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Commission

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- ★ **Commission Decision of 11 August 2006 concerning the technical specification of interoperability relating to the subsystem 'Traffic Operation and Management' of the trans-European conventional rail system** (notified under document number C(2006) 3593) ⁽¹⁾ 1

Price: 26 EUR

⁽¹⁾ Text with EEA relevance



Acts whose titles are printed in light type are those relating to day-to-day management of agricultural matters, and are generally valid for a limited period.

The titles of all other acts are printed in bold type and preceded by an asterisk.

II

(Acts whose publication is not obligatory)

COMMISSION

COMMISSION DECISION

of 11 August 2006

concerning the technical specification of interoperability relating to the subsystem 'Traffic Operation and Management' of the trans-European conventional rail system

(notified under document number C(2006) 3593)

(Text with EEA relevance)

(2006/920/EC)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Directive 2001/16/EC of 19 March 2001 of the European Parliament and of the Council on the interoperability of the conventional rail system ⁽¹⁾, and in particular Article 6(1) thereof,

Whereas:

- (1) In accordance with Article 2(c) of Directive 2001/16/EC, the trans-European conventional rail system is subdivided into structural and functional subsystems.
- (2) In accordance with Article 23(1) of the Directive, the subsystem 'Traffic Operation and Management' needs to be covered by a technical specification for interoperability (TSI).
- (3) The first step in establishing a TSI is to have a draft TSI drawn up by the European Association for Railway Interoperability (AEIF), which was appointed as the joint representative body.
- (4) The AEIF has been given a mandate to draw up a draft TSI for the 'Traffic Operation and Management' subsystem in accordance with Article 6(1) of Directive 2001/16/EC. The basic parameters provided for in Article 6(4) of this Directive were discussed as part of the attached TSI.

- (5) The draft TSI was accompanied by an introductory report containing a cost-benefit analysis as provided for in Article 6(5) of the Directive.

- (6) The draft TSIs have been examined by the Committee set up by Council Directive 96/48/EC of 23 July 1996 on the interoperability of the trans-European high-speed rail system ⁽²⁾ and referred to in Article 21 of Directive 2001/16/EC, in the light of the introductory report.

- (7) In its current version the TSI does not fully deal with all aspects of interoperability; the items which are not dealt with are classified as 'Open Points' in Annex U of the TSI. Given that the verification of interoperability has to be established by reference to the requirements of the TSIs, in accordance with Article 16(2) of Directive 2001/16/EC, it is necessary, during the transition period between the publication of this Decision and the full implementation of the attached TSI, to lay down the conditions to be complied with in addition to those explicitly referred to in the TSI attached. To this end, Member States are to inform the other Member States and the Commission of the relevant national technical rules in use for achieving interoperability and meeting the essential requirements of Directive 2001/16/EC as well as of the bodies it appoints for carrying out the procedure for the assessment of conformity or suitability for use as well as the checking procedure in use for verifying the interoperability of subsystems within the meaning of Article 16(2) of Directive 2001/16/EC. The Commission should carry out an analysis of the information forwarded by the Member States and, where appropriate, should discuss with the Committee the need for the adoption of any further measures.

⁽¹⁾ OJ L 110, 20.4.2001, p. 1. Directive as amended by Directive 2004/50/EC (OJ L 164, 30.4.2004, p. 114, corrected by OJ L 220, 21.6.2004, p. 40).

⁽²⁾ OJ L 235, 17.9.1996, p. 6. Directive as last amended by Directive 2004/50/EC.

- (8) The TSI in question should not demand the use of specific technologies or technical solutions except where this is strictly necessary for the interoperability of the trans-European conventional rail system.
- (9) The TSI is based on best available expert knowledge at the time of preparation of the relevant draft. Developments in technology, operational, safety or social requirements may make it necessary to amend or supplement this TSI. Where applicable, a review or updating procedure should be initiated in accordance with Article 6(3) of Directive 2001/16/EC.
- (10) To encourage innovation and in order to take into account the experience acquired, the attached TSI should be subject to a periodical revision at regular intervals.
- (11) Where innovative solutions are proposed the manufacturer or the contracting entity shall state the deviation from the relevant section of the TSI. The European Rail Agency will finalise the appropriate functional and interface specifications of the solution and develop the assessment methods.
- (12) Implementation of the attached TSI and conformity with the relevant sections of the TSI must be determined in accordance with an implementation plan that shall be drawn up by each Member State for the lines for which it is responsible. The Commission should carry out an analysis of the information forwarded by the Member States and, where appropriate, should discuss with the Committee the need for the adoption of any further measures.
- (13) Rail traffic currently operates under existing national, bilateral, multinational or international agreements. It is important that those agreements do not hinder current and future progress towards interoperability. To this end, it is necessary that the Commission examine those agreements in order to determine whether the TSI presented in this Decision needs to be revised accordingly.
- (14) The provisions of this Decision are in conformity with the opinion of the Committee set up by Article 21 of Directive 96/48/EC,

HAS ADOPTED THIS DECISION:

Article 1

A Technical Specification for Interoperability (TSI) relating to the 'traffic operation and management' subsystem of the trans-European conventional system referred to in Article 6(1) of Directive 2001/16/EC is hereby adopted by the Commission.

The TSI shall be as set out in the Annex to this Decision.

The TSI shall be applicable to the traffic operation and management subsystem as defined in Annex II section 2.4 to Directive 2001/16/EC.

Article 2

1. With regard to those issues classified as 'Open points' set out in Annex U of the TSI, the conditions to be complied with for the verification of the interoperability pursuant to Article 16(2) of Directive 2001/16/EC shall be those applicable technical rules in use in the Member State which authorise the placing in service of the subsystem covered by this Decision.

2. Each Member State shall notify to the other Member States and to the Commission within six months of the notification of this Decision:

- (a) the list of the applicable technical rules mentioned in paragraph 1;
- (b) the conformity assessment and checking procedures to be applied with regard to the application of these rules;
- (c) the bodies it appoints for carrying out those conformity-assessment and checking procedures.

Article 3

Member States shall notify the following types of agreement to the Commission within six months of the entry into force of the attached TSI:

- (a) national, bilateral or multilateral agreements between Member States and railway undertaking(s) or infrastructure manager(s), agreed on either a permanent or a temporary basis and required due to the very specific or local nature of the intended train service;
- (b) bilateral or multilateral agreements between railway undertaking(s), infrastructure manager(s) or Member State(s) which deliver significant levels of local or regional interoperability;
- (c) international agreements between one or more Member State(s) and at least one third country, or between railway undertaking(s) or infrastructure manager(s) of Member States and at least one railway undertaking or infrastructure manager of a third country, which deliver significant levels of local or regional interoperability.

Article 4

Member States shall establish a national implementation plan of the TSI in accordance with the criteria specified in Chapter 7 of the Annex.

They shall forward this implementation plan to the other Member States and the Commission not later than one year after the date on which this Decision becomes applicable.

Article 5

This Decision shall become applicable six months after the date of its notification.

Article 6

This Decision is addressed to the Member States.

Done at Brussels, 11 August 2006.

For the Commission

Jacques BARROT

Vice-President

ANNEX

TECHNICAL SPECIFICATION FOR INTEROPERABILITY

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TECHNICAL SPECIFICATION FOR INTEROPERABILITY
TRAFFIC OPERATION AND MANAGEMENT SUBSYSTEM

1. INTRODUCTION

1.1. TECHNICAL SCOPE

This TSI concerns the Traffic Operation and Management subsystem shown in the list contained in point 1 of Annex II to Directive 2001/16/EC.

Further information on this subsystem is provided in Chapter 2.

1.2. GEOGRAPHICAL SCOPE

The geographical scope of this TSI is the trans-European conventional rail system as described in Annex I to Directive 2001/16/EC.

Content of this TSI

In accordance with Article 5(3) of Directive 2001/16/EC, this TSI:

- (a) indicates its intended scope of the Traffic Operation and Management subsystem — Chapter 2;
- (b) lays down essential requirements for each subsystem concerned and its interfaces vis-à-vis other subsystems — Chapter 3;
- (c) establishes the functional and technical specifications to be met by the target subsystem and its interfaces vis-à-vis other subsystems. If necessary, these specifications may vary according to the use of the subsystem, for example according to the categories of line, hub and/or rolling stock provided for in Annex I to the Directive — Chapter 4;
- (d) determines the interoperability constituents and interfaces covered by European specifications, including European standards, which are necessary to achieve interoperability within the trans-European conventional rail system — Chapter 5;
- (e) states, in each case under consideration, the procedures for the assessment of conformity or suitability for use. This includes in particular the modules defined in Decision 93/465/EEC or, where appropriate, the specific procedures to be used to assess either the conformity or the suitability for use of interoperability constituents and 'EC' verification of subsystems. Where there are documents which can be used as references to assist the implementation of this TSI, these are listed — Chapter 6;
- (f) indicates the strategy for implementing the TSI. In particular, it is necessary to specify the stages to be completed and the elements that can be applied in order to make a gradual transition from the existing situation to the final situation in which compliance with the TSI must be the norm — Chapter 7;
- (g) indicates, for the staff concerned, the professional qualifications and health and safety conditions at work required for the operation and maintenance of the subsystem concerned, as well as for the implementation of the TSI — Chapter 4.

Moreover, in accordance with Article 5(5), provision may be made for specific cases for each TSI; these are indicated in Chapter 7.

This TSI also comprises, in Chapter 4, the operating and maintenance rules specific to the scope indicated in Subsections 1.1 and 1.2 above.

2. DEFINITION OF SUBSYSTEM/SCOPE

2.1. SUBSYSTEM

The Traffic Operation and Management subsystem is defined by annex II to Directive 2001/16/EC, section 2.4.

It includes in particular:

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

2.2. SCOPE

The scope of this TSI applies to the Traffic Operation and Management subsystem of Infrastructure Managers and Railway Undertakings related to the operation of trains on the conventional rail TEN lines.

The specifications laid down in the TSI on Traffic Operation and Management may be used as a reference document for the operation of trains even if they are not covered by the scope of this TSI.

2.2.1. STAFF AND TRAINS

Subsections 4.6 & 4.7 apply to those staff undertaking the safety critical tasks of driving a train and accompanying a train, when this involves crossing a border(s) between states and working beyond any location(s) designated as the 'frontier' in the Network Statement of an Infrastructure Manager and included in his safety authorisation.

A staff member will not be considered as crossing a border if the activity only involves working as far as any 'frontier' locations as described above.

For those staff undertaking the safety critical tasks of despatching trains and authorising train movements, mutual recognition of professional qualifications and health and safety conditions between Member States will apply.

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 'frontier' location(s) as described above, Subsection 4.6 will apply with mutual recognition between Member States of health and safety conditions. A 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) as described above.

This can be summarised in the tables below:

Staff involved with the working of trains that will cross-state borders and proceed beyond the frontier location.

Task	Professional Qualifications	Medical Requirements
Driving a Train and Accompanying a Train	4.6	4.7
Authorising Train movements	Mutual recognition	Mutual recognition
Train Preparation	4.6	Mutual recognition
Train Despatch	Mutual recognition	Mutual recognition

Staff working trains that do not cross state borders or do so as far as frontier locations

Task	Professional Qualifications	Medical Requirements
Driving a Train and Accompanying a Train	Mutual recognition	Mutual recognition
Authorising Train movements	Mutual recognition	Mutual recognition
Train Preparation	Mutual recognition	Mutual recognition
Train Despatch	Mutual recognition	Mutual recognition

In reading these tables it must be noted that the communications principles described in Chapter 4.2.1 are a mandatory requirement.

2.2.2. OPERATING PRINCIPLES

The existing European differences in infrastructure layout and concepts, which are at least partly responsible for existing differences in rules and procedures, can often only be overcome as a result of huge investment.

Consequently, the general objective of the present version of this TSI, which is the first one after the entry into force of Directive 2001/16/EC, is not to create a single European rulebook for conventional rail traffic operation and management. However, the rules and procedures enabling a coherent operation of the new structural subsystems intended to be used in the TEN, and in particular those that are linked directly to the operation of a new train control and signalling system, must be identical where identical situations exist.

Initially, this TSI has only covered those elements (as set out in Chapter 4) of the conventional rail 'Traffic Operation and Management' subsystem, where principally there are operational interfaces between Railway Undertakings and Infrastructure Managers or where there is a particular benefit to interoperability. In doing this, due consideration was given to the requirements of Directive 2004/49/EC (the Railway Safety Directive),

Subsequently, it is intended that detailed operating rules for the European Railway Traffic Management System (ERTMS) be specified in Annex (A1 for ERTMS/ETCS, A2 for ERTMS/GSMR) to this TSI when they become available. At present, the attached annex A1 is only informative and not mandatory, because the rules are not yet finalised.

2.2.3. APPLICABILITY TO EXISTING VEHICLES AND INFRASTRUCTURE

While the majority of the requirements contained in this TSI relate to processes and procedures, a number also relate to physical elements, trains and vehicles which are important for operation.

The design criteria for these elements are described in the TSIs covering other subsystems such as rolling stock. In the context of the OPE TSI it is their operational function that is considered.

In such cases, it is recognised that modifying existing rolling stock/infrastructure facilities to meet the full requirements of this TSI may not be cost effective. The requirements concerned need therefore, only be applied to new elements or when the element is upgraded or renewed and requires new authorisation for placing into service within the meaning of Directive 2001/16/EC Article 14.3.

2.3. LINK BETWEEN THIS TSI AND DIRECTIVE 2004/49/EC

Although this TSI is developed under the Interoperability Directive 2001/16/EC, it addresses requirements closely related to the operational procedures and processes required from an Infrastructure Manager or Railway Undertaking when applying for a safety certificate under the Safety Directive 2004/49/EC

3. ESSENTIAL REQUIREMENTS

3.1. COMPLIANCE WITH THE ESSENTIAL REQUIREMENTS

In accordance with Article 4(1) of Directive 2001/16/EC, the trans-European conventional rail system, its subsystems and their interoperability constituents must meet the essential requirements set out in general terms in Annex III to the Directive.

3.2. ESSENTIAL REQUIREMENTS — OVERVIEW

The essential requirements cover:

- safety,
- reliability and availability,
- health,
- environmental protection,
- technical compatibility.

According to Directive 2001/16/EC, the essential requirements may be generally applicable to the whole trans-European conventional rail system or be specific to each subsystem and its constituents.

3.3. SPECIFIC ASPECTS IN RELATION TO THESE REQUIREMENTS

The relevance of the general requirements to the Traffic Operation and Management subsystem is determined in the following clauses.

3.3.1. SAFETY

In accordance with Annex III of Directive 2001/16/EC, the safety-related essential requirements that apply to the Traffic Operation and Management subsystem are the following:

Essential requirement 1.1.1 of Annex III to Directive 2001/16/EC:

'The design, construction or assembly, maintenance and monitoring of safety-critical components and, more particularly, of the components involved in train movements must be such as to guarantee safety at the level corresponding to the aims laid down for the network, including those for specific degraded situations.'

As far as the Traffic Operation and Management subsystem is concerned, this essential requirement is addressed by the specification of Subsection 'train visibility' (sub sections 4.2.2.1 and 4.3) and 'train audibility' in sub sections 4.2.2.2 and 4.3.

Essential requirement 1.1.2 of Annex III to Directive 2001/16/EC:

'The parameters involved in the wheel/rail contact must meet the stability requirements needed in order to guarantee safe movement at the maximum authorised speed.'

This essential requirement is not relevant to the Traffic Operation and Management subsystem.

Essential requirement 1.1.3 of Annex III to Directive 2001/16/EC:

'The components used must withstand any normal or exceptional stresses that have been specified during their period in service. The safety repercussions of any accidental failures must be limited by appropriate means.'

As far as the Traffic Operation and Management subsystem is concerned, this essential requirement is addressed by the specification of Subsection 'train visibility' (sub sections 4.2.2.1 and 4.3).

Essential requirement 1.1.4 of Annex III to Directive 2001/16/EC:

'The design of fixed installations and rolling stock and the choice of the materials used must be aimed at limiting the generation, propagation and effects of fire and smoke in the event of a fire.'

This essential requirement is not relevant to the Traffic Operation and Management subsystem.

Essential requirement 1.1.5 of Annex III to Directive 2001/16/EC:

'Any devices intended to be handled by users must be so designed as not to impair the safe operation of the devices or the health and safety of users if used foreseeably in a manner not in accordance with the posted instructions.'

This essential requirement is not relevant to the Traffic Operation and Management subsystem.

3.3.2. RELIABILITY AND AVAILABILITY

Essential requirement 1.2 of Annex III to Directive 2001/16/EC

'The monitoring and maintenance of fixed or movable components that are involved in train movements must be organised, carried out and quantified in such a manner as to maintain their operation under the intended conditions.'

This essential requirement is not relevant to the Traffic Operation and Management subsystem.

3.3.3. HEALTH

Essential requirement 1.3.1 of Annex III to Directive 2001/16/EC:

'Materials likely, by virtue of the way they are used, to constitute a health hazard to those having access to them must not be used in trains and railway infrastructure.'

This essential requirement is not relevant to the Traffic Operation and Management subsystem.

Essential requirement 1.3.2 of Annex III to Directive 2001/16/EC:

‘Those materials must be selected, deployed and used in such a way as to restrict the emission of harmful and dangerous fumes or gases, particularly in the event of fire.’

This essential requirement is not relevant to the Traffic Operation and Management subsystem.

3.3.4. ENVIRONMENTAL PROTECTION

Essential requirement 1.4.1 of Annex III to Directive 2001/16/EC:

‘The environmental impact of establishment and operation of the trans-European conventional rail system must be assessed and taken into account at the design stage of the system in accordance with the Community provisions in force.’

This essential requirement is not relevant to the Traffic Operation and Management subsystem.

Essential requirement 1.4.2 of Annex III to Directive 2001/16/EC:

‘The materials used in the trains and infrastructure must prevent the emission of fumes or gases which are harmful and dangerous to the environment, particularly in the event of fire.’

This essential requirement is not relevant to the Traffic Operation and Management subsystem.

Essential requirement 1.4.3 of Annex III to Directive 2001/16/EC:

‘The rolling stock and energy-supply systems must be designed and manufactured in such a way as to be electromagnetically compatible with the installations, equipment and public or private networks with which they might interfere.’

This essential requirement is not relevant to the Traffic Operation and Management subsystem.

Essential requirement 1.4.4 of Annex III to Directive 2001/16/EC:

‘Operation of the trans-European conventional rail system must respect existing regulations on noise pollution.’

Whilst this is principally an Essential Requirement dealt with by the Noise TSI, the Traffic Operation and Management subsystem specifies certain elements in Subsections 4.2.2.2 and 4.3 in respect to ‘train audibility’.

Essential requirement 1.4.5 of Annex III to Directive 2001/16/EC:

‘Operation of the trans-European conventional rail system must not give rise to an inadmissible level of ground vibrations for the activities and areas close to the infrastructure and in a normal state of maintenance.’

This essential requirement is not relevant to the Traffic Operation and Management subsystem.

3.3.5. TECHNICAL COMPATIBILITY

Essential requirement 1.5 of Annex III to Directive 2001/16/EC

‘The technical characteristics of the infrastructure and fixed installations must be compatible with each other and with those of the trains to be used on the trans-European conventional rail system.’

If compliance with these characteristics proves difficult on certain sections of the network, temporary solutions, which ensure compatibility in the future, may be implemented.’

This essential requirement is not relevant to the Traffic Operation and Management subsystem.

3.4. ASPECTS RELATING SPECIFICALLY TO THE TRAFFIC OPERATION AND MANAGEMENT SUBSYSTEM

3.4.1. SAFETY

Essential requirement 2.6.1 of Annex III to Directive 2001/16/EC:

‘Alignment of the network operating rules and the qualifications of drivers and on-board staff and of the staff in the control centres must be such as to ensure safe operation, bearing in mind the different requirements of cross-border and domestic services.

The maintenance operations and intervals, the training and qualifications of the maintenance and control centre staff and the quality assurance system set up by the operators concerned in the control and maintenance centres must be such as to ensure a high level of safety.’

The essential requirement is addressed by the following Subsections of this specification:

- Vehicle identification (Subsection 4.2.2.3)
- Train braking (Subsection 4.2.2.6)
- Train composition (Subsection 4.2.2.5)
- Freight vehicle loading (Subsection 4.2.2.4)
- Ensuring that the train is in running order (Subsection 4.2.2.7)
- Train visibility (Subsections 4.2.2.1 and 4.3)
- Train audibility (Subsections 4.2.2.2 and 4.3)
- Train departure (Subsection 4.2.3.3)
- Traffic management (Subsection 4.2.3.4)
- Signal sighting and vigilance device (Subsection 4.3)
- Safety related communication (Subsections 4.2.1.5 and 4.6)
- Documentation for drivers (Subsection 4.2.1.2)
- Documentation for Railway Undertaking staff other than drivers (Subsection 4.2.1.3)
- Documentation for Infrastructure Manager’s staff authorising train movements (Subsection 4.2.1.4)
- Degraded operation (Subsection 4.2.3.6)
- Managing an emergency situation (Subsection 4.2.3.7)
- ERTMS operating rules (Subsection 4.4)
- Professional qualifications (Subsection 4.6)
- Health and safety conditions (Subsection 4.7)

3.4.2. RELIABILITY AND AVAILABILITY

Essential requirement 2.6.2 of Annex III to Directive 2001/16/EC:

‘The maintenance operations and periods, the training and qualifications of the maintenance and control centre staff and the quality assurance system set up by the operators concerned in the control and maintenance centres must be such as to ensure a high level of system reliability and availability.’

The essential requirement is ensured by the following Subsections of this specification:

- Train composition (Subsection 4.2.2.5)
- Ensuring that the train is in running order (Subsection 4.2.2.7)

- Traffic Management (Subsection 4.2.3.4)
- Safety Related communication (Subsection 4.2.1.5)
- Degraded operation (Subsection 4.2.3.6)
- Managing an emergency situation (Subsection 4.2.3.7)
- Professional qualifications (Subsection 4.6)
- Health and safety conditions (Subsection 4.7)

3.4.3. TECHNICAL COMPATIBILITY

Essential requirement 2.6.3 of Annex III to Directive 2001/16/EC:

‘Alignment of the network operating rules and the qualifications of drivers, on-board staff and traffic managers must be such as to ensure operating efficiency on the trans-European conventional rail system, bearing in mind the different requirements of cross-border and domestic services.’

The essential requirement is addressed by the following Subsections of this specification:

- Vehicle identification (Subsection 4.2.2.3)
- Train Braking (Subsection 4.2.2.6)
- Train composition (Subsection 4.2.2.5)
- Freight vehicle loading (Subsection 4.2.2.4)
- Safety Related communication (Subsection 4.2.1.5)
- Degraded operation (Subsection 4.2.3.6)
- Managing an emergency situation (Subsection 4.2.3.7)

4. CHARACTERISTICS OF THE SUB-SYSTEM

4.1. INTRODUCTION

The trans-European conventional rail system (TEN), to which Directive 2001/16/EC applies and of which the Traffic Operation and Management subsystem is a part, is an integrated system whose consistency must be verified. This consistency must be checked in particular with regard to the specifications of the subsystem, its interfaces vis-à-vis the system with which it is integrated, as well as the operating rules.

Taking into account all the relevant essential requirements, the Traffic Operation and Management subsystem, as described in Subsection 2.2, covers only the elements specified in the following section.

In conformity with Directive 2001/14/EC, it is the overall responsibility of the Infrastructure Manager to provide all the appropriate requirements which must be met by trains permitted to run on his network, taking into account the geographic particularities of individual lines and the functional or technical specifications set out below.

4.2. FUNCTIONAL AND TECHNICAL SPECIFICATIONS OF THE SUB-SYSTEM

The functional and technical specifications of the Traffic Operation and Management subsystem comprise of the following:

- specifications relating to staff
- specifications relating to trains
- specifications relating to train operations

4.2.1. SPECIFICATIONS RELATING TO STAFF

4.2.1.1. **General requirements**

This section deals with the staff who contributes to the operation of the subsystem by performing safety critical tasks involving a direct interface between a Railway Undertaking and an Infrastructure Manager.

- Railway Undertaking staff:
 - undertaking the task of driving trains (referred to throughout this document as 'driver') and forming part of the 'train crew',
 - undertaking tasks on-board (other than driving) and forming part of the 'train crew',
 - undertaking the task of preparing trains.
- Infrastructure Manager's staff undertaking the task of authorising the movement of trains

The areas covered are:

- Documentation
- Communication

and, in the scope specified in section 2.2 of this TSI:

- Qualifications (see Subsection 4.6 and Annexes H, J and L)
- Health and Safety conditions (see Subsection 4.7)

4.2.1.2. **Documentation for drivers**

The Railway Undertaking operating the train must supply the driver with all the necessary information required to carry out his duties.

This information must take into account the necessary elements for operation in normal, degraded and emergency situations for the routes to be worked over and the rolling stock used on those routes.

4.2.1.2.1. **Rule Book**

All the necessary procedures for the driver must be included in a document or a computer medium called the 'Driver's Rule Book'.

The 'Driver's Rule Book' must state the requirements for all the routes worked and the rolling stock used on those routes according to the situations of normal operation, degraded operation and in emergency situations which the driver may encounter.

The 'Driver's Rule Book' must cover two distinct aspects:

- one which describes the set of common rules and procedures valid across the TEN (taking into account the contents of Annexes A, B and C)
- another which sets out any necessary rules and procedures specific to each Infrastructure Manager

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

- Staff Safety and Security
- Signalling and Control Command
- Train Operation including degraded mode
- Traction and Rolling Stock
- Incidents and accidents

The Railway Undertaking is responsible for compiling this document.

The Railway Undertaking must present the Driver's Rule Book in the same format for the entire infrastructure over which their drivers will work.

It shall have two appendices:

- appendix 1: Manual of communication procedures;
- appendix 2: Book of Forms

The Railway Undertaking must write the driver's rule book in either the language of one of the Member States or the 'operating' language of one of the Infrastructure Manager(s) to which the rules will apply. This will not apply for messages and forms which must remain in the 'operating' language of Infrastructure Manager(s).

The process for preparing and updating the Driver's Rule Book shall include the following steps:

- the Infrastructure Manager (or the organisation responsible for the preparation of the operating rules) must provide the Railway Undertaking with the appropriate information in the Infrastructure Manager's 'operating' language,
- the Railway Undertaking must draw up the initial or updated document;
- if the language chosen by the Railway Undertaking for the Driver's 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.

In conformity with Annex III paragraph 2 of Directive 2004/49/EC, the Infrastructure Manager's Safety Management System must contain a validation process to ensure that the content of the documentation provided to the Railway Undertaking(s) is complete and accurate.

In conformity with Annex III paragraph 2 of Directive 2004/49/EC, the Railway Undertaking's Safety Management System must contain a validation process to ensure the content of the Rule Book is complete and accurate.

Annex V outlines this process in flowchart format and provides an overview to the process.

4.2.1.2.2. **Description of the line and the relevant lineside equipment associated with the lines worked over**

Drivers must be provided with a description of the lines and the associated lineside equipment for the lines over which they will operate and relevant to the driving task. Such information must be set out in a single document called the 'Route Book' (which can either be a traditional document or computer based).

The following is a list of information which must as a minimum, be provided:

- the general operating characteristics
- indication of rising and falling gradients
- detailed line diagram

4.2.1.2.2.1. *Preparation of the Route Book*

The Route Book must be prepared in either a language of one of the Member States chosen by the Railway Undertaking or the 'operating' language used by the Infrastructure Manager.

The following information must be included (this list is not exhaustive):

- the general operating characteristics:
 - type of signalling and corresponding running regime (double track, reversible working, left or right hand running, etc.)
 - type of power supply
 - type of ground-train radio equipment.

- indication of rising and falling gradients:
 - gradient values and their precise location
- detailed line diagram:
 - names of stations on the line and key locations and their location;
 - tunnels, including location, name, length, specific information such as the existence of walkways and points of safe egress as well as the location of safe places where evacuation of passengers can take place
 - essential locations such as neutral sections
 - permissible speed limits for each track, including, if necessary, differential speeds relating to certain types of train,
 - the name of the organisation responsible for traffic management control and the name(s) of the traffic management control areas;
 - the names and areas of control of traffic management centres such as signal boxes;
 - identification of the radio channels to be used ;

The format of the Route Book must be prepared in the same manner for all the infrastructures worked over by the trains of an individual Railway Undertaking.

The Railway Undertaking is responsible for the preparation of the Route Book using the information supplied by the Infrastructure Manager(s).

In conformity with Annex III paragraph 2 of Directive 2004/49/EC, the Infrastructure Manager's Safety Management System must contain a validation process to ensure that the content of the documentation provided to the Railway Undertaking(s) is complete and accurate.

In conformity with Annex III paragraph 2 of Directive 2004/49/EC, the Railway Undertaking's Safety Management System must contain a validation process to ensure the content of the Route Book is complete and accurate.

4.2.1.2.2.2. *Modified elements*

The Infrastructure Manager must advise any elements modified either permanently or temporarily to the Railway Undertaking. These changes must be grouped by the Railway Undertaking into a dedicated document or computer medium whose format must be the same for all the infrastructures worked over by the trains of an individual Railway Undertaking.

In conformity with Annex III paragraph 2 of Directive 2004/49/EC, the Infrastructure Manager's Safety Management System must contain a validation process to ensure that the content of the documentation provided to the Railway Undertaking(s) is complete and accurate.

In conformity with Annex III paragraph 2 of Directive 2004/49/EC, the Railway Undertaking's Safety Management System must contain a validation process to ensure the content of the document of modified elements is complete and accurate.

4.2.1.2.2.3. *Informing the driver in real time*

The procedure for advising drivers in real time about all modifications to safety arrangements on the route must be defined by the Infrastructure Manager concerned (the process must be unique where ERTMS/ETCS is in use).

4.2.1.2.3. **Timetables**

The provision of train schedule information facilitates the punctual running of trains and assists in service performance.

The Railway Undertaking must provide drivers with the 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, which must be based on information supplied by the Infrastructure Manager, may be provided either electronically or in a paper format.

Presentation to the driver must be consistent across all the lines over which the Railway Undertaking operates.

4.2.1.2.4. **Rolling stock**

The Railway Undertaking must provide the driver with all information relevant to the working of the rolling stock during degraded situations (such as trains requiring assistance). Such documentation must also focus on the specific interface with the Infrastructure Manager's staff in these cases.

4.2.1.3. ***Documentation for Railway Undertaking staff other than drivers***

The Railway Undertaking must provide all members of his staff (whether on train or otherwise) who undertake safety critical tasks involving a direct interface with the staff, equipment or systems of the Infrastructure Manager with the rules, procedures, rolling stock and route specific information it deems appropriate to such tasks. Such information shall be applicable in both normal and degraded operation.

For staff on-board trains, the structure, format, content and process for preparation and updating of such information must be based on the specification set out in Subsection 4.2.1.2 of this TSI.

4.2.1.4. ***Documentation for Infrastructure Manager's staff authorising train movements***

All the information necessary to ensure safety-related communication between staff authorising the movement of trains and train crews must be set out in:

- documents describing the Communications Principles (annex C);
- the document entitled Forms Book.

The Infrastructure Manager must draw up these documents in his 'operating' language.

4.2.1.5. ***Safety-related communications between traincrew, other Railway Undertaking staff and staff authorising train movements***

The language used for safety-related communication between traincrew, other Railway Undertaking staff (as defined in Annex L) and the staff authorising train movements shall be the 'operating' language (see glossary) used by the Infrastructure Manager on the route concerned.

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

In conformity with Directive 2001/14/EC, the Infrastructure Manager is responsible for publishing the 'operating language' used by his 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 must 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 must ensure that an approaching train is clearly visible and recognisable as such, by the presence and layout of its lit white front-end lights. This is to enable it to be distinguished as an approaching train from nearby road vehicles or other moving objects.

The detailed specification can be found in Subsection 4.3.3.4.1.

4.2.2.1.3. Rear end

These requirements are specified in Annex S.

4.2.2.2. Train audibility**4.2.2.2.1. General requirement**

The Railway Undertaking must ensure that trains are fitted with an audible warning device to indicate the approach of a train.

4.2.2.2.2. Control

The ability to sound the audible warning device must be possible from all driving positions.

4.2.2.3. Vehicle identification

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

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

Further requirements are specified in Annex P.

4.2.2.4. Freight vehicle loading

The Railway Undertaking must ensure that vehicles are safely and securely loaded and remain so throughout the journey, taking into account the following:

4.2.2.4.1. Weight distribution

Vehicles must be loaded so as to evenly distribute the weight of the load over all the axles. Where, due to the size or shape of a particular load, this is not possible the Railway Undertaking must apply special conditions of travel to the load for the entire journey.

4.2.2.4.2. Axle loading

The Railway Undertaking must ensure that vehicles are not loaded beyond their axle load limit. They must also ensure that vehicles are not loaded beyond the axle load limit of any part of the planned route (unless the Infrastructure Manager(s) concerned have authorised the movement).

4.2.2.4.3. Load securing

Railway Undertakings must ensure that loads and any unused load securing equipment on or in vehicles are secured in a safe manner to prevent unnecessary movement during the journey.

4.2.2.4.4. Kinematic envelope

The kinematic gauge of each vehicle (inclusive of any load) in the train must be within the maximum permissible for the section of route.

4.2.2.4.5. Load covering

RUs must ensure that any materials used to provide a cover for a load on a vehicle are safely attached either to the vehicle or to the load. These coverings must be made of materials that are suitable to cover the load in question taking in to account the forces that are liable to be experienced during the journey

4.2.2.5. Train composition

The Railway Undertaking must define the rules and procedures to be followed by his staff so as to ensure that the train is in compliance with the allocated path.

Train Composition requirements must take into account the following elements:

- the vehicles
 - all vehicles in the train must be in compliance with all the requirements applicable on the routes over which the train will run;
 - all vehicles on the train must be fit to run at the maximum speed at which the train is scheduled to run;

- all vehicles on the train must be currently within their specified maintenance interval and will remain so for the duration (in terms of both time and distance) of the journey being undertaken;
- the train
 - the combination of vehicles forming a train must comply with the technical 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 the train is technically fit for the journey to be undertaken and remains so throughout the journey
- the weight and axle load
 - the weight of the train must be within the maximum permissible for the section of route, the strength of the couplings, the traction power and other relevant characteristics of the train. Axle load limitations must be respected.
- the maximum speed of the train
 - the maximum speed at which the train can run must take into account any restrictions on the route(s) concerned, braking performance, axle load and vehicle type.
- the kinematic envelope
 - the kinematic gauge of each vehicle (inclusive of any load) in the train must be within the maximum permissible for the section of route

Additional constraints may be required or imposed due to the type of braking regime or traction type on a particular train.

The train composition must be described in an harmonised train composition document (see Annex U)

4.2.2.6. **Train braking**

4.2.2.6.1. **Minimum requirements of the braking system**

All vehicles in a train must be connected to the continuous automatic braking system as defined in the RST TSI.

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

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

4.2.2.6.2. **Brake performance**

The Infrastructure Manager must decide whether to:

- provide the Railway Undertaking with the information necessary for calculating the required braking performance for the route(s) concerned, including information on the braking systems which can be accepted, and on the conditions of their use, or
- alternatively provide the actual performance required.

The Railway Undertaking is responsible for ensuring that the train has sufficient braking performance by providing braking rules for its staff to follow.

The information required by the Railway Undertaking to calculate the braking performance enabling their trains to stop and remain stopped must take into account the geography of all the routes involved, the allocated pathway and the development of ERTMS/ETCS.

Further requirements are specified in Annex T.

4.2.2.7. Ensuring that the train is in running order**4.2.2.7.1. General requirement**

The Railway Undertaking must 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 must 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 must define and keep up to date conditions and procedures for train running in degraded mode.

4.2.2.7.2. Data required

The data required for safe and efficient operation and the process by which this data must be forwarded must comprise:

- 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 required for the transport of dangerous goods

The Railway Undertaking must define a process in order to ensure that this data is made available to the Infrastructure Manager(s) prior to the departure of the train.

The Railway Undertaking must define a process for advising the Infrastructure Manager(s) if a train will not occupy its allocated path or is cancelled.

4.2.3. SPECIFICATIONS RELATING TO TRAIN OPERATIONS**4.2.3.1. Train planning**

The Infrastructure Manager must advise what data is required when a train path is requested. Further aspects of this element are set out in Directive 2001/14/EC.

4.2.3.2. Identification of trains

An unambiguous identification for all trains must exist.

These requirements are specified in Annex R.

4.2.3.3. Train departure**4.2.3.3.1. Checks and tests before departure**

The Railway Undertaking must, in accordance with the requirements set out in the third paragraph of Subsection 4.1 of this TSI, define the checks and tests (especially in relation to brakes) that must be undertaken before departure.

4.2.3.3.2. Informing the Infrastructure Manager of the train's operational status

The Railway Undertaking must 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 must ensure the safe, efficient and punctual operation of the railway, including effective recovery from service disruption.

The Infrastructure Manager must 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) can 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*

The Infrastructure Manager must:

- provide a means of real time recording of the times at which trains depart from, arrive at or pass appropriate pre-defined reporting points on their networks and the delta-time value;
- provide the specific data required in relation to train position reporting. Such information must include:
 - Train identification
 - Identity of reporting point
 - Line on which the train is running
 - Scheduled time at reporting point
 - 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)
 - Number of minutes early or late at the reporting point
 - Initial explanation of any single delay exceeding 10 minutes or as otherwise required by the performance monitoring regime
 - Indication that a report for a train is overdue and the number of minutes by which it is overdue
 - Former train identification(s), if any
 - Train cancelled for a whole or a part of its journey.

4.2.3.4.2.2. *Predicted hand over time*

The Infrastructure Manager must 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 must include information on service disruption (description and location of problem).

4.2.3.4.3. **Dangerous goods**

The Railway Undertaking must define the procedures to supervise the transport of dangerous goods.

These procedures must include:

- existing European standards as specified in EC directive 96/49 for identifying dangerous goods on board a train
- advice 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 of, in conjunction with the Infrastructure Manager, 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 the 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 TEN.

Where such improvement actions would have network-wide benefits, involving other Infrastructure Managers and Railway Undertakings, then, subject to commercial confidentiality, they shall 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 must be recorded and retained for the purposes of:

- Supporting systematic safety monitoring as a means of preventing incidents and accidents.
- Identifying driver, train and infrastructure performance in the period leading up to and (if appropriate) immediately after an incident or accident, to enable the identification of causes related to train driving or train equipment, and supporting the case for new or changed measures to prevent recurrence.
- To record information relating to the performance of both the locomotive/traction unit and the person driving, including working time.

It must be possible to match recorded data to:

- the date and time of the recording
- the precise geographic location of the event being recorded (distance in kilometres from a recognisable location)
- the train identification
- the identity of the driver

Requirements with regard to storage, periodic evaluation of and access to this data are specified in relevant national laws of the Member State:

- in which the Railway Undertaking is licensed (with regard to on-board recorded data), or
- of the Member State in which the infrastructure is located (with regard to data recorded outside the train).

4.2.3.5.1. **Recording of supervision data outside the train**

As a minimum, the Infrastructure Manager must 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;
- communication between the train driver and Infrastructure Manager's staff authorising train movements.

4.2.3.5.2. **Recording of supervision data on-board the train**

As a minimum, the Railway Undertaking must record the following data:

- the passing of signals at danger or 'end of movement authority' without 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 (horn)
- operation of door controls (release, closure)
- detection by on-board hot axle box detectors, if fitted
- identity of the cab for which data is being recorded to be checked
- data in order to record working time.

4.2.3.6. **Degraded operation**

4.2.3.6.1. **Advice to other users**

The Infrastructure Manager in conjunction with Railway Undertaking(s) must 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 must 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 his infrastructure, and neighbouring Infrastructure Managers as appropriate, must 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 must be proportional to the nature and potential severity of the degradation.

These measures, which must 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 must 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 must include contact details both during and outside office hours.

The Railway Undertaking must submit this information to the Infrastructure Manager and advise the Infrastructure Manager of any changes to these contact details.

The Infrastructure Manager must advise all the Railway Undertaking(s) of any changes to his details.

4.2.3.7. **Managing an emergency situation**

The Infrastructure Manager must, in consultation with:

- all Railway Undertakings operating over his infrastructure, or
- where appropriate, representative bodies of Railway Undertakings operating over his infrastructure, and
- neighbouring Infrastructure Managers, as appropriate, as well as
- local authorities and
- representative bodies at either local or national level as appropriate, of the emergency services including fire fighting and rescue

and in conformity with Directive 2004/49/EC, 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 must 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. (See also clause 4.2.7.1 Emergency measures in the Conventional Rail Freight Wagon TSI).

Additionally, the Railway Undertaking must have processes to inform passengers about onboard emergency and safety procedures."

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

The Railway Undertaking must 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 (e.g. lines of communication, measures to be taken in case of evacuation of a train).

4.3. **FUNCTIONAL AND TECHNICAL SPECIFICATIONS OF THE INTERFACES**

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

4.3.1. **INTERFACES WITH THE INFRASTRUCTURE TSI**

RESERVED

4.3.2. **INTERFACES WITH THE CONTROL/COMMAND AND SIGNALLING TSI**

4.3.2.1. **Recording of supervision data**

The Traffic Operation and Management subsystem determines the operational requirements for the recording of supervision data (see Subsection 4.2.3.5 of this TSI) with which the Control/Command subsystem (see section 4.2.15 of the CR CCS TSI) must comply.

4.3.2.2. **Driver vigilance**

A means of monitoring the reactions of the driver, intervening to bring the train to a stand if the driver does not react within a time to be specified and where the infrastructure supports the facility, automatically reporting this to the controlling signalling centre. There is an interface between this operational requirement and Subsection 4.2.2 in the CR CCS TSI associated with ERTMS.

4.3.2.3. **ERTMS/ETCS and ERTMS/GSM-R operating rules**

Annex A (A1 and A2) of this TSI is an interface with the ERTMS/ETCS FRS and SRS, the ERTMS/GSM-R FRS and SRS detailed in annex A of the CR CCS TSI. There is also an interface with the ETCS Driver/Machine/Interface (DMI) specifications (section 4.2.13 of the CR CCS TSI) and the EIRENE DMI specifications (section 4.2.14 of the CR CCS TSI). There is an interface between annex A1 of this TSI and subsection 4.2.2 of the CR CCS TSI in respect to isolation of On-Board ETCS functionality.

4.3.2.4. **Signal and lineside marker sighting**

The driver must be able to observe signals and lineside markers, and they must be observable by the driver from his normal driving position. The same applies for other types of lineside signs if they are safety related.

Lineside markers, signs and information boards must be designed in such a consistent way to facilitate this. Issues that must be taken into account include:

- 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.

There is an interface with subsection 4.2.16 of the CR CCS TSI in respect to driver's external field of view. There will also be a new item in a future version of Annex A of the CR CCS TSI in respect to lineside markers on ETCS-fitted lines.

4.3.2.5. **Train braking**

An interface exists between subsection 4.2.2.6.2 of this TSI and subsection 4.3.1.5 (Guaranteed train braking performance and characteristics) of the CR CCS TSI.

4.3.2.6. **Use of sanding. Minimum elements relevant to professional qualifications for the task of driving a train**

An interface exists between annex H (and Annex B(C1)) of this TSI on one hand, and subsection 4.2.11 (compatibility with track-side Train Detection Systems) and § 4.1 of appendix 1 of Annex A (as quoted in subsection 4.3.1.10) of the CR CCS TSI on the other hand, in respect to the use of sanding.

4.3.2.7. **Data recording and hot axle box detection**

An interface exists between subsection 4.2.3.5 of this TSI on one hand, and subsection 4.2.2 (On-board ETCS functionality), indexes 5, 7 and 55 in annex A, and subsection 4.2.10 (HABD (Hot Axle Box Detector)) of the CR CCS TSI on the other hand. There will be a future interface with annex B of the OPE TSI, when the CR CCS open point is resolved.

4.3.3. INTERFACES WITH THE ROLLING STOCK TSI

4.3.3.1. **Vehicle identification**

An interface exists between Subsection 4.2.2.3 of this OPE TSI and Annex B of the Freight Wagons RST TSI.

Such an interface will also exist with other CR RST TSIs when they are created.

4.3.3.2. **Braking**

An interface exists between Subsection 4.2.2.6.1 of this OPE TSI, subsection 4.2.4 and Annex B of the Freight Wagons RST TSI.

Such an interface will also exist with other CR RST TSIs when they are created.

4.3.3.3. **Requirements for passenger vehicles**

It should be noted that an interface will exist, in respect to the following, with other CR RST TSIs when they are created.

- Compatibility between passenger vehicles and platforms at scheduled passenger stops must be sufficient in order to ensure safe access and egress.

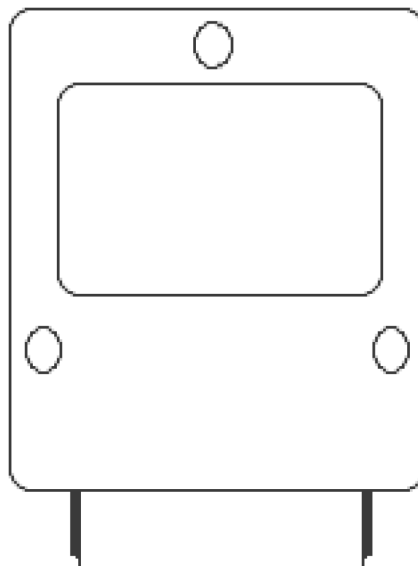
- Passengers must not be able to open body-side doors intended for their use until the train is at a standstill and the doors have been released by a member of the train crew.
- Door release must be separate for each side of the train. The integrity of door closure and blocking on passenger trains must be permanently indicated.
- Activation of the door release must prevent traction power being applied.
- All vehicles carrying passengers must be equipped with exits that facilitate emergency egress.
- Vehicles intended for passenger use must have either a passenger activated alarm or emergency brake fitted. In the event of this being triggered, the driver must be immediately alerted but be able to retain control of the train.

4.3.3.4. **Train visibility**

The Traffic Operation and Management subsystem determines that the basic requirements for train visibility, which the Rolling Stock subsystem must define, are shown in the following clauses.

4.3.3.4.1. **On the leading vehicle of a train facing in the direction of travel**

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



The front lights must optimise train detectability (e.g. to track workers and those using public crossings), provide sufficient visibility for the train driver (illumination of the line ahead, lineside information markers/boards, etc) by night and during low light conditions and must 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 must be standardised.

There will be an interface with future versions of the RST TSI when it deals with driving cabs and Subsection 4.2.2.1.2 of this TSI.

4.3.3.4.2. **On the rear end**

An interface between subsection 4.2.2.1.3 of this TSI and subsection 4.2.7.4 and annex BB of the CR RST (Freight Wagons) will exist, if the open point in annex S of the OPE TSI is concluded by specifying a rear signal that requires a bracket.

4.3.3.5. **Train audibility**

The Traffic Operation and Management subsystem determines that the basic requirements for train audibility with which the Rolling Stock subsystem must comply is that a train must be able to provide an audible warning of its presence.

The sounds emitted by this warning device, the frequency and intensity of these sounds and the method of activation by the driver must be standardised.

There will be an interface with future versions of the RST TSI when it deals with driving cabs and Subsection 4.2.2.2 of this TSI.

4.3.3.6. ***Signal sighting***

The driver must be able to observe signals, and signals must be observable by the driver. The same applies for line side signs if they are safety related.

Driving cabs must be designed in such a consistent way that the driver is able to easily see the information displayed to him from his usual driving position.

There will be an interface between subsection 4.3.2.4 of this TSI and a future version of the RST TSI when it deals with driving cabs.

4.3.3.7. ***Driver vigilance***

A means of monitoring the reactions of the driver, intervening to bring the train to a stand if the driver does not react within a time to be specified and where the infrastructure supports the facility, automatically reporting this to the controlling signalling centre.

There will be an interface with future versions of the RST TSI when it deals with driving cabs.

4.3.3.8. ***Train composition and annex B***

There is an interface between subsection 4.2.2.5 of this TSI and subsection 4.2.2.1.2.2 (draw gear) of the CR RST (Freight Wagons) TSI in respect to the maximum permissible weight of the train. There might be a future interface between annex B of this TSI and subsection 4.2.2.1.2.1 (buffers) of the CR RST (Freight Wagons) TSI in respect to shunting speed.

4.3.3.9. ***Freight Vehicle loading***

There is an interface between subsection 4.2.2.4 of this TSI and subsection 4.2.2.3.5 (securing of freight) and annex YY of the CR RST (Freight Wagons) TSI.

4.3.3.10. ***Ensuring that the train is in running order and Dangerous goods***

There is an interface between subsections 4.2.2.7 and 4.2.3.4.3 of this TSI and subsection 4.2.2.6 (Dangerous goods) of the CR RST (Freight Wagons) TSI.

4.3.3.11. ***Train composition, annexes H and L***

There is an interface between subsection 4.2.2.5 and Annexes H and L of this TSI and subsection 4.2.3.5. (Longitudinal compressive forces) of the CR RST (Freight Wagons) TSI in respect to driving trains, train handling and distribution of vehicles in the train.

There will be an interface with future versions of the RST TSI when it deals with traction units and passenger vehicles.

4.3.3.12. ***Contingency arrangements and Managing an emergency situation***

There is an interface between subsection 4.2.3.6.3 of this TSI and subsection 4.2.6.1.2 (functional and technical specifications in respect to environmental conditions) of the CR RST (Freight Wagons) TSI, in respect to extreme climatic conditions.

There is also an interface between subsections 4.2.3.6 and 4.2.3.7 of this TSI and subsection 4.2.7.1 (Emergency measures) and 4.2.7.2 (Fire safety) of the CR RST (Freight Wagons) TSI.

There will be an interface with future versions of the RST TSI when it deals with traction units and passenger vehicles.

4.3.3.13. ***Data recording***

There will be an interface between subsection 4.2.3.5.2 (Recording of supervision data on-board the train) of this CR OPE TSI and future versions of the CR RST TSI when it deals with traction units and coaches with driving cabs.

There is an interface between subsection 4.2.3.5.1 (Recording of supervision data outside the train) of this CR OPE TSI and subsection 4.2.3.3.2 (Hot axle box detection) of the CR Freight Wagons RST TSI. There will be also an interface between the same subsection of this CR OPE TSI and future versions of the CR RST TSI when it deals with traction units and coaches about axle box detection by track-side equipment.

4.3.4. INTERFACES WITH THE TSI TELEMATIC APPLICATIONS

4.3.4.1. *Identification of trains*

A means of providing an unambiguous identification for all trains operating on the TEN remains to be specified (see subsection 4.2.3.2 and Annex R). There is an interface in this aspect with the Telematics Applications for freight TSI in Subsection 4.2.2. There will also be an interface with the Telematics Applications for passengers TSI when it is created.

4.3.4.2. *Train composition*

Subsections 4.2.2.5 and 4.2.2.7.2 of this TSI have an interface in respect to train formation data with Subsection 4.2.3.2 of the Telematics Applications for freight TSI. There will also be an interface with the Telematics Applications for passengers TSI when it is created.

4.3.4.3. *Train departure*

Subsection 4.2.3.3 of this TSI has an interface in respect to train departure information with Subsection 4.2.3 of the Telematics Applications for freight TSI. There will also be an interface with the Telematics Applications for passengers TSI when it is created.

4.3.4.4. *Train running*

Subsection 4.2.3.4 of this TSI has an interface in respect to train running data with Subsections 4.2.4, 4.2.5 and 4.2.6 of the Telematics Applications for freight TSI. There will also be an interface with the Telematics Applications for passengers TSI when it is created.

4.3.4.5. *Vehicle identification*

An interface exists between Subsection 4.2.2.3 of this OPE TSI and Subsection 4.2.11.3 'The Rolling Stock Reference Databases' and annex A index 1 ('Data definitions and messages' § 1.18 'Native element: WagonIdent') of the Telematics Applications for freight TSI. There will also be an interface with the Telematics Applications for passengers TSI when it is created.

4.4. OPERATING RULES

The rules and procedures enabling coherent operation of new and different structural subsystems intended to be used in the TEN, and in particular those that are linked directly to the operation of a new train control and signalling system, must be identical where identical situations exist.

To this end, the operating rules for the European Rail Traffic Management System (ERTMS/ETCS) are specified in Annex A1. Those for the ERTMS/GSM-R radio system will be specified in Annex A2.

Other operating rules, which are able to be standardised across the TEN, will be specified in Annex B.

As these rules are designed to be applied across the entire TEN, it is important that there is complete consistency. The only organisation able to make modifications to these rules shall be the entity responsible for the upkeep of Annexes A, B and C to this TSI.

4.5. MAINTENANCE RULES

Not applicable

4.6. PROFESSIONAL QUALIFICATIONS

In accordance with Subsection 2.2.1 of this TSI, this section deals with professional and linguistic competency and the assessment process required for staff to attain this competency.

4.6.1. PROFESSIONAL COMPETENCY

Staff (including contractors) of the Railway Undertaking and the Infrastructure Manager must have attained appropriate professional competency to undertake all necessary safety-related duties in normal, degraded and emergency situations.

Such competency comprises professional knowledge and the ability to put this knowledge into practice.

Minimum elements relevant to professional qualification for individual tasks can be found in annexes H, J and L.

4.6.1.1. **Professional knowledge**

Taking these annexes into account and dependant on the duties of the individual staff member concerned, the knowledge required will comprise the following:

- general railway operation with particular emphasis on safety-critical activity:
 - principles of operation of their organisation's safety management system;
 - the roles and responsibilities of the key players involved in interoperable operations;
 - appreciation of hazards, especially in relation to the risks involving railway operation and electric traction supply
- appropriate knowledge of safety-related tasks in respect to procedures and interfaces for:
 - lines and lineside equipment;
 - rolling stock;
 - the environment.

4.6.1.2. **Ability to put this knowledge into practice**

The ability to apply this knowledge in routine, degraded and emergency situations will require staff to be fully acquainted with:

- the method and principles for applying these rules and procedures
- the process for the use of lineside equipment and rolling stock, as well as any specific safety-related equipment
- the principles of the safety management system to avoid the introduction of any undue risk to people and process

as well as a general ability to adapt to the different circumstances an individual may encounter.

In conformity with Annex III clause 2 of Directive 2004/49/EC, Railway Undertakings and Infrastructure Managers are required to establish a competence management system to ensure that the individual competency of their staff involved is assessed and maintained. Additionally, training must be provided, as necessary, to ensure that knowledge and skills are kept current, especially in relation to weaknesses or deficiencies in system or individual performance.

4.6.2. LINGUISTIC COMPETENCY

4.6.2.1. **Principles**

The Infrastructure Manager and the Railway Undertaking are required to ensure that their relevant personnel are competent in the use of the communication protocols and principles set out in this TSI.

Where the 'operating' language used by the Infrastructure Manager differs from that habitually used by the Railway Undertaking's personnel, such linguistic and communications training must form a critical part of the Railway Undertaking's overall competency 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 routine, degraded or emergency situations, must 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 language must be sufficient for safety purposes:

- As a minimum this must comprise of the driver being able to:
 - send and understand all the messages specified in annex C to the present TSI;

- effectively communicate in routine, degraded and emergency situations;
- complete the forms associated with the use of the Book of Forms
- Other members of the train crew whose duties require them to communicate with the Infrastructure Manager on safety critical matters, must as a minimum, be able to send and understand information describing the train and its operational status.

Guidance on the appropriate levels of competency is defined in Annex E. The level of knowledge for drivers shall be at least level 3. The level of knowledge for staff accompanying trains shall be at least level 2.

4.6.3. INITIAL AND ONGOING ASSESSMENT OF STAFF

4.6.3.1. **Basic elements**

In conformity with Annex III clause 2 of Directive 2004/49/EC, Railway Undertakings and Infrastructure Managers are required to define the assessment process for their staff.

It is recommended that account be taken of each of the following:

A Selection of personnel

- evaluation of individual experience and competence
- evaluation of individual competence in the use of any required foreign language(s) or the aptitude to learn them

B Initial professional training

- analysis of training needs;
- training resources
- training of the trainers

C Initial assessment

- basic conditions (minimum age for drivers,...);
- assessment programme, including practical demonstration;
- qualification of the trainers.
- deliver a certificate of competency.

D Competency retention

- principles for retention of competency
 - in particular, for those staff undertaking the task of driving a train, re-assessment of competence shall be undertaken at least on an annual basis
- methods to be followed
- formalisation of the competency retention process.
- assessment process.

E Refresher training

- principles for ongoing training (including language)

4.6.3.2. **Analysis of training needs**

4.6.3.2.1. **Development of the analysis of training needs**

The Railway Undertaking and the Infrastructure Manager must undertake an analysis of training needs for their relevant staff.

This analysis must set out both scope and complexity and take into account the risks associated with the operation of trains on the TEN, especially in relation to human capabilities and limitations (human factors) which may come about as a result of:

- differences in operating practices between Infrastructure Managers and the risks associated with changing between these;
- the differences between tasks, operating procedures and communication protocols;
- any difference in the 'operating' language used by the Infrastructure Manager's personnel;
- local operating instructions which may include special procedures or particular equipment to be applied in certain cases, for example a specific tunnel.

Guidance on the elements that should be considered can be found in the annexes referred to in Subsection 4.6.1 above. As appropriate, elements of the training for staff must be put in places which take these into account.

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 these annexes will not be appropriate. The analysis of training needs must document those not deemed appropriate and the reasons why.

4.6.3.2.2. **Updating the analysis of training needs**

The Railway Undertaking and the Infrastructure Manager must define a process for reviewing and updating their individual training needs, taking into account issues such as previous audits, system feedback and known changes to rules and procedures, infrastructure and technology.

4.6.3.2.3. **Specific elements for traincrew and auxiliary staff**

4.6.3.2.3.1. *Route knowledge*

The Railway Undertaking must define the process by which knowledge of train crew of the routes worked over is acquired and maintained. This process must be:

- based upon the route information provided by the Infrastructure Manager and
- in accordance with the process described in Subsection 4.2.1 of this TSI.

Drivers must learn these routes through both theoretical and practical elements.

4.6.3.2.3.2. *Knowledge of rolling stock*

The Railway Undertaking must define the process for the acquisition and retention of traction and rolling stock knowledge by its train crew.

4.6.3.2.3.3. *Auxiliary staff*

The Railway Undertaking shall make sure that the auxiliary staff (e.g. catering and cleaning) not forming part of the 'traincrew' is, in addition to their basic instruction, trained to respond to the instructions of the fully trained members of the 'traincrew'

4.7. **HEALTH AND SAFETY CONDITIONS**

4.7.1. **INTRODUCTION**

Staff specified in Subsection 4.2.1 as staff performing safety critical tasks in accordance with Subsection 2.2 of this TSI must have appropriate fitness to ensure that overall operational and safety standards are met.

In conformity with Directive 2004/49/EC, Railway Undertakings and Infrastructure Managers must 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 Subsection 4.7.4 and any associated decisions on the individual fitness of staff must be conducted by a recognised occupational doctor.

Staff must not perform safety critical work whilst vigilance is impaired by substances such as alcohol, drugs or psychotropic medication. Therefore, the Railway Undertaking and the Infrastructure Manager must 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 rules of the Member State where a train service is operated apply with regard to defined limits of the above mentioned substances.

4.7.2. CRITERIA FOR APPROVAL OF OCCUPATIONAL DOCTORS AND MEDICAL ORGANISATIONS ⁽¹⁾

Railway Undertakings and Infrastructure Managers must select occupational doctors and organisations involved in medical examinations in accordance with the national rules and practices of the country in which the Railway Undertaking or Infrastructure Manager is licensed or registered.

Occupational doctors performing medical examinations as specified in Subsection 4.7.4 must have the following:

- Expertise in occupational medicine
- Knowledge of the hazards of the work concerned and of the railway environment;
- An understanding of how measures intended to eliminate or reduce the risks from those hazards could be affected by lack of medical fitness.

The occupational doctor complying with these criteria may seek external medical or paramedical assistance to support his or her medical consultation and assessment, e. g. ophthalmologists.

4.7.3. CRITERIA FOR APPROVAL OF PSYCHOLOGISTS INVOLVED IN PSYCHOLOGICAL ASSESSMENT AND PSYCHOLOGICAL ASSESSMENT REQUIREMENTS

4.7.3.1. *Certification of psychologists*

The psychologist must have the relevant university qualification and be certified and recognised as competent according to national rules and practices of the country in which the Railway Undertaking or Infrastructure Manager is licensed or registered.

4.7.3.2. *Content and interpretation of psychological assessment*

The content and the procedure for interpretation of the psychological assessment must be determined by a person certified according to section 4.7.3.1, taking account of the railway work and environment.

4.7.3.3. *Selection of assessment tools*

The assessment must only include assessment tools that are based on psychological-scientific principles.

4.7.4. MEDICAL EXAMINATIONS AND PSYCHOLOGICAL ASSESSMENTS

4.7.4.1. *Before appointment:*

4.7.4.1.1. **Minimum content of the medical examination**

Medical examinations must 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 drugs of abuse.

4.7.4.1.2. **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 psychologist must, as a minimum, take the following criteria into account relevant to the requirements of each safety function:

- Cognitive:
 - Attention and concentration

⁽¹⁾ Section 4.7.2 is a recommendation

- Memory
- Perceptive capability
- Reasoning
- Communication
- Psychomotor:
 - Speed of reaction
 - Gestured co-ordination
- Behavioural and personality
 - Emotional self control
 - Behavioural reliability
 - Autonomy
 - Conscientiousness

If the psychologist omits any of the above, the respective decision must be justified and documented.

4.7.4.2. *After appointment*

4.7.4.2.1. **Periodicity of periodic medical examinations**

At least one systematic medical examination must 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 periodicity of examination must be set by the occupational doctor if the state of health of the member of the staff requires so.

4.7.4.2.2. **Minimum 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 must include as a minimum:

- 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 drugs of abuse where clinically indicated.

4.7.4.2.3. **Additional medical examinations and/or psychological assessments**

Besides the periodic medical examination, an additional specific medical examination and/or psychological assessment must 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 of abuse or abuse or inappropriate use of alcohol. This would be the case especially after an incident or accident caused by human error on the part of the individual.

The employer must request a medical examination after any sickness absence exceeding 30 days. In suitable cases such an examination can be limited to an assessment by the occupational doctor based on available medical information indicating that the employee's fitness for work has not been affected.

The Railway Undertaking and the Infrastructure Manager must put systems in place to ensure that such additional examinations and assessments are undertaken as appropriate.

4.7.5. MEDICAL REQUIREMENTS

4.7.5.1. *General requirements*

Staff must 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 co-ordination;
- Significant limitation of mobility.

The following vision and hearing requirements must be met:

4.7.5.2. *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 recognised occupational doctor (as defined in Subsection 4.7.2) 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: present
- Binocular vision: present
- Contrast sensitivity: good
- Absence of progressive eye disease
- Lens implants, keratomies and keratectomies are allowed only on condition that they are checked on a yearly basis or according to a periodicity set by the occupational doctor.

4.7.5.3. *Hearing requirements*

Sufficient hearing confirmed with tone audiogram, that is:

- Hearing good enough to keep a phone conversation going and be able to hear alert tones and radio messages.
- The following values given for information should be taken as guidelines:
- The hearing deficiency must not be higher than 40 dB at 500 and 1 000 Hz;
- The hearing deficiency must not be higher than 45 dB at 2 000 Hz for the ear with the worst air conduction of sound.

4.7.5.4. Pregnancy

Pregnancy must be considered a temporary cause for exclusion as regards drivers in the event of poor tolerance or pathological condition. The employer must ensure that the legal provisions protecting pregnant workers are applied.

4.7.6. SPECIFIC REQUIREMENTS REGARDING THE TASK OF DRIVING A TRAIN**4.7.6.1. Periodicity of periodic medical examinations**

In respect to staff undertaking the task of driving a train, Subsection 4.7.4.2.1 of this TSI is modified as follows:

At least one systematic medical examination must be performed:

- Every 3 years for staff aged up to 60;
- Every year for staff aged over 60.

4.7.6.2. Additional content of medical examination

Regarding the task of train driving the medical examination before appointment as well as each periodic medical examination concerning staff aged 40 and older must additionally involve monitoring by ECG at rest.

4.7.6.3. Additional vision requirements

- Aided or unaided distance visual acuity 1,0 (binocularly); at least 0,5 for the worse eye.
- Coloured contact lenses and photochromatic lenses are not allowed. UV filter lenses are allowed.

4.7.6.4. Additional hearing and speaking requirements

- No anomaly of the vestibular system.
- No chronic speech disorder (given the necessity to exchange messages loudly and clearly).
- Hearing requirements as set out in Subsection 4.7.5.3 must be achieved without the use of hearing aids. Subject to medical opinion, the use of hearing aids is allowed in special cases.

4.7.6.5. Anthropometrics

The anthropometric measures of staff must be suitable for the safe use of the rolling stock. Drivers must not be required or allowed to operate particular types of rolling stock if their height, weight or other physical characteristics would make this unsafe.

4.7.6.6. Trauma Counselling

Staff who, while performing the task of driving a train, are affected by traumatising accidents causing death or serious injuries of persons, shall be subject to appropriate care by the employer.

4.8. INFRASTRUCTURE AND ROLLING STOCK REGISTERS

In accordance with Article 24(1) of Directive 2001/16/EC, 'the Member States shall ensure that registers of infrastructure and of rolling stock are published and updated annually. Those registers shall indicate the main feature of each subsystem or part subsystem involved and their correlation with the features laid down by the applicable TSIs. To that end, each TSI shall indicate precisely which information must be included in the registers of infrastructure and of rolling stock.'

Due to the annual update and publication of these registers they are not suitable for the particular requirements of the 'Traffic Operations and Management' subsystem. Therefore this TSI specifies nothing in respect of these registers.

However, there is an operational requirement for certain infrastructure related data items to be made available to a Railway Undertaking and conversely for certain rolling stock related items to be made available to an Infrastructure Manager. In both cases the data concerned must be complete and accurate.

4.8.1. INFRASTRUCTURE

The requirements for the conventional rail infrastructure related data items with regard to the Traffic Operation and Management subsystem, and which must be made available to railway undertakings, are specified in Annex D. The Infrastructure Manager is responsible for the correctness of the data.

4.8.2. ROLLING STOCK

The following rolling stock related data items must be available to infrastructure managers. The keeper (vehicle owner) is responsible for the correctness of the data:

- whether the vehicle is constructed from materials which can be hazardous in case of accidents or fire (e.g. asbestos)
- length over buffers

5. INTEROPERABILITY CONSTITUENTS

5.1. DEFINITION

According to Article 2(d) of Directive 2001/16/EC:

Interoperability constituents are 'any elementary component, group of components, subassembly or complete assembly of equipment incorporated or intended to be incorporated into a subsystem upon which the interoperability of the trans-European conventional rail system depends directly or indirectly. The concept of a constituent covers both tangible objects and intangible objects such as software'.

An interoperability constituent is:

- a product which can be placed on the market before integration and use in the subsystem; in this respect, it must be possible to verify its conformity independently of the subsystem into which it will be incorporated,
- or an intangible object such as software or a process, organisation, procedure, etc. which has a function in the subsystem and the conformity of which must be verified to ensure that the essential requirements are met.

5.2. LIST OF CONSTITUENTS

The interoperability constituents are covered by the relevant provisions of Directive 2001/16/EC. In respect to the Traffic Operation and Management Subsystem, there are, at present, no interoperability constituents.

5.3. CONSTITUENTS' PERFORMANCES AND SPECIFICATIONS

Once a solution for indicating the rear end of the train has been established, it is possible that this will become an interoperability constituent. It might then be the case that an additional annex will be required to define the luminosity, retro-reflectivity and attachment arrangements. There may also be some additional interfaces with the RST TSIs in a future version.

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

6.1. INTEROPERABILITY CONSTITUENTS

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

If however interoperability constituents are subsequently defined and therefore able to be assessed by a Notified Body, the relevant assessment procedure(s) may then be added to a revised version.

6.2. TRAFFIC OPERATION AND MANAGEMENT SUBSYSTEM

6.2.1. PRINCIPLES

The Traffic Operation and Management subsystem is a structural subsystem according to annex II to Directive 2001/16/EC.

However, the individual elements are closely aligned with the operational procedures and processes required from an Infrastructure Manager or Railway Undertaking for the granting of a safety authorisation/certificate under the terms of the

Directive 2004/49/EC. The Railway Undertakings and Infrastructure Managers shall demonstrate compliance with the requirements of this TSI. They can do this by using the Safety Management System as described in Directive 2004/49/EC. It should be noted that at present none of the elements contained within this TSI require separate assessment by a Notified Body.

The relevant Competent Authority shall carry out an assessment of any new or amended operational procedures and processes, prior to implementation, before granting a new or revised safety authorisation/certificate. This assessment shall be a part of the process for granting the safety certificate/authorisation. Where the scope of this SMS will impact on another Member State(s), co-ordination with that Member State in respect to assessment should be ensured.

Subject to satisfactory completion of the assessment process described below, the Competent Authority shall authorise the Infrastructure Manager or Railway Undertaking to implement the relevant elements of its Traffic Operation and Management System in conjunction with the granting of the Safety Authorisation or Safety Certificate required by Articles 10 and 11 of Directive 2004/49/EC.

Wherever an Infrastructure Manager or Railway Undertaking introduces new/upgraded/renewed operational process(es) (or materially changes existing ones) covered by the requirements of this TSI, then they shall draw up a commitment indicating that such process(es) is(are) in compliance with the Traffic Operation and Management TSI (or a part of it in the transitional period — see Chapter 7).

6.2.2. RULES AND PROCEDURES DOCUMENTATION

In respect to the assessment of the documentation described in Subsection 4.2.1 of this TSI, assurance that the process for preparing the documentation provided by both Infrastructure Manager and Railway Undertaking is sufficient in terms of completeness and accuracy, is the responsibility of the Competent Authority .

6.2.3. ASSESSMENT PROCEDURE

6.2.3.1. *Decision by the Competent Authority*

In conjunction with Annex G, the Infrastructure Manager and the Railway Undertaking shall submit a description of any proposed new or amended operational process(es).

In respect to those items shown as being under Part A of the Safety Certificate/Authorisation as defined by Directive 2004/49/EC, these shall be presented to the Competent Authority of the Member State in which the company is established.

In respect to items shown as being under Part B of the Safety Certificate/Authorisation as defined by Directive 2004/49/EC, these shall be presented to the Competent Authority of each Member State concerned.

This shall be provided in sufficient detail to allow the Competent Authority(ies) to make a judgement as to whether a formal assessment will be required.

6.2.3.2. *If an assessment is required*

Where the Competent Authority(ies) decides that such an assessment is required, then this shall be carried out as part of the assessment leading to granting/renewal of the safety certificate/authorisation in conformity with Directive 2004/49/EC.

The assessment procedures shall be in compliance with the Common Safety Method to be established for assessment and certification/authorisation of Safety Management Systems required by Articles 10 and 11 of Directive 2004/49/EC.

Some guidelines as to how this assessment could be conducted are contained in Annex F.

6.2.4. SYSTEM PERFORMANCE

Article 14 paragraph 2 of Directive 2001/16/EC requires Member States to check at regular intervals that interoperability subsystems are being operated and maintained in accordance with the essential requirements. In respect to the Traffic Operation and Management subsystem, such checks will be conducted in conformity with Directive 2004/49/EC.

7. IMPLEMENTATION

7.1. PRINCIPLES

Implementation of this TSI and conformity with the relevant sections of this TSI must be determined in accordance with an implementation plan that shall be drawn up by each Member State for the lines for which they are responsible.

This plan must take into account:

- the specific human factors issues associated with operating any given line;
- the individual operating and safety elements of each line involved; and
- whether implementation of the element(s) under consideration is to be:
 - for all trains on the line, or not,
 - only for certain lines,
 - applicable on all TEN lines,
 - applicable to all trains running on TEN lines
- the relationship with implementation with the other subsystems (CCS, RST, TAF, ...);

At this time any specific exceptions that may be applicable should be taken into account and documented as part of the plan.

The implementation plan must take into account the various levels of potential for implementation from whenever:

- a Railway Undertaking or Infrastructure Manager commences operations, or
- a renewal or upgrade to the existing operational systems of a Railway Undertaking or Infrastructure Manager is introduced, or
- new or upgraded infrastructure, energy, rolling stock or command control & signalling subsystems, requiring a corresponding set of operating procedures, are put into service.

Where upgrades to existing operational systems affect both Infrastructure Manager(s) and Railway Undertaking(s), the Member State is responsible for ensuring that such projects are assessed and placed into service coincidentally.

It is commonly understood that the full implementation of all elements of this TSI cannot be complete until the hardware (infrastructure, control and command, etc.) that is to be operated has been harmonised. The guidelines set out in this chapter must therefore only be seen as an interim phase supporting migration to the target system.

In conformity with Articles 10 and 11 of Directive 2004/49/EC, the certification/authorisation is required to be renewed every 5 years. Once this TSI has been put into force and as part of the review process leading to this certification/authorisation renewal, the Railway Undertaking and the Infrastructure Manager must be able to demonstrate that they have taken the contents of this TSI into account and provide justification for any elements of it with which they do not yet comply.

Whilst full compliance with the target system described in this TSI is clearly the ultimate position, migration may be done in stages through the development of national or international, bilateral or multilateral agreements. Such agreements, which may be drawn up by and between a combination of IM — IM, IM — RU, RU — RU, shall always involve input from the Safety Authorities concerned.

Where existing agreements contain requirements related to traffic operation and management, then Member States shall notify the Commission, within 6 months after the entry into force of this TSI, of the following agreements:

- (a). national, bilateral or multilateral agreements between Member States and Railway Undertaking(s) or Infrastructure Manager(s), agreed on either a permanent or a temporary basis and required due to the very specific or local nature of the intended train service;
- (b). bilateral or multilateral agreements between Railway Undertaking(s), Infrastructure Manager(s) or Member State(s) which deliver significant levels of local or regional interoperability;
- (c). international agreements between one or more Member State(s) and at least one third country, or between Railway Undertaking(s) or Infrastructure Manager(s) of Member States and at least one Railway Undertaking or Infrastructure Manager of a third country, which deliver significant levels of local or regional interoperability.

The compatibility of these agreements with EU legislation, including their non-discriminatory character and, in particular, this TSI, will be assessed and the Commission will take the necessary measures such as the revision of this TSI to include possible specific cases or transitional measures.

The RIV, RIC and PPW Agreements and COTIF instruments shall not be notified, because they are known.

Renewal of such agreements shall be possible, but only in the interests of continued through working arrangements and only when no other alternatives exist. Any modification of existing agreements or any future agreement shall take into account EU legislation and, in particular, this TSI. Member States shall notify the Commission of such modifications or new agreements. The same procedure as shown above shall then apply.

7.2. IMPLEMENTATION GUIDELINES

The table shown in Annex N, which is informative and not mandatory, has been prepared as a guide to what the Member State could identify as the trigger for implementation of each of the elements in Chapter 4.

There are three distinct elements to implementation:

- Confirmation that any existing systems and processes comply with the requirements of this TSI
- Adaptation of any existing systems and processes to comply with the requirements of this TSI
- New systems and processes arising from implementation of other sub-systems
 - New/upgraded conventional lines (INS/ENE)
 - New or upgraded ETCS signalling installations, GSM-R radio installations, Hot Axle Box Detectors, ... (CCS)
 - New rolling stock (RST)
 - Telematics applications for traffic management (TAF)

7.3. SPECIFIC CASES

7.3.1. INTRODUCTION

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

These specific cases belong to two categories:

- the provisions apply either permanently (case ‘P’), or temporarily (case ‘T’).
- In temporary cases, it is recommended that the Member States concerned should conform with the relevant subsystem either by 2010 (case ‘T1’), an objective set out in Decision No 1692/96/EC of the European Parliament and of the Council of 23 July 1996 on Community guidelines for the development of the trans-European transport network, or by 2020 (case ‘T2’).

7.3.2. LIST OF SPECIFIC CASES

Temporary Specific Case (T2) Ireland

For the implementation of Annex P of this TSI in the Republic of Ireland, vehicles which are used solely in domestic traffic may be exempted from carrying the standard 12-digit number. This may apply also for cross-border traffic between Northern Ireland and the Republic of Ireland.

Temporary Specific Case (T2) UK

For the implementation of Annex P of this TSI in the United Kingdom, passenger coaches and locomotives which are used solely in domestic traffic may be exempted from carrying the standard 12-digit number. This may apply also for cross-border traffic between Northern Ireland and the Republic of Ireland.

ANNEX A1:

ERTMS/ETCS OPERATING RULES

This Annex contains the draft rules for ERTMS/ETCS. These are included here to provide a broad outline to the structure and scope of these rules. In particular, the rules concerning ETCS level 2 shall be consolidated after field tests. The completed set of rules will have also to be adapted to the updated baseline of the FRS and SRS contained in the CR CCS TSI and intended to be introduced by the end of 2005.

1. INTRODUCTION

This document is a compilation of ERTMS rules for the operation of lines equipped with level 1, or level 2 lines without any underlying system.

2. GLOSSARY

Reserved

3. DOCUMENTS

3.1. WRITTEN ORDERS AND TEXT MESSAGES

The different written orders to be used according to the rules are the following.

The information contained in these written orders is mandatory, the presentation is informative.

3.1.1. ERTMS WRITTEN ORDER 01

ERTMS Written Order 01		
PERMISSION TO START IN SR / TO OVERPASS AN EOA		

Signal box	Date/...../.....	Time :
------------------	------------------------	--------------------

Driver of Train N° at on track (km/board/signal)		
1	☐	is allowed to start in SR after awakening
2	☐	is allowed to overpass (board/signal)
3	☐	run with maximum speed of km/h from to (km/board/signal) (km/board/signal)
		and km/h from to (km/board/signal) (km/board/signal)
		and km/h from to (km/board/signal) (km/board/signal)
4	☐	additional instructions

Authorisation N°

Fill in the blanks in highlighted lines. Cross out non-valid text in brackets (example: km/~~board~~/signal). Only lines with boxes you crossed are valid (☒).

3.1.2. ERTMS WRITTEN ORDER 02

ERTMS Written Order 02
PERMISSION TO PROCEED AFTER TRAIN TRIP

Signal box	Date/...../.....	Time :
-------------------------	-------------------------------	---------------------------

Driver of Train N° at on track (km/board/signal)	
1	<input style="width: 30px; height: 20px; border: 1px solid black;" type="checkbox"/> is allowed to start in SR, if no MA received,
2	<input style="width: 30px; height: 20px; border: 1px solid black;" type="checkbox"/> run with maximum speed of km/h from to (km/board/signal) (km/board/signal) and km/h from to (km/board/signal) (km/board/signal) and km/h from to (km/board/signal) (km/board/signal)
3	<input style="width: 30px; height: 20px; border: 1px solid black;" type="checkbox"/> examine the line, for the following reason :
4	<input style="width: 30px; height: 20px; border: 1px solid black;" type="checkbox"/> report findings to
5	<input style="width: 30px; height: 20px; border: 1px solid black;" type="checkbox"/> additional instructions

Authorisation N°

Fill in the blanks in highlighted lines. Cross out non-valid text in brackets (example: km/~~board/signal~~). Only lines with boxes you crossed are valid (☒).

3.1.3. ERTMS WRITTEN ORDER 03

ERTMS Written Order 03
OBLIGATION TO REMAIN AT STANDSTILL

Signal box	Date/...../.....	Time :
-------------------------	-------------------------------	---------------------------

Driver of Train N° at on track (km/board/signal)	
1	☐ remain at standstill at (km/board/signal)
2	☐ additional instructions

Authorisation N°

Fill in the blanks in highlighted lines. Cross out non-valid text in brackets (example: km/~~board/signal~~).
Only lines with boxes you crossed are valid (☒).

3.1.4. ERTMS WRITTEN ORDER 04

ERTMS Written Order **04****PERMISSION TO RESTART
AFTER AN ORDER TO REMAIN AT STANDSTILL**

Signal box

Date/...../.....

Time :

Driver of Train N° at on track
(km/board/signal)1 ☐ is authorised to restart2 ☐ additional instructions
.....**Authorisation N°**

Fill in the blanks in highlighted lines. Cross out non-valid text in brackets (example: km/~~board/signal~~).
Only lines with boxes you crossed are valid (☒).

3.1.5 ERTMS WRITTEN ORDER 05

ERTMS Written Order **05****OBLIGATION TO RUN UNDER RESTRICTIONS**

Signal box

Date/...../.....

Time :

Driver of Train N° at on track
(km/board/signal)

1 ☐ run on sight from to
(km/board/signal) (km/board/signal)

2 ☐ run with maximum speed of km/h from to
(km/board/signal) (km/board/signal)

and km/h from to
(km/board/signal) (km/board/signal)

and km/h from to
(km/board/signal) (km/board/signal)

3 ☐ examine the line, for the following reason :
.....

4 ☐ report findings to

5 ☐ additional instructions
.....

Authorisation N°

Fill in the blanks in highlighted lines. Cross out non-valid text in brackets (example: km/~~board/signal~~).
Only lines with boxes you crossed are valid (☒).

3.1.6. ERTMS WRITTEN ORDER 06

ERTMS Written Order 06
PERMISSION TO OVERRIDE ROUTE UNSUITABILITY

Signal box	Date/...../.....	Time :
-------------------------	-------------------------------	---------------------------

Driver of Train N° at on track (km/board/signal)	
1	☐ override route unsuitability
2	☐ additional instructions

Authorisation N°

Fill in the blanks in highlighted lines. Cross out non-valid text in brackets (example: km/~~board/signal~~).
Only lines with boxes you crossed are valid (☒).

3.1.7. ERTMS TEXT MESSAGES

Fixed message to be displayed	Flashing message	References
Ack UN	x	SRS: 4.6.3, 4.7.2, 5.4.3.7.3
Ack OS	x	SRS: 4.6.3, 4.7.2, 5.9.1.2, 5.9.2.3, 5.9.2.4, 5.9.3.2, 5.9.3.4, 5.9.3.5, 5.9.3.6
Ack SH	x	SRS: 4.4.8.1.9, 4.6.3, 5.7.1.4, 5.7.2.3, 5.7.2.4, 5.7.3.2, 5.7.3.3, 5.7.3.4, 5.7.3.5
Ack SR	x	SRS: 4.7.2
Ack RV	x	SRS: 5.13.1.4
Ack STM ...	x	SRS: 4.4.16, 4.4.17
Ack train trip	x	SRS: 3.14.1, 4.4.13.1.4, 4.4.14.1.1, 4.6.3, 4.7.2, 5.11.1.1
Ack transition to level.....	x	SRS: 4.7.2, 5.10.4.1, 5.10.4.3, 5.10.4.4
Communication session terminated		SRS: 3.5.5, 5.15.4
No radio connection with RBC		SRS: 3.5.3.7
Route unsuitable		SRS 3.12.2.4
SF because of x		SRS: 4.4.5
SH refused		SRS 5.6.3, 4.7.2
SH granted not received		SRS 5.6.4.1.1
Transition to level.....		SRS: 4.7.2, 5.10.4.1, 5.10.4.3, 5.10.4.4
Waiting for SH		SRS: 5.6.3, 4.7.2

Text message to be confirmed:

Fixed message to be displayed	Flashing message	References
Failure of LTM		SRS:
Failure of Euroradio		SRS:

3.2. SITUATIONS — RULES

Intentionally blank.

4. ERTMS TRAIN CATEGORIES

4.1. SCOPE AND PURPOSE

This document defines the ERTMS Train categories.

4.2. DEFINITION

The ERTMS category of train depends on the kind of rolling stock and on the environment characteristics. It is individuated by a 2 letters symbol.

The symbols are the following:

— BT for basic train,

- AT for active tilting train,
- PT for passive tilting train,
- CW for cross wind sensitive train.

An ERTMS train is defined:

- by one symbol only referring to the rolling stock,
- or by the combination of one of the symbols referring to the rolling stock with the symbol of environment characteristics.

5. **PREPARING A TRAIN AS A TANDEM MOVEMENT**

5.1. *SITUATIONS*

Intentionally blank.

5.2. *RULES*

Intentionally blank.

6. **AWAKENING ON AN AWAKENING TRACK**

6.1. *SITUATIONS*

The driver is about to start a mission and the traction unit is in SB.

6.2. *RULES*

When requested by the onboard system, the driver shall:

- enter, re-enter or re-validate the Driver ID and the train running number,
- select the corresponding ERTMS/ETCS level according to national rules.

6.2.1. **THE TRACTION UNIT HAS TO MOVE AS A TRAIN**

The driver shall:

- enter the train data (rule 'Entering data'),
- select 'Start'.

6.2.1.1. ***In level 0***

The system requests an acknowledgement for UN.

The following message is displayed on the DMI:

'Ack UN'.

The driver shall react according to the indication displayed on the DMI (rule 'Reacting in function of DMI/ signalling system instruction').

6.2.1.2. ***In level 1***

The system requests an acknowledgement for SR.

The following message is displayed on the DMI:

‘Ack SR’.

The driver shall react according to the indication displayed on the DMI (rule ‘Reacting in function of DMI/ signalling system instruction’).

6.2.1.3. **In level 2**

Intentionally blank.

6.2.1.4. **In level STM**

The system requests an acknowledgement for STM.

The following message is displayed on the DMI:

‘Ack STM...’.

The driver shall apply national rules.

6.2.2. THE TRACTION UNIT HAS TO MOVE IN SH

The driver shall prepare for shunting (rule ‘Performing shunting movements in SH’).

6.2.3. THE TRACTION UNIT HAS TO MOVE IN NL

The driver shall prepare for tandem movement (rule ‘Preparing a train as a tandem movement’).

7. **ENDING A TRAIN AS A TANDEM MOVEMENT**

7.1. *SITUATIONS*

Intentionally blank.

7.2. *RULES*

Intentionally blank.

8. **PERFORMING SHUNTING MOVEMENTS IN SH**

8.1. *SITUATIONS*

Rolling stock has to be moved in SH.

8.2. *RULES*

8.2.1. *MANUAL ENTRY INTO SH*

Before authorising the driver to select SH, the signalman shall:

- check that all conditions are fulfilled for shunting according to national rules,
- give the driver all necessary information about movements to be done.

The driver selects SH only when he has received the permission from the signalman.

The driver shall select SH only at standstill.

In Level 2, the message is displayed on the DMI:

‘Waiting for SH’.

8.2.1.1. ***Permission for shunting is granted.***

The onboard system switches to SH.

The driver shall react according to the indication displayed on the DMI (rule ‘Reacting in function of DMI/ signalling system instruction’) and apply national rules.

8.2.1.2. ***Permission for shunting is refused or no answer to shunting request is received in level 2***

When the message is displayed on the DMI:

‘SH refused’,

or

‘SH granted not received’,

or

‘Communication session terminated’,

the driver shall contact the signalman.

The driver and the signalman shall apply national rules.

8.2.2. **AUTOMATIC ENTRY INTO SH**

The driver shall acknowledge the message:

‘Ack SH’.

The driver shall react according to the indication displayed on the DMI (rule ‘Reacting in function of DMI/ signalling system instruction’) and apply national rules.

8.2.3. **EXIT FROM SH**

When the shunting movement is at standstill and all shunting movements performed in SH are finished, the driver shall exit SH and inform the signalman.

9. **ENTERING DATA**

9.1. **SITUATIONS**

Data entry is necessary to prepare a train for service:

- when awakening,
- after each case the data have to be modified; these modifications can result of, for example:
 - a modification of the train according to the organisation documents of transportation,
 - a failure affecting the rolling stock characteristics,
 - assistance given to a train.

9.2. **RULES**

Before the initial departure, the train preparer shall check the conformity of the train to its ERTMS category and the driver shall verify that train data is available.

Before the initial departure the driver shall check the availability of the train data and take knowledge of the data. The same applies when changing the driver.

9.2.1. ENTERING DATA

A. General case

To perform the mission the train preparer shall enter and/or confirm the following sets of data:

- train data,
- additional data.

Train data refer to rolling stock characteristics and include:

- train running number,
- maximum train speed,
- ERTMS train category,
- train length,
- deceleration data,
- power supply,
- loading gauge,
- axle load,
- train fitted with airtight system,
- list of STM available.

Additional data refer to other parameters that may be needed to perform the mission and include:

- Driver ID,
- ERTMS/ETCS Level,
- RBC identification/telephone number,
- adhesion factor,
- and, if required by the journey, the STM to be activated including additional STM data.

B. Case of tandem movement

(to be completed)

9.2.1.1. Trainset

In case of a trainset, before confirming default data, the train preparer shall ascertain that technical conditions of rolling stock allow the use of already stored data.

For a trainset, the train preparer has to check the status of the equipment of rolling stock that can have an impact on train data:

- after the preparation of the train in the departure station,
- after each case the composition of the train is modified (in a station or elsewhere),
- after a technical problem that leads to modify the data.

If there are no specific restrictions, the train preparer shall validate each data displayed on the DMI.

If there are specific restrictions, the train preparer shall:

- determine the new data according to a technical document,
- correct this data,
- validate the new data.

9.2.1.2. Other trains

To enter train data, the train preparer shall use the train data form.

9.2.2. CHANGES OF DATA

If a change in the data is required during the journey, the driver shall take into account the new data.

If the adhesion factor has to be changed national rules apply.

9.2.2.1. Trainset

The driver shall:

- determine the new data according to a technical document,
- check the conformity of the train to its ERTMS category,
- correct this data,
- validate the new data.

He shall do the same for each data to be changed if necessary.

9.2.2.2. Other trains

The train preparer shall modify the train data form or shall produce a new one each time the characteristics of the train are modified. If there is no train preparer the driver shall update the train data form.

To enter new train data, the driver shall:

- use the new train data form,
- correct the data,
- validate the new data.

10. DEPARTURE OF THE TRAIN

10.1. SITUATIONS

The train is about to start at the initial station or after a scheduled stop.

10.2. RULES

The driver is allowed to depart after:

- he has received an authorisation for train movement,
- train service conditions are fulfilled according to national rules.

The driver shall react according to the indication displayed on the DMI (rule 'Reacting in function of DMI/ signalling system instruction').

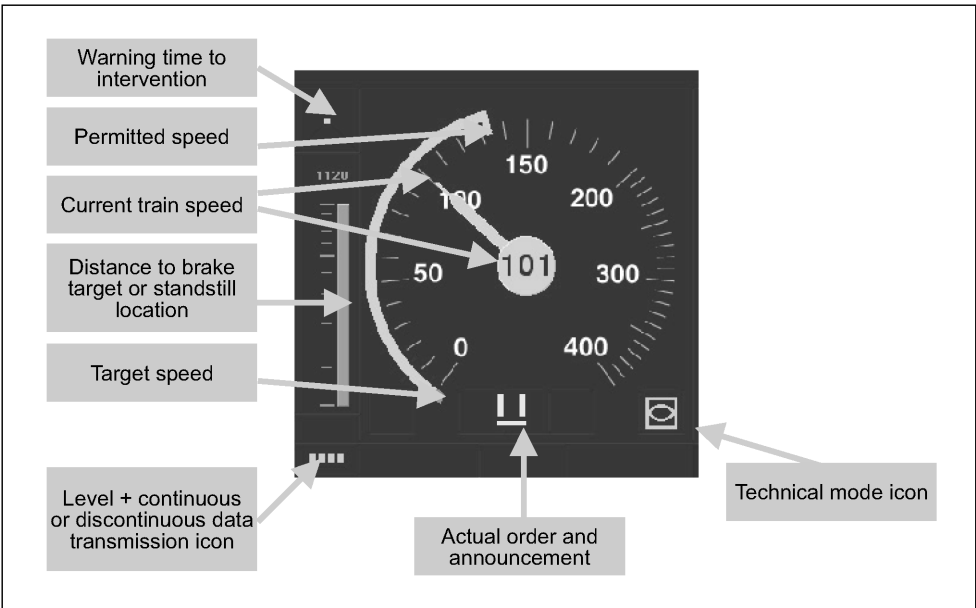
The driver shall inform the signalman if at the departure time the train has not received an authorisation for train movement.

11. REACTING IN FUNCTION OF DMI/SIGNALLING SYSTEM INSTRUCTION

11.1. PRESENTATION OF THE DMI

The different situations are presented in each paragraph of section 2, depending on DMI information.

11.1.1. VISUAL INDICATIONS



(This is an example of the visual indications).

11.1.2. AUDIBLE INDICATIONS

Audible information is considered as complementary information.

The audible information is given to draw the attention of the driver to new information visually presented on the DMI.

Elementary sounds:

Short low	o
Long high	#

11.2. RULES

11.2.1. PRECEDENCE OF DMI INDICATIONS/WRITTEN ORDERS

The driver shall obey the indications provided on the DMI. These indications take precedence over all relevant trackside indications except any indications of danger as specified in national rules.

Written orders take precedence over all indications provided by the DMI except when a lower permitted speed or a lower release speed is displayed.

11.2.2. DMI INDICATIONS

When the following icon/ text message is displayed	Name	Supported by sound	Situa- tion	The driver shall:
	level 0	o o		— apply national rules.
	level 1	o o		— apply level 1 rules.
	level 2	o o		— apply level 2 rules.
Transition to level...		o o		— start applying level ... rules at the transition point.
Ack transition to level... (flashing)		o o		— acknowledge the text message, — in level 0 and in level STM apply national rules.
Ack STM (flashing)		o o		— acknowledge the text message, — apply national rules.
Ack UN (flashing)		o o		— acknowledge the text message.
	UN	o o		— apply national rules.
 (light grey)	FS			— not overpass the indicated permitted speed, — respect the indicated target speed in the predicted distance.
Ack OS (flashing)		o o		— acknowledge the text message, — and start or continue running on sight.
 (light grey)	OS	o o		— start or continue running on sight as long as the OS icon is displayed, — not exceed the maximum speed for OS, — in level 1 check the aspect of the trackside signal, proceed in front of a proceed aspect and continue running on sight.

When the following icon/ text message is displayed	Name	Supported by sound	Situa- tion	The driver shall:
Ack SR (flashing)		o o		— first: — in level 1 receive permission for train movement, — in level 2 receive from the signalman: — the permission to start in SR or to overpass an EOA by means of the ERTMS Written Order 01 or, — the permission to proceed after train trip by means of the ERTMS Written Order 02, — check the lowest speed limit of: — timetable/route book, — written order, — maximum speed for SR, — then acknowledge the text message, — and prepare for departure (rule 'Departure of the train').
 (light grey)	SR			— run on sight, unless a written order says that running on sight is not necessary, — not exceed the lowest speed limit of: — timetable/route book, — written order, — maximum speed for SR, — in level 1 check the aspect of the trackside signal: a) stop the train in front of a stop aspect, b) proceed in front of a proceed aspect and continue running on sight, — in level 2 stop at the next marker board, contact the signalman and follow his instructions if the train reaches this point in SR.
Ack SH (flashing)		o o		— first be sure to have knowledge about the movement to perform, — then acknowledge the text message.
 (light grey)	SH			— apply national shunting rules.
Ack train trip (flashing)		o o		— take measures in response of a train trip (rule 'Taking measures in response of train trip').
Ack RV		o o		— acknowledge the text message.
	RV			— start the emergency propelling, — not exceed the maximum speed for RV, — and respect the target distance.

When the following icon/ text message is displayed	Name	Supported by sound	Situa- tion	The driver shall:
 (orange)	Lower panto- graphs	o o		— lower the pantographs.
 (yellow)	Raise panto- graphs	o o		— notice that he is authorised to raise the pantographs .
 (yellow)+ Indication of current system as text message e.g. '1 500 V = '	Raise panto- graphs with voltage indi- cation	o o		— notice that he is authorised to raise the pantographs after the current system announced has been selected.
 (grey)	Neutral sec- tion	o o		— switch off the main power switch.
 (yellow)	Neutral sec- tion	o o		— keep the main power switch switched off.
 (yellow)	Non stop- ping control	o o		— avoid to stop.

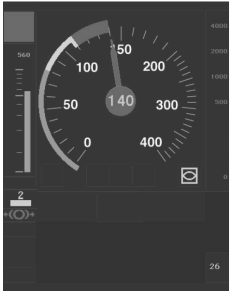
11.2.3. BRAKE INTERVENTION IN CASE OF OVERPASSING A SPEED LIMIT

11.2.3.1. *Situation*

ETCS is braking because the train has exceeded the speed limit.

If the intervention can be released, the symbol will start to flash at the moment the intervention could safely be stopped.

11.2.3.2. Rules

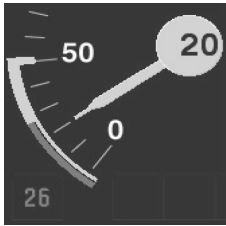
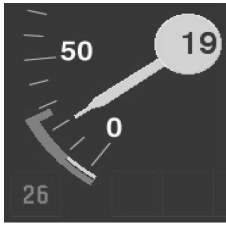
When the following picture is displayed	Supported by sound	The driver is allowed to:
1. The train exceeds the speed limit  in this example: — Current speed: 140 km/h, — Permitted speed: 110 km/h, Service brake has been triggered.	o # (intermittent)	
2. The current speed is equal or below the permitted speed  in this example: — Current speed: 104 km/h, — Permitted speed: 105 km/h, Service brake icon starts flashing.		— release the brake once the current train speed has become lower than the permitted speed.

11.2.4. RELEASE SPEED

11.2.4.1. Situation

The train is approaching the EOA and a release speed is displayed on the DMI.

11.2.4.2. **Rules**

When the following picture is displayed	Supported by sound	The driver:
 in this example: — Actual speed: 20 km/h; — Permitted speed: 50 km/h; — Release speed: 26 km/h.  in this example: — Actual speed: 19 km/h; — Permitted speed: 26 km/h; — Brake curve to target position: 9 km/h; — Release speed: 26 km/h.	o #	— shall not overpass the indicated permitted speed, — shall decrease the speed following the indication on the DMI, — in level 1 shall check the aspect of the trackside signal: a) stop the train in front of a stop aspect, b) proceed without overpassing the indicated release speed in front of a proceed aspect, — In level 2 is authorised to overpass the EOA to stop in front of a marker board or a buffer stop.

12. **GENERAL PRINCIPLES FOR LEVEL 1**12.1. **SCOPE AND PURPOSE**

This document refers to general principles and rules to be applied in all situations of level 1 and specifically required by that level (not in common with other levels).

12.2. **PRINCIPLES**

The driver shall know:

- side of track side signals to be observed,
- stop aspects of track side signals that he is not allowed to overpass,
- proceed aspects of track side signals that he is allowed to overpass. A list of proceed aspects shall distinguish signals that can be overpassed without restrictions from signals that can be overpassed with specific restrictions, according to national rules.

13. **RUNNING ON SIGHT**13.1. **SITUATIONS**

The driver has to run on sight from an operational point of view, whatever is the technical mode.

13.2. **RULES**

When a driver has to run on sight, he is obliged:

- to proceed with caution, controlling his speed, taking into account the line visible in advance, such that it is possible to stop short of any train, EOA, stop signal or obstacle,

- not to exceed the maximum speed for running on sight.

14. **MANAGING FAILURES OF THE ONBOARD SYSTEM**

14.1. *SITUATIONS*

A failure affecting the onboard system is detected.

14.2. *RULES*

14.2.1. FAILURE AFFECTING THE LOOP TRANSMISSION MODULE (LTM)

The driver observes the text message on the DMI:

‘failure of LTM’.

He shall contact the signalman; driver and signalman shall apply national rules.

14.2.2. FAILURE AFFECTING THE BALISE TRANSMISSION MODULE (BTM)

The driver shall isolate the onboard system and inform the signalman; driver and signalman shall apply national rules.

14.2.3. FAILURE AFFECTING THE EURORADIO

The driver observes the text message on the DMI:

‘failure of Euroradio’.

a) During the preparation of the traction unit

In level 2 the driver shall ask to change the traction unit.

- If the traction unit has to be moved, the signalman shall authorise the driver to overpass the EOA (rule ‘Authorised Overpassing an EOA’).

- If the traction unit has not to be moved, the driver shall switch off the onboard system.

In all other levels the driver shall inform the signalman; driver and signalman shall apply national rules.

b) While running

In level 1 with infill function by radio the driver shall inform the signalman. Driver and signalman shall apply national rules.

In level 2 the driver shall take measures in case of lack of radio communication (rule ‘Managing lack of radio communication’).

14.2.4. FAILURE AFFECTING THE DMI

a) During the preparation of the traction unit

The driver shall ask to change the traction unit.

If the traction unit has to be moved, the driver shall inform the signalman; driver and signalman shall apply national rules.

If the traction unit has not to be moved, the driver shall switch off the onboard system.

- b) While running

When DMI data can not be displayed the driver shall stop the train and inform the signalman; driver and signalman shall apply national rules.

14.2.5. OTHER FAILURES

The driver observes the text message on the DMI:

'SF because of x'.

- a) During the preparation of the traction unit

The driver shall ask to change the traction unit.

If the traction unit has to be moved, the driver shall isolate the onboard system and inform the signalman; driver and signalman shall apply national rules.

If the traction unit has not to be moved, the driver shall switch off the onboard system.

- b) While running

After coming to standstill the driver shall isolate the onboard system and inform the signalman; driver and signalman shall apply national rules.

15. AWAKENING OUTSIDE AN AWAKENING TRACK

15.1. SITUATIONS

The driver has to awake the train and the traction unit is in SB.

15.2. RULES

When requested by the onboard system, the driver shall:

- enter, re-enter or re-validate the Driver ID and the train running number,
- select the corresponding ERTMS/ETCS level according to national rules,
- enter, re-enter or re-validate the RBC-ID and/or telephone number according to national rules.

15.2.1. THE TRACTION UNIT HAS TO MOVE AS A TRAIN

The driver shall:

- enter the train data (rule 'Entering data'),
- select 'Start'.

15.2.1.1. In level 0

The system requests an acknowledgement for UN.

The following message is displayed on the DMI:

'Ack UN'.

The driver shall react according to the indication displayed on the DMI (rule 'Reacting in function of DMI/ signalling system instruction').

15.2.1.2. In level 1

The system requests an acknowledgement for SR.

The following message is displayed on the DMI:

'Ack SR'.

The driver shall react according to the indication displayed on the DMI (rule 'Reacting in function of DMI/signalling system instruction').

15.2.1.3. In level 2

When the following message is displayed on the DMI:

'No radio connection with the RBC',

the driver shall check the RBC ID and telephone number and correct them if necessary.

a) The radio communication has been established**a1) The system issues an MA:**

The driver shall react according to the indication displayed on the DMI (rule 'Reacting in function of DMI/signalling system instruction').

a2) The system requests an acknowledgement for SR:

The following message is displayed on the DMI:

'Ack SR'.

Before acknowledging the message the driver shall:

- receive the permission to start in SR from the signalman by means of the ERTMS Written Order 01,
- check that the written order refers to his train and its current location.

Before to authorise a driver to start in SR, the signalman shall get the following assurances for the part of the track from the marker board to be overpassed to the next one:

- check if all the conditions for the route are met according to national rules,
- check for speed limitations lower than the maximum speed for SR and include them in the ERTMS Written Order 01,
- check if other restrictions and/or instructions are necessary and include them in the ERTMS Written Order 01.

The signalman shall issue the ERTMS Written Order 01.

The driver shall react according to the indication displayed on the DMI (rule 'Reacting in function of DMI/signalling system instruction').

When the train is not close to the first marker board that the train will reach, the driver shall stop in front of this marker board to ascertain that the written order refers to it.

b) The radio communication has not been established.

If the communication with the RBC can not be re-established and the train has to be moved, the signalman shall authorise the driver to overpass the EOA (rule 'Authorised Overpassing an EOA'). In this particular case the signalman is not allowed to exempt the driver from running on sight in SR.

15.2.1.4. In level STM

The system requests an acknowledgement for STM...

The following message is displayed on the DMI:

'Ack STM...'

The driver shall apply national rules.

15.2.2. THE TRACTION UNIT HAS TO MOVE IN SH

The driver shall prepare for shunting (rule 'Performing shunting movements in SH').

15.2.3. THE TRACTION UNIT HAS TO MOVE IN NL

The driver shall prepare for tandem movement (rule 'Preparing a train as a tandem movement').

16. **PREPARING A TRAIN AS A TANDEM MOVEMENT FOR ASSISTANCE**

16.1. *SITUATIONS*

The non leading engine and the train are already coupled and the onboard ERTMS-ETCS equipment of the non leading engine is ready to switch to SB.

16.2. *RULES*

Intentionally blank.

17. **ENDING A TRAIN AFTER ASSISTANCE**

17.1. *SITUATIONS*

A slave traction unit has to be removed from the train.

17.2. *RULES*

Intentionally blank.

18. **OVERPASSING A TRANSITION POINT IN DEGRADED SITUATIONS FROM LEVEL 1 TO LEVEL 2 AND FROM LEVEL 2 TO LEVEL 1**

18.1. *SITUATIONS*

The radio communication can not be established when entering a level 2 area.

A transition does not take place when overpassing the transition point.

18.2. *RULES*

18.2.1. THE RADIO COMMUNICATION CAN NOT BE ESTABLISHED

When the following message is displayed on the DMI:

'No radio connection with the RBC',

the driver shall check the RBC ID and telephone number and correct them if necessary.

If the communication with the RBC can not be established and the train has to be moved, the signalman shall authorise the driver to overpass the EOA (rule 'Authorised Overpassing an EOA').

18.2.2. THE TRANSITION DOES NOT TAKE PLACE WHEN OVERPASSING THE TRANSITION POINT

18.2.2.1. ***If the train has been tripped***

The driver and the signalman shall take measures in response of a train trip (rule 'Taking measures in response of train trip').

When at standstill the driver shall:

- check the correct level to select,
- change the level,
- restart according to the indications displayed on the DMI (rule 'Reacting in function of DMI/signalling system instruction').

18.2.2.2. ***If in SR***

The driver shall:

- stop the train,
- apply 2.2.3.

18.2.2.3. ***In all other cases***

The driver shall:

- inform the signalman,
- when at standstill check the correct level to select,
- change the level,
- restart according to the indications displayed on the DMI (rule 'Reacting in function of DMI/signalling system instruction').

19. **MANAGING UNPLANNED TEMPORARY SPEED RESTRICTIONS**

19.1. *SITUATIONS*

An unplanned temporary speed restriction has to be managed.

19.2. *RULES*

When the signalman receives information that an unplanned temporary speed restriction is necessary, he shall:

- stop trains already in the section concerned,
- prevent other trains from entering this section.

Before setting a route for a train to run in the concerned section, the signalman shall give the driver the unplanned temporary speed restriction:

- for tripped trains, signalman and driver shall take measures in response of a train trip (rule 'Taking measures in response of train trip'), including the obligation to run under restrictions,
- for the other trains, the signalman shall give the obligation to run under restrictions to the drivers by means of the ERTMS Written Order 05.

The driver shall respect the temporary speed restriction until the rear end of the train has overpassed the end of the speed restriction.

The signalman shall apply these measures until the temporary speed restriction is managed by ERTMS.

20. **AUTHORISED OVERPASSING AN EOA**

20.1. *SITUATIONS*

It is necessary to authorise a driver to overpass an EOA.

20.2. *RULES*

If a driver has not received an authorisation for train movement in due time he shall contact the signalman if he has no information about the reason.

Until receiving permission from the signalman the driver shall not use the override function.

Before to authorise a driver to overpass an EOA by means of the ERTMS Written Order 01 the signalman shall:

- check if all the conditions for the route are met according to national rules,
- when he can establish according to national rules that the track is free exempt the driver from running on sight adding in the part 'Additional Instructions' the following words: 'is exempted from running on sight' in SR,
- check for speed limitations lower than the maximum speed for SR and include them in the ERTMS Written Order 01,
- check if other restrictions and/or instructions are necessary and include them in the ERTMS Written Order 01.

To overpass the EOA, the driver shall:

- receive ERTMS Written Order 01 from the signalman,
- check that the written order refers to his train and to its current location,
- check the lowest speed limit of:
 - timetable/route book,
 - list of temporary speed restrictions,
 - written order,
 - maximum speed for SR,
- use the override function and follow the instructions given in the ERTMS Written Order 01,
- restart according to the indications displayed on the DMI (rule 'Reacting in function of DMI/signalling system instruction').

21. **MANAGING LACK OF RADIO COMMUNICATION**

21.1. *SITUATIONS*

Radio communication is lost in an area not identified as a radio hole.

21.2. *RULES*

When the following icon is displayed on the DMI:

(red)

the driver shall report to the signalman.

If the train has to be moved, the signalman shall authorise the driver to overpass the EOA (rule 'Authorised Overpassing an EOA').

22. **TAKING MEASURES IN THE EVENT OF AN EMERGENCY SITUATION**22.1. *SITUATIONS*

An emergency situation occurs.

22.2. *RULES*22.2.1. *TO PROTECT THE TRAINS*

When a driver discovers an emergency situation he shall perform all actions necessary to avoid or reduce the effect of the situation and inform the signalman as soon as possible.

The driver shall apply national rules.

When a signalman is informed of an emergency situation he shall immediately protect endangered trains:

- in level 1, by applying national rules,
- in level 2, by transmitting the emergency stop order; the emergency stop order shall not be revoked before the trains are ready to restart.

The signalman shall stop and warn all other trains in front of the danger area.

The signalman shall inform all concerned drivers as soon as possible.

22.2.2. *TO RESTART THE TRAINS*

According to national rules, the signalman shall decide:

- when it is possible to authorise train movement,
- if instructions and/or restrictions for train movement are necessary.

To restart trains that have been tripped, signalman and driver shall take measures in response of a train trip (rule 'Taking measures in response of train trip'). For trains in level 2 the emergency stop order has to be revoked.

The signalman shall include necessary instructions and/or restrictions for train movement according to national rules:

- for tripped trains in ERTMS Written Order 02,
- for other trains in ERTMS Written Order 05,

In particular, he can ask the driver to examine a part of the line.

The driver shall obey the written order and report his findings if requested when he has cleared the affected area.

22.2.3. TO PROTECT AND RESTART SHUNTING MOVEMENTS

The signalman and the driver shall apply national rules.

23. **REVOKING AN AUTHORISATION FOR TRAIN MOVEMENT**

23.1. *SITUATIONS*

The signalman decides to make new traffic arrangements.

23.2. *RULES*

23.2.1. IN LEVEL 1

To revoke an authorisation for train movement, the signalman shall apply national rules.

When national rules stipulate that a train has to be at standstill before making traffic arrangements, the signalman shall order the driver to remain at standstill by means of the ERTMS Written Order 03.

To restart the signalman shall authorise the driver by means of ERTMS Written Order 04.

The driver shall run on sight until the next trackside signal.

23.2.2. IN LEVEL 2

If possible the signalman shall revoke an MA by the use of the co-operative shortening of MA.

In all other cases, the signalman shall apply national rules.

When national rules stipulate that a train has to be at standstill before making traffic arrangements, the signalman shall order the driver to remain at standstill by means of the ERTMS Written Order 03.

To restart the signalman shall authorise the driver by means of ERTMS Written Order 04.

24. **TAKING MEASURES IN RESPONSE OF TRAIN TRIP**

24.1. *SITUATIONS*

A train or a shunting movement is tripped.

24.2. *RULES*

When a trip occurs the driver shall assume that there is a dangerous situation and he shall perform all actions necessary to avoid or reduce the effect of this situation. This may include to move the train backwards according to national rules.

To move the train backwards, the driver shall acknowledge the text message 'ACK TRAIN TRIP' and release the emergency brake.

After moving the train backwards as soon as it is at standstill, the driver shall contact the signalman and inform him about the situation.

In all other cases, when at standstill the driver observes the text message on the DMI:

'Ack train trip',

he shall acknowledge the train trip and contact the signalman.

The driver shall not restart after a trip has occurred without the permission from the signalman.

Before giving permission to the driver to proceed after train trip by means of ERTMS Written Order 02 the signalman shall:

- check if all the conditions for the route are met according to national rules,
- when he can establish according to national rules that the track is free exempt the driver from running on sight adding in the part 'Additional Instructions' the following words: 'is exempted from running on sight' in SR,
- check for speed limitations lower than the maximum speed for SR and include them in the ERTMS Written Order 02,
- check if other restrictions and/or instructions are necessary and include them in the ERTMS Written Order 02.

To proceed the driver shall:

- receive the ERTMS Written Order 02 with all additional instructions given by the signalman,
- check that the written order refers to his train/shunting movement and to its current location,
- according to the mission select start or SH, and follow the instructions given in the ERTMS Written Order 02,
- restart according to the indications displayed on the DMI (rule 'Reacting in function of DMI/signalling system instruction').

25. **MANAGING ROUTE UNSUITABILITY**

25.1. *SITUATIONS*

An incompatibility between the characteristics of the rolling stock and the characteristics of the line is detected.

25.2. *RULES*

When the driver observes the text message on the DMI:

'Route unsuitable',

he shall:

- stop the train and inform the signalman about the indication of route unsuitability,
- check if the values are in accordance with the train characteristics, and correct them, if necessary.

Until receiving permission from the signalman the driver shall not override the route unsuitability.

25.2.1. **THE REASON FOR THE UNSUITABILITY CAN BE REMOVED**

If allowed by national rules the signalman shall authorise the driver to override the route unsuitability by means of the ERTMS Written Order 06 with all necessary additional instructions.

The driver shall override the route unsuitability, when he has received the ERTMS Written Order 06 from the signalman.

25.2.2. **THE REASON FOR THE UNSUITABILITY CAN NOT BE REMOVED**

The signalman and the driver shall apply national rules.

26. ENTER AN OCCUPIED TRACK SECTION WITHIN A STATION**26.1. SITUATIONS**

It is necessary to enter a station in a track section that is occupied for the purposes of:

- platform sharing,
- coupling of trains.

26.2. RULES

When a train shall enter an occupied track, the signalman shall:

- ensure that the first train is at standstill, and in level 2 that the movement authority of the first train has been revoked (rule 'Revoking an authorisation for train movement'),
- set the route for the train that has to enter the occupied track.

The driver of the train that has to enter the occupied track shall react according to the indications displayed on the DMI (rule 'Reacting in function of DMI/signalling system instruction') and follow the instructions received.

In case of an unplanned movement, before setting the route, the signalman shall inform the drivers of both trains involved of the circumstances according to national rules.

27. EMERGENCY PROPELLING**27.1. SITUATIONS**

An emergency situation requires to move the train in the opposite direction in an emergency propelling area.

27.2. RULES

When the train has to be propelled in emergency according to national rules the driver shall:

- acknowledge the following text message:

'Ack RV',

- propel the train in emergency.

After the train has completed its emergency propelling and as soon as it is at standstill the driver shall report to the signalman.

ANNEX A2

ERTMS/GSM-R OPERATING RULES

These rules will explain the principles of how operating staff will be expected to operate the equipment associated with GSM-R.

This aspect is still an open point and will be specified in a future version of this TSI.

ANNEX B

OTHER RULES ENABLING A COHERENT OPERATION OF NEW STRUCTURAL SUBSYSTEMS:

(see section 4.4)

This Annex will evolve over a period of time and will be subject to regular review and update.

Typical content of this Annex will be rules and procedures, which are to be applied in an identical way across the entire TEN and the conventional network in particular and which are not today covered in Chapter 4 of this TSI. It is also likely that some elements of Chapter 4 and associated annexes will also be integrated into this Annex.

A. General

Reserved

B. Staff Safety and Security

Reserved

C. Operational interface with signalling and command and control equipment**C1 Sanding**

The application of sand is an effective way of improving the adhesion of wheels to the rail, to aid braking and starting away especially in conditions of inclement weather.

A build-up of sand on the railhead can however, cause a number of problems, especially in connection with the activation of track circuits and the effective operation of points and crossings.

The driver must always be able to apply sand but this must be avoided wherever possible:

- in the area of points and crossings
- during braking at speeds less than 20 km/h.

These restrictions are nevertheless not applicable if there is a risk of SPAD (Signal Passed at Danger), or other serious incident and the application of sand would assist adhesion.

- when at a standstill. The exception to this is when starting away and when required to test the sanding equipment on the traction unit. (Testing should normally be undertaken in areas specifically designated in the Infrastructure Register).

C2 Activation of Hot Axle Box Detectors

Reserved

D. Train Movements**D1 Normal conditions****D2 Degraded conditions**

Reserved

E. Anomalies, incidents and accidents

Reserved

ANNEX C

SAFETY RELATED COMMUNICATIONS METHODOLOGY**Introduction**

The purpose of this document is to set out the rules for safety-related ground-to-mobile and mobile-to-ground communications applicable to information transmitted or exchanged for safety critical situations on the interoperable network and in particular to:

- define the nature and structure of the safety-related messages;
- define the methodology for voice transmission of those messages.

This annex is to serve as the basis:

- to enable the Infrastructure Manager to draw up the messages and Books of Forms. These elements shall be addressed to the Railway Undertaking at the same time as the rules and regulations are made available;
- for the Infrastructure Manager and the Railway Undertaking to draw up the documents for their staff (Books of Forms), instructions for staff authorising train movements and Appendix 1 to the Driver's Rule Book 'Manual of communication procedures'.

The extent to which forms are used and their structure may vary. For some risks the use of forms will be appropriate, whilst for others it will not be appropriate.

In the context of a given risk, the Infrastructure Manager shall, acting in compliance with Article 9(3) of Directive 2004/49/EC, decide whether the use of a form is appropriate. A form should only be used if the value of its safety and performance benefits exceeds that of any safety and performance disbenefits.

The Infrastructure Managers must structure his communications protocol in a formalised way and in line with the following 3 categories:

- urgent (emergency) verbal messages;
- written orders;
- additional performance messages;

To support the disciplined approach to transmission of these messages a Communications Methodology has been developed.

1. COMMUNICATIONS METHODOLOGY**1.1. ELEMENTS AND PRINCIPLES OF THE METHODOLOGY****1.1.1. STANDARD TERMINOLOGY TO BE USED IN THE PROCEDURES****1.1.1.1. *Speech transmission procedure***

Term transferring the opportunity to speak to the opposite party:

over

1.1.1.2. Message receiving procedure

- upon receiving a direct message

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 (+ speak slowly)

- upon reception of a message that has been read-back

Terms used to ascertain whether a read-back message exactly matches the sent message:

correct

or not:

error (+ I say again)

1.1.1.3. Communications breaking procedure

- if the message has ended:

out

- if break is temporary and does not break the connection

Term used to keep the other party waiting:

wait

- if break is temporary but the connection is broken

Term used to tell the other party that the communication is going to be broken but will be resumed later on:

I call again

1.1.1.4. Cancelling a written order

Term used to cancel the written order procedure underway:

cancel procedure.....

If the message is then to subsequently be resumed, the procedure shall be repeated from the start.

1.1.2. PRINCIPLES TO BE APPLIED IN THE EVENT OF ERROR OR MISUNDERSTANDING

To permit the correction of possible errors during communication, the following rules shall be applied:

1.1.2.1. **Errors**— **error during transmission**

When a transmission error is discovered by the sender himself, the sender must request cancellation by sending the following procedure message:

error (+ prepare new form ...)

or:

error + I say again

and then send the initial message again.

— **error during read-back**

When the sender discovers an error whilst the message is being read back to him, the sender shall send the following procedure messages:

error + I say again

and send the initial message again.

1.1.2.2. **Misunderstanding**

If one of the parties misunderstands a message he must ask the other party to repeat the message by using the following text:

say again (+speak slowly)

1.1.3. WORD, NUMBER, TIME, DISTANCE, SPEED AND DATE SPELLING CODE

To aid in understanding and expressing messages in different situations, each term must be pronounced slowly and correctly by spelling out any words or names and figures likely to be misunderstood. Examples would be the identifying codes for signals or points.

The following spelling rules shall apply:

1.1.3.1. **Spelling out of words and letter groups**

The International Phonetic Alphabet shall be used.

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

Example:

Points A B = points alpha-bravo.

Signal Number KX 835 = signal Kilo X-Ray eight three five.

The Infrastructure Manager may add further letters, along with a phonetic pronunciation for each letter added, if required by the alphabet of the Infrastructure Manager's operating language(s).

The Railway Undertaking may add further indications about pronunciation, as it deems necessary.

1.1.3.2. **Expression of numbers**

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

Example: train **2 183** = train two-one-eight-three.

Decimals shall be expressed by the word 'point'.

Example: **12,50** = one-two-point-five-zero

1.1.3.3. **Expression of time**

The time shall be given in local time, in plain language.

Example: **10:52** hours = ten fifty-two.

Whilst this is the principle, it would also be acceptable, whenever necessary, for the time to be spelled out digit by digit (one zero five two hours).

1.1.3.4. **Expression of distances and speeds**

Distances shall be expressed in kilometres and speeds in kilometres per hour.

Miles may be used if that unit is used on the infrastructure concerned.

1.1.3.5. **Expression of dates**

Dates shall be expressed in the usual manner.

Example: **10 December**

1.2. **COMMUNICATIONS STRUCTURE**

The voice transmission of safety-related messages shall in principle comprise 2 phases as follows:

- identification and request for instructions;
- transmission of the message itself and termination of the transmission.

The first phase may be cut back or entirely skipped for top priority safety messages.

1.2.1. RULES FOR IDENTIFICATION AND REQUESTS FOR INSTRUCTION

To enable the parties to identify one another, define the operational situation and transmit procedural instructions, the following rules shall apply:

1.2.1.1. *Identification*

It is very important that before each communication, other than very urgent top priority safety messages, the persons who are going to communicate identify themselves. Not only is this a polite thing to do it, more importantly, provides a confidence that the person authorising train movements is in communication with the driver of the correct train and the driver knows he is speaking with the correct signalling or control centre. This is especially critical when communication is taking place in areas where communications boundaries overlap.

This principle shall apply even after an interruption during transmission.

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

- by the staff authorising train movements:

train
(number)
this is Signals
(name)

- by the driver:

..... Signals
(name)
this is train
(number)

It should be noted that the identification may be followed by an additional information message giving the staff authorising train movements enough details of the situation to determine precisely the procedure that the driver may subsequently be required to follow.

1.2.1.2. *Request for instructions*

Every application of a procedure supported by a written order must be preceded by a request for instructions.

The following terms shall be used to request instructions:

prepare procedure

1.2.2. RULES FOR TRANSMISSION OF WRITTEN ORDERS AND VERBAL MESSAGES

1.2.2.1. *Top priority safety messages*

Due to their urgent and imperative nature, these messages:

- may be sent or received while running;
- may skip the identification part;

- shall be repeated;
- shall, as soon as possible, be followed by further information.

1.2.2.2. **Written Orders**

In order to reliably send or receive (at a standstill) the procedural messages contained in the Book or Forms, the following rules shall be followed:

1.2.2.2.1. **Message sending**

The form may be completed prior to transmitting the message so that the full text of the message can be sent in one single transmission.

1.2.2.2.2. **Message receiving**

The receiver of the message must fill in the form contained in the Book of Forms based upon the information given by the sender.

1.2.2.2.3. **Read-back**

All the predetermined railway messages in the Book of Forms shall be required to be read back. The read-back shall include the message shown in the grey field on the Forms, the 'report back' section and any additional or complementary information.

1.2.2.2.4. **Acknowledgement of correct read-back**

Every read-back message shall be followed by an acknowledgement of conformity or non-conformity given by the sender of the message.

correct

or

error + I say again

followed by a repeat sending of the initial message

1.2.2.2.5. **Acknowledgement**

Every message received shall be acknowledged positively or negatively as follows:

received

or

negative, say again (+ speak slowly)

1.2.2.2.6. Traceability and verification

A unique identification or authorisation number shall accompany all messages initiated from the ground:

- if the message concerns an action for which the driver requires a specific authorisation (e.g. passing a signal at danger,...):

authorisation (number)

- in all other cases (e.g. proceeding with caution,...):

message (number)

1.2.2.2.7. Reporting Back

Every message comprising a request to 'report back' shall be followed by a 'report'.

1.2.2.3. Additional messages

Additional messages

- shall be preceded by the identification procedure;
- shall be short and precise (limited wherever possible to information to be communicated and where it applies);
- shall be read back and followed by an acknowledgement of correct read-back, or not
- may be followed by a request for instructions or a request for further information.

1.2.2.4. Information messages with a variable non-predetermined content

Information messages with a variable content shall be:

- preceded by the identification procedure;
- prepared before sending;
- read back and followed by an acknowledgement of correct read-back, or not.

2. PROCEDURAL MESSAGES

2.1. NATURE OF THE MESSAGES

Procedural messages are used to send operational instructions associated with appropriate situations represented in the Driver's Rule Book.

They comprise the text of the message itself, corresponding to a situation, and a number identifying the message.

If the message requires the recipient to report back, the text of the report is also given.

These messages use predetermined wording prescribed by the Infrastructure Manager in his 'operating language' and they are presented in the form of pre-prepared forms in either paper format or in computer medium.

2.2. FORMS

Forms are a formalised medium for communicating procedural messages. These messages are generally those associated with degraded working conditions. Typical examples would be the authority for a driver to pass a signal or an 'end of movement authority', the requirement to run at reduced speed in a particular area, or to examine the line. There may well be other circumstances that will require the use of such messages.

Their purpose is to:

- provide a common working document used in real-time by the staff authorising train movements and by the drivers;
- provide the driver (especially when working in an unfamiliar or rare environment) with a reminder of the procedure he will be required to follow
- enable traceability of communications.

In order to identify the forms, a unique code word or number relating to the procedure should be developed. This could be based on the potential frequency that a form would be used. If, of all the forms being developed, the likelihood is that the one most often used is the one for passing a signal or EOA at danger, then this one could be numbered 001 and so on.

2.3. BOOK OF FORMS

Having identified all the forms to be used, the whole set must be collected into a document or a computer medium called the Book of Forms.

It is a joint document that will be used by the driver and the staff authorising the movement of trains when they communicate with each other. It is important therefore that the book used by the driver and the one used by the staff authorising the movement of trains are constructed and numbered in the same manner.

The Infrastructure Manager is responsible for drawing up the Book of Forms and the forms themselves in his 'operating language'.

The Railway Undertaking may add translations of the forms and associated information contained in the Book of Forms, if he thinks that would help his drivers both during training and in real-time situations.

The language to be used when transmitting the messages shall always be the 'operating language' of the Infrastructure Manager.

The Book of Forms shall comprise two parts.

The first part contains the following items:

- a reminder about the utilisation of the Book of Forms;
- an index of ground-originated Procedure Forms;
- an index of driver-originated Procedure Forms, where appropriate;
- the list of situations cross-referencing to which procedure form is to be used;
- a glossary giving the situations to which each procedure form applies;
- the code for spelling out messages (phonetic alphabet etc.).

The second part contains the Procedure Forms themselves.

Several examples of each form should be included in the Book of Forms and it is suggested that dividers should be used to separate the sections.

The Railway Undertaking may include explanatory text relevant to each form and the situations covered, in the drivers' Book of Forms.

3. ADDITIONAL MESSAGES

Additional messages are information messages used either:

- by the driver to inform the staff authorising train movements or
- by the staff authorising train movements to advise the driver

of situations of a rare nature and for which therefore a pre-determined form is considered unnecessary, or related to train running or to the technical condition of the train or the infrastructure.

To make it easier to describe the situations and construct the information messages, message guidelines, a glossary of railway terminology, a descriptive diagram of the rolling stock being employed and a descriptive statement of the infrastructure equipment (track, traction supply, etc.) might be beneficial.

3.1. GUIDELINE STRUCTURE FOR MESSAGES

These messages may be structured along the following lines:

Stage in the communication flow	Message element
Reason for passing the information	☐ for information ☐ for action
Observation	☐ There is ☐ I saw ☐ I had ☐ I hit
Position — along the line	☐ at(station name) ☐ (characteristic point) ☐ at mile post/kilometre point (number)
— in respect to my train	☐ power car (number) ☐ trailer car (number)
Nature — object — person	 (see glossary)
State — static	☐ standing on ☐ lying on ☐ fallen on
— moving	☐ walking ☐ running ☐ towards
Location with respect to the tracks	

These messages may be followed by a request for instructions.

The elements of the messages are provided in both the language chosen by the Railway Undertaking and in the operating language(s) of the Infrastructure Managers concerned.

3.2. GLOSSARY OF RAILWAY TERMINOLOGY

The Railway Undertaking shall produce a glossary of railway terminology for each network over which his 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 is worked over.

The glossary shall be composed of two parts:

- a listing of terms by subject matter;
- a listing of the terms in alphabetical order.

3.3. DESCRIPTIVE DIAGRAM OF THE ROLLING STOCK

If the Railway Undertaking feels it would benefit his operation a descriptive diagram of the rolling stock used shall be prepared. It should list the names of the various components that may be the subject of communications with the different Infrastructure Managers concerned. It should include the common names for the standard terms in the language chosen by the Railway Undertaking and in the 'operating' language of the Infrastructure Manager(s) whose infrastructure is worked over.

3.4. DESCRIPTIVE STATEMENT OF THE CHARACTERISTICS OF THE INFRASTRUCTURE EQUIPMENT (TRACK, TRACTION SUPPLY, ETC.)

If the Railway Undertaking feels it would benefit his operation a descriptive statement of the characteristics of the infrastructure equipment (track, traction supply, etc.) on the route worked over shall be prepared. This shall show the names of the various components that may be the subject of communications with the Infrastructure Manager(s) concerned. It should include the common names for the standard terms in the language chosen by the Railway Undertaking and in the 'operating' language of the Infrastructure Manager(s) whose infrastructure is worked over.

4. TYPE AND STRUCTURE OF VERBAL MESSAGES

4.1. EMERGENCY MESSAGES

Emergency messages are intended to give urgent operational instructions that are directly linked with the safety of the railway.

To avoid any risk of misunderstanding, messages must always be repeated once.

Classified according to need, the main messages which can be sent are indicated hereafter.

The Infrastructure Manager may, in addition, define other emergency messages according to the needs of his operation.

Emergency messages may be followed by a Written Order (see Subsection 2).

The type of text that goes to form Emergency messages must be included in Appendix 1 'Manual of communications procedures' to the Driver's Rule Book and in the documentation issued to staff authorising train movements.

4.2. MESSAGES SENT EITHER BY THE GROUND OR THE DRIVER

- Need to stop all trains:

The need to stop all trains must be transmitted by means of an acoustic signal; if this is not available the following phrase must be used:

Emergency, stop all trains

Information on location or area is, if necessary, specified in the message.

In addition, this message is to be quickly complemented, if possible, by the reason, the location of the emergency and the train's identification:

Obstruction	
Or Fire	
Or	
(other reason)	
on line	at.....
(name)	(km)
Driver of train	
(number)	

- Need to stop a particular train:

Train	(on line/track)
(number)	(name/number)
Emergency stop	

In this circumstance the name or number of the line or track on which the train is running may be used to complement this message.

4.3. MESSAGES ISSUED BY THE DRIVER

- Need to cut the traction power supply:

Emergency current isolation

This message is to be quickly complemented, if possible, by the reason, the location of the emergency and the train's identification:

At	
	(km)
on	line/track
	(name/number)
between	and
(station)	(station)
Reason	
Driver of train	
	(number)

In this circumstance the name or number of the line or track on which the train is running may be used to complement this message.

ANNEX D

INFORMATION TO WHICH THE RAILWAY UNDERTAKING MUST HAVE ACCESS IN CONNECTION WITH THE ROUTE(S) OVER WHICH HE INTENDS TO OPERATE

PART 1. GENERIC INFORMATION REGARDING THE INFRASTRUCTURE MANAGER

- 1.1. Name (s)/Identity of Infrastructure Manager(s)
- 1.2. Country (or Countries)
- 1.3. Brief description
- 1.4. List of general operational rules and regulations (and how to obtain them)

PART 2. MAPS AND DIAGRAMS

2.1. Geographic map

- 2.1.1. Routes
- 2.1.2. Principal locations (stations, yards, junctions, freight terminals)

2.2. Line diagram

Information to be included on diagrams, supplemented as necessary by text. Where a separate station/yard/depot diagram is provided then information on line diagram may be simplified

- 2.2.1. Indication of distance
- 2.2.2. Identification of running lines, loops, sidings and catch/trap points
- 2.2.3. Connections between running lines
- 2.2.4. Principal locations (stations, yards, junctions, freight terminals)
- 2.2.5. Location and meanings of all fixed signals

2.3 Station/Yard/Depot diagrams (N.B. applies only to locations available to interoperable traffic)

Information to be identified on location specific diagrams, supplemented as necessary by text

- 2.3.1. Name of location
- 2.3.2. Location identity code
- 2.3.3. Type of location (passenger terminal, freight terminal, yard, depot)
- 2.3.4. Location and meanings of all fixed signals
- 2.3.5. Identification and plan of tracks, including catch/trap points
- 2.3.6. Identification of platforms
- 2.3.7. Length of platforms
- 2.3.8. Height of platforms
- 2.3.9. Identification of sidings
- 2.3.10. Length of sidings
- 2.3.11. Availability of shore electric supply

- 2.3.12. Distance between the edge of the platform and the centre of the track, parallel to the running surface
- 2.3.13. (For passenger stations) Availability of access for disabled persons

PART 3. SPECIFIC LINE SEGMENT INFORMATION

3.1. **General Characteristics**

- 3.1.1. Country
- 3.1.2. Line segment identification code: national code
- 3.1.3. Line segment extremity 1
- 3.1.4. Line segment extremity 2
- 3.1.5. Times of opening for traffic (times, days, special arrangements for holidays)
- 3.1.6. Lineside indications of distance (frequency, appearance and positioning)
- 3.1.7. Type of traffic (mixed, passenger, freight, ...)
- 3.1.8. Maximum permissible speed(s)
- 3.1.9. Any other information which is necessary for safety reasons
- 3.1.10. Specific local operational requirements (including any special staff qualifications)
- 3.1.11. Special restrictions for dangerous goods
- 3.1.12. Special loading restrictions
- 3.1.13. Model of temporary works notice (and way to obtain it)
- 3.1.14. Indication that Line segment is congested (art. 22 of Directive 2001/14/EC)

3.2. **Specific Technical Characteristics**

- 3.2.1. EC verification for Infrastructure TSI
- 3.2.2. Date of putting into service as an interoperable line
- 3.2.3. List of possible specific cases
- 3.2.4. List of possible specific derogations
- 3.2.5. Track gauge
- 3.2.6. Structure gauge
- 3.2.7. Maximum axle load
- 3.2.8. Maximum load per linear metre
- 3.2.9. Transversal track forces
- 3.2.10. Longitudinal track forces
- 3.2.11. Minimum radius of curvature
- 3.2.12. Gradient percentage
- 3.2.13. Gradient location

3.2.14. For brake system that does not use wheel-rail adhesion, accepted braking effort

3.2.15. Bridges

3.2.16. Viaducts

3.2.17. Tunnels

3.2.18. Comments

3.3 **Energy subsystem**

3.3.1. EC verification for Energy TSI

3.3.2. Date of putting into service as an interoperable line

3.3.3. List of possible specific cases

3.3.4. List of possible specific derogations

3.3.5. Type of power supply system (e.g. none, overhead, 3rd rail)

3.3.6. Power supply system frequency (e.g. AC, DC)

3.3.7. Minimum voltage

3.3.8. Maximum voltage

3.3.9. Restriction related to power consumption of specific electric traction unit(s)

3.3.10. Restriction related to the position of Multiple Traction unit(s) to comply with contact line separation (position of pantograph)

3.3.11. How to obtain electrical isolation

3.3.12. Contact wire height

3.3.13. Permissible contact wire gradient in relation to the track and the variation of the gradient

3.3.14. Type of pantographs approved

3.3.15. Minimum static force

3.3.16. Maximum static force

3.3.17. Location of neutral sections

3.3.18. Information on operation

3.3.19. Lowering of pantographs

3.3.20. Conditions applying with regard to regenerative braking

3.3.21. Maximum allowable train current

3.4 **Control-Command and Signalling subsystem**

3.4.1. EC verification for CCS TSI

3.4.2. Date of putting into service as an interoperable line

3.4.3. List of possible specific cases

3.4.4. List of possible specific derogations

ERTMS/ETCS

3.4.5. Level of application

3.4.6. Optional functions installed lineside

3.4.7. Optional functions required on board

3.4.8. Software version number

3.4.9. Placing-in-service date of this version

ERTMS/GSM-R radio

3.4.10. Optional functions as specified in FRS

3.4.11. Version number

3.4.12. Placing-in-service date of this version

For ERTM/ETCS level 1 with infill function

3.4.13. Technical implementation required for rolling stock

Class B train protection, control and warning system(s)

3.4.14. National rules for operating class B systems (+ way to obtain them)

Line system

3.4.15. Responsible Member State

3.4.16. System name

3.4.17. Software Version number

3.4.18. Placing-in-service date of this version

3.4.19. End of period of validity

3.4.20. Need for more than one system active simultaneously

3.4.21. On-board system

Class B radio system

3.4.22. Responsible Member State

3.4.23. System name

3.4.24. Version number

3.4.25. Placing-in-service date of this version

3.4.26. End of period of validity

3.4.27. Special conditions to switch over between different class B train protection, control and warning systems

3.4.28. Special technical conditions required to switch over between ERTMS/ETCS and Class B Systems

3.4.29. Special conditions to switch over between different radio systems

Technical degraded modes of:

3.4.30. ERTM/ETCS

3.4.31. Class B train protection, control and warning system

3.4.32. ERTM/GSM-R

3.4.33. Class B radio system

3.4.34. Line side signalling

Speed restrictions related to braking performance

3.4.35. ERTM/ETCS

3.4.36. Class B train protection, control and warning systems

National rules for functioning Class B system

3.4.37. National rules linked to braking performance

3.4.38. Other national rules, e.g. : data corresponding with UIC leaflet 512 (8th edition of 1.1.79 and 2 Amendments)

EMC Susceptibility of infrastructure-side Control-command and signalling

3.4.39. Requirement to be specified according to European Standards

3.4.40. Permissibility to use Eddy-current brake

3.4.41. Permissibility to use magnetic brake

3.4.42. Requirements for technical solutions concerning implemented derogations

3.5. **Traffic Operation and Management Subsystem**

3.5.1. EC verification for OPE TSI

3.5.2. Date of putting into service as an interoperable line

3.5.3. List of possible specific cases

3.5.4. List of possible specific derogations

3.5.5. Language used for safety critical communications with infrastructure manager staff

3.5.6. Special climatic conditions and associated arrangements

ANNEX E

LANGUAGE AND COMMUNICATION LEVEL

The oral qualification in a language can be subdivided into five levels:

Level	Description
5	— Can adapt the way he/she speaks to any interlocutor — Can put forward an opinion — can negotiate — can persuade — can give advice
4	— can cope with totally unforeseen situations — can make assumptions — can express an argued opinion
3	— can cope with practical situations involving an unforeseen element — can describe — can keep a simple conversation going
2	— can cope with simple practical situations — can ask questions — can answer questions
1	— can talk using memorised sentences

This annex is a provisional position. A more detailed piece of work is being prepared and will be available for a future revision of this TSI.

There are also plans to incorporate a tool to be used when assessing the level of competence of an individual. This will be made available in a future version of this TSI.

ANNEX F:

TRAFFIC OPERATION AND MANAGEMENT SUBSYSTEM ASSESSMENT GUIDELINES

(The use of the expression 'Member State' when taken in the context of this module means the Member State or other body appointed by them, undertaking the assessment).

1. This annex sets out guidelines to facilitate assessments by Member States to confirm that the operational process(es) proposed:

- complies with this TSI and demonstrates that the essential requirements ⁽¹⁾ of Directive 2001/16/EC (and any amendments included in Directive 2004/50/EC) have been met,
- complies with the other regulations as appropriate, including Directive 2004/49/EC,

and may be placed into service

2. The Infrastructure Manager or Railway Undertaking concerned must supply the Member State with appropriate documentation (as described in clause 3 below) describing the new or amended operations process(es).

The documentation supplied about the conception and development of the new or amended operational process(es) must be sufficiently detailed so as to enable the Member State to understand the rationale behind the proposal. Additionally, where subsystems are being upgraded or renewed, the submission must also include feedback of operational experience.

The documentation may be supplied in either paper or computer medium format (or a combination of both). The Member State may request further copies if needed for carrying out the assessment.

3. Details of assessment

- 3.1. The documentation describing the operational process(es) concerned should contain at least the following elements:

- a general description of the Infrastructure Manager's or Railway Undertaking's operations organisation (overview of the management/supervision and functionality), together with a detail of the conditions and the framework within which the operations process(es) to be assessed shall be used and operated;
- details of all relevant operational processes required to be carried out (typically procedures, instructions, computer programs, etc.);
- a description of how the operations process(es) concerned shall be implemented, used and controlled, including an analysis of any specific equipment to be used;
- details of the people who will be affected by the operational process(es), the training and/or briefing that will take place and any assessment of risk to personal exposure to which the people might be subjected;
- a procedure for how subsequent amendments and updates to the operations process(es) will be managed (NOTE: this does not include any future major changes or new process(es) — in this case, a new submission under these guidelines would be applicable);
- diagram showing how necessary feedback information (and all other information relating to the operation) flows into, out of and around the Infrastructure Manager's or Railway Undertaking's operations organisation to support the relevant operation processes;
- descriptions, explanations and all the records necessary for understanding the conception and development of the new or amended operations process(es) concerned (NOTE: for Safety Critical processes, this should include an assessment of the risks associated with implementing the new/amended process(es));
- demonstration of compliance between of the operation process(es) concerned with the requirements of the TSI;

The following elements should also be supplied, where relevant:

- a list of the specifications or European standards, against which the relevant operation processes of the subsystem have been validated and the evidence of this conformity;

⁽¹⁾ The essential requirements are reflected in the technical parameters, interfaces and performance requirements set out in Chapter 4 of the TSI.

- evidence of conformity with other regulations deriving from the treaty (including certificates);
- specific conditions or restrictions of relevant operation processes

3.2. The Member State shall:

- identify the relevant provisions of the TSI, with which operations process(es) concerned must comply;
- check that the documentation supplied is complete and in accordance with clause 3.1;
- examine the documentation supplied and evaluate whether:
 - the operations process(es) concerned comply with the relevant requirements of the TSI;
 - the conception and development of the new or revised operations process(es) (including any assessment of risks) are robust and have been managed in a controlled manner;
 - the arrangements for implementation and subsequent use/control of the operations process(es) will ensure continued compliance with the relevant TSI requirements
- document (in an assessment report, see Clause 4 below) its findings with regards to compliance of the operations process(es) with the TSI provisions.

4. The assessment report shall include at least the following information:

- details of the Infrastructure Manager/Railway Undertaking concerned,
- description of operations process(es) that have been assessed, including details of any specific procedures, instructions, computer programs concerned;
- description of those elements relating to the control and use of the operations process(es) concerned, including monitoring, feedback and adjustment,
- any subsidiary inspection and audit reports drawn up in connection with the assessment
- confirmation that the operations process(es) concerned and their conditions of implementation will ensure compliance with the appropriate requirements stated in the relevant sections of the TSI, including any reservations remaining at the conclusion of the assessment.
- A statement of any conditions and limits (including any appropriate restrictions to address any reservations) for implementing the relevant operations process(es),
- name and address of the Member State involved in the assessment and date of the completion of the report.

If the Infrastructure Manager/Railway Undertaking is denied authorisation/certification to implement the relevant operation processes on the basis of the assessment report, the Member State must provide detailed reasons for such denial in accordance with Directive 2004/49/EC.

ANNEX G

INFORMATIVE AND NOT MANDATORY LIST OF ELEMENTS TO BE VERIFIED FOR EACH BASIC PARAMETER

This Annex is at an early stage of development and requires further work; it is included as a working draft.

In association with the certification and authorisation processes described in Articles 10 and 11 of Directive 2004/49/EC, this annex outlines the following supporting information:

- **A** — an item that is of an organisational or principals nature and should be included in the Safety Management System
- **B** — an item that is a detailed procedure or operational process in support of the organisational principals in the SMS and which is only applicable within the Member State

Parameters to be assessed	Elements to be verified for each parameter	TSI reference	Applicable to		A/B
			RU	IM	
Documentation for Drivers	Process for compilation of Driver's Rule Book (including language translation [where appropriate] and validation process)	4.2.1.2.1	X		A
	Process for IM to provide RU with appropriate information	4.2.1.2.1		X	A
	Content of Driver's Rule Book includes minimum requirements of this TSI and specific procedures required by IM	4.2.1.2.1	X		B
	Process for compilation of Driver's Route Book (and validation process)	4.2.1.2.2.1	X		A
	Content of Driver's Route Book includes minimum requirements of this TSI	4.2.1.2.2.1	X		B
	Process for IM to advise RU of changes to operational rules/information	4.2.1.2.2.2		X	A
	Process for grouping changes into a dedicated document	4.2.1.2.2.2	X		A
	Process for advising drivers in real time of changes	4.2.1.2.2.3		X	A
	Process for providing drivers with train schedule information	4.2.1.2.3	X		A
	Process for providing drivers with rolling stock information	4.2.1.2.4	X		A
	Process for compilation of location-specific rules and procedures (including validation process) <i>ground staff</i>	4.2.1.3	X		B
Documentation for IM's staff authorising train movements	Process for safety-related communication between IM and RU staff	4.2.1.4		X	A
Safety-related communication between RU and IM staff	Process for ensuring that staff apply the operational communication methodology as specified in annex C of this TSI	4.2.1.5, 4.6.1.3.1	X		A
				X	A
Train Visibility	Process for ensuring front end illumination of trains complies with the requirements of this TSI	4.2.2.1.2, 4.3.3.4.1	X		A
	Process for ensuring rear end indication of trains complies with the requirements of this TSI	4.2.2.1.3	X		
Train Audibility	Process for ensuring audibility of trains complies with the requirements of this TSI	4.2.2.2, 4.3.3.5	X		A

Parameters to be assessed	Elements to be verified for each parameter	TSI reference	Applicable to		A/B
			RU	IM	
Vehicle Identification	Process to demonstrate compliance with Annex P of this TSI	4.2.2.3	X		A
Freight vehicle loading	Compilation of Loading Rules to be applied by RU staff.	4.2.2.4	X		A
Train composition	Process for compilation of Train Composition Rules (including validation process)	4.2.2.5	X		A
	Content of Train Composition Rules includes minimum requirements specified in this TSI	4.2.2.5	X		B
Braking requirements	Process for ensuring provision of route related information required for brake performance calculations or provision of the actual performance required	4.2.2.6.2		X	A
	Process for calculation or provision of brake performance required ('Braking Rules')	4.2.2.6.2, 4.3.2.1	X		B
Responsibility to ensure that the train is in running order	Definition of the safety-related on-train equipment required to ensure train safe to run	4.2.2.7.1	X		B
	Process for ensuring that any modification to the characteristics of the train affecting its performance are identified, and that this information is provided to IM	4.2.2.7.1	X		A
	Process to ensure that train running information is made available to IM prior to departure	4.2.2.7.2	X		A
Train Planning	Process of ensuring RU provides required data to IM when requesting a train path	4.2.3.1		X	A
Identification of Trains	Process for assigning unique and unambiguous train identification numbers	4.2.3.2		X	A
Departure Procedures	Definition of pre-departure checks and tests	4.2.3.3.1	X		B
	Process for reporting factors that could affect train running	4.2.3.3.2	X		A
Traffic Management	Provision of means of recording real time information, including minimum data required by this TSI	4.2.3.4.1		X	B
	Definition of procedures for control and supervision of traffic operation	4.2.3.4.2.1		X	B
	Process of ensuring management of changes in line conditions and train characteristics	4.2.3.4.2		X	B
	Process for indication of estimated time a train is to be handed over from IM to IM	4.2.3.4.2.2		X	B
Dangerous Goods	Process of ensuring supervision of dangerous goods, including minimum requirements of this TSI	4.2.3.4.3	X		A
Operational Quality	Process to monitor efficient operation of all concerned services and communicate trends to all relevant IMs and RUs	4.2.3.4.4	X		B
				X	B

Parameters to be assessed	Elements to be verified for each parameter	TSI reference	Applicable to		A/B
			RU	IM	
Data Recording	List of data to be recorded outside the train includes minimum list of items required by this TSI	4.2.3.5.1		X	A
	List of data to be recorded inside the train includes minimum list of items required by this TSI	4.2.3.5.2, 4.3.2.3	X		A
Degraded Operation	Process for informing other users of disturbances likely to cause disruption of services	4.2.3.6.2		X	A
			X		A
	Definition of instructions to be given from IM to train drivers in times of service disruption	4.2.3.6.3		X	B
	Definitions of appropriate measures to address service disruption scenarios identified, including minimum requirements listed in this TSI	4.2.3.6.4		X	B
Managing an Emergency Situation	Process to define and publish contingency measures to manage emergency services	4.2.3.7		X	A
	Process for provision of emergency and safety instructions for passengers	4.2.3.7	X		A
Aid to traincrew in the event of major incident	Process to assist traincrew in degraded situations in order to avoid delays	4.2.3.8	X		A
Professional and Linguistic Competency	Process for assessing professional knowledge according to minimum requirements of this TSI	4.6.1.1	X		A
				X	A
	Definition of qualification management system to ensure staff's ability to put knowledge into practice according to minimum requirements of this TSI	4.6.1.2	X		A
				X	A
	Process for assessing linguistic ability to meet minimum requirements of this TSI	4.6.2	X		A
				X	A
	Definition of the assessment process for train crew, including: Basic qualifications, procedures and languages Route knowledge Rolling stock knowledge Special qualification (e.g. long tunnels)	4.6.3.1, 4.6.3.2.3	X		A
				X	A
	Definition of a training and competency needs analysis for staff with safety-critical duties, to take into account minimum requirements of this TSI	4.6.3.2	X		A
				X	A

Parameters to be assessed	Elements to be verified for each parameter	TSI reference	Applicable to		A/B
			RU	IM	
Health and Safety Conditions	Process for ensuring medical fitness of staff, including controls of affects of drugs and alcohol on operational performance	4.7.1	X		A
				X	A
	Determination of criteria for: Approval of occupational doctors and medical organisations Approval of psychologists Medical and psychological examination	4.7.2, 4.7.3, 4.7.4	X		A
				X	A
	Determination of medical requirements, including — General health — Vision — Hearing — Pregnancy (drivers)	4.7.5	X		A
				X	A
	Special requirements for drivers: — Vision — Hearing/speaking requirements — anthropometrics	4.7.6	X		A

ANNEX H

MINIMUM ELEMENTS RELEVANT TO PROFESSIONAL QUALIFICATION FOR THE TASK OF DRIVING A TRAIN**1. General requirements**

- This Annex, which must be read in conjunction with Subsection 4.6 and 4.7, is a list of the elements that are deemed to be relevant to the task of driving a train on the TEN.

It should be noted that whilst this document is as complete as it can be in terms of a generally applicable list, there will be additional items, of a local/national nature, that will also need to be considered.

- The expression 'professional qualification', when taken within the context of this TSI, refers to those elements that are important to ensuring that operational staff are trained and able to understand and discharge the elements of the task.
- 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.
- Any authorised qualified person must carry out all rules and procedures related to the task being performed..

2. Professional knowledge

Any authorisation requires a successfully passed initial examination and provisions for ongoing assessment and training as described in Subsection 4.6.

2.1. General professional knowledge

- General principles of safety management within the railway system, relevant to the task, including interfaces with other subsystems
- General conditions relevant to the safety of passengers and/or cargo and persons on or about the railway track
- Conditions of health and safety at work
- General principles of security of the railway system
- Personal safety including when leaving the driving cab on the running line
- General principles of safe train loading (freight operators)
- Train composition (*as required by the company*)
- Knowledge of electrical principles in respect to rolling stock and the infrastructure.

2.2. Knowledge of operational procedures and safety systems applied to the infrastructure to be used

- Operational procedures and safety rules
- Control command and signalling system including related cab signalling indications
- Regulations for train driving in normal, degraded and emergency conditions
- Communications principles and formalised messaging procedure including use of communication equipment
- The different roles and responsibilities of persons involved in the operation process
- Documents and other information related to the task including additional advice on current conditions e.g. regarding speed limits or temporary signalling received before departure

2.3. *Knowledge of rolling stock*

- Traction unit equipment relevant to the driving task:
 - Constituent parts and their purpose
 - Communication and emergency equipment
 - Control devices and indicators placed at the disposal of the driver and which concern traction, braking and traffic safety related elements
- Vehicle equipment relevant to the driving task:
 - Constituent parts and their purpose
 - Control devices and indicators placed at the disposal of the driver which concern braking and traffic safety related elements
 - Meaning of markings on the inside and outside of vehicles and the symbols used for the transportation on dangerous goods

3. **Route knowledge**

Route knowledge comprises the specific knowledge and/or experience of the individual characteristics of a route that a driver needs to have before being permitted to drive a train over it on his own responsibility. It comprises the knowledge that is needed in addition to information given by signals and documents such as timetables and other on board documents and in addition to knowledge of operations and safety rules applying to the route and as specified in clause 2.2 of this Annex.

Route knowledge covers in particular:

- The conditions of operation such as: signalling and control and communications
- Knowledge of the location of signals, steep gradients, and level crossings
- Points of transition between different operating systems or power supplies
- The type of traction power supply on the line concerned including location of neutral sections
- Local operating and emergency arrangements
- Stations and stopping points
- Local installations (depots, sidings,...) as required by the company .

4. **Ability to put the knowledge into practise**

The staff undertaking train driving duties must be capable of carrying out the following tasks (as appropriate to the company's activities)

4.1. *Prepare for duty*

- Identify the characteristics of the work to be done including any corresponding documents
- Ensure that documents and necessary equipment are complete
- Verify any requirements set out in the on board documents

4.2. *Prior to departure, perform the required tests, checks and verifications on the traction unit*

- 4.3. *Take part in checking the operation of the brakes on the train*
- Check before departure, based on the relevant documents, if the available brake performance complies with what is required for the train and the route it is to travel over.
 - Contribute to the brake tests as required by relevant operation rules and verify the correct working of the brake system
- 4.4. *Drive the train respecting the appropriate safety regulations, driving rules and timetable*
- Start movement of the train only if all requirements provided — especially train data — in the relevant rules are met.
 - Observation of track side signals and in-cab devices, understanding them immediately and correctly and react accordingly while running the train.
 - Take into account the speed limit of the train in relation to the type of train, the characteristics of the line, the traction unit and any information the driver is provided with before departure
- 4.5. *Act and report in accordance with the applicable rules in case of irregularities or defects either of lineside installations or rolling stock*
- 4.6. *Apply measures relating to operational incidents and accidents, particularly those relating to train protection and to fire or dangerous goods*
- Initiate all appropriate measures to protect passengers and other persons that could be endangered. Provide necessary information and take part in the evacuation of passengers as required
 - Inform the Infrastructure Manager as appropriate.
 - Communication with on-board staff (as required by the Railway Undertaking).
 - Apply the special rules related to the transport of dangerous goods.
- 4.7. *Determine the conditions to continue to run after incidents affecting the rolling stock*
- Decide dependent on the operational procedures and on the basis of personal examination or external advice, if the train is able to continue to run and what kind of conditions must be observed.
 - Communicate to the Infrastructure Manager as required by the operational rules
- 4.8. *Park the train and, once stationary, take all required measures to ensure the train remains stationary*
- 4.9. *Communicate with the Infrastructure Manager's staff on the ground*
- 4.10. *Report any unusual occurrences concerning the operation of the train, the conditions of the infrastructure etc.*
- If required this report must be made in writing, in the language chosen by the Railway Undertaking.

ANNEX I

NOT USED

ANNEX J

MINIMUM ELEMENTS RELEVANT TO PROFESSIONAL QUALIFICATION FOR THE TASKS ASSOCIATED WITH 'ACCOMPANYING TRAINS'**1. General requirements**

- This Annex, which must be read in conjunction with Subsection 4.6 and 4.7, is a list of the elements that are deemed to be relevant to the task of accompanying a train on the TEN.

It should be noted that whilst this document is as complete as it can be in terms of a generally applicable list, there will be additional items, of a local/national nature, that will also need to be considered.

- The expression 'professional qualification', when taken within the context of this TSI, refers to those elements that are important to ensuring that operational staff are trained and able to understand and discharge the elements of the task.
- 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.
- Any authorised qualified person must carry out all rules and procedures related to the task being performed.

2. Professional knowledge

Any authorisation requires a successfully passed initial examination and provisions for ongoing assessment and training as described in Subsection 4.6.

2.1. General professional knowledge

- General principles of safety management within the railway system, relevant to the task, including interfaces with other subsystems
- General conditions relevant to the safety of passengers and/or cargo and persons on or about the railway track
- Conditions of health and safety at work
- General principles of security of the railway system
- Personal safety including when leaving the train on the running line

2.2. Knowledge of operational procedures and safety systems applied to the infrastructure to be used

- Operational procedures and safety rules
- Control command and signalling system
- Communications principles and formalised messaging procedure including use of communication equipment

2.3. Knowledge of rolling stock

- Passenger vehicle interior equipment:
- Repairing minor defects within the passenger areas of rolling stock, as required by the Railway Undertaking

2.4. Knowledge of the route

- Operational arrangements (such as the method of train despatch) at individual locations (signalling, station equipment etc.)
- Stations at which passengers may alight or join
- Local operating and emergency arrangements specific to the line(s) of route

3. Ability to put the knowledge into practise

- Checks before departure, including brake tests and correct closure of the doors.
- Departure processes
- Communication with passengers especially in relation to circumstances involving passenger safety.
- Degraded operations
- Assess the potential of a defect within the passenger areas and react according to rules and procedures
- Protection and warning measures as required by the rules and regulations or in assistance to the driver
- Train evacuation and passenger safety especially if they are required to be on or near the line.
- Communicate with the Infrastructure Manager's staff when assisting the driver or during an evacuation incident.
- 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 must be made in writing, in the language chosen by the Railway Undertaking.

ANNEX K

NOT USED

ANNEX L

MINIMUM ELEMENTS RELEVANT TO PROFESSIONAL QUALIFICATION FOR THE TASK OF PREPARING TRAINS**1. General requirements**

- This Annex, which must be read in conjunction with Subsection 4.6, is a list of the elements that are deemed to be relevant to the task of preparing a train on the TEN.

It should be noted that whilst this document is as complete as it can be in terms of a generally applicable list, there will be additional items, of a local/national nature, that will also need to be considered.

- The expression 'professional qualification', when taken within the context of this TSI, refers to those elements that are important to ensuring that operational staff are trained and able to understand and discharge the elements of the task.
- 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.
- Any authorised qualified person must carry out all rules and procedures related to the task being performed.

2. Professional knowledge

Any authorisation requires a successfully passed initial examination and provisions for ongoing assessment and training as described in Subsection 4.6.

2.1 General professional knowledge

- General principles of safety management within the railway system, relevant to the task, including interfaces with other subsystems
- General conditions relevant to the safety of passengers and/or cargo including the carriage of dangerous goods and exceptional loads
- Conditions of health and safety at work
- General principles of security of the railway system
- Personal safety when on or in the vicinity of rail lines
- Communications principles and formalised messaging procedure including use of communication equipment

2.2 Knowledge of operational procedures and safety systems applied to the infrastructure to be used

- Working of trains in normal, degraded and emergency conditions
- Operational procedures at individual locations (signalling, station/depot/yard equipment) and safety rules
- Local operating arrangements

2.3 Knowledge of train equipment

- Purpose and use of wagon and vehicle equipment
- Identification of and arranging for technical inspections.

3. Ability to put the knowledge into practise

- Application of train composition rules, train braking rules, train loading rules etc. to ensure the train is in running order
- Understanding of marking and labels on vehicles
- Process for determining and making train data available
- Communication with train crew
- Communication with staff responsible for controlling the movement of trains
- Degraded operations especially as it affects the preparation of trains
- Protection and warning measures as required by the rules and regulations or local arrangements at the location in question
- Actions to be taken in respect to incidents involving the carriage of dangerous goods (where relevant)

ANNEX M

NOT USED

ANNEX N

IMPLEMENTATION GUIDELINES

The table below is informative and lists clauses from Chapter 4 and identifies a likely trigger for each of them.

Chapter 4 section	Work required by IM/RU to comply with requirements	Typical Trigger
4.2.1.2.1 Rule Book	RU — Production/revision of a document or a computer medium containing necessary operational procedures for working over IM's network	Change to network operational instructions
4.2.1.2.2.1 Preparation of the Route Book	RU — Production/revision of a document or a computer medium containing a description of the lines over which they will operate	Change to network infrastructure (e.g. junction re-modelling, re-signalling) resulting in amended route information
4.2.1.2.2.2 Modified Elements	RU — Definition/revision of procedure(s) whereby a document or computer medium is provided to drivers to inform them of any [route] elements modified	Change to RU's operational safety management system, resulting in amended roles and responsibilities
4.2.1.2.2.3 Informing the driver in real time	IM — Definition/revision of procedure(s) for advising drivers in real time about all modifications to [route] safety arrangements	Change to IM's or RU's organisational structure, resulting in amended roles and responsibilities
4.2.1.2.3 Timetables	RU — Definition/revision of procedure(s) for providing drivers with timetable information, in paper or electronic format	Change to RU's operational safety management system, resulting in amended roles and responsibilities
		Implementation of new (electronic) traffic management system
4.2.1.2.4 Rolling Stock	RU — Production/revision of a document or a computer medium containing necessary operational procedures associated with working of rolling stock during degraded situations.	Change to RU's operational safety management system, resulting in amended roles and responsibilities
		Implementation of new/modified rolling stock
4.2.1.3 Documentation for RU staff other than drivers	RU — Production/revision of a document or a computer medium containing necessary operational procedures for staff other than drivers working on or over IM's network	Change to RU's operational safety management system, resulting in amended roles and responsibilities
		Change to network infrastructure resulting in amended route information or introduction of new/modified rolling stock
4.2.1.4 Documentation for IM staff authorising train movements	IM — Production/revision of a document or a computer medium containing network operational procedures, including communications principles and the Book of Forms	Change to network operational arrangements as a result of an identified improvement action (e.g. inquiry recommendation)
		Change to network infrastructure resulting in amended operational arrangements
4.2.1.5 Safety-related communication between RU and IM staff	IM/RU — Document/computer mediums referred to in 4.2.1.2.1, 4.2.1.3 & 4.2.1.4 to include operational communication methodology as specified in annex C of the TSI	In conjunction with 4.2.1.2.1, 4.2.1.3 & 4.2.1.4
4.2.2.1.2 Train Visibility (Front End)	RU — Definition/revision of procedure(s) for drivers and/or other operational staff to ensure correct front end illumination	Change to RU's operational safety management system, resulting in amended roles and responsibilities
		Implementation of new/modified rolling stock

Chapter 4 section	Work required by IM/RU to comply with requirements	Typical Trigger
4.2.2.1.3 Train Visibility (Rear End)	RU — Definition/revision of procedure(s) for drivers and/or other operational staff to ensure correct rear end identification	Change to RU's operational safety management system, resulting in amended roles and responsibilities
		Implementation of new/modified rolling stock
4.2.2.4 Freight vehicle loading	RU — Production/revision of a document or a computer medium containing Loading Rules to be applied by RU staff.	Change to RU's operational safety management system, as a result of new/modified rolling stock or traffic flows
4.2.2.5 Train composition	RU — Definition/revision of procedure(s) to ensure that the trains is in compliance with the allocated path	Change to RU's operational safety management system, resulting in amended roles and responsibilities
		Change to network operational rules affecting train composition
		New/alterd infrastructure, signalling or implementation of new (electronic) traffic management system
4.2.2.6.1 Minimum requirements of the braking system	RU — Definition/revision of procedure(s) for operational staff to ensure that vehicles in train comply with braking requirements	Change to RU's operational safety management system, resulting in amended roles and responsibilities
4.2.2.6.2 Brake performance	IM — Definition/revision of procedure(s) for supplying RU's with braking performance information RU — Production/revision of a document or a computer medium containing braking rules for its staff to follow, taking into account geography of route(s), allocated pathway and development of ERTMS/ETCS	Change to IM's operational safety management system, resulting in amended roles and responsibilities
		Change to RU's operational safety management system, resulting in amended roles and responsibilities
		Change to network operational rules affecting braking rules
		New/alterd infrastructure, signalling or implementation of new (electronic) traffic management system
		Implementation of new/modified rolling stock
4.2.2.7.1 Ensuring that the train is in running order (General Requirements)	RU — Definition/revision of procedure(s) for operational staff to ensure that vehicles are in running order, including advising IM of changes that may affect running performance and running in degraded mode.	Change to RU's operational safety management system, resulting in amended roles and responsibilities
4.2.2.7.2 Data required	RU — Definition/revision of procedure(s) to ensure that train running information is made available to IM prior to departure	Change to RU's operational safety management system, resulting in amended roles and responsibilities
		Implementation of new (electronic) traffic management system
4.2.3.2 Identification of Trains	IM — Definition/revision of procedure(s) for assigning unique and unambiguous train identification numbers	Change to IM's or RU's train planning system, resulting in amended roles and responsibilities
		Implementation of new (electronic) traffic management system
4.2.3.3.1 Checks & tests before departure	RU — Definition/revision of checks and tests that must be undertaken before departure	Change to RU's operational safety management system, resulting in amended roles and responsibilities

Chapter 4 section	Work required by IM/RU to comply with requirements	Typical Trigger
4.2.3.3.2 Informing IM of train's operational status	RU- Definition/revision of procedure(s) for reporting rolling stock-related factors that could affect train running	Change to IM's or RU's operational safety management system, resulting in amended roles and responsibilities
		Implementation of new (electronic) traffic management system
4.2.3.4.1 Traffic Management General Requirements	IM — Definition/revision of procedure(s) for control and supervision of traffic operation, including interface with any additional processes required by RU's	Change to IM's or RU's operational safety management system, resulting in amended roles and responsibilities
		Implementation of new (electronic) traffic management system
4.2.3.4.2 Train Reporting	IM — Definition/revision of procedure(s) for train position reporting, including real time recording of arrivals/departures and predicted hand over times to other IM's.	Change to IM's traffic management system, resulting in amended roles and responsibilities
		Implementation of new (electronic) traffic management system
4.2.3.4.3 Dangerous Goods	RU — Definition/revision of procedure(s) for supervising the transport of dangerous goods, including provision of information required by IM.	Change to IM's or RU's operational safety management system, resulting in amended roles and responsibilities
4.2.3.4.4 Operational Quality	IM/RU — Documented procedures, describing internal processes for monitoring and review of operational performance and identifying improvement actions to improve network efficiency.	Change to IM's or RU's traffic management system, resulting in amended roles and responsibilities
		Implementation of new (electronic) traffic management system, including performance monitoring
4.2.3.5.1 Recording of Supervision data outside the train	IM — Definition/revision of procedure(s) for recording the required data, and storage and access arrangements	Change to IM's operational safety management system, resulting in amended roles and responsibilities
		Change to network infrastructure resulting in new/amended monitoring equipment
4.2.3.5.2 Recording of Supervision data on-board the train	RU — Definition/revision of procedure(s) for recording the required data, and storage and access arrangements	Change to RU's operational safety management system, resulting in amended roles and responsibilities
		Implementation of new/modified rolling stock (locomotives, multiple units)
4.2.3.6.1 Degraded Operation — Advice to other users	IM/RU — Definition/revision of procedure(s) for informing each other of situations likely to impede safety, performance or availability of network	Change to IM's or RU's traffic management system, resulting in amended roles and responsibilities
		Implementation of new (electronic) traffic management system
4.2.3.6.2 Advice to train drivers	IM — Definition/revision of instructions to drivers to deal with degraded situation	Change to IM's or RU's traffic management system, resulting in amended roles and responsibilities
4.2.3.6.3 Contingency arrangements	IM — Definition/revision of procedure(s) for dealing with degraded operation, including rolling stock and infrastructure failures (contingency arrangements)	Change to IM's or RU's traffic management system, resulting in amended roles and responsibilities
		Change to network infrastructure or introduction of new/modified rolling stock

Chapter 4 section	Work required by IM/RU to comply with requirements	Typical Trigger
4.2.3.7 Managing an Emergency Situation	IM/RU — Definition/revision of procedure(s) detailing contingency measures for dealing with emergency situations	Change to RU's operational safety management system, resulting in amended roles and responsibilities
4.2.3.8 Aid to traincrew for rolling stock incident/malfunction	RU — Definition/revision of procedure(s) for traincrew to deal with technical or other failure of rolling stock	Change to RU's traffic management system, resulting in amended roles and responsibilities Introduction of new/modified rolling stock
4.4 Operating Rules	IM/RU — Definition of rules and procedures to be used with ETCS and GSM-R and/or HABD	Introduction of ETCS signalling system and/or GSM-R radio system and/or HABD
4.6.1.1 Professional Knowledge	IM/RU — Definition of Process for assessing professional knowledge	Change to IM/RU's operational safety management system, resulting in amended roles and responsibilities
4.6.1.2 Ability to put this knowledge into practice	IM/RU — Definition/revision of competence management system to ensure staff's ability to put knowledge into practice	Change to IM/RU's operational safety management system, resulting in amended roles and responsibilities
4.6.2.2 Linguistic level of knowledge	IM/RU — Definition/revision of procedure(s) for assessing linguistic ability	Change to IM/RU's operational safety management system, resulting in amended roles and responsibilities
4.6.3.1 Assessment of Staff — Basic Elements	IM/RU — Definition/revision of assessment process(es) staff including : — Experience/qualifications — Language — Competency retention	Change to IM/RU's operational safety management system, resulting in amended roles and responsibilities
4.6.3.2 Analysis of Training Needs	IM/RU — Definition/revision of the process for undertaking and updating analysis of training needs for staff	Change to IM/RU's operational safety management system, resulting in amended roles and responsibilities
4.6.3.2.3 Specific elements for traincrew	RU — Definition/revision of the process for train crew acquisition and retention of: — Route knowledge — Rolling stock knowledge	Change to RU's operational safety management system, resulting in amended roles and responsibilities
4.7.1 Health and Safety Conditions Introduction	IM/RU — Definition/revision of procedure(s) for ensuring medical fitness of staff, including controls of affects of drugs and alcohol on operational performance	Change to RU's operational safety management system, resulting in amended roles and responsibilities
4.7.2-4.7.4 Criteria for approval of occupational doctors, medical organisations, psychologists & examinations	IM/RU — Determination/revision of criteria for: — Approval of occupational doctors and medical organisations — Approval of psychologists — Medical and psychological examination	Change to RU's operational safety management system, resulting in amended roles and responsibilities Change to national rules and practices for approval of medical practitioners and recognition of organisations
4.7.5 Medical requirements	IM/RU — Determination/revision of medical requirements, including — General health — Vision — Hearing — Pregnancy	Change to RU's operational safety management system, resulting in amended roles and responsibilities

Chapter 4 section	Work required by IM/RU to comply with requirements	Typical Trigger
4.7.6 Specific Requirements regarding the task of driving a train	IM/RU — Determination/revision of specific driver medical requirements, including: — ECG Monitoring (40+ year old) — Vision — Hearing/speaking requirements — Anthropometrics	Change to RU's operational safety management system, resulting in amended roles and responsibilities

ANNEX O

NOT USED

ANNEX P

VEHICLE IDENTIFICATION

General remarks:

1. This annex describes the number and linked marking applied in a visible manner on the vehicle to identify it uniquely in operation. It does not describe other numbers or markings eventually engraved or fixed in a permanent manner on the chassis or the main components of the vehicle during its construction.
2. The conformity of the number and linked marking with the indications described in this annex is not mandatory for:
 - vehicles that are only used on networks to which this TSI does not apply;
 - heritage vehicles, in a historical guise;
 - vehicles that are not normally used or transported on the networks to which this TSI applies.

Nevertheless, these vehicles must receive a temporary number permitting their operation.

3. This annex is subject to changes due to the future evolution of RIC and future implementation of the TAF TSI and TAP TSI.

Standard number and linked abbreviations

Each railway vehicle receives a number consisting of 12 figures (called standard number) with the following structure:

Types of rolling stock	Type of vehicle and indication of the interoperability [2 figures]	Country in which the vehicle is registered [2 figures]	Technical characteristics [4 figures]	Serial number [3 figures]	Self-checking digit [1 figure]
Wagons	00 to 09 10 to 19 20 to 29 30 to 39 40 to 49 80 to 89 <i>[details in annex P.6]</i>	01 to 99 <i>[details in annex P.4]</i>	0000 to 9999 <i>[details in annex P.9]</i>	001 to 999	0 to 9 <i>[details in annex P.3]</i>
Hauled passenger vehicles	50 to 59 60 to 69 70 to 79 <i>[details in annex P.7]</i>		0000 to 9999 <i>[details in annex P.10]</i>	001 to 999	
Tractive rolling stock	90 to 99 <i>[details in annex P.8]</i>		0000001 to 8999999 <i>[the meaning of these figures is defined by the Member States, eventually by bilateral or multilateral agreement]</i>		
Special vehicles			9000 to 9999 <i>[details in annex P.11]</i>	001 to 999	

In a given country, the 7 digits of technical characteristics and serial number are sufficient to identify uniquely a vehicle inside each group of wagons, hauled passenger vehicles, tractive rolling stock ⁽¹⁾ and special vehicles ⁽²⁾.

Alphabetical markings complete the number:

- a) markings linked to the interoperability ability (*details in annex P.5*);
- b) abbreviation of the country in which the vehicle is registered (*details in annex P.4*);
- c) keeper's ⁽³⁾ abbreviation (*details in annex P.1*);
- d) abbreviation of the technical characteristics (*details in annex P.13 for the hauled passenger vehicles, annex P.12 for the wagons, annex P.14 for the special vehicles*).

Technical characteristics, codes and abbreviations are managed by one or more bodies (hereafter designed as 'central body') to be proposed by ERA (European Railway Agency) as a result of activity N° 15 of its work programme 2005.

Allocation of number

The rules for the management of the numbers will be proposed by the ERA as part of the activity N°15 of its work programme 2005.

⁽¹⁾ For tractive rolling stock, the number has to be unique in a given country with 6 digits.

⁽²⁾ For special vehicles, the number has to be unique in a given country with the first digit and the 5 last digits of the technical characteristics and serial number.

⁽³⁾ A vehicle keeper is the person, who being the owner or having the right to dispose of it, exploits a vehicle economically in a permanent manner as a means of transport and is registered as such in the Rolling Stock Register.

ANNEX P.1

KEEPER'S ABBREVIATION MARKING**Definition of the Vehicle Keeper Marking (VKM)**

A Vehicle Keeper Marking (VKM) is an alphanumeric code, consisting of 2 to 5 letters ⁽¹⁾. A VKM is inscribed on each rail vehicle, near the vehicle number. The VKM denominates the Vehicle Keeper as registered in the Rolling Stock Register.

A VKM is unique in all countries covered by this TSI and all countries that enter into an agreement that involves the application of the system of vehicle numbering and vehicle keeper marking as described in this TSI.

Format of the Vehicle Keeper Marking

The VKM is representation of the full name or abbreviation of the vehicle keeper, if possible in a recognisable manner. All 26 letters of the Latina alphabet may be used. The letters in the VKM are written in capitals. Letters that do not stand for first letters of words in the keeper's name may be written in lower case. For checking uniqueness, the written name will be ignored.

Letters may contain diacritical signs ⁽²⁾. Diacritical signs used by these letters are ignored for checking uniqueness.

For vehicles of keepers that reside in a country that does not use the Latin alphabet, a translation of the VKM in its own alphabet may be applied behind the VKM separated from it by a slash-sign ('/'). This translated VKM is disregarded for data-processing purposes.

Exemptions for using a Vehicle Keeper Marking

Member States may decide to apply the following exemptions.

A VKM is not required for the vehicles whose numbering system does not follow the present annex (cf. general remark, point 2). Nevertheless, adequate information about the identity of the vehicle keeper has to be provided to the organisations involved in their operation over networks to which this TSI applies.

When the full name and address information is inscribed on the vehicle, a VKM is not required for:

- vehicles of keepers with such a limited vehicle fleet that this does not warrant the use of a VKM;
- specialised vehicles for infrastructure maintenance.

A VKM is not required for locomotives, multiple units and passenger vehicles used in national traffic only, when:

- they carry their keeper's logo and that logo contains the same and well recognisable letters as the VKM;
- they carry a well recognisable logo that has been accepted by the competent national authority as an adequate equivalent for the VKM.

When a company logo is applied in addition to the application of a VKM, only the VKM is valid and the logo is disregarded.

Provisions about allocation of Vehicle Keeper Markings

A vehicle keeper can be issued more than one VKM, in case:

- the vehicle keeper has a formal name in more than one language;
- a vehicle keeper has good cause to distinguish between separate vehicle fleets within his organisation.

⁽¹⁾ For NMBS/SNCB, the use of an encircled single letter B can be continued

⁽²⁾ Diacritical marks are 'accent-signs', such as in Å, Ç, Ö, Ć, Ž, Å etc. Special letters such as Ø and Æ will be represented by a single letter; in tests for uniqueness Ø is treated as O and Æ as A.

A single VKM can be issued for a group of companies:

- that belong to single corporate structure that has appointed and mandated one organisation within this structure to handle all issues on behalf of all others;
- that has mandated a separate, single legal entity for handling all issues on their behalf, in which event the legal entity is the keeper.

Register of Vehicle Keeper Markings and procedure for allocation

The register of VKM is public and updated on a real time basis.

An application for a VKM is filed with the applicant's competent national authority and forwarded to the central body. A VKM can be used only after publication by the central body.

The holder of a VKM must inform the competent national authority when he ends the use of a VKM, and the competent national authority will forward the information to the central body. A VKM will then be revoked once the keeper has proved that the marking has been changed on all vehicles concerned. It will not be reissued for 10 years, unless it is reissued to the original holder or at his request to another holder.

A VKM can be transferred to another holder, which is the legal successor to the original holder. A VKM stays valid when the holder changes his name to a name that does not bear resemblance to the VKM.

The first list of VKM will be drafted using existing railway company abbreviations.

The VKM will be applied to all new build vehicles after entry into force of the relevant TSIs. Existing vehicles will have until end 2014 to comply with VKM marking.

ANNEX P.2

INSCRIPTION OF THE NUMBER AND LINKED ALPHABETICAL MARKING ON THE BODYWORK**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.

Wagons

The marking shall be inscribed on the wagon bodywork in the following manner:

23	TEN	31	TEN	33	TEN	43	(In this case without VKM, full name and address information is inscribed on the vehicle)
80	D-RFC	80	D-DB	84	NL-ACTS	87	
7369 553-4		0691 235-2		4796 100-8		4273 361-3	
Zcs		Tanoos		Slpss		Laeks	

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 must be shown after the international letter marking and separated from it by a hyphen.

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
B¹⁰ 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 number is also written inside the cabin.

Locomotives, power cars and special vehicles

The standard 12-digit number must be marked on each sidewall of the tractive stock used in international service in the following manner:

91 88 0001323-0

The standard 12-digit number is also written inside each cabin of the tractive rolling stock.

The keeper can add, in letters of larger size than the standard 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.

Examples	SP 42037	ES 64 F4 — 099	88 — 1323	473011
	92 51 0042037-9	94 80 0189 999 — 6	91 88 0001323-0	92 87 473011-0 94 79 2 642 185-5

These rules may be altered in bilateral agreements for vehicles existing when the TSI comes into force and assigned to a specific service and where there is no risk of confusion between different stocks operating on the rail networks concerned. The exemption is valid for a period decided upon by the competent national authorities.

The national authority can prescribe that the alphabetic country code and the VKM be recorded additional to the 12 digit vehicle number.

ANNEX P.3

RULES FOR THE DETERMINATION OF THE CHECK-DIGIT (DIGIT 12)

The check-digit is determined in the following manner:

- the digits in the even positions of the basic number (counting from the right) are taken at their own decimal value;
- the digits in the odd positions of the basic number (counting from the right) are multiplied by 2;
- the sum formed by the digits in even position and by all the digits which constitute the partial products obtained from the odd positions is then established;
- the units digit of this sum is retained;
- the complement required to bring the units digit to 10 forms the check-digit; should this units digit be nought, then the check-digit will also be nought.

Examples

1.	Let the basic number be	3	3	8	4	4	7	9	6	1	0	0
	Multiplication factor	2	1	2	1	2	1	2	1	2	1	2
		6	3	16	4	8	7	18	6	2	0	0

Sum: $6 + 3 + 1 + 6 + 4 + 8 + 7 + 1 + 8 + 6 + 2 + 0 + 0 = 52$

The units digit of this sum is 2.

The check-digit number will therefore be 8 and the basic number thus becomes the registration number 33 84 4796 100 - 8.

2.	Let the basic number be	3	1	5	1	3	3	2	0	1	9	8
	Multiplication factor	2	1	2	1	2	1	2	1	2	1	2
		6	1	10	1	6	3	4	0	2	9	16

Sum: $6 + 1 + 1 + 0 + 1 + 6 + 3 + 4 + 0 + 2 + 9 + 1 + 6 = 40$

The units digit of this sum is 0.

The check-digit number will therefore be 0 and the basic number thus becomes the registration number 31 51 3320 198 - 0.

ANNEX P.4

CODING OF THE COUNTRIES IN WHICH THE VEHICLES ARE REGISTERED (DIGITS 3-4 AND ABBREVIATION)

'Information relating to third countries given for information purposes only.'

Countries	Alphabetical country code ⁽¹⁾	Numerical country code	Companies concerned by the square brackets in annexes P.6 and P.7 ⁽²⁾
Albania	AL	41	HSh
Algeria	DZ	92	SNTF
Armenia	AM ⁽³⁾	58	ARM
Austria	A	81	ÖBB
Azerbaijan	AZ	57	AZ
Belarus	BY	21	BC
Belgium	B	88	SNCB/NMBS
Bosnia-Herzegovina	BIH	44	ŽRS
		50	ŽFBH
Bulgaria	BG	52	BDZ, SRIC
China	RC	33	KZD
Croatia	HR	78	HŽ
Cuba	CU ⁽³⁾	40	FC
Cyprus	CY		
Czech Republic	CZ	54	ČD
Denmark	DK	86	DSB, BS
Egypt	ET	90	ENR
Estonia	EST	26	EVR
Finland	FIN	10	VR, RHK
France	F	87	SNCF, RFF
Georgia	GE	28	GR
Germany	D	80	DB, AAE ⁽⁴⁾
Greece	GR	73	CH
Hungary	H	55	MÁV, GySEV/ROeEE ⁽⁴⁾
Iran	IR	96	RAI
Iraq	IRQ ⁽³⁾	99	IRR
Ireland	IRL	60	CIE
Israel	IL	95	IR
Italy	I	83	FS, FNME ⁽⁴⁾

Countries	Alphabetical country code ⁽¹⁾	Numerical country code	Companies concerned by the square brackets in annexes P.6 and P.7 ⁽²⁾
Japan	J	42	EJRC
Kazakhstan	KZ	27	KZH
Kyrgyzstan	KS	59	KRG
Latvia	LV	25	LDZ
Lebanon	RL	98	CEL
Liechtenstein	LIE ⁽³⁾		
Lithuania	LT	24	LG
Luxembourg	L	82	CFL
Macedonia (Former Yugoslav Republic of)	MK	65	CFARYM (MŽ)
Malta	M		
Moldova	MD ⁽³⁾	23	CFM
Monaco	MC		
Mongolia	MGL	31	MTZ
Morocco	MA	93	ONCFM
Netherlands	NL	84	NS
North Korea	PRK ⁽³⁾	30	ZC
Norway	N	76	NSB, JBV
Poland	PL	51	PKP
Portugal	P	94	CP, REFER
Romania	RO	53	CFR
Russia	RUS	20	RZD
Serbia-Montenegro	SCG	72	JŽ
Slovakia	SK	56	ŽSSK, ŽSR
Slovenia	SLO	79	SŽ
South Korea	ROK	61	KNR
Spain	E	71	RENFE
Sweden	S	74	GC, BV
Switzerland	CH	85	SBB/CFR/FFS, BLS ⁽⁴⁾
Syria	SYR	97	CFS
Tajikistan	TJ	66	TZD
Tunisia	TN	91	SNCFT
Turkey	TR	75	TCDD

Countries	Alphabetical country code ⁽¹⁾	Numerical country code	Companies concerned by the square brackets in annexes P.6 and P.7 ⁽²⁾
Turkmenistan	TM	67	TRK
Ukraine	UA	22	UZ
United Kingdom	GB	70	BR
Uzbekistan	UZ	29	UTI
Vietnam	VN ⁽³⁾	32	DSVN

⁽¹⁾ According to the alphabetical coding system described in Appendix 4 to the 1949 convention and Article 45(4) of the 1968 convention on road traffic.

⁽²⁾ Companies who, at the time of coming into force, were members of UIC or OSJD and used the described country code as company code.

⁽³⁾ Codes to be confirmed.

⁽⁴⁾ Until the evolutions indicated in point 3 of the general remarks come into force, these companies can use the codes 43 (GySEV/ROeEE), 63 (BLS), 64 (FNME), 68 (AAE). The period of updating will then be defined together with the concerned Member States.

ANNEX P.5

ALPHABETICAL MARKING OF THE INTEROPERABILITY CAPABILITY

TEN: Vehicle which complies with Rolling Stock TSI
RIV: Wagon, which complies with the RIV regulations at the date of their abolishment
PPW: Wagon which complies with PPW agreement (inside OJSD States)
RIC: Coach which complies/complied with RIC regulations

The alphabetical marking of the interoperability capability concerning special vehicles is described in annex P.14.

INTEROPERABILITY CODES USED FOR WAGONS (DIGITS 1-2).

	1 st digit	2 nd digit	0	1	2	3	4	5	6	7	8	9	2 nd digit	1 st digit
		Gauge	fixed or variable	fixed	variable	fixed	variable	fixed	variable	fixed	variable	fixed or variable	Gauge	
TSI ^(a) and/or COTIF ^(b) and/or PPW	0	with axles	Spare	TSI and/or COTIF wagons ^(b) [of which keeper is a railway undertaking listed in annex P.4]		Not to be used pending further decision						PPW wagons (variable gauge)	with axles	0
	1	with bogies	Wagons used by industry										with bogies	1
	2	with axles	Spare	TSI and/or COTIF wagon ^(b) [of which keeper is a railway undertaking listed in annex P.4] PPW wagons		TSI and/or COTIF wagons ^(b) b PPW wagons				Others TSI and/or COTIF wagons ^(b) PPW wagons		PPW wagons (fixed gauge)	with axles	2
	3	with bogies											with bogies	3
Non TSI and non COTIF ^(b) and non PPW	4	with axles ^(c)	Service wagons	Others wagons [of which keeper is a railways undertaking listed in annex P.4]		Others wagons				Others wagons		Wagons with special numbering for technical characteristics	with axles ^(c)	4
	8	with bogies ^(c)											with bogies ^(c)	8
		Traffic	Domestic traffic or international traffic by special agreement	International traffic by special agreement	Domestic traffic	International traffic by special agreement	Domestic traffic	International traffic by special agreement	Domestic traffic	International traffic by special agreement	Domestic traffic	Domestic traffic or international traffic by special agreement	Traffic	
	1 st digit	2 nd digit	0	1	2	3	4	5	6	7	8	9	2 nd digit	1 st digit

^(a) Compliance at least with Rolling Stock TSI.^(b) Including vehicles, which according to existing regulations carry these digits at the time of coming into force of these new regulations.^(c) Fixed or variable gauge.

INTERNATIONAL TRAFFIC ABILITY CODES USED FOR HAULED PASSENGER VEHICLES (DIGITS 1-2)

Warning:

The conditions between square brackets are transitional and will be deleted with the evolutions of RIC (see general remarks, point 3).

	Domestic traffic	TSI ^(a) and/or RIC/COTIF ^(b) and/or PPW				Domestic traffic or international traffic by special agreement	TSI ^(a) and/or RIC/COTIF ^(b)	PPW		
2 nd digit 1 st digit	0	1	2	3	4	5	6	7	8	9
5	Vehicles for domestic traffic [of which keeper is a RIC railways undertaking listed in annex P.4]	Fixed-gauge non air-conditioned vehicles (including car-carrying wagons) [of which keeper is a RIC railways undertaking listed in annex P.4]	Gauge-adjustable (1435/1520) non air-conditioned vehicles [of which keeper is a RIC railways undertaking listed in annex P.4]	Reserved	Gauge-adjustable (1435/1672) non air-conditioned vehicles [of which keeper is a RIC railways undertaking listed in annex P.4]	Vehicles with special numbering for technical characteristics	Fixed-gauge vehicles	Fixed-gauge vehicles	Gauge-adjustable (1435/1520) vehicles with change of bogies	Gauge-adjustable (1435/1520) vehicles with gauge-adjustable axles
6	Service vehicles not run in revenue-earning service	Fixed-gauge air-conditioned vehicles [of which keeper is a RIC railways undertaking listed in annex P.4]	Gauge-adjustable (1435/1520) air-conditioned vehicles [of which keeper is a RIC railways undertaking listed in annex P.4]	Service vehicles not run in revenue-earning service [of which keeper is a RIC railways undertaking listed in annex P.4]	Gauge-adjustable (1435/1672) air-conditioned vehicles [of which keeper is a RIC railways undertaking listed in annex P.4]	Car-carrying wagons	Gauge-adjustable vehicles			
7	Air-conditioned and pressure-tight vehicles [of which keeper is a RIC railways undertaking listed in annex P.4]	Reserved	Reserved	Pressure-tight fixed-gauge air-conditioned vehicles [of which keeper is a RIC railways undertaking listed in annex P.4]	Reserved	Other vehicles	Reserved	Reserved	Reserved	Reserved

^(a) Compliance at least with future TSI on hauled passenger vehicles.

^(b) Compliance with RIC or COTIF according to the regulation in force.

ANNEX P.8

TYPES OF TRACTIVE STOCK (DIGITS 1-2)

The first digit is '9'.

The second digit is defined by each Member State. It can for example fit with the self-checking digit if this digit is also calculated with the serial number.

If the second digit describes the type of tractive stock, following coding is mandatory:

Code	General vehicle type
0	Miscellaneous
1	Electric locomotive
2	Diesel locomotive
3	Electric multiple-unit set (high speed) [power car or trailer]
4	Electric multiple-unit set (except high speed) [power car or trailer]
5	Diesel multiple-unit set [power car or trailer]
6	Specialised trailer
7	Electric shunting engine
8	Diesel shunting engine
9	Maintenance vehicle

ANNEX P.9

STANDARD NUMERICAL MARKING OF WAGONS (DIGITS 5 TO 7)

This annex indicates in tables the numerical marking in 4 figures associated to the main technical characteristics of the wagon.

This Annex is distributed on a separate medium (electronic file).

CODES FOR THE TECHNICAL CHARACTERISTICS OF THE HAULED PASSENGER STOCK (DIGITS 5-6)

	6 th digit 5 th digit	0	1	2	3	4
Reserved	0	Reserved	Reserved	Reserved	Reserved	Reserved
Vehicles with 1 st class seats	1	10 side-corridor compartments or equivalent open-saloon space with centre aisle	≥ 11 side-corridor compartments or equivalent open-saloon space with centre aisle	Reserved	Reserved	Two or three axles
Vehicles with 2 nd class seats	2	10 side-corridor compartments or equivalent open-saloon space with centre aisle	11 side-corridor compartments or equivalent open-saloon space with centre aisle	≥ 12 side-corridor compartments or equivalent open-saloon space with centre aisle	Three axles	Two axles
Vehicles with 1 st or 1 st /2 nd class seats	3	10 side-corridor compartments or equivalent open-saloon space with centre aisle	11 side-corridor compartments or equivalent open-saloon space with centre aisle	≥ 12 side-corridor compartments or equivalent open-saloon space with centre aisle	Reserved	Two or three axles
1 st or 1 st /2 nd class couchette cars	4	10 1 st /2 nd class compartments	Reserved	Reserved	Reserved	≤ 9 1 st /2 nd class compartments
2 nd class couchette cars	5	10 compartments	11 compartments	≥ 12 compartments	Reserved	Reserved
Reserved	6	Reserved	Reserved	Reserved	Reserved	Reserved
Sleeping cars	7	10 compartments	11 compartments	12 compartments	Reserved	Reserved
Vehicles of special design and vans	8	Driving trailer with seats, all classes, with or without luggage compartment, with driving cab for reversible working	Vehicles with 1 st or 1 st /2 nd class seats with luggage or mail compartment	Vehicles with 2 nd class seats with luggage or mail compartment	Reserved	Vehicles with seats, all classes with specially-fitted areas, e.g. children's play area
	9	Mail vans	Luggage vans with mail compartment	Luggage vans	Luggage vans and two or three-axle 2 nd class vehicles with seats, with luggage or mail compartment	Side-corridor luggage vans, with or without compartment under customs seal

Note: Fractions of a compartment are not considered. The equivalent accommodation in open saloon cars with centre aisle is obtained by dividing the number of available seats by 6, 8 or 10 depending on the construction of the vehicle.

CODES FOR THE TECHNICAL CHARACTERISTICS OF THE HAULED PASSENGER STOCK (DIGITS 5-6)

	6 th digit 5 th digit	5	6	7	8	9
Reserved	0	Reserved	Reserved	Reserved	Reserved	Reserved
Vehicles with 1 st class seats	1	Reserved	Double-deck coaches	≥ 7 side-corridor compartments or equivalent open-saloon space with centre aisle	8 side-corridor compartments or equivalent open-saloon space with centre aisle	9 side-corridor compartments or equivalent open-saloon space with centre aisle
Vehicles with 2 nd class seats	2	Only for OSJD, double-deck coaches	Double-deck coaches	Reserved	≥ 8 side-corridor compartments or equivalent open-saloon space with centre aisle	9 side-corridor compartments or equivalent open-saloon space with centre aisle
Vehicles with 1 st or 1 st /2 nd class seats	3	Reserved	Double-deck coaches	Reserved	≥ 8 side-corridor compartments or equivalent open-saloon space with centre aisle	9 side-corridor compartments or equivalent open-saloon space with centre aisle
1 st or 1 st /2 nd class couchette cars	4	Reserved	Reserved	Reserved	Reserved	≤ 9 1 st class compartments
2 nd class couchette cars	5	Reserved	Reserved	Reserved	Reserved	≤ 9 compartments
Reserved	6	Reserved	Reserved	Reserved	Reserved	Reserved
Sleeping cars	7	> 12 compartments	Reserved	Reserved	Reserved	Reserved
Vehicles of special design and vans	8	Coaches with seats and couchette cars, all classes, with bar or buffet area	Double-deck driving coach with seats, all classes, with or without luggage compartment, with driving cab for reversible working	Dining cars or coaches with bar or buffet area, with luggage compartment	Dining cars	Other special coaches (conference, disco, bar, cinema, video, ambulance coaches)
	9	Two or three-axle luggage vans with mail compartment	Reserved	Two or three-axle car-carrying wagons	Car-carrying wagons	Service vehicles

Note: Fractions of a compartment are not considered. The equivalent accommodation in open saloon cars with centre aisle is obtained by dividing the number of available seats by 6, 8 or 10 depending on the construction of the vehicle.

CODES FOR THE GENERAL CHARACTERISTICS OF HAULED PASSENGER STOCK (DIGITS 7-8)

Energy supply Maximum speed	8 th digit 7 th digit	0	1	2	3	4	5	6	7	8	9
< 120 km/h	0	All tensions (*)	Reserved	3 000 V~ + 3 000 V=	1 000 V~ (*)	Reserved	1 500 V~	Other tensions than 1 000 V, 1 500 V, 3 000 V	1 500 V~ + 1 500 V=	3 000 V=	Reserved
	1	All tensions (*) + Steam (1)	1 000 V~ + Steam (1)	1 000 V~ + Steam (1)	1 000 V~ + Steam (1)	1 000 V~ + Steam (1)	1 000 V~ + Steam (1)	Reserved	1 500 V~ + 1 500 V= + Steam (1)	3 000 V= + Steam (1)	3 000 V= + Steam (1)
	2	Steam (1)	Steam (1)	3 000 V~ + 3 000 V= + Steam (1)	Steam (1)	3 000 V~ + 3 000 V= + Steam (1)	Steam (1)	3 000 V~ + 3 000 V= 1 500 V~ + Steam (1)	1 500 V~ + Steam (1)	1 500 V~ + Steam (1)	A (1)
121 to 140 km/h	3	All tensions	Reserved	1 000 V~ + 3 000 V=	1 000 V~ (*) (1)	1 000 V~ (*) (1)	1 000 V~	1 000 V~ + 1 500 V~ + 1 500 V=	1 500 V~ + 1 500 V=	3 000 V=	3 000 V=
	4	All tensions (*) + Steam (1)	All tensions + Steam (1)	All tensions + Steam (1)	1 000 V~ (*) (1) + Steam (1)	1 500 V~ + 1 500 V=	1 000 V~ + Steam (1)	3 000 V~ + 3 000 V=	1 500 V~ + 1 500 V= + Steam (1)	3 000 V= + Steam (1)	Reserved
	5	All tensions (*) + Steam (1)	All tensions + Steam (1)	All tensions + Steam (1)	1 000 V~ + Steam (1)	Reserved	1 500 V~ + Steam (1)	Other tensions than 1 000 V, 1 500 V, 3 000 V	1 500 V~ + 1 500 V= + Steam (1)	Reserved	Reserved
	6	Steam (1)	Reserved	3 000 V~ + 3 000 V=	Reserved	3 000 V~ + 3 000 V=	Reserved	Steam (1)	Reserved	Reserved	A (1)

Energy supply	8 th digit	0	1	2	3	4	5	6	7	8	9
Maximum speed	7 th digit										
141 to 160 km/h	7	All tensions (*)	All tensions	1 500 V~ ⁽¹⁾ + 3 000 V= ⁽¹⁾ All tensions ⁽²⁾	1 000 V~ (*)	1 500 V~ + 1 500 V=	1 000 V~	1 500 V~	1 500 V~ + 1 500 V=	3 000 V=	3 000 V=
	8	All tensions (*) + Steam ⁽¹⁾	All tensions + Steam ⁽¹⁾	3 000 V~ + 3 000 V=	Reserved	All tensions (*) + Steam ⁽¹⁾	1 000 V~ + Steam ⁽¹⁾	3 000 V~ + 3 000 V=	Other tensions than 1 000 V, 1 500 V, 3 000 V	All tensions (*) + Steam ⁽¹⁾	A ⁽¹⁾ G ⁽²⁾
> 160 km/h	9	All tensions (*) ⁽²⁾	All tensions	All tensions + Steam ⁽¹⁾	1 000 V~ + 1 500 V~	1 000 V~	1 000 V~	Reserved	1 500 V~ + 1 500 V=	3 000 V=	A ⁽¹⁾ G ⁽²⁾

⁽¹⁾ Only for domestic traffic vehicles

⁽²⁾ Only for vehicles able to international traffic

All tensions Single phase alternating current 1 000 V 51 to 15 Hz, single phase alternating current 1 500 V 50 Hz, direct current 1 500 V, direct current 3 000 V. Can include single phase alternating current 3 000 V 50 Hz

(*) For certain vehicles with 1 000V single phase alternating current, only one frequency, either 16 2/3 or 50 Hz, is permitted

A Autonomous heating, without train bus electricity supply line

G Vehicles with train bus electricity supply line for all voltages, but requiring a generator van to supply air-conditioning

Steam Steam heating only. If tensions are written, the code is also available for vehicles without steam heating.

ANNEX P.11

CODES FOR THE TECHNICAL CHARACTERISTICS OF THE SPECIAL VEHICLES (DIGIT 6 TO 8)

Authorised speed for special vehicles (digit 6)

Classification			Self-propelled travelling speed		
			≥ 100 km/h	< 100 km/h	0 km/h
Can be put into a train	V ≥ 100 km/h	Self-propelled	1	2	
		Non self-propelled			3
	V < 100 km/h and/or restrictions ^(a)	Self-propelled		4	
		Non self-propelled			5
Cannot be put into a train		Self-propelled		6	
		Non self-propelled			7
Self-propelled rail/road vehicle than can be put into a train ^(b)				8	
Self-propelled rail/road vehicle than cannot be put into a train ^(b)				9	
Non self-propelled rail/road vehicle ^(b)					0

^(a) By restriction is meant a special position in a train (e.g. at the rear), an obligatory protection wagon, etc.

^(b) Special conditions concerning inclusion in a train must be complied with.

Type and sub-type of special vehicle (digits 7-8)

7th digit	8th digit	Vehicles/machines
1 Infrastructure and superstructure	1	Track laying and renewal train
	2	Switches and crossing laying equipment
	3	Track rehabilitation train
	4	Ballast cleaning machine
	5	Earthworks machine
	6	
	7	
	8	
	9	Rail-mounted crane (excl. rerailling)
	0	Other or general

7th digit	8th digit	Vehicles/machines
2 Track	1	High capacity plain track tamping machine
	2	Other plain track tamping machines
	3	Tamping machine with stabilisation
	4	Tamping machine for switches and crossings
	5	Ballast plough
	6	Stabilisation machine
	7	Grinding and welding machine
	8	Multi-purpose machine
	9	Track inspection car
	0	Other

7th digit	8th digit	Vehicles/machines
3 Overhead line	1	Multi-purpose machine
	2	Rolling and unrolling machine
	3	Mast installation machine
	4	Drum carrier machine
	5	Overhead line tensioning machine
	6	Machine with elevating work platform and machine with scaffold
	7	Cleaning train
	8	Greasing train
	9	Overhead line inspection car
	0	Other
4 Structures	1	Deck laying machine
	2	Bridge inspection platform
	3	Tunnel inspection platform
	4	Gas purification machine
	5	Ventilation machine
	6	Machine with elevating work platform or with scaffold
	7	Tunnel lighting machine
	8	
	9	
	0	Other
5 Loading, unloading and various transport	1	Rail loading/unloading and transport machine
	2	
	3	Loading/unloading and transport machine for ballast, gravel, etc.
	4	
	5	
	6	Sleeper loading/unloading and transport machine
	7	
	8	Loading/unloading and transport machine for switchgear, etc.
	9	Loading/unloading and transport machine for other materials
	0	Other

7th digit	8th digit	Vehicles/machines
6 Measuring	1	Earthworks recording car
	2	Track recording car
	3	Overhead line recording car
	4	Gauge recording car
	5	Signalling recording car
	6	Telecommunications recording car
	7	
	8	
	9	
	0	Other
7 Emergency	1	Emergency crane
	2	Emergency haulage car
	3	Emergency tunnel train
	4	Emergency car
	5	Fire car
	6	Sanitary vehicle
	7	Equipment car
	8	
	9	
	0	Other
8 Traction, transport, energy, etc.	1	Tractive units
	2	
	3	Transport car (excl. 59)
	4	Power car
	5	Track car/powered car
	6	
	7	Concreting train
	8	
	9	
	0	Other

7th digit	8th digit	Vehicles/machines
9 Environment	1	Self-propelled snow plough
	2	Hauled snow plough
	3	Snow broom
	4	De-icing machine
	5	Weed-killing machine
	6	Rail cleaning machine
	7	
	8	
	9	
	0	Other

7th digit	8th digit	Vehicles/machines
0 Rail/road	1	Category 1 rail/road machine
	2	
	3	Category 2 rail/road machine
	4	
	5	Category 3 rail/road machine
	6	
	7	Category 4 rail/road machine
	8	
	9	
	0	Other

ANNEX P.12

LETTER MARKING FOR WAGONS EXCLUDING ARTICULATED AND MULTIPLE WAGONS

DEFINITION OF THE CATEGORY AND INDEX LETTERS

1. Important notes

In the attached tables:

- the information given in meters refers to the inside length of the wagons (lu);
- the information given in tonnes (tu) corresponds to the highest load limit shown in the loading table for the wagon in question, this limit being determined in accordance with the procedures laid down.

2. Index letters with an international value common to all categories

q	pipe for electric heating which can be supplied by all accepted currents
qq	pipe and installation for electric heating which can be supplied by all accepted currents
s	wagons authorised to run under 's' conditions (see annex B of Rolling Stock TSI)
ss	wagons authorised to run under 'ss' conditions (see annex B of Rolling Stock TSI)

3. Index letters with an national value

t, u, v, w, x, y, z

The value of these letters is defined by each Member State.

CATEGORY LETTER: E — OPEN HIGH-SIDED WAGON

Reference wagon		of ordinary type, with side and end tipping, with flat floor with 2 axles: $lu \geq 7,70$ m; $25 t \leq tu \leq 30 t$ with 4 axles: $lu \geq 12$ m; $50 t \leq tu \leq 60 t$ with 6 axles or more: $lu \geq 12$ m; $60t \leq tu \leq 75 t$
Index letters	a	with 4 axles
	aa	with 6 axles or more
	c	with floor traps ^(a)
	k	with 2 axles: $tu < 20 t$ with 4 axles: $tu < 40 t$ with 6 axles or more: $tu < 50 t$
	kk	with 2 axles: $20 t \leq tu < 25 t$ with 4 axles: $40 t \leq tu < 50 t$ with 6 axles or more: $50 t \leq tu < 60 t$
	l	without side tipping
	ll	without floor traps ^(b)
	m	with 2 axles: $lu < 7,70$ m with 4 axles or more: $lu < 12$ m
	mm	with 4 axles or more: $lu > 12$ m ^(b)
	n	with 2 axles: $tu > 30 t$ with 4 axles: $tu > 60 t$ with 6 axles or more: $tu > 75 t$
	o	without end tipping
	p	with station for brakeman ^(b)

^(a) This concept only applies to open high-sided wagons with a flat floor, and provided with a device enabling them to be used, either as ordinary wagons with a flat bottom, or for gravity unloading of certain goods by suitable positioning of the traps.

^(b) Only applicable to wagons with gauge of 1 520 mm.

CATEGORY LETTER: F — OPEN HIGH-SIDED WAGON

Reference wagon		Of special type with 2 axles: $25 \text{ t} \leq tu \leq 30 \text{ t}$ with 3 axles: $25 \text{ t} \leq tu \leq 40 \text{ t}$ with 4 axles: $50 \text{ t} \leq tu \leq 60 \text{ t}$ with 6 axles or more: $60 \text{ t} \leq tu \leq 75 \text{ t}$
Index letters	a	with 4 axles
	aa	with 6 axles or more
	b	high capacity with axles (volume > 45 m ³)
	c	with controlled gravity unloading, on both sides, alternately, at the top ^(a)
	cc	with controlled gravity unloading, on both sides, alternately, at the bottom ^(a)
	f	suitable for traffic with Great Britain
	ff	suitable for traffic with Great Britain (by tunnel exclusively)
	fff	suitable for traffic with Great Britain (by train-ferry exclusively)
	k	with 2 or 3 axles: $tu < 20 \text{ t}$ with 4 axles: $tu < 40 \text{ t}$ with 6 axles or more: $tu < 50 \text{ t}$
	kk	with 2 or 3 axles: $20 \text{ t} \leq tu < 25 \text{ t}$ with 4 axles: $40 \text{ t} \leq tu < 50 \text{ t}$ with 6 axles or more: $50 \text{ t} \leq tu < 60 \text{ t}$
	l	with bulk gravity unloading, on both sides, simultaneously, at the top ^(a)
	ll	with bulk gravity unloading, on both sides, simultaneously, at the bottom ^(a)
	n	with 2 axles: $tu > 30 \text{ t}$ with 3 axles or more: $tu > 40 \text{ t}$ with 4 axles: $tu > 60 \text{ t}$ with 6 axles or more: $tu > 75 \text{ t}$
	o	with axial bulk gravity unloading, at the top ^(a)
	oo	with axial bulk gravity unloading, at the bottom ^(a)
	p	with axial controlled gravity unloading, at the top ^(a)
	pp	with axial controlled gravity unloading, at the bottom ^(a)
	ppp	with station for brakeman ^(b)

^(a) Wagons with gravity unloading in category F are open wagons, which do not have a flat floor and have no tipping facility either at the end or the side.

^(b) Only applicable to wagons with gauge of 1 520 mm.

The method of unloading these wagons is defined by a combination of the following characteristics:

Arrangement of the unloading apertures:

- axial: Apertures situated above the centre of the track
- bilateral: Apertures on either side of the track, outside the rails

(For these wagons, unloading is:

- simultaneous, if complete emptying of the wagon requires the apertures to be open on both sides,
- alternate, if complete emptying of the wagon can take place by opening the apertures on one side only)
- top: The lower edge of the discharge through (without taking into account mobile devices which may extend this through) is situated at least 0,700 m above the rail, and allows for the use of a conveyor belt to take away the goods
- bottom: The position of the lower edge of the discharge through does not allow for the use of a conveyor belt to take away the goods

Rate of unloading:

- bulk: Once the apertures are open for unloading, they cannot be closed again until the wagon is empty
- controlled: At any time during unloading, the flow of the goods can be regulated or even stopped

CATEGORY LETTER: G — COVERED WAGON

Reference wagon		Of ordinary type with at least 8 ventilation apertures with 2 axles: $9\text{ m} \leq l_u < 12\text{ m}$; $25\text{ t} \leq t_u \leq 30\text{ t}$ with 4 axles: $15\text{ m} \leq l_u < 18\text{ m}$; $50\text{ t} \leq t_u \leq 60\text{ t}$ with 6 axles or more: $15\text{ m} \leq l_u < 18\text{ m}$; $60\text{ t} \leq t_u \leq 75\text{ t}$
Index letters	a	with 4 axles
	aa	with 6 axles or more
	b	high capacity: — with 2 axles: $l_u \geq 12\text{ m}$ and payload capacity $\geq 70\text{ m}^3$ — with 4 axles or more: $l_u \geq 18\text{ m}$
	bb	with 4 axles: $l_u > 18\text{ m}$ ^(a)
	g	for grain
	h	for fruits and vegetables ^(b)
	k	with 2 axles: $t_u < 20\text{ t}$ with 4 axles: $t_u < 40\text{ t}$ with 6 axles or more: $t_u < 50\text{ t}$
	kk	with 2 axles: $20\text{ t} \leq t_u < 25\text{ t}$ with 4 axles: $40\text{ t} \leq t_u < 50\text{ t}$ with 6 axles or more: $50\text{ t} \leq t_u < 60\text{ t}$
	l	with less than 8 ventilation apertures
	ll	with enlarged doors apertures ^(a)
	m	with 2 axles: $l_u < 9\text{ m}$ with 4 axles or more: $l_u < 15\text{ m}$
	n	with 2 axles: $t_u > 30\text{ t}$ with 4 axles: $t_u > 60\text{ t}$ with 6 axles or more: $t_u > 75\text{ t}$
	o	with 2 axles: $l_u < 12\text{ m}$ and payload capacity $\geq 70\text{ m}^3$
	p	with station for brakeman ^(a)

^(a) Only applicable to wagons with gauge of 1 520 mm.

^(b) The concept 'for fruits and vegetables' applies only to wagons provided with additional ventilation apertures at the floor level.

CATEGORY LETTER: H — COVERED WAGON

Reference wagon		of special type with 2 axles: $9 \text{ m} \leq \text{lu} \leq 12 \text{ m}$; $25 \text{ t} \leq \text{tu} \leq 28 \text{ t}$ with 4 axles: $15 \text{ m} \leq \text{lu} < 18 \text{ m}$; $50 \text{ t} \leq \text{tu} \leq 60 \text{ t}$ with 6 axles or more: $15 \text{ m} \leq \text{lu} < 18 \text{ m}$; $60 \text{ t} \leq \text{tu} \leq 75 \text{ t}$
Index letters	a	with 4 axles
	aa	with 6 axles or more
	b	with 2 axles: $12 \text{ m} \leq \text{lu} \leq 14 \text{ m}$ and payload capacity $\geq 70 \text{ m}^3$ ^(a) with 4 axles or more: $18 \text{ m} \leq \text{lu} < 22 \text{ m}$
	bb	with 2 axles: $\text{lu} \geq 14 \text{ m}$ with 4 axles or more: $\text{lu} \geq 22 \text{ m}$
	c	with end doors
	cc	with end doors and fitted internally for the transport of motor cars
	d	with floor traps
	dd	with tipping body ^(b)
	e	with 2 floors
	ee	with 3 floors or more
	f	suitable for traffic with Great Britain ^(a)
	ff	suitable for traffic with Great Britain (by tunnel exclusively)
	fff	suitable for traffic with Great Britain (by train-ferry exclusively) ^(a)
	g	for grain
	gg	for cement ^(b)
	h	for fruits and vegetables ^(c)
	hh	for mineral fertilizer ^(b)
	i	with opening or shunt walls
	ii	with very robust opening or shunt walls ^(d)
	k	with 2 axles: $\text{tu} < 20 \text{ t}$ with 4 axles: $\text{tu} < 40 \text{ t}$ with 6 axles or more: $\text{tu} < 50 \text{ t}$
	kk	with 2 axles: $20 \text{ t} \leq \text{tu} < 25 \text{ t}$ with 4 axles: $40 \text{ t} \leq \text{tu} < 50 \text{ t}$ with 6 axles or more: $50 \text{ t} \leq \text{tu} < 60 \text{ t}$
	l	with movable partitions ^(e)
	ll	with lockable movable partitions ^(e)
	m	with 2 axles: $\text{lu} < 9 \text{ m}$ with 4 axles or more: $\text{lu} < 15 \text{ m}$
	mm	with 4 axles or more: $\text{lu} > 18 \text{ m}$ ^(b)
	n	with 2 axles: $\text{tu} > 28 \text{ t}$ with 4 axles: $\text{tu} < 60 \text{ t}$ with 6 axles or more: $\text{tu} > 75 \text{ t}$
	o	with 2 axles: $\text{lu} 12 \text{ m} < 14 \text{ m}$ et volume utile $\geq 70 \text{ m}^3$
	p	with station for brakeman ^(b)

^(a) 2-axle wagons bearing the index letters 'f', 'fff' can have a payload capacity less than 70 m^3 .

^(b) Only applicable to wagons with gauge of 1 520 mm.

^(c) The concept 'for fruits and vegetables' applies only to wagons provided with additional ventilation apertures at the floor level.

^(d) Only applicable to wagons with gauge of 1 435 mm.

^(e) Movable partitions may be dismantled temporarily.

CATEGORY LETTER: I — TEMPERATURE-CONTROLLED WAGON

Reference wagon		refrigerator wagon with class IN thermal insulation, with motor-driven ventilation, with gratings and ice bunker $\geq 3,5 \text{ m}^3$ with 2 axles: $19 \text{ m}^2 \leq \text{floor area} < 22 \text{ m}^2$; $15 \text{ t} \leq \text{tu} \leq 25 \text{ t}$ with 4 axles: floor area $\geq 39 \text{ m}^2$; $30 \text{ t} \leq \text{tu} \leq 40 \text{ t}$
Index letters	a	with 4 axles
	b	with 2 axles and large floor area: $22 \text{ m}^2 \leq \text{floor area} \leq 27 \text{ m}^2$
	bb	with 2 axles and very large floor area: floor area $> 27 \text{ m}^2$
	c	with meat hooks
	d	for fish
	e	with electric ventilation
	f	suitable for traffic with Great Britain
	ff	suitable for traffic with Great Britain (by tunnel exclusively)
	fff	suitable for traffic with Great Britain (by train-ferry exclusively)
	g	with mechanical refrigeration ^(a) ^(b)
	gg	refrigerator with liquefied gas ^(a)
	h	with class IR thermal insulation
	i	mechanically refrigerated by the machinery of an accompanying technical wagon ^(a) ^(b) ^(c)
	ii	accompanying technical wagon ^(a) ^(c)
	k	with 2 axles: $\text{tu} > 15 \text{ t}$ with 4 axles: $\text{tu} < 30 \text{ t}$
	l	insulated without ice bunkers ^(a) ^(d)
	m	with 2 axles: floor area $< 19 \text{ m}^2$ with 4 axles: floor area $< 39 \text{ m}^2$
	mm	with 4 axles: floor area $\geq 39 \text{ m}^2$ ^(e)
	n	with 2 axles: $\text{tu} > 25 \text{ t}$ with 4 axles: $\text{tu} > 40 \text{ t}$
	o	with ice bunkers of capacity less than $3,5 \text{ m}^3$ ^(d)
	p	without gratings

^(a) The index letter 'l' shall not be marked on wagons bearing the index letters 'g', 'gg', 'i' or 'ii'

^(b) Wagons bearing both the index letters 'g' and 'i' can be used individually or in a mechanically refrigerated raft.

^(c) The concept of 'accompanying technical wagon' applies at the same time to factory wagons, workshop wagons (both with or without sleeping accommodation) and dormitory wagons.

^(d) The index letter 'o' shall not be marked on wagons bearing the index letter 'l'

^(e) Only applicable to wagons with gauge of 1 520 mm.

Note: The floor area of covered refrigerator wagons is always determined taking into account the use of ice bunkers.

CATEGORY LETTER: K — 2-AXLE FLAT WAGON

Reference wagon		Of ordinary type with drop sides and short stanchions $lu \geq 12 \text{ m}$; $25 \text{ t} \leq tu \leq 30 \text{ t}$
Index letters	b	with long stanchions
	g	fitted for the transport of containers ^(a)
	i	with removable cover and non-removable ends ^(b)
	j	with shock-absorbing device
	k	$tu < 20 \text{ t}$
	kk	$20 \text{ t} \leq tu < 25 \text{ t}$
	l	without stanchions
	m	$9 \text{ m} \leq lu < 12 \text{ m}$
	mm	$lu < 9 \text{ m}$
	n	$tu > 30 \text{ t}$
	o	with non-removable sides
	p	without sides ^(b)
	pp	with removable sides

^(a) Index letter 'g' may be used together with category letter K exclusively for ordinary wagons which have only been additionally fitted out for the transport of containers. Wagons fitted out solely for the transport of containers must be classified in category L.

^(b) The index letter 'p' shall not be marked on wagons bearing index letter 'i'

CATEGORY LETTER: L — 2-AXLE FLAT WAGON

Reference wagon		of special type lu ≥ 12 m; 25 t ≤ tu ≤ 30 t
Index letters	b	with special fittings for securing purposes for medium-sized containers (pa) ^(a)
	c	with swivelling bolster ^(a)
	d	fitted out for the transport of motor cars, without deck ^(a)
	e	with decks for the transport of motor cars ^(a)
	f	suitable for traffic with Great Britain
	ff	suitable for traffic with Great Britain (by tunnel exclusively)
	fff	suitable for traffic with Great Britain (by train-ferry exclusively)
	g	fitted for the transport of containers (except pa) ^(a) ^(b)
	h	fitted out for the transport of steel coils, eye to side ^(a) ^(c)
	hh	fitted out for the transport of steel coils, eye to sky ^(a) ^(c)
	i	with removable cover and non-removable ends ^(a)
	ii	with very robust removable metallic cover ^(d) and non-removable ends ^(a)
	j	with shock-absorbing device
	k	tu < 20 t
	kk	20 t ≤ tu < 25 t
	l	without stanchions (a)
	m	9 m ≤ lu < 12 m
	mm	lu < 9 m
	n	tu > 30 t
	p	without sides ^(a)

^(a) The inscription of the index letters 'l' or 'p' is optional for wagons bearing the index letters 'b', 'c', 'd', 'e', 'g', 'h', 'hh', 'i' or 'ii'. But numerical codes must always correspond to letter markings on wagons.

^(b) Wagons used solely for the transport of containers (except pa).

^(c) Wagons used solely for the transport of steel coils.

^(d) Only applicable to wagons with gauge of 1 435 mm.

CATEGORY LETTER: O — MIXED FLAT AND OPEN HIGH-SIDED WAGON

Reference wagon		of ordinary type with 2 or 3 axles, with drop sides or ends and stanchions with 2 axles: lu ≥ 12 m; 25 t ≤ tu ≤ 30 t with 3 axles: lu ≥ 12 m; 25 t ≤ tu ≤ 40 t
Index letters	a	with 3 axles
	f	suitable for traffic with Great Britain
	ff	suitable for traffic with Great Britain (by tunnel exclusively)
	fff	suitable for traffic with Great Britain (by train-ferry exclusively)
	k	tu < 20 t
	kk	20 t ≤ tu < 25 t
	l	without stanchions
	m	9 m ≤ lu < 12 m
	mm	lu < 9 m
	n	with 2 axles: tu > 30 t with 3 axles: tu > 40 t

CATEGORY LETTER: R — FLAT BOGIES WAGON

Reference wagon		of ordinary type with drop ends and stanchions $18\text{ m} \leq lu < 22\text{ m}$; $50\text{ t} \leq tu \leq 60\text{ t}$
Index letters	b	$lu \geq 22\text{ m}$
	e	with drop sides
	g	fitted for the transport of containers ^(a)
	h	fitted out for the transport of steel coils, eye to side ^(b)
	hh	fitted out for the transport of steel coils, eye to sky ^(b)
	i	with removable cover and non-removable ends ^(c)
	j	with shock-absorbing device
	k	$tu < 40\text{ t}$
	kk	$40\text{ t} \leq tu < 50\text{ t}$
	l	without stanchions
	m	$15\text{ m} \leq lu < 18\text{ m}$
	mm	$lu < 15\text{ m}$
	n	$tu > 60\text{ t}$
	o	with non-removable ends less than 2 m in height
	oo	with non-removable ends, 2 m or more in height ^(c)
	p	without drop ends ^(c)
	pp	with removable sides

^(a) The use of the index letter 'g' associated with the category letter R is only possible in the case of ordinary wagons which have only been additionally fitted out for the transport of containers. Wagons fitted out solely for the transport of containers must be classified in category S.

^(b) The use of the index letter 'h' or 'hh' together with the category letter R is only possible in the case of ordinary wagons which have only been additionally fitted out for the transport of containers. Wagons fitted out solely for the transport of containers must be classified in category S.

^(c) The index letters 'oo' and/or 'p' shall not be marked on wagons bearing index letter 'i'

CATEGORY LETTER: S — FLAT BOGIES WAGON

Reference wagon		of special type with 4 axles: $lu \geq 18$ m; 50 t $\leq tu \leq 60$ t with 6 axles or more: $lu \geq 22$ m; 60 t $\leq tu \leq 75$ t
Index letters	a	with 6 axles (2 bogies of 3 axles)
	aa	with 8 axles or more
	aaa	with 4 axles (2 bogies of 2 axles) ^(a)
	b	with special fittings for securing purposes for medium-sized containers (pa) ^(b)
	c	with swivelling bolster ^(b)
	d	fitted out for the transport of motor cars, without deck ^(b) ^(c)
	e	with decks for the transport of motor cars ^(b)
	f	suitable for traffic with Great Britain
	ff	suitable for traffic with Great Britain (by tunnel exclusively)
	fff	suitable for traffic with Great Britain (by train-ferry exclusively)
	g	fitted for the transport of containers, total loading length ≤ 60 ' (except pa) ^(b) ^(c) ^(d)
	gg	fitted for the transport of containers, total loading length > 60 ' (except pa) ^(b) ^(c) ^(d)
	h	fitted out for the transport of steel coils, eye to side ^(b) ^(e)
	hh	fitted out for the transport of steel coils, eye to sky ^(b) ^(e)
	i	with removable cover and non-removable ends ^(b)
	ii	with very robust removable metallic cover ^(f) and non-removable ends ^(b)
	j	with shock-absorbing device
	k	with 4 axles: $tu < 40$ t with 6 axles or more: $tu < 50$ t
	kk	with 4 axles: 40 t $\leq tu < 50$ t with 6 axles or more: 50 t $\leq tu < 60$ t
	l	without stanchions ^(b)
	m	with 4 axles: 15 m $\leq lu < 18$ m; with 6 axles or more: 18 m $\leq lu < 22$ m
	mm	with 4 axles: $lu < 15$ m with 6 axles or more: $lu < 18$ m
	mmm	with 4 axles: $lu \geq 22$ m ^(a)
	n	with 4 axles: $tu > 60$ t with 6 axles or more: $tu > 75$ t
	p	without sides ^(b)

^(a) Only applicable to wagons with gauge of 1 520 mm.

^(b) The inscription of the index letters 'i' or 'p' is optional for wagons bearing the index letters 'b', 'c', 'd', 'e', 'g', 'gg', 'h', 'hh', 'i' or 'ii'. But numerical codes must always correspond to letter markings on wagons.

^(c) Wagons which in addition to the transport of containers and swap bodies are used to transport vehicles shall be marked with the index letters 'g' or 'gg' and the letter 'd'.

^(d) Wagons used solely for the transport of containers or for transport of swap bodies for grab handling and spreader gripping.

^(e) Wagons used solely for the transport of steel coils.

^(f) Only applicable to wagons with gauge of 1 435 mm.

CATEGORY LETTER: T — WAGON WITH OPENING ROOF

Reference wagon		with 2 axles: $9\text{ m} \leq l_u < 12\text{ m}$; $25\text{ t} \leq t_u \leq 30\text{ t}$ with 4 axles: $15\text{ m} \leq l_u < 18\text{ m}$; $50\text{ t} \leq t_u \leq 60\text{ t}$ with 6 axles or more: $15\text{ m} \leq l_u < 18\text{ m}$; $60\text{ t} \leq t_u \leq 75\text{ t}$
Index letters	a	with 4 axles
	aa	with 6 axles or more
	b	high capacity: with 2 axles: $l_u \geq 12\text{ m}$ with 4 axles or more: $l_u \geq 18\text{ m}$ ^(a) ^(b)
	c	with end doors
	d	with controlled gravity unloading, on both sides, alternately, at the top ^(a) ^(b) ^(c)
	dd	with controlled gravity unloading, on both sides, alternately, at the bottom ^(a) ^(b) ^(c)
	e	with unobstructed height of the doors $> 1,90\text{ m}$ ^(a) ^(b) ^(c)
	f	suitable for traffic with Great Britain
	ff	suitable for traffic with Great Britain (by tunnel exclusively)
	fff	suitable for traffic with Great Britain (by train-ferry exclusively)
	g	for grain
	h	fitted out for the transport of steel coils, eye to side
	hh	fitted out for the transport of steel coils, eye to sky
	i	with opening walls ^(a)
	j	with shock-absorbing device
	k	with 2 axles: $t_u < 20\text{ t}$ with 4 axles: $t_u < 40\text{ t}$ with 6 axles or more: $t_u < 50\text{ t}$
	kk	with 2 axles: $20\text{ t} \leq t_u < 25$ with 4 axles: $40\text{ t} \leq t_u < 50\text{ t}$ with 6 axles or more: $50\text{ t} \leq t_u < 60\text{ t}$
	l	with bulk gravity unloading, on both sides, simultaneously, at the top ^(a) ^(b) ^(c)
	ll	with bulk gravity unloading, on both sides, simultaneously, at the bottom ^(a) ^(b) ^(c)
	m	with 2 axles: $l_u < 9\text{ m}$ with 4 axles or more: $l_u < 15\text{ m}$ ^(b)

Reference wagon		with 2 axles: $9\text{ m} \leq l_u < 12\text{ m}$; $25\text{ t} \leq t_u \leq 30\text{ t}$ with 4 axles: $15\text{ m} \leq l_u < 18\text{ m}$; $50\text{ t} \leq t_u \leq 60\text{ t}$ with 6 axles or more: $15\text{ m} \leq l_u < 18\text{ m}$; $60\text{ t} \leq t_u \leq 75\text{ t}$
	n	with 2 axles: $t_u > 30\text{ t}$ with 4 axles: $t_u > 60\text{ t}$ with 6 axles or more: $t_u > 75\text{ t}$
	o	with axial bulk gravity unloading, at the top ^(a) ^(b) ^(c)
	oo	with axial bulk gravity unloading, at the bottom ^(a) ^(b) ^(c)
	p	with axial controlled gravity unloading, at the top ^(a) ^(b) ^(c)
	pp	with axial controlled gravity unloading, at the bottom ^(a) ^(b) ^(c)

^(a) Index letter 'e':

- is optional on wagons bearing the index letter 'b' (but numerical codes must always correspond to letter markings on wagons),
- shall not be marked on wagons bearing the index letters 'd', 'dd', 'i', 'l', 'll', 'o', 'oo', 'p' or 'pp'

^(b) Index letter 'b' and 'm' shall not be marked on wagons bearing the index letters 'd', 'dd', 'i', 'l', 'll', 'o', 'oo', 'p' or 'pp'

^(c) Wagons with gravity unloading in category T are wagons fitted with an opening roof giving access to a loading hatch over the complete length of the body; these wagons do not have a flat floor and are not designed for end or side tipping.

The method of unloading these wagons is defined by a combination of the following characteristics:

Arrangement of the unloading apertures:

- axial: Apertures situated above the centre of the track
- bilateral: Apertures on either side of the track, outside the rails (For these wagons, unloading is:
 - simultaneous, if complete emptying of the wagon requires the apertures to be open on both sides,
 - alternate, if complete emptying of the wagon can take place by opening the apertures on one side only)
- top: The lower edge of the discharge through (without taking into account mobile devices which may extend this through) is situated at least 0,700 m above the rail, and allows for the use of a conveyor belt to take away the goods
- bottom: The position of the lower edge of the discharge through does not allow for the use of a conveyor belt to take away the goods

Rate of unloading:

- bulk: Once the apertures are open for unloading, they cannot be closed again until the wagon is empty
- controlled: At any time during unloading, the flow of the goods can be regulated or even stopped

CATEGORY LETTER: U — SPECIAL WAGONS

Reference wagon		other than those in categories F, H, L, S ou Z with 2 axles: $25\text{ t} \leq tu \leq 30\text{ t}$ with 3 axles: $25\text{ t} \leq tu \leq 40\text{ t}$ with 4 axles: $50\text{ t} \leq tu \leq 60\text{ t}$ with 6 axles or more: $60\text{ t} \leq tu \leq 75\text{ t}$
Index letters	a	with 4 axles
	aa	with 6 axles or more
	c	with unloading under pressure
	d	with controlled gravity unloading, on both sides, alternately, at the top ^(a)
	dd	with controlled gravity unloading, on both sides, alternately, at the bottom ^(a)
	f	suitable for traffic with Great Britain
	ff	suitable for traffic with Great Britain (by tunnel exclusively)
	fff	suitable for traffic with Great Britain (by train-ferry exclusively)
	g	for grain
	i	fitted out for the transport of objects which should exceed the gauge if they were loaded on ordinary wagons ^(b) ^(c)
	k	with 2 or 3 axles: $tu < 20\text{ t}$ with 4 axles: $tu < 40\text{ t}$ with 6 axles or more: $tu < 50\text{ t}$
	kk	with 2 or 3 axles: $20\text{ t} \leq tu < 25\text{ t}$ with 4 axles: $40\text{ t} \leq tu < 50\text{ t}$ with 6 axles or more: $50\text{ t} \leq tu < 60\text{ t}$
	l	with bulk gravity unloading, on both sides, simultaneously, at the top ^(a)
	ll	with bulk gravity unloading, on both sides, simultaneously, at the bottom ^(a)
	n	with 2 axles: $tu > 30\text{ t}$ with 3 axles: $tu > 40\text{ t}$ with 4 axles: $tu > 60\text{ t}$ with 6 axles or more: $tu > 75\text{ t}$ ^(c)
	o	with axial bulk gravity unloading, at the top ^(a)
	oo	with axial bulk gravity unloading, at the bottom ^(a)
	p	with axial bulk gravity unloading, at the top ^(a)

Reference wagon	other than those in categories F, H, L, S ou Z with 2 axles: $25\text{ t} \leq tu \leq 30\text{ t}$ with 3 axles: $25\text{ t} \leq tu \leq 40\text{ t}$ with 4 axles: $50\text{ t} \leq tu \leq 60\text{ t}$ with 6 axles or more: $60\text{ t} \leq tu \leq 75\text{ t}$
	pp with axial bulk gravity unloading, at the bottom ^(a)

^(a) Wagons with gravity unloading in category U are closed wagons which can only be loaded through one or more loading apertures situated in at the top part of the body, and whose total opening dimensions are less than the length of the body; these wagons do not have a flat floor and are not designed for end or side tipping.

^(b) In particular:

- well wagons
- wagons with a central recess
- wagons with an ordinary sloping diagonal permanent control desk

^(c) Index letter 'n' shall not be marked on wagons bearing the index letter 'i'

The method of unloading these wagons is defined by a combination of the following characteristics:

Arrangement of the unloading apertures:

- axial: Apertures situated above the centre of the track
- bilateral: Apertures on either side of the track, outside the rails
(For these wagons, unloading is:
 - simultaneous, if complete emptying of the wagon requires the apertures to be open on both sides,
 - alternate, if complete emptying of the wagon can take place by opening the apertures on one side only)
- top: The lower edge of the discharge through (without taking into account mobile devices which may extend this through) is situated at least 0,700 m above the rail, and allows for the use of a conveyor belt to take away the goods
- bottom: The position of the lower edge of the discharge through does not allow for the use of a conveyor belt to take away the goods

Rate of unloading:

- bulk: Once the apertures are open for unloading, they cannot be closed again until the wagon is empty
- controlled: At any time during unloading, the flow of the goods can be regulated or even stopped

CATEGORY LETTER: Z — TANK WAGON

Reference wagon		with metal shell, for the transport of liquids or gases with 2 axles: $25\text{ t} \leq l_u \leq 30\text{ t}$ with 3 axles: $25\text{ t} \leq t_u \leq 40\text{ t}$ with 4 axles: $50\text{ t} \leq t_u \leq 60\text{ t}$ with 6 axles or more: $60\text{ t} \leq t_u \leq 75\text{ t}$
Index letters	a	with 4 axles
	aa	with 6 axles or more
	b	for oil products ^(a)
	c	with unloading under pressure ^(b)
	d	for food and chemical products ^(a)
	e	fitted with heating devices
	f	suitable for traffic with Great Britain
	ff	suitable for traffic with Great Britain (by tunnel exclusively)
	fff	suitable for traffic with Great Britain (by train-ferry exclusively)
	g	for the transport of gases under pressure, liquefied or dissolved under pressure ^(b)
	i	tank of non-metallic material
	j	with shock-absorbing device
	k	with 2 or 3 axles: $t_u < 20\text{ t}$ with 4 axles: $t_u < 40\text{ t}$ with 6 axles or more: $t_u < 50\text{ t}$
	kk	with 2 or 3 axles: $20\text{ t} \leq t_u < 25\text{ t}$ with 4 axles: $40\text{ t} \leq t_u < 50\text{ t}$ with 6 axles or more: $50\text{ t} \leq t_u < 60\text{ t}$
	n	with 2 axles: $t_u > 30\text{ t}$ with 3 axles: $t_u > 40\text{ t}$ with 4 axles: $t_u > 60\text{ t}$ with 6 axles or more: $t_u > 75\text{ t}$
	p	with station for brakeman ^(a)

^(a) Only applicable to wagons with gauge of 1 520 mm.

^(b) The index letter 'c' shall not be marked on wagons bearing the index letter 'g'.

LETTER MARKING FOR WAGONS FOR ARTICULATED AND MULTIPLE WAGONS

DEFINITION OF THE CATEGORY AND INDEX LETTERS

1. Important notes

In the attached tables, the information given in meters refers to the inside length of the wagons (l_u).

2. Index letters with an international value common to all categories

q	pipe for electric heating which can be supplied by all accepted currents
qq	pipe and installation for electric heating which can be supplied by all accepted currents
s	wagons authorised to run under 's' conditions (see annex B of rolling stock STI)
ss	wagons authorised to run under 'ss' conditions (see annex B of rolling stock STI)

3. Index letters with a national value

t, u, v, w, x, y, z

The value of these letters is defined by each Member State.

CATEGORY LETTER: F — OPEN HIGH-SIDED WAGON

Reference wagon		Articulated or multiple wagon with axles, with 2 units $22\text{ m} \leq l_u < 27\text{ m}$
Index letters	a	with bogies
	c	with controlled gravity unloading, on both sides, alternately, at the top ^(a)
	cc	with controlled gravity unloading, on both sides, alternately, at the bottom ^(a)
	e	with 3 units
	ee	with 4 units or more
	f	suitable for traffic with Great Britain
	ff	suitable for traffic with Great Britain (by tunnel exclusively)
	fff	suitable for traffic with Great Britain (by train-ferry exclusively)
	l	with bulk gravity unloading, on both sides, simultaneously, at the top ^(a)
	ll	with bulk gravity unloading, on both sides, simultaneously, at the bottom ^(a)
	m	with 2 units: $l_u \geq 27\text{ m}$
	mm	with 2 units: $l_u < 22\text{ m}$
	o	with axial bulk gravity unloading, at the top ^(a)
	oo	with axial bulk gravity unloading, at the bottom ^(a)
	p	with axial controlled gravity unloading, at the top ^(a)
	pp	with axial controlled gravity unloading, at the bottom ^(a)
	r	articulated wagon
	rr	multiple wagon

^(a) Wagons with gravity unloading in category F are open wagons, which do not have a flat floor and are not designed for end or side tipping.

The method of unloading these wagons is defined by a combination of the following characteristics:

Arrangement of the unloading apertures:

— axial: Apertures situated above the centre of the track

— bilateral: Apertures on either side of the track, outside the rails

(For these wagons, unloading is:

— simultaneous, if complete emptying of the wagon requires the apertures to be open on both sides,

— alternate, if complete emptying of the wagon can take place by opening the apertures on one side only)

— top: The lower edge of the discharge through (without taking into account mobile devices which may extend this through) is situated at least 0,700 m above the rail, and allows for the use of a conveyor belt to take away the goods

— bottom: The position of the lower edge of the discharge through does not allow for the use of a conveyor belt to take away the goods

Rate of unloading:

— bulk: Once the apertures are open for unloading, they cannot be closed again until the wagon is empty

— controlled: At any time during unloading, the flow of the goods can be regulated or even stopped

CATEGORY LETTER: H — COVERED WAGON

Reference wagon		articulated or multiple wagon with axles, with 2 units $22\text{ m} \leq \text{lu} < 27\text{ m}$
Index letters	a	with bogies
	c	with end doors
	cc	with end doors and fitted internally for the transport of motor cars
	d	with floor traps
	e	with 3 units
	ee	with 4 units or more
	f	suitable for traffic with Great Britain
	ff	suitable for traffic with Great Britain (by tunnel exclusively)
	fff	suitable for traffic with Great Britain (by train-ferry exclusively)
	g	for grain
	h	for fruits and vegetables ^(a)
	i	with opening or shunt walls
	ii	with very robust opening or shunt walls ^(b)
	l	with movable partitions ^(c)
	ll	with lockable movable partitions ^(c)
	m	with 2 units: $\text{lu} \geq 27\text{ m}$
	mm	with 2 units: $\text{lu} < 22\text{ m}$
	r	articulated wagon
	rr	multiple wagon

^(a) The concept 'for fruits and vegetables' applies only to wagons provided with additional ventilation apertures at the floor level.

^(b) Only applicable to wagons with gauge of 1 435 mm.

^(c) Movable partitions may be dismantled temporarily.

CATEGORY LETTER: I — TEMPERATURE CONTROLLED WAGON

Reference wagon		refrigerator wagon with class IN thermal insulation, with motor-driven ventilation, with gratings and ice bunker $\geq 3,5 \text{ m}^3$ articulated or multiple wagon with axles, with 2 units $22 \text{ m} \leq \text{lu} < 27 \text{ m}$
Index letters	a	with bogies
	c	with meat hooks
	d	for fish
	e	with electric ventilation
	ee	with 4 units or more
	f	suitable for traffic with Great Britain
	ff	suitable for traffic with Great Britain (by tunnel exclusively)
	fff	suitable for traffic with Great Britain (by train-ferry exclusively)
	g	with mechanical refrigeration ^(a)
	gg	refrigerator with liquefied gas ^(a)
	h	with class IR thermal insulation
	i	mechanically refrigerated by the machinery of an accompanying technical wagon ^(a) ^(b)
	ii	accompanying technical wagon ^(a) ^(b)
	l	insulated without ice bunkers ^(a) ^(c)
	m	with 2 units: $\text{lu} \geq 27 \text{ m}$
	mm	with 2 units: $\text{lu} < 22 \text{ m}$
	o	with ice bunkers of capacity less than $3,5 \text{ m}^3$ ^(c)
	oo	with 3 units
	p	without gratings
	r	articulated wagon
	rr	multiple wagon

^(a) The index letter 'l' shall not be marked on wagons bearing the index letters 'g', 'gg', 'i' or 'ii'.

^(b) The concept of 'accompanying technical wagon' applies at the same time to factory wagons, workshop wagons (both with or without sleeping accommodation) and dormitory wagons.

^(c) The index letter 'o' shall not be marked on wagons bearing the index letter 'l'.

CATEGORY LETTER: L — FLAT WAGON WITH SEPARATE AXLES

Reference wagon		articulated or multiple wagon with 2 units $22\text{ m} \leq l_u < 27\text{ m}$
Index letters	a	articulated wagon
	aa	multiple wagon
	b	with special fittings for securing purposes for medium-sized containers (pa) ^(a)
	c	with swivelling bolster ^(a)
	d	fitted out for the transport of motor cars, without deck ^(a)
	e	with decks for the transport of motor cars ^(a)
	f	suitable for traffic with Great Britain
	ff	suitable for traffic with Great Britain (by tunnel exclusively)
	fff	suitable for traffic with Great Britain (by train-ferry exclusively)
	g	fitted for the transport of containers ^(a) ^(b)
	h	fitted out for the transport of steel coils, eye to side ^(a) ^(c)
	hh	fitted out for the transport of steel coils, eye to sky ^(a) ^(c)
	i	with removable cover and non-removable ends ^(a)
	ii	with very robust removable metallic cover ^(d) and non-removable ends ^(a)
	j	with shock-absorbing device
	l	without stanchions ^(a)
	m	with 2 units: $18\text{ m} \leq l_u < 22\text{ m}$
	mm	with 2 units: $l_u < 18\text{ m}$
	o	with 3 units
	oo	with 4 units or more
	p	without sides ^(a)
	r	with 2 units: $l_u \geq 27\text{ m}$

^(a) The inscription of the index letters 'l' or 'p' is optional for wagons bearing the index letters 'b', 'c', 'd', 'e', 'g', 'h', 'hh', 'i' or 'ii'. But numerical codes must always correspond to letter markings on wagons.

^(b) Wagons used solely for the transport of containers (except pa).

^(c) Wagons used solely for the transport of steel coils.

^(d) Only applicable to wagons with gauge of 1 435 mm.

CATEGORY LETTER: S — FLAT BOGIE WAGON

Reference wagon		articulated or multiple wagon with 2 units $22\text{ m} \leq l_u < 27\text{ m}$
Index letters	b	with special fittings for securing purposes for medium-sized containers (pa) ^(a)
	c	with swivelling bolster ^(a)
	d	fitted out for the transport of motor cars, without deck ^(a) ^(b)
	e	with decks for the transport of motor cars ^(a)
	f	suitable for traffic with Great Britain
	ff	suitable for traffic with Great Britain (by tunnel exclusively)
	fff	suitable for traffic with Great Britain (by train-ferry exclusively)
	g	fitted for the transport of containers, total loading length $\leq 60'$ (except pa) ^(a) ^(b) ^(c)
	gg	fitted for the transport of containers, total loading length $> 60'$ (except pa) ^(a) ^(b) ^(c)
	h	fitted out for the transport of steel coils, eye to side ^(a) ^(d)
	hh	fitted out for the transport of steel coils, eye to sky ^(a) ^(d)
	i	with removable cover and non-removable ends ^(a)
	ii	with very robust removable metallic cover ^(c) and non-removable ends ^(a)
	j	with shock-absorbing device
	l	without stanchions ^(a)
	m	with 2 units: $l_u \geq 27\text{ m}$
	mm	with 2 units: $l_u < 22\text{ m}$
	o	with 3 units
	oo	with 4 units or more
	p	without sides ^(a)
	r	articulated wagon
	rr	multiple wagon

^(a) The inscription of the index letters 'l' or 'p' is optional for wagons bearing the index letters 'b', 'c', 'd', 'e', 'g', 'gg', 'h', 'hh', 'i' or 'ii'. But numerical codes must always correspond to letter markings on wagons.

^(b) Wagons which in addition to the transport of containers and swap bodies are used to transport vehicles shall be marked with the index letters 'g' or 'gg' and the letter 'd'.

^(c) Wagons used solely for the transport of containers or for transport of swap bodies for grab handling and spreader gripping.

^(d) Wagons used solely for the transport of steel coils.

^(e) Only applicable to wagons with gauge of 1 435 mm.

CATEGORY LETTER: T — WAGON WITH OPENING ROOF

Reference wagon		articulated or multiple wagon with axles, with 2 units $22\text{ m} \leq l_u < 27\text{ m}$
Index letters	a	with bogies
	b	with unobstructed height of doors $> 1,90\text{ m}$ ^(a)
	c	with end doors
	d	with controlled gravity unloading, on both sides, alternately, at the top ^(b)
	dd	with controlled gravity unloading, on both sides, alternately, at the bottom ^(a) ^(b)
	e	with 3 units
	ee	with 4 units or more
	f	suitable for traffic with Great Britain
	ff	suitable for traffic with Great Britain (by tunnel exclusively)
	fff	suitable for traffic with Great Britain (by train-ferry exclusively)
	g	for grain
	h	fitted out for the transport of steel coils, eye to side
	hh	fitted out for the transport of steel coils, eye to sky
	i	with opening walls ^(a)
	j	with shock-absorbing device
	l	with bulk gravity unloading, on both sides, simultaneously, at the top ^(a) ^(b)
	ll	with bulk gravity unloading, on both sides, simultaneously, at the bottom ^(a) ^(b)
	m	with 2 units: $l_u \geq 27\text{ m}$
	mm	with 2 units: $l_u < 22\text{ m}$
	o	with axial bulk gravity unloading, at the top ^(a) ^(b)
	oo	with axial bulk gravity unloading, at the bottom ^(a) ^(b)
	p	with axial controlled gravity unloading, at the top ^(a) ^(b)
	pp	with axial controlled gravity unloading, at the bottom ^(a) ^(b)
	r	articulated wagon
	rr	multiple wagon

^(a) Index letter 'b' shall not be marked on wagons bearing the index letters 'd', 'dd', 'i', 'l', 'll', 'o', 'oo', 'p' or 'pp'.

^(b) Wagons with gravity unloading in category T are wagons fitted with an opening roof giving access to a loading hatch over the complete length of the body; these wagons do not have a flat floor and are not designed for end or side tipping.

The method of unloading these wagons is defined by a combination of the following characteristics:

Arrangement of the unloading apertures:

— axial: Apertures situated above the centre of the track
— bilateral: Apertures on either side of the track, outside the rails

(For these wagons, unloading is:

— simultaneous, if complete emptying of the wagon requires the apertures to be open on both sides,
— alternate, if complete emptying of the wagon can take place by opening the apertures on one side only)

— top: The lower edge of the discharge through (without taking into account mobile devices which may extend this through) is situated at least 0,700 m above the rail, and allows for the use of a conveyor belt to take away the goods

— bottom: The position of the lower edge of the discharge through does not allow for the use of a conveyor belt to take away the goods

Rate of unloading:

— bulk: Once the apertures are open for unloading, they cannot be closed again until the wagon is empty
— controlled: At any time during unloading, the flow of the goods can be regulated or even stopped

CATEGORY LETTER: U — SPECIAL WAGONS

Reference wagon		articulated or multiple wagon, with axles, with 2 units $22\text{ m} \leq lu < 27\text{ m}$
Index letters	a	with bogies
	e	with 3 units
	ee	with 4 units or more
	c	with unloading under pressure
	d	with controlled gravity unloading, on both sides, alternately, at the top ^(a)
	dd	with controlled gravity unloading, on both sides, alternately, at the bottom ^(a)
	f	suitable for traffic with Great Britain
	ff	suitable for traffic with Great Britain (by tunnel exclusively)
	fff	suitable for traffic with Great Britain (by train-ferry exclusively)
	g	for grain
	i	fitted out for the transport of objects which should exceed the gauge if they were loaded on ordinary wagons ^(b)
	l	with bulk gravity unloading, on both sides, simultaneously, at the top ^(a)
	ll	with bulk gravity unloading, on both sides, simultaneously, at the bottom ^(a)
	m	with 2 units: $lu \geq 27\text{ m}$
	mm	with 2 units: $lu < 22\text{ m}$
	o	with axial bulk gravity unloading, at the top ^(a)
	oo	with axial bulk gravity unloading, at the bottom ^(a) ^(b)
	p	with axial controlled gravity unloading, at the top ^(a)
	pp	with axial controlled gravity unloading, at the bottom ^(a)
	r	articulated wagon
	rr	multiple wagon

^(a) Wagons with gravity unloading in category U are closed wagons which can only be loaded through one or more loading apertures situated in at the top part of the body, and whose total opening dimensions are less than the length of the body; these wagons do not have a flat floor and are not designed for end or side tipping.

^(b) In particular:

- well wagons
- wagons with a central recess
- wagons with an ordinary sloping diagonal permanent control desk

The method of unloading these wagons is defined by a combination of the following characteristics:

Arrangement of the unloading apertures:

- axial: Apertures situated above the centre of the track
- bilateral: Apertures on either side of the track, outside the rails. (For these wagons, unloading is:
 - simultaneous, if complete emptying of the wagon requires the apertures to be open on both sides,
 - alternate, if complete emptying of the wagon can take place by opening the apertures on one side only)
- top: The lower edge of the discharge through (without taking into account mobile devices which may extend this through) is situated at least 0,700 m above the rail, and allows for the use of a conveyor belt to take away the goods
- bottom: The position of the lower edge of the discharge through does not allow for the use of a conveyor belt to take away the goods

Rate of unloading:

- bulk: Once the apertures are open for unloading, they cannot be closed again until the wagon is empty
- controlled: At any time during unloading, the flow of the goods can be regulated or even stopped

CATEGORY LETTER: Z — TANK WAGON

Reference wagon		with metal shell, for the transport of liquids or gases articulated or multiple wagon with axles, with 2 units $22\text{ m} \leq l_u < 27\text{ m}$
Index letters	a	with bogies
	c	with unloading under pressure ^(a)
	e	fitted with heating devices
	f	suitable for traffic with Great Britain
	ff	suitable for traffic with Great Britain (by tunnel exclusively)
	fff	suitable for traffic with Great Britain (by train-ferry exclusively)
	g	for the transport of gases under pressure, liquefied or dissolved under pressure ^(a)
	i	tank of non-metallic material
	j	with shock-absorbing device
	m	with 2 units: $l_u \geq 27\text{ m}$
	mm	with 2 units: $l_u < 22\text{ m}$
	o	with 3 units
	oo	with 4 units or more
	r	articulated wagon
	rr	multiple wagon

^(a) The index letter 'c' shall not be marked on wagons bearing the index letter 'g'.

ANNEX P.13

LETTER MARKING FOR HAULED PASSENGER STOCK

Serial letters with an international value:

A	1 st class coach with seats
B	2 nd class coach with seats
AB	1 st /2 nd class coach with seats
WL	Sleeping-car with serial letter A, B or AB depending on the type of accommodation offered. The serial letters for sleeping-car with 'special' compartments are supplemented with index-letter 'S'
WR	Dining-car
R	Coach with dining-car, buffet or bar compartment (serial-letter used in addition)
D	Van
DD	Open, 2-tier car-carrier van
Post	Mail van
AS SR WG	Bar coach with dancing facilities
WSP	Pullman coach
Le	Open 2-axle 2-tier car-carrier wagon
Leq	Open 2-axle 2-tier car-carrier wagon fitted with train supply cable
Laeq	Open 3-axle 2-tier car-carrier wagon fitted with train supply cable

Index letters with an international value:

b h	Coach fitted out to carry disabled passengers
c	Compartments convertible into couchette accommodation
d v	Vehicle fitted to receive bicycles
ee z	Vehicle fitted with central power supply
f	Vehicle fitted with driver's cab (driving trailer)
p t	Centre-aisle coach with seats
m	Vehicle over 24,5 m in length
s	Centre-aisle in vans and coaches with luggage compartment

The number of compartments is shown in the form of an index (for example: Bc9)

Serial letters and index letters with a national value

The others serial letters and index letters have a national value, defined by each Member State.

ANNEX P.14

Letter marking for special vehicles

This marking is indicated in document EN 14033-1 'Railway applications — Track — Technical requirements for railbound construction and maintenance machines — Part 1: Running of railbound machines'.

ANNEX Q

NOT USED

ANNEX R

TRAIN IDENTIFICATION

This aspect is still an open point and will be specified in a future version of this TSI.

A CWA is being developed in this area. Once it has been introduced, its suitability as a means by which application of this CWA will assume compliance with requirements of this TSI, will be assessed by the ERA and the EC.

Such a detailed specification must mainly cover the four principles (Regulation and routing, type of train, safety-related communication, performance monitoring), all types of train and the responsibility for the allocation of these numbers. This specification should take account of existing standards (such as UIC Fiche 419-1 and 419-2 OR) already in use and the development of ERTMS/ETCS. An expert drafting group must be established to take this forward.

Until this CWA has been developed, , Railway Undertakings and Infrastructure Managers must liaise to jointly establish bilateral or multilateral agreements, taking into account of existing standards (such as UIC Fiche 419-1 and 419-2 OR) already in use and the development of ERTMS/GSM-R and of ERTMS/ETCS, to facilitate the unhindered passage of trains from one Infrastructure Manager's operating area to another.

See also Annex U

ANNEX S:

TRAIN VISIBILITY — REAR END

This aspect is still an open point and will be specified in a future version of this TSI.

A detailed specification must be defined that takes into account why a rear end indication is required, what philosophy underpins this requirement across the TEN and how best this can be harmonised safely and in a cost-effective manner.

The specification and associated conformity assessment process for a solution of a portable nature will be published in this TSI as an Interoperability Constituent.

Until the detailed specification can be developed and introduced, Railway Undertaking(s) and Infrastructure Manager(s) must liaise to jointly establish bilateral or multilateral agreements to facilitate the unhindered passage of trains from one Infrastructure Manager's operating area to another.

See also Annex U

ANNEX T

BRAKE PERFORMANCE

This aspect is still an open point and will be specified in a future version of this TSI.

A detailed specification must be defined which will set out the formula for the calculation of brake performance. This specification shall be valid across the TEN and shall take into account how best such a formula can be established to permit the working of brakes to be harmonised safely and in a cost-effective manner. An expert, multi-disciplined drafting group has been established to take this forward.

Until the detailed specifications can be developed and introduced, it is recommended that Railway Undertaking(s) and Infrastructure Manager(s) liaise to jointly establish bilateral or multilateral agreements to facilitate the unhindered passage of trains from one Infrastructure Manager's operating area to another.

See also Annex U

ANNEX U

LIST OF OPEN POINTS

ANNEX A2 (see Subsection 4.4 of this TSI)
Operating rules in respect to GSM-R

ANNEX B (see Subsection 4.4 of this TSI)
Other rules enabling a coherent operation of the new different structural subsystems

ANNEX R (see Subsection 4.2.3.2 of this TSI)
Identification of trains

ANNEX S (see Subsection 4.2.2.1.3 of this TSI)
Train Visibility — Rear End

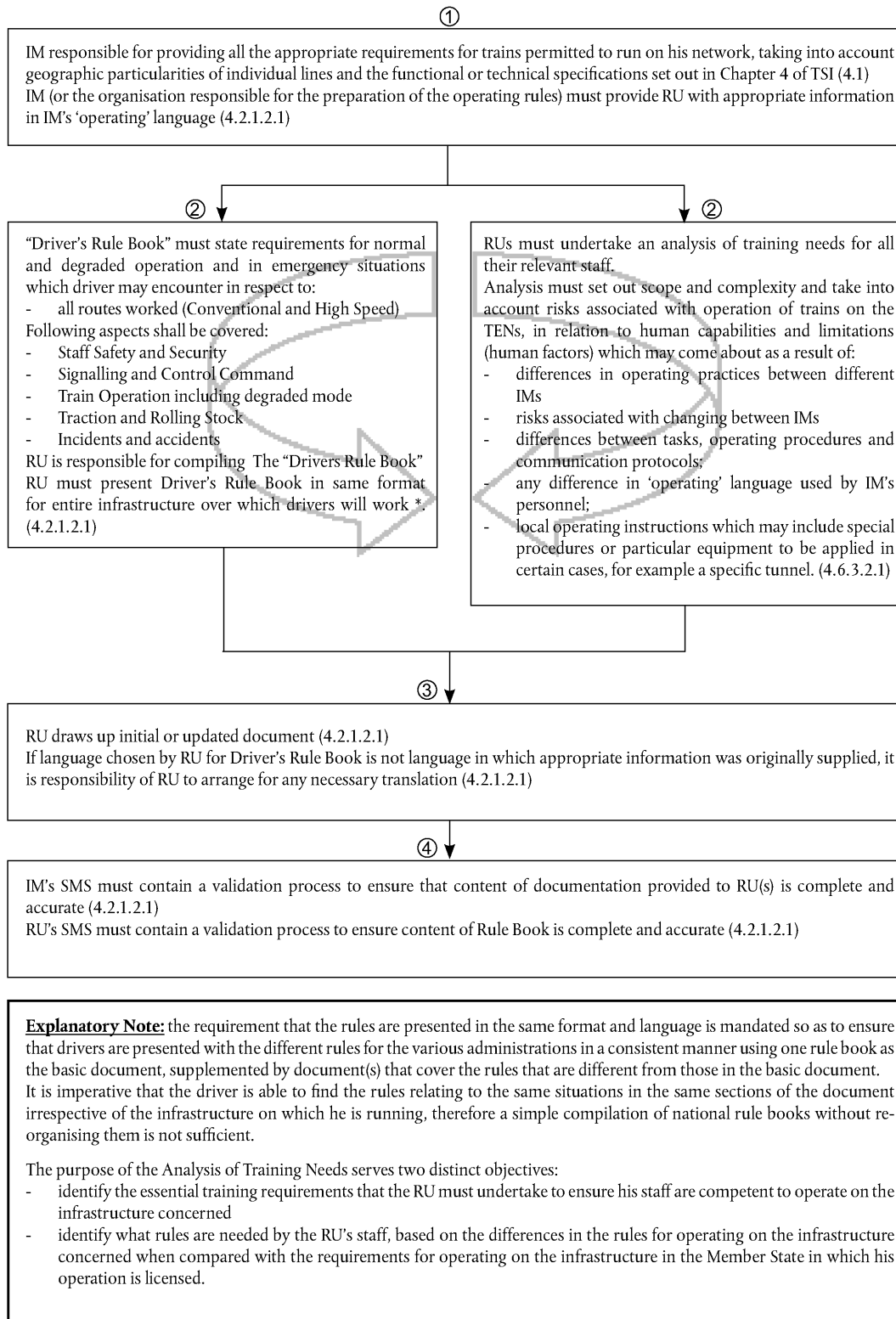
ANNEX T (see Subsection 4.2.2.6.2 of this TSI)
Brake Performance

Section 4.2.2.
Train Composition Document

ANNEX V

PREPARATION AND UPDATING RULES DOCUMENTATION FOR DRIVERS

In conjunction with Subsections 4.2 and 4.6 of this TSI, the diagram below is a pictorial representation of the process outlined in this TSI for the preparation and updating of rules documentation required by this TSI.



GLOSSARY

Term	Definition
Accident	As defined in Article 3 of Directive 2004/49/EC.
Authorising the movement of trains	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.
Competence	The qualification and experience necessary to safely and reliably undertake the task being performed. Experience can be gained as part of the training process.
Dangerous goods	As defined by Article 2 of Directive 96/49
Degraded operation	Operation resulting from an unplanned event that prevents the normal delivery of train services.
Despatch	See Train despatch
Driver	A person qualified and authorised to drive trains.
Exceptional loads	A load carried on a rail vehicle, for example a container, swap body or other traffic where the rail vehicle size and/or axle loading requires special authority for the movement and/or the application of special conditions of travel for all or part of the journey.
Health and Safety Conditions	In the context of this TSI, 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.
Livret de Formulaires	A book of forms that describes the sequence of action to be taken by the Infrastructure Manager's staff and the Railway Undertaking's staff when moving trains in degraded situations. Each separate activity requires a separate form. The Livret de Formulaires is prepared in the languages of both the Infrastructure Manager and the Railway Undertaking and the relevant Infrastructure Manager's and Railway Undertaking's staff holds copies.
Member State	When used in connection with this TSI it refers to the Member State which issues the safety authorisation/certificate as set out in Articles 10 and 11 of Directive 2004/49/EC.
Operating Language	The language or languages used in daily operation an Infrastructure Manager and published in his Network Statement, for the communication of operational or safety related messages between the staff of the Infrastructure Manager and the Railway Undertaking.
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 trains journey as they occur.

Term	Definition
Reporting point	A point on the trains schedule where reporting of the arrival, departure or passing time is required.
Route	The particular section or sections of line
Route knowledge	The knowledge of the section(s) of line over which on board staff operate, based on information provided by the Infrastructure Manager, to enable them to operate the train safely. Essential elements of this knowledge must be learned in detail and remembered by the staff concerned. Other elements may be held in documentation, which those staff can rapidly access based on an assessment of the route by the Railway Undertaking or by the requirements of the National Safety Authority.
Safety critical work	Work performed by staff when they control or affect the movement of a vehicle, which could affect the health, and safety of persons.
Staff	Employees working for a Railway Undertaking or an Infrastructure Manager, or their contractors, undertaking tasks as specified in this TSI.
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 railway vehicles, or a self-propelled set of vehicles, with train data available operating between two or more defined points on the TENs.
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 identification	The means to unambiguously identify a particular train.
Train preparation	Ensuring that a train is in a fit condition to enter service, that the train equipment is correctly deployed and the formation of the train matches the train's designated pathway. Train preparation also includes technical inspections carried out prior to the train entering service.
Vehicle	Any single item of rolling stock, for example a locomotive, carriage or wagon.
Vehicle identification	A number applied to a vehicle to uniquely identify it from any other vehicles

Abbreviation	Explanation
AC	Alternating current
CCS	Command Control Signalling
CEN	European Committee for Standardisation (<i>Comité Européen de Normalisation</i>)
COTIF	Convention Concerning International Carriage by Rail (<i>Convention relative aux Transports Internationaux Ferroviaires</i>)
CR	Conventional Rail
DB	Decibels
DC	Direct Current
DMI	Driver Machine Interface
EC	European Community
ECG	Electro Cardiogram
EIRENE	European Integrated Railway Radio Enhanced Network
EN	Euro-norm
ENE	Energy
ERA	European Rail Agency
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
HABD	Hot Axle Box Detector
Hz	Hertz
IM	Infrastructure Manager
INS	Infrastructure
OPE	Traffic Operation and Management
OSJD	Organisation for Co-operation of Railways
PPW	Russian abbreviation for <i>Prawila Polzowaniia Wagonami w mejdunarodnom soobqenii</i> = Rules for use of railway vehicles in international traffic
RIC	Regulations governing the reciprocal use of carriages and brake vans in international traffic (<i>Règlement pour l'emploi réciproque des Voitures et des Fourgons en Trafic international</i>)
RIV	Regulations governing the reciprocal use of wagons in international traffic. (<i>Règlement pour l'emploi réciproque des Wagons en Trafic international</i>)
RST	Rolling Stock
RU	Railway Undertaking
SMS	Safety Management System
SPAD	Signal Passed at Danger
SRS	System Requirement Specification

Abbreviation	Explanation
TAF	Telematic Applications for Freight
TEN	Trans-European Network
TSI	Technical Specification for Interoperability
UIC	International Union of Railways (<i>Union Internationale des Chemins de fer</i>)
UV	Ultra violet
VKM	Vehicle Keeper Marking