**PRTR Estimation Manual**

# 04. Automobile Maintenance Industry

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**Japan Automobile Dealers Association**
**Japan AutoBody Repair Cooperative Association**
**Japan Automobile Service Promotion Association**

## Contents

## 1. Selected list of Class I Designated Chemical Substances (PRTR Chemicals) related to the automobile maintenance industry (reference)

The data below are examples of the Class I Designated Chemical Substances. Workers in individual job sites should formally make inquiries to the manufacturers to identify the substances according to the MSDS system (the manufactures are obliged to provide information about the characteristics and treatment of the chemical substances by using Material Safety Data Sheets to the purchasers, when transferring the Class I Chemical Substances). However, in cases of the automobile retailing industry and automobile maintenance industry, because their work and scale are limited, they may report the releases and transfers only if the identufied volume of the four limited chemical substances (see * in the table below) fall under the law.

| Application | Cabinet Order No. | CAS NO. | Name of chemical substance | Content (%) | Remarks |
|---|---|---|---|---|---|
| Oils and fats<br>Engine oil<br>Transmission oil<br>Brake oil<br>Power steering oil<br>Differential gear oil | | | | All PRTR substances less than 1 | Not subject to the law |
| Radiator coolant (LLC) | 43 | 107-21-1 | Ethylene glycol* | 90 | |
| Refrigerant for air conditioner | 121 | 75-71-8 | Dichlorodifluoromethane (CFC-12)* | 100 | |
| Paint and thinner | 40 | 100-41-4 | Ethylbenzene | 2 ～ 18 | |
| | 63 | 1330-20-7 | Xylene * | 5 ～ 50 | |
| | 224 | 108-67-8 | 1, 3, 5- trimethylbenzene | 1 | |
| | 227 | 108-88-3 | Toluene * | 5 ～ 35 | |
| Adhesive and sealing compound<br>Class I Substances vary depending on types of adhesives | 30 | 25068-38-5 | Bisphenol A type epoxy resin | 80 | |
| | 63 | 1330-20-7 | Xylene* | 10 ～ 25 | |
| | 211 | 79-01-6 | Trichloroethylene | 20 | |
| | 227 | 108-88-3 | Toluene* | 5 or less ～ 35 | |
| | 272 | 117-81-7 | Bis(2-ethylhexyl) phthalate | 30 | |
| Cleaner (cleaning of components) | 145 | 75-09-2 | Dichloromethane (Methylene dichloride) | 60 | |

## 2. Actual examples of calculation for releases and transfers of Class I Designated Chemical Substances

### 2.1. Estimation of releases and transfers of ethylene glycol in the operations of Long Life Coolant (LLC) collection and filling

#### 2.1.1. Condition assumed for estimating releases and transfers

(1) All amounts are on an annual basis (April through March of the following year).

(2) The amount of ethylene glycol handled is calculated by multiplying the amount of LLC purchased x ethyleneglycol content x specific gravity of ethylene glycol.

(3) The amount of ethylene glycol extracted (= filled up) is equivalent to the amount of new liquid purchased.

(4) When washing the remaining liquid in radiators with water, the extracted amount and the remaining amount are equivalent to 0.95 and 0.05 of the amount of ethylene glycol handled, respectively.

(5) The concentration of filled up LLC is regarded as being equivalent to that of the extracted liquid. The dilution ratio is not taken into consideration (to simplify the calculation).

(6) The specific gravity and the content of ethylene glycol which is a PRTR Chemical contained in LLC, should be confirmed by MSDS. If they cannot be confirmed, use the following figures: specific gravity: 1.1, content: 90 percent.

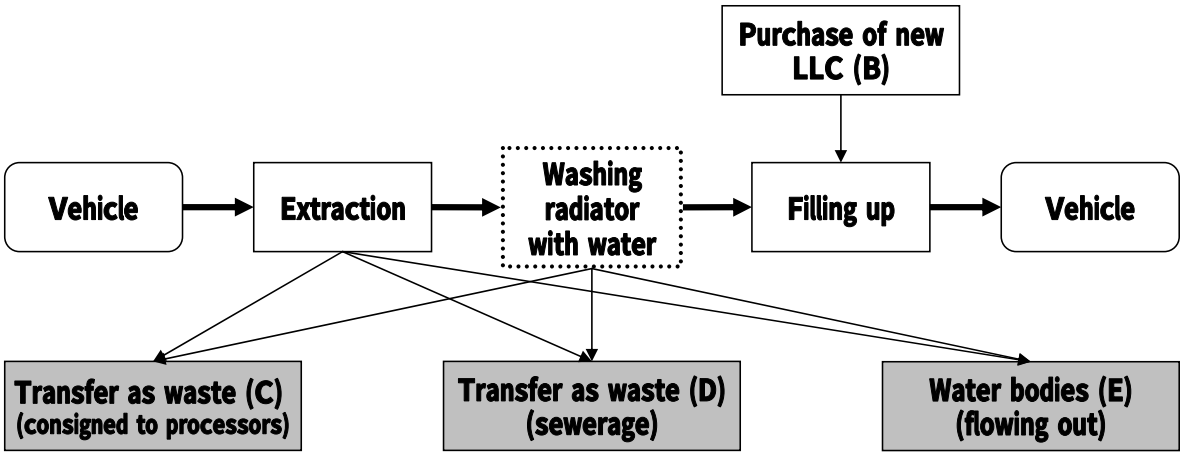
(7) There is no necessity to report the extracted LLC that is recycled.

(8) The new liquid and extracted liquid, which are stored temporarily, are omitted from the calculation because they are evened out on an annual basis.

(9) If the distinction between sewerage and water bodies is not clear, make an inquiry to the municipality.

(10) Physical properties of ethylene glycol (see the reference table at the end of this manual)

2.1.2. Flow chart of LLC released and transferred




2.1.3. Procedure for estimating releases and transfers

(1) Estimation of handled amount of ethylene glycol contained in coolant

(Criterion for PRTR reporting: handled amount of 1 ton or more annually [5 tons or more for 2001 and 2002])

Amount of ethylene glycol handled (A) = amount of new LLC purchased (B)
x content of ethylene glycol
x specific gravity of ethylene glycol

(The specific gravity and content should be confirmed by MSDS.)

[Calculation example: 8,732 kg = 8,820 liters x 0.9 x 1.1]

(2) Procedure for estimating releases and transfers to be reported

The quantity to be reported is calculated by using an appropriate case from [1] through [8] below.

[1] In cases where extracted waste liquid is transferred to collectors and new liquid is filled up without washing out the remaining liquid in radiators with water:

Transfers as waste (C) = A

[Calculation example: C = 8,732 kg]

[2] In cases where extracted waste liquid is released to sewerage and new liquid is filled up without washing out the remaining liquid in radiators with water:

Transfers as waste (D) = A

[Calculation example: D = 8,732 kg]

[3] In cases where extracted waste liquid is released to water bodies and new liquid is filled up without washing out the remaining liquid in radiators with water:

Releases to water bodies (E) = A

[Calculation example: E = 8,732 kg]

[4] In cases where extracted waste liquid and wash water with which the remaining liquid in radiators is washed out are transferred to collectors:

Transfers as waste (C) = A

[Calculation example: C = 8,732 kg]

[5] In cases where extracted waste liquid is transferred to collectors and wash water with which the remaining liquid in radiators is washed out is released to sewerage:

Transfers as waste (C) = A x 0.95

Transfers as waste (D) = A x 0.05

[Calculation example: C = 8,295 kg = 8,732 x 0.95
D = 437 kg = 8,732 x 0.05]

[6] In cases where extracted waste liquid is transferred to collectors and wash water with which the remaining liquid in radiators is washed out is released to water bodies:

Transfers as waste (C) = A x 0.95

Releases to water bodies (E) = A x 0.05

[Calculation example: C = 8,295 kg = 8,732 x 0.95
E = 437 kg = 8,732 x 0.05]

[7] In cases where extracted waste liquid and wash water with which the remaining liquid in radiators is washed out are released to sewerage:

Transfers as waste (D) = A

[Calculation example: D = 8,732 kg]

[8] In cases where extracted waste liquid and wash water with which remaining liquid in radiators is washed out are released to water bodies:

Releases to water bodies (E) = A

[Calculation example: E = 8,732 kg]

2.2. Estimation of releases and transfers of dichlorodifluoromethane (CFC-12) in the maintenance work of automobile air conditioners

2.2.1. Condition assumed for estimating releases and transfers

(1) All the quantities are calculated on an annual basis (April through March of the following year)

(2) The amount of dichlorodifluoromethane (CFC-12) handled is the sum of the amounts of the dichlorodifluoromethane (CFC-12) purchased and collected.

(3) It is not necessary to report the recycled amount of collected dichlorodifluoromethane (CFC-12).

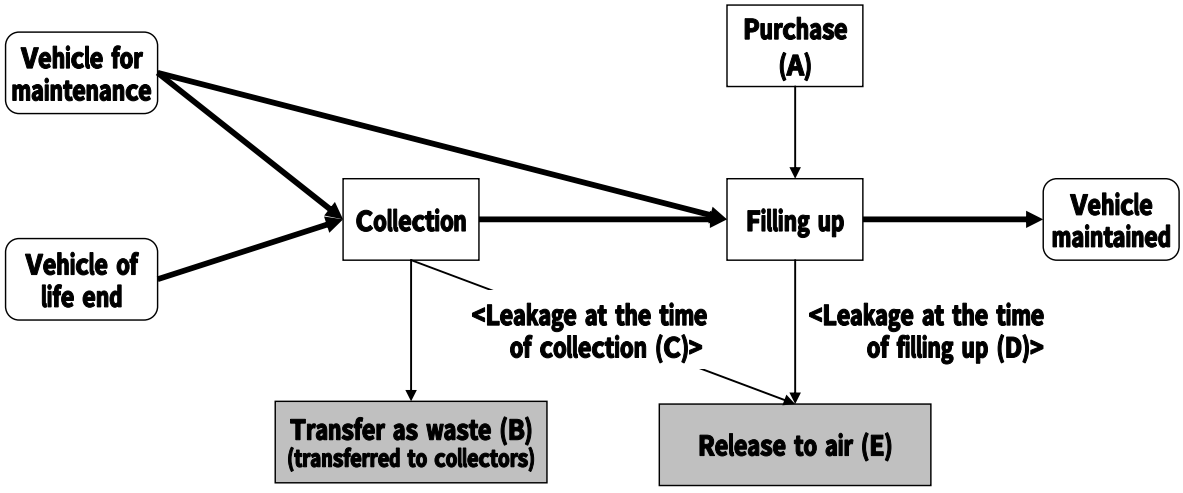
(4) Temporarily stored dichlorodifluoromethane (CFC-12) is omitted from the calculation because they are evened out on an annual basis.

(5) The amount of leaked dichlorodifluoromethane (CFC-12) when being collected from vehicles or being filled up is 0.0036 kg per vehicle for each. In case where dichlorodifluoromethane (CFC-12) is collected from and filled up into a vehicle, the vehicle is counted both as collected vehicles and filled up vehicles at the same time.

(6) The dichlorodifluoromethane (CFC-12) itself is a pure (100%) PRTR Chemical.

(7) Physical properties of dichlorodifluoromethane (CFC-l2) (See the reference table at the end of this manual.)

2.2.2. Flow chart of CFC-12 released and transferred



2.2.3. Procedure for estimating releases and transfers

(1) Estimation of handled amount of dichlorodifluoromethane (CFC-12)

(Criterion for PRTR reporting: handled amount of 1 ton or more annually [5 tons or more for 2001 and 2002])

Amount of CFC-12 handled = amount purchased (A) + amount collected (F)

[1] Calculation of amount of new cans purchased (A)

A = total content of purchased cans

〔 Calculation example: purchase of 1,000 cans with the content of 250 g each
A = 250 kg = 0.25 kg x 1,000 cans 〕

[2] Estimation of the total amount collected (F)

F = total amount collected

The total amount collected is estimated by an applicable case from the two cases shown below.

(a) Calculate the total amount of collected by weighing the difference of gas cylinders between before and after the collection.

(b) Total amount collected = number of cars collected x amount collected/car
(when the estimation of the amount collected per car is available)
*In case the estimation is not available, the amount 400g per passenger car may be used.

〔 Calculation example: CFC-12 was collected from the total of 40 cars for maintenance and of life end.
F = 16 kg = 0.40 kg x 40 cars 〕

(2) Procedure for estimating releases and transfers to be reported

[1] Calculation of transfers as waste (B)

B = amount transferred to collectors

The total amount transferred to collectors is estimated by an applicable case from the two cases shown below.

(a) Calculate the total amount transferred to collectors by weighing the differences of gas cylinders between before and after the collection

(b) Total amount transferred to collectors
= number of gas cylinders x content/cylinder
(in case the average content per cylinder can be estimated)
In case the average value is not available, the amount 400 g per 1 liter gas cylinder may be used.

Calculation example: Transferred 35 cylinders of 1 liter filled with 400g on the average to collector.

B = 14 kg = 0.40 kg x 35 cylinders

When a 20 kg cylinder is used, calculate by assuming 20 kg per cylinder is filled up.

[2] Calculation of releases to air (E)

E = leakage at the time of collection (C)
+ leakage at the time of filling up (D)
= (number of cars collected x 0.0036)
+ (number of cars filled up x 0.0036)
= (number of cars collected+ number of cars filled up) x 0.0036

Calculation example:
30 cars are for collection only, 50 cars for filled up only,
10 cars for both collection and filled up
(total of 40 cars collected and 60 cars filled up)

E = (30 + 10 + 50 + 10) x 0.0036 = 0.36 kg

2.3. Estimating releases and transfers of toluene and xylene in painting work

2.3.1. Condition assumed for estimating releases and transfers

(1) All amounts are calculated on an annual basis (April through March of the following year).

(2) The amount of toluene handled is the total of the amount calculated by multiplying the amount of toluene contained in purchased paint by the specific gravity of toluene and the amount calculated by multiplying the amount of toluene contained in purchased thinner by the specific gravity of toluene.

The amount of xylene handled is the total of the amount calculated by multiplying the amount of xylene contained in purchased paint by the specific gravity of xylene and the amount calculated by multiplying the amount of xylene contained in purchased thinner by specific gravity of xylene.

(3) Reporting of the recycled amount of waste paint and thinner is not required.

(4) Temporarily stored toluene and xylene are omitted from the calculation because they are evened out.

(5) The specific gravity and content of toluene and xylene contained in new paint and thinner should be obtained from MSDS as a rule. However, figures shown in the following table may be used for the calculation in order to simplify the calculation work.

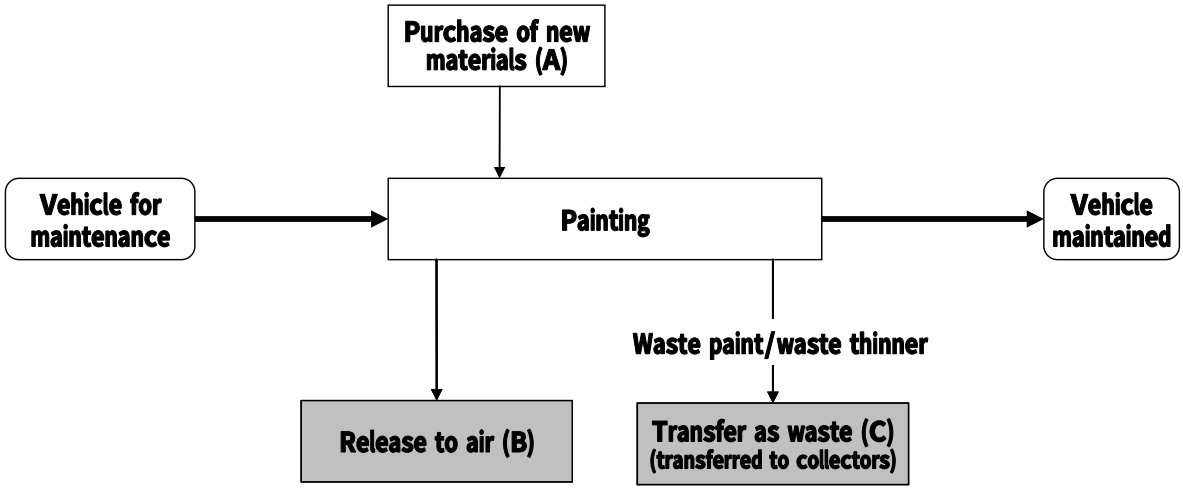
| | Toluene | Xylene |
|---|---|---|
| Paint | 35% | 30% |
| Thinner | 30% | 50% |

(6) The specific gravity of waste paint and thinner are assumed to be 0.88. The content of toluene and xylene shown in the table below may be used for the calculation.

| | Toluene | Xylene |
|---|---|---|
| Content | 6% | 3% |

(7) Physical properties of toluene and xylene (See the reference table at the end of this manual.)

2.3.2. Flow chart of toluene and xylene released and transferred




2.3.3. Procedure for estimating releases and transfers

(1) Calculation of amounts of the handled Class I Designated Chemical Substances contained in paint and thinner

(Criterion for PRTR reporting: handled amount of 1 ton or more annually [5 tons or more for 2001 and 2002])

Amount of toluene handled

= (amount of paint purchased x content of toluene in paint x specific gravity of toluene) + (amount of thinner purchased x content of toluene in thinner x specific gravity of toluene)

[Calculation example – in case where specific gravity is assumed 0.87
13,616 kg = (22,000 liters x 0.35 x 0.87) + (26,500 liters x 0.30 x 0.87)]

Amount of xylene handled

= (amount of paint purchased x content of xylene in paint x specific gravity of xylene) + (amount of thinner purchased x content of xylene in thinner x specific gravity of xylene)

[Calculation example – in case where specific gravity is assumed 0.88
17,468 kg = (22,000 liters x 0.30 x 0.88) + (26,500 liters x 0.50 x 0.88)]

(2) Procedure for estimating releases and transfers to be reported

[1] Calculation of transfers as waste (transferred to collectors) (C)

Transfers of toluene contained in waste

= amount transferred to collectors x content of toluene in waste paint and thinner x

specific gravity of waste paint and thinner

[Calculation example: 700 kg = 13,250 liters x 0.06 x 0.88]

Transfers of xylene contained in waste

= amount transferred to collectors x content of xylene in waste paint and thinner x specific gravity of waste paint and thinner

[Calculation example: 350 kg = 13,250 liters x 0.03 x 0.88]

[2] Calculation of releases to air (B)

Toluene transfer to air

= amount of toluene handled – transfers of toluene contained in waste

Xylene transfer to air

= amount of xylene handled – transfers of xylene contained in waste

Calculation example:

Toluene : 12,916 kg = 13,616 kg – 700 kg

Xylene : 17,118 kg = 17,468 kg – 350 kg

## 3. Physical properties

3.1. Physical properties of ethylene glycol

| CAS NO. | 107-21-1 | Vapor pressure | 0.06 mmHg (20℃) |
|---|---|---|---|
| Molecular weight | 62.1 | Aqueous solubility | Soluble at any ratio |
| Melting point | -13℃ | Specific gravity | 1.1088 (20℃) |
| Boiling point | 197.6℃ | State | Liquid |

3.2. Physical properties of dichlorodifluoromethane (CFC-12)

| CAS NO. | 75-71-8 | Vapor pressure | 84.8 psia (70 ° F) |
|---|---|---|---|
| Molecular weight | 120.9 | Aqueous solubility | 0.028 g/l |
| Melting point | -158℃ | Specific gravity | 1.486 (-29.8℃) |
| Boiling point | -29.8℃ | State | Gas |

3.3. Physical properties of toluene and xylene

Toluene

| CAS NO. | 108-88-3 | Vapor pressure | 36.7 mmHg (30℃) |
|---|---|---|---|
| Molecular weight | 92.1 | Aqueous solubility | 0.54-0.58 g/l (25℃) |
| Melting point | -95℃ | Specific gravity | 0.8661 (20℃) |
| Boiling point | 111℃ | State | Liquid |

Xylene

| CAS NO. | 1330-20-7 | Vapor pressure | 7.99 mmHg (30℃) |
|---|---|---|---|
| Molecular weight | 106.2 | Aqueous solubility | 130 mg/l (25℃) |
| Melting point | - | Specific gravity | 0.864 (20℃) |
| Boiling point | 137-140℃ | State | Liquid |

- ○ CAS No.: An international registry number of chemicals. Can identify a chemical substance regardless of the naming methods.
- ○ mmHg : Pressure expressed in millimeters of mercury
- ○ psia : Pound per square inch absolute
- ○ °F : = [℃] x (9 / 5) + 32