1-6 Printing process

This is a process where ink is printed on paper, metal plate, plastic plate, etc by relief, flat plate or intaglio printing method.

Release to the environment and off-site transfer in waste include the following.

- Volatilization of specified substance (solvent component) in ink
- Mixing of solvent component or pigment component in effluent
- Transfer of solvent component or pigment component as spent ink

If exhaust gas or effluent generated from the process is treated in exhaust gas or effluent treatment facility by activated carbon adsorption method, waste (such as spent carbon) may be generated.

[Examples of subject substances]

Solvent component:	Toluene, xylene, etc.
Component of pigment:	Hexavalent chromium compound and metal compounds such as lead and its compound

[Example of calculation]

The following is an example of calculating the release/transfer from the printing facility described by Table 1-6 and Fig. 1-6.

Table 1-6 Outline of printing facility

Handling status of specified substance

① Outline of the work of handling specified substance

Description of printing	Gravure printing (Refer to Fig. 1-6.) Generation of effluent/waste and leakage to land: None
Exhaust gas treatment facility	Activated carbon adsorption device (Removal rate: 80%, Decomposition rate: 0%)

② Raw material or material containing specified substance handled

- Ink A

<table>
<tr><td>Annual quantity purchased</td><td>9.4 t/year</td></tr>
<tr><td>Stock at beginning of fiscal year</td><td>0.70 t</td></tr>
<tr><td>Stock at end of fiscal year</td><td>1.3 t</td></tr>
<tr><td>Content of specified substance listed in MSDS</td><td>
<table>
<tr><th>Substance No.</th><th>Name of specified substance</th><th>Content</th></tr>
<tr><td>63</td><td>Xylene</td><td>40%</td></tr>
<tr><td>69</td><td>Hexavalent chromium compounds</td><td>2.5%</td></tr>
<tr><td>230</td><td>Lead and its compounds</td><td>20%</td></tr>
</table>
</td></tr>
</table>

(cont’d)

③ Waste generated

Type of waste	**Quantity**	**Content of specified substance**	**Waste treatment**
Spent ink	250 kg/year	Not known	Delivered to industrial waste management contractor
Spent carbon	Not known		

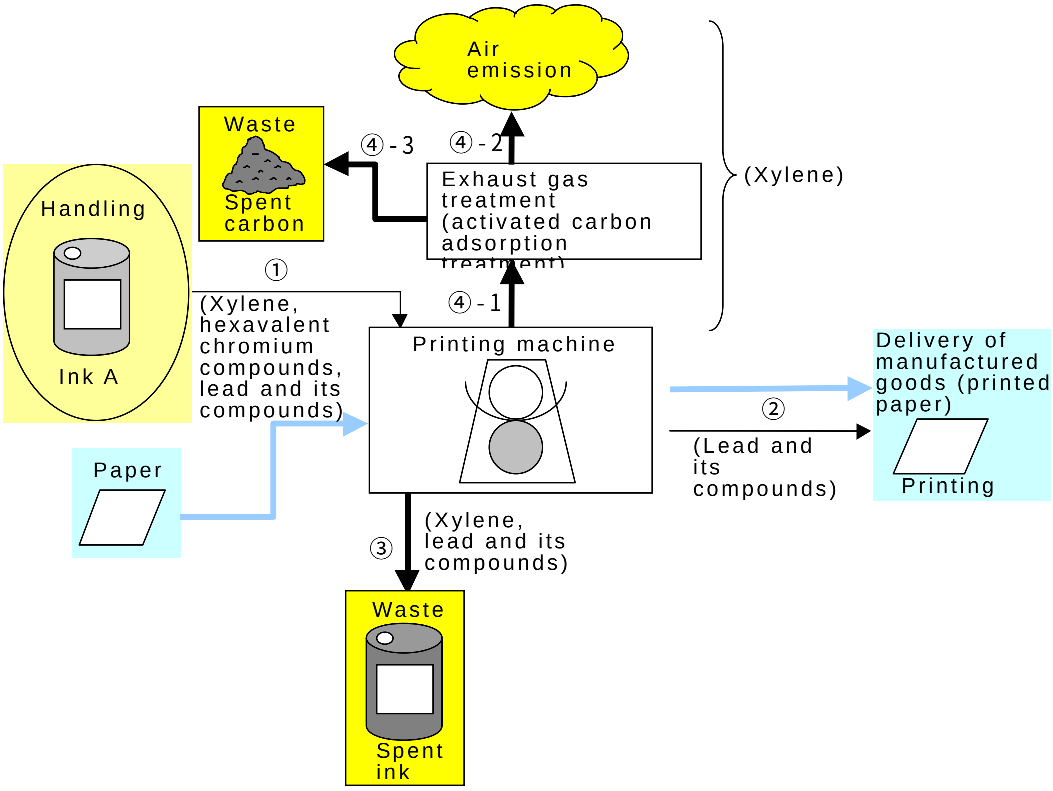

Fig. 1-6 Outline of printing facility

Follow the procedure based on mass balance described in Part I and Part II to calculate the release/transfer from the printing facility.

Step 1 Calculate the annual quantity of specified substance handled.

Step 1-1 Calculate the annual quantity of specified substance manufactured.

Since specified substance is not manufactured in the facility, 0 is assumed as annual quantity of specified substance manufactured.

Annual quantity of specified substance manufactured t/year = 0 t/year

Step 1-2 Calculate the annual quantity of ink A used.

Annual quantity of ink A used t/year = Annual quantity of ink A purchased 9.4t/year − Quantity of ink A stored at the end of the fiscal year 1.3t + Quantity of ink A stored at the beginning of the fiscal year 0.70t

= 8.8t/year

Step 1-3 Calculate the annual quantity of specified substance used.

Annual quantity of xylem used t/year = Annual quantity of ink A used 8.8t/year × Content of xylem in ink A 40% ÷ 100

= 3.52t/year

Annual quantity of hexavalent chromium compounds used t/year = Annual quantity of ink A used 8.8t/year × Content of hexavalent chromium compounds in ink A 2.5% ÷ 100

= 0.22t/year

Annual quantity of lead and its compounds used t/year = Annual quantity of ink A used 8.8t/year × Content of lead and its compounds in ink A 20% ÷ 100

= 1.76t/year

Step 1-4 Calculate the annual quantity of specified substance handled.

Annual quantity of xylem handled t/year = Annual quantity of xylem manufactured 0t/year + Annual quantity of xylem used 3.52t/year

= 3.52t/year ≧ Designated value of specified substance (Class 1 designated chemical substance) 1t/year

Annual quantity of hexavalent chromium compounds handled t/year = Annual quantity of hexavalent chromium compounds manufactured 0t/year + Annual quantity of hexavalent chromium compounds used 0.22t/year

= 0.22t/year < Designated value of specified substance (Specific class 1 designated chemical substance) 0.5t/year

Annual quantity of lead and its compounds handled t/year = Annual quantity of lead and its compounds manufactured 0t/year + Annual quantity of lead and its compounds used 1.76t/year

= 1.76t/year ≧ Designated value of specified substance (Class 1 designated chemical substance) 1t/year

Since the annual quantity of xylem and lead and its compounds handled is larger than the specified quantity (1t/year), they are designated as requiring notification. However, since the quantity of hexavalent chromium compounds is less than the designated value of specific class 1 designated chemical substance, you do not have to assess or notify its release.

Procedure of calculating solvent component (xylene) and pigment component (lead and its compounds) is described separately in the following sections.

Step 2 Calculate the quantity of specified substance released as manufactured goods.

○ Solvent component
Since the substance is not contained in manufactured goods (printed matter), 0 is assumed as the quantity released as manufactured goods.

$$\text{Quantity of xylene released as manufactured goods kg/year} = \text{0kg/year}$$

○ Pigment component
Since the quantity other than those in waste is assumed to be contained in manufactured goods, calculate the quantity using the following formula. (Refer to Step 3 for the calculation of the quantity in waste.)

$$\text{Quantity of lead and its compounds released as manufactured goods kg/year} = \boxed{\text{Annual quantity of lead and its compounds handled 1.76t/year}} \times \text{1000kg/t} - \text{Quantity of lead and its compounds in waste 50kg/year}$$

$$= \text{1710kg/year}$$

Step 3 Calculate the quantity of specified substance in waste.

○ Solvent component
Since the content of the specified substance in spent ink is not known, calculate the quantity using the content in ink A. Spent carbon containing xylene is generated by exhaust gas treatment in the facility. Calculate the quantity of xylene in spent carbon when calculating the air emission.

$$\text{Quantity of xylene in waste kg/year} = \boxed{\text{Quantity of spent ink 250kg/year}} \times \text{Content of xylene in ink A 40\%} \div 100$$

$$= \text{100kg/year}$$

○ Pigment component

Since the content of the specified substance in spent ink is not known, calculate the quantity using the content in ink A.

Quantity of lead and its compounds in waste kg/year = Quantity of spent ink 250kg/year × Content of lead and its compounds in ink A 20% ÷ 100

= 50kg/year

Step 4 Calculate the maximum potential release of specified substance.

○ Solvent component

Maximum potential release of xylene to the environment kg/year = Annual quantity of xylene handled 3.52t/year ×1000kg/t − Quantity of xylene released as manufactured goods 0kg/year − Quantity of xylene in waste 100kg/year

= 3420kg/year

○ Pigment component

Since the release to the environment is almost none, 0 is assumed as the maximum potential release to the environment. (The subsequent procedure will be omitted.)

Maximum potential release of lead and its compounds to the environment kg/year = 0 kg/year

Step 5 Calculate the land emission of specified substance.

Since there is no leakage to land in the facility, 0 is assumed as land emission.

○ Solvent component

Land emission of xylene kg/year = 0 kg/year

Step 6 Judge to which medium, air or water, larger or smaller quantity is released.

○ Solvent component
Since the facility does not have contact with water, it is assumed that larger quantity is released to air.

Step 7 Calculate the release of specified substance to water.

○ Solvent component
Since the facility does not have contact with water, 0 is assumed as the release to water.

Release of xylene to water kg/year = 0 kg/year

Step 8 Calculate the air emission of specified substance.

○ Solvent component
Calculate the air emission using mass balance.

Potential air emission of xylene kg/year = Maximum potential release of xylene to the environment 3420kg/year − Land emission of xylene 0kg/year − Release of xylene to water 0kg/year

= 3420kg/year

Calculate the air emission of xylene after exhaust gas treatment and the quantity in waste (spent carbon) generated by the treatment by using the removal rate and decomposition rate of activated carbon adsorption treatment.

Air emission of xylene kg/year = Potential air emission of xylene 3420kg/year ×(100 − Removal rate of activated carbon adsorption treatment 80%) ÷ 100

= 684kg/year

Quantity of xylene in waste (spent carbon) generated by the treatment kg/year = Potential air emission of xylene 3420kg/year ×(Removal rate of activated carbon adsorption treatment 80% − Decomposition rate of activated carbon adsorption treatment 0%) ÷ 100

= 2736kg/year

Step 9 Sum up the quantities of specified substance released or transferred.

Xylene (unit; kg/year)

Classification for Calculation	**Classification for Notification**
	(Releases)
A Air emission; 684	a. Air emission; 680
B Release to water; 0	b. Surface water discharge; 0.0
C Land emission; 0	c. Land emission in the business establishment; 0.0
D Quantity in waste; 2736	d. Landfills in the business establishment; 0.0
	(Transfers)
	e. Transfer to sewage; 0.0
	f. Off-site transfer in waste; 2700

Lead and its compounds (unit; kg/year)

Classification for Calculation	**Classification for Notification**
	(Releases)
A Air emission; 0	a. Air emission; 0.0
B Release to water; 0	b. Surface water discharge; 0.0
C Land emission; 0	c. Land emission in the business establishment; 0.0
D Quantity in waste; 50	d. Landfills in the business establishment; 0.0
	(Transfers)
	e. Transfer to sewage; 0.0
	f. Off-site transfer in waste; 50

1-7 Adhesion process

This is a process where adhesive agent is coated on materials such as paper, metals and plastics by brushing or spraying to adhere materials.

The release to the environment and off-site transfer in waste include the following.

- Volatilization of specified substance (solvent component) in adhesive agent
- Mixing of solvent component or adhesive component in effluent
- Transfer of solvent component or pigment component as spent adhesive agent

If exhaust gas or effluent generated from the process is treated by activated carbon adsorption method in exhaust gas/effluent treatment facility, waste may be generated.

[Examples of subject substances]

Solvent component: Toluene, xylene, etc.

Additive component: Bis phthalate (2-ethylhexyl), etc.

[Example of calculation]

The following is an example of calculating the release/transfer from the adhesion facility described by Table 1-7 and Fig. 1-7.

Table 1-7 Outline of adhesion process

Handling status of specified substance

① Outline of the work of handling specified substance

Description of adhesion	Adhesion and cutting of plastic parts (Refer to Fig. 1-7.) Generation of effluent and leakage to land: None
Exhaust gas treatment facility	None

② Raw material or material containing specified substance handled

- Adhesive agent A

Annual quantity purchased	10.7 t/year
Stock at beginning of fiscal year	2.2 t
Stock at end of fiscal year	1.8 t
Content of specified substance listed in MSDS	

Substance No.	Name of specified substance	Content
227	Toluene	15%
272	Bis phthalate (2-ethyl-hexyl)	10%

(cont'd)

③ Waste generated

Type of plastics	**Quantity**	**Content of specified substance**	**Waste treatment**
Plastic chips	3% of total bonded parts	Not known	Delivered to industrial waste management contractor

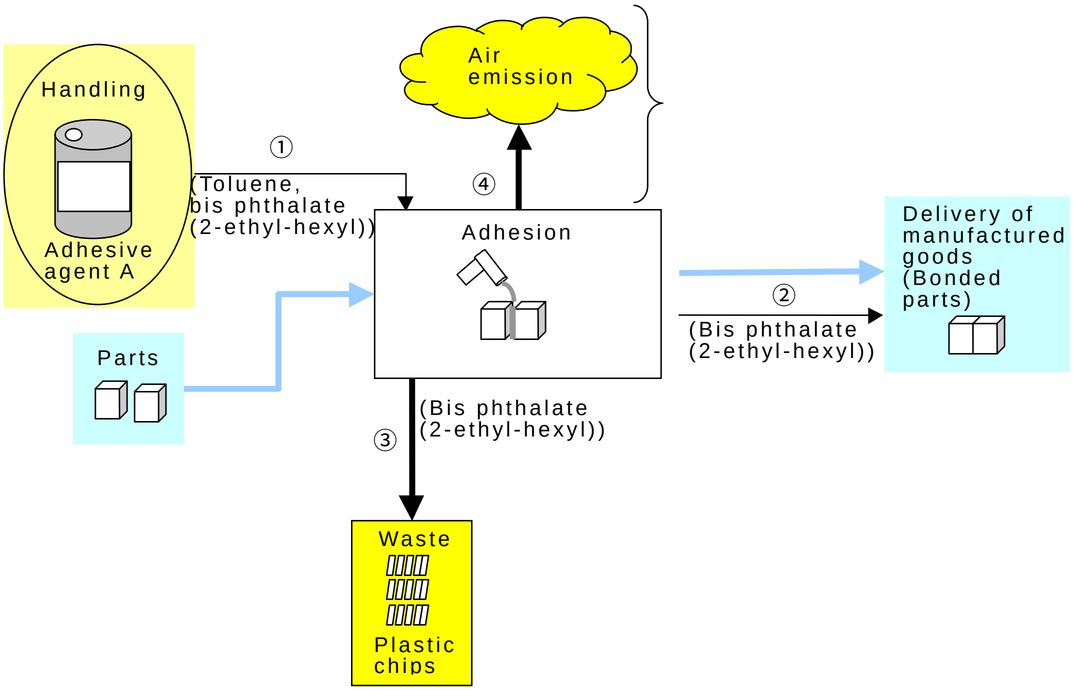

Fig. 1-7 Outline of adhesion facility

Follow the procedure based on mass balance described in Part I and Part II to calculate the release/transfer from the adhesion facility.

Step 1 Calculate the annual quantity of specified substance handled.

Step 1-1 Calculate the annual quantity of specified substance manufactured.

Since no specified substance is manufactured in the facility, 0 is assumed as the annual quantity of specified substance manufactured.

Annual quantity of specified substance manufactured t/year = 0 t/year

Step 1-2 Calculate the annual quantity of adhesive agent A used.

Annual quantity of adhesive agent A used t/year = Annual quantity of adhesive agent A purchased 10.7t/year − Quantity of adhesive agent A stored at the end of the fiscal year 1.8t + Quantity of adhesive agent A stored at the beginning of the fiscal year 2.2t

= 11.1t/year

Step 1-3 Calculate the annual quantity of specified substance used.

Annual quantity of toluene used t/year = Annual quantity of adhesive agent A used 11.1t/year × Content of toluene in adhesive agent A 15% ÷ 100

= 1.67t/year

Annual quantity of bis phthalate (2-ethyl-hexyl) used t/year = Annual quantity of adhesive agent A used 11.1t/year × Content of bis phthalate (2-ethyl-hexyl) in adhesive agent A 10% ÷ 100

= 1.11t/year

Step 1-4 Calculate the annual quantity of specified substance handled.

Annual quantity of toluene handled t/year = Annual quantity of toluene manufactured 0t/year + Annual quantity of toluene used 1.67t/year

= 1.67t/year ≧ Designated value of specified substance (Class 1 designated chemical substance) 1t/year

Annual quantity of bis phthalate (2-ethyl-hexyl) handled t/year = Annual quantity of bis phthalate (2-ethyl-hexyl) manufactured 0t/year + Annual quantity of bis phthalate (2-ethyl-hexyl) used 1.11t/year

= 1.11t/year ≧ Designated value of specified substance (Class 1 designated chemical substance) 1t/year

Since the quantity of toluene and bis phthalate (2-ethyl-hexyl) is larger than the specified quantity (1t/year), they are designated as the substances requiring notification.

Procedure of calculating solvent component (toluene) and pigment component (bis phthalate [2-ethyl-hexil]) is described separately in the following sections.

Step 2 Calculate the quantity of specified substance released as manufactured goods.

○ Solvent component
Since no specified substance is contained in manufactured goods (bonded parts), 0 is assumed as the quantity released as manufactured goods.

Quantity of toluene released as manufactured goods kg/year = 0kg/year

○ Additive agent
Those other than solvent component of adhesive agent is assumed to be contained in manufactured goods coated on them. In this process, however, 3% is cut off and disposed. Therefore, the remaining 97% is assumed to be delivered as manufactured goods. Calculate the quantity using the following formula.

(Quantity of bis phthalate (2-ethyl-hexyl) released as manufactured goods kg/year) ＝ [Annual quantity of bis phthalate (2-ethyl-hexyl) handled 1.11t/year] ×(100－〈Cut off rate 3%〉)÷ 100×1000kg/t

＝ (1077kg/year)

Step 3 Calculate the quantity of specified substance in waste.

○ Solvent component
Since no waste containing toluene is generated in the facility, 0 is assumed as the quantity in waste.

(Quantity of toluene in waste kg/year) ＝ (0kg/year)

○ Additive agent
Since almost no quantity is released to the environment, calculate the quantity using mass balance as shown below.

(Quantity of bis phthalate (2-ethyl-hexyl) in waste kg/year) ＝ [Annual quantity of bis phthalate (2-ethyl-hexyl) handled 1.11t/year] ×1000kg/t － (Quantity of bis phthalate (2-ethyl-hexyl) released as manufactured goods 1077kg/year)

＝ (33kg/year)

Step 4 Calculate the maximum potential release of specified substance to the environment.

○ Solvent component

Maximum potential release of toluene to the environment kg/year = Annual quantity of toluene handled 1.67t/year × 1000kg/t − Quantity of toluene released as manufactured goods 0kg/year − Quantity of toluene in waste 0kg/year

= 1670kg/year

○ Additive component
Since almost no quantity is released to the environment, 0 is assumed as the maximum potential release to the environment. (The subsequent procedure will be omitted.)

Maximum potential release of bis phthalate (2-ethyl-hexyl) to the environment kg/year = 0 kg/year

Step 5 Calculate the land emission of specified substance.

Since there is no leakage to land in the facility, 0 is assumed as land emission.

○ Solvent component

Land emission of toluene kg/year = 0 kg/year

Step 6 Judge to which medium, land or water, larger or smaller quantity is released.

○ Solvent component
Since the facility does not have contact with water, it is assumed that larger quantity is released to air.

Step 7 Calculate the release of specified substance released to water.

○ Solvent component
Since the facility does not have contact with water, 0 is assumed as the release to water.

Release of toluene to water kg/year = 0 kg/year

Step 8 Calculate the air emission of specified substance.

○ Solvent component
Calculate the air emission using mass balance as shown below.

Air emission of toluene kg/year = Maximum potential release of toluene to the environment 1670kg/year − Land emission of toluene 0kg/year − Release of toluene to water 0kg/year

= 1670kg/year

Step 9 Sum up the quantities of specified substance released or transferred.

Toluene (unit; kg/year)

Classification for Calculation	Classification for Notification
	(Releases)
A Air emission; 1670	a. Air emission; 1700
B Release to water; 0	b. Surface water discharge; 0.0
C Land emission; 0	c. Land emission in the business establishment; 0.0
D Quantity in waste; 0	d. Landfills in the business establishment; 0.0
	(Transfers)
	e. Transfer to sewage; 0.0
	f. Off-site transfer in waste; 0.0

Bis phthalate (2-ethyl-hexyl) (unit; kg/year)

Classification for Calculation	Classification for Notification
	(Releases)
A Air emission; 0	a. Air emission; 0.0
B Release to water; 0	b. Surface water discharge; 0.0
C Land emission; 0	c. Land emission in the business establishment; 0.0
D Quantity in waste; 33	d. Landfills in the business establishment; 0.0
	(Transfers)
	e. Transfer to sewage; 0.0
	f. Off-site transfer in waste; 33

1-8 Plating process

This is a process where thin metal film is laid over the surface of metallic or non-metallic products, which includes electric plating and chemical plating.

The release to the environment and off-site transfer in waste include the following.

- Mixing of plating liquid into effluent
- Transfer as spent plating liquid, etc.

If the effluent generated from the process is treated in effluent treatment facility by neutralization treatment etc., specified substance is transferred in waste generated (such as sludge).

[Examples of subject substances]

Nickel compound, Hexavalent chromium compound, inorganic cyanogen compound

[Example of calculation (1)] When plating liquid and nickel compound used as electrode are released (Calculate the quantity released as manufactured goods from plated area.)

The following is an example of calculating the release/transfer from the plating facility (1) described by Table 1-8-1 and Fig. 1-8-1.

Table 1-8-1 Outline of plating facility (1)

Handling status of specified substance

① Outline of the work of handling specified substance

Description of plating	Nickel plating of metallic parts (Refer to Fig. 1-8-1.) Plated part: Plated area; 500 cm^2/piece (0.050 m^2/piece) Average plating thickness; 10 μm (1.0×10^{-5} m) Annual quantity manufactured; 600,000/year Leakage to land; None
Exhaust gas treatment facility	None
Effluent treatment facility	Neutralizing sedimentation treatment (Removal rate: 70%, Decomposition rate: 0%)
Effluent released to	***** river

(cont’d)

② Raw material and material containing specified substance handled

- Plating liquid A

Annual quantity purchased	9.6 t/year
Stock at beginning of fiscal year	0.64 t
Stock at end of fiscal year	0.32 t
Content of specified substance listed in MSDS	

Substance No.	**Name of specified substance**	**Content**
232	Nickel compound	7.0%

- Electrode B

Annual quantity purchased	3.3 t/year
Stock at beginning of fiscal year	0.12 t
Stock at end of fiscal year	0.59 t
Content of specified substance listed in MSDS	

Substance No.	**Name of specified substance**	**Content**
231	Nickel	100%

③ Raw material or material containing specified substance handled

Type of waste	**Quantity**	**Content of specified substance**	**Waste treatment**
Spent plating liquid	5 t/year	Not known	Delivered to industrial waste management contractor
Sludge	Not known		

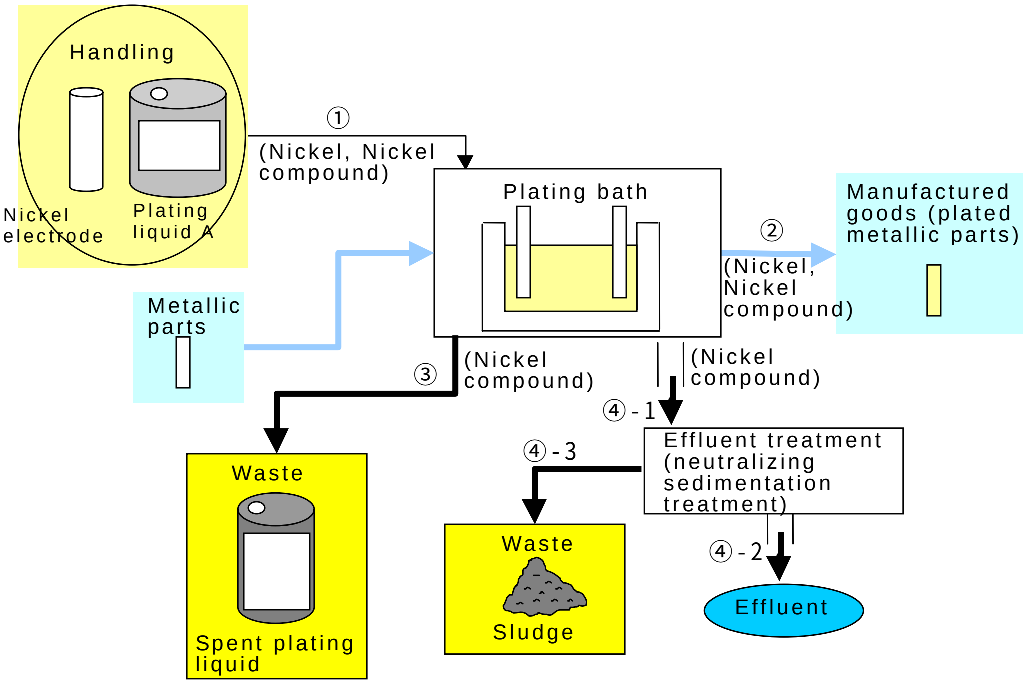

Fig. 1-8-1 Outline of plating facility (1)

Follow the procedure based on mass balance described in Part I and Part II to calculate the release/transfer from the plating facility. (Refer also to Q92 in 2. Questions and Answers of Part III [→ pIII-148].)

Step 1 Calculate the annual quantity of specified substance handled.

Step 1-1 Calculate the annual quantity of specified substance manufactured.

In the facility, metallic nickel used as electrode is dissolved into a nickel compound in the plating tank, which is assumed to be the manufacturing of a nickel compound. Calculate the quantity manufactured using the following formula, since the quantity of nickel compound manufactured equals to that of nickel deposited on the plated object.
The density of nickel is 8.90 kg/L (= 8900 kg/m^3).

Annual quantity of nickel compound manufactured t/year = Quantity of nickel deposited on plated object t/year

= Area of plated material 0.050m^2/piece × Average plating thickness 1.0×10^{-5}m × Number of pieces plated 600000 pieces /year × Density of nickel 8900kg/m^3 × 10^{-3}t/kg

= 2.67t/year

Step 1-2 Calculate the annual quantity of plating liquid A.

Annual quantity of plating liquid A used t/year = Annual quantity of plating liquid A purchased 9.6t/year − Quantity of plating liquid A stored at the end of the fiscal year 0.32t + Quantity of plating liquid A stored at the beginning of the fiscal year 0.64t

= 9.92t/year

Step 1-3 Calculate the annual quantity of specified substance used.

Calculate the annual quantity of nickel compound used using the annual quantity of plating liquid A and nickel compound content in it as shown below.

Annual quantity of nickel compound used t/year = Annual quantity of plating liquid A used 9.92t/year × Content of nickel compound in plating liquid A 7.0% ÷ 100

= 0.694t/year

The annual quantity of nickel used equals to the quantity of metallic nickel, which is used as an electrode, dissolved. The quantity is equal to the quantity of nickel compound manufactured that is calculated in Step 1-1.

Annual quantity of nickel used t/year = Annual quantity of nickel compound manufactured t/year

= 2.67t/year

Step 1-4 Calculate the annual quantity of specified substance handled.

Annual quantity of nickel compound handled t/year = Annual quantity of nickel compound manufactured 2.67t/year + Annual quantity of nickel compound used 0.694t/year

= 3.36t/year ≧ Designated value of specified substance (Class 1 designated chemical substance) 1t/year

Annual quantity of nickel handled t/year = Annual quantity of nickel manufactured 0t/year + Annual quantity of nickel used 2.67t/year

= 2.67t/year ≧ Designated value of specified substance (Class 1 designated chemical substance) 1t/year

Since the annual quantity of nickel compound is larger than the quantity specified for specific class 1 designated chemical substance (0.5 t/year), and the annual quantity of nickel handled is also larger than the specified quantity (1 t/year), they are designated as substances requiring notification.

Step 2 **Calculate the quantity of specified substance released as manufactured goods.**

The quantity of nickel compound and nickel released as manufactured goods is equal to the quantity deposited on the plated object, which is the same as the quantity calculated in Step 1-1.

Quantity of nickel compound released as manufactured goods kg/year = Quantity of nickel released as manufactured goods kg/year

= Quantity of nickel deposited on plated object 2.67t/year × 1000kg/t

= 2670kg/year

Step 3 Calculate the quantity of specified substance in waste.

Since the content of nickel compound in spent plating liquid is not known, calculate the quantity using the content in plating liquid A.

Quantity of nickel compound in waste kg/year = Quantity of spent plating liquid 5.0t/year × Content of nickel compound in plating liquid A 7.0% ÷100×1000kg/t

= 350kg/year

Sludge that contains nickel compound is generated by effluent treatment. Calculate the quantity in the sludge when calculating the release to water.

Since waste that contains nickel is not generated, 0 is assumed as the quantity of nickel in waste.

Quantity of nickel in waste kg/year = 0 kg/year

Step 4 Calculate the maximum potential discharge of specified substance to the environment.

Maximum potential release of nickel compound to the environment kg/year = Annual quantity of nickel compound handled 3.36t/year ×1000kg/t − Quantity of nickel compound released as manufactured goods 2670kg/year − Quantity of nickel compound in waste 350kg/year

= 340kg/year

Since nickel is assumed to be contained in all the manufactured goods, the quantity released as manufactured goods equals to the annual quantity handled. (All the quantities released/transferred are 0. (The subsequent procedure will be omitted.)

Maximum potential release of nickel to the environment kg/year = Annual quantity of nickel handled 2.67t/year ×1000kg/t − Quantity of nickel released as manufactured goods 2670kg/year − Quantity of nickel in waste 0kg/year

= 0kg/year

Step 5 Calculate the land emission of specified substance.

Since there is no leakage to land in the facility, 0 is assumed as land emission.

Land emission of nickel compound kg/year = 0 kg/year

Step 6 Judge to which medium, air or water, larger or smaller quantity is released.

Since nickel compound has low volatility, almost no quantity is assumed to be released to air. Therefore, it is assumed that larger quantity is released to water.

Step 7 Calculate the air emission of specified substance.

Since almost no nickel compound is released to air, 0 is assumed as air emission.

Air emission of nickel compound kg/year = 0 kg/year

Step 8 Calculate the release of specified substance to water.

Calculate the potential release to water using mass balance.

Potential release of nickel compound to water kg/year = Maximum potential release of nickel compound to the environment 340kg/year − Land emission of nickel compound 0kg/year − Air emission of nickel compound 0kg/year

= .340kg/year

Calculate the quantity of nickel compound released to water after effluent treatment and the quantity in waste generated by the treatment using the removal rate of neutralizing sedimentation treatment.

Release of nickel compound to water kg/year = Potential release of nickel compound to water 340kg/year ×(100 − Removal rate of neutralizing sedimentation treatment 70%)÷ 100

= 102kg/year

Quantity of nickel compound in waste (sludge) kg/year = Potential release of nickel compound to water 340kg/year ×(Removal rate of neutralizing sedimentation treatment 70% − Decomposition rate of neutralizing sedimentation treatment 0%) ÷ 100

= 238kg/year

Step 9 Sum up the quantities of specified substance released or transferred.

Nickel compound (unit; kg/year)

Classification for Calculation	Classification for Notification
	(Releases)
A Air emission; 0 →	a. Air emission; 0.0
B Release to water; 102 →	b. Surface water discharge; 100
C Land emission; 0 →	c. Land emission in the business establishment; 0.0
D Quantity in waste;	d. Landfills in the business establishment; 0.0
Spent plating liquid 350	(Transfers)
Sludge 238 →	e. Transfer to sewage; 0.0
	f. Off-site transfer in waste; 590

Nickel (unit; kg/year)

Classification for Calculation	Classification for Notification
	(Releases)
A Air emission; 0 →	a. Air emission; 0.0
B Release to water; 0 →	b. Surface water discharge; 0.0
C Land emission; 0 →	c. Land emission in the business establishment; 0.0
D Quantity in waste; 0 →	d. Landfills in the business establishment; 0.0
	(Transfers)
	e. Transfer to sewage; 0.0
	f. Off-site transfer in waste; 0.0

[Example of calculation (2)] When hexavalent chromium compound (that is changed into tarvalent chromium compound through effluent treatment) is released to plating liquid (Calculate the quantity released as manufactured goods based on electrochemical reaction.)

The following is an example of calculating the release/transfer from the plating facility (2) described by Table 1-8-2 and Fig. 1-8-2.

Table 1-8-2 Outline of plating facility (2)

Handling status of specified substance

① Outline of the work of handling specified substance

Description of plating	Chrome plating of metallic parts (Refer to Fig. 1-8-2.) Plated part: Current and time at plating; 20 A/piece, 30 min./piece Electrochemical equivalence quantity; 0.323 g/ (A•Time) Current efficiency; 13% Annual quantity manufactured; 2,500,000/year) Leakage to land; None
Exhaust gas treatment facility	None
Effluent treatment facility	Neutralizing sedimentation treatment (Removal rate: 100%, Decomposition rate: 0%)
Effluent released to	***** river

② Raw material and material containing specified substance handled

- Plating liquid A

Annual quantity purchased	10.3 t/year
Stock at beginning of fiscal year	0.52 t
Stock at end of fiscal year	0.96 t
Content of specified substance listed in MSDS	

Substance No.	Name of specified substance	Content
69	Hexavalent chromium compound	15%

③ Outline of the work of handling specified substance

Type of waste	Quantity	Content of specified substance	Waste treatment
Spent plating liquid	Not known	Not known	Delivered to industrial waste management contractor
Sludge			

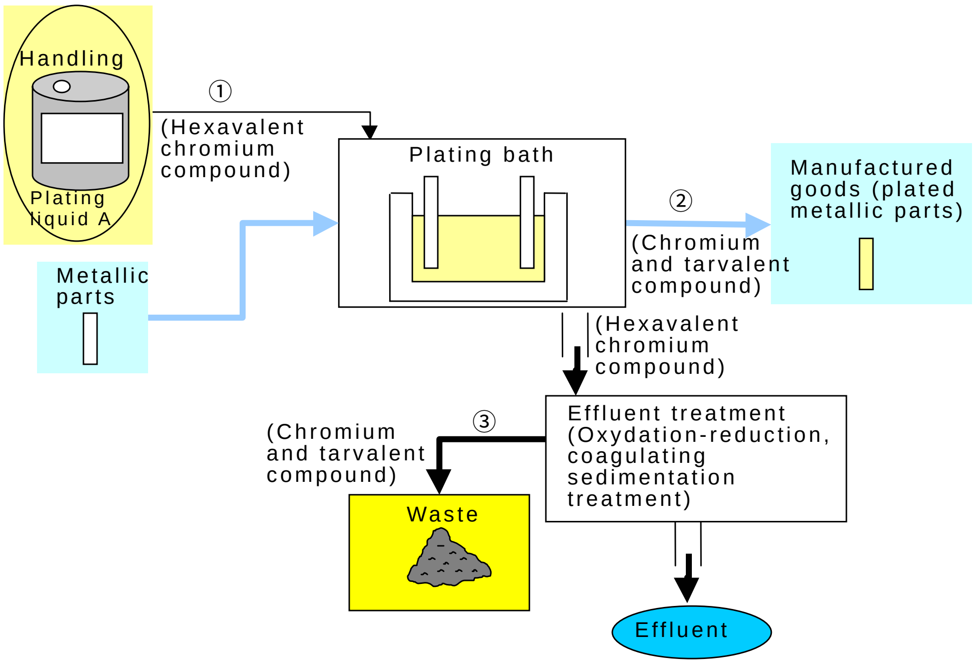

Fig.1-8-2 Outline of plating facility (2)

Follow the procedure based on mass balance described in Part I and Part II to calculate the release/transfer from the plating facility.

Step 1 Calculate the annual quantity of specified substance handled.

Step 1-1 Calculate the annual quantity of specified substance manufactured.

In the facility, chrome and tarvalent chromium compound are deposited on the plated object and generated in sludge through effluent treatment. The quantity is equal to that of hexavalent chromium compound in plating liquid. (Refer to Step 1-2 and Step 1-3 for calculating procedure.)

Annual quantity of chrome and tarvalent chromium compound manufactured = Annual quantity of hexavalent chromium compound used t/year

= 1.48t/year

Step 1-2 Calculate the annual quantity of plating liquid A.

Annual quantity of plating liquid A used t/year = Annual quantity of plating liquid A purchased 10.3t/year − Quantity of plating liquid A stored at the end of the fiscal year 0.96t + Quantity of plating liquid A stored at the beginning of the fiscal year 0.52t

= 9.86t/year

Step 1-3 Calculate the annual quantity of specified substance used.

Calculate the annual quantity of hexavalent chromium compound using the annual quantity of plating liquid A used and the content of hexavalent chromium compound in it as shown below.

Annual quantity of hexavalent chromium compound used t/year = Annual quantity of plating liquid A used 9.86t/year × Content of hexavalent chromium compound in plating liquid A 15% ÷ 100

= 1.48t/year

Since chrome and tarvalent chromium compound are not contained in raw material or material used, 0 is assumed as the annual quantity used.

Annual quantity of chrome and tarvalent chromium compound used t/year = 0t/year

Step 1-4 Calculate the annual quantity of specified substance handled.

Annual quantity of hexavalent chromium compound handled t/year = Annual quantity of hexavalent chromium compound manufactured 0t/year + Annual quantity of hexavalent chromium compound used 1.48t/year

= 1.48t/year ≧ Designated value of specified substance (Specific class 1 designated chemical substance) 0.5t/year

Annual quantity of chrome and tarvalent chromium compound handled t/year = Annual quantity of chrome and tarvalent chromium compound manufactured 1.48t/year + Annual quantity of chrome and tarvalent chromium compound used 0t/year

= 1.48t/year ≧ Designated value of specified substance (Class 1 designated chemical substance) 1t/year

Since the annual quantity of hexavalent chromium compound is larger than the quantity specified for specific class 1 designated chemical substance (0.5 t/year), and the annual quantity of tarvalent chromium compound handled is also larger than the specified quantity (1 t/year), they are designated as requiring notification.

Step 2 Calculate the quantity of specified substance released as manufactured goods.

Since hexavalent chromium compound is changed into tarvalent chroumium compound within the facility, the quantity released as manufactured goods is equal to the annual quantity of chrome and tarvalent chromium compound manufactured.

$$\text{Quantity of hexavalent chromium compound released as manufactured goods kg/year} = \text{Annual quantity of chrome and tarvalent chromium compound manufactured 1.48t/year} \times 1000\text{kg/t}$$

$$= \text{1480kg/year}$$

Since the quantity of chrome and tarvalent chromium compound released as manufactured goods is equal to the quantity deposited on the plated object, calculate the quantity using the current at the time of plating or electrochemical equivalence quantity as shown below.

$$\text{Quantity of chrome and tarvalent chromium compound released as manufactured goods t/year} = \text{Current 20A} \times \text{Plating time 0.5hour} \times \text{Electrochemical equivalent 0.323g/(A・hour)} \times \text{current efficiency 13\%} \times \text{Number of pieces plated 2500000 pieces}$$

$$\times\ 10^{-3}\ \text{kg/g} \div 100$$

$$= \text{1050kg/year}$$

Step 3 Calculate the quantity of specified substance in waste.

Since no waste containing hexavalent chromium compound is generated, 0 is assumed as the quantity of hexavalent chromium compound in waste.

$$\text{Quantity of hexavalent chromium compound in waste kg/year} = \text{0kg/year}$$

Since almost no chrome or tarvalent chromium compound is released to the environment, or sludge containing the substance is generated, calculate the quantity in sludge using mass balance as shown below.

Quantity of chrome and tarvalent chromium compound in waste kg/year = Annual quantity of chrome and tarvalent chromium compound handled 1.48t/year × 1000kg/t − Quantity of chrome and tarvalent chromium compound released as manufactured goods 1050kg/year

= 430kg/year

Step 4 Calculate the maximum potential release of specified substance to the environment.

Since the whole quantity of hexavalent chromium compound is assumed to be contained in manufactured goods, the quantity released as manufactured goods is equal to the quantity handled. (All the quantities released/transferred become 0. The subsequent procedure will be omitted.)

Maximum potential release of hexavalent chromium compound to the environment kg/year = Annual quantity of hexavalent chromium compound handled 1.48t/year × 1000kg/t − Quantity of hexavalent chromium compound released as manufactured goods 1480kg/year − Quantity of hexavalent chromium compound in waste 0kg/year

= 0kg/year

Since almost no chrome or tarvalent chromium compound is released to the environment, they are assumed to be released in manufactured goods and waste. (All the quantities released/transferred become 0. The subsequent procedure will be omitted.)

Maximum potential release of chrome and tarvalent chromium compound to the environment kg/year = Annual quantity of chrome and tarvalent chromium compound handled 1.48t/year × 1000kg/t − Quantity of chrome and tarvalent chromium compound released as manufactured goods 1050kg/year − Quantity of chrome and tarvalent chromium compound in waste 430kg/year

= 0kg/year

Step 5 Sum up the quantities of specified substance released or transferred.

Chrome and tarvalent chromium compound (unit; kg/year)

Classification for Calculation	Classification for Notification
	(Releases)
A Air emission; 0	a. Air emission; 0.0
B Release to water; 0	b. Surface water discharge; 0.0
C Land emission; 0	c. Land emission in the business establishment; 0.0
D Quantity in waste; 430	d. Landfills in the business establishment; 0.0
	(Transfers)
	e. Transfer to sewage; 0.0
	f. Off-site transfer in waste; 430

Hexavalent chromium compound (unit; kg/year)

Classification for Calculation	Classification for Notification
	(Releases)
A Air emission; 0	a. Air emission; 0.0
B Release to water; 0	b. Surface water discharge; 0.0
C Land emission; 0	c. Land emission in the business establishment; 0.0
D Quantity in waste; 0	d. Landfills in the business establishment; 0.0
	(Transfers)
	e. Transfer to sewage; 0.0
	f. Off-site transfer in waste; 0.0

1-9 Dyeing process

This is a process where dyes are infiltrated into fabrics or clothes for coloring, fabrics are soaked in fabric treatment agent to change the fabric quality (soften, etc.), and excessive dyes are washed away.

The release to the environment and off-site transfer in waste include the following.
- Volatilization of volatile fabric treatment agent to air
- Mixing of dyes into effluent
- Transfer of dyes as waste

If the effluent generated from the process is treated in effluent treatment facility by neutralization treatment etc., specified substance is transferred in waste generated (such as sludge).

[Examples of subject substances]

Pigment:	Aniline, phenylenediamine, diphenylamine, chrome and tervalent chromium compound, etc.
Textile treatment agent:	Hydrogen fluoride and water-soluble salt, xylene, etc.

[Example of calculation]

The following is an example of calculating the release/transfer from the dyeing facility described by Table 1-9 and Fig. 1-9.

Table 1-9 Outline of dyeing facility

Handling status of specified substance

① Outline of the work of handling specified substance

Description of plating	Coloring of fabrics (Refer to Fig. 1-9.) Quantity of effluent: 5m^3/day, 200 days/year Leakage to land: None
Exhaust gas treatment facility	None
Effluent treatment facility	Coagulating sedimentation treatment (Removal rate: 80%, Decomposition rate: 0%)
Effluent released to	***** river

(cont'd)

② Raw materials and materials containing specified substance handled

- Dye A

Annual quantity purchased	32.4 t/year
Stock at beginning of fiscal year	5.8 t
Stock at end of fiscal year	3.6 t
Content of specified substance listed in MSDS	<table><tr><th>Substance No.</th><th>Name of specified substance</th><th>Content</th></tr><tr><td>68</td><td>Chrome and tarvalent chromium compound</td><td>5.0%</td></tr></table>

③ Outline of the work of handling specified substance

Type of waste	Quantity	Content of specified substance	Waste treatment
Sludge	Not known	Not known	Delivered to industrial waste management contractor

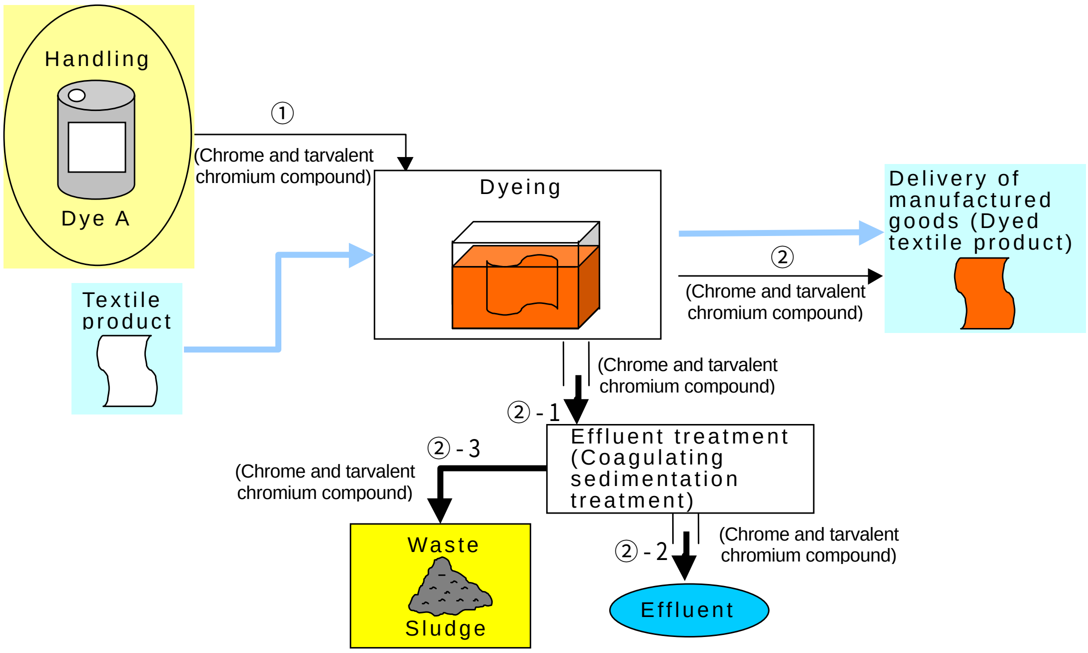

Fig. 1-9 Outline of dyeing facility

Follow the procedure based on mass balance described in Part I and Part II to calculate the release/transfer from the dyeing facility.

Step 1 Calculate the annual quantity of specified substance handled.

Step 1-1 Calculate the annual quantity of specified substance manufactured.

Since no specified substance is manufactured in the facility, 0 is assumed as the annual quantity of specified substance manufactured.

Annual quantity of specified substance manufactured t/year = 0 t/year

Step1-2 Calculate the annual quantity of dye A.

Annual quantity of dye A used t/year = Annual quantity of dye A purchased 32.4t/year − Quantity of dye A stored at the end of the fiscal year 3.6t + Quantity of dye A stored at the beginning of the fiscal year 5.8t

= 34.6t/year

Step 1-3 Calculate the annual quantity of specified substance used.

Annual quantity of chrome and tarvalent chromium compound used t/year = Annual quantity of dye A used 34.6t/year × Content of chrome and tarvalent chromium compound in dye A 5.0% ÷ 100

= 1.73t/year

Step 1-4 Calculate the annual quantity of specified substance handled.

Annual quantity of chrome and tarvalent chromium compound handled t/year = Annual quantity of chrome and tarvalent chromium compound manufactured 0t/year + Annual quantity of chrome and tarvalent chromium compound used 1.73t/year

= 1.73t/year ≧ Designated value of specified substance (Class 1 designated chemical substance) 1t/year

Since the annual quantity of chrome and tarvalent chromium compound handled is larger than the specified quantity (1t/year), they are designated as requiring notification.

Step 2 Calculate the quantity of specified substance released as manufactured goods.

Since it is known from experience that 90% of the dye is transferred to manufactured goods (textiles), make calculations using the value obtained through experience as shown below.

Quantity of chrome and tarvalent chromium compound released as manufactured goods kg/year

＝ Annual quantity of chrome and tarvalent chromium compound handled 1.73t/year

× 1000kg/t × Value obtained through experience 90% ÷ 100

＝ 1557kg/year

Step 3 Calculate the quantity of specified substance in waste.

Sludge containing chrome and tarvalent chromium compound is generated through effluent treatment in the facility. Calculate the quantity in sludge when calculating the release to water.
Since no waste containing chrome and tarvalent chromium compound other than the above is generated, 0 is assumed as the quantity in waste.

Quantity of chrome and tarvalent chromium compound in waste kg/year ＝ 0kg/year

Step 4 Calculate the maximum potential quantity of specified substance released to air.

Maximum potential release of chrome and tarvalent chromium compound to the environment kg/year

＝ Annual quantity of chrome and tarvalent chromium compound handled 1.73t/year

× 1000kg/t − Quantity of chrome and tarvalent chromium compound released as manufactured goods 1557kg/year

− Quantity of chrome and tarvalent chromium compound in waste 0kg/year

＝ 173kg/year

Step 5 Calculate the land emission of specified substance.

Since there is no leakage to land in the facility, 0 is assumed as the release to land.

Land emission of chrome and tarvalent chromium compound kg/year ＝ 0kg/year

Step 6 Judge to which medium, air or water, larger or smaller quantity is released.

Since chrome and tarvalent chromium compound have low volatility, almost no quantity is released to air. Therefore, it is assumed that larger quantity is released to water.

Step 7 Calculate the air emission of specified substance.

Since almost no chrome or tarvalent chromium compound is emitted to air, 0 is assumed as air emission.

$$\boxed{\text{Air emission of chrome and tarvalent chromium compound kg/year}} = \boxed{\text{0kg/year}}$$

Step 8 Calculate the release of specified substance to water.

Calculate the potential release to water using mass balance.

$$\boxed{\text{Potential release of chrome and tarvalent chromium compound to water kg/year}} = \boxed{\text{Maximum potential release of chrome and tarvalent chromium compound to the environment 173kg/year}} - \boxed{\text{Land emission of chrome and tarvalent chromium compound 0kg/year}} - \boxed{\text{Air emission of chrome and tarvalent chromium compound 0kg/year}}$$

$$= \boxed{\text{.173kg/year}}$$

Calculate the quantity of chrome and tarvalent chromium compound released to water after effluent treatment and the quantity of waste (sludge) generated through the treatment using the removal rate of coagulating sedimentation treatment.

$$\boxed{\text{Release of chrome and tarvalent chromium compound to water kg/year}} = \boxed{\text{Potential release of chrome and tarvalent chromium compound to water 173kg/year}} \times (100 - \boxed{\text{Removal rate of coagulating sedimentation treatment 80\%}}) \div 100$$

$$= \boxed{\text{34.6kg/year}}$$

$$\boxed{\text{Quantity of chrome and tarvalent chromium compound in waste (sludge) kg/year}} = \boxed{\text{Potential release of chrome and tarvalent chromium compound to water 173kg/year}} \times (\boxed{\text{Removal rate of coagulating sedimentation treatment 80\%}} - \boxed{\text{Decomposition rate of coagulating sedimentation treatment 0\%}}) \div 100$$

$$= \boxed{\text{138.4kg/year}}$$

Step 9 Sum up the quantities of specified substance released or transferred.

Chrome and tarvalent chromium compound (unit; kg/year)

Classification for Calculation	**Classification for Notification**
	(Releases)
A Air emission; 0 →	a. Air emission; 0.0
B Release to water; 34.6 →	b. Surface water discharge; 35
C Land emission; 0 →	c. Land emission in the business establishment; 0.0
D Quantity in waste; 138.4 ↘	d. Landfills in the business establishment; 0.0
	(Transfers)
	e. Transfer to sewage; 0.0
	f. Off-site transfer in waste; 140

1-10 Sterilizing and disinfecting process

This is a process where raw materials such as food and timber, and tools and equipment used in business establishment are sterilized or disinfected by spraying sterilizer or disinfectant or filling them into equipment.

The release into the environment and off-site transfer in waste include the following.

- Volatilization of specified substance in sterilizer or disinfectant into air and mixing into effluent
- Transfer as spent agent, etc.

If the effluent generated from the process is treated in effluent treatment facility by activated sludge method, waste (such as sludge) may be generated.

[Examples of subject substances]

Formaldehyde, bromomethane, ethylene oxide, etc.

[Example of calculation]

The following is an example of calculating the release/transfer from the sterilizing treatment facility described by Table 1-10 and Fig. 1-10.

Table 1-10 Outline of sterilizing treatment facility

① Outline of the work of handling specified substance

Description of sterilizing treatment	Sterilization of storage tank (sealing of sterilizing agent) (Refer to Fig. 1-10.)
Exhaust gas treatment facility	None
Effluent treatment facility	Activated sludge treatment (Removal rate: 60%, Decomposition rate: 0%)
Effluent released to	***** river

② Raw materials and materials containing specified substance handled

- Sterilizer A

Annual quantity purchased	4.3 t/year
Stock at beginning of fiscal year	0.24 t
Stock at end of fiscal year	0.37 t
Content of specified substance listed in MSDS	

Substance No.	**Name of specified substance**	**Content**
310	Formaldehyde	37%

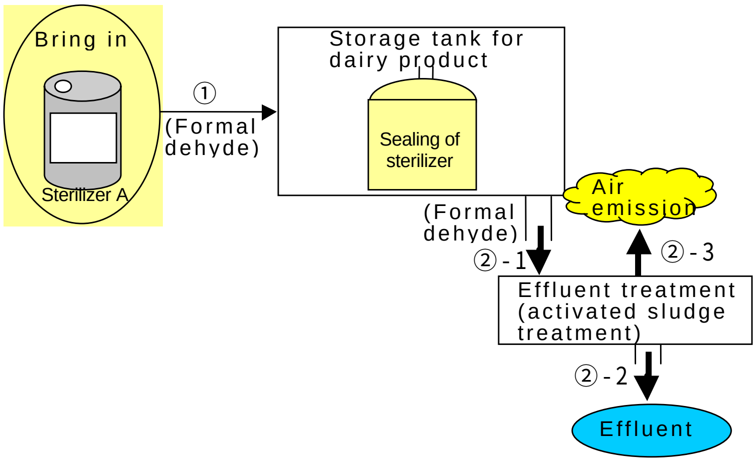

Fig. 1-10 Outline of sterilizing treatment

Follow the procedure based on mass balance described in Part I and Part II to calculate the release/transfer from the sterilizing facility.

Step 1 Calculate the annual quantity of specified substance handled.

Step 1-1 Calculate the annual quantity of specified substance manufactured.

Since no specified substance is manufactured in the facility, 0 is assumed as the annual quantity of specified substance manufactured.

Annual quantity of specified substance manufactured t/year = 0 t/year

Step 1-2 Calculate the annual quantity of sterilizer A.

Annual quantity of sterilizer A used t/year = Annual quantity of sterilizer A purchased 4.3t/year − Quantity of sterilizer A stored at the end of the fiscal year 0.37t + Quantity of sterilizer A stored at the beginning of the fiscal year 0.24t

= 4.17t/year

Step 1-3 Calculate the annual quantity of specified substance used.

Annual quantity of formaldehyde used t/year = Annual quantity of sterilizer A used 4.17t/year × Content of formaldehyde in sterilizer A 15% ÷ 100

= 1.54t/year

Step 1-4 Calculate the annual quantity of specified substance handled.

Annual quantity of formaldehyde handled t/year = Annual quantity of formaldehyde manufactured 0t/year + Annual quantity of formaldehyde used 1.54t/year

= 1.54t/year ≧ Designated value of specified substance (Class 1 designated chemical substance) 1t/year

Since the annual quantity of formaldehyde is larger than the specified quantity (1 t/year), it is designated as requiring notification.

Step 2 Calculate the quantity of specified substance released as manufactured goods.

Since no goods containing specified substance is manufactured in the process, 0 is assumed as the quantity released as manufactured goods.

Quantity of formaldehyde released as manufactured goods kg/year = 0kg/year

Step 3 Calculate the quantity of specified substance in waste.

Since no waste containing formaldehyde is generated in the process, 0 is assumed as the quantity in waste.

Quantity of formaldehyde in waste kg/year = 0kg/year

Step 4 Calculate the maximum potential release to the environment.

Maximum potential release of formaldehyde to the environment kg/year = Annual quantity of formaldehyde handled 1.54t/year × 1000kg/t − Quantity of formaldehyde released as manufactured goods 0kg/year − Quantity of formaldehyde in waste 0kg/year

= 1540kg/year

Step 5 Calculate the land emission of specified substance.

Since there is no leakage to land in the process, 0 is assumed as land emission.

Land emission of formaldehyde kg/year = 0kg/year

Step 6 Judge to which medium, air or water, larger or smaller quantity is released.

Since the processing is performed in enclosed state, it is assumed that no substance is released to air. Therefore, larger quantity is released to water.

Step 7 Calculate the air emission of specified substance.

Since no substance is released to air, 0 is assumed as air emission. Calculate the air emission that occurs in the process of activated sludge treatment by following Step 8.

Air emission of formaldehyde kg/year = 0kg/year

Step 8 Calculate the release of specified substance to water.

Calculate the release to water using mass balance.

Potential release of formaldehyde to water kg/year = Maximum potential release of formaldehyde to the environment 1540kg/year − Land emission of formaldehyde 0kg/year − Air emission of formaldehyde 0kg/year

= 1540kg/year

Calculate the release of formaldehyde to water after effluent treatment and the air emission by treatment using the removal rate of activated sludge treatment.

Release of formaldehyde to water kg/year = Potential release of formaldehyde to water 1540kg/year × (100 − Removal rate of activated sludge treatment 60%) ÷ 100

= 616kg/year

Air emission of formaldehyde by treatment kg/year = Potential release of formaldehyde to water 1540kg/year × (Removal rate of activated sludge treatment 60% − Decomposition rate of activated sludge treatment 0%) ÷ 100

= 924kg/year

Step 9 Sum up the quantities of specified substance released or transferred.

Formaldehyde (unit; kg/year)

Classification for Calculation	Classification for Notification
	(Releases)
A Air emission; 924 →	a. Air emission; 920
B Release to water; 616 →	b. Surface water discharge; 620
C Land emission; 0 →	c. Land emission in the business establishment; 0.0
D Quantity in waste; 0 →	d. Landfills in the business establishment; 0.0
	(Transfers)
	e. Transfer to sewage; 0.0
	f. Off-site transfer in waste; 0.0

1-11 Process of using other solvents

This is a process where solvents are used other than the processes described in 1-1 to 1-10, including the cases where pigments coated to parts or surface of products are peeled off by soaking in solvents, or the surface of metallic materials are etched.

The release to the environment and off-site transfer in waste include the following.
- Volatilization of specified substance in solvent to air and mixing into effluent
- Transfer as spent solvent, etc.

If exhaust gas or effluent generated from the process is treated in exhaust gas or effluent treatment facility by activated carbon adsorption method, etc, waste (such as spent carbon) may be generated.

[Examples of subject substances]

Dichloromethane, toluene, xylene, etc.

[Example of calculation]

The following is an example of calculating the release/transfer from the coating peel-off facility described by Table 1-11 and Fig. 1-11.

Table 1-11 Outline of peeling facility

Handling status of specified substance

① Outline of the work of handling specified substance

Description of peeling	Peeling of coating with solvent (Refer to Fig. 1-11.) Generation of effluent and leakage to land: None
Exhaust gas treatment facility	None

② Raw materials and materials containing specified substance handled

- Dye A

Annual quantity purchased	1.8 t/year
Stock at beginning of fiscal year	0.57 t
Stock at end of fiscal year	0.69 t
Content of specified substance listed in MSDS	Substance No.: 145 Name of specified substance: Dichloromethane Content: 99%

(cont’d)

③ Outline of the work of handling specified substance

Type of waste	Quantity generated	Content of specified substance	Waste treatment
Spent peeling solvent	1.5 t/year	Not known	Delivered to industrial waste management contractor

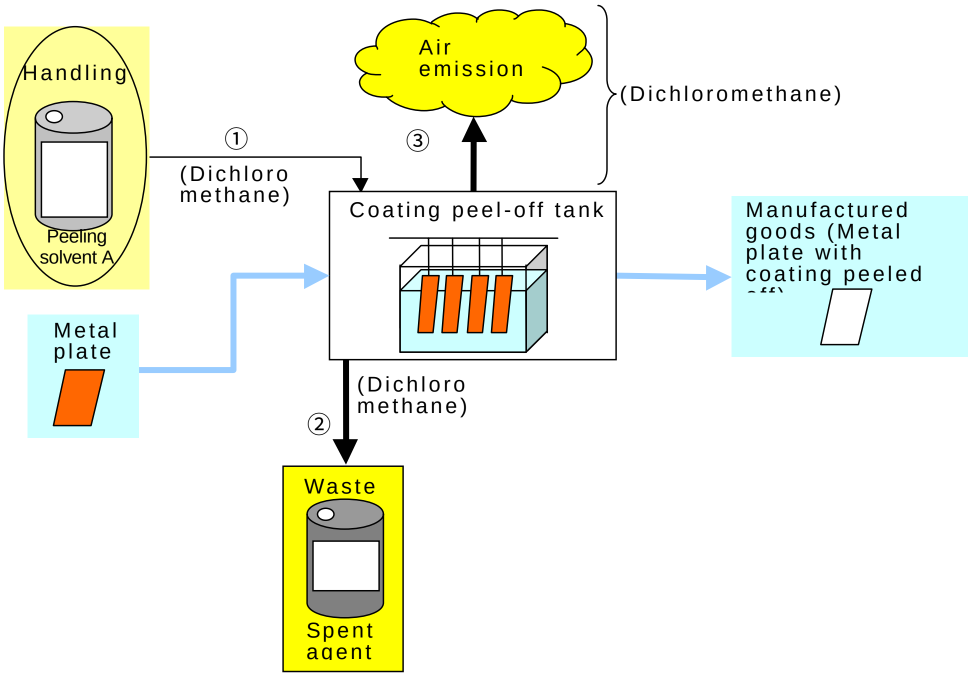

Fig. 1-11 Outline of peeling facility

Follow the procedure based on mass balance described in Part I and Part II to calculate the release/transfer from the peeling facility.

Step 1 Calculate the annual quantity of specified substance handled.

Step 1-1 Calculate the annual quantity of specified substance manufactured.

Since no specified substance is manufactured in the facility, 0 is assumed as the annual quantity of specified substance manufactured.

Annual quantity of specified substance manufactured t/year = 0 t/year

Step 1-2 Calculate the annual quantity of peeling solvent A used.

Annual quantity of peeling solvent A used t/year = Annual quantity of peeling solvent A purchased 1.8t/year − Quantity of peeling solvent A stored at the end of the fiscal year 0.69t + Quantity of peeling solvent A stored at the beginning of the fiscal year 0.57t

= 1.68t/year

Step 1-3 Calculate the annual quantity of specified substance used.

Annual quantity of dichloromethane used t/year = Annual quantity of peeling solvent A used 1.68t/year × Content of dichloromethane in peeling solvent A 99% ÷ 100

= 1.66t/year

Step 1-4 Calculate the annual quantity of specified substance handled.

Annual quantity of dichloromethane handled t/year = Annual quantity of dichloromethane manufactured 0t/year + Annual quantity of dichloromethane used 1.66t/year

= 1.66t/year ≧ Designated value of specified substance (Class 1 designated chemical substance) 1t/year

Since the annual quantity of dichloromethane handled is larger than the specified quantity (1 t/year), it is designated as requiring notification.

Step 2 Calculate the quantity of specified substance released as manufactured goods.

Since products containing specified substance are not manufactured in the facility, 0 is assumed as the quantity released as manufactured goods.

Quantity of dichloromethane released as manufactured goods kg/year = 0kg/year

Step 3 Calculate the quantity of specified substance in waste.

Waste solvent containing dichloromethane is generated in the facility. However, since the content is not known, make calculations using the content in the peeling solvent as shown below.

Quantity of dichloro methane in waste kg/year = Quantity of spent agent 1.5t/year × Content of dichloromethane in peeling solvent A 99% ÷100×1000kg/t

= 1485kg/year

Step 4 Calculate the maximum potential release of specified substance to the environment.

Maximum potential release of dichloromethane to the environment kg/year = Annual quantity of dichloro methane handled 1.66t/year ×1000kg/t − Quantity of dichloromethane released as manufactured goods 0kg/year − Quantity of dichloromethane in waste 1485kg/year

= 175kg/year

Step 5 Calculate the land emission of specified substance.

Since there is no leakage to land in the facility, 0 is assumed as land emission.

Land emission of dichloromethane kg/year = 0kg/year

Step 6 Judge to which medium, air or water, larger or smaller quantity is released.

Since the facility does not have contact with water, it is assumed that larger quantity is released to air.

Step 7 Calculate the release of specified substance to water.

Since no substance is released to water in the facility, 0 is assumed as the release to water.

Release of dichloromethane to water kg/year = 0kg/year

Step 8 Calculate the air emission of specified substance.

Calculate the air emission using mass balance.

Air emission of dichloromethane kg/year = Maximum potential release of dichloromethane to the environment 175kg/year − Land emission of dichloromethane 0kg/year − Release of dichloromethane to water 0kg/year

= 175kg/year

Step 9 Sum up the quantities of specified substance released or transferred.

Formaldehyde (unit; kg/year)

Classification for Calculation	Classification for Notification
	(Releases)
A Air emission; 175 →	a. Air emission; 180
B Release to water; 0 →	b. Surface water discharge; 0.0
C Land emission; 0 →	c. Land emission in the business establishment; 0.0
D Quantity in waste; 1485 ↘	d. Landfills in the business establishment; 0.0
	(Transfers)
	e. Transfer to sewage; 0.0
	f. Off-site transfer in waste; 1500