
***Changes to legislation:** There are outstanding changes not yet made to Regulation (EU) No 540/2014 of the European Parliament and of the Council. Any changes that have already been made to the legislation appear in the content and are referenced with annotations. (See end of Document for details) [View outstanding changes](#)*

Regulation (EU) No 540/2014 of the European Parliament and of the Council of 16 April 2014 on the sound level of motor vehicles and of replacement silencing systems, and amending Directive 2007/46/EC and repealing Directive 70/157/EEC (Text with EEA relevance)

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ANNEX VII

MEASURING METHOD TO EVALUATE COMPLIANCE WITH THE ADDITIONAL SOUND EMISSION PROVISIONS

3. ANALYSIS OF RESULTS

3.1. Determination of the anchor point for each gear ratio

For measurements in gear i and lower, the anchor point consists of the maximum sound level L_{woti} , the reported engine speed n_{woti} and vehicle speed v_{woti} at BB' of gear ratio i of the acceleration test in Annex II.

$$\begin{aligned} L_{\text{anchor},i} &= L_{woti,\text{Annex II}} \\ n_{\text{anchor},i} &= n_{\text{BB},woti,\text{Annex II}} \\ v_{\text{anchor},i} &= v_{\text{BB},woti,\text{Annex II}} \end{aligned}$$

For measurements in gear $i+1$ the anchor point consists of the maximum sound level L_{woti+1} , the reported engine speed n_{woti+1} and vehicle speed v_{woti+1} at BB' of gear ratio $i+1$ of the acceleration test in Annex II.

$$\begin{aligned} L_{\text{anchor},i+1} &= L_{woti+1,\text{Annex II}} \\ n_{\text{anchor},i+1} &= n_{\text{BB},woti+1,\text{Annex II}} \\ v_{\text{anchor},i+1} &= v_{\text{BB},woti+1,\text{Annex II}} \end{aligned}$$

3.2. Slope of the regression line for each gear

The sound measurements shall be evaluated as a function of engine speed in accordance with point 3.2.1.

3.2.1. Calculation of the slope of the regression line for each gear

The linear regression line is calculated using the anchor point and the four correlated additional measurements.

$$\text{Slope}_k = \frac{\sum_{j=1}^5 (n_j - \bar{n})(L_j - \bar{L})}{\sum_{j=1}^5 (n_j - \bar{n})^2}$$

(in dB/1 000 min⁻¹)

With

$$\bar{L} = \frac{1}{5} \sum_{j=1}^5 L_j$$

and

$$\bar{n} = \bar{n} \frac{1}{5} \sum_{j=1}^5 n_j$$

where n_j = engine speed measured at line BB'

3.2.2. Slope of the regression line for each gear

The Slope_k of a particular gear for the further calculation is the derived result of the calculation in point 3.2.1 rounded to the first decimal place, but not higher than 5 dB/1 000 min⁻¹.

3.3. Calculation of the linear sound level increase expected for each measurement

The sound level $L_{\text{ASEP},kj}$ for measurement point j and gear k shall be calculated using the engine speeds measured for each measurement point, using the slope specified in point 3.2 to the specific anchor point for each gear ratio.

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For $n_{BB_k,j} \leq n_{anchor,k}$:

$$L_{ASEP_k,j} = L_{anchor_k} + (Slope_k - Y) * (n_{BB_k,j} - n_{anchor,k}) / 1\ 000$$

For $n_{BB_k,j} > n_{anchor,k}$:

$$L_{ASEP_k,j} = L_{anchor_k} + (Slope_k + Y) * (n_{BB_k,j} - n_{anchor,k}) / 1\ 000$$

Where $Y = 1$

3.4. Samples

On request of the approval authority two additional runs within the boundary conditions in accordance with point 2.3 shall be carried out.

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Changes and effects yet to be applied to the whole legislation item and associated provisions

- Signature words omitted by [S.I. 2022/1273 reg. 75\(10\)](#)
- Annex 7 s. 1 words substituted by [S.I. 2022/1273 reg. 76\(7\)](#)
- Annex 8 s. 3.5 words substituted by [S.I. 2022/1273 reg. 76\(8\)](#)
- Annex 4 s. 1 words substituted by [S.I. 2022/1273 reg. 76\(5\)](#)
- Annex 9 Appendix 3 image substituted by [S.I. 2022/1273 reg. 76\(9\)\(n\)\(i\)](#)
- Annex 9 Appendix 1 point 1.5 word substituted by [S.I. 2022/1273 reg. 76\(9\)\(k\)](#)
- Annex 9 Appendix 2 Addendum word substituted by [S.I. 2022/1273 reg. 76\(9\)\(l\)](#)
- Annex 9 Appendix 3 image words omitted by [S.I. 2022/1273 reg. 76\(9\)\(n\)\(ii\)](#)
- Annex 9 Appendix 2 notes words substituted by [S.I. 2022/1273 reg. 76\(9\)\(m\)](#)
- Annex 6 s. 3 words substituted by [S.I. 2022/1273 reg. 76\(6\)](#)
- Annex 1 Appendix 2 heading word substituted by [S.I. 2022/1273 reg. 76\(2\)\(j\)\(i\)](#)
- Annex 1 Appendix 2 Addendum word substituted by [S.I. 2022/1273 reg. 76\(2\)\(l\)](#)
- Annex 1 Appendix 2 words inserted by [S.I. 2022/1273 reg. 76\(2\)\(j\)\(ii\)](#)
- Annex 1 Appendix 1 heading words substituted by [S.I. 2022/1273 reg. 76\(2\)\(i\)\(i\)](#)
- Annex 1 Appendix 1 point 9(1) words substituted by [S.I. 2022/1273 reg. 76\(2\)\(i\)\(ii\)](#)
- Annex 1 Appendix 2 notes words substituted by [S.I. 2022/1273 reg. 76\(2\)\(k\)\(i\)](#)
- Annex 1 Appendix 2 notes words substituted by [S.I. 2022/1273 reg. 76\(2\)\(k\)\(ii\)](#)
- Art. 3(1) words substituted by [S.I. 2022/1273 reg. 75\(4\)\(b\)](#)
- Art. 3(5) words substituted by [S.I. 2022/1273 reg. 75\(4\)\(c\)](#)
- Art. 3(21) word substituted by [S.I. 2022/1273 reg. 75\(4\)\(d\)](#)