



NSAI
Standards

Irish Standard
I.S. EN 15610:2009

Railway applications - Noise emission - Rail roughness measurement related to rolling noise generation

I.S. EN 15610:2009

Incorporating amendments/corrigenda issued since publication:

<i>This document replaces:</i>	<i>This document is based on:</i> EN 15610:2009	<i>Published:</i> 13 May, 2009	
This document was published under the authority of the NSAI and comes into effect on: 17 July, 2009		ICS number: 17.140.30 93.100	
NSAI 1 Swift Square, Northwood, Santry Dublin 9	T +353 1 807 3800 F +353 1 807 3838 E standards@nsai.ie W NSAI.ie	Sales: T +353 1 857 6730 F +353 1 857 6729 W standards.ie	Price Code: K
Údarás um Chaighdeáin Náisiúnta na hÉireann			

ICS 17.140.30; 93.100

English Version

Railway applications - Noise emission - Rail roughness measurement related to rolling noise generation

Applications ferroviaires - Bruit à l'émission - Mesurage de
la rugosité des rails relative à la génération du bruit de
roulement

Bahnanwendungen - Geräuschemission - Messung der
Schienenrauheit im Hinblick auf die Entstehung von
Rollgeräusch

This European Standard was approved by CEN on 16 April 2009.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	6
4 Symbols	8
5 Measuring system requirements.....	8
5.1 General.....	8
5.2 Accuracy of the output signal	8
5.3 Dimensions of the probe.....	8
5.4 Tracking of the probe	9
5.5 Sampling interval	9
5.6 Record length.....	9
6 Data acquisition	9
6.1 General.....	9
6.2 Test section requirements	9
6.2.1 Track structure.....	9
6.2.2 Localized geometric features	9
6.3 Reference surface choice	9
6.4 Data sampling	11
6.4.1 General.....	11
6.4.2 Longitudinal sampling	11
6.4.3 Lateral sampling	11
6.5 Preparation of the rail head surface	12
6.6 Acoustic roughness acquisition	12
7 Data processing.....	12
7.1 Principle.....	12
7.2 Spike removal technique	12
7.3 Curvature processing.....	13
7.4 Spectral analysis.....	14
7.4.1 Method A: Fourier analysis.....	14
7.4.2 Method B: digital filtering	15
7.5 Procedure for extending the wavelength range	15
7.6 Averaging process.....	15
8 Acceptance criteria.....	15
9 Presentation of the data	15
10 Report	16
Annex A (informative) Examples of rail defects	17
Annex B (informative) Example of program code to implement acoustic roughness processing.....	19
B.1 Purpose.....	19
B.2 Conditions of use.....	19
B.3 List of Matlab program files	19
B.4 Input data file requirements.....	19
B.5 Processing options.....	20
B.6 Spectral analysis.....	20
B.7 1/3 octave reporting.....	20
B.8 Output	20

B.9	Listing	21
B.9.1	file RoughProcess.m	21
B.9.2	21	
B.9.3	file ruw_curve_rp.m	27
B.9.4	file noct_rp.m	28
Annex C	(normative) Algorithm used to synthesize a one-third octave band spectrum from a corresponding narrow band spectrum	31
Annex ZA	(informative) Relationship between this European Standard and the Essential Requirements of EU Directive EU 2008/57/EC	32
Bibliography	34

Foreword

This document (EN 15610:2009) has been prepared by Technical Committee CEN/TC 256 "Railway applications", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2009, and conflicting national standards shall be withdrawn at the latest by November 2009.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EC Directives 2001/16/EC, 96/48/EC and 2008/57/EC.

For relationship with EC Directive(s), see informative Annex ZA, which is an integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

1.1 This European Standard specifies a direct method for characterizing the surface roughness of the rail associated with rolling noise ("acoustic roughness"), in the form of a one-third octave band spectrum.

This standard describes a method for:

- a) selecting measuring positions;
- b) data acquisition;
- c) measurement data processing in order to estimate a set of one-third octave band roughness spectra;
- d) presentation of this estimate for comparison with limits of acoustic roughness;
- e) comparison with a given upper limit in terms of a one-third octave band wavelength spectrum.

1.2 It is applicable to the:

- a) performance testing of reference track sections for the measurement, within a period of three months before or after roughness characterization, of noise emitted by railway vehicles for acceptance testing purposes;
- b) acceptance of the rail surface condition only in the case where the result of the direct measurement of the acoustic roughness is regarded as an established acceptance criterion.

1.3 It is not applicable to the:

- a) measurement of rail roughness using an indirect method;
- b) measurement of combined wheel-rail roughness;
- c) analysis of the effect of wheel-rail interaction, such as a "contact filter";
- d) approval of rail reprofiling, including rail grinding operations, except for those where the acoustic roughness (and not the level of corrugation) is an established approval criterion;
- e) characterization of track geometry.

Testing and approval of measuring apparatus are not part of the scope of this standard.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 61260, *Electroacoustics — Octave-band and fractional-octave-band filters (IEC 61260:1995)*

EN ISO 266, *Acoustics — Preferred frequencies (ISO 266:1997)*

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-