

TRUCK COATING

SYNOPSIS SHEET

Prepared in the framework of EGTEI

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1. Activity description and EGTEI contribution - summary

This sector covers the coating of vans and trucks as part of production and assembly. This activity emits VOC originating from the spray booths, the drying ovens and the application equipment's cleaning steps.

No information on VOC emissions is available at a European level.

The coating of trucks **is addressed by the European Directive 1999/13/EC** (SED) [1] related to the reduction of NMVOC emissions from the use of solvents in some industrial activities. In order to be able to better represent the impact of this Directive in term of emission reduction and costs, **this sector has been considered as an individual activity by EGTEI [2]**. The background document was carried out in close cooperation with the European Automobile Manufacturer Association (ACEA) [3] which has delivered specific data for this sector to EGTEI.

In the previous RAINS version [4], the coating of trucks was not studied as a separate sector. It was considered together with the coating of cars, busses and truck cabins. Presently, the new RAINS version [5] does not take into account the new EGTEI data (for simplification reasons). These sectors are very little in terms of VOC emissions and usually already well equipped. Thus, the coating of all vehicles is still considered together.

In EGTEI, the representative unit used is the number of vehicles coated annually (trucks/year). Only one reference installation (RI) has been defined with ACEA to simplify the work of national experts.

Aggregated measures defined correspond to the substitution of coatings consumed and to the use of thermal oxidiser. Measures 02 and 03 allow large installations respecting the SED Directive requirements.

EGTEI provides default emission factors (EF) with abatement efficiencies, investments, variable and fixed operating costs (OC) as well as additional unit costs (€/t NMVOC abated and €/activity unit) for the four abatement measures defined.

Unit costs vary from 6.9 to 21.7 k€/t of VOC abated (or 66 to 335 €/truck). National experts have only to provide the activity level trend from 2000 to 2020 as well as the application and applicability rates of each abatement technique.

This sector has not been specifically introduced in RAINS but the completion of ECODAT will facilitate the bilateral discussions to describe how this sector has to be effectively taken into account with the manufacture of cars.

2. European regulation

As mentioned above, the European Directive 99/13/EC [1] applies to this sector (annex IIA, part II).

The Directive applies to installations with a solvent consumption above 15 t per year. Emission limit values defined in the Directive are presented in table 2.1. All obligations are not described in this chapter.

Table 2.1: Emission limit values

Activity (type of vehicle)	Production threshold [number of vehicles]	Total emission limit values	
		New installations	Existing installations
Truck coating	> 2,500	70 g / m ²	90 g / m ²
	≤ 2,500	90 g / m ²	120 g / m ²

The compliance date for existing installations is 2007. Following the transcription of the directive in Member States, this date can be different from country to country. For example, in France, the compliance date is October 30th, 2005.

3. Methodology developed within EGTEI to represent the sector

3.1 Definition of the reference installation

Only one installation is defined according to the number of vehicles produced.

Table 3.1.1: Reference installation

Reference Installation Code RIC	Description	Technical characteristics
01	Medium Installation: output: > 25,000 units / y	Solvent consumption: 1,000 t/y Average surface per vehicle: 200 m ²

The activity is defined as the annual production of vehicles. As there is only one reference installation, it is relatively simple to find data in every country.

3.2 Definition of emission abatement techniques

No distinction is made between primary and secondary measure. Measures are defined as a mix of techniques enabling to reach the Directive requirements [1] and to go further.

Measure 00 represents the reference case. Only conventional solvent-based products are used.

Measure 01: this intermediate measure corresponds to the use of water-based primer and high solid enamel.

Measure 02: in order to reach the Directive limit value (90 g/m²), a partial VOC abatement in the enamel spray booths is required.

Measure 03: this final measure corresponds to the use of waterborne enamel. As this is in most cases hard to modify an existing installation in order to adopt water-based enamel (basically for lack of space), the unique alternative is to build a new installation in a new building.

Table 3.2.1: Definition of aggregated measures

Measure code MC	Description of the measure
00	50 % two layer – 50 % one layer <ul style="list-style-type: none"> Solvent-based products Incineration on electrophoresis oven applied
01	50 % two layer – 50 % one layer <ul style="list-style-type: none"> MC 00 + water-based primer and high solid enamel Improved solvent recovery / solvent consumption reduction Incineration on primer and enamel
02	01 + partial VOC abatement in the enamel spray booths
03	80 % two layer – 20 % one layer <ul style="list-style-type: none"> Waterborne primer Waterborne basecoat High solid clear coat Waterborne solid coat Improvement of the cleaning stages Incineration on electrophoresis oven applied Improved solvent recovery / solvent consumption reduction Incineration on primer and enamel

4. Country specific data to be collected

Very few country specific data have to be collected to represent this sector. Costs have been developed at a European level on field observations. So no economic parameter is necessary.

Information concerning activity levels from 2000 to 2020 as well as the description of the control strategy is required (these data can be directly entered in the database ECODAT). A full definition of the work to be done by national experts is provided in the general EGTEI methodology [6].

The national expert can also modify the default unabated emission factor proposed by EGTEI to represent the reference situation of the coating of trucks for all Parties in a range of $\pm 10\%$. If the modification is higher than 10%, then appropriate explanations have to be provided.

Table 4.1: Unabated emission factor [kg of VOC / truck coated]

Default emission factor	User specific emission factor
28.4	To be completed by national experts

5. Default emission factors and cost data defined with the EGTEI methodology

Table 5.1 gives an overview of all data provided by EGTEI: default emission factors (EF) with abatement efficiencies, variable operating costs (OC) as well as additional unit costs per t NMVOC abated and per unit of activity.

Table 5.1: Default emission factors (EF), abatement efficiencies and costs for each combination

RIC MC	NMVOC EF [kg NMVOC/ vehicle]	Abatement efficiency [%]	Investment [k€]	Variable Operating Costs [k€/ year]	Fixed Operating Costs [k€/ year]	Unit cost [€/t NMVOC abated]	Unit cost [€/ vehicle]
01 00	28,4	0,0	0	0	0	-	0
01 01	18,8	33,8	11,000	500	165	6,891	66
01 02	18	36,6	20,000	500 *	615	12,488	130
01 03	13	54,2	90,000	1,300	225	21,751	335

* No information is available on operating costs incurred for the thermal oxidation in the enamel spray booths. These costs are believed to be very high.

Costs incurred by the use waterborne enamel are much higher because usually, a new installation has to be built because of a lack of space.

Investments correspond to the cost of new application lines, booths and the use of secondary measures when it is appropriate. Variable operating costs are derived from the use of alternative coatings and secondary measures as defined in table 3.2.1. Fixed operating costs are only taken into account for secondary measures (5% of thermal oxidation investment) as it is assumed that fixed operating costs are the same for all primary measures.

Additional unit costs are obtained by dividing the additional annual cost of the measure considered by the amount of VOC abated (compared to the reference case MC 00).

6. Relevance of EGTEI information for Integrated Assessment Modelling (IAM)

In the previous version of the RAINS model [4], the coating of trucks was considered with the coating of cars. According to ACEA, techniques used in the manufacture of cars are not suitable for the coating of vans and trucks. That is why this sector has been treated separately within EGTEI.

EGTEI provides now an approach to consider this sector and to test the impact of the current legislation.

Data provided in the EGTEI approach (emission factors and costs) have not been implemented in the new RAINS version [5] for the modelling work because VOC emissions are very little and already well treated. This sector will still be considered together with the manufacture of cars, busses and truck cabins (for simplification reasons). The unabated emission factor is country specific and has to be defined by the national expert (it depends on the shares of the different types of vehicles coated). Abatement techniques and costs are defined according to the EGTEI document concerning the manufacture of cars [7].

It is still interesting for national experts to do this exercise for this sector so they can define their country specific unabated emission factor for the manufacture of all types of vehicles and they can also estimate more precisely their VOC emissions from 2000 to 2020.

7. Perspective for the future

In the future, any new technology which could be developed should be considered by EGTEI in the background document to continuously improve the representation of the sector.

About national data collection, in France for example, no truck is coated anymore. This is also the case in Belgium. Pieces are coated abroad and are shipped to the country where they are assembled. When this is the case, no VOC emissions are accounted for this particular sector.

8. Bibliography

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