**Supplement: Default emission factors**

1. Fuel consumption

**Table 1** – Fuel Consumption factors (in MJ/km) used in the calculations with COPERT for the default CO2 emission values for 4 driving modes and weighted average (wAvg) used as one driving mode. These factors change across different Euro classes. Also shown for comparison the annual real-world (RW) FC values determined from the real-world CO2 emissions as shown in Fig. 1C.

|  |  |  |
| --- | --- | --- |
|  | **Petrol** | **Diesel** |
| **COPERT** | **RW FC** | **COPERT** | **RW FC** |
| **Urban Off Peak** | **Urban Peak** | **Rural** | **Highway** | **wAvg** | **Urban Off Peak** | **Urban Peak** | **Rural** | **Highway** | **wAvg** |
| **1995** | 2.78 | 4.61 | 2.28 | 2.27 | 2.47 | 2.82 | 2.41 | 3.88 | 2.06 | 2.17 | 2.24 | 2.63 |
| **1996** | 2.78 | 4.61 | 2.28 | 2.27 | 2.47 | 2.77 | 2.41 | 3.88 | 2.06 | 2.17 | 2.24 | 2.61 |
| **1997** | 2.78 | 4.61 | 2.28 | 2.27 | 2.47 | 2.74 | 2.50 | 4.02 | 2.11 | 2.19 | 2.29 | 2.57 |
| **1998** | 2.79 | 5.30 | 2.28 | 2.26 | 2.50 | 2.71 | 2.50 | 4.02 | 2.11 | 2.19 | 2.29 | 2.51 |
| **1999** | 2.79 | 5.30 | 2.28 | 2.26 | 2.50 | 2.68 | 2.50 | 4.02 | 2.11 | 2.19 | 2.29 | 2.42 |
| **2000** | 2.79 | 5.30 | 2.28 | 2.26 | 2.50 | 2.66 | 2.50 | 4.02 | 2.11 | 2.19 | 2.29 | 2.39 |
| **2001** | 2.76 | 4.67 | 2.25 | 2.20 | 2.43 | 2.58 | 2.43 | 3.80 | 2.09 | 2.13 | 2.24 | 2.29 |
| **2002** | 2.76 | 4.67 | 2.25 | 2.20 | 2.43 | 2.6 | 2.43 | 3.80 | 2.09 | 2.13 | 2.24 | 2.31 |
| **2003** | 2.76 | 4.67 | 2.25 | 2.20 | 2.43 | 2.59 | 2.43 | 3.80 | 2.09 | 2.13 | 2.24 | 2.34 |
| **2004** | 2.76 | 4.67 | 2.25 | 2.20 | 2.43 | 2.63 | 2.43 | 3.80 | 2.09 | 2.13 | 2.24 | 2.35 |
| **2005** | 2.76 | 4.67 | 2.25 | 2.20 | 2.43 | 2.55 | 2.43 | 3.80 | 2.09 | 2.13 | 2.24 | 2.34 |
| **2006** | 2.74 | 4.56 | 2.25 | 2.26 | 2.44 | 2.49 | 2.43 | 3.80 | 2.09 | 2.13 | 2.24 | 2.35 |
| **2007** | 2.74 | 4.56 | 2.25 | 2.26 | 2.44 | 2.52 | 2.43 | 3.80 | 2.09 | 2.13 | 2.24 | 2.37 |
| **2008** | 2.74 | 4.56 | 2.25 | 2.26 | 2.44 | 2.51 | 2.43 | 3.80 | 2.09 | 2.13 | 2.24 | 2.35 |
| **2009** | 2.74 | 4.56 | 2.25 | 2.26 | 2.44 | 2.41 | 2.43 | 3.80 | 2.09 | 2.13 | 2.24 | 2.29 |
| **2010** | 2.74 | 4.56 | 2.25 | 2.26 | 2.44 | 2.38 | 2.43 | 3.80 | 2.09 | 2.13 | 2.24 | 2.26 |
| **2011** | 2.74 | 4.56 | 2.25 | 2.26 | 2.44 | 2.35 | 2.43 | 3.80 | 2.09 | 2.13 | 2.24 | 2.28 |
| **2012** | 2.74 | 4.56 | 2.25 | 2.26 | 2.44 | 2.33 | 2.43 | 3.80 | 2.09 | 2.13 | 2.24 | 2.29 |
| **2013** | 2.74 | 4.56 | 2.25 | 2.26 | 2.44 | 2.34 | 2.43 | 3.80 | 2.09 | 2.13 | 2.24 | 2.27 |
| **2014** | 2.74 | 4.56 | 2.25 | 2.26 | 2.44 | 2.36 | 2.43 | 3.80 | 2.09 | 2.13 | 2.24 | 2.27 |
| **2015** | 2.74 | 4.56 | 2.25 | 2.26 | 2.44 | 2.4 | 2.43 | 3.80 | 2.09 | 2.13 | 2.24 | 2.33 |
|  | **LPG** | **CNG** |
| **COPERT** | **RW FC** | **COPERT** | **RW FC** |
| **Urban Off Peak** | **Urban Peak** | **Rural** | **Highway** | **wAvg** | **Urban Off Peak** | **Urban Peak** | **Rural** | **Highway** | **wAvg** |
| **1995** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.67 |  |
| **1996** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.63 |
| **1997** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.60 |
| **1998** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.57 |
| **1999** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.54 |
| **2000** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.52 |
| **2001** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.45 |
| **2002** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.46 |
| **2003** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.46 |
| **2004** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.49 |
| **2005** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.42 |
| **2006** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.36 | 2.79 | 4.40 | 2.36 | 2.35 | 2.52 | 2.68 |
| **2007** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.39 | 2.79 | 4.40 | 2.36 | 2.35 | 2.52 | 2.72 |
| **2008** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.38 | 2.79 | 4.40 | 2.36 | 2.35 | 2.52 | 2.70 |
| **2009** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.29 | 2.79 | 4.40 | 2.36 | 2.35 | 2.52 | 2.60 |
| **2010** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.26 | 2.79 | 4.40 | 2.36 | 2.35 | 2.52 | 2.56 |
| **2011** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.23 | 2.79 | 4.40 | 2.36 | 2.35 | 2.52 | 2.53 |
| **2012** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.21 | 2.79 | 4.40 | 2.36 | 2.35 | 2.52 | 2.51 |
| **2013** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.21 | 2.79 | 4.40 | 2.36 | 2.35 | 2.52 | 2.52 |
| **2014** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.23 | 2.79 | 4.40 | 2.36 | 2.35 | 2.52 | 2.54 |
| **2015** | 2.38 | 3.01 | 2.10 | 2.31 | 2.25 | 2.27 | 2.79 | 4.40 | 2.36 | 2.35 | 2.52 | 2.58 |

1. PM

**Table 2** – PM emission factors (g/km) used in the calculations with COPERT for the default PM and BC emission values for 4 driving modes and weighted average (wAvg) used as one driving mode, and real-world (RW) PM values.

|  |  |  |  |
| --- | --- | --- | --- |
| **Fuel** | **Euro Standard** | **COPERT** | **RW** |
| **Urban Off Peak** | **Urban Peak** | **Rural** | **Highway** | **wAvg** |
| Petrol | Euro 1 | 0.0032 | 0.0032 | 0.0018 | 0.0019 | 0.0021 | 0.0250 |
| Euro 2 | 0.0032 | 0.0032 | 0.0018 | 0.0019 | 0.0021 | 0.0030 |
| Euro 3 | 0.0013 | 0.0013 | 0.0008 | 0.0012 | 0.0010 | 0.0030 |
| Euro 4 | 0.0013 | 0.0013 | 0.0008 | 0.0012 | 0.0010 | 0.0030 |
| Euro 5 | 0.0015 | 0.0022 | 0.0013 | 0.0012 | 0.0013 | 0.0030 |
| Diesel | Euro 1 | 0.0599 | 0.0891 | 0.0554 | 0.0872 | 0.0673 | 0.1360 |
| Euro 2 | 0.0499 | 0.0711 | 0.0396 | 0.0447 | 0.0442 | 0.0730 |
| Euro 3 | 0.0306 | 0.0421 | 0.0279 | 0.0381 | 0.0321 | 0.0348 |
| Euro 4 | 0.0304 | 0.0390 | 0.0252 | 0.0247 | 0.0265 | 0.0318 |
| Euro 5 | 0.0026 | 0.0046 | 0.0019 | 0.0016 | 0.0021 | 0.0051 |
| LPG Bifuel | Euro 1 | 0.0032 | 0.0032 | 0.0018 | 0.0019 | 0.0021 | 0.0012 |
| Euro 2 | 0.0032 | 0.0032 | 0.0018 | 0.0019 | 0.0021 | 0.0012 |
| Euro 3 | 0.0013 | 0.0013 | 0.0008 | 0.0012 | 0.0010 | 0.0012 |
| Euro 4 | 0.0013 | 0.0013 | 0.0008 | 0.0012 | 0.0010 | 0.0012 |
| Euro 5 | 0.0013 | 0.0013 | 0.0008 | 0.0012 | 0.0010 | 0.0012 |
| CNG Bifuel | Euro 4 | 0.0013 | 0.0013 | 0.0008 | 0.0012 | 0.0010 | 0.0012 |
| Euro 5 | 0.0013 | 0.0013 | 0.0008 | 0.0012 | 0.0010 | 0.0012 |