

2-1-5 Judge the medium, air or water, to which larger or smaller quantity is released

Study the following and determine which is larger, the quantity released to air or to water.

- a) Material properties of the specified substance (gaseous, liquid, solid) and handling method^{*1}
- b) Henry's constant of the specified substance^{*2}

*1 When it is assumed that either of the quantities released to air or to water is zero depending on the condition where raw materials or materials containing the specified substance are handled, you can enter 0 as the released quantity.

*2 Substance that has a larger Henry constant is more likely to be released to air.

(NOTE)

You must calculate the smaller quantity first because if the larger release is calculated first by subtracting the other quantity from the maximum potential release, the error of the smaller release will become larger (reliability will be decreased).

Example: Maximum potential release to the environment = 100 kg/year

Larger release = 90 kg/year (error 10% → assumed to be 81 to 99 kg/year)

In this case

$$\begin{aligned}
 \text{Smaller release (kg/year)} &= \text{Maximum potential release to the environment (100kg/year)} - \text{Larger release (90kg/year (81 ~ 99kg/year))} \\
 &= \text{10kg/year (1 ~ 19kg/year)}
 \end{aligned}$$

On the contrary,

Smaller release = 10 kg/year (error 10% → assumed to be 9 to 11 kg/year)

In this case

$$\begin{aligned}
 \text{Larger release (kg/year)} &= \text{Maximum potential release to the environment (100kg/year)} - \text{Smaller release (10kg/year (9 ~ 11kg/year))} \\
 &= \text{90kg/year (89 ~ 91kg/year)}
 \end{aligned}$$

Therefore, in the case of Smaller release , the error of the smaller release is larger than the case of Larger release . Error in the case of Smaller release : 90%, Error in the case of Larger release : 10%

Reference page

- Part I 2-2-3 (1) Step1-5 Judge the medium, air or water, to which larger or smaller quantity is released (pI-47)
- Part III 4-2-6 Table of physical properties of specified substances (pIII-227)
4-3-7 Guideline to judge to which medium, air or water, larger quantity is released (pIII-288)

Filling out the worksheet3

Smaller quantity released		Larger quantity
Judgment of medium, the atmosphere or water area, to which the smaller quantity is released 3H Enter the name of the medium to which the smaller quantity is released (water area or the atmosphere).	...	The medium to which the larger quantity is released, the atmosphere or water 3AH Enter the name of the medium to which the larger quantity is released (the atmosphere or water area).
Water area	...	The atmosphere

2-1-6 Calculate the quantity released to the medium to which the smaller quantity is released

Calculate the quantity released to the medium to which the smaller quantity is discharged using either of the following methods or other appropriate methods such as values obtained through experience.

- a) Direct Measurement (Example of calculation 1-3 pII-60)
- b) Emission Factors (Example of calculation 4, 5 pII-66)
- c) Engineering Calculations (Example of calculation 6-8 pII-70)

When exhaust gas or effluent treatment is performed, calculate the following values using removal rate and decomposition rate*.

- Discharge after treatment
- Quantity decomposed by treatment
- Quantity in waste generated by treatment

* Removal rate : The rate of removing specified substance in exhaust gas or effluent using a dust remover, purification device, activated carbon adsorption device, etc.

Decomposition rate : The rate of decomposing specified substance in exhaust gas or effluent into another simpler substance (such as carbon dioxide and water) using a combustion device or microbial decomposition device

(NOTE)

When the measured value is less than the minimum limit of detection (N.D.: not detected) in the calculation based on actual measurement, assume it to be 0. When it is within the range larger than the minimum limit of detection and less than the minimum limit of determination, assume it to be 1/2 of the minimum limit of determination. If the minimum limit of detection or the minimum limit of determination is not known, ask the analysis service who carried out the measurement.

When exhaust gas/effluent treatment is performed and information on removal rate or decomposition rate based on actual measurement or documents is not available, use "Typical removal rate and decomposition rate of exhaust gas and effluent treatment devices" in Part III (→ pIII-283). If you think the value does not suit the actual situation of the business establishment, adopt a method that you think is more appropriate, such as using values obtained through experience, advice of the equipment manufacturer, etc.

When waste such as activated carbon or sludge containing a specified substance is generated by activated carbon adsorption or activated sludge treatment, calculate the quantity in waste from exhaust gas or effluent treatment, on the assumption that the difference between the removed quantity and decomposed quantity is included in the waste. When the volatile specified substance contained in effluent is released to air by aeration during activated sludge treatment, calculate the release to other media by exhaust gas or effluent treatment by using the above formula, on the assumption that the difference between the removed quantity and decomposed quantity is released to other media.

When an activated carbon adsorption recovery system is used for exhaust gas/effluent treatment, and a specified substance adsorbed by the activated carbon is recovered and recycled within the same business establishment, do not calculate the “quantity in waste generated by treatment” to prevent the quantity recovered/recycled from being added to the “quantity in waste” or subtracted twice from the released quantity.

Reference page

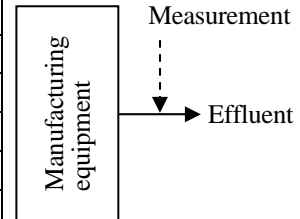
- Part I 2-2-2 Concept of calculating released/transferred quantities ([pI-35](#))
2-2-3 (1) Step1-6 Calculate the quantity released to the medium to which the smaller quantity is released ([pI-48](#))
- Part III 2. Q&A Q88–Q90 ([pIII-147–148](#)), Q94 ([pIII-149](#)), Q104–Q105 ([pIII-152](#)),
4-2-6 Table of physical properties of specified substances ([pIII-227](#)),
4-3-1 Examples of emission factors of specified substances into the atmosphere ([pIII-246](#)),
4-3-2 Examples of emission factors of the gasoline in a storage tank into the atmosphere ([pIII-247](#)),
4-3-3 Emission factors listed in manuals of each industry ([pIII-249](#)),
4-3-6 Rejection rate and decomposition rate in representative exhaust gas device and wastewater treatment device ([pIII-283](#))

**(Example of calculation 1) Method by actual measurement
(when effluent treatment is not performed)**

When acetaldehyde mixed in effluent during the solvent manufacturing process is released

- Quantity of effluent and acetaldehyde concentration in effluent

	Acetaldehyde concentration ($\mu\text{g/L} = \text{mg/m}^3$)	Quantity of effluent (m^3/month)
Apr.	86	2,500
May	-	3,200
Jun.	120	4,400
Jul.	-	2,800
Aug.	-	2,900
Sep.	98	4,500
Oct.	N.D.(Not Detected)	3,600
Nov.	-	3,300
Dec.	-	2,700
Jan.	65	2,600
Feb.	-	2,800
Mar.	-	3,100
	Mean value ($86+120+98+0+65$)/5 =73.8	Total 38,400



- Calculation of the quantity of acetaldehyde released to water

$$\begin{aligned}
 &\text{Quantity of acetaldehyde released to water (kg/year)} = \text{Annual quantity of effluent (38,400 m}^3\text{/year)} \times \text{Average acetaldehyde content in effluent (73.8 mg/m}^3\text{)} \div 1,000,000 \text{ mg/kg} \\
 &= 2.8 \text{ kg/year}
 \end{aligned}$$

Filling out the worksheet3

Concentration
of the subject
substance

Quantity of
exhaust gas
or effluent

Smaller
quantity
released
 $3W \times 3X \div 1000$

Post 3Y.

When the released quantity is calculated by actual measurement

When the medium to which the smaller quantity is released is the atmosphere, fill out 3AT. Fill out 3AU or 3AV if it is water area.
(Without exhaust gas or effluent treatment: 3Y)
(With exhaust gas or effluent treatment: 3AB)

Concentration of 3B in exhaust gas (effluent)	Quantity of exhaust gas (effluent)	Smaller quantity released
mg/L 3W	m ³ /year 3X	kg/year 3Y =3W × 3X ÷ 1000
73.8 × 10 ⁻³	38,400	2.8

-1

-1 When exhaust gas or effluent is not treated

Smaller quantity released = 3Y

2.8

-2

-2 When exhaust gas or effluent is treated

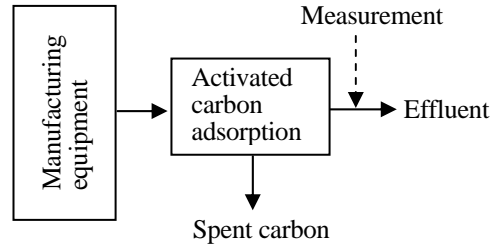
Removal efficiency of exhaust gas or effluent treatment	Decomposition rate of exhaust gas or effluent treatment	Released quantity after treatment
%	%	kg/year

**(Example of calculation 2) Method by actual measurement
(when waste is generated as a result of effluent treatment)**

When acetaldehyde mixed in effluent during the solvent manufacturing process is released after activated carbon adsorption treatment

- Quantity of effluent and acetaldehyde concentration after effluent treatment

Table in pII-60



- Removal rate/decomposition rate of activated carbon adsorption treatment

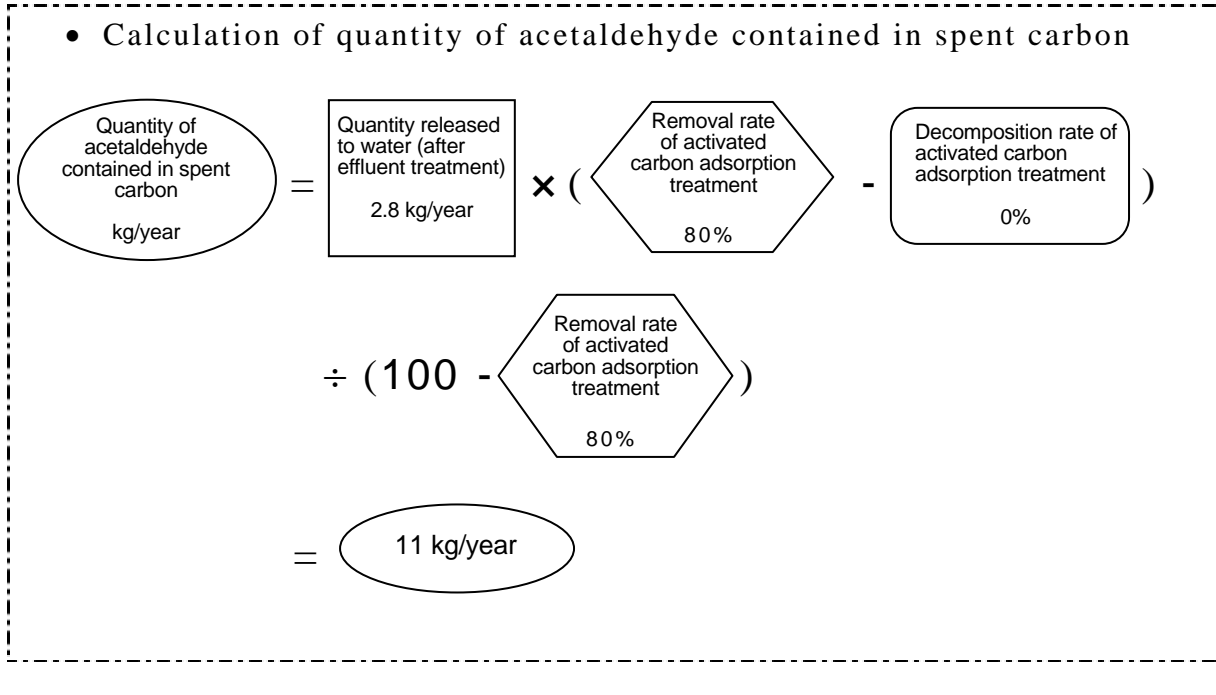
Removal rate of activated carbon adsorption treatment	80%
Decomposition rate of activated carbon adsorption treatment	0%

- Calculation of the quantity of acetaldehyde released to water

$$\begin{aligned}
 & \text{Quantity of acetaldehyde released to water (kg/year)} = \text{Annual quantity of effluent (38,400 m}^3\text{/year)} \times \text{Average acetaldehyde concentration after effluent treatment (73.8 mg/m}^3\text{)} \div 1,000,000 \text{ mg/kg} \\
 & = 2.8 \text{ kg/year}
 \end{aligned}$$

- Calculation of the quantity of acetaldehyde decomposed by activated carbon adsorption treatment

$$\begin{aligned}
 & \text{Quantity of acetaldehyde decomposed by activated carbon adsorption treatment (kg/year)} = \text{Quantity released to water (after effluent treatment) (2.8 kg/year)} \times \text{Decomposition rate of activated carbon adsorption treatment (0\%)} \div (100 - \text{Removal rate of activated carbon adsorption treatment (80\%)}) \\
 & = 0 \text{ kg/year}
 \end{aligned}$$



Filling out the worksheet3

Smaller quantity released **Removal efficiency of treatment** **Decomposition rate of treatment** **Released quantity after treatment** **Quantity decomposed by treatment**

When the released quantity is calculated by actual measurement

Concentration of 3B in exhaust gas (effluent) mg/L 3W	Quantity of exhaust gas (effluent) m ³ /year 3X	Smaller quantity released kg/year 3Y =3W×3X÷1000
73.8×10 ⁻³	38,400	2.8

When the medium to which the smaller quantity is released is the atmosphere, fill out 3AT. Fill out 3AU or 3AV when it is f water area.
(Without exhaust gas or effluent treatment: 3Y)
(With exhaust gas or effluent treatment: 3AB)

-1

Smaller quantity released = 3Y	2.8
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-2

Removal efficiency of exhaust gas or effluent treatment % 3Z	Decomposition rate of exhaust gas or effluent treatment % 3AA	Released quantity after treatment kg/year 3AB *	Quantity decomposed by treatment kg/year 3AC *
80	0	2.8	0

* When 3W is the concentration after treatment:
3AB=3Y
3AC=3Y×3AA÷(100 - 3Z)÷100
3AD=3Y×(3Z-3AA)÷(100-3Z)
3AF=3Y×(3Z-3AA)÷(100-3Z)
When 3W is the concentration before treatment
3AB=3Y×(100 - 3Z)÷100
3AC=3Y×3AA÷100
3AD=3Y×(3Z-3AA)÷100
3AF=3Y×(3Z-3AA)÷100

Enter a 3AF in 3AX or 3AY.

-2-1

Quantity released to the same medium to which the larger quantity is released kg/year 3AD *	3V'	kg/year 3U'	3V

Enter into 3AI'(B).

-2-2

Name of the waste generated from exhaust gas or effluent treatment	Quantity of 3B contained in the waste 3AF	Classification of transfer of 3AE
3AE	kg/year 3AF	3AG
Activated carbon	11	Transferred to outside the establishment

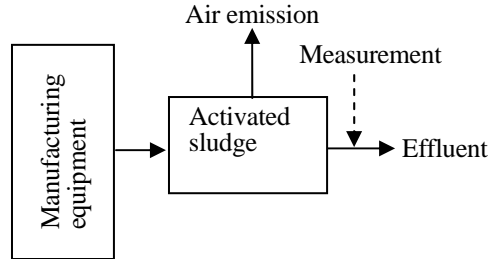
Waste generated by treatment **Quantity contained in waste** **Classification of transfer**

**(Example of calculation 3) Method by actual measurement
(Air emission resulting from effluent treatment)**

When acetaldehyde mixed in effluent during the solvent manufacturing process is released after activated sludge treatment

Table in pII-60

- Removal rate/decomposition rate of activated sludge treatment



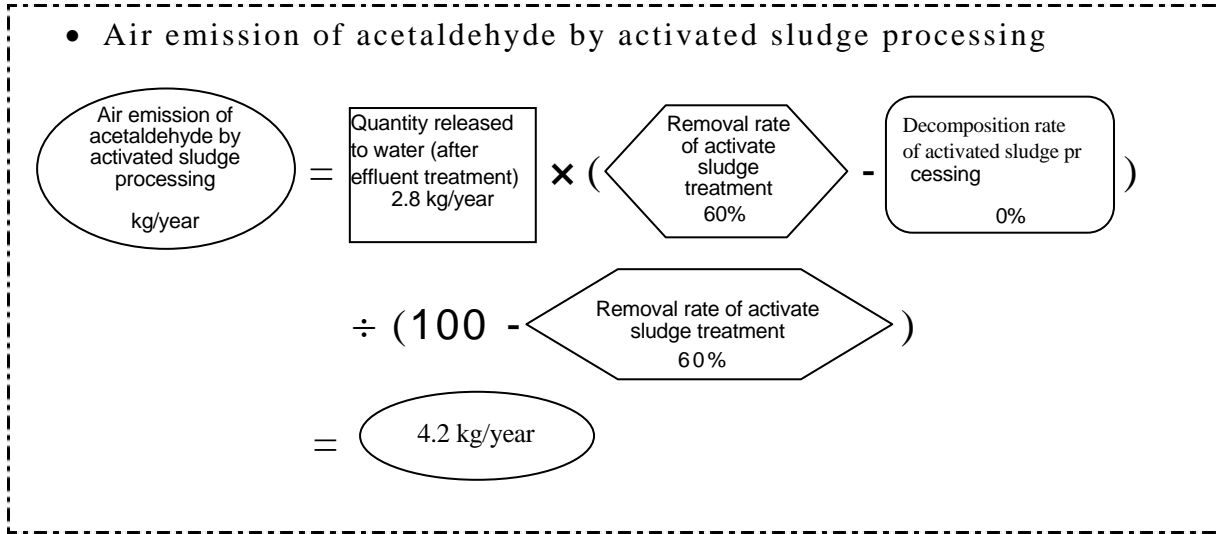
Removal rate of activated sludge treatment	60%
Decomposition rate of activated sludge treatment	0%

- Calculation of the quantity of acetaldehyde released to water

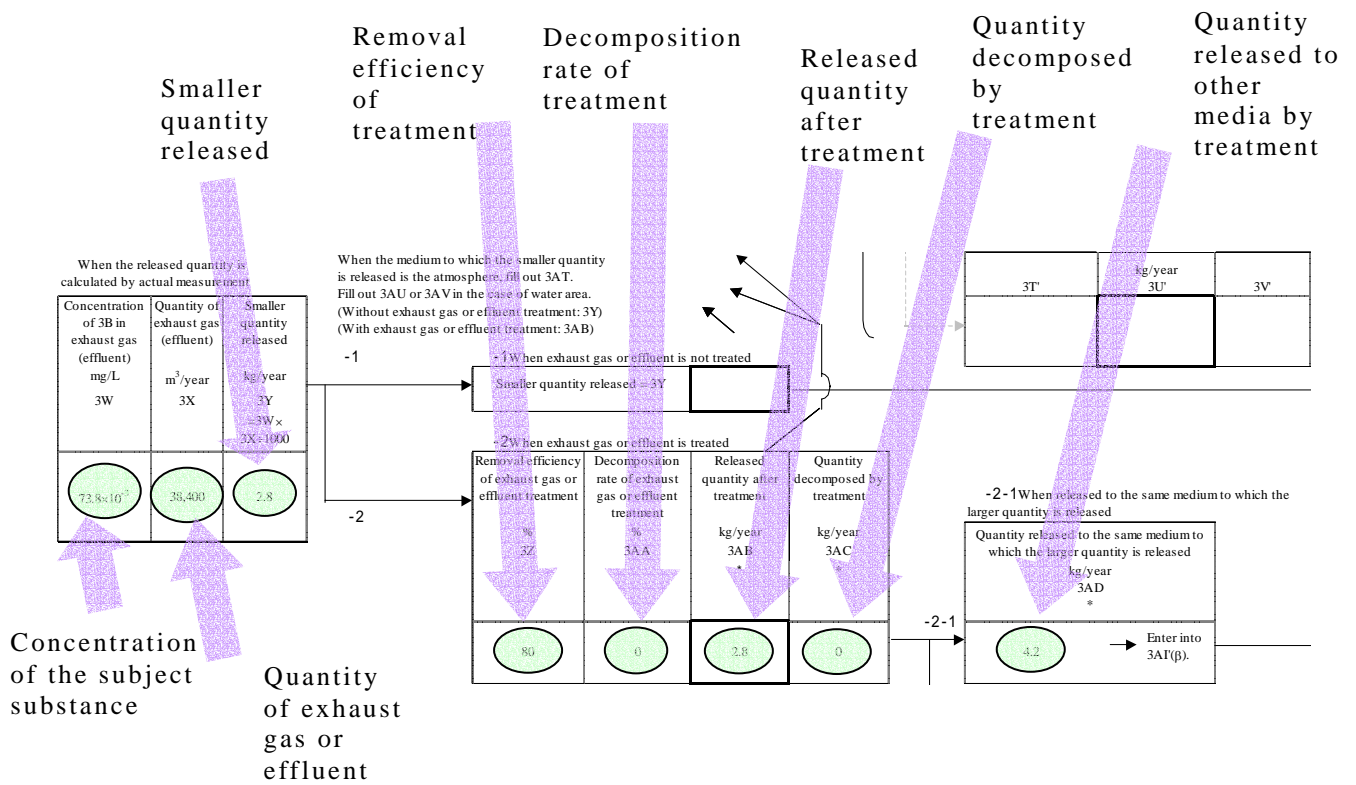
$$\begin{aligned}
 & \text{Quantity of acetaldehyde released to water (kg/year)} = \text{Annual quantity of effluent (38.400 m}^3\text{/year)} \times \text{Average acetaldehyde concentration after effluent treatment (73.8 mg/m}^3\text{)} \div 1,000,000 \text{ mg/kg} \\
 & = 2.8 \text{ kg/year}
 \end{aligned}$$

- Calculation of quantity of acetaldehyde decomposed by activated sludge processing

$$\begin{aligned}
 & \text{Quantity of acetaldehyde decomposed by activated sludge processing (kg/year)} = \text{Quantity released to water (after effluent treatment) (2.8 kg/year)} \times \text{Decomposition rate of activated sludge processing (0\%)} \div (100 - \text{Removal rate of activated sludge processing (60\%)}) \\
 & = 0 \text{ kg/year}
 \end{aligned}$$



Filling out the worksheet3



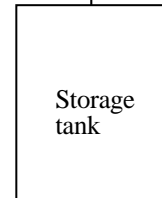
**(Example of calculation 4) Method by actual measurement
(When exhaust gas treatment is not conducted)**

When dichloromethane is discharged into air from a storage tank

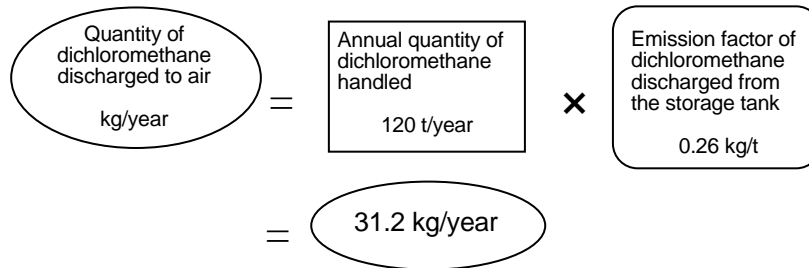
- Annual quantity of dichloromethane handled and emission factor

Annual quantity of dichloromethane handled	120 t/year
Emission factor of dichloromethane discharged from a storage tank	0.26 kg/t

Air emission



- Calculation of the quantity of dichloromethane discharged to air



Filling out the worksheet3

Formula to calculate the smaller quantity released

Smaller quantity released

Post 3J

When calculating by using a method other than actual measurement

Formula to calculate the smaller latent release quantity 3I	Smaller latent release quantity kg/year 3J	-1	Smaller quantity released = 3J	31.2	If the media to which the smaller quantity is released is the atmosphere, enter into 3AT, and if it is water area, enter into #3AU or 3AV. (Without exhaust gas or effluent treatment: 3AJ, 3AJ') (With exhaust gas or effluent treatment: 3AM, 3AM')
0.26 × 120	31.2	Quantity released to the same medium to which the smaller quantity is released by the treatment of the medium to which the larger quantity is released = 3J'			

-1 When exhaust gas or effluent treatment is not carried out

Removal efficiency of exhaust gas or effluent treatment %	Decomposition rate of exhaust gas or effluent treatment %	Smaller quantity released after treatment kg/yaer	Quantity decomposed by treatment kg/year
3K	3L	3M	3N

-2 When exhaust gas or effluent treatment is carried out

-2-1 When the substance is released to the same medium to which the larger quantity is released by waste gas or effluent treatment

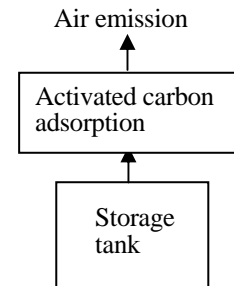
Quantity released to the same medium to which the larger quantity is released by exhaust gas or effluent treatment

**(Example of calculation 5) Method using emission factors
(When waste is generated as a result of exhaust gas treatment)**

When exhaust gas containing dichloromethane in a storage tank is treated by activated carbon adsorption equipment and discharged to air

- Annual quantity of dichloromethane and emission factor

Annual quantity of dichloromethane	120 t/year
Emission factor of dichloromethane from the storage tank	0.26 kg/t



- Removal rate/decomposition rate of activated carbon adsorption treatment

Removal rate of activated carbon adsorption treatment	80%
Decomposition rate of activated carbon adsorption treatment	0%

- Calculation of potential air emission of dichloromethane

$$\begin{aligned}
 &\text{Potential air emission of dichloromethane (kg/year)} = \text{Annual quantity of dichloromethane handled (120 t/year)} \times \text{Emission factor of dichloromethane from the storage tank (0.26 kg/t)} \\
 &= 31.2 \text{ kg/year}
 \end{aligned}$$

- Calculation of air emission of dichloromethane after exhaust gas treatment

$$\begin{aligned}
 &\text{Air emission of dichloromethane (kg/year)} = \text{Potential air emission of dichloromethane (31.2 kg/year)} \times (100 - \text{Removal rate of activated carbon adsorption treatment (80\%)}) \div 100 \\
 &= 6.2 \text{ kg/year}
 \end{aligned}$$

- Calculation of the quantity of dichloromethane decomposed by activated carbon adsorption treatment

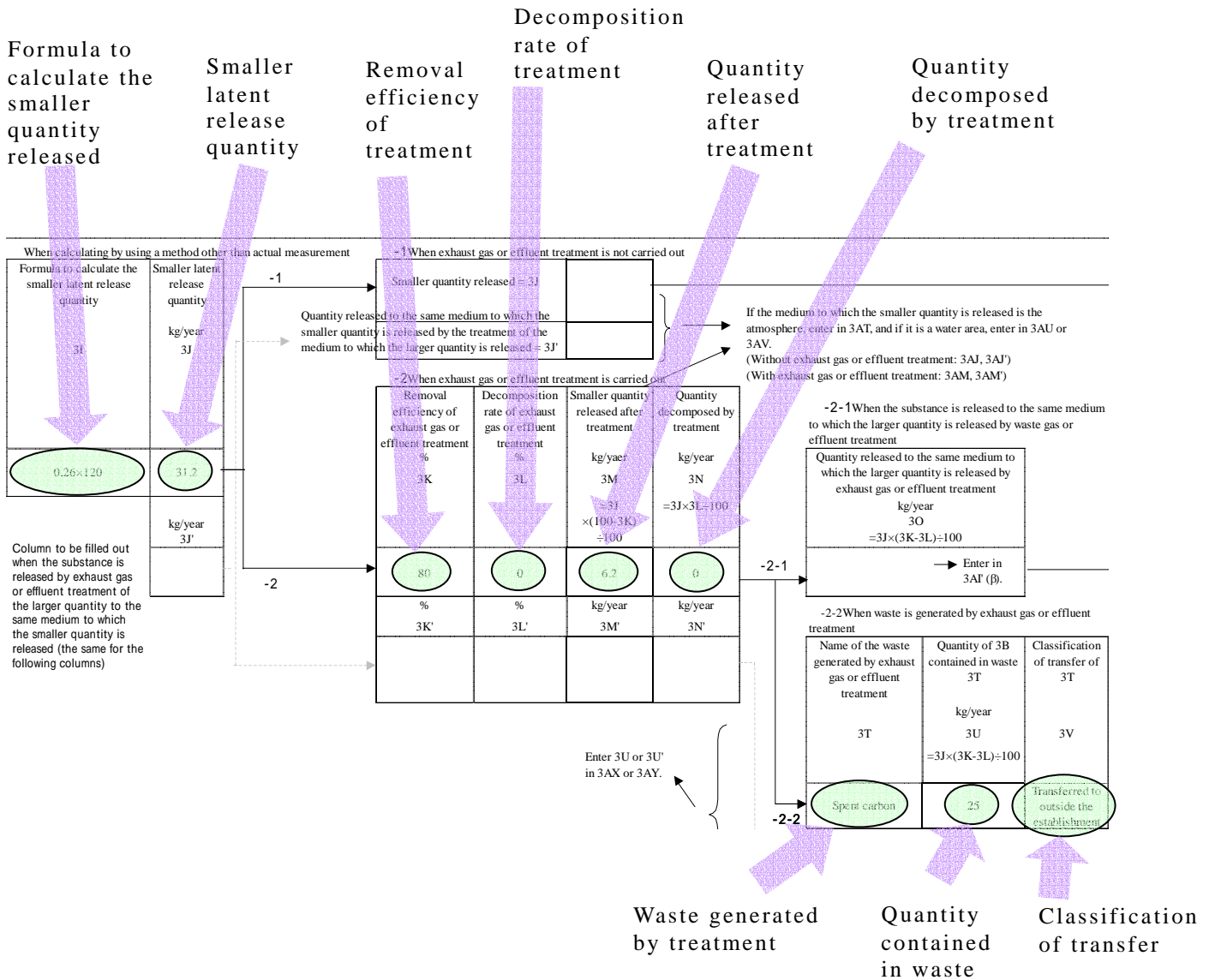
$$\begin{aligned}
 & \text{Quantity of dichloromethane decomposed by activated carbon adsorption treatment (kg/year)} \\
 &= \text{Potential air emission (31.2 kg/year)} \times \text{Decomposition rate of activated carbon adsorption treatment (0\%)} \div 100 \\
 &= 0 \text{ kg/year}
 \end{aligned}$$

- Calculation of the quantity of dichloromethane contained in spent carbon

$$\begin{aligned}
 & \text{Quantity of dichloromethane in spent carbon (kg/year)} \\
 &= \text{Potential air emission (31.2 kg/year)} \times (\text{Removal rate of activated carbon adsorption treatment (80\%)} - \text{Decomposition rate of activated carbon adsorption treatment (0\%)}) \div 100 \\
 &= 25 \text{ kg/year}
 \end{aligned}$$

NOTE: The above is an example of calculation using the emission factors. Engineering calculations can also be used in the same manner to calculate the release after treatment, the quantity decomposed by treatment, and the quantity contained in waste.

Filling out the worksheet3

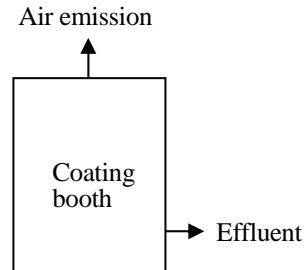


**(Example of calculation 6) Engineering Calculations
(When effluent treatment is not performed)**

When toluene in paint splattered in the process of spray coating is recovered by a wet booth (provided with water curtain) and released in effluent

- Quantity of effluent per day, number of days of operation per year, and solubility of toluene to water

Quantity of effluent per day	2 m ³ /day
Number of days of operation per year	200 days/year
Solubility of toluene to water	0.58 kg/m ³



- Calculation of the quantity of toluene released to water

$$\begin{aligned}
 &\text{Quantity of toluene released to water (kg/year)} = \text{Annual quantity of effluent (2 m}^3\text{/day} \times \text{200 days/year)} \times \text{Solubility of toluene to water (0.58 kg/m}^3\text{)} \\
 &= 232 \text{ kg/year}
 \end{aligned}$$

Filling out the worksheet3

Formula to calculate the smaller quantity released

Smaller quantity released

Post 3J

When calculating by using a method other than actual measurement

Formula to calculate the smaller latent release quantity 3I	Smaller latent release quantity kg/year 3J	-1	Smaller quantity released = 3J	232	If the media to which the smaller quantity is released is the atmosphere, enter into 3AT, and if it is water area, enter into #3AU or 3AV. (Without exhaust gas or effluent treatment: 3AJ, 3AJ') (With exhaust gas or effluent treatment: 3AM, 3AM')
0.58×2×200	232	Quantity released to the same medium to which the smaller quantity is released by the treatment of the medium to which the larger quantity is released = 3J'			

-1 When exhaust gas or effluent treatment is not carried out

Removal efficiency of exhaust gas or effluent treatment % 3K	Decomposition rate of exhaust gas or effluent treatment % 3L	Smaller quantity released after treatment kg/yaer 3M	Quantity decomposed by treatment kg/year 3N
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-2 When exhaust gas or effluent treatment is carried out

-2-1 When the substance is released to the same medium to which the larger quantity is released by waste gas or effluent treatment

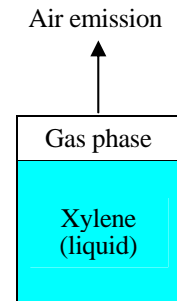
Quantity released to the same medium to which the larger quantity is released by exhaust gas or effluent treatment

**(Example of calculation 7) Engineering Calculations
(When exhaust gas treatment is not performed)**

When xylene is stored in a storage tank and released as exhaust gas

- Tank conditions, vapor pressure of xylene and molecular mass

Quantity of exhaust gas from the tank	0.2 m ³ /min. (@ 25 °C)
Days of storage per year	365 days/year
Full pressure inside the tank	101.3 × 10 ³ Pa
Vapor pressure of xylene	1.06 × 10 ³ Pa
Molecular mass of xylene	106.2 g/mol



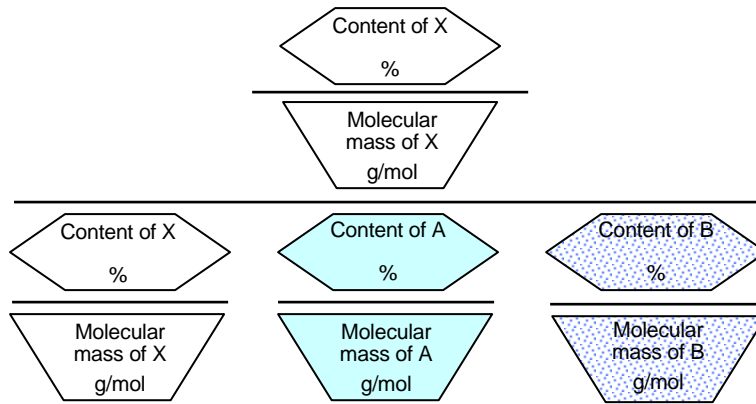
- Calculation of air emission of xylene
Calculate the air emission of xylene using the vapor pressure, etc. as shown below.

$$\begin{aligned}
 &\text{Air emission of xylene (kg/year)} = \frac{\text{Vapor pressure of xylene (1.06} \times 10^3 \text{ Pa)}}{\text{Full pressure inside the tank (101.3} \times 10^3 \text{ Pa)}} \times \frac{\text{Molecular mass of xylene (106.2 g/mol)}}{\text{Volume of air at 25}^\circ\text{C per 1 mol. (24.45 L/mol)}} \\
 &\times \text{Quantity of exhaust gas (0.2 m}^3\text{/min.)} \times 1440 \text{ mins./day} \times \text{Number of days of storage (365 days)} \\
 &= 4,800 \text{ kg/year}
 \end{aligned}$$

* If the exhaust gas temperature is not 25°C, look for the vapor pressure at that temperature in chemistry reference guides, etc. and use that value. To convert to the volume at the given temperature, multiply the above formula by the coefficient obtained using the following formula.

$$\text{Conversion factor for the volume of gas per 1 mol at a given temperature} = \frac{25 + 273.15}{\text{Given temperature } ^\circ\text{C} + 273.15}$$

* If the stored substance is mixed liquor, find the content and the molecular mass of each substance contained in the mixed liquor, and multiply the above formula by them.
 (To find the quantity of substance X in the mixed liquor consisting of substances X, A and B)



Filling out the worksheet3

Formula to calculate the smaller quantity released

Smaller quantity released

Post 3J

When calculating by using a method other than the fact

Formula to calculate the smaller quantity released	Smaller latent release quantity	-1 When exhaust gas or effluent treatment is not carried out	
	kg/year	Smaller quantity released = 3J	4800
	3J	Quantity released to the same medium to which the smaller quantity is released by the treatment of the medium to which the larger quantity is released = 3J'	

If the media to which the smaller quantity is released is the atmosphere, enter into 3AT, and if it is water area, enter into #3AU or 3AV.
 (Without exhaust gas or effluent treatment: 3AJ, 3AJ')
 (With exhaust gas or effluent treatment: 3AM, 3AM')

-2 When exhaust gas or effluent treatment is carried out			
Removal efficiency of exhaust gas or effluent treatment	Decomposition rate of exhaust gas or effluent treatment	Smaller quantity released after treatment	Quantity decomposed by treatment
%	%	kg/year	kg/year
3K	3L	3M	3N
		=3J	=3J×3L÷100
		×(100-3K)	
		÷100	

-2-1 When the substance is released to the same medium to which the larger quantity is released by waste gas or effluent treatment

Quantity released to the same medium to which the larger quantity is released by exhaust gas or effluent treatment
kg/year
3O
=3J×(3K-3L)÷100

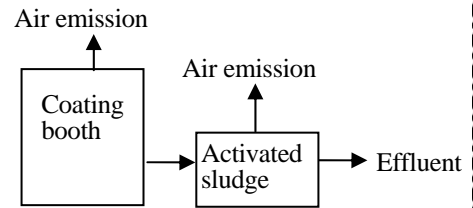
Column to be filled out when the

**(Example of calculation 8) Engineering calculations
(When specified substance is released
to air through effluent treatment)**

When toluene in paint splattered in the process of spray coating is recovered by a wet booth (provided with water curtain) and released in effluent

- Quantity of effluent per day, number of days of operation per year, and solubility of toluene to water

Quantity of effluent per day	2 m ³ /day
Number of days of operation per year	200 day/year
Solubility of toluene to water	0.58 kg/m ³



- Removal rate/decomposition rate of activated sludge treatment

Removal rate of activated sludge treatment	60%
Decomposition rate of activated sludge treatment	0%

- Calculation of potential release of toluene to water

$$\begin{aligned}
 &\text{Potential release of toluene to water (kg/year)} = \text{Annual quantity of effluent (2 m}^3\text{/day} \times \text{200 days/year)} \times \text{Solubility of toluene to water (0.58 kg/m}^3\text{)} \\
 &= 232 \text{ kg/year}
 \end{aligned}$$

- Calculation of release of toluene to water after effluent treatment

$$\begin{aligned}
 &\text{Release of toluene to water (kg/year)} = \text{Potential release to water (232 kg/year)} \times (100 - \text{Removal rate of activated sludge processing (60\%)}) \div 100 \\
 &= 93 \text{ kg/year}
 \end{aligned}$$

- Calculation of decomposition rate of toluene by activated sludge processing

$$\begin{aligned} \text{Quantity decomposed by activated sludge processing (kg/year)} &= \text{Potential release to water (232 kg/year)} \times \text{Decomposition rate of activated sludge processing (0\%)} \div 100 \\ &= 0 \text{ kg/year} \end{aligned}$$

- Calculation of air emission of toluene by activated sludge processing

$$\begin{aligned} \text{Air emission by activated sludge processing (kg/year)} &= \text{Potential release to water (232 kg/year)} \times (\text{Removal rate of activated sludge processing (60\%)} - \text{Decomposition rate of activated sludge processing (0\%)}) \div 100 \\ &= 139 \text{ kg/year} \end{aligned}$$

NOTE: The above is an example of engineering calculations. Emission Factors can also be used in the same manner to calculate the release after treatment, the quantity decomposed by treatment, and the quantity contained in waste.

Filling out the worksheet3

Formula to calculate the smaller quantity released Smaller latent release quantity Removal efficiency of treatment Decomposition rate of treatment Quantity released after treatment Quantity decomposed by treatment Quantity released to other media by treatment

When calculating by using a method other than actual measurement	-1 When exhaust gas or effluent treatment is not carried out					
Formula to calculate the smaller latent release quantity 3I	Smaller latent release quantity kg/year 3J	Smaller quantity released = 3J				
		Quantity released to the same medium to which the smaller quantity is released by the treatment of the medium to which the larger quantity is released = 3J				If the medium to which the smaller quantity is released is the atmosphere, enter in 3AT, and if it is a water area, enter in 3AU or 3AV. (Without exhaust gas or effluent treatment: 3AJ, 3AJ') (With exhaust gas or effluent treatment: 3AM, 3AM')
		-2 When exhaust gas or effluent treatment is carried out				-2-1 When the substance is released to the same medium to which the larger quantity is released by waste gas or effluent treatment
		Removal efficiency of exhaust gas or effluent treatment % 3K	Decomposition rate of exhaust gas or effluent treatment % 3L	Smaller quantity released after treatment kg/yaer 3M =3J ×(100-3K) ÷100	Quantity decomposed by treatment kg/year 3N =3J×3L÷100	Quantity released to the same medium to which the larger quantity is released by exhaust gas or effluent treatment kg/year 3O =3J×(3K-3L)÷100
Column to be filled out when the substance is released by exhaust gas or effluent treatment of the larger quantity to the same medium to		60	0	93	0	139 → Enter in 3AI (β).

2-1-7 Calculate the quantity released to the medium to which the larger quantity is released

Calculate the quantity released to the medium to which the larger quantity is released using the following formula.

$$\begin{array}{c} \text{Release to the} \\ \text{medium to} \\ \text{which the} \\ \text{larger quantity} \\ \text{is released} \\ \text{kg/year} \end{array} = \begin{array}{c} \text{Maximum potential} \\ \text{discharge of} \\ \text{specified} \\ \text{substance to the} \\ \text{environment} \\ \text{kg/year} \end{array} - \begin{array}{c} \text{Land emission of} \\ \text{specified} \\ \text{substance} \\ \text{kg/year} \end{array} - \begin{array}{c} \text{Release to} \\ \text{the medium to} \\ \text{which the smaller} \\ \text{quantity is} \\ \text{released} \\ \text{kg/year} \end{array}$$

When exhaust gas or effluent treatment is performed, calculate the following values using removal rate and decomposition rate*.

- Discharge after treatment
- Quantity in waste generated by treatment

(NOTE)

When exhaust gas or effluent treatment is performed in a “medium to which a smaller quantity is released,” subtract the “potential release to the medium to which a smaller quantity is released.”

Reference page

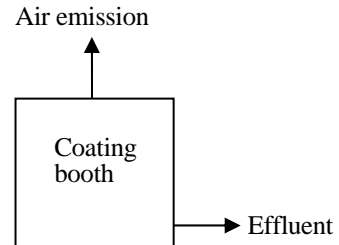
- Part I 2-2-3 (1) Step1-7 Calculate the quantity released to the medium to which the larger quantity is released (pI-50)
- Part III 2. Q&A Q88 (pIII-147), Q94 (pIII-149),
4-3-6 Rejection rate and decomposition rate in representative exhaust gas device and wastewater treatment device (pIII-283)

(Example of calculation 1) When exhaust gas treatment is not performed

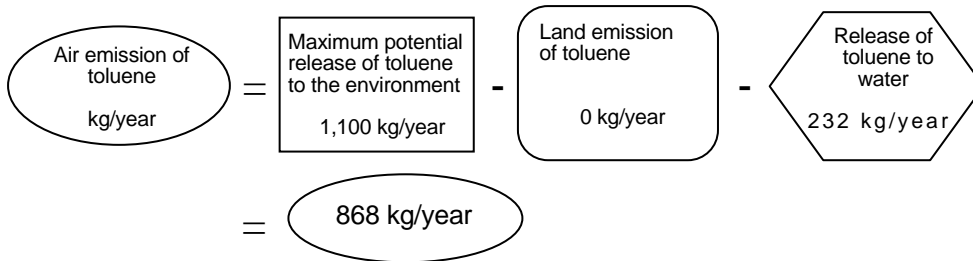
When toluene in paint splattered in the process of spray coating is recovered by a wet booth (provided with water curtain), some of which is released contained in effluent, and the rest is released to air.

- Annual handled quantity of toluene in paint manufactured

Maximum potential release of toluene to the environment	1,100 kg/year
Land emission of toluene	0 kg/year
Release of toluene to water	232 kg/year



- Calculation of air emission of toluene



Filling out the worksheet3

Larger quantity released 3D-3J

Post "3AI"

Medium to which the larger quantity is released, the atmosphere or water area 3AH Enter the name of the medium (the atmosphere or water area) to which the larger quantity is released.	Larger latent release quantity kg/year 3AI *	<p>* Calculate the larger latent release quantity according to each calculation method of the quantity released to the medium to which the smaller quantity is released as shown below.</p> <p>-1 : 3AI = 3D - 3G - 3J</p> <p>-2-1 : 3AI = 3D - 3G - 3M - 3N - 3O</p> <p>-2-2 : 3AI = 3D - 3G - 3M - 3N - 3U</p> <p>-1 : 3AI = 3D - 3G - 3Y</p> <p>-2-1 : 3AI = 3D - 3G - 3Y - 3AC - 3AD</p>	
Atmosphere	868	When exhaust gas or effluent treatment is not performed	868
		Quantity released to the medium to which the smaller quantity is released by the treatment of the larger quantity = 3AI	

When the medium to which the larger quantity is released is the atmosphere, enter in 3AT. When it is water area, enter in 3AV.
(Without exhaust gas or effluent treatment: 3AI, 3AI)
(With exhaust gas or effluent treatment: 3AL, 3AL)

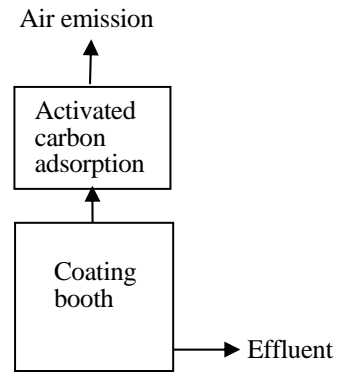
-1 When the substance is released to the same medium to which the smaller quantity is released

(Example of calculation 2) When exhaust gas treatment is performed

When toluene in paint splattered in the process of spray coating is recovered by a wet booth (provided with water curtain), some of which is released contained in effluent, and the rest undergoes activated carbon adsorption treatment and then released to air.

- Annual handled quantity of toluene in paint manufactured

Maximum potential release of toluene to the environment	1.100 kg/year
Land emission of toluene	0 kg/year
Release of toluene to water	232 kg/year



- Removal rate/decomposition rate of activated carbon adsorption treatment

Removal rate of activated carbon adsorption treatment	80%
Decomposition rate of activated carbon adsorption treatment	0%

- Calculation of potential air emission of toluene

$$\begin{aligned}
 \text{Potential air emission of toluene (kg/year)} &= \text{Maximum potential release of toluene to the environment (1,100 kg/year)} - \text{Land emission of toluene (0 kg/t)} - \text{Release of toluene to water (232 kg/t)} \\
 &= 868 \text{ kg/year}
 \end{aligned}$$

- Calculation of air emission of toluene after exhaust gas treatment

$$\begin{aligned}
 \text{Air emission of toluene (kg/year)} &= \text{Potential air emission (868 kg/year)} \times \left(100 - \text{Removal rate of activated carbon adsorption treatment (80\%)} \right) \div 100 \\
 &= 174 \text{ kg/year}
 \end{aligned}$$

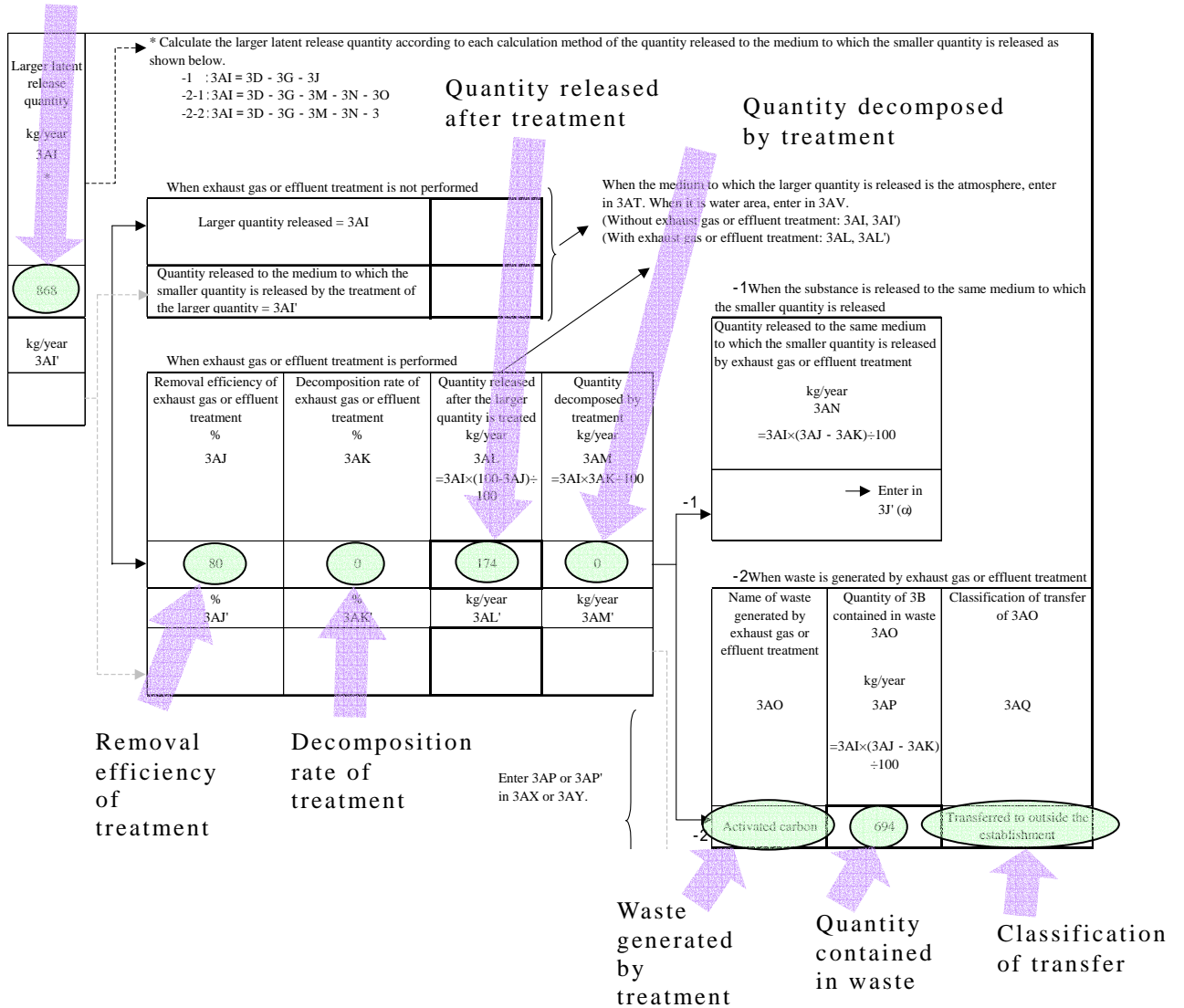
- Calculation of the quantity of toluene in spent carbon

$$\begin{aligned}
 & \text{Quantity in spent carbon (kg/year)} = \text{Potential air emission (868 kg/year)} \times \left(\text{Removal rate of activated carbon adsorption treatment (80\%)} - \text{Decomposition rate of activated carbon adsorption treatment (0\%)} \right) \div 100 \\
 & = 694 \text{ kg/year}
 \end{aligned}$$

* When exhaust gas or effluent treatment is performed in the medium to which the smaller release, subtract not only the release to water but also the quantity decomposed by exhaust gas or effluent treatment and the transfer by being contained in waste from the treatment (or the release to another medium by the treatment).

Filling out the worksheet3

Larger latent release quantity



2-1-8 Compilation of quantities released/transferred

Add up all the released/transferred quantities calculated according to the classification of notification.

(NOTE)

Sum up the releases to a medium to which the larger quantity is released and the one to which the smaller quantity is released by the air emission and the release to water. Sum up the releases to water depending on the release conditions as shown below.

- When released to public water area such as rivers, lakes, agricultural waterways..... Surface water discharge
- When released to sewage works Transfer to sewage

Sum up the quantities contained in waste according to treatment methods as shown below.

- When waste is handed over to an industrial waste treatment service and it is handed over to a recycling service at no charge Off-site Transfer in waste
- When waste is disposed of in a landfill inside the pertinent establishment Landfills in the business establishment

When waste is sold to a recycling service, it need not be included in the summation, since it is considered to be a transfer of products.

When waste liquid generated in business establishment A is transferred directly to the effluent treatment plant of business establishment B where treatment is performed, and then discharged to surface water, the following classification applies.

- a) If effluent generated in business establishment A is transferred directly to the effluent treatment plant of business establishment B through a pipeline, etc. and then released from there, report it as “surface water discharge” from business establishment A. In this case, business establishment B need not submit notifications.
- b) If effluent is not transferred directly through a pipeline, etc., report it as “off-site transfer in waste.” In this case, business establishment B must submit a notification of quantities released/transferred from specific requirement facilities if it has a waste treatment plant.

Reference page

- Part I 2-2-3 (1) Step1-8 Sum-up the released/transferred quantities (pI-52)