

ICS 45.020
CCS S 09

TB

**RAILWAY INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

TB/T 3122-2019

**Acoustic elements of railway sound barrier
(English Translation)**

Issued on: March 25, 2019

Implemented on: October 1, 2019

Issued by: National Railway Administration

Table of Contents

Foreword...	3
1 Scope...	4
2 Normative references...	4
3 Terms and definitions...	5
4 Technical requirements...	7
5 Inspection methods...	9
6 Inspection rules...	11

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard replaces TB/T 3122-2010 "Technique requirements and measurement of acoustic elements of railway sound barrier". Compared with TB/T 3122-2010, the main technical changes of this standard are as follows.

- MODIFY the requirements for acoustic performance, providing the requirements for sound absorption and sound insulation performance of acoustic elements, by frequency division (see 4.1; 4.1 of the 2010 edition);
- MODIFY the fireproof performance requirements and inspection methods (see 4.4 and 5.5; 4.4 and 5.5 of the 2010 edition);
- MODIFY the requirements and inspection methods for anti-corrosion performance (see 4.5 and 5.6; 4.5 and 5.6 of the 2010 edition);
- ADD the requirements and inspection methods for waterproof performance of acoustic elements of sound barriers (see 4.7 and 5.8);
- ADD the performance retention rate requirements and inspection methods, for organic synthetic transparent panel acoustic elements (see 4.9 and 5.10).

This standard shall be under the jurisdiction of the Institute of Energy Conservation, Environmental Protection, Labor and Sanitation of China Academy of Railway Sciences Group Co., Ltd.

The drafting organizations of this standard. Energy Conservation, Environmental Protection, Labor and Sanitation Research Institute of China Railway Research Institute Group Co., Ltd., China Railway Economic Planning Research Institute Co., Ltd., China Railway Design Group Co., Ltd.

1 Scope

This standard specifies terms and definitions, technical requirements, inspection methods, inspection rules for acoustic elements of railway sound barriers.

This standard applies to the design, manufacture, product inspection of acoustic elements of railway sound barriers.

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) is applicable to this standard.

GB/T 1036 Test method for coefficient of linear thermal expansion of plastics between -30 °C and 30 °C with a vitreous silica dilatometer

GB/T 1040.1 Plastics - Determination of tensile properties - Part 1.General principles

GB/T 1041 Plastics - Determination of compressive properties

GB/T 1633 Plastics - Thermoplastic materials - Determination of Virat softening temperature (VST)

GB/T 2410 Determination of the luminous transmittance and haze of transparent plastics

GB/T 3947-1996 Acoustic terminology

GB/T 5464 Non-combustibility test method for building materials

GB 8624-2012 Classification for burning behavior of building materials and products

GB/T 8626 Test method of flammability for building materials

GB/T 9341 Plastics - Determination of flexural properties

GB/T 10299 Test method for hydrophobic nature of thermal insulation

GB/T 14153-1993 General rule of test method for impact resistance of rigid plastics
by means of falling weight

3 Terms and definitions

The terms and definitions, which are defined in GB/T 3947-1996, as well as the following terms and definitions, apply to this document. For ease of use, some terms and definitions in GB/T 3947-1996 are repeated below.

3.1

Railway sound barrier

A structure, which is built on both sides of a railway line, to reduce the impact of train running noise on the acoustic environment.

3.2

Acoustic elements of sound barrier

A unit in a sound barrier, that functions as sound insulation and/or sound absorption.

3.3

Sound absorption coefficient

The ratio -- of the sum of the sound power, which is absorbed by the interface (surface) or medium, plus the sound power, which is transmitted through the interface (wall or partition, etc.), TO the incident sound power, at a given frequency and condition. In general, the measurement conditions and frequencies shall be explained. The sound absorption coefficient is equal to the sum of the loss coefficient and the transmission coefficient.

[GB/T 3947-1996, definition 12.38]

3.4

Noise reduction coefficient

The arithmetic mean of sound absorption coefficients, which are measured at 250 Hz, 500 Hz, 1000 Hz, 2000 Hz, etc. It is calculated to two decimal places; the last

digit takes 0 or 5.

[GB/T 3947-1996, definition 12.43]

4.1 Acoustic performance

The sound absorption performance of a sound barrier's acoustic element is characterized by its noise reduction coefficient and sound absorption coefficient towards the sound source side. The sound insulation performance of sound barrier's acoustic elements is characterized by weighted sound reduction index and sound reduction index. It shall meet the following requirements.

4.2 Wind pressure resistance

The wind pressure resistance performance of the acoustic elements of the sound barrier shall be evaluated, based on the requirements that it shall not occur functional impairment, residual deformation or damage; that the maximum elastic deflection shall not exceed $LA/100$ (wherein LA is the maximum free length of the acoustic element of sound barrier, the same below); that the residual deformation shall not exceed $LA/500$.

4.4 Fireproof performance

The acoustic elements of organic synthetic transparent panels shall meet the requirements of grade B2 and above in GB 8624-2012.

4.5 Corrosion resistance

The anti-corrosion performance of metal materials in acoustic elements of sound barriers is represented by salt spray resistance or coating adhesion. Salt spray resistance and coating adhesion shall meet the requirements in GB/T 17748-2016. The salt spray resistance grade is less than or equal to grade 1; the coating adhesion is grade 0.

4.6 Fatigue resistance

Anti-fatigue tests shall be carried out, on the acoustic elements of sound barriers, on railway lines where the train's design running speed is over 200 km/h. After the anti-fatigue test is carried out, according to the test method of 5.7, there shall be no internal and external structural damage, such as. cracks, panel damage, bonding failure,