

SNAP CODE: **060407**
060409

SOURCE ACTIVITY TITLE: **OTHER USE OF SOLVENTS & RELATED INDUSTRIES**
Underseal Treatment and Conservation of Vehicles
Vehicles Dewaxing

NOSE CODE: **107.04.07**
107.04.09

NFR CODE: **3 D**

1 ACTIVITIES INCLUDED

This chapter addresses the application of protective coatings to the undersides of cars and the removal from cars of temporary protective coverings that are applied to protect the car's paint work during transport.

2 CONTRIBUTION TO TOTAL EMISSIONS

Underseal treatment of cars and vehicle dewaxing are unlikely to be a significant source of emissions.

Table 2.1: Contribution to total emissions of the CORINAIR90 inventory

Source-activity	SNAP-code	Contribution to total emissions (including nature) [%]							
		SO ₂	NO _x	NMVOC	CH ₄	CO	CO ₂	N ₂ O	NH ₃
Underseal Treatment of Cars	060407	-	-	0.15	-	-	-	-	-
Vehicle Dewaxing	060409	-	-	0.2	-	-	-	-	-

0 = emissions are reported but the exact value is below the rounding limit (0.1 per cent)
- = no emissions are reported

Note that the above contributions represent emissions reported from 9 countries for 060407 and 8 countries for 060409.

These activities are not believed to be a significant source of PM_{2,5} (as of December 2006).

3 GENERAL

The following description of the processes and controls is based on discussions with SMMT, ACEA and Ford Europe (see references, section 17).

3.1 Description

3.1.1 Underseal treatment

The application of coatings to the underside of car bodies can be divided into Original Equipment Manufacture (OEM) sector and the aftermarket (repair) sector. For the OEM sector a coating of PVC plastisol¹ is applied during manufacture to the underneath of car bodies at the same time as the primer. The body is then heated in an oven at 135°C for about 5 minutes to cure both the primer and the PVC coating. This coating is applied for protection from stone chips and for sound deadening. The PVC coating is 97% - 99% solids and is an integral part of the vehicle's coating "package". Any emission during manufacture will be included in any estimate of the emission from painting during vehicle manufacture (activity 060101 "paint application: manufacture of automobiles").

In the aftermarket sector coatings are applied to the underside of cars only during repair of damaged bodywork. This coating is the same type as in the OEM sector. These emissions will be included under activity 060102 "car repairing".

Before the early 1980s car manufacturers did not apply any coating to the underside of their cars. If a car owner wanted to protect their car against rust and stone chip damage they had to pay to have their car 'undersealed' at a garage or workshop. This involved the application of a bituminous coating. The market for this service no longer exists in much of Western Europe. It may still occur in Eastern Europe and in the restoration and maintenance of vintage cars but this activity is likely to be very small indeed.

3.1.2 Vehicle Dewaxing

Some new cars have a protective covering applied to their bodies after painting to provide protection during transport. In the UK this is usually done only on cars destined for export. Removal of the coating is usually done only at import centres. Cars produced for the home market are not usually given a protective covering unless there is a specific reason, for example problems at their storage location. In continental Europe cars are transported long distances on land as well as being imported from overseas so the driving forces affecting the use of such coatings may be different.

Transport protection coverings are not applied to the whole car body but only to regions of the body considered vulnerable to damage during transport. The pattern of application varies from one manufacturer to another. Some manufacturers do only the bumper, some do only the drivers door, some do the horizontal surfaces and some do the sides as well.

There are a number of methods for applying coverings for protection during transport. Traditionally a hydrocarbon wax has been used which had to be removed using a mixture of hot water, kerosene and detergent. Recently two alternative methods have been introduced. The first of these is a water soluble wax which can be removed with hot water alone without the need for the kerosene. The second is a self adhesive polyethylene film called "Wrap Guard". This can be peeled off by hand and disposed of as ordinary commercial waste. Most European car manufacturers are currently either already using self adhesive polyethylene film

¹ a colloidal suspension of fine PVC particles in a liquid plasticiser which solidifies on heating to give a rubbery material

or are evaluating it. It is expected that within a few years all European manufacturers will be using self adhesive polyethylene film as their only method of applying transportation protective coverings, as has been the situation in the US for a number of years already.

Consequently it is recommended that the VOC emission from this source is assumed to be rapidly approaching zero.

3.2 Definitions

Vehicle refinishing The repair of vehicles damaged in accidents and also the repainting of old vehicles to improve their appearance (see SNAP 060102).

OEM Original Equipment Manufacture - refers in this context to the manufacture of new vehicles.

Aftermarket Products and services supplied to vehicle owners in connection with their vehicle but not as part of the vehicle manufacture itself (see SNAP 060102).

3.3 Techniques

The techniques used in the activities are described in Section 3.1.

3.4 Controls

Aftermarket underseal treatment of vehicles using bituminous coatings is no longer carried out in Europe on modern cars. What little is carried out is likely to be during the restoration and maintenance of vintage cars. This market is very small indeed. Where it is carried out emissions could be reduced by:

- using alternative non-solvent containing materials
- carrying out the coating operation in a cabin with an extract system leading to abatement plant.

Atmospheric emissions from the application of transport protective coverings can be eliminated by the use of non-solvent containing products such as self adhesive plastic film. The major European car manufacturers are already changing over to this method and within a few years it is expected that all will have done so.

4 SIMPLER METHODOLOGY

The current emission from the sources covered by this chapter can be assumed to negligible.

In some circumstances it may be necessary to calculate an emission estimate for previous years, for example, in assessing emission reductions under the UNECE VOC protocol. To estimate an emission for vehicle dewaxing for previous years when the process was still carried out, an emission factor is given in section 8. This emission factor should be applied only to a proportion of the cars sold in the country in question.

5 DETAILED METHODOLOGY

Not applicable, because the emission is very small.

6 RELEVANT ACTIVITY STATISTICS

6.1 Simpler Methodology

For vehicle dewaxing in previous years when the process was still carried out on a large scale, emission estimation requires knowledge of the number of vehicles dewaxed in a year. This can be ascertained from local motor industry representatives. In the UK, for example, it would apply only to those vehicles imported into the country from overseas. In continental Europe it may apply only to those vehicles transported over longer distances.

6.2 Detailed Methodology

Not applicable.

7 POINT SOURCE CRITERIA

These activities do not lead to atmospheric emissions.

8 EMISSION FACTORS QUALITY CODES AND REFERENCES

8.1 Simpler methodology

Compound	Process	Emission factor	Data quality	Reference	Country
NM VOC	Dewaxing of new vehicles following storage / transport	1 kg/car ⁽¹⁾	E	van der Most, pers. com.	The Netherlands

⁽¹⁾ Emission factor assumes 3 kg of solvent is used per car, with 2 kg of solvent recycled.

No emission factors are available for underseal (aftermarket) treatment.

8.2 Detailed methodology

Not Applicable

9 SPECIES PROFILES

No available information.

10 UNCERTAINTY ESTIMATES

There is probably a small amount of bituminous coating still used in the restoration and maintenance of vintage cars. This activity is usually carried out by small firms or by amateurs so reliable statistics are difficult to obtain. The extent to which the practice is still continued is likely to represent only a small deviation from zero.

The emission factor for vehicle dewaxing of 1 kg/car is subject to a number of uncertainties. These are:

1. manufacturers do not coat the whole car surface and the pattern of application varies from one manufacturer to another - consequently the smaller the amount of coated surface the less emission there will be from removing it.
2. the factor itself was not based on actual measurements but rather on "engineering judgement"

Also, not all cars sold in a country are dewaxed. It is necessary to obtain an estimate of how many cars are dewaxed and this estimate may also be subject to considerable uncertainty.

11 WEAKEST ASPECTS/PRIORITY AREAS FOR IMPROVEMENT IN CURRENT METHODOLOGY

Underseal treatment and dewaxing activities which are within the coverage of this chapter are rapidly declining or are not carried out by major manufacturers across Western Europe. This needs to be confirmed for all countries with manufacturing plant.

Lack of data means that it is difficult to reliably estimate emissions in previous years, if required, but the emission was likely to be low compared to other NMVOC sources.

These activities, however, could be widespread in Eastern European countries and, if this is the case, then emission factors need to be developed, particularly for underseal (aftermarket) treatment.

12 SPATIAL DISAGGREGATION CRITERIA FOR AREA SOURCES

Not applicable.

13 TEMPORAL DISAGGREGATION CRITERIA

Several decades ago the use of bituminous coatings to "underseal" cars was common. However, this practice ceased in the late seventies/early eighties.

The use of hydrocarbon waxes as protective coatings is only coming to an end now. In previous years there would have been an atmospheric emission from this source. It may be assumed that in 1988 transportation protective coatings in Europe were entirely of hydrocarbon wax. However, the timescale over which the transition from to the present situation has taken place is uncertain.

14 ADDITIONAL COMMENTS

No additional comments.

15 SUPPLEMENTARY DOCUMENTS

Not required

16 VERIFICATION PROCEDURES

Not applicable.

17 REFERENCES

ACEA (Association of European Automobile Manufacturers), personal communication, 1997.

Ford Europe, personal communication, 1997.

SMMT (Society of Motor Manufacturers and Traders, UK), personal communication, 1997.

van der Most, personal communication. Data originally from Dutch "Emission factor Handbook", 1980.

18 BIBLIOGRAPHY

Not applicable

19 RELEASE VERSION DATE AND SOURCE

Version: 1.2

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20 POINT OF ENQUIRY

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