ISO 3095:2025-09 (E)

Railway applications - Acoustics - Measurement of noise emitted by railbound vehicles

Contents

Page

Foreword vi

Introduction vii

1 Scope 1

2 Normative references 1

3 Terms and definitions 2
3.1 General definitions 2
3.2 Definitions of track properties 3
3.3 Definitions of acoustic measurement quantities 4
3.4 Definitions for noise from parked trains 6

4 Instrumentation and calibration 6
4.1 Instrumentation 6
4.2 Calibration 7

5 Stationary test 7
5.1 General 7
5.2 Environmental conditions 7
5.2.1 Acoustical environment 7
5.2.2 Meteorological conditions 8
5.2.3 Background sound pressure level 8
5.3 Track conditions 8
5.4 Vehicle conditions 9
5.4.1 General 9
5.4.2 Normal operating conditions 9
5.4.3 Additional operating conditions 10
5.5 Measurement positions 10
5.5.1 Standard measurement positions 10
5.5.2 Additional measurement positions 11
5.6 Measured quantities 11
5.7 Test procedure 11
5.8 Data processing 12
5.8.1 Standard processing 12
5.8.2 Additional processing 12

6 Constant speed test 13
6.1 Environmental conditions 13
6.1.1 Acoustical environment 13
6.1.2 Meteorological conditions 14
6.1.3 Background sound pressure level 14
6.2 Track conditions 14
6.2.1 General 14
6.2.2 Geometry of the line 14
6.2.3 Track superstructure 15
6.2.4 Track quality 15
6.2.5 Acoustic rail roughness of the test track 15
6.2.6 Dynamic properties of the test track 16
6.2.7 Special conditions 17

6.3 Vehicle conditions 17
6.3.1 General 17
6.3.2 Normal operating conditions 18
6.3.3 Occupancy and load 18
6.3.4 Wheel tread conditioning 19
6.3.5 Train composition (adjacent vehicles) 19
6.4 Measurement positions 20
6.4.1 Standard measurement positions 20
6.4.2 Additional measurement positions 21

6.5 Measured quantities 21
6.6 Test procedure 21
6.6.1 General 21
6.6.2 Pass-by speeds 21
6.6.3 Recording and measurement time intervals 21
6.7 Data processing 24
6.7.1 Standard processing 24
6.7.2 Additional processing 24

7 Acceleration test from standstill 24
7.1 General 24
7.2 Environmental conditions 25
7.2.1 Acoustical environment 25
7.2.2 Meteorological conditions 25
7.2.3 Background sound pressure level 25
7.3 Track conditions 25
7.4 Vehicle conditions 26
7.4.1 General 26
7.4.2 Normal operating conditions 27
7.4.3 Occupancy and load 27
7.5 Maximum level method 27
7.5.1 Measurement positions 27
7.5.2 Measured quantities 29
7.5.3 Test procedure 30
7.5.4 Data processing 30
7.6 Averaged level method 30
7.6.1 Measurement positions 30
7.6.2 Measurement quantity 31
7.6.3 Test procedure 31
7.6.4 Data processing 31

8 Braking test 32
8.1 General 32
8.2 Environmental conditions 32
8.2.1 Acoustical environment 32
8.2.2 Meteorological conditions 32
8.2.3 Background sound pressure level 32
8.3 Track conditions 33
8.4 Vehicle conditions 33
8.4.1 General 33
8.4.2 Normal operating conditions 34
8.4.3 Occupancy and load 34
8.4.4 Braking modes 34
8.5 Measurement positions 34
8.6 Measurement quantity 35
8.7 Test procedure 35
8.8 Data processing 35
8.8.1 Standard processing 35
8.8.2 Additional processing 36

9 Quality of the measurements 36
9.1 General 36

9.2 Deviations from the requirements 36
9.3 Measurement tolerances 36
9.4 Measurement spread 36
9.5 Measurement uncertainties 36

10 Test report 37

Annex A (normative) Method to characterize the impulsive character of the noise 38

Annex B (normative) Tests at constant speed -- Special cases 41

Annex C (informative)Trackinfluenceonthepass-bytestresult 45

Annex D (normative) Method to assess acceptable small deviations from acoustic rail roughness requirements 61

Annex E (informative) Guidance for urban rail vehicles measurement 63

Annex F (informative) Additional measurements 65

Annex G (informative) Quantification of measurement uncertainties according to ISO/ IECGuide98-3:2008[1] 71

Annex H (informative) Noise from parked trains 76

Annex I (informative) Data processing for tonal noise assessment at standstill 86

Bibliography 89