

ISO 3381:2021-09 (E)

Railway applications - Acoustics - Noise measurement inside railbound vehicles

Contents		Page
Foreword		vi
1	Scope	1
2	Normative references	1
3	Terms and definitions	2
4	Instrumentation and calibration	3
4.1	Instrumentation	3
4.2	Calibration	3
5	Measurement positions	4
5.1	Division of the unit into areas	4
5.1.1	General	4
5.1.2	Definition of area types	4
5.1.3	Definition of area acoustics	4
5.1.4	Selection of areas to be assessed	4
5.2	Measurement positions	6
5.3	Measurement height	7
5.3.1	Seating position	7
5.3.2	Standing position	7
5.3.3	Lying position	7
5.3.4	Driving position	8
6	Stationary test	9
6.1	General	9
6.2	Environmental conditions	9
6.2.1	Acoustical environment	9
6.2.2	Meteorological conditions	9
6.2.3	Background sound pressure level	10
6.3	Track conditions	10
6.4	Vehicle conditions	10
6.4.1	General	10
6.4.2	Normal operating conditions	10
6.4.3	Additional operating conditions	11
6.5	Measured quantities	11
6.6	Test procedure	11
6.7	Data processing	11
6.7.1	Standard processing	11
6.7.2	Additional processing	12
7	Testing in cabs when sounding an external warning horn	12
7.1	Environmental conditions	12
7.1.1	Acoustical environment	12
7.1.2	Meteorological conditions	13
7.1.3	Background sound pressure level	13
7.2	Track conditions	13
7.3	Vehicle conditions	13
7.4	Measured quantities	13
7.5	Test procedure	13
7.6	Data processing	14

7.6.1	Standard processing	14
7.6.2	Additional processing	14
8	Constant speed test	14
8.1	General	14
8.2	Environmental conditions	14
8.2.1	Acoustical environment	14
8.2.2	Meteorological conditions	15
8.2.3	Background sound pressure level	15
8.3	Track conditions	15
8.3.1	General	15
8.3.2	Track design	15
8.3.3	Track superstructure	16
8.3.4	Track quality	16
8.3.5	Rail roughness and track dynamic properties	16
8.3.6	Special conditions	16
8.4	Vehicle conditions	16
8.4.1	General	16
8.4.2	Normal operating conditions	17
8.4.3	Occupancy and load	17
8.4.4	Wheel tread conditioning	17
8.4.5	Additional conditions	18
8.5	Measured quantities	18
8.6	Test procedure	18
8.6.1	General	18
8.6.2	Test speeds	18
8.6.3	Measurement time intervals	18
8.7	Data processing	19
8.7.1	Standard processing	19
8.7.2	Additional processing	19
9	Acceleration from stand-still test and deceleration to stand-still test	20
9.1	General	20
9.2	Environmental conditions	20
9.2.1	Acoustical environment	20
9.2.2	Meteorological conditions	20
9.2.3	Background sound pressure level	21
9.3	Track conditions	21
9.4	Vehicle conditions	21
9.4.1	General	21
9.4.2	Normal operating conditions	22
9.4.3	Occupancy and load	22
9.4.4	Wheel tread conditions	22
9.5	Test procedure for the acceleration test	23
9.6	Test procedure for the deceleration test	23
9.7	Maximum level method	23
9.7.1	Measured quantities	23
9.7.2	Data processing	23
9.8	Averaged level method	24
9.8.1	Measured quantity	24
9.8.2	Data processing	24
10	Quality of the measurements	25
10.1	Deviations from the requirements	25
10.2	Positional tolerances	25
10.3	Measurement spread	25
10.4	Measurement uncertainties	25
11	Test report	25
Annex A (informative)	Guidance on the definition and reporting of vehicle conditions	27

Annex B (informative) Method to characterize the impulsive character of the noise28
Annex C (normative) Acoustic track characteristics 30
Annex D (informative)Specificenvironments 34
Annex E (informative)Quantificationofmeasurementuncertaintiesaccordingto ISO/IEC Guide 98-3 ...37
Bibliography41