ISO 362-3:2022-09 (E)

Acoustics - Measurement of noise emitted by accelerating road vehicles - Engineering method - Part 3: Indoor testing M and N categories

Contents

Page

Foreword ..... **v**

Introduction ..... **vi**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **2**

4 Symbols and abbreviated terms **2**

5 Acceleration for vehicles of categories M1 and M2 having a maximum authorized mass not exceeding 3 500 kg, and of category N1 ..... **5**
5.1 Applicability and conditions 5
5.2 Calculation of acceleration 5
5.2.1 Calculation procedure for vehicles with manual transmission, automatic transmission, adaptive transmission, and continuously variable transmission (CVT) tested with locked gear ratios 5
5.2.2 Calculation procedure for vehicles with automatic transmission, adaptive transmission, and CVT tested with non-locked gear ratios 5
5.3 Calculation of the target acceleration 5
5.4 Calculation of the reference acceleration 5
5.5 Partial power factor, k_P 6

6 Instrumentation **6**
6.1 Instruments for acoustical measurement 6
6.1.1 General 6
6.1.2 Calibration 6
6.2 Conformity with requirements 7
6.3 Instrumentation for speed measurement 7
6.4 Meteorological instrumentation 7

7 Test room requirements **7**
7.1 General 7
7.2 Test room dimensions 8
7.2.1 Test room dimensions for measurements where the length of the test track is greater than 20m 10
7.3 Acoustical qualification of the room 11
7.3.1 General 11
7.3.2 Validation of free-field conditions of the microphone array 11
7.3.3 Qualification procedure 14
7.4 Condition of the floor 15
7.5 Cooling, ventilation, air temperature, exhaust gas management 15
7.6 Background noise 15

8 Dynamometer requirements **16**
8.1 Type of texture of the rollers 16
8.2 Diameter of the rollers 16
8.3 Reproducibility of the pass-by dynamics 17
8.4 Single-axle or multi-axle operation 17
8.5 Noise emission limit under operating conditions produced by the dynamometer rollers 17

9 Test procedures **18**
9.1 General 18

9.2 Microphone array — Hardware and software ... 18
9.3 Vehicle fixing system ... 18
9.4 Conditions of the vehicle ... 18
9.4.1 General conditions ... 18
9.4.2 Test mass of the vehicle ... 19
9.4.3 Tyre selection and tyre condition ... 19
9.4.4 Calculation of total engine power ... 20
9.4.5 Battery state of charge ... 20
9.4.6 Additional sound emitting devices ... 20
9.4.7 Vehicle cooling fans or cooling systems ... 20
9.5 Operating conditions ... 20
9.5.1 Vehicles of categories M1, M2 having a maximum authorized mass not exceeding 3 500 kg, and N1 ... 20
9.5.2 Vehicles of categories M2 having a maximum authorized mass exceeding 3 500 kg, M3, N2 and N3 ... 21
9.6 Measurement readings and reported values ... 22
9.6.1 General ... 22
9.6.2 Data compilation ... 23
9.6.3 Vehicles of categories M1 and M2 having a maximum authorized mass not exceeding 3 500 kg, and of category N1 ... 23
9.6.4 Vehicles of categories M2 having a maximum authorized mass exceeding 3 500 kg, M3, N2, and N3 ... 23
9.7 Measurement uncertainty ... 23

10 Test methods and test report ... 24
10.1 General ... 24
10.2 Variant A ... 24
10.2.1 General ... 24
10.2.2 Power train noise ... 24
10.2.3 Tyre/road noise ... 25
10.2.4 Calculation of the total vehicle noise using variant A ... 25
10.3 Test report ... 25

Annex A (normative) **Validation of method ... 27**

Annex B (normative) **Procedure for measurement, evaluation, and calculation of tyre/road noise when using variant A ... 31**

Annex C (informative) **Procedure for description of tyre torque influence by an energetic model ... 49**

Annex D (informative) **Procedure for measurement, evaluation, and calculation of tyre/road noise when using variant B ... 54**

Annex E (informative) **Measurement uncertainty — Framework for analysis according to ISO/IEC Guide 98-3 ... 56**

Annex F (informative) **Room length deviation from recommendation ... 64**

Bibliography ... 66