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## ANNEX

### Methodology for determining the reduction in CO<sub>2</sub> emissions due to the use of the Valeo Efficient Generation Alternator in an M1 vehicle

#### 6. Error in the CO<sub>2</sub> savings due to the standard deviation (propagation law)

The standard deviation of the efficiency value of the alternator ( $\Delta\eta_A$ ), leads to an error in the CO<sub>2</sub> savings. This error is to be calculated by means of the following formula<sup>(1)</sup>:

$$\text{Formula (5)} \quad : \quad \Delta\text{CO}_2 = (P_{m-RW} - P_{m-TA}) \times (1 / \eta_{A-EI}^2) \times \Delta\eta_A \times (V_{Pe} \times CF_p / v)$$

Where:

$\Delta\text{CO}_2$	= error in CO <sub>2</sub> savings (g CO <sub>2</sub> /km);
$P_{RW}$	= 750 W;
$P_{TA}$	= 350 W;
$\eta_{A-EI}$	= Efficiency of the high efficient alternator;
$\Delta\eta_A$	= Standard deviation of the efficiency of the alternator (result of equation in Formula (4));
$V_{Pe}$	= Willans' factors (l/kWh);
CF	= Conversion factors (g CO <sub>2</sub> /l);
v	= mean driving speed of the NEDC (km/h)

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- (1) This formula (5) can be derived from the error propagation law which is explained in the Technical Guidelines (par. 4.2.1).

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