

Addendum Sector : Vehicle refinishing

1 Methodology used

To be consistent with the data used in the RAINS model, emission factors for this sector have been modified.

- ✓ In the final working document of 17/06/03, emission factors (g VOC / kg of coatings) are defined according to the consumption of coatings for each primary measure.
- ✓ In the methodology used in the RAINS model, all measures have to be compared to the same reference case. This means that all emission factors are defined according to the consumption of coatings corresponding to the primary measure 00.

For simplification purposes, as coatings used differ from one measure to another, they have been differentiated as follows : coatings_{s00} for PMC 00, coatings_{s01} for PMC 01 and coatings_{s02} for PMC 02.

Explanations are given in tables 1.1 and 1.2 hereafter :

Data shown in table 1.1 are consistent with the final background document “Vehicle refinishing” from 17/06/03 (table 7.2.2 p.13).

Table 1.1 : Consumptions of coatings for the different measures

Primary Measure Code PMC	Consumption factor	Consumption per year for 1500 vehicles
00	2,41 kg of coatings _{s00} / vehicle	3,615 t coatings _{s00} / y
01	1,81 kg of coatings _{s01} / vehicle	2,715 t coatings _{s01} / y
02	1,61 kg of coatings _{s02} / vehicle	2,415 t coatings _{s02} / y

Data shown in table 1.2 are consistent with the final background document “Vehicle refinishing” from 17/06/03 (table 7.3.2.2 p.15).

Table 1.2 : VOC emission factor (EF) for the different measures

Primary Measure Code PMC	Emission factor
00	1,605 kg of VOC / vehicle
01	0,674 kg of VOC / vehicle
02	0,475 kg of VOC / vehicle

In table 1.3, the two methodologies are compared :

- ✓ EF (final document 17/0603) correspond to the emission factors shown in the final document in table 5.3.1 p.10.
- ✓ In the column “EF (new methodology)”, calculations of the new emission factors are given. All emissions factors are calculated compared to PMC 00.

Table 1.3 : Comparison between EF from the working document and EF used in the tool

Primary Measure Code PMC	EF (final document 170603)	EF (new methodology)
00	666 kg VOC/t coatings _{s00}	1,605 / 2,41 = 666 kg VOC/t coatings _{s00}
01	372 kg VOC/t coatings _{s01}	0,674 / 2,41 = 280 kg VOC/t coatings _{s00}
02	295 kg VOC/t coatings _{s02}	0,475 / 2,41 = 197 kg VOC/t coatings _{s00}

Data shown in table 1.4 are consistent with the final background document “Vehicle refinishing” from 17/06/03 (table 5.3.2 p.10).

Table 1.4 : Operating costs

Primary Measure Code PMC	Costs [€/ year]
00	0
01	1 611
02	13 620

In table 1.5, the two methodologies are compared for the “cost per activity” determination.

Table 1.5 : Costs per activity

Primary Measure Code PMC	Cost per activity (methodology of the final document 170603)	Cost per activity (new methodology)
00	0 €/ t coatings _{S00}	0 €/ t coatings _{S00}
01	1 611 / 2,715 = 593 €/ t coatings _{S01}	1 611 / 3,615 = 446 €/ t coatings _{S00}
02	13 620 / 2,415 = 5 640 €/ t coatings _{S02}	13 620 / 3,615 = 3 768 €/ t coatings _{S00}

Table 1.6 summarizes the figures which will be presented in the last version of the tool :

Table 1.6 : Figures given in the tool for the new methodology

Primary Measure Code PMC	EF (new methodology)	Cost per activity (new methodology)
00	666 kg VOC/t coatings _{S00}	0 €/ t coatings _{S00}
01	280 kg VOC/t coatings _{S00}	446 €/ t coatings _{S00}
02	197 kg VOC/t coatings _{S00}	3 768 €/ t coatings _{S00}

2 Example

An example is given hereafter to show that results are similar with one or the other method.

Activity levels differ from one methodology to the other :

- ✓ If we consider the methodology used in the final document 170603, the consumption of products is reduced when switching from the use of coatings_{S00} to coatings_{S01} and coatings_{S02} as shown in table 1.1. The consumption of 100 tonnes of coatings_{S00} corresponds to the consumption of 75 tonnes of coatings_{S01} and 67 tonnes of coatings_{S02}.
- ✓ In the other methodology used for RAINS, the consumption of coatings_{S00} being the reference, activity will remain the same (i.e. 100 tonnes).

Table 2.1 : Annual activity levels for the use of the three types of coatings

Primary Measure Code PMC	Activity (final document 170603)	Activity (new methodology)
00	100 t coatings _{S00} / y	100 t coatings _{S00} / y
01	75 t coatings _{S01} / y	100 t coatings _{S00} / y
02	67 t coatings _{S02} / y	100 t coatings _{S00} / y

Table 2.2 : Annual Emissions

Primary Measure Code PMC	Annual emissions (final document 170603)	Annual emissions (new methodology)
00	$100 \times 666 = 66\,598 \text{ kg VOC / y}$	$100 \times 666 = 66\,598 \text{ kg VOC / y}$
01	$75 \times 372 = 27\,967 \text{ kg VOC / y}$	$100 \times 280 = 27\,967 \text{ kg VOC / y}$
02	$67 \times 295 = 19\,710 \text{ kg VOC / y}$	$100 \times 197 = 19\,710 \text{ kg VOC / y}$

As shown in table 2.2, emissions are similar with one or the other methodology. The same approach applies for annual costs.

3 Activity levels

In the working document, activity levels (tonnes of coatings / year) are required for the years 2000 to 2020 with 5 year-intervals.

*As mentioned above, the only parameter to be considered is changes in the activity. The fact that fewer coatings are required for the same task **is not to be taken into account.***