"Annex 7

 Measuring method to evaluate compliance with the Real Driving Additional Sound Emission Provisions (RD-ASEP)

Only applicable for vehicles as specified in paragraph 6.2.3. of this Regulation

1. General

This annex describes a measurement method to evaluate compliance of the vehicle with the ~~additional sound emission provisions~~ ~~(~~**RD-**ASEP~~)~~ conforming to paragraph 6.2.3. of this Regulation.

~~If the tests according to Annex 7 are carried out in the course of type approval,~~ **A**ll tests ~~either~~ for Annex 3 and for Annex 7 shall be carried out on the same test track[[1]](#footnote-2) **or indoor facility.**

**To avoid extended measurements uncertainties, it is recommended to carry out all tests** ~~and, if possible,~~ under similar environmental conditions.

**[**If Annex 7 tests are carried out when type approval has already been granted, e.g. during tests for conformity of production or for in-use compliance, the test specified in Annex 3 shall be repeated with the same gears/gear ratios and weighting factors as determined during the type approval process.**]** *(to be considered under Annex 6)*

2. Measurementmethod

2.1. Measurementinstruments and condition of measurements

Unless otherwise specified, the measurement instruments, the conditions of the measurements and the condition of the vehicle are equivalent to those specified in Annex 3, paragraphs 1. and 2.

~~If the vehicle has different modes, e.g. powertrain system modes, gear selection modes and exhausted system modes, that affect sound emission, any mode(s) may be tested to comply with the requirements in this annex.~~ [**If the vehicle has different modes,** the mode(s) used during **the measurements**  ~~those tests~~ shall be reported in **the** ~~a~~ test report.**]** *(to be reconsidered with test report)*

2.2. Method of testing

 Unless otherwise specified, the conditions and procedures of Annex 3, paragraphs 3.1. to 3.1.2.1.2.2. shall be used. For the purpose of this annex, single test runs are measured and evaluated.

2.3. Control range

**A measurement for RD-ASEP is valid, if all parameters are within the specifications of the table below during the whole pass-by test between AA’ and BB’. ~~The ASEP requirements apply to every gear ratio κ that leads to test results within the control range as defined below.~~**

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Minimum** | **Maximum** |
| Vehicle Speed | 0 km/h | 100 km/h |
| Engine Speed | 1.5 \* nidle \*) | [80% S] |
| AccelerationDeceleration \*\*) | 0 m/s²[-2 m/s²] | [5 m/s²][0 m/s²] |
| Acceleration PerformanceDeceleration Performance | 0 m²/s³ [t.b.d.] | [100] m²/s³0 m²/s³  |
| Gear | ANY |
| Mode | ANY |
| Engine Load | ANY |

\*) stable acceleration according to 2.26.1. shall be ensured. Therefore it is allowed to increase the approach vehicle speed such as a stable is given.

\*\*) Deceleration is understood as the vehicle deceleration stipulated by the acceleration control unit only, without any driver applied braking.

 ***(location in the Regulation to be confirmed)***

~~2.3.1. Control range for starting tests~~

~~Vehicle speed V~~~~AA+5\_ASEP~~~~: v~~~~AA+5~~ ~~=0 km/h~~

~~Vehicle acceleration a~~~~WOT\_ASEP~~~~: a~~~~WOT~~ ~~≤ 5.0 m/s~~~~2~~

~~Engine speed n~~~~BB\_ASEP~~ ~~n~~~~BB~~ ~~≤ 2.0 \* PMR~~~~-0.222~~ ~~\* S or~~

 ~~n~~~~BB~~ ~~≤ 0.8 \* S, whichever is the lowest~~

 ~~Vehicle speed V~~~~BB\_ASEP~~~~: V~~~~BB\_ASEP~~~~≤ 30km/h~~

**~~Gears~~**

|  |  |
| --- | --- |
| ***~~Annex 3 gear selection~~*** | ***~~Annex 7 gear selection~~*** |
| **~~Locked condition~~** | **~~1~~~~st~~ ~~gear or Non-locked~~** |
| **~~Non-locked~~** | **~~Non-locked~~**  |

~~2.3.2 Control range for running tests~~

~~Vehicle speed V~~~~AA\_ASEP~~~~: v~~~~AA~~ ~~≥20 km/h~~

~~Vehicle acceleration a~~~~WOT\_ASEP~~~~: a~~~~WOT~~ ~~≤ 5.0 m/s~~~~2~~

~~Engine speed n~~~~BB\_ASEP~~ ~~n~~~~BB~~ ~~≤ 2.0 \* PMR~~~~-0.222~~ ~~\* S or~~

 ~~n~~~~BB~~ ~~≤ 0.8 \* S, whichever is the lowest~~

~~Vehicle speed V~~~~BB\_ASEP~~~~: V~~~~BB\_ASEP~~~~≤ 120km/h or 80%×maximum speed, whichever is the lowest, for M~~~~1~~

~~V~~~~BB\_ASEP~~~~≤ 100km/h or 80%×maximum speed, whichever is the lowest, for N~~~~1~~ ~~and M~~~~2~~~~< 3,500 kg~~

~~Or V~~~~BB\_ASEP~~~~≤ 100km/h or 80%×maximum speed, whichever is the lowest (~~*~~depends on Japan or other countries who have lower speed limitations on road transport systems~~*~~).~~

**~~Gears~~**

|  |  |
| --- | --- |
| ***~~Annex 3 gear selection~~*** | ***~~Annex 7 gear selection~~*** |
| **~~Locked condition~~** | **~~2~~~~nd~~ ~~gear and above or Non-locked~~** |
| **~~Non-locked~~** | **~~Non-locked~~**  |

|  |  |
| --- | --- |
|  |  |
|  |  |
|  |  |

END OF THE MEETING**2.4 . Target conditions**

The sound emission may be measured in any valid gear ratio or gear position within the control range as specified in paragraph 2.3 of Annex 7.

2.**5**. Test of the vehicle

The path of the centreline of the vehicle shall follow line CC' as closely as possible throughout the entire test.

**2.5.1. Starting tests**

Start from the approach **of the reference point according to definition 2.11. of the main body** to line AA'+5m until the rear of the vehicle passes line BB' or the gear changes, which happens firstly.

At line AA'+5m the accelerator may be fully or partly depressed.

**2.5.2. Running tests**

Start from the approach **of the reference point according to definition 2.11. of the main body** to line AA' until the rear of the vehicle passes line BB'.

At line AA' the accelerator shall be fully or partly depressed. To achieve a more stable acceleration before line BB', pre-acceleration before line AA' may be used **according to the provisions of paragraphs 3.1.2.1.2.1. and 3.1.2.1.2.2**. **of Annex 3**. The accelerator shall be kept in a stable depressed condition until the rear of the vehicle reaches line BB' during one single run.

**In case of vehicles tested with non-locked gear ratios, the test may include a gear ratio change. If possible, the manufacturer shall take the measures to avoid a gearshift which leads to a condition that is not in compliance with the boundary conditions. In such a case, it is permitted to establish and use electronic or mechanical devices, including alternate gear selector positions.**

**2.5.3. Measurements reading:**

**At least one test point for starting and four test points for running at different conditions are needed.**

**Per test point, one single run is carried out.**

For every separate test run, the following parameters shall be determined and noted:

The maximum A-weighted sound pressure level of both sides of the vehicle, indicated during each passage of the vehicle between the two lines AA' and BB'+20m, shall be mathematically rounded to the first decimal place (Lwot,κj). If a sound peak obviously out of character with the general sound pressure level is observed, the measurement shall be discarded. Left and right side may be measured simultaneously or separately**. For further processing the higher sound pressure level of both sides shall be used.**

The vehicle speed readings at AA'(AA'+5m for starting test)**, PP’** and BB' shall be **rounded and** reported with the first significant digit after the decimal place. (vAA,κj(vAA+5, κj); **vPP,κj**; vBB,κj (nMax, κj)).

If applicable, the engine speed readings at BB' shall be reported as a full integer value (nBB,κj).

The calculated acceleration shall be determined in accordance to the formula in paragraph 3.1.2.1.2. of Annex 3 and reported to the second digit after the decimal place (awot,test,κj).

 II. Justification

1. In the limit value formula, it is better to use the nMax than nBB’.
2. (100%-x%) and x% should be decided per vehicle according to the test result of Annex 3.
3. If starting tests are needed, that means new speed points, engine speed points and accelerations calculation methods need to be created.
4. Totally 1+4 runs are needed. If 1 or 2 runs cannot comply with the requirements in this annex, added two times runs at such conditions, if the added runs comply with the requirements, it is Ok and if not, it fails.
1. **Tests for Annex 3 and Annex 7 may be carried out on different test tracks if documentation exists that demonstrates that the differences in sound performance are neglectable.**  [↑](#footnote-ref-2)