

Interpretation document with regards applicable test speed of the motorcycle when performing test runs for type approval according to regulation UNECE R41-05, Annex 7 “RD-ASEP”

Purpose of this document:

This Document supports the harmonized application of tolerances for applicable test speed for vehicles where such tolerances are not specifically defined in the regulation, and where the application of such tolerances is justified by the principle of avoiding undue workload, and where the application of such tolerances can be considered as being in line with the “RD-ASEP” purpose and general principles.

- **“RD-ASEP” purpose and relevant general principles**
 - assessment of noise emissions in all real driving conditions within the RD-ASEP control range, as defined in point 2.5.
 - assessment of noise emissions in vehicle operations as defined in point 3.3. and different from the operating conditions which are applied for the determination of L_{urb} according to Annex 3
 - assessment and prove of compliance of the motorcycle noise emissions in all operating conditions within the RD-ASEP control range, including available user selectable software programs or modes
 - avoid undue workload by limiting the number of RD-ASEP test runs, while granting the effectiveness of the test procedure, by applying the “mystery point concept” – meaning that the actual operation conditions are understood as a spot check, for which the applied operating conditions are not known to the applicant for approval (vehicle manufacturer) prior to the type approval test

Background: The assessment of noise emissions in all possible vehicle operating conditions within the RD-ASEP control range cannot be performed, as this would require an infinite number of test runs. Instead, a random selection of vehicle operation conditions is defined by the technical service or the type approval authority. The random selection of operating conditions is not known to the applicant for type approval prior to the actual type approval testing. Since the applicant for type approval does not know which operating conditions will actually be applied during the RD-ASEP tests, the vehicle has to be designed for being compliant with all possible operating conditions within the RD-ASE control range. The vehicle test speed is one of the variable parameters of the vehicle operating conditions which are defined by the technical service or the approval authority in the course of type approval testing.

- **tolerances for vehicle speed at lines PP' and BB'**

Point 3.3.1. reads, *"The approach velocity shall be chosen as such that the vehicle reaches a prescribed test speed $v_{test} \pm 5$ km/h when its front passes the line AA'."*

Annex 7 does not include specific tolerances for the vehicle speed at lines PP' and BB', although the vehicle speed at BB' is relevant for reference point tests according to point 3.2.2. (b), in cases when the maximum vehicle speed at BB' is applied instead of the engine rpm ($0.8 \times S$), and vehicle speed at PP' and BB' is relevant for additional operating conditions according to the provisions of point 3.3.1. to determine if a deceleration of the vehicle is present with the prescribed throttle operation.

Interpretation: If no specific tolerances for the vehicle speed are defined, it may be assumed that the tolerances for vehicle speed as defined in Annex 3 should be applied.

However, for the above mentioned test the application of the tolerances as defined in Annex 3 are not appropriate, because they are rather tight and therefore results in a high number of invalid test runs.

Due to the fact, that test runs which were discarded due to the exceedance of the speed at BB' or due to a slight deceleration at PP' or BB' can still be considered to be compliant with the "RD-ASEP" purpose and general principles, it is justified to apply a larger tolerance to the vehicle speed, in order to render these tests as valid.

To respect the principle of avoiding undue workload while granting for the effectiveness of the test procedure, the application of a tolerance of ± 5 km/h as it is defined in point 3.3.1. for the test speed v_{test} at line AA' is appropriate to be applied for the vehicle speed at PP' and BB'.

The principles of the wording of point 2.5., *"The values for the RD-ASEP control range shall be seen as absolute values and shall not be increased or lowered by addition or subtraction of the tolerance for v_{test} as indicated in paragraph 3.3.1."* shall also apply to the tolerances for the vehicle speed at lines PP' and BB'. Meaning that the application of the tolerance shall neither decrease the vehicle speed below the minimum speed of 10km/h nor increase the maximum vehicle speed above 80km/h for vehicles with $PMR \leq 150$ or above 100km/h for vehicles with $PMR > 150$.

- **tolerances for engine speed at line BB'**

Point 3.2.2. (b) reads, *" $v_{BB'}$ corresponding to $n_{BB'} = 0.8 \times S$ " and " $v_{BB'}$ shall not exceed the values as specified in paragraph 2.5 (b) of this Annex."*

Annex 7 does not include specific tolerances for the engine speed at line BB', although the engine speed at BB' may be relevant for reference point test according to point 3.2.2. (b)

The provisions of the text in the regulation are stating $v_{BB'}$ as the relevant parameter for the test according to point 3.2.2. (b) and setting the speed at BB' to a value which is corresponding to an engine speed of 80% of the rated engine speed S of the vehicle.

Interpretation: Although the primary parameter for the test according to point 3.2.2. (b) is the vehicle speed at line BB', it may be more practicable to apply the engine speed at line BB' as validation parameter for this test instead.

In such a case, following the above interpretation and justification of the application of tolerances for the vehicle speed, it is appropriate to apply a tolerance for the engine speed which is corresponding to the tolerance for the vehicle speed.

The value for the tolerance of the engine speed can be calculated from the overall transmission ratio of the vehicle in a specific gear, corresponding to the tolerance of +/- 5 km/h for the vehicle speed.