

2-2 Procedure of calculating the quantity released/transferred from specific requirement facilities

Businesses having facilities designated as specific requirement facilities must calculate the released/transferred quantity of the substances subject to measurement according to other regulations and submit notifications. Calculate the quantities of designated substances such as dioxins released from specific requirement facilities using actual measurement values by referring to Fig. 2-2.

If the concentration actually measured is less than the minimum limit of determination, follow the procedures shown below.

Dioxins

Perform the following procedure designated in the Law concerning Special Measures against Dioxins. Check the measurement by substance and perform the TEQ conversion of the value that is the same as or larger than the minimum limit of determination, perform the TEQ conversion of the value that is less than the minimum limit of determination with the value regarded as 0, and then add them up.

Specified substances other than dioxins

Regard a value that is less than the minimum limit of detection (N.D.) as 0, and a value that is the same as or larger than the minimum limit of detection and less than the minimum limit of determination as 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.

Note that the unit used for the notification of dioxins is mg-TEQ/year, and that kg/year is used for other substances.

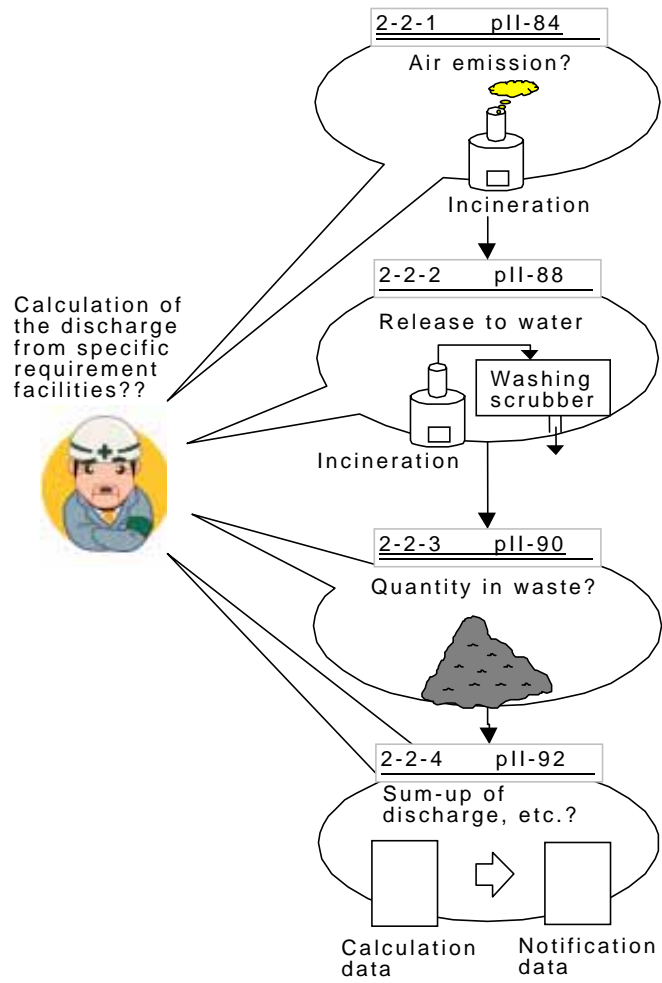


Fig. 2-2 Procedure of calculating the quantity released/transferred from specific requirement facilities

Reference page

- Part I 2-2-3 (2) Procedure of calculating the quantity released/transferred from specific requirement facilities (pI-54)

2-2-1 Procedure of calculating the quantity released/transferred from specific requirement facilities

Calculate the air emission from specific requirement facilities by using the following formula.

$$\text{Air emission from specific requirement facilities} = \text{Concentration of specified substance in exhaust gas} \times \text{Annual quantity of exhaust gas}$$

(NOTE)

To calculate the quantity of dioxins in exhaust gas released to air from an incinerator, use the concentration of dioxins before O₂ 12% conversion.*

Convert the dioxin concentration presented by the analysis company, which is usually the value after O₂ 12% conversion, back into the value before conversion, using the following formula.

$$\text{Concentration before O}_2 \text{ 12\% conversion} = \frac{21 - \text{Oxygen concentration in exhaust gas \%}}{21 - 12} \times \text{Concentration after O}_2 \text{ 12\% conversion}$$

If the oxygen concentration in exhaust gas exceeds 20%, use the value of 20% in the calculations.

* The concentration after O₂ 12% conversion is the concentration obtained by converting the value to that when the oxygen concentration in exhaust gas is 12%. The Law Concerning Special Measures against Dioxins requires that the concentration after O₂ 12% conversion be submitted. The Law Concerning Special Measures against Dioxins also requires that the concentration of exhaust gas in incinerators after O₂ 15% conversion be submitted. Therefore, in the case of a sintering furnace, convert the concentration after O₂ 15% conversion into that before the conversion using the following formula, and submit that value.

$$\text{Concentration before O}_2 \text{ 15\% conversion} = \frac{21 - \text{Oxygen concentration in exhaust gas \%}}{21 - 15} \times \text{Concentration after O}_2 \text{ 15\% conversion}$$

You can use either of the following values as the annual quantity of exhaust gas for calculating the quantity of dioxins in exhaust gas released to air from the incinerator.

- The value estimated based on the quantity of exhaust gas at the time of measurement of dioxin concentration
- The value estimated based on the quantity of waste incinerated

(cont'd)

Use the dry gas quantity for the quantity of exhaust gas.

* Dry gas quantity is the value obtained with the moisture content in exhaust gas regarded as 0.

Reference page

- Part I 2-2-3 (2) Step2-1 Procedure of calculating the quantity released/transferred from specific requirement facilities (pI-56)
- Part III 2. Q&A Q123 (pIII-159)

(Example of calculation 1) When using the quantity of exhaust gas at the time of measurement

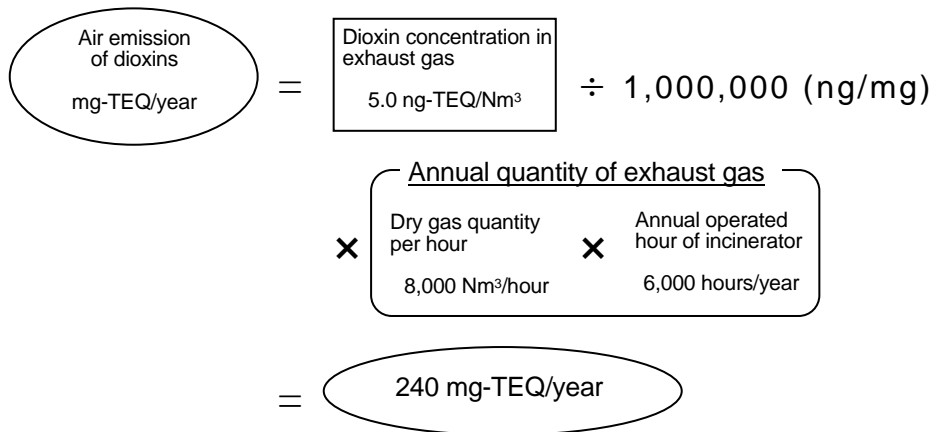
When dioxins in exhaust gas of incinerator is released to air

- Dioxin concentration in exhaust gas and measurement result of exhaust gas quantity

Dioxin concentration in exhaust gas	5.0 ng-TEQ/Nm ³ (Before O ₂ 12% conversion)
Dry exhaust gas quantity per hour	8,000 Nm ³ /hour
Annual operated hour of incinerator	6,000 hours/year

* If the operated hour of incinerator only is not known, you can make calculations using the operated hour including the time for preliminary work, etc.

- Calculation of air emission of dioxins



Filling out the worksheet5

Concentration of the subject substance Quantity of exhaust gas Quantity released to the atmosphere
 $5E \times 5F \div 1,000,000$

Calculation of the subject substance released to the atmosphere

Concentration of PCDDs in exhaust gas ng-TEQ/Nm ³ 5Ea	Quantity of exhaust gas Nm ³ /year 5Fa	Quantity of PCDDs released to the atmosphere mg-TEQ/year 5Ga =5Ea×5Fa÷1,000,000
5.0	8000 × 6000	240

(Example of calculation 2) When exhaust gas quantity estimated based on the quantity of incineration is used

When dioxins in exhaust gas from the incinerator is released to air

- Dioxin concentration in exhaust gas and the quantity of exhaust gas per the quantity of waste incinerated

Dioxin concentration in exhaust gas	2.0 ng-TEQ/Nm ³ (Before O ₂ 12% conversion)
Dry gas quantity per quantity of waste incinerated	5,000 Nm ³ /t
Annual quantity of waste incinerated	15,000 t/year

- Calculation of air emission of dioxins

$$\begin{aligned}
 & \text{Air emission of dioxins (mg-TEQ/year)} = \frac{\text{Dioxin concentration in exhaust gas (2.0 ng-TEQ/Nm}^3)}{1,000,000 \text{ (ng/mg)}} \\
 & \quad \times \left[\text{Annual quantity of exhaust gas} \right] \\
 & \quad \quad \times \left[\begin{array}{l} \text{Dry exhaust gas quantity per quantity of waste incinerated (5,000 Nm}^3\text{/t)} \\ \times \\ \text{Annual quantity of waste incinerated (15,000 t/year)} \end{array} \right] \\
 & = 150 \text{ mg-TEQ/year}
 \end{aligned}$$

Filling out the worksheet5

Concentration of the subject substance Quantity of exhaust gas Quantity released to the atmosphere
 $5E \times 5F \div 1,000,000$

Calculation of the subject substance released to the atmosphere

Concentration of PCDDs in exhaust gas ng-TEQ/Nm ³ 5Ea	Quantity of exhaust gas Nm ³ /year 5Fa	Quantity of PCDDs released to the atmosphere mg-TEQ/year 5Ga =5Ea×5Fa÷1,000,000
2.0	5000 × 15000	150

2-2-2 Calculate the release to water from specific requirement facilities

Calculate the release to water from specific requirement facilities by using the following formula.

$$\text{Release to water from specific requirement facilities} = \text{Concentration of specified substance in effluent} \times \text{Annual quantity of effluent}$$

Reference page

- Part I 2-2-3 (2) Step2-2 Calculate the release to water from specific requirement facilities (pI-57)
- Part III 2.Q&A Q115–Q117 (pIII-155–156)

(Example of calculation)

When exhaust gas from the incinerator is fed through the washing tower, from which effluent is generated

- Dioxin concentration in effluent and measurement of effluent

Dioxin concentration in effluent	1.0 pg-TEQ/L
Quantity of effluent	30,000 m ³ /year

- Calculation of the release of dioxins to water

$$\begin{aligned} \text{Release of dioxins to water} &= \text{Dioxin concentration in effluent} \times \text{Annual quantity of effluent} \\ \text{mg-TEQ/year} &= 1.0 \text{ pg-TEQ/L} \times 30,000 \text{ m}^3/\text{year} \\ &\div 1,000,000 \text{ (pg/L)/(mg/m}^3\text{)} \\ &= 0.03 \text{ mg-TEQ/year} \end{aligned}$$

Filling out the worksheet5

Concentration
of the subject
substance

Quantity of
effluent

Quantity released
to water area
 $5H \times 5I \div 1,000,000$

Calculation of the quantity of the subject substance released to water area		
Concentration of PCDDs in effluent	Quantity of effluent	Quantity of PCDDs released to water area
pg-TEQ/L	$m^3/year$	mg-TEQ/year
5Ha	5Ia	5Ja
		$=5Ha \times 5Ia \div 1,000,000$
1.0	30,000	0.030

2-2-3 Calculate the quantity in waste released from specific requirement facilities

Calculate the quantity in waste released from specific requirement facilities by using the following formula.

$$\text{Quantity in waste from specific requirement facilities} = \text{Concentration of specified substance in waste} \times \text{Waste generated per year}$$

Reference page

- Part I 2-2-3 (2) Step2-3 Calculate the quantity in waste released from specific requirement facilities (pI-58)

(Example of calculation)

When treatment of incineration ash generated is commissioned to an industrial waste management contractor

- Dioxin concentration in incineration ash and quantity of incineration ash generated

Dioxin concentration in incineration ash	0.24 ng-TEQ/g
Quantity of incineration ash generated	1,300 t/year Handed over to an industrial waste management contractor

- Calculation of dioxins in waste

$$\begin{aligned} \text{Quantity of dioxins in waste (mg-TEQ/year)} &= \text{Dioxin concentration in waste (0.24 ng-TEQ/g)} \times \text{Quantity of waste generated (1,300 t/year)} \\ &\times 1 \text{ (mg/ng) (g/t)} \\ &= 312 \text{ mg-TEQ/year} \end{aligned}$$

Filling out the worksheet5

Name of waste	Concentration of the subject substance	Quantity of waste generated	Classification of transfer	Quantity contained in waste 5L×5M
Calculation of the quantity of the subject substance contained in waste				
Name of waste containing PCDDs 5Ka	Concentration of PCDDs in waste ng-TEQ/g 5La	Quantity of waste generated t/year 5Ma	Classification of transfer of waste 5Na	Quantity of PCDDs contained in waste mg-TEQ/year 5Oa =5La×5Ma
Incineration ash	0.24	1,300	Transferred to outside the establishment	312

2-2-4 Sum-up the quantities released/transferred from specific requirement facilities

Sum up the quantities calculated according to the classification of notification.

(NOTE)

The quantity of incineration ash containing dioxins generated within a business establishment need not be included in the quantity released/transferred if it is used as raw material by the same business establishment. If the incineration ash is transferred to another business establishment at no cost or by receiving a treatment fee, report it as “off-site transfer in waste.”

Reference page

- Part I 2-2-3 (2) Step2-4 Sum-up the quantities released/transferred from specific requirement facilities (pI-59)

Filling out the worksheet5

Information on the subject substance released					Calculation of the subject substance released to the atmosphere		
Serial No.	Name of the facility from which the subject substance is released	CAS No. of the subject substance	Substance No. of the subject substance	Name of the subject substance released	Concentration of PCDDs in exhaust gas ng-TEQ/Nm ³ 5Ea	Quantity of exhaust gas Nm ³ /year 5Fa	Quantity of PCDDs released to the atmosphere mg-TEQ/year 5Ga =5Ea×5Fa÷1,000,000
	5Aa	5Ba Enter "-".	5Ca Enter "179".	5Da Enter "PCDDs".			
1	Incinerator 1	-	179	PCDDs	5.0	48,000,000	240
2	Incinerator 2	//	//	//	3.0	48,000,000	144
	Total						384

↑
Sum of the quantities released to the atmosphere

Calculation of the quantity of the subject substance released to water area			Calculation of the quantity of the subject substance contained in waste				
Concentration of PCDDs in effluent pg-TEQ/L 5Ha	Quantity of effluent m ³ /year 5Ia	Quantity of PCDDs released to water area mg-TEQ/year 5Ja =5Ha×5Ia÷1,000,000	Name of waste containing PCDDs 5Ka	Concentration of PCDDs in waste ng-TEQ/g 5La	Quantity of waste generated t/year 5Ma	Classification of transfer of waste 5Na	Quantity of PCDDs contained in waste mg-TEQ/year 5Oa =5La×5Ma
1.0	30,000	0.030	Incineration ash	0.24	1,300	Transferred to outside the establishment	312
1.2	20,000	0.024	Incineration ash	0.15	1,200	Transferred to outside the establishment	180
		0.054					492

↑
Sum of the quantities released to water area

↑
Sum of the quantities contained in waste