clause Title	Safety					Reliability & Availability	Health		Environmental protection					Technical compatibility	Accessibility		Essential requirements specific to operation and traffic management			
		1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	1.2	1.3.1	1.3.2	1.4.1	1.4.2	1.4.3	1.4.4	1.4.5	1.5	1.6.1	1.6.2	2.6.1	2.6.2	2.6.3	2.6.4
4.2.3.4	Traffic management																	X	X	X	
4.2.3.4.1	General requirements																	X	X	X	
4.2.3.4.2	Train reporting																	X	X	X	
4.2.3.4.2.1	Data required for train position reporting																	X		X	
4.2.3.4.3	Dangerous goods																	X	X		
4.2.3.4.4	Operational quality																		X	X	
4.2.3.5	Data recording						X												X		
4.2.3.5.1	Recording of monitoring data outside the train						X												X		
4.2.3.5.2	Recording of monitoring data on board the train						X												X		
4.2.3.6	Degraded operation																	X	X	X	

Clause	Clause Title	Safety					Reliability & Availability	Health		Environmental protection					Technical compatibility	Accessibility		Essential requirements specific to operation and traffic management			
		1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	1.2	1.3.1	1.3.2	1.4.1	1.4.2	1.4.3	1.4.4	1.4.5	1.5	1.6.1	1.6.2	2.6.1	2.6.2	2.6.3	2.6.4
4.2.3.6.1	Advice to other users																	X		X	
4.2.3.6.2	Advice to train drivers																	X			
4.2.3.6.3	Contingency arrangements																	X	X	X	
4.2.3.7	Managing an emergency situation																	X	X	X	
4.2.3.8	Aid to train crew in the event of an incident or of a major rolling stock malfunction																			X	
4.4	ERTMS operating rules																	X	X		
4.6	Professional qualifications																	X	X	X	

Clause	Clause Title	Safety					Reliability & Availability	Health		Environmental protection					Technical compatibility	Accessibility		Essential requirements specific to operation and traffic management			
		1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	1.2	1.3.1	1.3.2	1.4.1	1.4.2	1.4.3	1.4.4	1.4.5	1.5	1.6.1	1.6.2	2.6.1	2.6.2	2.6.3	2.6.4
4.7	Health and safety conditions																	X			
4.8	Additional information on infrastructure and vehicles																	X			
4.8.1	Infrastructure																	X			
4.8.2	Vehicles																	X			

4. CHARACTERISTICS OF THE SUBSYSTEM

4.1. INTRODUCTION

In accordance with Directive 2012/34/EU of the European Parliament and of the Council[4], it is the overall responsibility of the infrastructure manager to provide all the appropriate parameters and characteristics of the infrastructure which shall be used by the railway undertaking to check the compatibility of the railway undertaking's trains to run on the infrastructure manager's network, taking into account the geographic particularities of individual lines and the functional or technical specifications set out in this section.

The fundamental operational principles and common operational rules applicable to the GB rail network are defined in Appendix B.

4.2. FUNCTIONAL AND TECHNICAL SPECIFICATIONS OF THE SUBSYSTEM

The functional and technical specifications of the 'operation and traffic management' subsystem define the specifications to ensure safe operation, system reliability and availability and operational efficiency of the GB rail system, with focus in particular on specifications relating to:

— staff executing safety-critical tasks,

— trains,

— train operations,

— ERTMS based harmonised operation.

4.2.1. Specifications relating to staff

4.2.1.1. General requirements

In its Safety Management System (SMS), each RU and IM shall identify its safety-critical tasks and safety-related functions, and the staff responsible for executing them. RUs and IMs shall define and describe in their SMS procedures and requirements to train, assess and monitor the competence of their staff executing safety-critical tasks, except the requirements laid down in the following provisions:

4 Directive 2012/34/EU of the European Parliament and of the Council of 21 November 2012 establishing a single European railway area. Implemented by the Railways (Access, Management and Licensing of Railway Undertakings) Regulations 2016. This EU legislation is EU derived domestic legislation under section 2 of the European Union (Withdrawal) Act 2018.

(i) training, fitness and certification requirements for train drivers (addressed by Directive 2007/59/EC of the European Parliament and of the Council[5]);

(ii) elements relevant to professional qualification applicable to staff 'accompanying trains' other than the train driver, to which Appendix F of this Annex shall apply;

(iii) elements relevant to professional qualification applicable to staff 'preparing trains' other than the train driver, to which Appendix G of this Annex shall apply.

Any qualification acquired based on the procedures and rules defined in the SMS of the RU or IM shall be recorded in the concerned SMS.

The documents providing evidence of training, experience and professional competences shall be delivered to the concerned staff executing safety-critical tasks, upon request.

Such a qualification shall allow the member of staff executing safety-critical tasks to undertake similar tasks for another RU or IM, subject to the identification of additional training needs on geographical and technical specifications and the SMS of the RU or IM in accordance with point 4.6.3.2, and to the satisfactory completion of that training.

4.2.1.2. Information exchange between IMs and RUs, including information for staff executing safety-critical tasks

IMs and RUs shall plan, prepare and operate trains and instruct staff in accordance with the information contained in Rule Book and Route Book.

Their staff executing safety-critical tasks shall be trained, and train drivers certified, based on the information provided in the Rule Book and the Route Book in accordance with their SMS.

IMs and RUs shall cooperate to exchange information and follow a process for establishing and regularly updating the Rule Book and Route Book as appropriate. Such information shall be applicable for normal, degraded and emergency operations.

[5] Directive 2007/59/EC of the European Parliament and of the Council of 23 October 2007 on the certification of train drivers operating locomotives and trains on the railway system in the Community. Implemented by the Train Driving Licences and Certificates Regulations 2010. This EU legislation is EU derived domestic legislation under section 2 of the European Union (Withdrawal) Act 2018.

The IM, in consultation with the RUs operating on its network, shall define the appropriate procedures for communication in real time and emergency situations in order to ensure that information relevant for operation is provided to the RU and/or the driver as soon as such information is available.

IMs and RUs shall ensure that all infrastructure information and rules relevant for planning, preparing and operating of trains are shared and communicated to staff executing safety-critical tasks in accordance with each staff member's tasks in all the IMs, and RUs, respective operating language(s).

IM and RUs may group the Rule Book and Route Book information into support for individual staff and/or individual operations.

IMs and RUs shall supply to each member of their respective staff executing safety-critical tasks, including train drivers, with versions of the Rule Book and the Route Book tailored to the information necessary for their operations. This shall include the interface information where staff executes safety-critical tasks with a direct interface between IM and RU, in particular to ensure safety-related communication between staff authorising the movement of trains and staff onboard trains.

4.2.1.2.1. Rule Book

The RU and the IM shall be responsible for the compilation of their respective Rule Book as integral part of their SMS to instruct staff executing safety-critical tasks, on operational rules applicable to their role.

The Rule Book is a description of the operational rules and procedures for a network or a part thereof and vehicles operated on that network or its part(s) in normal, degraded operation and emergency situations. It shall be consistent across all the lines over which the RU operates and it shall be consistent across all the lines managed by the IM.

a) The Rule Book shall cover For the RU:

   (i) the common safety and operating rules and procedures in accordance with Appendices A, B, C and D);

   (ii) This provision has been left intentionally blank;

   (iii) RU instructions to the staff executing safety-critical tasks including train driver laid down in its SMS;

   (iv) information relevant to the vehicles and trains operated by the RU; and

   (v) all the lines over which the RU operates.

b) For the IM:

(i) the common safety and operating rules and procedures in accordance with Appendices A, B, C and D;

(ii) This provision has been left intentionally blank;

(iii) IM instructions to the staff executing safety-critical tasks laid down in its SMS;

(iv) information relevant to the vehicles operated by the IM when applicable and when the IM is not acting as an RU; and

(v) all the lines managed by the IM.

It shall include procedures covering, as a minimum, the following aspects:

— staff safety and security,

— signalling and control command (class A and class B systems),

— train operation, including degraded mode and related to line characteristics and vehicle characteristics,

— incidents and accidents, including the reporting scheme, incident or accident management plan and the detailed actions to be taken in the event of an accident or an incident,

— degraded and emergency situations

— For the RUs, traction and rolling stock, including all information relevant to the operation of the rolling stock during normal and degraded mode (such as trains requiring assistance); such documentation shall also focus on the specific interface with the infrastructure manager's staff in these cases.

It shall have two appendices:

— Appendix 1: Manual of communication procedures in accordance with Appendix C1,

— Appendix 2: Book of ERTMS Operational and national Instructions in accordance with Appendix C2.

Predefined messages and forms shall at least exist in the 'operating' language(s) of infrastructure manager(s).

If the language chosen by the railway undertaking for the Rule Book is not the language in which the appropriate information was originally supplied, it is the responsibility of the railway undertaking to arrange for any necessary translation and/or provide explanatory notes in another language.

4.2.1.2.2. Route Book

The IM shall establish the infrastructure information covering its network for its own use and for the use of the RUs operating on this network. The IM shall provide each RU with the information for the RU's Route Book as defined in Appendix D, including permanent or temporary restrictions and modifications.

The infrastructure manager shall ensure that the infrastructure information is complete and accurate.

The railway undertaking is responsible for the complete and correct compilation of the Route Book, using the information supplied by the infrastructure manager(s). The railway undertaking shall ensure the Route Book duly describes operational conditions related to line characteristics and vehicle characteristics.

The infrastructure manager shall inform the railway undertaking of any changes to the infrastructure information, whenever such information becomes available and affects train operations, including permanent or temporary restrictions and modifications.

The IM, in consultation with the RUs operating on its network, shall define the appropriate procedures when modification of the Route Book is not transmitted from the IM to RU in the appropriate agreed timing, as defined in the SMS of the IM and reflected in the SMS of the RU; in that case, the IM shall also directly inform the driver.

RU Route Book:

Using the information received, the railway undertaking is responsible for the complete and correct compilation of the Route Book, covering the infrastructure on which it operates trains.

The railway undertaking shall ensure that the route information compiled in the Route Book consists in a description of the lines and the associated lineside equipment for the lines over which the driver will operate and relevant to the driving task.

The format of the Route Book shall be prepared in the same manner for all the infrastructures operated on by the trains of an individual railway undertaking.

When informed by the infrastructure manager of the changes in the infrastructure information, the railway undertaking shall update the Route Book and communicate the modification in accordance with the procedures defined in their SMS, including instructing their drivers impacted by the change.

IM Route Book:

The IM shall compile in an IM Route Book the infrastructure information to be shared with their staff executing safety-critical tasks and compile it in accordance with its SMS.

The infrastructure manager shall update the IM Route Book, whenever such information becomes available and affects the tasks of its staff executing safety critical tasks, including permanent or temporary restrictions and modifications.

4.2.1.2.3. Train running information for drivers

When the railway undertaking provides the drivers with their working plan, it shall provide information necessary for the normal running of the train and as a minimum include:

— the train identification,

— the train running days (if necessary),

— the stopping points and the activities associated with them,

— other timing points,

— the arrival/departure/passing times at each of those points.

Such train running information must be updated whenever appropriate prior to departure and shall be based on and supplement the Rule Book and Route Book information. The information may be provided either electronically or in a paper format..

4.2.1.2.4. Informing the driver in real time during train operation

The infrastructure manager shall inform and instruct drivers in real time about last minute changes to operations regarding the line or relevant lineside equipment, in accordance with the communication methodology established between IM and RU in line with Appendix C.

Real time information shall be limited to situation and changes that have not been managed under 4.2.1.2.2 and 4.2.1.2.3 in accordance with IMs and RUs SMS procedures and are directly affecting the driver's route.

For emergency situations, appropriate alternative means of communication shall be established between the IM and RU in order to ensure that relevant information is made available.

Infrastructure managers and railway undertakings must have a process in place to be able to confirm the suitability of the vehicles and the drivers in respect of route knowledge for real time route deviation.

4.2.1.3. Not used

4.2.1.4. Not used

4.2.1.5. Safety-related communications between train crew, other railway undertaking staff and staff authorising train movements

The language used for safety-related communication between train crew, other railway undertaking staff (as defined in Appendix G) and the staff authorising train movements is the operating language(s) (as defined in Appendix J) used by the infrastructure manager on the route concerned.

The principles for safety-related communication between train crew and staff responsible for authorising the movement of trains are to be found in Appendix C.

In accordance with Directive 2012/34/EU, the infrastructure manager is responsible for publishing the 'operating' language(s) used by its personnel in daily operational use.

Where, however, local practice requires that a second language is also provided for, it is the responsibility of the infrastructure manager to determine the geographic boundaries for its use.

4.2.2. Specifications relating to trains

4.2.2.1. Train visibility

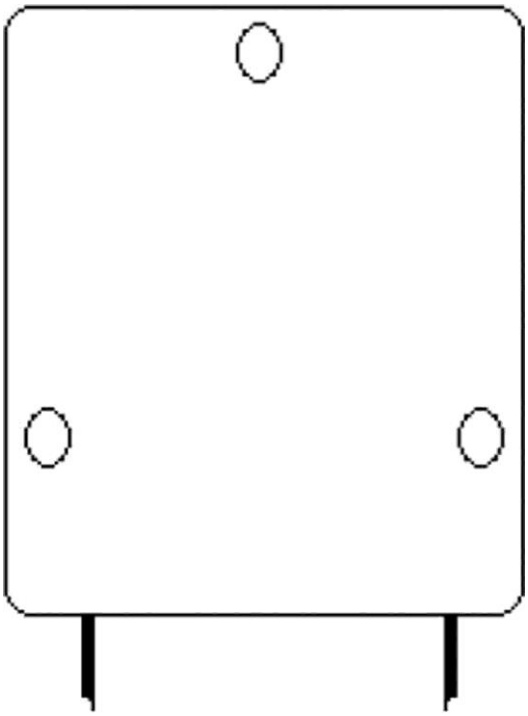
4.2.2.1.1. General requirement

The railway undertaking shall ensure that trains are fitted with means of indicating the front and rear of the train.

4.2.2.1.2. Front end

The railway undertaking shall ensure that an approaching train is clearly visible and recognisable as such, by the presence and layout of its lit white front-end lights.

The forward facing front end of the leading vehicle of a train shall be fitted with three lights in an isosceles triangle, as shown below. These lights shall always be lit when the train is being driven from that end.



The front-end lights shall optimise train detectability (marker lights), provide sufficient visibility for the train driver (head lights) by night and during low light conditions and shall not dazzle the drivers of oncoming trains.

The spacing, the height above rails, the diameter, the intensity of the lights, the dimensions and shape of the emitted beam in both day and night time operation are defined in LOC&PAS NTSN.

4.2.2.1.3. Rear end

The railway undertaking shall provide the required means of indicating the rear of a train. The rear-end signal shall only be exhibited on the rear of the last vehicle of the train. .

4.2.2.1.3.1. Passenger trains

The rear end signal of a passenger train shall consist of 2 steady red lights at the same height above buffer on the transversal axis.

4.2.2.1.3.2. Freight trains

The rear end signal shall consist of two steady red lights in accordance with the LOC&PAS NTSN or one flashing red light that meets the requirements specified in the relevant national technical rules.

Reflective plates shall comply with Appendix E to the WAG NTSN and have the following shape with white side triangles and red top and bottom triangle:

The lamps shall be on the same height above buffer on the transversal axis.

4.2.2.2. Train audibility

4.2.2.2.1. General requirement

The railway undertaking shall ensure that trains are fitted with an audible warning device to indicate the approach of a train.

4.2.2.2.2. Control

The activation of the audible warning device shall be possible from all driving positions.

4.2.2.3. Vehicle identification

Each vehicle shall have a number to uniquely identify it from any other rail vehicle. This number shall be prominently displayed at least on each longitudinal side of the vehicle.

It shall also be possible to identify operational restrictions applicable to the vehicle.

Further requirements are specified in Appendix H.

4.2.2.4. Safety of passengers and load

4.2.2.4.1. Safety of load

The railway undertaking shall make sure that freight vehicles are safely and securely loaded and remain so throughout the journey.

4.2.2.4.2. Safety of passengers

The railway undertaking shall ensure that passenger transport is undertaken safely at the departure and during the journey.

4.2.2.5. Route compatibility and train composition

4.2.2.5.1. Route compatibility

(a) The railway undertaking is responsible for ensuring that all vehicles composing its train are compatible with the intended route(s).

The railway undertaking shall have a process in its SMS to ensure that all vehicles it uses are authorised, registered and compatible with the intended route(s) including the requirements to be followed by its staff.

The processes for route compatibility in the SMS of the railway undertaking shall include the following checks, which may be performed in parallel at any appropriate time or in any appropriate sequence:

— each vehicle is authorised and registered;

— each vehicle in the train is compatible with the route;

— the composition of the train is compatible with the route and the path;

— the preparation of the train ensuring that the train is correctly formed and complete.

(b) The infrastructure manager shall provide the information for route compatibility as defined in Appendix D.

The infrastructure manager shall provide this information free of charge as soon as possible to railway undertakings, authorised applicants for path requests and, where applicable, to an applicant for authorisation under the Railway Interoperability Regulations 2011.

The infrastructure manager shall ensure that the information provided to the railway undertaking(s) is complete and accurate.

The infrastructure manager shall inform the railway undertaking of the changes on characteristics of the route whenever such information becomes available.

For emergency situations or real time information, the infrastructure manager shall ensure timely information is given to the railway undertaking through appropriate means of communication.

(c) Additional elements for route compatibility shall be checked when relevant:

— transport of dangerous good as referred to in point 4.2.3.4.3,

— quieter route as referred to in the Noise NTSN,

— exceptional transport

— access conditions to underground stations for diesel and other thermal traction systems as referred to in point 4.2.8.3 of the LOC&PAS NTSN.

d) *This provision has been left intentionally blank.*

4.2.2.5.2. Train composition

Train composition requirements shall take into account the following elements according to the allocated path:

(a) all vehicles composing a train including their loads

— shall be compatible with all the requirements applicable on the routes over which the train shall run;

— shall be fit to run at the maximum speed at which the train is scheduled to run;

(b) all vehicles on the train shall remain within their specified maintenance interval for the duration (in terms of both time and distance) of the journey being undertaken;

(c) the train composed of vehicles including their loads, shall comply with the technical and operational constraints of the route concerned and be within the maximum length permissible for forwarding and receiving terminals.

The railway undertaking is responsible for ensuring that all vehicles composing the train including their load are technically fit for the journey to be undertaken and remain so throughout the journey.

The railway undertaking may need to consider additional constraints due to the type of braking regime or traction type on a particular train (see point 4.2.2.6).

4.2.2.6. Train braking

The railway undertaking shall set up and implement braking requirements in accordance with points 4.2.2.6.1 and 4.2.2.6.2 and shall manage them within its safety management system.

4.2.2.6.1. Minimum requirements of the braking system

All vehicles in a train shall be connected to the continuous automatic braking system as defined in the LOC&PAS NTSNs.

The first and last vehicles (including any traction units) in any train shall have the automatic brake operative.

In the case of a train becoming accidentally divided into two parts, both sets of detached vehicles shall come automatically to a stand as a result of a maximum application of the brake.

4.2.2.6.2. Braking performance and maximum speed allowed

(1) The infrastructure manager shall provide the railway undertaking with all relevant line characteristics for each route:

— signalling distances (warning, stopping) containing their inherent safety margins,

— gradients,

— maximum permitted speeds, and

— conditions of use of braking systems possibly affecting the infrastructure such as magnetic, regenerative and eddy-current brake.

The infrastructure manager shall ensure that the information provided to the railway undertaking(s) is complete and accurate, and shall inform the railway undertaking of the changes on the line characteristics whenever such information becomes available and affects trains operation..

(2) The infrastructure manager may provide the following information:

(i) for trains able to run at a maximum speed higher than 200 km/h, deceleration profile and equivalent response time on level track;

(ii) for trainsets or for fixed train compositions, unable to run at a maximum speed higher than 200 km/h, deceleration (as above in (i)) or brake weight percentage;

(iii) for other trains (variable compositions of trains unable to run at a maximum speed higher than 200 km/h): brake weight percentage.

If the infrastructure manager provides the abovementioned information, it shall be made available to all railway undertakings who intend to operate trains on its network in a non-discriminatory way.

The braking tables already in use and accepted for the existing non NTSN conform lines at the 1 July 2015 shall also be made available.

(3) The railway undertaking shall, in the planning stage, determine the braking regime, the braking capability and corresponding maximum speed of the train taking into account:

— the relevant line characteristics as expressed in point (1) and, if available, the information provided by the infrastructure manager in accordance to point (2); and

— the rolling stock-related margins derived from reliability and availability of the braking system.

Furthermore, the railway undertaking shall ensure that during operation each train achieves at least the necessary braking performance. In particular the railway undertaking has to set up rules to be used if a train does not reach the necessary braking performance during operation. In this case, the railway undertaking shall immediately inform the infrastructure manager. The infrastructure manager may take appropriate measures to reduce the impact on the overall traffic on its network.

4.2.2.7. Ensuring that the train is in running order

4.2.2.7.1. General requirement

The railway undertaking shall define the process to ensure that all safety-related on-train equipment is in a fully functional state and that the train is safe to run.

The railway undertaking shall inform the infrastructure manager of any modification to the characteristics of the train affecting its performance or any modification that might affect the ability to accommodate the train in its allocated path.

The infrastructure manager and the railway undertaking shall define and keep up to date conditions and procedures for train running temporarily in degraded mode.

4.2.2.7.2. Pre-departure data

The railway undertaking shall ensure that the following data required for safe and efficient operation is made available to the infrastructure manager(s) prior to the departure of the train:

— the train identification,

— the identity of the railway undertaking responsible for the train,

— the actual length of the train,

— if a train carries passengers or animals when it is not scheduled to do so,

— any operational restrictions with an indication of the vehicle(s) concerned (gauge, speed restrictions, etc.),

— information the infrastructure manager requires for the transport of dangerous goods.

The railway undertaking shall advise the infrastructure manager(s) if a train does not occupy its allocated path or is cancelled.

4.2.2.8. Requirements for signal and lineside marker sighting

Without prejudice of ERTMS operations as defined in Appendix A, the driver shall be able to observe signals and lineside markers. Signals and lineside markers as well as all other types of lineside signs that are safety related shall be observable by the driver whenever applicable.

Therefore, signals, lineside markers, signs and information boards shall be designed and positioned in such a consistent way to facilitate this. Issues that shall be taken into account include (see point 4.3.2 of this NTSN for reference to CCS NTSN):

— that they are suitably sited so that train headlights allow the driver to read the information,

— suitability and intensity of lighting, where required to illuminate the information,

— where retro-reflectivity is employed, the reflective properties of the material used are in compliance with appropriate specifications and the signs are fabricated so that train headlights easily allow the driver to read the information.

Driving cabs shall be designed in such a consistent way that the driver is able to easily see the information displayed to them (see point 4.3.3.1 of this NTSN for reference to LOC&PAS NTSN).

4.2.2.9. Driver vigilance

The driver’s activity on board shall be monitored to automatically stop the train when a lack of driver's activity is detected. The requirements related to the means to monitor the driver’s onboard activity are specified in the clause set out in point 4.2.9.3.1 of LOC&PAS NTSN.

4.2.3. Specifications relating to train operations, including ERTMS based operation

Fundamental operational principles and common operational rules set out in Appendix B shall apply in addition to this chapter for train operation in the GB rail system.

The ERTMS operational principles and rules specified in Appendix A of this NTSN shall apply where ERTMS is deployed.

4.2.3.1. Train planning and timetable

In accordance with Directive 2012/34/EU, the infrastructure manager shall advise what data is required when a train path is requested.

Every train has to follow a timetable, agreed between IM and RU under path allocation process; the IM shall ensure the punctual running of trains and shall assist in service performance when scheduling the timetable.

4.2.3.2. Identification of trains

Each train shall be identified by a train running number. The train running number is given by the infrastructure manager when allocating a train path and shall be known by the railway undertaking and all infrastructure managers operating the train. The train running number shall be unique per network. Changes of train running number during a train journey should be avoided.

4.2.3.2.1. Format of train running number

The train running number format is defined in the control-command and signalling NTSN (hereinafter referred to as 'CCS NTSN').

4.2.3.3. Train departure

4.2.3.3.1. Checks and tests before departure

The railway undertaking shall determine the checks and tests to ensure that any departure of train is undertaken safely.

4.2.3.3.2. Informing the infrastructure manager of the train's operational status

The railway undertaking shall inform the infrastructure manager when a train is ready for access to the network.

The railway undertaking shall inform the infrastructure manager of any anomaly affecting the train or its operation having possible repercussions on the train's running prior to departure and during the journey.

4.2.3.4. Traffic management

4.2.3.4.1. General requirements

Traffic management shall ensure the safe, efficient and punctual operation of the railway, including effective recovery from service disruption.

The infrastructure manager shall determine procedures and means for:

— the real time management of trains,

— operational measures to maintain the highest possible performance of the infrastructure in case of delays or incidents, whether actual or anticipated, and

— the provision of information to the railway undertaking(s) in such cases.

Any additional processes required by the railway undertaking and which affect the interface with the infrastructure manager(s) may be introduced after being agreed with the infrastructure manager.

4.2.3.4.2. Train reporting

4.2.3.4.2.1. Data required for train position reporting and predicted handover time

The infrastructure manager shall:

(a) provide a means of real time recording of the times at which trains depart from, arrive at or pass appropriate predefined reporting points on their networks and the delta-time value;

(b) have a process which enables an indication of the estimated number of minutes of deviation from the scheduled time a train is scheduled to be handed over from one infrastructure manager to another; this shall include information on service disruption (description and location of problem).

(c) provide the specific data according to the Telematics Applications for Freight (TAF) and Telematics Applications for Passengers (TAP) NTSNs required in relation to train position reporting. Such information must include:

(1) Train identification

(2) Identity of reporting point

(3) Line on which the train is running

(4) Scheduled time at reporting point

(5) Actual time at reporting point (and whether depart, arrive or pass — separate arrival and departure times must be provided in respect of intermediate reporting points at which the train calls)

(6) Number of minutes early or late at the reporting point

(7) Initial explanation of any single delay exceeding 10 minutes or as otherwise required by the performance monitoring regime

(8) Indication that a report for a train is overdue and the number of minutes by which it is overdue

(9) Former train identification(s), if any

(10) Train cancelled for a whole or a part of its journey.

4.2.3.4.3. Dangerous goods

The railway undertaking shall define the procedures to perform the transport of dangerous goods.

These procedures shall include:

— the provisions as specified in Directive 2008/68/EC of the European Parliament and of the Council[6] and Directive 2010/35/EU of the European Parliament and of the Council[7], as applicable,

— information to the driver of the presence and position of dangerous goods on the train,

— information the infrastructure manager requires for transport of dangerous goods,

— determination, in conjunction with the infrastructure manager, of lines of communication and planning of specific measures in case of emergency situations involving the goods.

4.2.3.4.4. Operational quality

The infrastructure manager and the railway undertaking shall have processes in place to monitor the efficient operation of all the services concerned.

Monitoring processes shall be designed to analyse data and detect underlying trends, both in terms of human error and system error. The results of this analysis shall be used to generate improvement actions, designed to eliminate or mitigate against events which could compromise the efficient operation of the network.

6 Directive 2008/68/EC of the European Parliament and of the Council of 24 September 2008 on the inland transport of dangerous goods. Implemented by the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009. This EU legislation is EU derived domestic legislation under section 2 of the European Union (Withdrawal) Act 2018.

[7] Directive 2010/35/EU of the European Parliament and of the Council of 16 June 2010 on transportable pressure equipment and repealing Council Directives 76/767/EEC, 84/525/EEC, 84/526/EEC, 84/527/EEC and 1999/36/EC. Implemented by the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009. This EU legislation is EU derived domestic legislation under section 2 of the European Union (Withdrawal) Act 2018.

Where such improvement actions would have network-wide benefits, involving other infrastructure managers and railway undertakings, they shall, subject to commercial confidentiality, be communicated accordingly.

Events that have significantly disrupted operations shall be analysed as soon as possible by the infrastructure manager. Where appropriate, and in particular where one of their staff is concerned, the infrastructure manager shall invite those railway undertaking(s) involved in the event concerned to participate in the analysis. Where the result of such analysis leads to network improvement recommendations designed to eliminate or mitigate against causes of accidents/incidents, these shall be communicated to all relevant infrastructure managers and railway undertakings concerned.

These processes shall be documented and subject to internal audit.

4.2.3.5. Data recording

Data pertaining to the running of a train shall be recorded and retained for the purposes of:

— Supporting systematic safety monitoring as a means of preventing incidents and accidents.

— Identification of driver, train and infrastructure performance in the period leading up to and, if appropriate, immediately after an incident or accident, in order to enable the identification of causes, and supporting the case for new or changed measures to prevent recurrence.

— Recording information relating to the performance of both the locomotive/traction unit and the person driving.

It shall be possible to match recorded data to:

— the date and time of the recording,

— the precise geographic location of the event being recorded,

— the train identification,

— the identity of the driver.

Data to be recorded for ETCS/GSM-R are those defined in the CCS NTSN and that are relevant considering the requirements in this point 4.2.3.5.

The data shall be securely sealed and stored and accessible to authorised bodies including the Rail Accident Investigation Branch in carrying out their role pursuant to Article 19 of Directive 2004/49/EC.

4.2.3.5.1. Recording of monitoring data outside the train

As a minimum, the infrastructure manager shall record the following data:

— the failure of lineside equipment associated with the movement of trains (signalling, points etc.);

— the detection of an overheating axle bearing, if fitted;

— safety-related communication between the train driver and signaller.

4.2.3.5.2. Recording of monitoring data on board the train

As a minimum, the railway undertaking shall record the following data:

— the detection of passing of signals at danger or 'end of movement authority';

— application of the emergency brake;

— speed at which the train is running;

— any isolation or overriding of the on-board train control (signalling) systems;

— operation of the audible warning device;

— operation of door controls (release, closure), if fitted;

— detection by on-board alarm systems related to the safe operation of the train, if fitted;

— identity of the cab for which data is being recorded to be checked.

Further technical specifications concerning the recording device are set out in the LOC&PAS NTSN.

4.2.3.6. Degraded operation

4.2.3.6.1. Advice to other users

The infrastructure manager in conjunction with the railway undertaking(s) shall define a process to immediately inform each other of any situation that impedes the safety, performance and/or the availability of the rail network or rolling stock.

4.2.3.6.2. Advice to train drivers

In any case of degraded operation associated with the infrastructure manager's area of responsibility, the infrastructure manager shall give formal instructions to drivers on what measures to take in order to safely overcome the degradation.

4.2.3.6.3. Contingency arrangements

The infrastructure manager in conjunction with all the railway undertakings operating over its infrastructure, and neighbouring infrastructure managers as appropriate, shall define, publish and make available appropriate contingency measures and assign responsibilities based on the requirement to reduce any negative impact as a result of degraded operation.

The planning requirements and the response to such events shall be proportional to the nature and potential severity of the degradation.

These measures, which shall as a minimum include plans for recovering the network to 'normal' status, may also address:

— rolling stock failures (for example, those which could result in substantial traffic disruption, the procedures for rescuing failed trains);

— infrastructure failures (for example, when there has been a failure of the electric power or the conditions under which trains may be diverted from the booked route);

— extreme weather conditions.

The infrastructure manager shall establish and keep updated contact information for key infrastructure manager and railway undertaking staff who may be contacted in the event of service disruption leading to degraded operation. This information shall include contact details both during and outside office hours.

The railway undertaking shall submit this information to the infrastructure manager and advise the infrastructure manager of any changes to these contact details.

The infrastructure manager shall advise all the railway undertaking(s) of any changes to its details.

4.2.3.7. Managing an emergency situation

The infrastructure manager shall, in consultation with:

— all railway undertakings operating over its infrastructure, or, where appropriate, representative bodies of railway undertakings operating over its infrastructure,

— neighbouring infrastructure managers, as appropriate,

— local authorities, representative bodies of the emergency services (including fire-fighting and rescue) at either local or national level, as appropriate, define, publish and make available appropriate measures to manage emergency situations and restore the line to normal operation.

Such measures shall typically cover:

— collisions,

— fires on train,

— evacuation of trains,

— accidents in tunnels,

— incidents involving dangerous goods,

— derailments.

The railway undertaking shall provide the infrastructure manager with any specific information in respect to these circumstances, especially in respect to the recovery or re-railing of their trains.

Additionally, the railway undertaking shall have processes to inform passengers about on-board emergency and safety procedures.

4.2.3.8. Aid to train crew in the event of an incident or of a major rolling stock malfunction

The railway undertaking shall define appropriate procedures to assist the train crew in degraded situations in order to avoid or decrease delays caused by technical or other failures of the rolling stock (for example, lines of communication, measures to be taken in case of evacuation of a train).

4.3. FUNCTIONAL AND TECHNICAL SPECIFICATIONS OF THE INTERFACES

In the light of the essential requirements set out in Chapter 3 of this NTSN, the functional and technical specifications of the interfaces are as follows:

4.3.1. Interfaces with the infrastructure NTSN (INF NTSN)

Reference this NTSN		Reference INF NTSN	
Parameter	**Point**	**Parameter**	**Point**
Braking performance and maximum speed allowed	4.2.2.6.2	Longitudinal track resistance	4.2.6.2
Route Book	4.2.1.2.2	Operating rules	4.4

Degraded operation	4.2.3.6		

4.3.2. Interfaces with the control-command and signalling NTSN (CCS NTSN)

Reference this NTSN		Reference CCS NTSN	
Parameter	**Point**	**Parameter**	**Point**
Rule Book	4.2.1.2.1	Operating rules (normal and degraded conditions) List of harmonised text indications and messages displayed on the ETCS Driver Machine Interface	4.4 Appendix E
Operating rules	4.4		
ERTMS trackside engineering information relevant to operation	Appendix D2		
Requirements for line-side signal and marker sighting	4.2.2.8	Track-side control-command and signalling objects	4.2.15 4.2.18
Train braking	4.2.2.6	Train braking performance and characteristics	4.2.2
Rule Book	4.2.1.2.1	Use of sanding equipment On-board flange lubrication Use of composite brake blocks	4.2.10
Format of train running number	4.2.3.2.1	ETCS DMI GSM-R DMI	4.2.12 4.2.13
Data recording	4.2.3.5	Interface to data recording for regulatory purposes	4.2.14

Reference this NTSN		Reference CCS NTSN	
Parameter	**Point**	**Parameter**	**Point**
Ensuring that the train is in running order	4.2.2.7	Key management	4.2.8

4.3.3. Interfaces with the rolling stock NTSNs

4.3.3.1. Interfaces with the locomotives and passenger rolling stock NTSN (LOC&PAS NTSN)

Reference this NTSN		Reference LOC&PAS NTSN	
Parameter	**Point**	**Parameter**	**Point**
Contingency arrangements	4.2.3.6.3	Rescue coupling End coupling	4.2.2.2.4 4.2.2.2.3
Route Compatibility and Train composition	4.2.2.5	Axle load parameter	4.2.3.2.1
Train braking	4.2.2.6	Braking performance	4.2.4.5
Train visibility	4.2.2.1	External lights	4.2.7.1
Train audibility	4.2.2.2	Horn (audible warning device)	4.2.7.2
Requirements for lineside signal and marker sighting	4.2.2.8	External visibility Optical characteristics of the windscreen Internal lighting	4.2.9.1.3 4.2.9.2.2 4.2.9.1.8
Driver vigilance	4.2.2.9	Driver's activity control function	4.2.9.3.1
Recording of monitoring data on board the train	4.2.3.5 Appendix I	Recording device	4.2.9.6
Managing an emergency situation	4.2.3.7	Lifting diagram and instructions	4.2.12.5

Reference this NTSN		Reference LOC&PAS NTSN	
Parameter	**Point**	**Parameter**	**Point**
		Rescue-related descriptions	4.2.12.6
Route Compatibility and train composition Elements relevant to professional qualification for the tasks associated with 'accompanying trains'	4.2.2.5 Appendix F	Operating documentation	4.2.12.4
Sanding	Appendix B	Rolling stock characteristics for compatibility with train detection system based on track circuits — Isolating emissions	4.2.3.3.1.1

4.3.3.2. Interfaces with the freight wagons NTSN (WAG NTSN)

Reference this NTSN		Reference WAG NTSN	
Parameter	**Point**	**Parameter**	**Point**
Rear end	4.2.2.1.3	Attachment devices for rear-end signal	4.2.6.3
Freight trains	4.2.2.1.3.2	Rear-end signal	Appendix E
Route Compatibility and train composition	4.2.2.5	Gauging	4.2.3.1
Route Compatibility and train composition	4.2.2.5	Compatibility with load carrying capacity of lines	4.2.3.2
Contingency arrangements	4.2.3.6.3	Strength of unit — Lifting and jacking	4.2.2.2
Train braking	4.2.2.6	Brake	4.2.4

4.3.4. Interfaces with the Energy NTSN (ENE NTSN)

Reference this NTSN		Reference ENE NTSN	
Parameter	**Point**	**Parameter**	**Point**
Route compatibility and Train composition	4.2.2.5	Maximum train current	4.2.4.1
Route Book	4.2.1.2.2		
Route compatibility and Train composition	4.2.2.5	Separation sections:	
Route Book	4.2.1.2.2.1	Phase	4.2.15
		System	4.2.16

4.3.5. Interfaces with the Safety in Railway Tunnels NTSN (SRT NTSN)

Reference this NTSN		Reference SRT NTSN	
Parameter	**Point**	**Parameter**	**Point**
Ensuring that the train is in running order	4.2.2.7	Emergency rule	4.4.1
Train departure	4.2.3.3		
Degraded operation	4.2.3.6		
Managing an emergency situation	4.2.3.7	Tunnels emergency plan	4.4.2
		Exercises	4.4.3
		Provision of on-train safety and emergency information to passengers	4.4.5
Professional competence	4.6.1	Tunnel-specific competence of the train crew and other staff	4.6.1

4.3.6. Interfaces with the Noise NTSN (NOI NTSN)

Reference this NTSN		Reference NOI NTSN	
Parameter	**Point**	**Parameter**	**Point**
Route compatibility and Train composition	4.2.2.5	Additional provisions for the application of this NTSN to existing wagons	7.2.2
Train planning and timetable	4.2.3.1	Quieter routes	Appendix D
Contingency arrangements	4.2.3.6.3	Specific rules for the operation of wagons on quieter routes in case of degraded operation	4.4.1

4.3.7. Interfaces with the Accessibility NTSN (ACC NTSN)

Reference this NTSN		Reference ACC NTSN	
Parameter	**Point**	**Parameter**	**Point**
Professional Competence Minimum elements relevant to professional qualification for the tasks associated with 'accompanying trains'	4.6.1 Appendix F	Infrastructure subsystem	4.4.1
Professional Competence Minimum elements relevant to professional qualification for the tasks associated with 'accompanying trains'	4.6.1 Appendix F	Rolling stock subsystem	4.4.2
Route Compatibility and Train composition	4.2.2.5	Rolling stock subsystem	4.4.2

4.4. OPERATING RULES

4.4.1. Railway system operational principles and rules

Operational principles and rules to be applied throughout the railway system are specified in Appendices A (ERTMS operational principles and rules) and B (common operational principles and rules).

4.5. MAINTENANCE RULES

Not applicable

4.6. PROFESSIONAL COMPETENCES

4.6.1. Professional competence

Railway undertaking and the infrastructure manager shall define their own risk-based competence management system within their safety management system processes.

Appendices F and G define professional qualification relevant to the competence management system.

4.6.2. Language competence

4.6.2.1. Principles

The infrastructure manager and the railway undertaking are required to ensure that their relevant staff are competent in the use of the communication protocols and principles set out in Appendix C.

Where the operating language used by the infrastructure manager differs from that habitually used by the railway undertaking's staff, such linguistic and communications training shall form a critical part of the railway undertaking's overall competence management system.

Railway undertaking staff whose duties require them to communicate with staff of the infrastructure manager in connection with safety-critical matters, whether in normal, degraded or emergency situations, shall have a sufficient level of knowledge in the operating language of the infrastructure manager.

4.6.2.2. Level of knowledge

The level of knowledge in the infrastructure manager's operating language shall be sufficient for safety purposes.

(a) As a minimum this shall comprise of the driver being able to:

- send and understand all the messages specified in Appendix C,
- effectively communicate in normal, degraded and emergency situations,
- complete the forms associated with the use of the Book of ERTMS Operational and national Instructions.

(b) Other members of the train crew whose duties require them to communicate with the infrastructure manager on safety-critical matters, shall as a minimum, be able to send and understand information describing the train and its operational status.

The level of knowledge for staff accompanying trains other than train drivers shall be at least level 2 as described in Appendix E.

4.6.3. Initial and ongoing assessment of staff

4.6.3.1. Basic elements

Railway undertakings and infrastructure managers are required to define the assessment process for their staff in order to meet the requirements specified in Commission Regulations (EU) No 1158/2010[8] and (EU) No 1169/2010[9].

4.6.3.2. Analysis and update of training needs

Railway undertakings and infrastructure managers shall undertake an analysis of training needs for their relevant staff and define a process for reviewing and updating their individual training needs in order to meet the requirements specified in Regulations (EU) 1158/2010 and (EU) 1169/2010.

8 Commission Regulation (EU) No 1158/2010 of 9 December 2010 on a common safety method for assessing conformity with the requirements for obtaining railway safety certificates. The EU legislation is retained EU law under section 3 of the European Union (Withdrawal) Act 2018, and it has been amended under that Act by the Rail Safety (Amendment etc.) (EU Exit) Regulations 2019.

9 Commission Regulation (EU) No 1169/2010 of 10 December 2010 on a common safety method for assessing conformity with the requirements for obtaining a railway safety authorisation. The EU legislation is retained EU law under section 3 of the European Union (Withdrawal) Act 2018, and it has been amended under that Act by the Rail Safety (Amendment etc.) (EU Exit) Regulations 2019.

This analysis shall set out both scope and complexity and take into account the risks associated with the operation of trains, traction and rolling stock. The railway undertaking shall define the process by which knowledge of on board staff of the routes worked over is acquired and maintained. This process shall be:

— based upon the route information provided by the infrastructure manager, and

— in accordance with the process described in point 4.2.1.

For the tasks associated with 'accompanying trains' and 'preparing trains', the elements that shall be considered may be found in respectively the appendices F and G. As appropriate, these elements shall be put in place as part of the training for staff.

It is possible that due to the type of operation envisaged by a railway undertaking or the nature of the network being run by an infrastructure manager, some of the elements in the appendices F and G shall not be appropriate. The analysis of training needs shall document those not deemed appropriate and the reasons why.

4.6.4. Auxiliary staff

The railway undertaking shall make sure that the auxiliary staff (for example, catering and cleaning) not forming part of the train crew is, in addition to their basic instruction, trained to respond to the instructions of the fully trained members of the train crew.

4.7. HEALTH AND SAFETY CONDITIONS

4.7.1. Introduction

Staff specified in point 4.2.1.1 as staff executing safety-critical tasks as specified in the SMS of a RU or IM shall have appropriate fitness to ensure that overall operational and safety standards are met.

Railway undertakings and infrastructure managers shall set up and document the process they put in place to meet the medical, psychological and health requirements for their staff within their safety management system.

Medical examinations as specified in point 4.7.2 and 4.7.3 on the individual fitness of staff shall be conducted by a person established as medical doctor or a psychologist qualified to carry out such examinations. The results must be accepted by every IM and RU as proof of fitness of staff or potential staff members.

Such examinations shall allow the member of staff executing safety-critical tasks to undertake similar tasks for another RU or IM, subject to the identification of additional medical, psychological and health requirements in the SMS of the RU or IM and to the satisfactory fitness of staff or potential staff members.

Fitness requirements set in point 4.7.2 and in point 4.7.3 are applicable to:

— Staff 'accompanying trains' other than the train driver;

— Staff undertaking the task of preparing trains;

— Staff undertaking the task of dispatching and authorising the movement of trains.

4.7.1.1. Alcohol, drugs and psychotropic medication limits

Staff shall not perform safety-critical tasks whilst vigilance is impaired by substances such as alcohol, drugs or psychotropic medication. Therefore, the railway undertaking and the infrastructure manager shall have in place procedures to control the risk that staff attend for work under the influence of such substances, or consume such substances at work.

National legislation applies with regard to defined limits of the abovementioned substances.

4.7.2. Medical examinations and psychological assessments

4.7.2.1. Before appointment

4.7.2.1.1. Content of the medical examination

Medical examinations shall cover:

— General medical examination;

— Examinations of sensory functions (vision, hearing, colour perception);

— Urine or blood analysis for the detection of diabetes mellitus and other conditions as indicated by the clinical examination;

— Screening for abuse of drugs.

4.7.2.1.2. Psychological assessment

The aim of the psychological assessment is to support the railway undertaking in the appointment and management of staff who have the cognitive, psychomotor, behavioural and personality capabilities to perform their roles safely.

In determining the content of the psychological assessment the following criteria relevant to the requirements of each safety function shall be taken into account:

(a) Cognitive:

- Attention and concentration,
- Memory,
- Perceptive capability,
- Reasoning,
- Communication.

(b) Psychomotor:

- Speed of reaction,
- Gestured coordination.

(c) Behavioural and personality

- Emotional self-control,
- Behavioural reliability,
- Autonomy,
- Conscientiousness.

If any of those elements is omitted, the respective decision shall be justified and documented by a psychologist.

Applicants shall demonstrate their psychological fitness by passing an examination conducted by, or under the supervision of — to be decided by the Safety Authority — a psychologist or a medical doctor.

4.7.2.2. After appointment

4.7.2.2.1. Frequency of periodic medical examinations

At least one systematic medical examination shall be performed:

- Every 5 years for staff aged up to 40;
- Every 3 years for staff aged between 41 and 62;
- Every year for staff aged over 62.

Increased frequency of examination shall be set by the medical doctor if the state of health of the member of the staff requires so.

4.7.2.2.2. Content of the periodic medical examination

If the worker complies with the criteria required at the examination, which is carried out before practising an occupation, the periodic specialised examinations shall include:

— General medical examination;

— Examination of sensory functions (vision, hearing, colour perception);

— Urine or blood analysis for the detection of diabetes mellitus and other conditions as indicated by the clinical examination;

— Screening for abuse of drugs where clinically indicated.

4.7.2.2.3. Additional medical examinations and/or psychological assessments

Besides the periodic medical examination, an additional specific medical examination and/or psychological assessment shall be performed where there is reasonable ground for doubting the medical or psychological fitness of a member of staff or reasonable suspicion of use of drugs or use of alcohol over the limits allowed. This would be the case especially after an incident or accident caused by human error on the part of the individual.

The railway undertaking and the infrastructure manager shall put systems in place to ensure that such additional examinations and assessments are undertaken as appropriate.

4.7.3. Medical requirements

4.7.3.1. General requirements

Staff shall not suffer from medical conditions or take medical treatment likely to cause:

— Sudden loss of consciousness;

— Impairment of awareness or concentration;

— Sudden incapacity;

— Impairment of balance or coordination;

— Significant limitation of mobility.

The following vision and hearing requirements shall be met:

4.7.3.2. Vision requirements

— Aided or unaided distance visual acuity: 0,8 (right eye + left eye – measured separately), minimum of 0,3 for the worse eye;

— Maximum corrective lenses: hypermetropia + 5 / myopia – 8. The medical doctor may allow values outside this range in exceptional cases and after having sought the opinion of an eye specialist;

— Intermediate and near vision: sufficient whether aided or unaided,

— Contact lenses are allowed;

— Normal colour vision: using a recognised test, such as the Ishihara, completed by another recognised test if required;

— Vision field: normal (absence of any abnormality affecting the task to be performed);

— Vision for both eyes: effective;

— Binocular vision: effective;

— Contrast sensitivity: good;

— Absence of progressive eye disease;

— Lens implants, keratotomies and keratectomies are allowed only on condition that they are checked on a yearly basis or according to a frequency set by the medical doctor.

4.7.3.3. Hearing requirements

Sufficient hearing confirmed with tone audiogram, that is:

— Hearing good enough to hold a phone conversation going and be able to hear alert tones and radio messages

— The use of hearing aids is allowed.

4.8. ADDITIONAL INFORMATION ON INFRASTRUCTURE AND VEHICLES

4.8.1. Infrastructure

The requirements for the rail infrastructure related data items with regard to the operation and traffic management subsystem, and which shall be made available to railway undertakings, are specified in Appendix D.

The infrastructure manager shall inform the railway undertaking of the changes on the infrastructure related data whenever such information becomes available and

affects train operation. The infrastructure manager is responsible for the accuracy of the data..

4.8.2. Rolling stock

The following rolling stock related data items shall be available to infrastructure managers:

— whether the vehicle is constructed from materials which may be hazardous in case of accidents or fire (for example, asbestos); the keeper is responsible for the correctness of the data. The keeper shall ensure the data is complete and accurate.

— total length of the vehicle, including buffers if existing; the railway undertaking is responsible for the correctness of the data. The railway undertaking shall ensure the data is complete and accurate.

5. INTEROPERABILITY CONSTITUENTS

5.1. DEFINITION

Regulation 2 of the Railways (Interoperability) Regulations 2011 defines the ‘interoperability constituents’.

5.2. LIST OF CONSTITUENTS

In respect to the operation and traffic management subsystem, there is no interoperability constituent.

6. ASSESSMENT OF CONFORMITY AND/OR SUITABILITY FOR USE OF THE CONSTITUENTS AND VERIFICATION OF THE SUBSYSTEM

6.1. INTEROPERABILITY CONSTITUENTS

As this NTSN does not yet specify any interoperability constituents, no assessment arrangements are discussed.

6.2. OPERATION AND TRAFFIC MANAGEMENT SUBSYSTEM

6.2.1. Principles

The operation and traffic management subsystem is a functional subsystem according to Schedule 3 to the Railways (Interoperability) Regulations 2011.

In accordance with Articles 10 and 11 of Directive 2004/49/EC, railway undertakings and infrastructure managers shall demonstrate compliance with the requirements of this NTSN within their safety management system when applying for any new or amended safety certificate or safety authorisation.

The common safety methods on conformity assessment require safety authorities to set up an inspection regime to supervise and monitor the compliance with the safety management system including all NTSNs. It should be noted that none of the requirements contained within this NTSN require separate assessment by an approved body.

Requirements in this NTSN that refer to structural subsystems and listed in the interfaces (point 4.3) are assessed under the relevant structural NTSNs.

7. IMPLEMENTATION

7.1. PRINCIPLES

In accordance with regulation 5 of The Railways and Other Guided Transport Systems (Safety) Regulations 2006 (as amended), railway undertakings and infrastructure managers shall ensure compliance with this NTSN under their SMS.

Implementation of this NTSN and conformity with the relevant points of this NTSN shall be determined in accordance with the UK national implementation plan which was published in September 2016.

7.2. UK SPECIFIC CASES

7.2.1. Introduction

The following special provisions are permitted in the UK specific cases below.

These UK specific cases belong to two categories. The provisions apply either permanently (case ‘P’), or temporarily (case ‘T’).

7.2.2. List of UK specific cases

7.2.2.1. This provision has been left intentionally blank

7.2.2.2. This provision has been left intentionally blank

7.2.2.3. Permanent UK specific case (P1) (Great Britain)

For the implementation of point 4.2.3.2.1, Great Britain is using alphanumeric numbers in the existing systems. Duplicate train running numbers may exist.

Appendix A ERTMS operational principles and rules – version 6

1. INTENTIONALLY BLANK

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3. INTRODUCTION

3.1. Purpose and structure of the document

This Appendix sets out the principles and harmonised rules for the operation of ERTMS.

The structure of each rule is the following:

(i) title,

(ii) when necessary, situations in which the rule applies, presented in a frame, including the applicable ETCS levels; sometimes the situation is described for some specific sub-sections of the rules,

(iii) the rule itself.

When this Appendix refers to ETCS level 1 it applies to both applications, with or without trackside signals, unless otherwise stated.

When this Appendix refers to ETCS level 2 it applies to both applications, with or without trackside signals, unless otherwise stated.

The ERTMS Operational Instructions referenced in this Appendix are listed under Appendix C2 to this NTSN.

All language referring to people applies equally to male and female persons.

Part A is intentionally blank.

Part B contains the different ETCS operational train categories.

Part C contains the list of references to non-harmonised rules. In some situations a procedure is not related to ERTMS and therefore depends on non-harmonised rules.

The description of the technical functions for ETCS and GSM-R is contained in the corresponding system requirements specification.

If information displayed on the DMI does not require an action from the driver this information is not contained in the rules.

SCOPE AND FIELD OF APPLICATION

This Appendix is fully applicable to trains fitted with ETCS On-board units complying with the single set of specifications of the CCS NTSN Issue 2 with an operated system version X.Y up to and including 2.2. It is also applicable to On-board units complying with Set of specifications #2 or Set of specifications #3 and largely

applicable to ETCS On-board units complying with Set of specifications #1 of the CCS NTSN published 1 January 2021, provided that the DMI used fulfills the specification ERA_ERTMS_015560.

The scope is the following:

(i) ETCS level 0 application,

(ii) ETCS level 1 application whether or not trackside signals or infill are present,

(iii) ETCS level 2 application, whether or not trackside signals are present,

(iv) ETCS transitions between level 0, level 1 and level 2 applications,

(v) ETCS level NTC application

(vi) ETCS transitions to / from level NTC,

(vii) GSM-R.

Class B systems (even when operated through the ETCS DMI) are out of the scope.

The rules have been developed independently of other control command systems that may be present including where lines are equipped with ETCS level 1 / 2.

When ETCS level 1 or ETCS level 2 are implemented on lines fitted with other control command systems it is necessary to assess the applicability of these rules and if necessary supplement them with non-harmonised rules. This includes those lines fitted with both ETCS level 1 and ETCS level 2.

GSM-R voice radio operational rules are applicable on lines equipped with GSM-R independently of the control command system in use. Conversely, ETCS operational rules are applicable on lines equipped with ETCS independently of the voice radio system in use.

The applicability of the rules further depends on the engineering solutions adopted by the ERTMS trackside subsystem. In this context, some rules may not need to apply if the relevant functions are not implemented trackside (e.g. when track conditions are not transmitted or the level crossing procedure is not implemented); yet when a rule needs to apply, it will always do so in the way described in this Appendix .

All actions involving the driver assume their physical presence in the driver's cab, unless when required to examine a technical failure of the train at standstill, obtain signaller's instructions through a fixed lineside phone or when requested by the signaller or non-harmonised rules.

Throughout this Appendix , the ETCS On-board unit is assumed to be powered on if not otherwise stated. The desk of the active driving cab is assumed to be open unless otherwise stated.

An End of Authority (EOA) can be physically identified by means of an ETCS Stop Marker or an ETCS Location Marker. The EOA can also be identified by a lineside signal or other marker board with a stop indication. Under certain conditions, an EOA can also be at the train's front end.

4. REFERENCES, TERMS AND ABBREVIATIONS

4.1. Not used

4.2. Terms & abbreviations

Table 1 : Terms*

Term	Definition
Acknowledgement	Confirmation given by the driver to a request from the ETCS on-board that they have received information they need to take into account.
Applicable speed limit (in SR)	The lowest speed limit of: - maximum speed for SR, - maximum train speed, - timetable / Route Book, - temporary speed restrictions (transmitted by other means than ERTMS Operational Instruction 1, 2, 5, 6, 7 or 8), - ERTMS Operational Instruction.
Authorisation for ERTMS train movement	Permission for a train to move given by means of: - a trackside signal at proceed aspect or, - an MA or, - an ERTMS Operational Instruction: - to start after preparing a movement or, - to pass EOA or, - to proceed after trip.
Border crossing	Location where trains cross from the railway network in Great Britain to another railway network.
De-registration	Termination of the temporary relationship between the telephone number and the train running number. This action can be initiated by the user of a GSM-R radio, by automatic systems or by the network authority. The de-registration allows the de-registered train running number to be re-used.
Driver Machine Interface (DMI)	Train device to enable communication between the ETCS on-board and the driver.
Emergency propelling area	Area where propelling movements in RV are allowed.

Table 1 : Terms*

Term	Definition
Emergency stop order	ETCS order braking a train with the maximum brake force until the train is at a standstill.
ETCS Location Marker	Harmonised trackside ETCS marker board defined in EN 16494/2015[10] used to identify a potential EOA, e.g. the end of a block section.
ETCS on-board	The part of ETCS installed on a railway vehicle.
ETCS Stop Marker	Harmonised trackside ETCS marker board defined in EN 16494/2015 used to: - identify a potential EOA and - indicate the location where a driver has to stop the train, if running without an MA.
ETCS operational train category	Set of technical and / or operational characteristics of a train to which a specific ETCS speed profile applies.
Functional number (GSM-R)	Full number used within the functional addressing scheme to identify an end user or a system by function or role rather than by a specific item of radio equipment or user subscription. The functional number can be divided into two parts: - functional addressing (process of addressing a call using a specific number, representing the function a user is performing, rather than a number identifying the GSM-R on-board), - location dependent addressing (process of addressing a particular function – typically a signaller – based on the current location of the user – typically a train).
GSM-R mode	Status of the GSM-R on-board which provides functions for: - train movement, - or movement of a shunting composition.
GSM-R network	Radio network which provides GSM-R functions.

[10] EN 16494/2015 - Railway applications – Requirements for ERTMS Trackside Boards

Table 1 : Terms*

Term	Definition
GSM-R network marker	Harmonised trackside GSM-R signal defined in EN 16494/2015 to indicate the network to be selected.
GSM-R on-board	The part of GSM-R installed on a railway vehicle.
Maximum speed for RV	Maximum speed given from the ETCS trackside in RV.
Maximum speed for SR	Maximum speed given from the ETCS trackside in SR.
Movement Authority (MA)	Permission for a train (shunting composition) to move to a specific location with supervision of speed.
Non-stopping area	Area defined by the Infrastructure Manager where it may not be safe or suitable to stop a train.
Override EOA speed	Maximum speed when the override EOA function is active.
Permitted speed	Maximum speed at which a train can run without ETCS warning and/or brake intervention.
Proceed aspect	Any signal aspect which permits the driver to pass the signal.
Propelling	Movement of a train where the driver is not in the leading cab of the leading vehicle.
Radio communication	Exchange of information between the ETCS on-board and the RBC / radio infill unit.
Radio Block Centre (RBC)	ETCS trackside centralised unit controlling ETCS train movements in level 2.
Radio hole	A pre-defined area where it is not possible to establish a reliable radio communication channel.

Table 1 : Terms*

Term	Definition
Registration	Temporary relationship between the telephone number and the train running number.
Release speed	Maximum speed at which a train is allowed to reach the end of its MA.
Revocation of MA	Withdrawal of a previous given Movement Authority.
Route Book	Description of the lines and the associated line-side equipment for the lines over which the driver will operate and relevant to the driving task.
Securing	Measures to be applied to avoid unintentional movement of railway vehicles.
Shunting movement	Way of moving vehicles without train data and controlled by shunting orders.
Tandem	Two or more traction units mechanically and pneumatically but not electrically coupled in the same train, each one requiring its own driver.
Temporary speed restriction	Reduction of the line speed for a limited period of time.
Text message	Information in writing displayed on the Driver Machine Interface.
Train data	Information which describes the characteristics of a train.
Train preparer	Staff in charge of the preparation of a train.
Transition	Controlled change between the different ETCS levels.
Transition point	Point where a transition between ETCS levels takes place.

Table 1 : Terms*

Term	Definition
Trip	Irrevocable application of the emergency brakes by ETCS until the train/shunting composition is at a standstill.

Table 2 : Abbreviations *

Abbreviation	
AD	Automatic Driving mode
ATO	Automated Train Operation
BMM	Big Metal Mass
BTM	Balise Transmission Module
DAS	Driver Advisory System
DMI	Driver Machine Interface
EOA	End Of Authority
ERTMS	European Rail Traffic Management System
ETCS	European Train Control System
FS	Full Supervision mode
G	Goods train braking mode
GSM-R	Global System for Mobile communication - Railway
IM	Infrastructure Manager
LS	Limited Supervision mode
MA	Movement Authority
NL	Non-Leading mode
NTC	National Train Control system
OS	On Sight mode
P	Passenger train braking mode
RBC	Radio Block Centre
REC	Radio Emergency Call
RU	Railway Undertaking

Table 2 : Abbreviations *

Abbreviation	
RV	Reversing mode
SH	Shunting mode
SL	Sleeping mode
SN	National System
SR	Staff Responsible mode
STM	Specific Transmission Module
TIMS	Train Integrity Monitoring System
UN	Unfitted mode
VBC	Virtual Balise Cover

* For a complete list of ERTMS terms and abbreviations refer to Subset 023 'Glossary of Terms and Abbreviations' under Appendix A of the CCS NTSN Issue 2.

5. PRINCIPLES

5.1. Principles for ETCS

5.1.1. CAB-signalling

The driver shall observe the displayed information on the DMI and shall react as required by this Appendix.

The driver may, depending on the trackside implementation, be required to take into account the harmonised marker boards defined in EN 16494:2015 - Railway applications – Requirements for ERTMS Trackside Boards as well as other non-harmonised trackside information.

5.1.2. Knowledge of operating level

The driver and the signaller shall always operate according to the ETCS rules that are particular to the specific operating ETCS level.

When more than one ETCS level are coexisting, the signaller shall ascertain what ETCS level the concerned train is operating in before issuing any instruction to the driver.

5.1.3. Not used

5.1.4. Not used

5.1.5. Not used

5.1.6. Authorisation to start a movement in SR

The driver shall be authorised by the signaller to start a movement in SR by means of ERTMS Operational Instruction 7, except in case of starting a movement in ETCS level 1 / 2 with trackside signals.

5.1.7. Speed restrictions in SR

The signaller shall give all speed restrictions lower than the maximum speed for SR to the driver of a train running in SR by means of an ERTMS Operational Instruction 1, 2, 5, 6, 7 or 8 except if the driver is informed by a dedicated document/computer medium about these speed limitations.

5.1.8. Authorisation to pass an EOA

The driver shall only be authorised to pass an EOA by the signaller by means of an ERTMS Operational Instruction 1 or 7.

5.1.9. Train/shunting composition being tripped

After a trip has occurred, the driver shall restart in the initial or opposite direction only if they have received authorisation by means of an ERTMS Operational Instruction 2 from the signaller.

5.1.10. ETCS stop marker

The driver shall stop on the approach to an ETCS Stop Marker:

(i) indicating the EOA of the current MA, or

(ii) when running without an MA unless they have received a specific authorisation from the signaller by means of ERTMS Operational Instruction 1 or 7.

5.1.11. ETCS location marker

The driver shall stop on the approach to an ETCS Location Marker:

(ii) indicating the EOA of the current MA, or

(ii) when running without an MA if they have received a specific order from the signaller.

5.2. Not used

6. ETCS OPERATIONAL RULES

6.1. Putting the ETCS on-board into service

The driver switches the ETCS on-board on. Levels 0, 1, 2, NTC

6.1.1. Entering data during start of mission

When requested by the ETCS on-board, the driver shall enter, re-enter or re-validate the driver identification, the train running number, the ETCS level, the radio network identification and the RBC identification and phone number.

In case the following text message is displayed:

'Radio network registration failed'

the driver shall enter the radio network identification.

6.1.2. Manual change of data

If a change is required, the driver shall enter/modify and validate:

(iii) the train running number.

(ii) the driver identification while at standstill or, if allowed by national value, while running.

(iv) the ETCS level, the radio network identification and the RBC identification and phone number while at standstill.

6.2. Preparing a movement

The ETCS on-board is in service. Levels 0, 1, 2, NTC

In ETCS level 2, in case the train is rejected the driver shall apply rule 'Reacting to unexpected situations when preparing a train movement' (section 6.40.2).

6.2.1. The traction unit has to move as a train

The driver shall:

(v) apply rule 'Entering train data during train preparation' (section 6.4.1),

(ii) select 'Start'.

In case an acknowledgement for SR is requested, the driver shall apply rule 'The traction unit has to move as a train and an acknowledgement for SR is requested' (section 6.2.4).

In case an acknowledgement for SH is requested in ETCS level 2, the driver shall apply rule 'Reacting to unexpected situations when preparing a train movement' (section 6.40.1).

6.2.2. The traction unit has to move in SH

The driver shall prepare for shunting and apply rule 'Performing shunting movements in SH' (section 6.3).

6.2.3. The traction unit has to move in NL

The driver of the non-leading traction unit shall prepare for tandem movement and apply rule 'Performing a tandem movement' (section 6.32).

6.2.4. The traction unit has to move as a train and an acknowledgement for SR is requested

Levels 1 without trackside signals, 2 without trackside signals

When the following symbol is displayed with a flashing frame:

The driver shall inform the signaller, receive authorisation to start in SR by means of ERTMS Operational Instruction 7 and acknowledge.

Before authorising a driver to start in SR, the signaller shall, according to non-harmonised rules:

1. check if all the conditions for the route are met,

(i) check all restrictions and / or instructions that are necessary and include them in ERTMS Operational Instruction 7,

(ii) check for temporary speed restrictions to be included in ERTMS Operational Instruction 7.

If the train is located at an ETCS Stop Marker

The signaller shall authorise the driver to pass this ETCS Stop Marker by means of ERTMS Operational Instruction 7. This authorisation is valid from this ETCS Stop Marker to the next one. If the conditions allow, the Signaller can authorise the driver to pass this second ETCS Stop Marker as well using the same ERTMS Operational Instruction 7. The authorisation is then valid up to the ETCS Stop Marker following the second one in the direction of travel.

The driver shall:

(i) receive ERTMS Operational Instruction 7 from the signaller,

(ii) check the applicable speed limit,

(iii) use, unless instructed not to do so, the override function for each of the ETCS Stop Markers to be passed and wait for the following symbol:

(iv) start the train,

(v) not exceed the override EOA speed while this symbol is displayed.

If the train is not located at an ETCS Stop Marker

The signaller shall authorise the driver to start by means of ERTMS Operational Instruction 7. This authorisation is valid from the current location of the train to the first ETCS Stop Marker in the direction of travel. If the conditions allow, the signaller can authorise the driver to pass this as well as the next ETCS Stop Marker by means of the same ERTMS Operational Instruction 7. This authorisation is then valid up to the ETCS Stop Marker following the last one authorised by the ERTMS Operational Instruction 7 to be passed.

The driver shall:

(i) receive ERTMS Operational Instruction 7 from the signaller,

(ii) check the applicable speed limit,

(iii) start the train

(iv) when approaching an ETCS Stop Marker and if authorised by the ERTMS Operational Instruction 7 to pass it, use, unless instructed not to do so, the override function and wait for the following symbol:

(v) start the train or continue moving,

(vi) not exceed the override EOA speed while this symbol is displayed.

It is possible to provide more than one ERTMS Operational Instructions for an equal number of consecutive ETCS Stop Markers to be passed.

If the signaller can establish that the track up to the end of the authorisation to be issued is free then they may exempt the driver from running on sight in SR.

Levels 1 with trackside signals, 2 with trackside signals

When the following symbol is displayed with a flashing frame:

The driver shall apply rule ‘Running in SR’ (section 6.14).

6.2.5. The traction unit has to move in SL

The driver / train preparer shall make sure that all driving desks of any non-leading traction unit, which is electrically connected to and will be remotely controlled from the leading one, are closed and remain so as long as this traction unit is remotely controlled from the leading one.

6.3. Performing shunting movements in SH

Rolling stock has to be moved in SH. Levels 1, 2

6.3.1. Manual entry into SH

The driver shall select ‘Shunting’ according to non-harmonised rules.

6.3.2. Automatic entry into SH

When the following symbol is displayed with a flashing frame:

the driver shall:

(i) first ensure they have the correct information concerning the movement they are to perform,

(ii) then acknowledge.

6.3.3. Running in SH

When the following symbol is displayed:

the driver shall apply non-harmonised rules.

6.3.4. Maintain SH when changing the cab

When the shunting procedure requires the use of different cabs the driver is allowed to select 'Maintain Shunting' before closing the driving desk.

6.3.5. Exit from SH

When all shunting movements to be performed in SH are finished the driver shall:

(i) select 'Exit Shunting',

(ii) ensure that no traction unit remains in the 'Maintain Shunting' status.

6.3.6. SH not granted

Level 2

When one of the following text messages is displayed:

'SH refused'

'SH request failed'

the driver shall inform the signaller about the situation.

The driver and signaller shall apply non-harmonised rules.

6.3.7. Passing a defined border of a shunting area

When a shunting composition needs to pass a defined border of a shunting area the driver and signaller shall apply non-harmonised rules.

6.4. Entering train data

Train Data have to be entered or modified. Levels 0, 1, 2, NTC

6.4.1. Entering train data during train preparation

The driver / train preparer shall enter/modify and validate all of the following train data if this data is not pre-configured on-board or received from ETCS external sources:

(i) ETCS operational train category,

(ii) train length,

(iii) brake percentage,

(iv) maximum train speed,

(v) axle load category,

(vi) train fitted with airtight system,

(vii) loading gauge,

(viii) additional data for the available STMs,

(ix) specific data for ATO, if requested.

Before confirming train data that are pre-configured on-board or received from ETCS external sources and that are modifiable by the driver, the train preparer shall make sure the train data and the train composition match.

6.4.2. Manual change of train data

After each modification of the composition of the train and after a technical problem that leads to a change of the train data, the train preparer / driver shall:

(i) determine the new train data,

(ii) enter the new train data,

(iii) validate the new train data.

6.4.3. Change of train data by ETCS external sources

When the following text message is displayed on the DMI:

'Train data changed'

a) if the change of train data leads to an application of the brake

When at a standstill, the driver shall:

(i) acknowledge the brake application,

(ii) modify and/or validate the train data if requested by the on-board system,

(iii) take into account the modified train data.

In ETCS level 1, and in ETCS level 2 if no new MA is received, the signaller shall authorise the driver to pass the EOA (rule 'Authorising the passing of an EOA'-section 6.39).

b) in all other cases

The driver shall take into account the modified train data.

6.5. Not used

6.6. Not used

6.7. Entering and operating in ETCS level 0

6.7.1. Announcement

The train is approaching an ETCS level 0 area. Levels 1, 2, NTC

When a transition to ETCS level 0 is announced by displaying the following symbol:

the driver shall apply non-harmonised rules.

6.7.2. Acknowledgement

When the following symbol is displayed with a flashing frame:

the driver shall acknowledge.

6.7.3. Running

The train is running in an ETCS level 0 area.

When the following symbol is displayed:

the driver shall apply non-harmonised rules.

6.8. Entering and operating in ETCS level 1

6.8.1. Announcement

The train is approaching an ETCS level 1 area. Levels 0, 2, NTC

When a transition to ETCS level 1 is announced by displaying the following symbol:

the driver shall prepare to apply rules for ETCS level 1.

6.8.2. Not used

6.8.3. Running

The train is running in an ETCS level 1 area.

When the following symbol is displayed:

the driver shall apply rules according to ETCS level 1.

6.9. Entering and operating in ETCS level 2

6.9.1. Announcement

The train is approaching an ETCS level 2 area. Levels 0, 1, NTC

When a transition to ETCS level 2 is announced by displaying the following symbol:

the driver shall prepare to apply rules for ETCS level 2.

6.9.2. Not used

6.9.3. Running

The train is running in an ETCS level 2 area.

When the following symbol is displayed:

the driver shall apply rules according to ETCS level 2.

When requested by the signaller to manually confirm train integrity on the DMI, the driver shall do so only at standstill and according to RU rules.

6.10. Not used

6.11. Entering and operating in ETCS level NTC

6.11.1. Announcement

The train is approaching an ETCS level NTC area. Levels 0, 1, 2

When a transition to ETCS level NTC is announced by displaying a symbol indicating the name of the applicable NTC, as example:

the driver shall apply non-harmonised rules.

A specific symbol for each NTC exists.

6.11.2. Acknowledgement

When the symbol indicating the applicable NTC is displayed with a flashing frame, as example:

the driver shall acknowledge.

A specific symbol for each NTC exists.

6.11.3. Running

The train is running in an ETCS level NTC area.

When the symbol indicating the entered NTC is displayed, as example:

the driver shall apply non-harmonised rules.

A specific symbol for each NTC exists.

6.12. Running in FS

Levels 1, 2

When the following symbol is displayed:

the driver

(i) shall not exceed the permitted speed

(ii) may, if DAS information is available on-board:

– follow the target advice speed when displayed on the DMI

coast when  is displayed

respect the stopping points if indicated

request a stopping point to be skipped if instructed and this option is available on the DMI

operate the doors when invited to do so by relevant DMI indications

In ETCS level 1 with trackside signals the driver is authorised to proceed without a new MA when the trackside signal shows a proceed aspect.

If in addition the following text message is displayed:

'Entering FS'

the driver shall not exceed speed restrictions that apply for the part of the train that is not covered by the FS MA.

6.13. Running in OS

Levels 1, 2

When the following symbol is displayed with a flashing frame:

the driver shall:

(i) acknowledge,

(ii) start or continue applying rule 9 of Appendix B2.

When the following symbol is displayed:

the driver shall:

(i) apply rule 9 of Appendix B2 as long as this symbol is displayed,

(ii) not exceed the permitted speed.

If in addition the following text message is displayed:

'Entering OS'

the driver shall not exceed speed restrictions that apply for the part of the train that is not covered by the OS MA.

6.14. Running in SR

Levels 1, 2

When the following symbol is displayed with a flashing frame:

the driver shall:

(i) first receive an authorisation for ERTMS train movement,

(ii) check the applicable speed limit,

(iii) then acknowledge.

When the following symbol is displayed:

the driver shall:

(i) run on sight, unless an ERTMS Operational Instruction 1, 2 or 7 exempts them from running on sight in SR,

(ii) not exceed the applicable speed limit,

(iii) in ETCS level 1 without trackside signals and in ETCS level 2 without trackside signals, when approaching the next ETCS Stop Marker inform the signaller and apply rule 'Authorising the passing of an EOA' (section 6.39) unless already authorized to pass this ETCS Stop Marker by means of an ERTMS Operational Instruction.

It is possible to provide more than one ERTMS Operational Instructions for an equal number of consecutive ETCS Stop Markers to be passed.

6.15. Running in LS

Levels 1, 2

When the following symbol is displayed with a flashing frame:

the driver shall acknowledge according to non-harmonised rules.

When the following symbol is displayed:

the driver shall apply non-harmonised rules.

6.16. Running in UN

Level 0

When the following symbol is displayed with a flashing frame:

the driver shall acknowledge according to non-harmonised rules.

When the following symbol is displayed:

the driver shall apply non-harmonised rules.

6.17. Running in SN

Level NTC

When the following symbol is displayed with a flashing frame:

the driver shall acknowledge according to non-harmonised rules.

When the following symbol is displayed:

the driver shall apply non-harmonised rules.

6.18. Approaching an EOA with a release speed indication

Levels 1, 2

When the train is approaching an EOA and a release speed is displayed on the DMI, the driver is authorised:

(i) to approach a signal, an ETCS Stop Marker, an ETCS Location Marker or a buffer stop which is a short distance behind the EOA indicated on the DMI without exceeding the release speed,

(ii) in ETCS level 1 with trackside signals to proceed without exceeding the release speed when the trackside signal shows a proceed aspect.

6.19. Managing a track ahead free request

The train is at a standstill or approaching a trackside signal, or an ETCS Stop Marker / ETCS Location Marker. Level 2

When the following symbol is displayed:

the driver is allowed to confirm that the track ahead is free if they can ascertain that the track section between the head of the train and the next trackside signal, ETCS Stop Marker or ETCS Location Marker is free.

6.20. Passing a section with lowered pantograph(s)

The train is approaching a section of the line to be passed with lowered pantograph(s). Levels 1, 2

When the following symbol is displayed:

or, when running without an MA or if this functionality is not supported by the trackside, the following marker board is encountered

 *

the driver shall lower the pantograph(s), taking into account their position.

When the following symbol is displayed:

or, when running without an MA or if this functionality is not supported by the trackside, the following marker board is encountered

 *

the driver shall keep the pantograph(s) lowered.

When the following symbol is displayed:

or, when running without an MA or if this functionality is not supported by the trackside, the following marker board is encountered

 *

the driver is authorised to raise the pantograph(s), taking into account their positions.

** For the exact dimensions and layout of the marker boards, EN 16494/2015 needs to be used*

6.21. Changing the electric power supply

The train is approaching a section of the line where the electric power supply must be changed. Levels 1, 2

When one of the following symbols is displayed:

or, when running without an MA or if this functionality is not supported by the trackside, one of the following marker boards is encountered:

the driver shall change the electric power supply accordingly.

When one of the following symbols is displayed:

or, when running without an MA or if this functionality is not supported by the trackside, one of the following marker boards is encountered:

the driver shall ensure that the power supply has changed accordingly.

When the following symbol is displayed:

or, when running without an MA or if this functionality is not supported by the trackside, the following marker board is encountered:

the driver is informed about approaching a line without any traction system.

When the following symbol is displayed:

or, when running without an MA or if this functionality is not supported by the trackside, the following marker board is encountered:

the driver is informed about reaching a line without any traction system.

6.22. Passing a section with main power switch switched off

The train is approaching a section of the line where the main power switch must be switched off. Levels 1, 2

When the following symbol is displayed:

or, when running without an MA or if this functionality is not supported by the trackside, the following marker board is encountered

the driver shall switch off the main power switch, taking into account the position of the pantographs, or, if allowed by the Infrastructure Manager, keep the main power switch on and refrain from applying traction.

When the following symbol is displayed:

or, when running without an MA or if this functionality is not supported by the trackside, the following marker board is encountered

the driver shall keep the main power switch switched off or, if allowed by the Infrastructure Manager, continue to refrain from applying traction.

When the following symbol is displayed:

or, when running without an MA or if this functionality is not supported by the trackside, the following marker board is encountered

the driver is authorised to switch on the main power switch, taking into account the position of the pantographs, and is allowed to apply traction again.

** For the exact dimensions and layout of the marker boards, EN 16494:2015 needs to be used*

6.23. Passing a non-stopping area

The train is approaching a non-stopping area. Levels 1, 2

When the following symbol is displayed:

the driver is notified of an upcoming area in which they shall avoid stopping.

When the following symbol is displayed:

the driver shall avoid stopping.

6.24. Passing a section with inhibition of magnetic shoe brake

The train is approaching a section of the line where the magnetic shoe brake shall not be used. Levels 1, 2

When the following symbol is displayed:

the driver shall release the magnetic shoe brake, if applied, except in an emergency.

When the following symbol is displayed:

the driver shall not use the magnetic shoe brake except in an emergency.

6.25. Passing a section with inhibition of eddy current brake

The train is approaching a section of the line where the eddy current brake shall not be used. Levels 1, 2

When the following symbol is displayed:

the driver shall release the eddy current brake, if applied, except in an emergency.

When the following symbol is displayed:

the driver shall not use the eddy current brake except in an emergency.

6.26. Passing a section with inhibition of regenerative brake

The train is approaching a section of the line where the regenerative brake shall not be used. Levels 1, 2

When the following symbol is displayed:

the driver shall release the regenerative brake, if applied, except in an emergency.

When the following symbol is displayed:

the driver shall not use the regenerative brake except in an emergency.

6.27. Passing a pressure seal section

The train is approaching a section of the line where the air condition intakes are to be closed. Levels 1, 2

When the following symbol is displayed:

the driver shall close the air conditioning intakes.

When the following symbol is displayed:

the driver shall keep the air conditioning intakes closed.

When the following symbol is displayed:

the driver is authorised to open the air conditioning intakes.

6.28. Sounding the audible warning device

Levels 1, 2

When the following symbol is displayed:

or, when running without an MA or if this functionality is not supported by the trackside, the following marker board is encountered:

the driver shall apply the audible warning device unless prevented by non-harmonised rules.

6.29. Changing of adhesion factor

The train is in a section of line where the adhesion factor could be changed. Levels 1, 2

If the national value allows the driver to select ‘Slippery rail’, they may do so when the adhesion conditions are poor or when informed by the signaller. If the driver is not informed by the signaller before selecting ‘Slippery rail’, the driver shall inform the signaller.

When a signaller is informed about poor adhesion conditions, they shall activate the ETCS reduced adhesion function, where possible, and if this is not possible they shall take measures as prescribed by the IM, until normal operation is restored.

When the following symbol is displayed:

the driver shall apply internal RU rules.

6.30. Passing a radio hole

The train is in a section of line without radio coverage. Level 2

When the following symbol is displayed:

the driver may continue on any valid movement authority.

If the driver reaches the end of authority and the symbol is still displayed, the driver shall inform the signaller. The signaller and driver shall apply rule 'Authorising the passing of an EOA' (section 6.39).

6.31. Not used

6.32. Performing a tandem movement

A non-leading traction unit is coupled to the leading traction unit (or to a train including the leading traction unit). Levels 0, 1, 2, NTC

6.32.1. Entry into NL

The driver of the non-leading traction unit shall select 'Non-Leading'.

When the following symbol is displayed on the DMI:

the driver of the non-leading traction unit shall confirm to the driver of the leading traction unit that the non-leading traction unit is in NL.

6.32.2. Performing the tandem movement

Both drivers shall apply internal RU rules.

6.32.3. Exit from NL

When the train is at a standstill the driver of the non-leading traction unit shall:

(i) apply the brakes,

(ii) confirm to the driver of the leading traction unit that the non-leading traction unit is no longer in NL.

6.33. Revoking an authorisation for ERTMS train movement

The signaller decides to change existing traffic arrangements. Levels 1, 2

6.33.1. Measures before making traffic arrangements

(a) In case the co-operative shortening of the MA is possible

If possible in ETCS level 2 the signaller shall revoke an MA by the use of the co-operative shortening of MA.

(b) In all other cases

In all other cases, the signaller shall apply non-harmonised rules to stop the train if it is not already at standstill.

Once the train is at a standstill and before making traffic arrangements, the signaller shall order the driver to remain at a standstill by means of ERTMS Operational Instruction 3 or other available means and to delete any MA remaining on-board if required.

6.33.2. To restart the trains

To restart the trains the signaller shall:

(i) issue an authorisation for ERTMS train movement,

(ii) revoke ERTMS Operational Instruction 3 if one has been issued.

6.34. TAKING MEASURES IN THE EVENT OF AN EMERGENCY

An emergency situation occurs. Levels 1, 2

6.34.1. To protect the trains

When a member of staff discovers an emergency situation, they shall apply rule 14 of Appendix B2.

To stop trains in ETCS level 2, the signaller may use the emergency stop order; the emergency stop order shall not be revoked before it is safe for these trains to restart.

The signaller may use ERTMS Operational Instruction 3 to keep the stopped trains at standstill if required.

When the following text message is displayed:

'Emergency stop'

and the train is tripped, the driver shall apply rule 'Responding to a trip' (section 6.41).

6.34.2. To restart the trains

The signaller shall:

(i) decide if it is possible to authorise train movement,

(ii) decide if instructions and / or restrictions for train movement are necessary,

(iii) revoke the emergency stop order if one has been issued,

(iv) revoke ERTMS Operational Instruction 3 if one has been issued

(v) give authorisation to the drivers to restart.

To restart trains that have not been tripped and if instructions and / or restrictions are necessary the signaller shall issue an ERTMS Operational Instruction(s). In ETCS level 1 with trackside signals the driver shall run on sight up to the next trackside signal.

To restart trains that have been tripped, the signaller and driver shall apply rule 'Responding to a trip - to restart' (section 6.41.2).

6.34.3. To protect and restart shunting movements

The signaller and driver shall apply non-harmonised rules.

6.35. Stopping in a safe area

The driver needs to stop the train in a safe area. Levels 1, 2

The driver shall toggle-on the display of the indication of the safe areas where the train can stop.

When the following symbol is displayed:

or, when running without an MA or if this functionality is not supported by the trackside, the following marker board is encountered:

and the driver decides to stop at the indicated safe area they shall take into account the remaining distance displayed on the DMI or the distance up to the marker board marking the start of the safe area.

When the following symbol is displayed:

or, when running without an MA or if this functionality is not supported by the trackside, the following marker board is encountered:

and the driver decides to stop at the indicated safe area, they shall stop the train taking into account its length.

When the following marker board is encountered:

the driver is informed that they have reached the end of the safe area.

6.36. Propelling in RV

A train has to be moved in the reverse direction inside an emergency propelling area. Levels 1, 2

6.36.1. Preparing the movement to be performed in RV

When the train is at a standstill and the following symbol is displayed:

the driver shall trigger the transition to RV while informing the signaller if possible and taking into account any further instructions.

6.36.2. Running in RV

When the following symbol is displayed with a flashing frame:

the driver shall:

(i) acknowledge,

(ii) propel the train following any instructions given by the signaller as soon as the following symbol is displayed:

(iii) not exceed the maximum speed for RV,

(iv) not exceed the permitted distance to run.

6.36.3. Exceeding the permitted distance in RV

When the following text message is displayed with a flashing frame:

'RV distance exceeded',

the driver shall:

(i) report to the signaller,

(ii) acknowledge at a standstill if the permitted distance in RV has not been extended,

(iii) release the brake.

6.36.4. Exit from RV

After the train has completed its propelling and as soon as it is at a standstill the driver shall report to the signaller. If no additional movement in RV is required the driver shall close the driving desk to exit RV.

6.37. Reacting to unintentional movements

After being at a standstill the train / shunting composition has moved unintentionally and the ETCS on-board has triggered the brake. Levels 1, 2

When the following text message is displayed:

'Runaway movement',

the driver shall secure the train / shunting composition according to internal RU rules and acknowledge the brake application.

6.38. Managing route unsuitability detected by the on-board system

Levels 1, 2

When any of the following messages is displayed:

'Route unsuitable - loading gauge'

'Route unsuitable - traction system'

'Route unsuitable – axle load category'

a route unsuitability is detected.

The driver shall stop the train using service brake.

The driver shall inform the signaller and follow any instructions given.

6.39. Authorising the passing of an EOA

It is necessary to authorise a driver to pass an EOA. Levels 1, 2

Before authorising a driver to pass an EOA by means of ERTMS Operational Instruction 1 the signaller shall, according to non-harmonised rules:

(i) check if all the conditions for the route are met,

(ii) check all restrictions and / or instructions that are necessary and include them in ERTMS Operational Instruction 1,

(iii) check for temporary speed restrictions to be included in ERTMS Operational Instruction 1.

If the signaller can establish that the track up to the end of the authorisation to be issued is free then they may exempt the driver from running on sight in SR .

It is possible to provide more than one ERTMS Operational Instructions for an equal number of consecutive ETCS Stop Markers to be passed.

To pass the EOA, the driver shall:

(iv) receive ERTMS Operational Instruction 1 from the signaller for this EOA,

(v) check the applicable speed limit,

(vi) use the override function, and

(vii) when the following symbol is displayed:

start the train or continue moving,

not exceed the override EOA speed while this symbol is displayed.

6.40. Reacting to unexpected situations when preparing a train movement

Level 2

6.40.1. The traction unit has to move as a train but an acknowledgement for SH is requested

When the following symbol is displayed with a flashing frame:

the driver shall inform the signaller about the situation, then acknowledge and proceed according to the instructions received from the signaller.

6.40.2. The train is rejected

When the following text message is displayed on the DMI:

'Train is rejected'

the driver shall inform the signaller about the situation. The driver and signaller shall apply non-harmonised rules.

6.41. Responding to a trip

A train or a shunting movement is tripped. Levels 1, 2

6.41.1. Immediate measures

When the following symbol is displayed:

the driver shall assume that there is a potentially dangerous situation and they shall perform all actions necessary to avoid or reduce the effect of this situation. This may include moving the train / shunting composition backwards.

When the following symbol is displayed with a flashing frame:

the driver shall acknowledge and apply the brakes.

(a) In case an immediate backward movement is necessary due to an emergency

When the driver decides or is instructed by the signaller to move the train / shunting composition backwards due to an emergency

and

when the following symbol is displayed:

the driver shall move the train / shunting composition backwards following any instructions given by the signaller.

As soon as the train / shunting composition is at a standstill, the driver shall inform the signaller about the situation.

(b) In all other cases

When the following symbol is displayed:

the driver shall inform the signaller about the situation and follow any instructions given.

6.41.2. To restart

(a) In the initial direction

Before giving authorisation to the driver to proceed after a trip by means of ERTMS Operational Instruction 2 the signaller shall, according to non-harmonised rules:

(i) check if all the conditions for the route are met,

(ii) check all restrictions and / or instructions that are necessary and include them in ERTMS Operational Instruction 2,

(iii) check for temporary speed restrictions to be included in ERTMS Operational Instruction 2.

If the signaller can establish that the track up to the end of the authorised movement is free then they may exempt the driver from running on sight in SR .

To proceed the driver shall:

(i) receive ERTMS Operational Instruction 2 with all additional instructions given by the signaller,

(ii) according to the task to be performed select 'Start' or 'Shunting' and follow the instructions given in ERTMS Operational Instruction 2,

(iii) restart the train / shunting movement.

If in ETCS level 2, at any step of the procedure, the following text message is displayed:

'Communication error',

the driver shall inform the signaller about the situation. The signaller and driver shall apply rule 'Authorising the passing of an EOA' (section 6.39). In this case, ERTMS Operational Instruction 1 shall be issued by the signaller instead of ERTMS Operational Instruction 2.

(b) In the opposite direction

The signaller shall order the driver to remain at standstill and to perform End of Mission by means of ERTMS Operational Instruction 3, and then to restart in the opposite direction by means of ERTMS Operational Instruction 7.

The driver shall carry out the End of Mission and then apply rule 'Putting the on-board into service' (section 6.1) and rule 'Preparing a movement' (section 6.2). If the driver is not operating from the leading cab, they shall apply internal RU rules to ensure safe running.

6.41.3. No movement required after a trip

In the case of a train / shunting composition not required to be moved after a trip, the signaller shall order the driver to remain at standstill and to perform End of Mission by means of ERTMS Operational Instruction 3.

6.41.4. Trip in SH when passing a defined border of a shunting area

Levels 1, 2

When a shunting movement is tripped when passing a defined border of a shunting area the driver and signaller shall apply non-harmonised rules.

6.42. Managing an ETCS trackside malfunction

The on-board receives the information of an ETCS trackside equipment malfunction. Levels 1, 2

When the following text message is displayed:

'Trackside malfunction',

the driver shall inform the signaller about the situation.

6.43. Managing incompatibility between ETCS trackside and ETCS on-board

An incompatibility between ETCS trackside and ETCS on-board is detected by the system and the train is tripped. Levels 1, 2

When the following text message is displayed:

'Trackside not compatible',

the train cannot continue in ETCS.

The driver shall apply rule 'Responding to a trip' (section 6.41).

6.44. Managing a level crossing not protected

The train is approaching a level crossing which is not protected. Levels 1, 2

6.44.1. If in FS, OS or LS

When the following symbol is displayed:

the driver shall apply rule 7 of Appendix B2.

6.44.2. If in SR

When the following text message is displayed:

'Level crossing not protected',

the driver shall apply rule 7 of Appendix B2.

6.45. Managing a balise read error

A balise read error occurs and the brakes are triggered by the ETCS on-board (the train is not tripped).

Levels 1, 2

When the following text message is displayed:

'Balise read error',

and the train is not tripped, the driver shall inform the signaller about the situation.

If no new MA is received when the train has come to a standstill, the signaller shall authorise the driver to pass the EOA by applying rule 'Authorising the passing of an EOA' (section 6.39).

If the situation is repeated, the driver and signaller shall apply non-harmonised rules.

6.46. Managing a failed level transition

The transition takes place but no MA valid beyond the transition point is received on-board or the transition does not take place when passing the transition point.

Levels 1, 2

The ETCS level transition point may be marked through the following trackside marker board:

*

* For the exact dimensions and layout of the marker board, EN 16494:2015 needs to be used if the ETCS level transition point is marked with this trackside marker board

6.46.1. If the train has been tripped

The driver and signaller shall apply rule 'Responding to a trip' (section 6.41).

After selecting 'Start' the driver shall:

(i) check the correct ETCS level to be selected,

(ii) change the ETCS level (rule 'Manual change of data' (section 6.1.2)),

and then restart the train.

In case the ETCS level to be selected is not available on-board, the driver and signaller shall apply rule 15 of Appendix B2.

6.46.2. If in SR

The driver shall:

(i) stop the train,

(ii) apply the following rule 'In all other cases' (section 6.46.3).

6.46.3. In all other cases

The driver shall:

(i) inform the signaller about the situation,

(ii) when at a standstill, check the correct ETCS level to be selected,

(iii) change the ETCS level (rule 'Manual change of data' (section 6.1.2)),

and then restart the train.

In case the ETCS level to be selected is not available on-board, the driver and signaller shall apply rule 15 of Appendix B2.

6.47. Managing absence of RBC information

There is no RBC information received in an area not identified as a radio hole and the brakes are triggered by the ETCS on-board (the train is not tripped). Level 2

When the following text message is displayed:

'Communication error',

the driver shall inform the signaller about the situation when at a standstill.

If no new MA is received when the train has come to a standstill, the signaller shall authorise the driver to pass the EOA by applying rule 'Authorising the passing of an EOA' (section 6.39).

6.48. Managing a radio communication failure

An ETCS radio communication failure occurs. Levels 0, 1, 2, NTC

When the following symbol is displayed:

the driver shall check the ETCS level, the radio network identification, the RBC identification and phone number, and correct them if necessary (rule 'Manual change of data' (section 6.1.2)).

If the radio communication with the RBC still cannot be established, the driver shall inform the signaller about the situation.

(a) when in ETCS level 2 preparing a movement and the traction unit has to move in SH

The driver and the signaller shall apply non-harmonised rules.

(b) when in ETCS level 2 preparing a tandem movement

The driver of the non-leading traction unit shall inform the driver of the leading traction unit about the radio communication failure. Both drivers shall apply internal RU rules.

(c) in all other cases

The signaller shall authorise the driver to pass the EOA by applying rule 'Authorising the passing of an EOA' (section 6.39).

6.49. Managing a failure of self test

Levels 0, 1, 2, NTC

When the information about the failure of an ETCS device is shown to the driver, they shall switch off the ETCS on-board and then switch it on again to trigger a new self test. If the same information is shown again, the driver shall attempt to troubleshoot the problem using the applicable technical information. If this attempt fails or is not possible, the driver shall inform the signaller about the situation.

The driver shall request a change of traction unit.

If the traction unit must be moved the driver and signaller shall apply rule 15 of Appendix B2.

6.50. Managing a failure affecting the on-board radio equipment

Levels 0, 1, 2, NTC

When a failure of the on-board radio equipment is detected the driver shall inform the signaller about the situation.

6.50.1. During the preparation of the traction unit

Level 2

The driver shall request a change of traction unit.

If the traction unit must be moved, the driver shall inform the signaller, apply RU rules and any instructions given by the signaller.

If the traction unit need not be moved, the driver shall switch off the ETCS on-board.

6.50.2. While running

Levels 1 with infill function by radio, 2

The driver and signaller shall apply rule 15 of Appendix B2.

6.51. Managing a failed DMI

The DMI fails. Levels 0, 1, 2, NTC

When the DMI fails the driver and signaller shall apply rule 15 of Appendix B2, unless another DMI is available on the desk.

6.52. Managing a system failure

Levels 0, 1, 2, NTC

When the following symbol is displayed:

the driver shall attempt to troubleshoot the problem using the applicable technical information.

If this attempt fails or is not possible, the driver and signaller shall apply rule 15 of Appendix B2.

6.53. Managing an NTC failure

Levels 0, 1, 2, NTC

When the following text message is displayed:

'[name of NTC] failed'

the driver shall acknowledge and apply non-harmonised rules.

6.54. Managing a VBC

Levels 0, 1, 2, NTC

The driver and signaller shall apply non-harmonised rules.

6.55. Running in AD

The driver switches the ATO on-board on. Levels 1, 2

6.55.1. Engaging ATO

When the following symbol is displayed, the driver may engage automated train operation by selecting it:

When ATO is engaged the following symbol is displayed:

Running in ATO

When the following symbol is displayed:

the driver:

(i) shall activate 'skip stopping point' when required by the timetable or if instructed to do so

(ii) after coming to a standstill at an operational stopping point, may manually move the train to correct its position, in the forward direction (when  is displayed) after notifying any passengers or in the reverse direction (when  is displayed, if authorised by the signaller and after notifying any passengers accordingly, until  is displayed.

(iii) shall operate door opening/closing if invited to do so by the respective DMI indications.

6.55.2. Disengaging ATO

The driver can disengage ATO by either :

(i) selecting the button associated with this icon 

(ii) applying the brake

(iii) switching off the ATO

(iv) selecting Override

Once the ATO disengages, the driver shall observe the icon displaying the current ETCS mode and shall follow the rule applicable for the mode entered.

6.56. Managing a TIMS failure

Level 2 when train integrity has to be confirmed

When the train preparer / driver of a train scheduled to run or running in an ETCS level 2 area where train integrity has to be confirmed becomes aware that the TIMS has failed, they shall apply rule 15 of Appendix B2.

6.57. Managing an impaired odometer

Levels 1, 2

When the following text message is displayed:

'odometer impaired'

the driver shall apply rule 15 of Appendix B2.

7. GSM-R VOICE RADIO OPERATIONAL RULES

7.1. Selecting the GSM-R mode

The driver needs to change the GSM-R mode.

When the displayed GSM-R mode does not correspond with the task to be performed (train or shunting movement), the driver shall select the correct mode.

7.2. Entering the functional number

The train preparer / driver is performing the registration.

The train preparer / driver shall enter the functional number:

(i) as early as possible before the initial departure,

(ii) every time the functional number changes.

7.3. Selecting the GSM-R network at a border crossing

The train is approaching a border crossing.

7.3.1. Inhibition of automatic network selection

When approaching a section in the vicinity of network borders, the driver shall inhibit the (on-board) automatic network selection function in the cab radio, if activated, when instructed to do so by the Route Book.

7.3.2. Selection of another GSM-R network

When according to the Route Book or a GSM-R network marker

*

* For the exact dimensions and layout of the marker board, EN 16494:2015 needs to be used

the driver is instructed to select another GSM-R network, they shall select the indicated GSM-R network on the cab radio unless the network is selected following an ETCS trackside command. If the driver is engaged in an emergency call, they shall not proceed with the manual selection as long as the call is active.

7.4. Performing a de-registration

The train has to be manually de-registered.

At the end of the train run or when requested by the signaller, the driver shall carry out the de-registration .

7.5. Not used

7.6. Managing a failure of self test

When a text message indicating the failure of the GSM-R Cab Radio self-test is displayed (e.g. 'Self-test failed'), the driver shall inform the signaller about the situation.

The driver and signaller shall apply rule 8 of Appendix B2.

7.7. Managing a lack of GSM-R network after the train has entered service

When a text message indicating the lack of GSM-R network is displayed (e.g. 'No network', 'GSM-R signal missing') ,the driver and signaller shall apply rule 8.2 of Appendix B2.

7.8. Not used

7.9. Managing a failure of de-registration

If the de-registration is not possible the driver shall inform the signaller about the situation, apply RU rules and follow any instructions given.

7.10. Taking measures in case the functional number is not available

When a text message indicating that the entered functional number is not available is displayed (e.g. 'Number not available'), the train preparer / driver shall check the number and try again to register using the correct number.

If the registration fails again, they shall inform the signaller about the situation, apply RU rules and follow any instructions given.

7.11. Taking measures in case the functional number is already used

When a text message indicating that the entered functional number is already in use is displayed (e.g. 'Number already used' or 'Number already allocated'), the train preparer / driver shall check the number and try again to register using the correct number.

If the functional number used was correct, the train preparer / driver shall call that functional number and ask the other party to de-register the current number unless prevented from doing so by non-harmonised rules.

(i) If the call is successful and the other party de-registers the number in question, the train preparer / driver shall re-start the functional number registration procedure.

(ii) If there is no response to the call, the train preparer / driver shall initiate forced de-registration of the specific functional number.

In all other cases, the train preparer / driver shall inform the signaller on the issue and follow any instructions given.

7.12. Managing a failure when registering the functional number

When it is not possible to register the functional number, the train preparer / driver shall inform the signaller about the situation, apply RU rules and follow any instructions given.

7.13. GSM-public as primary communications (if this option is available on-board)

7.13.1. Changing-over from GSM-R to GSM-Public

When instructed through a marker board indicating entry in a GSM network or through instructions on the route book, the driver shall select the indicated public GSM network, unless the network is automatically selected.

The driver and signaller shall apply non-harmonised rules.

7.13.2. Changing-over from GSM-Public to GSM-R

When instructed through a marker board indicating (re-)entry into a GSM-R network or through instructions on the route book, the driver shall select the indicated GSM-R network, unless the GSM-R network is automatically selected.

If the GSM-R network is not available, the driver shall apply rule 8.2 Appendix B2.

7.14. GSM-public as fall-back communication (if this option is available on-board)

7.14.1. Changing-over from GSM-R to GSM-Public

When the connection to the GSM-R network is lost, the driver shall select an alternate GSM public network if authorised to do so according to instructions previously given by the signaller or provided in the rule book and/or route book, unless the on-board GSM-R terminal is configured to carry out an automatic network selection.

The driver and signaller shall apply non-harmonised rules.

7.14.2. Changing-over from GSM-Public to GSM-R

When instructed by the signaller or through instructions in the rule and/or route book, the driver shall manually select the indicated GSM-R network on the cab radio, unless the on-board GSM-R terminal is configured to carry out an automatic network selection.

8. PART A - INTENTIONALLY BLANK

9. PART B – LIST OF ETCS OPERATIONAL TRAIN CATEGORIES

The ETCS operational train categories are listed in the table below:

label	Type of train	Type of brake	Cant deficiency
PASS 1	**passenger train**	**P**	**80**
PASS 2			**130**
PASS 3			**150**
TILT 1	**tilting passenger train**		**165**
TILT 2			**180**
TILT 3			**210**
TILT 4			**225**
TILT 5			**245**
TILT 6			**275**
TILT 7			**300**
FP 1	**freight train**		**80**
FP 2			**100**

FP 3			**130**
FP 4			**150**
FG 1		**G**	**80**
FG 2			**100**
FG 3			**130**
FG 4			**150**

10. PART C – TABLE OF REFERENCES TO NON-HARMONISED RULES

This Part lists the non-harmonised rules of Appendix A.

The table further defines the entity (IM or RU) that is in charge of laying down any necessary further details for each of those rules in their respective safety management system.

Reference	Subject	In charge
5.1.1	Driver's observance of the line in cab-signalling	RU
6.2.4 6.39 6.41.2	Checking route conditions	IM
6.2.4 6.39 6.41.2	Checking necessary restrictions and / or instructions for running in SR	IM
6.2.4 6.39 6.41.2	Checking speed restrictions lower than the maximum speed for SR	IM
6.3.1	Manual entry into SH	RU
6.3.3	Running in SH	IM
6.3.6	SH refused by the RBC / SH request failed	IM
6.3.7	Passing a defined border of a shunting area	IM
6.7.1	Announcement of an ETCS level 0 transition	IM

Reference	Subject	In charge
6.7.3	Running in ETCS level 0	IM
6.11.1	Announcement of an ETCS level NTC transition	IM
6.11.3	Running in ETCS level NTC	IM
6.15	Acknowledgement of LS	IM
6.15	Running in LS	IM
6.16	Acknowledgement of UN	IM
6.16	Running in UN	IM
6.17	Acknowledgement of SN	IM
6.17	Running in SN	IM
6.28	Sounding the audible warning device	IM
6.33.1	Revoking an authorisation for ERTMS train movement	IM
6.34.3	Protecting and restarting shunting movements	IM
6.40.2	The train is rejected when preparing a movement	IM
6.41.4	Trip in SH	IM
6.45	Managing a balise read error	IM
6.48 a)	Managing a radio communication failure when SH is requested	IM
6.53	Managing a NTC failure	IM
6.54	Managing a VBC	IM
7.11	Taking measures in case the functional number is already used	IM
7.13.1	Changing-over from GSM-R to GSM-Public	IM
7.14.1	Changing-over from GSM-R to GSM-Public	IM

Appendix B Fundamental operational principles and common operational rules

B1. Fundamental operational principles

(1) The method of signalling must maintain a space interval between trains that is safe.

(2) Before a train is allowed to start or continue moving, it must have an authority to move that clearly indicates the limit of that authority.

(3) Trains proceeding over any portion of line must not be obstructed in a way that threatens their safety.

(4) Trains must be prevented from proceeding onto a portion of line if it is known or suspected that it would not be safe for them to pass.

(5) Trains must not be allowed to begin or continue their journeys until it is clear that it is safe for them to do so.

(6) Trains must only be allowed to operate over any portion of line as long as the rolling stock is compatible with the infrastructure on that portion of line.

(7) Trains must not continue to operate after they have been found to be unsafe in any respect, until measures have been taken to allow them to continue safely.

(8) People must be kept at a safe distance from moving trains.

(9) The workforce must be protected from the particular hazards associated with electrified railways.

B2. Common operational rules

In case of degraded operation, the contingency arrangements set out in point 4.2.3.6.3 shall also be considered.

1. SANDING

If the train is equipped with manually activated sanding equipment, the driver shall always be allowed to apply sand but shall avoid it wherever possible:

— in the area of points and crossings,

— during braking at speeds less than 20 km/h,

— when at standstill.

The exceptions to this are:

— if there is a risk of SPAD (Signal Passed At Danger), or other serious incident and the application of sand would assist adhesion,

— when starting away,

— when required to test the sanding equipment on the traction unit.

2. DEPARTURE OF THE TRAIN

At the initial station or after a scheduled stop the driver is allowed to depart when the following conditions are fulfilled:

— after the driver has received an authorisation for train movement;

— after train service conditions are fulfilled;

— when it is time to depart, except when allowed to start before the scheduled time.

3. NO AUTHORISATION FOR TRAIN MOVEMENT AT THE EXPECTED TIME

If the driver has not received an authorisation for train movement at the expected time, and has no information as to the reason, the driver shall inform the signaller.

COMPLETE FAILURE OF FRONT END LIGHTS

If the driver is not able to display any front end light:

3.1. During good visibility

The driver shall inform the signaller about the failure. The train shall proceed at the maximum permitted speed to the nearest location where the front end light may be repaired/replaced or the affected vehicle replaced. When proceeding, the driver shall use the train audible warning device as necessary or as instructed by the signaller.

3.2. During darkness or poor visibility

The driver shall inform the signaller about the failure. As long as a portable front-end light displaying a white light is fitted on the front of the train, the train shall proceed at the maximum allowable speed for that failure to the nearest location where the front-end light may be repaired/replaced or the affected vehicle replaced.

If a portable front end light is not available, the train shall not proceed, unless formal instructions are given by the signaller to continue to the nearest suitable location to where the line may be cleared.

When proceeding, the driver shall use the train audible warning device as necessary or as instructed by the signaller.

4. COMPLETE FAILURE OF A REAR END SIGNAL

(1) If the signaller becomes aware of the complete failure of the train rear-end signal, the signaller shall make arrangements to stop the train in an appropriate location and inform the driver.

(2) The driver shall then check the completeness of the train and if necessary repair/replace the train rear end signal.

(3) The driver shall report to the signaller that the train is ready to proceed. Otherwise, if the repair is not possible, the train may not proceed, unless special arrangements are made between signaller and driver.

5. FAILURE OF THE AUDIBLE WARNING DEVICE OF A TRAIN

If the audible warning device fails, the driver shall inform the signaller about the failure. The train shall not exceed the permitted speed in the event of the failure of an audible warning device and shall proceed to the nearest location where the audible warning device may be repaired or the affected vehicle replaced. The driver shall be prepared to stop before passing over any level crossing where the audible warning device is required to be sounded and then proceed over the level crossing only when it is safe to do so. If a multi-tone audible warning device is defective but at least one tone is functioning, the train may proceed normally.

6. FAILURE OF LEVEL CROSSING

6.1. Stopping trains passing over a defective level crossing

When a technical failure affecting safety of running trains over a level crossing has been detected and as long as the safe operation has not been restored, the normal passing of trains over the level crossing shall be prevented.

Passing trains over the defective level crossing (if authorised)

(1) Where the nature of the failure permits train movements to continue, the driver of each train shall be authorised to continue and to pass over the level crossing.

(2) After being instructed to pass over the level crossing with a failure, the driver shall pass the level crossing as instructed. If the level crossing becomes obstructed the driver shall take all possible measures necessary to stop.

(3) When approaching the level crossing, the driver shall use the audible warning device when necessary or when formal instructions have been given by the

signaller. If the level crossing is clear, the driver shall proceed and accelerate the train as soon as the front of the train has passed clear the level crossing.

7. FAILURE OF VOICE RADIO COMMUNICATION

7.1. Failure of train radio detected during train preparation

In case of on board radio failure a train shall not be permitted to start a service on lines where a radio is required.

7.2. Failure of voice radio communication when the train has entered service

All failure types

If the driver becomes aware that the primary voice radio communication is failed, the driver shall inform the signaller as soon as practicable using any available means.

The driver shall then apply the instructions by the signaller concerning the further movement of the train.

On-board failure

A train with a failed voice radio communication may:

— continue its service if another means of communication is provided between the train driver and the signaller; or

— proceed to the nearest location where the radio may be repaired or the affected vehicle replaced if another means of voice communication is not provided between the driver and the signaller.

8. RUNNING ON SIGHT

When a driver has to run on sight, the driver shall:

— Proceed with caution, controlling the speed, having regard to the visibility of the line, so that it is possible within the free visible part to stop short of any vehicle, stop aspect or obstacle on the infrastructure; and

— Not exceed the maximum speed for running on sight.

This does not apply to unexpected obstacle entering the track zone within the stopping distance.

9. ASSISTANCE TO A FAILED TRAIN

(1) If a train is stopped by failure, the driver shall immediately inform the signaller about the failure and the circumstances of the failure.

(2) When an assisting train is needed, the driver and signaller shall agree at least all of the following:

— the type of assisting train needed,

— if a specific direction is required (front or rear),

— the location of the failed train.

— After the driver has asked for assistance, the train shall not be moved even if the defect is rectified until:

— the assisting train has arrived, or

— the driver and signaller have agreed alternative arrangements.

(3) The signaller shall not allow the assisting train to enter the section occupied by the failed train unless confirmation has been received that the failed train shall not be moved.

When the assisting train is ready to enter the section occupied by the failed train, the signaller shall inform the driver of the assisting train at least the following:

— the location of the failed train,

— the location where the failed train is to be taken to

(4) The driver of the combined train shall make sure that:

— the assisting train is coupled to the failed train, and

— the brake performance of the train is checked, the automatic brake, if compatible, is connected and a brake test has been carried out.

(5) When the combined train is ready to continue, the driver in control shall contact the signaller and inform the signaller of any restrictions and move the train in accordance with any instructions given by the signaller.

10. AUTHORISATION TO PASS AN END OF AUTHORITY

The driver of the train concerned shall have authorisation to pass an EOA.

When giving authorisation, the signaller shall give the driver any instructions concerning the movement. The driver shall apply the instructions and shall not exceed any speed restriction, where one is imposed, until reaching the location where the normal operation may be resumed.

11. ANOMALIES IN LINE-SIDE SIGNALLING

If any of the following anomalies are observed:

— no signal aspect is shown where there should be one,

— an irregular aspect is shown at the signal,

— an irregular signal aspect sequence is received on the approach to the signal,

— the aspect of the signal is not clearly visible.

The driver shall act according to the most restrictive aspect that could be presented by the signal.

In all cases the driver shall report to the signaller the abnormal signalling aspect when observed.

12. EMERGENCY CALL

When receiving an emergency call the driver shall assume that there is a dangerous situation and perform all actions necessary in order to avoid or reduce the effect of this situation.

In addition, the driver shall:

— immediately reduce the speed of the train to the appropriate speed for running on sight; and

— run on sight unless otherwise instructed by the signaller; and

— obey the instructions given by the signaller.

Drivers that have been ordered to stop shall not restart without authorisation from the signaller. Other drivers shall continue running on sight until the signaller informs them that running on sight is no longer necessary.

Anyone who receives an emergency call shall listen, not intervene in the communication that is in progress except to provide elements relevant to the context.

13. IMMEDIATE ACTIONS TO PREVENT DANGER TO TRAINS

Any railway undertaking/infrastructure manager staff who becomes aware of a danger to trains shall take immediate action to stop any trains which may be affected, alert the signaller and take any other action as necessary to avoid harm or loss, and in particular:

(1) Any driver made aware of a danger to their train shall stop as soon as it is safe to do so and alert the signaller immediately to the danger.

(2) Any signaller made aware of a danger shall alert all drivers as appropriate through an emergency call or using any other available means.

14. FAILURE OF ON-BOARD EQUIPMENT

The railway undertaking shall determine the cases in which a failure of an on-board equipment affects the running of the train.

The railway undertaking shall give the necessary information to the driver and/or train crew of what action to take in the case of on-board failures that affect the running of the train.

If the driver becomes aware of a failure of any on-board equipment that affects the running of the train, the driver shall:

— Inform the signaller of the situation, the location and the restrictions on the train should the train be allowed to continue its mission,

— not commence or recommence the mission until permission to do so has been granted by the signaller.

If the signaller gives permission for the train to start or continue its mission then the driver shall proceed in accordance with the restrictions placed upon the train.

If the signaller does not give permission for the train to commence or recommence its mission then the driver shall follow the instructions given by the signaller.

15. END OF AUTHORITY PASSED WITHOUT PERMISSION

— If the driver becomes aware that the train has passed an end of authority without permission, the driver shall stop the train immediately.

— If the train is stopped by ATP/TPS, the driver shall take action to support the emergency brake.

— The driver shall inform the signaller.

— If the signaller becomes aware that a train has passed an end of authority without permission, then the signaller shall take any necessary action to stop the train immediately.

— The driver and signaller shall take any necessary action to protect all movements.

When the train is able to continue, the driver shall inform the signaller. The signaller shall set or check the route for the train to continue its journey and issue all necessary instructions

16. FAILURE OF TRACKSIDE EQUIPMENT INCLUDING CATENARY

— The infrastructure manager shall determine whether the failure of trackside equipment (including catenary) affects the safe and/or effective operation of trains.

— The infrastructure manager shall provide the necessary instructions to the driver of what action to take in the case of such a failure as referenced in this NTSN in point 4.2.1.2.2.3.

— If the driver becomes aware of a failure of any trackside equipment (including catenary) that affects the safe and/or effective operation of trains, the driver shall inform the signaller of the situation as soon as possible and follow the instructions given by the signaller.

17. ENTERING AN OCCUPIED TRACK SECTION WITHIN A STATION

— In case of an unplanned entry into an occupied track section, the signaller shall, before authorising the entry to the occupied track section, ensure that the involved drivers are informed of the circumstances.

— In all cases when a train has to enter an occupied track section, the signaller shall, before authorising the entry to the occupied track section, obtain confirmation that the occupying train or vehicles will not move towards the train entering the occupied track section.

Appendix C Safety-related communications methodology

C1. Oral communication

1. Scope and Purpose

This Appendix sets out the rules for safety-related communications, between train crew, mainly the train driver, and signaller, in particular to define its structure, methodology and content. Safety-related communication has priority over all other communication.

2. Safety related communications

2.1. Communication structure

The transmission of safety-related messages shall be short and clear and, as far as possible, without abbreviation. In order to ensure a message is understood and the necessary action may be undertaken, whoever is giving the message shall cover at least the following points:

— indicate their exact location.

— state the function they are carrying out and information on the action that is needed.

Drivers shall identify themselves by the train running number and the location.

Signallers shall identify themselves by the control area or the location of the signal box.

Communication methodology

Whoever is giving the message shall:

— check that the message is received and repeated back as required. As emergency messages are intended to give urgent operational instructions that are directly linked with the safety of the railway, the repetition of these messages may be omitted.

— if necessary, correct a mistake that has been made in the message,

— if necessary, let the person know how they may be contacted.

For communication between signallers and drivers it is the signallers' responsibility to ensure that they are talking to the driver within their control area. This is critical when communication is taking place in areas where communications boundaries overlap. This principle shall apply even after an interruption during transmission.

2.2. Communication content

The following messages shall be used for identification by the different parties.

— by the signaller:

Train …… [running number]
this is …… [control area/location of the signal box]

— by the driver:

this is train …… [running number] at …… [location]

Terminology shall be used in the communication procedure by all the parties:

Situation	**Terminology**
Term transferring the opportunity to speak to the opposite party	*'Over'*
Term confirming that the sent message has been received	*'Received'*
Term used to have the message repeated in the event of poor reception or misunderstanding	*'Say again'*
Term used to ascertain whether a read-back message exactly matches the sent message	*'Correct'*

Term used to indicate that a read-back message does not match the sent message	*'Error (+ I say again)'*
Term used to keep the other party waiting when there is a temporary break in the communication and the connection is not broken	*'Wait'*
Term used to tell the other party that the communication might be broken but should be resumed later on	*'I call again'*
Term used to indicate that the message has ended	*'Out'*

Terminology used by all parties to indicate that there is an emergency situation shall be either as defined in the Rule Book or the standard European terminology of 'Mayday, Mayday, Mayday'.

For use of 'Mayday, Mayday, Mayday' this term shall not be translated and does not have to be used in case emergency call functionality is available on the train (e.g. GSM-R).

2.3. *Glossary of Railway Terminology*

When relevant, the railway undertaking shall produce a glossary of railway terminology for each network over which its trains operate. It shall supply the terms in regular use in the language chosen by the railway undertaking and in the 'operating' language of the infrastructure manager(s) whose infrastructure the railway undertaking operates on, based on the terminology used by the respective infrastructure manager.

3. Communication rules

In order that safety-related communication is correctly understood, whatever the communication means is used, the following rules shall be used:

3.1. International Phonetic Alphabet

The International Phonetic Alphabet shall be used:

— to identify letters of the alphabet;

— to spell words and location names that are difficult to say, or may be misunderstood;

— when quoting the identity of signals or points.

A	Alpha	H	Hotel	O	Oscar	U	Uniform
B	Bravo	I	India	P	Papa	V	Victor
C	Charlie	J	Juliet	Q	Quebec	W	Whisky
D	Delta	K	Kilo	R	Romeo	X	X-ray
E	Echo	L	Lima	S	Sierra	Y	Yankee
F	Foxtrot	M	Mike	T	Tango	Z	Zulu
G	Golf	N	November				

3.2. Numbers

The numbers shall be spoken digit by digit:

0 = Zero	5 = Five
1 = One	6 = Six
2 = Two	7 = Seven
3 = Three	8 = Eight
4 = Four	9 = Nine

C2. ERTMS Operational Instructions

1. Introduction

Railway undertakings and infrastructure managers shall use ERTMS Operational Instructions in the communication procedure in the following cases:

(1) Authorisation to pass an End of Authority ;

(2) Authorisation to proceed after trip;

(3) Obligation to remain at standstill;

(4) Revocation of an instruction;

(5) Obligation to run with speed restriction;

(6) Obligation to run on sight;

(7) Authorisation to start after preparing a movement;

(8) Authorisation to pass defective level crossing(s);

(9) Obligation to run with power supply restriction;

(10-20) RESERVED

The numbers 1 to 20 are reserved for ERTMS Operational Instructions.

The use of the ERTMS Operational Instructions numbers 1, 2 and 7 is mandatory for ETCS, in accordance with the rules of the Appendix A. Infrastructure managers may choose, in consultation with railway undertakings, to use numbers 3, 4, 5, 6, 8 and 9.

Whenever the signaller needs to issue an operational instruction for which an ERTMS Operational Instruction exists, the signaller shall use this ERTMS Operational Instruction. If an operational instruction related to a class B system requires more information than the ERTMS Operational Instructions, a national instruction may be used instead. In such a case, the infrastructure manager may set out these requirements in its national instructions.

If numbered, the national instructions drawn up by the individual infrastructure managers shall start from 21 onwards.

The national instructions shall contain at least the same content as that for an ERTMS Operational Instruction.

2. Content

An operational instruction shall state the following as a minimum:

— from where it was issued (location of signaller),

— at what date it was issued (not for verbal instruction),

— to which train/shunting composition it refers,

— clear, precise, unambiguous instructions,

— unique identification provided by the signaller.

In addition, depending on the circumstances, an operational instruction might also state:

— at what time it was issued,

— where that train/shunting composition is located, at which location it applies,

— ID of train driver;

— ID of issuer;

— verification (signature or electronic confirmation) that the instruction has been received.

Any operational instruction that has been issued to be written down may only be revoked by a ERTMS Operational Instruction (4) explicitly referring to the unique identification of the instruction to be revoked.

By way of derogation, an ERTMS Operational Instruction 3 can also be revoked by a ERTMS Operational Instruction 1, 2 or 7 without requiring a dedicated ERTMS Operational Instruction 4.

3. Delivery of the operational instruction

An ERTMS Operational Instruction includes information delivered digitally, verbally, physically on paper or as verbal instructions to be written down by the train driver or by other safe methods of communication with the same level of information.

In case of verbal communication of an ERTMS Operational Instruction, the signaller shall only read out the first and second identifier figure of every field. Where a third identifier figure also exists, its field qualifier will be read out instead.

In principle when it is necessary for an operational instruction to be written down by the train driver, the train shall be at standstill. The railway undertaking and the concerned infrastructure manager may jointly undertake a risk assessment which could, as a result, define the conditions under which it is safe to deviate from this principle.

An operational instruction shall be delivered as close as practicable to the affected area.

An operational instruction takes precedence over the related indications provided by trackside signals and/or the DMI. When a permitted speed or a release speed lower than the maximum speed prescribed in the operational instruction is applicable, the lowest speed shall be applied.

An operational instruction shall only be issued by the signaller when the train running number has been identified and, if necessary, the location of the train/shunting composition. Before applying the operational instruction, the train driver shall check that this operational instruction refers to their train/shunting composition and their current or identified location.

4. Awareness of the operational instruction

The railway undertaking has to define a procedure to ensure that the train driver is aware of an operational instruction until the train has reached the location where it has to be processed.

When the operational instruction does not need to be performed immediately after its delivery, it shall be possible for the train driver to retrieve the operational instruction.

5. Monitoring of processed operational instruction

As part of the compliance with the Railways and Other Guided Transport Systems (Safety) Regulations 2006 (as amended), the infrastructure manager and railway undertaking shall monitor the processes of delivery and use of the operational instructions.

6. ERTMS Operational Instructions

Each tick box, field of information and option for input in a field contained in an ERTMS Operational Instruction shall be given its own alphabetical or numerical identifier. Numbered identifiers that are part of more than one ERTMS Operational Instruction shall be given an identifier starting with “x” instead of the number of the ERTMS Operational Instruction. This “x” may only be replaced by the number of the ERTMS Operational Instruction when transmitting this instruction digitally.

While the content and the identifiers must be used and the alphabetical and numerical order of the identifiers must be respected, the format itself shall be indicative.

If a specific tick box, field or option for input in a field is not to be used on the network of an infrastructure manager, there is no obligation to display this tick box, field or option for input in a field in the ERTMS Operational Instruction.

No tick box, field or option for input in a field shall be added.

The scope of each individual field cannot extend beyond the scope of application of the ERTMS Operational Instruction to which it belongs.

The infrastructure manager and the railway undertaking may add guidance on how to fill in and read the forms of the ERTMS Operational Instructions, under the condition that this guidance is not part of the communication procedure.

A Train No | Shunting composition No

B Date

C Location of train | Location of shunting composition

D Location of issuer

European Instruction 1 – Permission to pass EOA

1

1.10 Is allowed to pass EOA at ____ and at ____ and at ____

1.11.1 Km | 1.11.2 Signal — 1.12.1 Km | 1.12.2 Signal — 1.13.1 Km | 1.13.2 Signal

from ____ to ____

1.14.1 Location | 1.14.2 Km | 1.14.3 Signal — 1.15.1 Location | 1.15.2 Km | 1.15.3 Signal

1.20 Proceed in SH

x.25 Is exempted from running on sight

x.30 Set SR speed to ____

x.31.1 Km/h | x.31.2 Mph

x.35 Set SR distance to ____

x.36 Meter

x.41 Do not exceed the speed of ____

x.42.1 Km/h | x.42.2 Mph

between | in ____ and ____

x.43 Location — x.44 Location

on ____ and ____

x.45.1 Track | x.45.2 Line — x.46.1 Track | x.46.2 Line

from ____ to ____

x.47.1 Km | x.47.2 Signal — x.48.1 Km | x.48.2 Signal

x.90 Examine the line for the following reason ____ and report findings to ____

x.91 [*free text*] — x.92 [*free text*]

x.95 Additional instructions ____

x.96 [*free text*]

V ID of driver

W ID of Issuer

Y Time

Z Unique identification

User instructions:

Mark with a cross the tick boxes that become valid, as follows: X

In case of multiple options for the information, delete the non-valid options, as follows: x.47.1 Km ~~| x.47.2 Signal~~

In the valid fields, fill in the information on the dotted lines.

A Train No | Shunting composition No

B Date

C Location of train | Location of shunting composition

D Location of issuer

European Instruction 2 – Permission to proceed after trip

2

2.10 If no MA is received, is allowed to proceed in SR

[or]

2.11 Is allowed to proceed in SH

x.25 Is exempted from running on sight

x.30 Set SR speed to ..... x.31.1 Km/h | x.31.2 Mph

x.35 Set SR distance to ..... x.36 Meter

x.41 Do not exceed the speed of ..... x.42.1 Km/h | x.42.2 Mph

between | in ..... x.43 Location and ..... x.44 Location

on ..... x.45.1 Track | x.45.2 Line and ..... x.46.1 Track | x.46.2 Line

from ..... x.47.1 Km | x.47.2 Signal to ..... x.48.1 Km | x.48.2 Signal

x.90 Examine the line for the following reason ..... x.91 [*free text*] and report findings to ..... x.92 [*free text*]

x.95 Additional instructions ..... x.96 [*free text*]

V ID of driver

W ID of issuer

Y Time

Z Unique identification

User instructions:

Mark with a cross the tick boxes that become valid, as follows: X

In case of multiple options for the information, delete the non-valid options, as follows: ..... x.47.1 Km ~~| x.47.2 Signal~~

In the valid fields, fill in the information on the dotted lines.

A Train No | Shunting composition No

B Date

C Location of train | Location of shunting composition

D Location of issuer

European Instruction 3 – Obligation to remain at standstill

3

3.10 Remain at standstill at the current location

3.15 Carry out End of Mission

3.20 Delete the available MA

x.95 Additional instructions

x.96 [*free text*]

V ID of driver

W ID of issuer

Y Time

Z Unique identification

User instructions:

Mark with a cross the tick boxes that become valid, as follows: X

In case of multiple options for the information, delete the non-valid options, as follows: x.47.1 Km ~~| x.47.2 Signal~~

In the valid fields, fill in the information on the dotted lines.

A Train No | Shunting composition No

B Date

C Location of train | Location of shunting composition

D Location of issuer

European Instruction 4 – Revocation of an instruction

4

4.10 Operational instruction ..... is revoked

4.11 Unique identification

x.95 Additional instructions .....

x.96 [*free text*]

V ID of driver

W ID of issuer

Y Time

Z Unique identification

User instructions:

Mark with a cross the tick boxes that become valid, as follows: X

In case of multiple options for the information, delete the non-valid options, as follows: x.47.1 Km ~~x.47.2 Signal~~

In the valid fields, fill in the information on the dotted lines.

A Train No | Shunting composition No

B Date

C Location of train | Location of shunting composition

D Location of issuer

European Instruction 5 – Obligation to run with speed restriction

5

x.41 Do not exceed the speed of ____ x.42.1 Km/h | x.42.2 Mph

between | in ____ x.43 Location and ____ x.44 Location

on ____ x.45.1 Track | x.45.2 Line and ____ x.46.1 Track | x.46.2 Line

from ____ x.47.1 Km | x.47.2 Signal to ____ x.48.1 Km | x.48.2 Signal

Speed restriction indicated by lineside boards

5.67 Yes

[or]

5.68 No

x.90 Examine the line for the following reason ____ x.91 [*free text*] and report findings to ____ x.92 [*free text*]

x.95 Additional instructions ____ x.96 [*free text*]

V ID of driver

W ID of issuer

Y Time

Z Unique identification

User instructions:

Mark with a cross the tick boxes that become valid, as follows: X

In case of multiple options for the information, delete the non-valid options, as follows: x.47.1 Km | ~~x.47.2 Signal~~

In the valid fields, fill in the information on the dotted lines.

A Train No | Shunting composition No

B Date

C Location of train | Location of shunting composition

D Location of issuer

6 European Instruction 6 – Obligation to run on sight

6.40 Run on sight

[and]

x.41 Do not exceed the speed of

x.42.1 Km/h | x.42.2 Mph

between | in ____ and ____

x.43 Location | x.44 Location

on ____ and ____

x.45.1 Track | x.45.2 Line | x.46.1 Track | x.46.2 Line

from ____ to ____

x.47.1 Km | x.47.2 Signal | x.48.1 Km | x.48.2 Signal

x.90 Examine the line for the following reason

x.91 [*free text*]

and report findings to

x.92 [*free text*]

x.95 Additional instructions

x.96 [*free text*]

V ID of driver

W ID of issuer

Y Time

Z Unique identification

User instructions:

Mark with a cross the tick boxes that become valid, as follows: X

In case of multiple options for the information, delete the non-valid options, as follows:

x.47.1 Km | ~~x.47.2 Signal~~

In the valid fields, fill in the information on the dotted lines.

A Train No | Shunting composition No

B Date

C Location of train | Location of shunting composition

D Location of issuer

7 European Instruction 7 – Permission to start after preparing a movement

7.10 Is allowed to start in SR

[or]

7.11 Is allowed to start in SH

in the direction towards _____ 7.12.1 Location | 7.12.2 Signal

7.20 Is allowed to pass EOA at _____ 7.21 Signal and at _____ 7.22 Signal

[and]

7.23 Is prohibited to use override

x.25 Is exempted from running on sight

x.30 Set SR speed to _____ x.31.1 Km/h | x.31.2 Mph

x.35 Set SR distance to _____ x.36 Meter

x.41 Do not exceed the speed of _____ x.42.1 Km/h | x.42.2 Mph between | in _____ x.43 Location and _____ x.44 Location

on _____ x.45.1 Track | x.45.2 Line and _____ x.46.1 Track | x.46.2 Line

from _____ x.47.1 Km | x.47.2 Signal to _____ x.48.1 Km | x.48.2 Signal

x.90 Examine the line for the following reason _____ x.91 [*free text*] and report findings to _____ x.92 [*free text*]

x.95 Additional instructions _____ x.96 [*free text*]

V ID of driver

W ID of Issuer

Y Time

Z Unique identification

User instructions:

Mark with a cross the tick boxes that become valid, as follows: X

In case of multiple options for the information, delete the non-valid options, as follows: _____ x.47.1 Km | ~~x.47.2 Signal~~

In the valid fields, fill in the information on the dotted lines.

A Train No | Shunting composition No

B Date

C Location of train | Location of shunting composition

D Location of issuer

European Instruction 8 – Permission to pass defective level crossing(s)

8

8.40 Be advised of defective level crossing(s)

[and / or]

x.41 Do not exceed the speed of

x.42.1 Km/h | x.42.2 Mph

between | in x.43 Location and x.44 Location

on x.45.1 Track | x.45.2 Line and x.46.1 Track | x.46.2 Line

from x.47.1 Km | x.47.2 Signal to x.48.1 Km | x.48.2 Signal

8.50 Defective level crossing(s) (at) 8.51.1 Km | 8.51.2 ID and 8.52.1 Km | 8.52.2 ID and 8.53.1 Km | 8.53.2 ID and 8.54.1 Km | 8.54.2 ID

and 8.55.1 Km | 8.55.2 ID and 8.56.1 Km | 8.56.2 ID and 8.57.1 Km | 8.57.2 ID and 8.58.1 Km | 8.58.2 ID and 8.59.1 Km | 8.59.2 ID

8.60 When approaching level crossing(s), do not exceed the speed of

8.61.1 Km/h | 8.61.2 Mph

8.65 Stop before level crossing(s)

8.70 Examine level crossing(s)

8.75 Activate level crossing(s) manually

8.80 Activate audible warning device

8.85 Is allowed to pass level crossing(s)

x.95 Additional instructions

x.96 [*free text*]

V ID of driver

W ID of issuer

Y Time

Z Unique identification

User instructions:

Mark with a cross the tick boxes that become valid, as follows: X

In case of multiple options for the information, delete the non-valid options, as follows:

x.47.1 Km ~~| x.47.2 Signal~~

In the valid fields, fill in the information on the dotted lines.

A Train No | Shunting composition No

B Date

C Location of train | Location of shunting composition

D Location of issuer

9 European Instruction 9 – Obligation to run with power supply restriction

9.40 Power supply restriction

between | in ..... and .....
x.43 Location x.44 Location

on ..... and .....
x.45.1 Track | x.45.2 Line x.46.1 Track | x.46.2 Line

from ..... to .....
x.47.1 Km | x.47.2 Signal x.48.1 Km | x.48.2 Signal

Power supply restriction indicated by lineside boards

9.67 Yes

[or]

9.68 No

9.70 Run with lowered pantograph(s)

9.75 Run with 'main switch off'

9.80 Limit power consumption to .....
9.81.1 % | 9.81.2 Amp. | 9.81.3 kVA

x.90 Examine the line for the following reason ..... **and report findings to** .....
x.91 [*free text*] x.92 [*free text*]

x.95 Additional instructions .....
x.96 [*free text*]

V ID of driver

W ID of issuer

Y Time

Z Unique identification

User instructions:

Mark with a cross the tick boxes that become valid, as follows: X

In case of multiple options for the information, delete the non-valid options, as follows: x.47.1 Km | ~~x.47.2 Signal~~

In the valid fields, fill in the information on the dotted lines.

7. Communication of an operational instruction

The following terminology shall be used in the communication procedure by all the parties:

Situation	Terminology
Starting the delivery of an operational instruction	*'Prepare procedure … [identification of the procedure]'*
Confirming that an operational instruction may be delivered	*'Ready for procedure … [identification of the procedure]'*
Cancelling an operational instruction	*'Cancel procedure' [identification of the procedure]'*
If the message is then subsequently to be resumed, the procedure shall be repeated from the start	*'Error during transmission'*
When a transmission error is discovered by the sender, the sender shall request cancellation	*'Error (+ prepare new procedure … [identification of the procedure])'* *Or* *'Error (+ I say again)'*
Error during read back	*'Error (+ I say again)'*
Misunderstanding: if one of the parties does not fully understand a message, the message shall be repeated	*'Say again (+ speak slowly)'*

8. BOOK OF ERTMS OPERATIONAL AND NATIONAL INSTRUCTIONS

The infrastructure manager is responsible for drawing up the Book of ERTMS operational and national instructions in its operating languages.

All the forms of the national instructions and the ERTMS Operational Instructions to be used shall be assembled in a document or a computer medium called the Book of ERTMS operational and national instructions.

This Book shall be used by both the driver and the staff authorising the movement of trains. The Book used by the driver and the Book used by the staff authorising the movement of trains shall be structured and numbered in the same way.

The Book shall comprise two parts.

The first part contains at least the following items:

— an index of the ERTMS Operational Instructions as used by the infrastructure manager;

— an index of the national operational instructions;

— a list of situations to which each operational instruction applies;

— the way of delivering each operational instruction, including whether it is allowed to be written down by the driver while running;

— the table containing the international phonetic alphabet.

The second part contains, in the operating languages of the infrastructure manager, the forms of:

— the ERTMS Operational Instructions

— the national operational instructions.

These shall be collected by the railway undertaking and given to the driver. Railway undertakings operating in more than one infrastructure manager network shall provide to the driver:

— the generic forms of the ERTMS Operational Instructions as defined in point 6 of Appendix C2, or

— reduced forms of the ERTMS Operational Instructions that include at least the fields used by the infrastructure manager(s) on the network(s) of which the railway undertaking will operate.

Appendix D Route compatibility and Route Book

Elements the infrastructure manager has to provide to the railway undertaking for the Route Book and for the train compatibility over the route intended for operation

Number	Title	Route Book	Train compatibility over route intended for operation
1	**Generic information regarding the IM**		
1.1	IM's Name	X	X
2	**Maps and diagrams**		
2.1	**Map: schematic overview including**		
2.1.1	Sections of line	X	
2.1.2	Principal locations (stations, yards, junctions, freight terminals)	X	
2.2	**Route diagram**		
2.2.1	Indication of running lines	X	
2.2.1.2	Indication of loops	X	
2.2.1.3	Indication of catch/trap points	X	
2.2.1.4	Indication of sidings	X	
2.2.2	Principal locations (stations, yards, junctions, freight terminals) and their position relative to the line	X	
2.2.3	Location, type and name of all fixed signals relevant for trains	X	
2.3	**Station/yard/depot diagrams**		
2.3.1	Name of location	X	X
2.3.2	Type of location passenger terminal, freight terminal, yard, depot	X	

Number	Title	Route Book	Train compatibility over route intended for operation
2.3.3	Location, type and identification of fixed signals that protect danger points	X	
2.3.4	Identification and plan of tracks, including switches	X	
2.3.5	Identification of platforms	X	X
2.3.6	Length of platforms	X	X
2.3.7	Height of platforms	X	X
2.3.8	Curvature of platforms	X	X
2.3.9	Identification of loops	X	X
2.3.10	Length of loops		X
2.3.11	Fixed installations for servicing trains (toilet discharge, cleaning facilities, water restocking, refuelling, sand restocking, electric shore supply)	X	
3	**Specific section of line information**		
3.1	**General characteristics**		
3.1.1	Section of line extremity 1	X	X
3.1.2	Section of line extremity 2	X	X
3.1.3	Lineside indications of distance (frequency, appearance and positioning)	X	
3.1.4	Maximum permissible speed for each track, including, if necessary, differential speeds relating to certain types of train	X	X
3.1.5	Intentionally blank	X	
3.1.6	Intentionally blank	X	
3.1.7	Special restrictions for dangerous goods		X

Number	Title	Route Book	Train compatibility over route intended for operation
3.1.8	Special loading restrictions		X
3.1.9	Means of communication with the traffic management/control centre in normal, degraded and emergency situation	X	
3.2	**Specific technical characteristics**		
3.2.1	Track gauge		X
3.2.2	Structure gauge		X
3.2.3	Maximum axle load		X
3.2.4	Maximum load per linear meter		X
3.2.5	Maximum cant deficiency		X
3.2.6	Minimum radius of curvature		X
3.2.7	Gradient profile	X	X
3.2.8	Gradient location	X	X
3.2.9	Braking performance related information		X
3.2.10	For brake system that does not use wheel-rail adhesion, accepted braking effort		X
3.2.11	Tunnels: location, name, length, specific information such as the existence of walkways and evacuation and rescue points as well as the location of safe areas where evacuation of passengers may take place; fire safety categorisation	X	X
3.2.12	Non-stopping areas: identification, location, type	X	
3.2.13	Industrial risks — locations where it is dangerous for the driver to step out	X	
3.2.14	Intentionally blank	X	

Number	Title	Route Book	Train compatibility over route intended for operation
3.2.15	Type of signalling system and corresponding operational regime (double track, reversible working, left or right hand running, etc.)	X	
3.2.16	Type of track to train radio equipment	X	
3.3	**Energy subsystem**		
3.3.1	Energy supply system (voltage and frequency)	X	X
3.3.2	Maximum train current	X	X
3.3.3	Restriction related to power consumption of specific electric traction unit(s)	X	
3.3.4	Restriction related to the position of Multiple Traction unit(s) to comply with contact line separation (position of pantograph)	X	
3.3.5	Location of neutral sections	X	
3.3.6	Location of areas that shall be passed with lowered pantographs.	X	
3.3.7	Conditions applying with regard to regenerative braking	X	X
3.3.8	Maximum current at standstill per pantograph	X	X
3.3.9	Requirements for number of raised pantographs and spacing between them		X
3.3.10	Contact wire height		X
3.3.11	Characteristics of pantograph accepted		X
3.3.12	Mean contact force permitted		X
3.4	**Control-command and signalling subsystem**		
3.4.1	Need for more than one system active simultaneously	X	

Number	Title	Route Book	Train compatibility over route intended for operation
ERTMS/ETCS			
3.4.2	Level of application		X
3.4.3	Optional functions required on board: infill		X
3.4.4	Software version number		X
ERTMS/GSM-R radio			
3.4.5	Version number		X
Class B signalling systems			
3.4.6	System name		X
3.4.7	Software version number		X
Class B radio systems			
3.4.8	System name		X
3.4.9	Software version number		X
Speed restrictions related to braking performance			
3.4.10	Class B train protection, control and warning systems		X
Switch-overs			
3.4.11	Special conditions to switch over between different class B train protection, control and warning systems	X	
3.4.12	Special technical conditions required to switch over between ERTMS/ETCS and Class B systems, boundary locations between ERTMS/ETCS and Class B systems	X	
3.4.13	Radio network ID(s) used in the route and special instructions (location) to switch over between different radio systems	X	

Number	Title	Route Book	Train compatibility over route intended for operation
EMC Susceptibility of infrastructure-side control-command and signalling			
3.4.14	Permissibility to use eddy-current brake	X	X
3.4.15	Permissibility to use magnetic brake	X	X
3.4.16	This provision has been left intentionally blank		
3.4.17	This provision has been left intentionally blank		
3.4.18	This provision has been left intentionally blank		
3.4.19	Big Metal Mass	X	
3.4.20	Train integrity confirmed by on-board	X	
3.5	**Operation and traffic management subsystem**		
3.5.1	Operating language	X	
3.5.2	Special climatic conditions and associated arrangements, if any		X

D1. ERTMS trackside engineering information relevant to operation that the infrastructure manager shall provide to the railway undertaking

Notes:

(1) The information provided herein is complementary to the route compatibility check, which is assumed to have already been performed for a train intended to operate on a route. It has to be provided by the infrastructure managers.

(2) Most of the information listed below is not otherwise visible to the driver or can only be indirectly perceived under certain operational conditions, usually by observing the system behaviour in certain situations.

(3) Item 1.5 lists the minimum set of ETCS National Values required to be made available to the railway undertakings. Infrastructure managers shall also provide upon request to a railway undertaking the complete set of National Values.

(4) The ERTMS terms mentioned in the table are defined in the glossary and system requirements specification of the CCS NTSN (under indexes 3 and 4 respectively of Appendix A).

(5) The information provided in this Appendix will enhance drivers' knowledge of the operational conditions they need to consider when running under ERTMS in the infrastructure manager's network. It can be used in drivers' training and may be integrated under internal railway undertaking rules and procedures.

Number	Information	Explanation
1	**ETCS specificities**	
1.1	Whether the ETCS trackside is engineered to transmit Track Conditions and if yes, which ones	If the trackside does not provide Track Conditions, the driver will need to be informed about such conditions via alternative methods
1.2	Whether the ETCS trackside implements the Level Crossing (LX) procedure or an equivalent solution	If the trackside does not implement any solution to cover defective LXs (which are normally protected by means of a technical system), then drivers will be required to comply with instructions received from other sources
1.3	The cant deficiency used to determine the basic Static Speed Profile of the line and other cant deficiency train categories for which the ETCS trackside is configured to provide Static Speed Profiles	Essential information for drivers of trains with a worse (lower) tolerated cant deficiency than those for which the ETCS trackside provides Static Speed Profiles
1.4	Reasons for which an ETCS Radio Block Centre can reject a train	List of cases subject to system design choices made by the infrastructure manager
1.5	ETCS National Values	Minimum set of parameters to be communicated to the railway undertakings

Number	Information	Explanation
1.5.1	D_NVROLL	Parameter used by the ETCS on-board to supervise the distance allowed to be travelled under the roll- away protection and the reverse movement protection
1.5.2	Q_NVEMRRLS	Qualifier defining whether the application of the emergency brake for reasons other than a trip can be revoked as soon as the conditions for it have disappeared or after the train has come to a complete standstill
1.5.3	V_NALLOWOVTRP	Maximum speed allowed when selecting 'Override EOA'
1.5.4	V_NVSUPOVTRP	Permitted speed limit supervised when 'Override EOA' is active
1.5.5	D_NVOVTRP	Maximum distance for overriding the train trip
1.5.6	T_NVOVTRP	Maximum time for overriding the train trip
1.5.7	D_NVPOTRP	Maximum distance allowed for reversing in Post Trip Mode
1.5.8	T_NVCONTACT	Maximum time without a safe message from Radio Block Centre before train reacts
1.5.9	M_NVCONTACT	On-Board system reaction when T_NVCONTACT expires
1.5.10	M_NVDERUN	Qualifier determining whether ETCS on-board allows a driver ID to be changed while running or only at standstill
1.5.11	Q_NVDRIVER_ADHES	Qualifier determining whether the driver is allowed to modify the adhesion factor used by the

Number	Information	Explanation
		ETCS on-board to calculate the braking curves
1.5.12	Q_NVSBTSMPERM	Permission to use service brake in target speed monitoring
1.5.13	National Values used for the brake model	Set of parameters for tweaking the braking curves calculated by the ETCS on-board system to match accuracy, performance and safety margins imposed by the infrastructure manager
2	**GSM-R specificities**	
2.1	Whether the GSM-R network is configured to allow forced de-registration of a functional number by another driver	This feature will condition the applicable operational rules for drivers and signallers when dealing with cab radios registered under wrong numbers
2.2	Specific constraints imposed by the GSM-R network operator on ETCS on-board units only able to operate in circuit-switch	These constraints, where applicable, are meant to manage the limited number of circuit-switched radio connections that can be handled simultaneously by a Radio Block Centre

Appendix E Language and communication level

The oral qualification in a language may be subdivided into five levels:

Level	Description
5	— may adapt the way they speak to any interlocutor — may put forward an opinion — may negotiate — may persuade — may give advice
4	— may cope with totally unforeseen situations — may make assumptions

	— may express an argued opinion
3	— may cope with practical situations involving an unforeseen element — may describe — may keep a simple conversation going
2	— may cope with simple practical situations — may ask questions — may answer questions
1	— may talk using memorised sentences

Appendix F Minimum elements relevant to professional qualification for the tasks associated with 'accompanying trains'

1. General requirements

(a) This Appendix, which shall be read in conjunction with points 4.6 and 4.7 is a list of the elements that are deemed to be relevant to the tasks associated with accompanying a train on the network.

(b) The expression "professional qualification", when taken within the context of this NTSN, refers to those elements that are important to ensure that operational staff are trained and able to understand and discharge the tasks.

(c) Rules and procedures apply to the tasks being performed and to the person carrying out the tasks. These tasks may be carried out by any authorised qualified person irrespective of any name, job title or grade used in rules or procedures or by the individual company.

2. Professional knowledge

Any authorisation requires a successfully passed initial examination and provisions for ongoing assessment and training as described in point 4.6.

2.1. General professional knowledge

(a) Principles of organisation's safety management system, relevant to the tasks.

(b) Roles and responsibilities of the key players involved in operations.

(c) General conditions relevant to the safety of passengers or cargo and persons on or about the railway track.

(d) Conditions of health and safety at work.

(e) General principles of security of the railway system.

(f) Personal safety including when leaving the train on the running line.

2.2. Knowledge of operational procedures and safety systems relevant to the tasks

(a) Operational procedures and safety rules.

(b) Relevant aspects of control command and signalling system.

(c) Formalised messaging procedure including use of communication equipment.

2.3. Knowledge of rolling stock

(a) Passenger vehicle interior equipment.

(b) Appropriate knowledge of safety-critical tasks in respect to procedures and interfaces for rolling stock.

2.4. Knowledge of the route

(a) Relevant operational arrangements (such as the method of train despatch) at individual locations (station equipment and signalling etc.).

(b) Stations at which passengers may alight or board the train.

(c) Local operating and emergency arrangements specific to the line(s) of route.

2.5. Knowledge on passenger safety

The training on passenger safety shall cover at least the following:

(a) Principles to ensure the safety of passengers:

— Support passengers with reduced mobility;

— Identify the hazards;

— Procedures applicable to accidents involving persons;

— Events of a fire and/or smoke;

— Evacuation of passengers.

(b) Principles of communication:

— Identify who needs to be contacted and understand communication methods, especially with the signaller during an evacuation incident;

— Identify causes/situations and requests to initiate communication;

— Communication methods for informing passengers;

— Communication methods in degraded operations/emergency situations.

(c) Behavioural skills:

— Situational awareness;

— Conscientiousness;

— Communication;

— Decision-making and action.

3. Ability to put the knowledge into practice

The ability to apply this knowledge in normal, degraded and emergency situations shall require staff to be fully acquainted with:

— Methods and principles for applying the rules and procedures,

— Process for the use of line-side equipment and rolling stock, as well as any specific safety-related equipment.

In particular with:

(a) Checks before departure, including brake tests if necessary and correct closure of the doors.

(b) Departure procedure.

(c) Degraded operation.

(d) Assess the potential of a defect within the passenger areas and react according to rules and procedures.

(e) Protection and warning measures as required by the rules and regulations or in assistance to the driver.

(f) Communicate with the infrastructure manager’s staff when assisting the driver.

(g) Report any unusual occurrences concerning the operation of the train, the condition of the rolling stock and the safety of passengers. If required these reports shall be made in writing, in the language chosen by the railway undertaking.

Appendix G Professional qualifications – preparing trains

Minimum elements relevant to professional qualification for the task of preparing trains

1. General requirements

(a) This Appendix, which shall be read in conjunction with point 4.6, gives a list of the elements that are deemed to be relevant to the task of preparing a train on the network.

(b) The expression 'professional qualification', when taken within the context of this NTSN, refers to those elements that are important to ensure that operational staff are trained and able to understand and discharge the elements of the task.

(c) Rules and procedures apply to the task being performed and to the person carrying out the task. These tasks may be carried out by any authorised qualified person irrespective of any name, job title or grade used in rules or procedures or by the individual company.

2. Professional knowledge

Any authorisation requires a successfully passed initial examination and provisions for ongoing assessment and training as described in point 4.6.

2.1. General professional knowledge

(a) Principles of organisation's safety management system, relevant to the task.

(b) Roles and responsibilities of the key players involved in operations.

(c) General conditions relevant to the safety of passengers and/or cargo including the carriage of dangerous goods and exceptional loads.

(d) Appreciation of hazards, especially in relation to the risks involving railway operation and electric traction supply.

(e) Conditions of health and safety at work.

(f) General principles of security of the railway system.

(g) Personal safety when on or in the vicinity of rail lines.

(h) Communications principles and formalised messaging procedure including use of communication equipment.

2.2. Knowledge of operational procedures and safety systems relevant to the task

(a) Working of trains in normal, degraded and emergency situations.

(b) Operational procedures at individual locations (signalling, station/depot/yard equipment) and safety rules.

(c) Local operating arrangements.

2.3. Knowledge of train equipment

(a) Purpose and use of wagon and vehicle equipment.

(b) Identification of and arranging for technical inspections.

(c) Appropriate knowledge of safety-critical tasks in respect to procedures and interfaces for rolling stock.

3. Ability to put the knowledge into practice

The ability to apply this knowledge in normal, degraded and emergency situations shall require staff to be fully acquainted with:

— Methods and principles for applying the rules and procedures;

— Process for the use of line-side equipment and rolling stock, as well as any specific safety-related equipment.

In particular:

(d) Application of train composition rules, train braking rules, train loading rules etc. to ensure the train is in running order.

(e) Understanding of marking and labels on vehicles.

(f) Process for determining and making train data available.

(g) Communication with train crew.

(h) Communication with staff responsible for controlling the movement of trains.

(i) Degraded operations especially as it affects the preparation of trains.

(j) Protection and warning measures as required by the rules and regulations or local arrangements at the location in question.

(k) Actions to be taken in respect to incidents involving the carriage of dangerous goods (where relevant).

Appendix H European Vehicle Number and linked alphabetical marking on the bodywork

1. GENERAL PROVISIONS ON THE EUROPEAN VEHICLE NUMBER

The European Vehicle Number (EVN) is assigned according to the codes defined in Commission Decision 2007/756/EC, Appendix 6.

The EVN shall be changed when it does not reflect the interoperability capability or technical characteristics according to this Appendix due to technical modifications of the vehicle. Such technical modifications may require a new authorisation to place into service.

2. GENERAL ARRANGEMENTS FOR EXTERNAL MARKINGS

The capital letters and figures making up the marking inscriptions shall be at least 80 mm in height, in a sans serif font type of correspondence quality. A smaller height may only be used where there is no option but to place the marking on the sole bars.

The marking is put not higher than 2 metres above rail level.

The keeper may add, in letters of larger size than the European Vehicle Number, an own number marking (consisting generally of digits of the serial number supplemented by alphabetical coding) useful in operations. The place where the own number is marked is left to the choice of the keeper, however it shall be always be possible to distinguish easily the European Vehicle Number from the keeper's own number marking.

3. WAGONS

The marking shall be inscribed on the wagon bodywork in the following manner:

23.	TEN		31.	TEN		33.	TEN	
80	D-RFC		80	D-DB		84	NL-ACTS	
7369		553-4	0691		235-2	4796		100-8
Zcs			Tanoos			Slpss		

Where in the examples:

D and NL stand for the registering EU Member State as set out in NVR-decision 2007/756/EC, Appendix 6, part 4.

RFC, DB and ACTS stand for the keeper marking as set out in NVR-decision 2007/756/EC, Appendix 6, part 1.

For wagons whose bodywork does not offer a large enough area for this type of arrangement, particularly in the case of flat wagons, the marking shall be arranged as follows:

01	87	3320 644-7
TEN	F-SNCF	Ks

When one or more index letters of national significance are inscribed on a wagon, this national marking shall be shown after the international letter marking and separated from it by a hyphen as follows:

01	87	3320 644-7
TEN	F-SNCF	Ks-xy

4. COACHES AND HAULED PASSENGER STOCK

The number shall be applied to each sidewall of the vehicle in the following manner:

F-SNCF	61 87 20 - 72 021 - 7
	B^{10} tu

The marking of the country in which the vehicle is registered and of the technical characteristics are printed directly in front of, behind or under the twelve digits of the vehicle number.

In case of coaches with driver's cabin, the European Vehicle Number is also written inside the cabin.

LOCOMOTIVES, POWER CARS AND SPECIAL VEHICLES

The European Vehicle Number shall be marked on each sidewall of the tractive stock in the following manner:

92 10 1108 062-6

The European Vehicle Number is also written inside each cabin of the tractive rolling stock.

Appendix I List of open points

(a) Exceptional transport

(b) The provision has been left intentionally blank

(c) Train running information for drivers (see 4.2.1.2.3)

– Additional information';

(d) Recording of monitoring data outside the train (see 4.2.3.5.1)

– Additional information

(e) Recording of monitoring data on-board the train (see 4.2.3.5.2)

– Additional information

(f) Professional competences (see point 4.2.1.1 and 4.6)

– Elements relevant to professional qualification for the tasks associated with despatching trains and authorising train movements.

– Evidence of professional competences.

(g) Health and safety conditions (see point 4.7)

– Alcohol, drugs and psychotropic medication limits (see 4.7.1).

(h) Common operational principles and rules (See 4.4 and Appendix B)

– Sanding — automatic sanding equipment and report in case of use of the sanding equipment;

– Failure of level crossing — additional information;

(i) Safety-related communications methodology

– Additional terms (see Appendix C1)

(j) Operations in long tunnels (see 4.3.5)

– Additional information'

Appendix J Glossary

The definitions in this glossary refer to the use of terms in this OPE NTSN.

For the purpose of this NTSN, the definitions in regulation 2 of the Railways (Interoperability) Regulations 2011 and in point 2.2 of the LOC&PAS NTSN shall apply.

Term	**Definition**
Accident	As defined in Article 3 of Directive 2004/49/EC.
Authorising train movements	The operation of equipment in signalling centres, electric traction current supply control rooms and traffic control centres that permits train movement. This does not include those staff employed by a railway undertaking who are responsible for management of resources such as train crew or rolling stock.
This provision has been left intentionally blank.	*This provision has been left intentionally blank*
Competence	The qualification and experience necessary to safely and reliably undertake the task being performed. Experience may be gained as part of the training process.
Dangerous goods	As covered by Directive 2008/68/EC of the European Parliament and of the Council on the inland transport of dangerous goods
Degraded operation	Operation resulting from an unplanned event that prevents the normal delivery of train services.
Despatch (= dispatch)	See Train despatch
Driver	As defined in Article 3 of Directive 2007/59/EC.
Emergency call	Call set up in some dangerous situations to warn all trains/shunting compositions in a defined area.
End Of Authority	Location up to which a train or a shunting composition is authorised to proceed.
End of authority passed without permission	An end of authority passed without permission is any occasion when a train proceeds beyond the end of authority in the following circumstances: — A trackside signal at danger, or an order to STOP where an ATP is not operational, — The end of a movement authority provided in an ATP,

Term	Definition
	— A point communicated by verbal or written authorisation laid down in regulations, — Stop boards, — Hand signals. This covers movement authority as described in ETCS and authority to move covered by instructions/signalling. Any case in which a vehicle without any traction unit attached or a train that is unattended runs away is not included.
ERTMS Operational Instruction	An operational instruction giving similar content to train drivers in the UK and the European Union in order for them to answer in a similar manner to similar situation.
Evacuation	Evacuation of a train is when all passengers are instructed to leave the train and go on to the infrastructure under the supervision of on-board staff. On-board staff having agreed with the signaller or other responsible infrastructure manager staff, that it is safe to do so.
Exceptional transport	A vehicle and/or the load carried which because of construction/design, dimensions or weight does not meet the parameters of the route and requires special authority for the movement and may require special conditions over part or its entire journey.
Health and Safety Conditions	In the context of this NTSN, this refers only to the medical and psychological qualifications required to operate the relevant elements of the subsystem.
Hot axle box	An axle box and bearing that has exceeded its maximum designed operating temperature.
Incident	As defined in Article 3 of Directive 2004/49/EC.
Length of train	Total length of all vehicles over buffers including locomotive(s)
Loop	Track, connected to the main track, used for passing, crossing and stabling.
National instruction	An instruction defined by an infrastructure manager which covers situations specific to a Class B system or the transition between class A and class B systems.

Term	Definition
Operating language	The language or languages used in daily operation an infrastructure manager and published in its Network Statement, for the communication of operational or safety- related messages between the staff of the infrastructure manager and the railway undertaking.
Operational instruction	Formal information exchanged between signaller and train driver so as to ensure/continue railway operation in specific situations.
Passenger	Person (other than an employee with specific duties on the train) travelling by train or on railway property before or after a train journey.
Performance monitoring	The systematic observation and recording of the performance of the train service and the infrastructure for the purpose of bringing about improvements in the performance of both.
Qualification	The physical and psychological suitability for the task together with the required knowledge.
Real time	The ability to exchange or process information on specified events (such as arrival at a station, passing a station or departure from a station) on the train's journey as they occur.
Reporting point	A point on the train's schedule where reporting of the arrival, departure or passing time is required.
Route	The particular section or sections of line
Safety-critical task	Task affecting railway safety, performed by staff preparing, operating, controlling or otherwise involved inthe movement of a train.
Scheduled stop	Planned stop for commercial or operational reasons.
Shunting composition	A traction unit coupled or not to a set of vehicles and intended to be moved under shunting conditions without train data.
Siding	Any track(s) within an operational point which is not used for operational routing of a train.
Signaller	Staff in charge of the route setting of trains / shunting compositions and of issuing instructions to drivers.
Staff	Employees working for a railway undertaking or an infrastructure manager, or their contractors, undertaking tasks as specified in this NTSN.

Term	Definition
Stop aspect	Any signal aspect that does not allow the driver to pass the signal.
Stopping point	A location identified in the schedule of a train where the train is planned to stop, usually to carry out a specific activity such as allowing passengers to join and leave the train.
Timetable	Document or system that gives details of a train(s) schedule over a particular route.
Timing point	A location identified in the schedule of a train where a specific time is identified. This time may be an arrival time, departure time or in the case of a train not scheduled to stop at that location the passing time.
Traction unit	A powered vehicle able to move itself and other vehicles to which it may be coupled.
Train	A train is defined as (a) traction unit(s) with or without coupled vehicles with train data available operating between two or more defined points according to an allocated train path and identified by means of a unique train running number.
Train composition	Train composition is the sequence of vehicles in a train. This means both the formation of vehicles within a train and their specific vehicle characteristics.
Train despatch	The indication to the person driving the train that all station or depot activities are completed and that, as far as the staff responsible are concerned, movement authority has been granted for the train.
Train crew	Members of the on-board staff of a train, who are certified as competent and appointed by a railway undertaking to carry out specific, designated safety-related tasks on the train, for example the driver or the guard.
Train preparation	Process for ensuring that a train is in a fit condition to enter service, that the train equipment is correctly deployed and the train composition matches the train's designated route(s). It includes the coupling or decoupling of vehicles, connecting or disconnecting of pipes, services, cabling and the indication of a rear end signal. Train preparation also includes brake configuration setting and the inspections, tests, and checks before departure. Note: The movement to get a vehicle in or out of the train composition is a shunting movement.

Abbreviation	Explanation
AC	Alternating current
ATP	Automatic Train Protection
CCS	Control-Command and Signalling
CEN	European Committee for Standardisation (Comité Européen de Normalisation)
COTIF	Convention Concerning International Carriage by Rail (Convention relative aux Transports Internationaux Ferroviaires)
This provision has been left intentionally blank	
dB	Decibels
DC	Direct Current
DMI	Driver Machine Interface
ECG	Electrocardiogram
EIRENE	European Integrated Railway Radio Enhanced Network
EN	Euro-norm
ENE	Energy
EOA	End Of Authority
ERA	European Union Agency for Railways
ERTMS	European Rail Traffic Management System
ETCS	European Train Control System
EU	European Union
FRS	Functional Requirement Specification
GSM-R	Global System for Mobile Communications — Rail
This provision has been left intentionally blank	
IM	Infrastructure Manager
INF	Infrastructure

Abbreviation	Explanation
OPE	Operation and traffic management
OSJD	Organisation for Co-operation between Railways
RST	Rolling stock
RU	Railway Undertaking
This provision has been left intentionally blank	
SMS	Safety Management System
SPAD	Signal Passed At Danger
SRS	System Requirement Specification
TAF	Telematic Applications for Freight
TEN	Trans-European Network
TPS	Train Protection System
UIC	International Union of Railways (Union Internationale des Chemins de fer)