Department for Transport

National Technical Specification Notice

Rolling Stock – Noise (NOI)

Issue 2

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Railway Interoperability – The Railways (Interoperability) Regulations 2011

Notice to all:

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

This Notice has been published by the Secretary of State for Transport pursuant to regulation 3B of the Railways (Interoperability) Regulations 2011 (RIR 2011).

Summary

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

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

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

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

- Reduced environmental impact.

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

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

This NTSN covers the required level of specification to limit railway noise emission for the rolling stock subsystem (including locomotives, passenger rolling stock and freight wagons) and associated 'interoperability constituents' (See article 1 'Scope' for details). See table 1 of Section 3 of this NTSN for a breakdown of the basic parameters corresponding to each of the six 'Essential Requirements'.

3. How this NTSN should be read

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

Rail projects that will introduce new, upgraded or renewed rolling stock subsystems on the GB railway should check article 1 'Scope' and article 2 'Application' of this NTSN to identify whether they are legally obliged to apply requirements in the Annex. Projects in scope should review the applicable requirements in the Annex at the earliest stage of project development and factor these into cost benefit analysis on designs and procurements specifications so that implementation, or a need for an exemption to apply alternative measures, can be planned accordingly (See Summary subsection 7 'Exemptions from this NTSN').

4. Changes from Issue 1 published on 1 January 2021

NTSNs were created for EU Exit to take the place of EU regulations called Technical Specifications for Interoperability (TSIs). Issue 1 of the NOI NTSN substantially reproduced Commission Regulation (EU) No 1304/2014 – the NOI TSI – which applied in Britain until 31 December 2020.

Changes from Issue 1 to 2 of this NTSN primarily focus on sections where the NOI TSI was amended in 2023 by Commission Implementing Regulation (EU) 2023/1694 and sections where the British rail sector or Government identified a need for change and agreed solutions. Changes to technical content, including decisions on whether to maintain alignment with the NOI TSI, were made on the principles that mandatory requirements in NTSNs should be strictly necessary for achieving interoperability in GB, outcome focused where appropriate, supported by GB-focused analysis, and tested with those who will be obliged to apply them. To support use of the NTSN in line with these principles, Issue 2 also contains a substantial redraft of the Summary and Articles section to improve clarity, reflect Government NTSN policy, and align application with the objectives and target outcomes of rail interoperability in GB.

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

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

5. Relationship with rail safety obligations

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

6. Relationship with other rail standards

Entities that are obliged to apply this NTSN may have other obligations concerning the application of standards covering the same topics. Within the context set out in article 1 'Scope' and article 2 'Application', this NTSN's mandatory requirements take precedence over all other rail technical standards covering the same topics, including those set by individual companies or cross-industry bodies, unless otherwise indicated within this

NTSN's Annex (e.g. there is an applicable UK Specific Case or transitional provision), the National Implementation Plan for this NTSN, a formal exemption granted by the Department for Transport as 'competent authority' (See Summary subsection 7 'Exemptions from this NTSN', or – in the case of international rail services – the Convention Concerning International Carriage by Rail (COTIF) Uniform Technical Prescriptions (UTPs) apply.

7. Exemptions from this NTSN

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

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

- The project is at an advanced stage of development (i.e. its *"…planning or construction stage has reached a point where the impact of a change in technical specifications would present a significant legal, contractual, economic, financial, social or environmental impediment to the project concerned"*) or the project is the subject of a contract in the course of performance when the applicable NTSN is published.The project concerns the renewal or upgrading of an existing subsystem, where the loading gauge, track gauge, space between tracks or electrification voltage in the applicable NTSN is not compatible with those of the existing subsystem.

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

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

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

Under regulation 13 of RIR 2011 ‘Authorisation requirements for the renewal of upgrading of subsystems’, the Department also has the power to decide whether an authorisation to place into service is needed for an upgraded or renewed subsystem, and the extent to which NTSN requirements apply for authorisation.

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

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

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

Rolling Stock – Noise

National Technical Specification Notice

Articles

Article 1

Scope

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

2. This NTSN covers the rolling stock subsystem of the railway and associated interoperability constituents in scope of the Rolling Stock – Locomotive and Passenger (LOC&PAS) and Rolling Stock – Freight Wagons (WAG) NTSNs. See Section 4 of the Annex for further details.

3. The interoperability constituents covered by this NTSN are:

    - Friction element for wheel tread brakes.

    See Section 5 of the Annex for further details.

Article 2

Application

1. This NTSN principally applies to rail projects that require an authorisation to be placed into service as per regulation 4 of the RIR 2011 'Requirement for authorisation'.

2. Compliance with this NTSN is mandatory for rail projects that will place new rolling stock subsystems within scope in service after 2nd May 2025, without prejudice to any transitional arrangements specified in the Annex (See Chapter 7 'Implementation' and Appendix H 'Changes of requirements and transition regimes' for further details) or exemptions granted by the Department for Transport.

3. Compliance is also mandatory for rail projects meeting the definitions of 'upgrading' (i.e. any major modification work on a subsystem or part of a subsystem which improves the overall performance of the subsystem) or 'renewal' (i.e. any major substitution work on a subsystem or part of a subsystem which does not change the

overall performance of the subsystem) under regulation 2 of RIR 2011 'Interpretation', or otherwise specified in the list published by the Secretary of State pursuant to regulation 12 of RIR 2011 'List of projects for the renewal or upgrading of subsystems', that will seek authorisation to place rolling stock subsystems within scope into service after 2nd May 2025, without prejudice to any transitional arrangements specified in the Annex or exemptions granted by the Department for Transport.

4. Operators of rolling stock subsystems that were authorised to be placed into service against this NTSN are required to operate and maintain the subsystem in conformity with this NTSN or subsequent updated versions, as per regulation 20 of the RIR 2011 'Continuing duty on operator in relation to standards'.

5. Operators of rolling stock subsystems authorised against Issue 1 of this NTSN or a version of the NOI TSI that preceded it may voluntarily choose to apply this NTSN to their operation and maintenance of the subsystem, unless otherwise specified in the corresponding National Implementation Plan.

Article 3

Verification of conformity to this NTSN

1. A rolling stock subsystem's conformity to the requirements of this NTSN shall be confirmed by a UK Declaration of Verification following the procedures set out in Schedule 4 'UK verification assessment procedure for subsystems' and Schedule 5 'UK declaration of verification of subsystems' to the RIR 2011.

2. The procedures specific to this NTSN for assessment of conformity, suitability for use and UK verification are set out Chapter 6 of the Annex, and shall be based on the modules established in the NTSN concerning modules for the procedures for assessment of conformity or suitability for use and UK verification ('Modules NTSN'). Chapter 6 specifies the modules from the 'Modules NTSN' that can be applied to assess conformity to this NTSN.

3. It is the responsibility of the applicant for an authorisation to place a subsystem into service to choose the conformity assessment module(s) that are to be applied by the Approved Body from the options listed in Chapter 6 of the Annex. The applicant should consider which module is most proportionate and cost effective for the project.

4. Without prejudice to paragraph 5 of this article, an interoperability constituent's conformity to the requirements of this NTSN shall be confirmed by a UK declaration of conformity or suitability for use. This is required for placing these constituents on the market in Great Britain.

5. Where interoperability constituent specifications in the NOI TSI are equivalent to those of this NTSN, an EC declaration of conformity or suitability for use is valid for demonstrating compliance with this NTSN and for placing these interoperability constituents on the market.

6. Where a 'UK Specific Case' applies to an interoperability constituent, additional assessment may be needed against the Specific Case requirements. See point 7.3 'UK specific cases' of the Annex for further details.

7. UK certificates which have been issued according to the requirements of Issue 1 of the NOI NTSN remain valid, without a need for a new conformity assessment, until the expiry date originally established. In order to renew a certificate, the design or type shall be re-assessed only against new or modified requirements set out in the Annex to this NTSN.

8. Subject to the reassessment requirements under RIR 2011, and the procedure set out in the NTSN concerning the further assessment of interoperability constituents which hold an EC declaration of conformity or suitability for use, EC certificates which have been issued according to the requirements of the NOI TSI remain valid, without a need for a new conformity assessment, until the expiry date originally established. In order to renew a certificate, the design or type shall be re-assessed only against new or modified requirements set out in the Annex to this NTSN.

Article 4

Quieter Routes

1. A 'quieter route' is a part of the railway infrastructure designated by the Department for Transport as 'competent authority' as requiring special noise mitigation. The Department shall update the list of quieter routes at least every five years, following the procedure set out in Appendix D of the Annex.

Article 5

Lower Exposure Action Values

1. Compliance with the lower exposure action values set out in The Control of Noise at Work Regulations 2005 shall be ensured by compliance with the driver's cabin interior noise level, as set out in point 4.2.4 of the Annex to this NTSN as well as by appropriate operational conditions to be defined by the railway undertaking.

ANNEX

TABLE OF CONTENTS

1. INTRODUCTION

A National Technical Specification Notice (NTSN) is a specification that covers a subsystem (or part of it) as described in regulation 2 of the Railways (Interoperability) Regulations 2011 in order:

— to ensure the interoperability of the GB rail system, and

— to meet the essential requirements.

1.1. TECHNICAL SCOPE

The technical scope of this NTSN is defined in Article 1(2) of the NTSN.

1.1.1. Scope related to rolling stock

This NTSN applies to all rolling stock within the scope of the LOC&PAS NTSN and the WAG NTSN.

1.1.2. Scope related to operational aspects

Alongside with the OPE NTSN, this NTSN applies to the operation of freight wagons which are used on railway infrastructure designated as ‘quieter routes’.

1.2. GEOGRAPHICAL SCOPE

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

2. DEFINITION OF THE SUBSYSTEM

A ‘unit’ means the rolling stock, which is subject to the application of this NTSN, and therefore subject to the ‘UK’ verification procedure. Chapter 2 of the LOC&PAS NTSN and Chapter 2 of the WAG NTSN describe what a unit can consist of.

The requirements of this NTSN apply to the following categories of rolling stock:

(a) Locomotives and passenger rolling stock including thermal or electric traction units, self-propelling thermal or electric passenger trains, and passenger coaches. This category is further defined in Chapter 2 of the LOC&PAS NTSN and shall be referred to in this NTSN as locomotives, electric multiple units (EMU), diesel multiple units (DMU) and coaches;

(b) Freight wagons, including low-deck vehicles designed for the entire network and vehicles designed to carry lorries. This category is further defined in Chapter 2 of the WAG NTSN and shall be referred to in this NTSN as wagons;

(c) Special vehicles, such as on-track machines. This category is further defined in Chapter 2 of the LOC&PAS NTSN.

3. ESSENTIAL REQUIREMENTS

All basic parameters set out in this NTSN shall be linked to at least one of the essential requirements as set out in Schedule 2 to the RIR 2011 . Table 1 indicates the allocation.

Table 1

Basic parameters and their link to the essential requirements

Point	Basic parameter	Essential requirements					
		Safety	Reliability and availability	Health	Environmental protection	Technical compatibility	Accessibility
4.2.1	Limits for stationary noise				1.4.4		
4.2.2	Limits for starting noise				1.4.4		
4.2.3	Limits for pass-by noise				1.4.4		
4.2.4	Limits for driver's cab interior noise				1.4.4		

4. CHARACTERISATION OF THE SUBSYSTEM

4.1. INTRODUCTION

This Chapter sets out the optimal level of harmonisation related to specifications on the rolling stock subsystem intended to limit the noise emission of the GB rail system and to achieve interoperability.

4.2. FUNCTIONAL AND TECHNICAL SPECIFICATIONS OF THE SUBSYSTEMS

The following parameters have been identified as critical for the interoperability (basic parameters):

(a) ‘stationary noise’;

(b) ‘starting noise’;

(c) ‘pass-by noise’;

(d) ‘driver's cab interior noise’.

The corresponding functional and technical specifications allocated to the different categories of rolling stock are set out in this point. In case of units equipped with both thermal and electric power, the relevant limit values under all normal operation modes shall be respected. If one of those operation modes plans the use of both thermal and electric power at the same time, the less restrictive limit value applies. There are UK specific cases indicated in point 7.3.

The assessment procedures for the requirements in this point are defined in the indicated points of Chapter 6.

4.2.1. Limits for stationary noise

The limit values for the following sound pressure levels under normal vehicle conditions concerning the stationary noise allocated to the categories of the rolling stock subsystem are set out in Table 2:

(a) the A-weighted equivalent continuous sound pressure level of the unit ($L_{pAeq,T[unit]}$);

(b) the A-weighted equivalent continuous sound pressure level at the nearest measuring position i considering the main air compressor ($L^{i}_{pAeq,T}$);

(c) the AF-weighted sound pressure level at the nearest measuring position i considering impulsive noise of the exhaust valve of the air dryer (L^{i}_{pAFmax}).

The limit values are set at a distance of 7,5 m from the centre of the track and 1,2 m above top of rail.

Table 2

Limit values for stationary noise

Category of the rolling stock subsystem	**$L_{pAeq,T\ [unit]}$ [dB]**	**$L^{i}_{pAeq,T}$ [dB]**	**L^{i}_{pAFmax} [dB]**
Electric locomotives and special vehicles with electric traction	70	75	85
Diesel locomotives and special vehicles with diesel traction	71	78	
EMUs	65	68	
DMUs	72	76	
Coaches	64	68	
Wagons	65	n.a.	n.a.

The demonstration of conformity is described in point 6.2.2.1.

Note: there is a UK specific case relevant to this point (see point 7.3.2.2).

4.2.2. Limits for starting noise

The limit values for the AF-weighted maximum sound pressure level ($L_{pAF,max}$) concerning the starting noise allocated to the categories of the rolling stock subsystem are set out in Table 3. The limit values are set at a distance of 7,5 m from the centre of the track and 1,2 m above top of rail.

Table 3

Limit values for starting noise

Category of the rolling stock subsystem	**$L_{pAF,max}$ [dB]**
Electric locomotives with total tractive power P < 4 500 kW	81
Electric locomotives with total tractive power P ≥ 4 500 kW special vehicles with electric traction	84
Diesel locomotives P < 2 000 kW at the engine output shaft	85
Diesel locomotives P ≥ 2 000 kW at the engine output shaft special vehicles with diesel traction	87
EMUs with a maximum speed v_{max} < 250 km/h	80
EMUs with a maximum speed v_{max} ≥ 250 km/h	83
DMUs P < 560 kW/engine at the engine output shaft	82
DMUs P ≥ 560 kW/engine at the engine output shaft	83

The demonstration of conformity is described in point 6.2.2.2.

Note: there is a UK specific case relevant to this point (see point 7.3.2.3).

4.2.3. Limits for pass-by noise

The limit values for the A-weighted equivalent continuous sound pressure level at a speed of 80 km/h ($L_{pAeq,Tp,(80\ km/h)}$) and, if applicable, at 250 km/h ($L_{pAeq,Tp,(250\ km/h)}$) concerning the pass-by noise allocated to the categories of the rolling stock subsystem are set out in Table 4. The limit values are set at a distance of 7,5 m from the centre of the track and 1,2 m above top of rail.

Measurements at speeds higher than or equal to 250 km/h shall also be made at the 'additional measurement position' with a height of 3,5 m above top of rail in accordance with the specification referenced in Appendix B, Index [1.1] and assessed against the applicable limit values of Table 4.

Table 4

Limit values for pass-by noise

Category of the rolling stock subsystem	**$L_{pAeq,Tp\ (80\ km/h)}$ [dB]**	**$L_{pAeq,Tp\ (250\ km/h)}$ [dB]**
Electric locomotives and special vehicles with electric traction	84	99
Diesel locomotives and special vehicles with diesel traction	85	n.a.
EMUs	80	95
DMUs	81	96
Coaches	79	n.a.
Wagons (normalised to APL = 0,225) (1)	83	n.a.
(1) APL: the number of axles divided by the length over the buffers (m^{-1})		

The demonstration of conformity is described in point 6.2.2.3.

Note: there is a UK specific case relevant to this point (see point 7.3.2.4).

4.2.3.a. Friction elements for wheel tread brakes

The friction element for wheel tread brakes (i.e. brake block) has an influence on the pass-by noise by creating roughness on the wheel tread when braking.

The demonstration of conformity of brake blocks for freight wagons is described in point 6.1.2.1 of this NTSN. Conformity of its brake blocks to that point does not exempt the unit under assessment from the requirements set out in point 4.2.3 and the demonstration of conformity set out in point 6.2.2.3.

4.2.4. Limits for the driver's cab interior noise

The limit values for the A-weighted equivalent continuous sound pressure level ($L_{pAeq,T}$) concerning the noise within the driver's cab of electric and diesel locomotives, EMUs, DMUs and coaches fitted with a cab are set out in Table 5. The limit values are set in the vicinity of the driver's ear.

These limit values are not mandatory for special vehicles. However, the demonstration of conformity referred to in point 6.2.2.4 shall be performed and the resulting values shall be recorded in the technical file.

Table 5

Limit values for driver's cab interior noise

Noise within the driver's cab	**$L_{pAeq,T}$ [dB]**
At standstill with horns sounding	95
At maximum speed v_{max} if $v_{max} < 250$ km/h	78
At maximum speed v_{max} if 250 km/h ≤ $v_{max} < 350$ km/h	80

The demonstration of conformity is described in point 6.2.2.4.

4.3. FUNCTIONAL AND TECHNICAL SPECIFICATIONS OF THE INTERFACES

This NTSN has the following interfaces with the rolling stock subsystem:

Interface with subsystems referred to in Chapter 2, points (a) and (c), of this NTSN (dealt with in the LOC&PAS NTSN) with regard to:

— stationary noise,

— starting noise (not applicable to coaches),

— pass-by noise,

— interior noise within the driver's cab, where applicable.

Interface with subsystems referred to in Chapter 2, point (b), of this NTSN (dealt with in the WAG NTSN) with regard to:

— pass-by noise,

— stationary noise.

This NTSN has the following interface with the OPE NTSN with regard to:

— pass-by noise.

4.4. OPERATING RULES

Requirements concerning the operating rules for the subsystem rolling stock are set out in point 4.4. of the LOC&PAS NTSN and in point 4.4 of the WAG NTSN.

4.4.1. Specific rules for the operation of wagons on quieter routes in case of degraded operation

The contingency arrangements as set out in point 4.2.3.6.3 of the OPE NTSN include the operation of wagons not compliant with point 7.2.2.2 of this NTSN on quieter routes.

This measure can be applied to address capacity restrictions or operational constraints caused by rolling stock failures, extreme weather conditions, accidents or incidents and infrastructure failures.

4.4.2. Specific rules for the operation of wagons on quieter routes in case of infrastructure works and wagons maintenance

The operation of wagons not compliant with point 7.2.2.2 on quieter routes shall be possible in case of wagons maintenance activities where only a quieter route is available in order to access the maintenance workshop.

Contingency arrangements set out in point 4.4.1 are applicable in case of infrastructure works where a quieter route is the only suitable alternative.

4.5. MAINTENANCE RULES

Requirements concerning the maintenance rules for the subsystem rolling stock are set out in point 4.5 of the LOC&PAS NTSN and in point 4.5 of the WAG NTSN.

4.6. PROFESSIONAL QUALIFICATIONS

Not applicable.

4.7. HEALTH AND SAFETY CONDITIONS

See Article 5.

5. INTEROPERABILITY CONSTITUENTS

5.1. GENERAL

Interoperability constituents (ICs), as defined in regulation 2 of the Railways (Interoperability) Regulations 2011, are listed in point 5.2 of this NTSN together with the reference to corresponding requirements set out in point 4.2 of this NTSN.

5.2. INTEROPERABILITY CONSTITUENT SPECIFICATIONS

5.2.1. Friction element for wheel tread brakes

This interoperability constituent is only applicable to the 'rolling stock - freight wagons' subsystem.

A friction element for wheel tread brakes shall comply with the requirements set out in point 4.2.3.a. Those requirements shall be assessed at IC level.

6. CONFORMITY ASSESSMENT AND UK VERIFICATION

6.1. INTEROPERABILITY CONSTITUENTS

6.1.1. Modules

The conformity assessment of an interoperability constituent shall be performed in accordance with the module(s) described in Table 5a.

Table 5a

Modules for conformity assessment of interoperability constituents

Module CB	UK-Type examination
Module CD	Conformity to type based on quality management system of the production process
Module CF	Conformity to type based on product verification
Module CH1	Conformity based on full quality management system plus design examination

Those modules are specified in detail in the Modules for the procedures for assessment of conformity or suitability for use and UK verification (Modules) NTSN.

6.1.2. Conformity assessment procedures

The manufacturer or its authorised representative shall choose one of the modules or module combinations indicated below for the constituent 'Friction element for wheel tread brakes':

— CB+CD

— CB+CF

— CH1

Within the application of the chosen module or combination of modules, the interoperability constituent shall be assessed against the requirements set out in point 4.2. If necessary, additional requirements concerning the assessment of particular interoperability constituents are defined in the following points.

6.1.2.1. Friction element for wheel tread brakes of freight wagons

A friction element for wheel tread brakes of freight wagons shall comply with the requirements set out in Appendix F.

Until the end of the transition period set out in Appendix G, the types of friction elements for wheel tread brakes listed in Appendix G are deemed compliant with the requirements set out in Appendix F without testing.

Note: there is a UK specific case relevant to this point (see point 7.3.2.5).

6.2. SUBSYSTEM ROLLING STOCK REGARDING NOISE EMITTED BY ROLLING STOCK

6.2.1. Modules

The UK verification shall be performed in accordance with the module(s) described in Table 6.

Table 6

Modules for UK verification of subsystems

SB	UK-Type Examination
SD	UK verification based on quality management system of the production process
SF	UK verification based on product verification
SH1	UK verification based on full quality management system plus design examination

Those modules are specified in detail in the Modules NTSN.

6.2.2. UK verification procedures

The applicant shall choose one of the following assessment procedures consisting of one or more modules for the UK verification of the subsystem:

— (SB+SD),

— (SB+SF),

— (SH1).

Within the application of the chosen module or module combination the subsystem shall be assessed against the requirements set out in point 4.2. If necessary, additional requirements concerning the assessment are given in the following points.

6.2.2.1. Stationary noise

The demonstration of conformity with the limit values on stationary noise as set out in point 4.2.1 shall be carried out in accordance with the specification referenced in Appendix B, Index [1.2].

For the assessment of the main air compressor noise at the nearest measuring position i, the $L^{i}_{pAeq,T}$ indicator shall be used with T representative of one operating cycle as defined in the specification referenced in Appendix B, Index [1.3]. Only the train systems that are required for the air compressor to run under normal operating conditions shall be used for that purpose. The train systems which are not needed for the operation of the compressor may be switched off to prevent contribution to the noise measurement. The demonstration of conformity with the limit values shall be carried out under the conditions solely necessary for operation of the main air compressor at the lowest rpm.

For the assessment of the impulsive noise sources at the nearest measuring position i, the L^{i}_{pAFmax} indicator shall be used. The relevant noise source is the exhaust from the valves of the air dryer.

6.2.2.2. Starting noise

The demonstration of conformity with the limit values on starting noise as set out in point 4.2.2 shall be carried out in accordance with the specification referenced in Appendix B, Index [1.4]. The maximum level method shall apply. Deviating from the test procedure of the specification, the train shall accelerate from standstill up to 30 km/h and then maintain the speed.

In addition the noise shall be measured at the same distance from the centre of the track and the same height above top of rail as set out in point 4.2.2. The ‘averaged

level method' and the 'maximum level method' in accordance with the specification referenced in Appendix B, Index [1.4] shall apply and the train shall accelerate from standstill up to 40 km/h and then maintain the speed. The measured values are not assessed against any limit value and shall be recorded in the technical file.

For special vehicles the starting procedure shall be performed without additional trailer loads.

6.2.2.3. Pass-by noise

The demonstration of conformity with the limit values on pass-by noise as set out in point 4.2.3 shall be carried out in accordance with points 6.2.2.3.1 and 6.2.2.3.2.

6.2.2.3.1. Test track conditions

The tests shall be performed on a reference track as defined in the specification referenced in Appendix B, Index [1.5].

However, it is permitted to carry out the test on a track that does not comply with the reference track conditions in terms of acoustic rail roughness level and track decay rates as long as the noise levels measured in accordance with point 6.2.2.3.2 do not exceed the limit values set out in point 4.2.3.

The acoustic rail roughness and the decay rates of the test track shall be determined in any case. If the track on which the tests are performed does meet the reference track conditions, the measured noise levels shall be marked 'comparable', otherwise they shall be marked 'non-comparable'. It shall be recorded in the technical file whether the measured noise levels are 'comparable' or 'non-comparable'.

The measured acoustic rail roughness values of the test track remain valid during a period starting 3 months before and ending 3 months after that measurement, provided that during that period no track maintenance has been performed which influences the rail acoustic roughness.

The measured track decay rate values of the test track shall remain valid during a period starting 1 year before and ending 1 year after that measurement, provided that during that period no track maintenance has been performed which influences the track decay rates.

Confirmation shall be provided in the technical file that the track data related to the type's pass-by noise measurement were valid during the day(s) of testing, e.g. by providing the date of last maintenance having an impact on noise.

Furthermore, it is permitted to carry out tests at speeds equal to or higher than 250 km/h on slab tracks. In that case the limit values shall be 2 dB higher than those set out in point 4.2.3.

6.2.2.3.2. Procedure

The tests shall be carried out in accordance with the provision in the specification referenced in Appendix B, Index [1.6]. Any comparison against limit values shall be carried out with results rounded to the nearest integer decibel. Any normalisation shall be performed before rounding. The detailed assessment procedure is set out in points 6.2.2.3.2.1, 6.2.2.3.2.2 and 6.2.2.3.2.3.

6.2.2.3.2.1. EMU, DMUs, locomotives and coaches

For EMU, DMUs, locomotives and coaches three classes of maximum operational speed are distinguished:

(1) If the maximum operational speed of the unit is lower than or equal to 80 km/h, the pass-by noise shall be measured at its maximum speed v_{max}. That value shall not exceed the limit value $L_{pAeq,Tp(80\ km/h)}$ as set out in point 4.2.3.

(2) If the maximum operational speed v_{max} of the unit is higher than 80 km/h and lower than 250 km/h, the pass-by noise shall be measured at 80 km/h and at its maximum speed. Both measured pass-by noise values $L_{pAeq,Tp(Vtest)}$ shall be normalised to the reference speed of 80 km/h $L_{pAeq,Tp(80\ km/h)}$ using formula (1). The normalised value shall not exceed the limit value $L_{pAeq,Tp(80\ km/h)}$ as set out in point 4.2.3.

Formula (1):

$$L_{pAeq,Tp(80\ km/h)} = L_{pAeq,Tp(Vtest)} - 30 * \log (v_{test}/80\ km/h)$$

v_{test} = Actual speed during the measurement

(3) If the maximum operational speed v_{max} of the unit is equal to or higher than 250 km/h, the pass-by noise shall be measured at 80 km/h and at its maximum speed with an upper test speed limit of 320 km/h. The measured pass-by noise value $L_{pAeq,Tp(Vtest)}$ at 80 km/h shall be normalised to the reference speed of 80 km/h $L_{pAeq,Tp(80\ km/h)}$ using formula (1). The normalised value shall not exceed the limit value $L_{pAeq,Tp(80\ km/h)}$ as set out in point 4.2.3. The measured pass-by noise value at maximum speed $L_{pAeq,Tp(Vtest)}$ shall be normalised to the reference speed of 250 km/h $L_{pAeq,Tp(250\ km/h)}$ using formula (2). The normalised value shall not exceed the limit value $L_{pAeq,Tp(250\ km/h)}$ as set out in point 4.2.3.

Formula (2):

$L_{pAeq,Tp(250\ km/h)} = L_{pAeq,Tp(Vtest)} - 50 * \log(v_{test}/250\ km/h)$

v_{test} = Actual speed during the measurement

6.2.2.3.2.2. Wagons

For wagons two classes of maximum operational speed are distinguished:

(1) If the maximum operational speed v_{max} of the unit is lower than or equal to 80 km/h, the pass-by noise shall be measured at its maximum speed. The measured pass-by noise value $L_{pAeq,Tp(Vtest)}$ shall be normalised to a reference APL of 0,225 m^{-1} $L_{pAeq,Tp\ (APLref)}$ using formula (3). That value shall not exceed the limit value $L_{pAeq,Tp(80\ km/h)}$ as set out in point 4.2.3.

Formula (3):

$L_{pAeq,Tp\ (APLref)} = L_{pAeq,Tp(Vtest)} - 10 * \log(APL_{wag}/0{,}225\ m^{-1})$

APL_{wag} = Number of axles divided by the length over the buffers [m^{-1}]

v_{test} = Actual speed during the measurement

(2) If the maximum operational speed v_{max} of the unit is higher than 80 km/h, the pass-by noise shall be measured at 80 km/h and at its maximum speed. Both measured pass-by noise values $L_{pAeq,Tp(Vtest)}$ shall be normalised to the reference speed of 80 km/h and to a reference APL of 0,225 m-1 $L_{pAeq,Tp(APL\ ref,\ 80\ km/h)}$ using formula (4). The normalised value shall not exceed the limit value $L_{pAeq,Tp(80\ km/h)}$ as set out in point 4.2.3.

Formula (4):

$L_{pAeq,Tp\ (APLref,\ 80\ km/h)} = L_{pAeq,Tp(Vtest)} - 10 * \log(APL_{wag}/0{,}225\ m^{-1}) — 30 * \log(v_{test}/80\ km/h)$

APL_{wag} = Number of axles divided by the length over the buffers [m^{-1}]

v_{test}= Actual speed during the measurement

6.2.2.3.2.3. Special Vehicles

For special vehicles the same assessment procedure as set out in 6.2.2.3.2.1 applies. The measuring procedure shall be performed without additional trailer loads.

Special vehicles are deemed to comply with the pass-by noise level requirements in point 4.2.3 without measuring when they are:

— solely braked by either composite brake blocks or disc brakes, and

— equipped with composite scrubbers, if scrubber blocks are fitted.

6.2.2.4. Driver's cab interior noise

The demonstration of conformity with the limit values on the driver's cab interior noise as set out in point 4.2.4 shall be carried out in accordance with the specification referenced in Appendix B, Index [2.1]. For special vehicles the measuring procedure shall be performed without additional trailer loads.

6.2.3. Simplified evaluation

Instead of the test procedures as set out in point 6.2.2, it is permitted to substitute some or all of the tests by a simplified evaluation. The simplified evaluation consists of acoustically comparing the unit under assessment to an existing type (further referred to as the reference type) with documented noise characteristics.

The simplified evaluation may be used for each of the applicable basic parameters 'stationary noise', 'starting noise', 'pass-by noise' and 'driver's cab interior noise' autonomously and shall consist of providing evidence that the effects of the differences of the unit under assessment do not result in exceeding the limit values set out in point 4.2.

For the units under simplified evaluation, the proof of conformity shall include a detailed description of the noise relevant changes compared to the reference type. On the basis of that description, a simplified evaluation shall be performed. The estimated noise values shall include the uncertainties of the applied evaluation method. The simplified evaluation can either be a calculation and/or simplified measurement.

A unit certified on the basis of the simplified evaluation method shall not be used as a reference unit for a further evaluation.

If the simplified evaluation is applied for pass-by noise, the reference-type shall comply with at least one of the following:

— Chapter 4 of this NTSN and for which the pass-by noise results are marked 'comparable'

— Chapter 4 of the Annex to Decision 2011/229/EU and for which the pass-by noise results are marked 'comparable'

— Chapter 4 of the Annex to Decision 2006/66/EC[1]

— Chapter 4 of the Annex to Decision 2008/232/EC.

In case of a wagon whose parameters remain, compared to the reference type, within the permitted range of Table 7 it is deemed without further verification that the unit complies with the limit values on pass-by noise as set out in point 4.2.3.

Table 7

Permitted variation of wagons for the exemption from verification

Parameter	Permitted variation (compared to the reference unit)
Max. unit speed	Any speed up to 160 km/h
Type of wheel	Only if equally or less noisy (acoustic characterisation in accordance with the specification referenced in Appendix B, Index [3.1])
Tare weight	Only within the range of +20 %/- 5 %
Brake block	Only if the reference unit is fitted with brake blocks and the brake block of the unit under assessment is covered either by a UK Declaration of Conformity in accordance with this NTSN or it is listed in Appendix G of this NTSN.

7. IMPLEMENTATION

7.1. APPLICATION OF THIS NTSN TO NEW SUBSYSTEMS

(1) This NTSN is applicable to all units of rolling stock in its scope which are placed into service after 2nd May 2025, except where point 7.1.1.2 'Application to ongoing projects' or point 7.1.1.3 'Application to special vehicles' of the LOC&PAS NTSN or point 7.1.1 'Application to ongoing projects' of the WAG NTSN applies.

(2) Compliance with the NOI NTSN in its version applicable before 2nd May 2025 is deemed equivalent to compliance with this NTSN, except for the NTSN changes listed in Appendix H.

1 Commission Implementing Decision 2006/66/EC of 23 December 2005 concerning the technical specification for interoperability relating to the subsystem rolling stock- noise of the trans-European conventional rail system, repealed 4 April 2011. (OJ L 37, 8.2.2006, p. 1-49).

(3) For the rolling stock subsystem and the associated interoperability constituents, the rules related to the UK type or design examination certificates shall be as specified in point 7.1.3 of the LOC&PAS NTSN and in the point 7.2.3 of the WAG NTSN.

7.2. APPLICATION OF THIS NTSN TO EXISTING SUBSYSTEMS

The principles to be applied by the applicants and Safety Authority in case of change(s) to a rolling stock in operation or to an existing rolling stock type are defined in point 7.1.2 of the LOC&PAS NTSN and point 7.2.2 of the WAG NTSN.

7.2.1. Provisions in case of changes to rolling stock in operation or to an existing rolling stock type

The applicant shall ensure that the noise levels of rolling stock subject to change(s) remain below the limits set out in the version of the NTSN or TSI which was applicable when the rolling stock in question was first authorised. If no NTSN or TSI existed at the time of the first authorisation, the applicant shall ensure that the noise levels of the rolling stock subject to change(s) are either not increased or remain below the limits set out in Decision 2006/66/EC or Commission Decision 2002/735/EC.

If an assessment is required, it shall be limited to the basic parameters affected by the change(s).

If the simplified evaluation is applied, the original unit may represent the reference unit in accordance with the provisions of point 6.2.3.

The replacement of a whole unit or (a) vehicle(s) within a unit (e.g. a replacement after a severe damage) does not require a conformity assessment against this NTSN, as long as the unit or the vehicle(s) are identical to the ones they replace.

7.2.2. Additional provisions for the application of this NTSN to existing wagons

The restriction of the operation of wagons in scope of this NTSN but not covered by point 7.2.2.2 shall not apply to wagons mostly operated on lines with a gradient of more than 40 ‰, wagons with a maximum operating speed higher than 120 km/h, wagons with a maximum axle load higher than 22,5 t, wagons exclusively operated for infrastructure works and wagons used in rescue trains.

If a wagon is being equipped with either friction elements for wheel tread brakes covered by a UK Declaration of Conformity in accordance with this NTSN or with friction elements for wheel tread brakes listed in Appendix G and no noise sources

are added to the wagon, then it shall be assumed that the requirements of point 4.2.3 are met without further testing.

7.2.2.1. Not used

7.2.2.2. Wagons operated on quieter routes

Wagons belonging to one of the following categories may be operated on the quieter routes:

— wagons holding an EC declaration of verification against Decision 2006/66/EC,

— wagons holding an EC declaration of verification against Decision 2011/229/EU,

— wagons holding a UK declaration of verification against this NTSN,

— wagons holding a UK declaration of verification against the version of the NOI NTSN published on 1 January 2021

— wagons holding an EC declaration of verification against Commission Implementing Regulation (EU) 2019/774 and used in the UK before 1 January 2021,

— wagons fitted with either of the following:

- friction elements for wheel tread brakes covered by a UK Declaration of Conformity in accordance with this NTSN, or

- friction elements for wheel tread brakes listed in Appendix G,

- brake discs for the service brake function;

— Wagons fitted with composite brake blocks listed in Appendix E for the service brake function. The operation of those wagons on the quieter routes shall be limited in accordance with the conditions described in this Appendix.

7.2.2.3. Interoperability constituents

This point concerns interoperability constituents, which are subject to type examination or design examination.

The type or design examination or suitability for use remains valid even if a variation of this NTSN comes into force, unless explicitly otherwise specified in the variation of this NTSN.

During this time, new constituents of the same type are permitted to be placed on the market without a new type assessment.

7.3. UK SPECIFIC CASES

7.3.1. Introduction

The UK specific cases, as listed in point 7.3.2, are classified as

(a) **'P' cases:** 'permanent' cases;

(b) **'T' cases**: 'temporary' cases.

7.3.2. List of UK specific cases

7.3.2.1. This provision has been left intentionally blank.

7.3.2.2. Limits for stationary noise (point 4.2.1)

(a) This provision has been left intentionally blank

(b) UK Specific case for Great Britain

('P') For DMUs intended to operate solely on the railway network of Great Britain the limit value for stationary noise $L_{pAeq,T\ [unit]}$ in Table 2 may be raised up to 77 dB.

This specific case does not apply to DMUs intended to operate solely on the High Speed 1 railway network.

(c) UK Specific case for Great Britain

('T') For units intended to operate solely on the railway network of Great Britain the limit values $L^{i}_{\ pAeq,T}$ in Table 2 considering the main air compressor do not apply. The measured values shall be submitted to the Safety Authority.

This specific case does not apply to units intended to operate solely on the High Speed 1 railway network.

7.3.2.3. Limits for starting noise (point 4.2.2)

(a) This provision has been left intentionally blank

(b) UK Specific case for Great Britain

('P') For units specified in Table 8 intended to operate solely on the railway network of Great Britain the limit value for starting noise $L_{pAF,max}$ in Table 3 may be raised up to the values set out in Table 8.

Table 8

Limit values for starting noise regarding a UK specific case for Great Britain

Category of the rolling stock subsystem	**$L_{pAF,max}$ [dB]**
Electric locomotives with total tractive power P < 4 500 kW	83
Diesel locomotives P < 2 000 kW at the engine output shaft	89
DMUs	85

This specific case does not apply to units intended to operate solely on the High Speed 1 railway network.

7.3.2.4. Limits for pass-by noise (point 4.2.3)

(a) UK Specific case Channel Tunnel

('P') For the Channel Tunnel, the limits for pass-by noise shall not apply to wagons dedicated to the transport of heavy goods vehicles between Coquelles (France) and Folkestone (United Kingdom).

7.3.2.5. Friction element for wheel tread brakes of freight wagons (point 6.1.2.1, Appendix G)

('P') The types of friction elements for wheel tread brakes listed in Appendix G of the WAG NTSN are also deemed compliant with the requirements set out in Appendix F without testing. They are permanently exempt from a UK Declaration of conformity.

7.4. PARTICULAR IMPLEMENTATION RULES

7.4.1. Particular implementation rules for the application of this NTSN to existing wagons (point 7.2.2)

(a) Particular implementation rules for the application of this NTSN to existing wagons in the Channel Tunnel

('P') For the calculation of the annual average daily operated freight trains during night-time the freight trains composed of wagons dedicated to the transport of heavy goods vehicles confined in the Coquelles (France) - Folkestone (United Kingdom) line shall not be taken into account.

7.4.2. Particular rules for wagons operated on quieter routes (point 7.2.2.2)

(b) Particular implementation rules for wagons operated on quieter routes of Channel Tunnel

('P') On top of the wagons listed in point 7.2.2.2, the following existing wagons can be operated on quieter routes in the Channel Tunnel concession:

Wagons dedicated to the transport of heavy goods vehicles between Coquelles (France) and Folkestone (United Kingdom)

(h) Particular rules for wagons operated on quieter routes of Great Britain

('T') Wagons existing prior to 8 December 2024 equipped with cast iron brake blocks intended to operate on the GB Network shall be permitted to operate on quieter routes until 31 December 2030.

('T') Wagons existing prior to 8 December 2024 equipped with cast iron brake blocks intended to operate on the GB Network used exclusively for the transport of nuclear products shall be permitted to operate on quieter routes until 31 December 2050.

Appendix A Not used

Appendix B Standards referred to in this NTSN

Table B.1

Standards or normative documents

Index	Characteristics to be assessed	NTSN Point	Mandatory standard Point
[1]	**EN ISO 3095:2013** **Acoustics — Railway applications — Measurement of noise emitted by railbound vehicles**		
[1.1]	Pass-by noise – measurements at speeds higher than or equal to 250 km/h	4.2.3	6

Index	Characteristics to be assessed	NTSN Point	Mandatory standard Point
[1.2]	Stationary noise – demonstration of conformity	6.2.2.1	5.1, 5.2, 5.3, 5.4, 5.5 (without 5.5.2), 5.7 and clause 5.8.1
[1.3]	Stationary noise – operating cycle of the main air compressor	6.2.2.1	5.7
[1.4]	Starting noise	6.2.2.2	7 (without 7.5.1.2) Deviation to 7.5.3
[1.5]	Pass-by noise – test track conditions	6.2.2.3.1	6.2
[1.6]	Pass-by noise - procedure	6.2.2.3.2	6.1, 6.3, 6.4, 6.5, 6.6 and 6.7 (without 6.7.2)
[2]	**EN ISO 3381:2021** **Railway applications - Acoustics - Noise measurement inside railbound vehicles**		
[2.1]	Driver's cab interior noise	6.2.2.4	7, 8 except 8.4.5 and 8.7.2
[3]	**EN 13979-1:2020** **Railway applications - Wheelsets and bogies - Monobloc wheels - Technical approval procedure - Part 1: Forged and rolled wheels** Note: EN 13979-1:2003+A2:2011, Annex E is also acceptable		
[3.1]	Simplified evaluation	6.2.3 – table 7	Annex I
[3.2]	Particular implementation rules for wagons operated on quieter routes	7.4.2	All
[4]	**UIC 541-4:2020** **Composite brake blocks - General conditions for certification and use**		
[4.1]	Brake performance test program	Appendix F	Test programs A1_a and A2_a
[5]	**EN 16452:2015+A1:2019**		

Index	Characteristics to be assessed	NTSN Point	Mandatory standard Point
	Railway applications - Braking - Brake blocks		
[5.1]	Brake performance test program – LL-blocks and K-blocks	Appendix F	Test programs D.1 and C.1
[5.2]	Brake performance test program – other blocks	Appendix F	Test program J.2
[6]	**EN 15610:2019** **Railway applications - Acoustics - Rail and wheel roughness measurement related to noise generation**		
[6.1]	Wheel acoustic roughness measurement procedure	Appendix F	All except clause 6.2.2.2

Appendix C Assessment of the rolling stock subsystem

Characteristics to be assessed, as specified in point 4.2					Particular assessment procedure
Element of the rolling stock sub-system	**Point**	**Design review**	**Type Test**	**Routine Test**	**Point**
Stationary noise	4.2.1	X ([1])	X	n.a.	6.2.2.1
Starting noise	4.2.2	X ([1])	X	n.a.	6.2.2.2
Pass-by noise	4.2.3	X ([1])	X	n.a.	6.2.2.3
Driver's cab interior noise	4.2.4	Xhttps://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.356.01.0421.01.ENG ([1])	X	n.a.	6.2.2.4

([1]) Only if the simplified evaluation in accordance with point 6.2.3 is applied.

Appendix D Quieter routes

D.1 Identification of quieter routes

The Competent Authority may designate sections of railway infrastructure as quieter routes following consultation with stakeholders affected by such a designation. If any part of the railway infrastructure is designated as a quieter route, the Competent Authority shall publish a list of quieter routes, together with the rationale associated with each such designation. The list shall contain at least the following information:

— Start and end points of the quieter routes and their corresponding sections. If one of these points is at the border with an EU Member State, it shall be reflected;

— Identification of the sections making up the quieter route

The list shall be provided using the template below:

Quieter route	Sections in the route	Unique section ID	Quieter route starts/finishes at the border
Point A — Point E	Point A — Point B	201	Yes POINT E (Country Y)
	Point B — Point C	202	
	Point C — Point D	203	
	Point D — Point E	204	
Point F — Point I	Point F — Point G	501	No
	Point G — Point H	502	
	Point H — Point I	503	

In addition, the Competent Authority may provide maps illustrating the quieter routes on a voluntary basis.

D.2 Update of quieter routes

Without prejudice to point D.1, the Competent Authority may update the list of quieter routes at any time, taking into account reasonable transitional periods allowing actors sufficient time to adjust.

Appendix E Historic composite brake blocks

E.1 Historic composite brake blocks for international use

Existing wagons equipped with the brake blocks listed in the table are allowed to be used on the quieter routes, until the relevant date set out in Appendix N of UIC 541-4.

Manufacturer/name of product	Designation/type of block	Type of friction coefficient
Valeo/Hersot Wabco/Cobra	693 W554	K
Ferodo	I/B 436	K
Abex	229	K (Fe — sintered)
Jurid	738	K (Fe — sintered)

Wagons equipped with historic composite brake blocks not listed in the table but already authorised for international traffic in conformity with Commission Decision 2004/446/EC or Commission Decision 2006/861/EC may still be used without any deadline within the area of use covered by their authorisation.

Appendix F Assessment of acoustic performance of a brake block

The purpose of this procedure is to demonstrate the acoustic performance of a composite brake block at interoperability constituent level.

The procedure consists of the following steps:

1. Measure the acoustic roughness of a wheel representative of the brake block under assessment.

Wheel acoustic roughness development on bench test

New brake blocks shall be used. Only new or reprofiled wheels shall be used. The wheels shall be free of any damage (cracks, flats, etc.).

One of the following brake performance test programs shall be applied to at least one wheel of 920 mm nominal diameter:

— A2_a for LL-Blocks and A1_a for K-blocks of the specification referenced in Appendix B, Index [4.1];

— D.1 for LL-Blocks and C.1 for K-blocks of the specification referenced in Appendix B, Index [5.1];

— J.2 of the specification referenced in Appendix B, Index [5.2] for other blocks

The selected program shall be completed and the results of the measurement series after completion shall be used to determine the wheel roughness index.

It is optional to continue with a second run of the selected program. If that option is chosen, the results of the measurement series after completion of the second run shall be used to determine the wheel roughness index. The results from both runs shall be documented.

The second run shall be performed with the same wheel, but the brake block may be renewed and replaced with another block of the same type. In that option the bedding-in of the new brake block shall be completely executed at the beginning of the second run.

Wheel acoustic roughness measurement procedure

The measurement will be performed as set out in the specification referenced in Appendix B, Index [6.1]. In order to ensure the representativeness of the acoustic roughness of the wheel tread, 8 measurement lines spaced 5 mm are deemed sufficient instead of the positions set out in the specification referenced in Appendix B, Index [6.1].

The measurement shall be performed during the wheel acoustic roughness development on bench test specified in the previous section in accordance with one of the tables below:

If the selected program is A2_a of the specification referenced in Appendix B, Index [4.1]:

Acoustic roughness measurement series / Label		Programme section	Brake application No.
1st run	2nd run		
A		At start	Initial condition
B	I	After bedding-in	after Br 6
C	J	After conditioning the block for empty load	after Br. 26

D	K	Dry and empty conditions	after Br. 51
E	L	Wet and empty conditions	after Br. 87
F	M	Laden conditions	after Br. 128
G	N	Drag braking (steep gradient downhill simulation)	after Br. 130
H	O	End of programme	after Br. 164

If the selected program is A1_a of the specification referenced in Appendix B, Index [4.1]:

Acoustic roughness measurement series / Label		Programme section	Brake application No.
1st run	2nd run		
A		At start	Initial condition
B	I	After bedding-in	after Br 6
C	J	After conditioning the block for empty load	after Br. 26
D	K	Dry and empty conditions	after Br. 51
E	L	Wet and empty conditions	after Br. 87
F	M	Laden conditions	after Br. 128
G	N	Drag braking (steep gradient downhill simulation)	after Br. 130
H	O	End of programme	after Br. 164

If the selected program is D.1 of the specification referenced in Appendix B, Index [5.1];

Acoustic roughness measurement series / Label		Programme section	Brake application No.
1st run	2nd run		
A		At start	Initial condition
B	I	After bedding-in	after Br 6
C	J	After conditioning the block for empty load	after Br. 26

D	K	Dry and empty conditions	after Br. 51
E	L	Wet and empty conditions	after Br. 87
F	M	Laden conditions	after Br. 128
G	N	Drag braking (steep gradient downhill simulation)	after Br. 130
H	O	End of programme	after Br. 149

If the selected program is C.1 of the specification referenced in Appendix B, Index [5.1];

Acoustic roughness measurement series / Label		Programme section	Brake application No.
1st run	2nd run		
A		At start	Initial condition
B	I	After bedding-in	after Br 6
C	J	After conditioning the block for empty load	after Br. 26
D	K	Dry and empty conditions	after Br. 51
E	L	Wet and empty conditions	after Br. 87
F	M	Laden conditions	after Br. 128
G	N	Drag braking (steep gradient downhill simulation)	after Br. 130
H	O	End of programme	after Br. 149

If the selected program is J.2 of the specification referenced in Appendix B, Index [5.2];

Acoustic roughness measurement series / Label		Programme section	Brake application No.
1st run	2nd run		
A		At start	Initial condition
B	I	After bedding-in	after Br 6
C	J	After conditioning the block for empty load	after Br. 26

D	K	Dry and empty conditions	after Br. 51
E	L	Wet and empty conditions	after Br. 87
F	M	Laden conditions	after Br. 128
G	N	Drag braking (steep gradient downhill simulation)	after Br. 130
H	O	End of programme	after Br. 149

— Sampling: The acoustic roughness of 1 wheel shall be measured.

— Averaging: the RMS average of the acoustic roughness shall be used.

The result is a representative one-third octave wavelength wheel roughness spectrum in the wavelength domain L_r

2. Derive a scalar indicator from the measured wheel roughness L_r in step 1

$$C(i) = B(i) + 10\ \log_{10}[10^{0,1L_R(i)} + 10^{0,1A(i)}]$$

$$Indicator = \ 10\log_{10}(\Sigma_{i=1}^{19}\ 10^{0,1\ C(i)})$$

Where A(i) and B(i) are tabulated as follows[6]:

i	Wavelength λ [m]	A dB re 1 micrometer	B dB re 1/(10^{-6} m)	L_r dB re 1 micrometer
1	0,00315	-17,9	-16,6	
2	0,004	-16,2	-13,9	
3	0,005	-15,5	-10,0	
4	0,0063	-14,4	-6,9	
5	0,008	-13,3	-6,2	
6	0,01	-13,1	-5,4	
7	0,0125	-12,8	-3,3	Obtained from
8	0,016	-12,4	-2,2	Wheel
9	0,02	-10,9	-4,2	roughness
10	0,025	-11,1	-8,5	measurements
11	0,0315	-10,5	-11,2	
12	0,04	-9,8	-14,3	
13	0,05	-4,8	-15,6	
14	0,063	-5,9	-17,3	

15	0,08	-5,6	-23,7	
16	0,1	-0,5	-29,0	
17	0,125	2,4	-30,7	
18	0,16	4,8	-31,7	
19	0,2	2,4	-30,7	

[6] Coefficients A(i) and B(i) are tailored to the current limit values for pass-by noise and reference track conditions

3. Pass-fail criterion

The indicator measured in step 2 shall be lower than or equal to 1.

The indicator measured in step 2 as well as the representative one-third octave wavelength wheel roughness spectrum in the wavelength domain L_r shall be recorded in the IC certificate.

Appendix G Exempted brake blocks

The blocks listed below are exempted from a UK Declaration of conformity until 10 years after 2nd May 2025.

Manufacturer	**Type description and abbreviated designation (if different)**
Becorit	K40
CoFren	C333
CoFren	C810
Knorr-Bremse	Cosid 704
Knorr-Bremse	PROBLOCK J816M
Frenoplast	FR513
Federal Mogul	Jurid 816 M abbreviated: J816M
Federal Mogul	Jurid 822
Knorr-Bremse	PROBLOCK J822
CoFren	C952-1
Federal Mogul	J847
Knorr-Bremse	PROBLOCK J847

Icer Rail / Becorit	IB 116*
Alstom/Flertex	W30-1

Note: there is a UK specific case relevant to this point (see point 7.3.2.5).

Appendix H Changes of requirements and transition regimes

For other NTSN points than these listed in Table H.1 and Table H.2, compliance with the 'previous NTSN' (i.e. the NOI NTSN published on 1 January 2021) imply compliance with this NTSN applicable from 2nd May 2025.

Changes with a generic transition regime of 7 years:

For NTSN points listed in Table H.1, compliance with the previous NTSN does not imply compliance with the version of this NTSN applicable from 2nd May 2025.

Projects already in design phase on 2nd May 2025, shall comply with the requirements of this NTSN applicable from 2nd May 2025 + 7 years.

Projects in production phase and rolling stock in operation are not affected by the NTSN requirements listed in Table H.1

Table H.1

Transition regime of 7 years

NTSN point(s)	NTSN point(s) in previous NTSN	Explanation of the NTSN change
Not applicable		

Changes with a specific transition regime:

For NTSN points listed in Table H.2, compliance with the previous NTSN does not imply compliance with this NTSN applicable from 2nd May 2025.

Projects already in design phase on 2nd May 2025, projects in production phase, and rolling stock in operation shall comply with the requirement of this NTSN in accordance with the respective transition regime set out in Table H.2. starting from 2nd May 2025.

Table H.2

Specific transition regime

NTSN point(s)	NTSN point(s) in previous version	Explanation on NTSN change	Transition regime			
			Design phase not started	Design phase started	Production phase	rolling stock in operation
Not applicable						