

Worksheet for Storage Process

Use this worksheet to calculate the quantity of specified substance released to the environment or that in waste in a storage process. Refer to the calculation example given in 1-1 Storage Process (pIII-4) of Part III of this manual.

I. Engineering calculations

Serial number	Raw material, manufactured goods, etc.		Properties of specified substance contained in raw materials, manufactured goods, etc.					Size of the storage tank, etc.				Calculation of air emission												
	Name of raw materials, manufactured goods, etc.	Annual quantity of raw materials or manufactured goods taken in m ³	Name of specified substance contained in 1A	Content of 1C in 1A %	Molecular mass of 1C g/mol	Vapor pressure of 1C Pa	Partial pressure of 1C in tank Pa	Internal diameter of the tank m	Tank volume kL	Tank height m	Average storage height m	Average annual outdoor temperature difference	Internal pressure of the tank Pa (Absolute pressure)	Color factor of the tank	Diameter factor of the tank	Breathing loss kg/year	Loss at acceptance kg/year	Potential air emission kg/year	Removal rate of exhaust gas treatment %	Decomposition rate of exhaust gas treatment %	Air emission kg/year	Name of waste generated by treatment	Classification of transfer of 1V	Quantity of 1V in waste kg/year
	1A	1B	1C	1D	1E	1F	1G 1	1H	1I	1J = 1I × 4 ÷ (1H ² × 3.14)	1K	1L	1M	1N	1O	1P 2	1Q 3	1R = 1P + 1Q	1S	1T	1U = 1R × (100 - 1S) ÷ 100	1V	1W	1X = 1R × (1S - 1T) ÷ 100
1	Solvent A	2,000	Toluene	40	92.1	3.75 × 10 ³	1.55 × 10 ³	10	500	6.4	3.2	5	9.81 × 10 ⁴	1.2	1.0	424	119	543	-	-	-	-	-	0
			Xylene	45	106.2	1.33 × 10 ³	5.32 × 10 ²	10	500	6.4	3.2	5	9.81 × 10 ⁴	1.2	1.0	234	47.2	281	-	-	-	-	-	0
			Benzene	15	78.1	13.3 × 10 ³	2.39 × 10 ³	10	500	6.4	3.2	5	9.81 × 10 ⁴	1.2	1.0	486	156	642	-	-	-	-	-	0

If not known, assume 1/2 of the height of the tank. If the storage height has been set, enter it.

White: 1.0
Silver: 1.2
Light brown/cream: 1.33
Others: 1.46

Internal diameter of the tank
5m or less: 0.3
More than 5m to less than 9m: 0.8
9m or more: 1.0

Sum up 1R when exhaust gas treatment is not performed and 1U when it is performed as "air emission."

Sum up "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.

1 $1G = 1F \times (1D/1E) / [(1D/1E) + (\text{Content of component a in 1A except for 1C} \%) / (\text{Molecular mass of component a in 1A except for 1C} \%) / (\text{Content of component b in 1A except for 1C} \%) / (\text{Molecular mass of component b in 1A except for 1C} \%)]$
 2 $1P = 0.3 \times 1E \times [1G \div (760 - 1G)]^{0.68} \times 1H^{1.73} \times (1J - 1K)^{0.51} \times 1L^{0.5} \times 1N \times 1O$
 3 $1Q = 0.041 \times 1E \times 1B \times (1G \div \times 1M)$

II. Emission Factors

Serial number	Raw material, manufactured goods, etc.		Properties of specified substance contained in raw materials, manufactured goods, etc.				Emission factor of specified substance			Calculation of air emission											
	Name of raw materials, manufactured goods, etc.	Annual quantity of raw materials or manufactured goods taken in, taken out, or oil absorption m ³ = kL	Name of specified substance in 2A	Content of 2C in 2A %	Vapor pressure of 2C Pa	Tank volume kL	Number of days used day	Emission factor of 2C (breathing loss)	Emission factor of 2C (acceptance loss)	Emission factor of 2C (delivery or fueling loss)	Breathing loss kg/year	Loss at acceptance kg/year	Delivery or fueling loss kg/year	Potential air emission kg/year	Removal rate of exhaust gas treatment %	Decomposition rate of exhaust gas treatment %	Air emission kg/year	Name of waste generated by treatment	Classification of transfer of 2R	Quantity of 2R in waste kg/year	
	2A	2B	2C	2D	2E	2F	2G	2H	2I	2J	2K = 2G × 2H	2L = 2B × 2I	2M = 2B × 2J	2N = 2K + 2L + 2M	2O	2P	2Q = 2N × (100 - 2O) ÷ 100	2R	2S	2T = 2N × (2O - 2P) ÷ 100	
1	Regular gasoline	Bring in: 1,500	Benzene	0.7	13.3 × 10 ³			-	0.0025759	0.0032437	-	3.86	4.61	8.5	-	-	-	-	-	-	0
		Fueled: 1,420	Toluene	9.1	3.75 × 10 ³			-	0.010754	0.0135421	-	16.13	19.23	35.4	-	-	-	-	-	-	0
			Xylene	6.1	1.33 × 10 ³			-	0.0020498	0.0025812	-	3.07	3.67	6.7	-	-	-	-	-	-	0
			Ethylbenzene	1.4	1.33 × 10 ³			-	0.0005316	0.0006694	-	0.80	0.95	1.7	-	-	-	-	-	-	0

Quantity taken in: Acceptance loss
Quantity taken out: Delivery loss
Fueled quantity: Fueling loss } Fill out

To calculate the release from filling station: Factor given in 4-3-3 a) in Part III (pIII-250)
To calculate the release of designated pure substance: Factor given in 4-3-2) in Part III (pIII-247) × 2E/420

Sum up 1R when exhaust gas treatment is not performed and 1U when it is performed as "air emission."

Sum up "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.

Sum up 3F when exhaust gas treatment is not performed and 3I when it is performed as "air emission."

Sum up as "off-site transfer in waste" or "landfill in the business establishment" per classification of transfer.

Mass Balance

Serial number	Raw material, manufactured goods, etc.			Specified substance in raw materials or manufactured goods		Calculation of air emission						
	Name of raw materials, manufactured goods, etc.	Annual quantity of raw materials or manufactured goods taken in kg/year	Annual quantity of raw materials or manufactured goods taken out kg/year	Name of specified substance in 3A	Content of 3D in 3A %	Potential air emission kg/year	Removal rate of exhaust gas treatment %	Decomposition rate of exhaust gas treatment %	Air emission kg/year	Name of waste generated by treatment	Classification of transfer of 3J	Quantity of 3J in waste kg/year
	3A	3B	3C	3D	3E	3F = (3B - 3C) × 3E ÷ 100	3G	3H	3I = 3F × (100 - 3G) ÷ 100	3J	3K	3L = 3F × (3G - 3H) ÷ 100
1	Thinner A	3,300	2,800	Xylene	45	230	-	-	-	-	-	0

Worksheet for Reaction and Mixing Process

Use this worksheet to calculate the quantity of raw materials or manufactured goods released to the environment and that in waste in reaction and mixing process. (Use one copy per substance.) Refer to the calculation example given in 1-2 Reaction and mixing process in Part III of this manual (p11-21).

When a new substance is manufactured with a specified substance used as a raw material, calculate the quantity consumed by reaction using reaction rate.

If the content of the specified substance in waste is not known, use the content of the substance in used raw material or in manufactured goods.

Name of specified substance and process where it is named			Calculation of annual quantity of specified substance handled					Calculation of the quantity of specified substance released as manufactured goods					Calculation of the quantity of specified substance in waste					Calculation of maximum potential discharge of specified substance to the environment		
Name of process where raw materials or materials containing the specified substance is handled	Name of specified substance contained in raw materials or materials handled in A	Name of individual substance in the case where material group name is entered in B	Name of raw materials or materials that contain B	Annual quantity of C handled	Content of B (B') in C	Conversion factor used for the conversion from B' to B	Annual quantity of B (B') contained in C handled	Annual quantity of B handled (Sum of G)	Name of manufactured goods that contain B manufactured in A	Quantity of I manufactured	Content of B (B') in I	Quantity of B in I released as manufactured goods	Sum of the quantity of B taken out as manufactured goods	Name of waste containing B generated in A	Quantity of N generated	Content of B (B') in N	Classification of transfer of N	Quantity of B in N	Sum of B in waste (Sum of R)	Maximum potential discharge of B to the environment
A	B	B'	C	D	E	F	G =D×E÷100	H (Sum of G)	I	J	K	L =J×K×F÷100	M (Sum of L)	N	O	P	Q	R =O×P×F÷100	S (Rの合計)	T =H-M-S
Mixing	Toluene		Raw materials of paint	10,000	100		10,000	10,000	Paint	45,000	20	9,000	9,000	-	-	-	-	0	0	1,000
																			Sum them up as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.	

Calculation of release to water

Judgment of the medium (air or water) to which smaller quantity is released

Enter the medium (air or water) to which smaller quantity is released.

Water

To calculate using solubility to water

Concentration of B in effluent	Quantity of effluent	Potential released to water
mg/L V	m ³ /year W	kg/year X
		=V × W ÷ 1000

Fill out if the substance is released to water by exhaust gas treatment (the same for the following columns)

Enter the actual measurement value if the concentration in effluent is measured.

kg/year X'

When effluent treatment is not performed

Release to water = X	
Release to water by exhaust gas treatment = X'	

Sum up X/X' when effluent treatment is not performed and AA/AA' when it is performed as "surface water discharge" or "transfer to sewage."

When effluent treatment is performed

Removal rate of effluent treatment	Decomposition rate of effluent treatment	Release to water after treatment	Quantity decomposed by treatment
% Y	% Z	kg/year AA	kg/year AB
		=X × (100-Y) ÷ 100	=X × Z ÷ 100
60	0	23	0
% Y'	% Z'	kg/year AA'	kg/year AB'

-1 When released to air by effluent treatment

Air emission by effluent treatment	
kg/year AC	
=X × (Y-Z) ÷ 100	
35	→ Fill out AH' ()

-2 When waste is generated by effluent treatment

Name of waste generated by effluent treatment	Quantity of B in AD	Classification of transfer of AD
AD	kg/year AE	AF
		=X × (Y-Z) ÷ 100
AD'	kg/year AE'	AF'

Sum up AE/AE' as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.

Calculation of air emission

Medium to which larger quantity is released

AG

Enter the medium to which larger quantity is released (air or water)

Air

Potential air emission kg/year AH *

942

kg/year AH'

35

Fill out when the substance is released to air by effluent treatment (the same for the following columns)

* Calculate "potential air emission AH" as follows by the method of "calculation of release to water."

:AH = T - X
-1: AH = T - AA - AB - AC
-2: AH = T - AA - AB - AE

When exhaust gas treatment is not performed

Release to air = AH	942
Air emission by effluent treatment = AH'	35

Sum up AH/AH' when exhaust gas treatment is not performed and AK/AK' when it is performed as "air emission."

When exhaust gas treatment is performed

Removal rate of exhaust gas treatment	Decomposition rate of exhaust gas treatment	Air emission after treatment	Quantity decomposed by treatment
% AI	% AJ	kg/year AK	kg/year AL
		=AH × (100-AI) ÷ 100	=AH × AJ ÷ 100
% AI'	% AJ'	kg/year AK'	kg/year AL'

-1 When released to water by exhaust gas treatment

Release to water by exhaust gas treatment	
kg/year AM	
=AH × (AI - AJ) ÷ 100	
	→ Fill out X' ()

-2 When waste is generated by exhaust gas treatment

Name of waste generated by waste gas treatment	Quantity of B in AN	Classification of transfer of AN
AN	kg/year AO	AP
		=AH × (AI - AJ) ÷ 100
AN'	kg/year AO'	AP'

Sum up AO/AO' as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.

Worksheet for Machining Process

Use this worksheet to calculate the quantity of additives released to the environment contained in cutting oil or in waste in machining processes. (Use one copy per substance).
 Refer to the calculation example given in 1-3 Machining process in Part III of this manual (pIII-42).

If the content of the specified substance in spent cutting fluid is not known, use the content in the cutting fluid.

Name of specified substance and process where it is handled		Calculation of annual quantity of specified substance handled						Calculation of the quantity of specified substance in waste					Calculation of maximum potential discharge of specified substance to the environment	
Name of process where raw materials or materials containing the specified substance is handled	Name of specified substance contained in raw materials or materials handled in A	Name of raw materials or materials that contain B	Annual quantity of C handled kg/year D	Content of B in C % E	Annual quantity of B contained in C handled kg/year F =D × E ÷ 100	Annual quantity of B handled kg/year G (Sum of	Sum of the quantity of B taken out as manufactured goods kg/year H	Name of waste containing B generated in A	Quantity of I generated kg/year J	Content of B in I % K	Classification of transfer of I L	Quantity of B in I kg/year M =J × K ÷ 100	Sum of B in waste kg/year N (Sum of M)	Maximum potential discharge of B to the environment kg/year O =G-N
Machining	Boron and its compound	Cutting oil	24,500	4.3	1,054	1,054	0	Spent cutting oil	20,000	4.3	Off-site transfer	860	860	194
													Sum them up as "off-site transfer in waste" or "landfills in the business establishment" by category of transfer.	

Calculation of air emission		Calculation of release to water		Calculation of release to water after treatment						
Judgment of the medium (air or water) to which smaller quantity is released P Enter the medium (air or water) to which smaller quantity is released.	air emission kg/year Q	Medium to which larger quantity is released R Enter the medium to which larger quantity is released (air or water)	Potential released to water kg/year S =O	Removal rate of effluent treatment % T	Decomposition rate of effluent treatment % U	Release to water after treatment kg/year V =S × (100 - T) ÷ 100	Quantity decomposed by treatment kg/year W =S × U ÷ 100	Name of waste generated by effluent treatment X	Quantity of B in X kg/year Y =S × (T - U) ÷ 100	Classification of transfer of X Z
Air	0	Water	194							
				<p>When effluent treatment is not performed</p> <p>Release to water = S 194</p> <p>Sum up S when effluent treatment is not performed and V when it is performed as "surface water discharge" or "transfer to sewage."</p> <p>When effluent treatment is performed</p> <p>Sum up as "off-site transfer in waste" or "landfills in the business establishment" by classification of transfer.</p>						

Worksheet for Washing Process

Use this worksheet to calculate the quantity of specified substance released to the environment contained in detergent or waste in washing process. (Use one copy per substance).
Refer to the calculation example given in 1-4 Washing process in Part III of this manual (p111-47).

If the content of the specified substance in spent detergent is not known, use the content in the detergent.
If waste is generated, make calculations using the difference between the weight of the waste including the detergent and that not including the detergent.

Name of specified substance and process where it is handled		Calculation of annual quantity of specified substance handled						Calculation of the quantity of specified substance released as manufactured goods	Calculation of the quantity of specified substance in waste					Calculation of maximum potential discharge of specified substance to the environment
Name of process where raw materials or materials containing the specified substance is	Name of specified substance contained in raw materials or materials handled in A	Name of raw materials or materials that contain B	Annual quantity of C handled	Content of B in C	Annual quantity of B contained in C handled	Annual quantity of B handled	Sum of the quantity of B taken out as manufactured goods	Name of waste containing B generated in A	Quantity of I generated	Content of B in I	Classification of transfer of I	Quantity of B in I	Sum of B in waste	Maximum potential discharge of B to the environment
A	B	C	kg/year D	% E	kg/year F =D × E ÷ 100	kg/year G (Sum of F)	kg/year H	I	kg/year J	% K	L	kg/year M =J × K ÷ 100	kg/year N (Sum of M)	kg/year O =G-N
Washing	Detergent	Trichloroethylene	2,800	100	2,800	2,800	0	Spent detergent	1,700	100	Off-site transfer	1,700	1,900	900
								Waste cloth	1,000	20	Off-site transfer	200	Sum them up as "off-site transfer in waste" or "landfills in the business establishment" by category of transfer.	

Calculation of release to water

Judgment of the medium (air or water) to which smaller quantity is released

Enter the medium (air or water) to which smaller quantity is released

Water	mg/L Q	m ³ /year R	kg/year S =Q × R ÷ 1000
	-	-	0

Fill out if the substance is released to water by exhaust gas treatment (the same for the following columns)

Enter the actual measurement value if the concentration in effluent is measured.

When effluent treatment is not performed

Release to water = S	0
Release to water by exhaust gas treatment = S'	

Sum up S/S' when effluent treatment is not performed and V/V' when it is performed as "surface water discharge" or "transfer to sewage."

When effluent treatment is performed

Removal rate of effluent treatment	Decomposition rate of effluent treatment	Release to water after treatment	Quantity decomposed by treatment
% T	% U	kg/year V =S × (100 - T) ÷ 100	kg/year W =S × U ÷ 100
% T'	% U'	kg/year V'	kg/year W'

Sum up Z/Z' as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.

-1 When released to air by effluent treatment

Air emission by effluent treatment	kg/year X
=S × (T - U) ÷ 100	
Fill out AC' ()	

-2 When waste is generated by effluent treatment

Name of waste generated by effluent treatment	Quantity of B in Y	Classification of transfer of Y
Y	kg/year Z =S × (T - U) ÷ 100	AA
Y'	kg/year Z'	AA'

Calculation of air emission

Medium to which larger quantity is released

Enter the medium to which larger quantity is released (air or water)

Air	Potential air emission kg/year AC*
900	900
kg/year AC'	

Fill out when the substance is released to air by effluent treatment (the same for the following columns)

* Calculate "potential air emission AH" as follows by the method of "calculation of release to water."

-1: AC = O - S
-2: AC = O - V - W - X

When exhaust gas treatment is not performed

Release to air = AC	900
Air emission by effluent treatment = AC'	

Sum up AC/AC' when exhaust gas treatment is not performed and AF/AF' when it is performed as "air emission."

When exhaust gas treatment is performed

Removal rate of exhaust gas treatment	Decomposition rate of exhaust gas treatment	Air emission after treatment	Quantity decomposed by treatment
% AD	% AE	kg/year AF =AC × (100 - AD) ÷ 100	kg/year AG =AC × AE ÷ 100
% AD'	% AE'	kg/year AF'	kg/year AG'

Sum up AJ/AJ' as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.

-2 When waste is generated by exhaust gas treatment

Name of waste generated by exhaust gas treatment	Quantity of B in AI	Classification of transfer of AI
AI	kg/year AJ =AC × (AD - AE) ÷ 100	AK
AI'	kg/year AJ'	AK'

Worksheet for Coating Process

Use this worksheet to calculate the quantity of volatile solvent released to the environment contained in paint or in waste in coating process. (Use one copy per substance.)
 Refer to the calculation example given in 1-5 Coating process in Part III of this manual (pIII-59).

Name of specified substance and process where it is handled		Calculation of annual quantity of specified substance handled					Calculation of the quantity of specified substance released as manufactured goods	Calculation of the quantity of specified substance in waste				Calculation of maximum potential discharge of specified substance to the environment		
Name of process where raw materials or materials containing the specified substance is	Name of specified substance contained in raw materials or materials handled in A	Name of raw materials or materials that contain B	Annual quantity of C handled	Content of B in C	Annual quantity of B contained in C handled	Annual quantity of B handled	Sum of the quantity of B taken out as manufactured goods	Name of waste containing B generated in A	Quantity of I generated	Content of B in I	Classification of transfer of I	Quantity of B in I	Sum of B in waste	Maximum potential discharge of B to the environment
A	B	C	kg/year D	% E	kg/year F =D × E ÷ 100	kg/year G (Sum of F)	kg/year H	I	kg/year J	% K	L	kg/year M =J × K ÷ 100	kg/year N (Sum of M)	kg/year O =G-N
Coating	Toluene	Paint A	15,140	50	7,570	7,570	0	Spent paint	200	50	Off-site transfer	100	100	7,470
													Sum them up as "off-site transfer in waste" or "landfills in the business establishment" by category of transfer.	

If the content of the specified substance in spent paint is not known, use the content in the paint.

Calculation of release to water

Judgment of the medium (air or water) to which smaller quantity is released

Enter the medium (air or water) to which smaller quantity is released

Water

To calculate using solubility to water

Concentration of B in effluent	Quantity of effluent	Potential released to water
mg/L Q	m ³ /year R	kg/year S =Q × R ÷ 1000
-	-	0
kg/year S'		

Fill out if the substance is released to water by exhaust gas treatment (the same for the following columns)

Enter the actual measurement value if the concentration in effluent is measured.

When effluent treatment is not performed

Release to water = S	0
Release to water by exhaust gas treatment = S'	

Sum up S/S' when effluent treatment is not performed and V/V' when it is performed as "surface water discharge" or "transfer to sewage."

When effluent treatment is performed

Removal rate of effluent treatment	Decomposition rate of effluent treatment	Release to water after treatment	Quantity decomposed by treatment
% T	% U	kg/year V =S × (100-T) ÷ 100	kg/year W =S × U ÷ 100
% T'	% U'	kg/year V'	kg/year W'

-1 When released to air by effluent treatment

Air emission by effluent treatment	
kg/year X =S × (T-U) ÷ 100	
Fill out AC' ()	

-2 When waste is generated by effluent treatment

Name of waste generated by effluent treatment	Quantity of B in Y	Classification of transfer of Y
Y	kg/year Z =S × (T-U) ÷ 100	AA
Y'	kg/year Z'	AA'

Sum up Z/Z' as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.

Calculation of air emission

Medium to which larger quantity is released

Enter the medium to which larger quantity is released (air or water)

Air

Potential air emission

kg/year AC *

7,470

kg/year AC'

Fill out when the substance is released to air by effluent treatment (the same for the following columns)

* Calculate "potential air emission AH" as follows by the method of "calculation of release to water."

:AC = O - S
 -1: AC = O - V - W - X
 -2: AC = O - V - W - Z

When exhaust gas treatment is not performed

Release to air = AC	7,470
Air emission by effluent treatment = AC'	

Sum up AC/AC' when exhaust gas treatment is not performed and AF/AF' when it is performed as "air emission."

When exhaust gas treatment is performed

Removal rate of exhaust gas treatment	Decomposition rate of exhaust gas treatment	Air emission after treatment	Quantity decomposed by treatment
% AD	% AE	kg/year AF =AC × (100-AD) ÷ 100	kg/year AG =AC × AE ÷ 100
% AD'	% AE'	kg/year AF'	kg/year AG'

-1 When released to water by exhaust gas treatment

Release to water by exhaust gas treatment	
kg/year AH =AC × (AD - AE) ÷ 100	
Fill out S' ()	

-2 When waste is generated by exhaust gas treatment

Name of waste generated by waste gas treatment	Quantity of B in AI	Classification of transfer of AI
AI	kg/year AJ =AC × (AD - AE) ÷ 100	AK
AI'	kg/year AJ'	AK'

Sum up AJ/AJ' as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.

Worksheet for Coating Process (pigment)

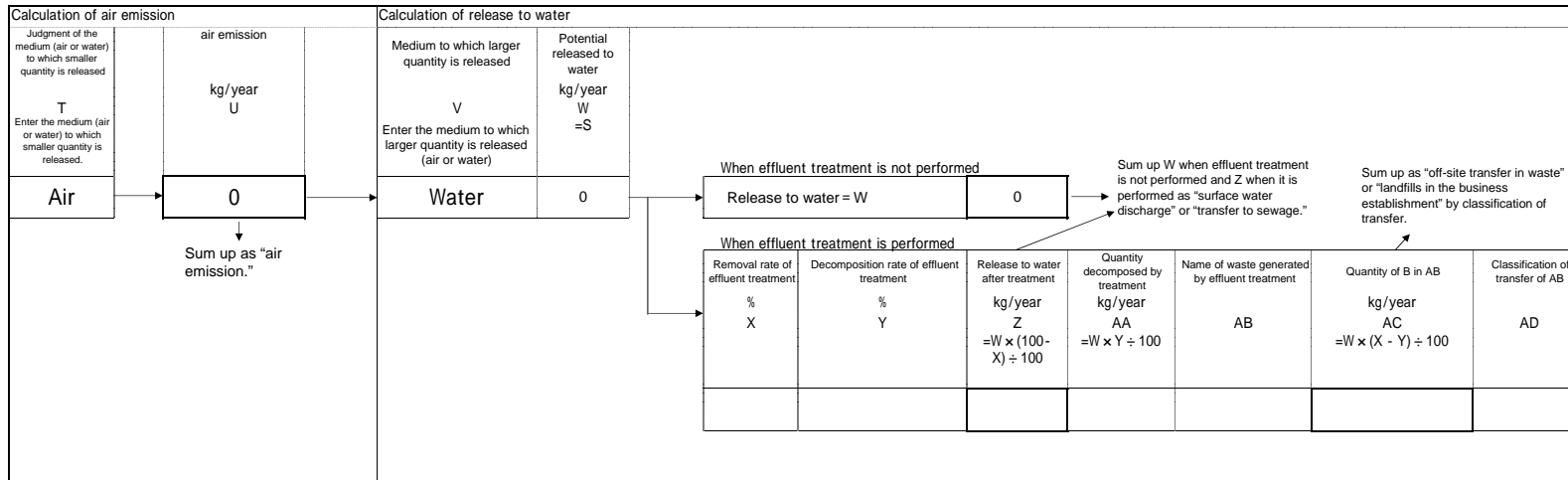
Use this worksheet to calculate the quantity of pigments such as metallic compounds released to the environment contained in paint or in waste in painting process. (Use one copy per substance.)
Refer to the calculation example in 1-5 Painting process in Part III of this manual (pIII-59).

If the content in manufactured goods is not known, make calculations using the following formulas.

- Painted area x painted film thickness x content of specified substance in painted film
- Adherence efficiency x Quantity of specified substance handled
(Refer to 4-3-4 in Part III of this manual (pIII-281)).

If the content of the specified substance in waste paint is not known, use the content in the paint.

Name of specified substance and process where it is handled			Calculation of annual quantity of specified substance handled					Calculation of the quantity of specified substance released as manufactured goods					Calculation of the quantity of specified substance in waste					Calculation of maximum potential discharge of specified substance to the environment	
Name of process where raw materials or materials containing the specified substance is handled	Name of specified substance contained in raw materials or materials handled in A	Name of individual substance in the case where material group name is entered in B	Name of raw materials or materials that contain B	Annual quantity of C handled kg/year D	Content of B in C % E	Annual quantity of B (B') contained in C handled kg/year F =D x E ÷ 100	Annual quantity of B handled kg/year G (Sum of F)	Name of manufactured goods that contain B manufactured in A	Quantity of H manufactured kg/year I	Content of B in H % J	Quantity of B in H released as manufactured goods kg/year K =I x J ÷ 100	Sum of the quantity of B taken out as manufactured goods kg/year L (Sum of K)	Name of waste containing B generated in A	Quantity of M generated kg/year N	Content of B in M % O	Classification of transfer of M P	Quantity of B in M kg/year Q =N x O ÷ 100	Sum of B in waste kg/year R (Sum of Q)	Maximum potential discharge of B to the environment kg/year S =G-L-R
Coating	Manganese and its compounds	Manganese carbonate	Paint A	15,140	20	3,028	3,028	Coating plate	3,028	60	1,817	1,817	Spent paint	3,028 - 1,817	Off-site transfer		1,211	1,211	0
									(Quantity of handled)	(Adherence efficiency)								Sum them up as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.	



Worksheet for Printing Process

Use this worksheet to calculate the quantity of volatile solvent released to the environment contained in printing ink or in waste in printing process. (Use one copy per substance.)
Refer to the calculation example given in 1-6 Printing process in Part III of this manual (p111-66).

If the content of the specified substance in spent ink is not known, use the content in the ink.

Name of specified substance and process where it is handled		Calculation of annual quantity of specified substance handled						Calculation of the quantity of specified substance in waste					Calculation of maximum potential discharge of specified substance to the environment	
Name of process where raw materials or materials containing the specified substance is handled	Name of specified substance contained in raw materials or materials handled in A	Name of raw materials or materials that contain B	Annual quantity of C handled	Content of B in C	Annual quantity of B contained in C handled	Annual quantity of B handled	Sum of the quantity of B taken out as manufactured goods	Name of waste containing B generated in A	Quantity of I generated	Content of B in I	Classification of transfer of I	Quantity of B in I	Sum of B in waste	Maximum potential discharge of B to the environment
A	B	C	kg/year D	% E	kg/year F = D × E ÷ 100	kg/year G (Sum of F)	kg/year H	I	kg/year J	% K	L	kg/year M = J × K ÷ 100	kg/year N (Sum of M)	kg/year O = G - N
Printing	Xylene	Ink A	8,800	40	3,520	3,520	0	Spent ink	250	40	Off-site transfer	100	100	3,420
													Sum them up as "off-site transfer in waste" or "landfills in the business establishment" by category of transfer.	

Calculation of release to water

Judgment of the medium (air or water) to which smaller quantity is released

Enter the medium (air or water) to which smaller quantity is released.

Water

To calculate using solubility to water

Concentration of B in effluent	Quantity of effluent	Potential released to water
mg/L Q	m ³ /year R	kg/year S = Q × R ÷ 1,000
-	-	0

Fill out if the substance is released to water by exhaust gas treatment (the same for the following columns)

Enter the actual measurement value if the concentration in effluent is measured.

When effluent treatment is not performed

Release to water = S	0
Release to water by exhaust gas treatment = S'	

Sum up S/S' when effluent treatment is not performed and V/V' when it is performed as "surface water discharge" or "transfer to sewage."

When effluent treatment is performed

Removal rate of effluent treatment	Decomposition rate of effluent treatment	Release to water after treatment	Quantity decomposed by treatment
% T	% U	kg/year V = S × (100 - T) ÷ 100	kg/year W = S × U ÷ 100
T'	U'	kg/year V'	kg/year W'

-1 When released to air by effluent treatment

Air emission by effluent treatment
kg/year X
= S × (T - U) ÷ 100
→ Fill out AC' ()

-2 When waste is generated by effluent treatment

Name of waste generated by effluent treatment	Quantity of B in Y	Classification of transfer of Y
Y	kg/year Z = S × (T - U) ÷ 100	AA
Y'	kg/year Z'	AA'

Sum up Z/Z' as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.

Calculation of air emission

Medium to which larger quantity is released

Enter the medium to which larger quantity is released (air or water)

Air

Potential air emission

kg/year AC *

kg/year AC'

Fill out when the substance is released to air by effluent treatment (the same for the following columns)

* Calculate "potential air emission AH" as follows by the method of "calculation of release to water."

: AC = O - S
-1: AC = O - V - W - X
-2: AC = O - V - W - Z

When exhaust gas treatment is not performed

Release to air = AC	
Air emission by effluent treatment = AC'	

Sum up AC/AC' when exhaust gas treatment is not performed and AF/AF' when it is performed as "air emission."

When exhaust gas treatment is performed

Removal rate of exhaust gas treatment	Decomposition rate of exhaust gas treatment	Air emission after treatment	Quantity decomposed by treatment
% AD	% AE	kg/year AF = AC × (100 - AD) ÷ 100	kg/year AG = AC × AE ÷ 100
80	0	684	0
AD'	AE'	kg/year AF'	kg/year AG'

-1 When released to water by exhaust gas treatment

Release to water by exhaust gas treatment
kg/year AH = AC × (AD - AE) ÷ 100
→ Fill out S' ()

-2 When waste is generated by exhaust gas treatment

Name of waste generated by waste gas treatment	Quantity of B in AI	Classification of transfer of AI
AI	kg/year AJ = AC × (AD - AE) ÷ 100	AK
Spent carbon	2,736	Off-site transfer
AI'	kg/year AJ'	AK'

Sum up AJ/AJ' as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.

Worksheet for Printing Process (pigment)

Use this worksheet to calculate the quantity of pigments such as metallic compounds released to the environment contained in printing ink or in waste in printing process. (Use one copy per substance.)
 Refer to the calculation example in 1-6 Printing process in Part III of this manual (pIII-66).

If the content in manufactured goods is not known, make calculations using mass balance.

If the content of the specified substance in spent printing ink is not known, use the content in the printing ink used.

Name of specified substance and process where it is handled			Calculation of annual quantity of specified substance handled					Calculation of the quantity of specified substance released as manufactured goods					Calculation of the quantity of specified substance in waste					Calculation of maximum potential discharge of specified substance to the environment	
Name of process where raw materials or materials containing the specified substance is handled A	Name of specified substance contained in raw materials or materials handled in A B	Name of individual substance in the case where material group name is entered in B B'	Name of raw materials or materials that contain B C	Annual quantity of C handled kg/year D	Content of B in C % E	Annual quantity of B (B') contained in C handled kg/year F =D × E ÷ 100	Annual quantity of B handled kg/year G (Sum of F)	Name of manufactured goods that contain B manufactured in A H	Quantity of H manufactured kg/year I	Content of B in H % J	Quantity of B in H released as manufactured goods kg/year K =I × J ÷ 100	Sum of the quantity of B taken out as manufactured goods kg/year L (Sum of K)	Name of waste containing B generated in A M	Quantity of M generated kg/year N	Content of B in M % O	Classification of transfer of M P	Quantity of B in M kg/year Q =N × O ÷ 100	Sum of B in waste kg/year R (Sum of Q)	Maximum potential discharge of B to the environment kg/year S =G-L-R
Printing	Lead and its compounds	Chrome yellow	Ink A	8,800	20	1,760	1,760	Printed paper	1,760	50	1,710	1,710	Spent ink	250	20	Off-site transfer	50	50	0
																		Sum them up as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.	

Calculation of air emission		Calculation of release to water															
Judgment of the medium (air or water) to which smaller quantity is released T Enter the medium (air or water) to which smaller quantity is released.	air emission kg/year U	Medium to which larger quantity is released V Enter the medium to which larger quantity is released (air or water)	Potential released to water kg/year W =S														
Air	0	Water	0														
Sum up as "air emission."		<p>When effluent treatment is not performed</p> <p>Release to water = W 0</p> <p>Sum up W when effluent treatment is not performed and Z when it is performed as "surface water discharge" or "transfer to sewage."</p> <p>Sum up as "off-site transfer in waste" or "landfills in the business establishment" by classification of transfer.</p> <p>When effluent treatment is performed</p> <table border="1"> <thead> <tr> <th>Removal rate of effluent treatment %</th> <th>Decomposition rate of effluent treatment %</th> <th>Release to water after treatment kg/year Z =W × (100 - X) ÷ 100</th> <th>Quantity decomposed by treatment kg/year AA =W × Y ÷ 100</th> <th>Name of waste generated by effluent treatment AB</th> <th>Quantity of B in AB kg/year AC =W × (X - Y) ÷ 100</th> <th>Classification of transfer of AB AD</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>Y</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Removal rate of effluent treatment %	Decomposition rate of effluent treatment %	Release to water after treatment kg/year Z =W × (100 - X) ÷ 100	Quantity decomposed by treatment kg/year AA =W × Y ÷ 100	Name of waste generated by effluent treatment AB	Quantity of B in AB kg/year AC =W × (X - Y) ÷ 100	Classification of transfer of AB AD	X	Y					
Removal rate of effluent treatment %	Decomposition rate of effluent treatment %	Release to water after treatment kg/year Z =W × (100 - X) ÷ 100	Quantity decomposed by treatment kg/year AA =W × Y ÷ 100	Name of waste generated by effluent treatment AB	Quantity of B in AB kg/year AC =W × (X - Y) ÷ 100	Classification of transfer of AB AD											
X	Y																

Worksheet for Adhesion Process

Use this worksheet to calculate the quantity of volatile solvent released to the environment contained in adhesive agent or in waste in adhesion process. (Use one copy per substance.)
Refer to the calculation example given in 1-7 Adhesion process in Part III of this manual (pIII-74).

If the content of the specified substance in spent adhesive agent is not known, use the content in the adhesive agent used.

Name of specified substance and process where it is handled		Calculation of annual quantity of specified substance handled						Calculation of the quantity of specified substance in waste				Calculation of maximum potential discharge of specified substance to the environment		
Name of process where raw materials or materials containing the specified substance is handled	Name of specified substance contained in raw materials or materials handled in A	Name of raw materials or materials that contain B	Annual quantity of C handled	Content of B in C	Annual quantity of B contained in C handled	Annual quantity of B handled	Sum of the quantity of B taken out as manufactured goods	Name of waste containing B generated in A	Quantity of I generated	Content of B in I	Classification of transfer of I	Quantity of B in I	Sum of B in waste	Maximum potential discharge of B to the environment
A	B	C	kg/year D	% E	kg/year F = D × E ÷ 100	kg/year G (Sum of F)	kg/year H	I	kg/year J	% K	L	kg/year M = J × K ÷ 100	kg/year N (Sum of M)	kg/year O = G - N
Adhesion	Toluene	Adhesive agent A	11,100	15	1,670	1,670	0	-	-	-	-	0	0	1,670
													Sum them up as "off-site transfer in waste" or "landfills in the business establishment" by category of transfer.	

Calculation of release to water

Judgment of the medium (air or water) to which smaller quantity is released

Enter the medium (air or water) to which smaller quantity is released.

Water

To calculate using solubility to water

Concentration of B in effluent	Quantity of effluent	Potential released to water
mg/L Q	m ³ /year R	kg/year S = Q × R ÷ 1000
-	-	0

Fill out if the substance is released to water by exhaust gas treatment (the same for the following columns)

kg/year S'

When concentration in effluent is measured

When effluent treatment is not performed

Release to water = S	0
Release to water by exhaust gas treatment = S'	

Sum up S/S' when effluent treatment is not performed and V/V' when it is performed as "surface water discharge" or "transfer to sewage."

When effluent treatment is performed

Removal rate of effluent treatment	Decomposition rate of effluent treatment	Release to water after treatment	Quantity decomposed by treatment
% T	% U	kg/year V = S × (100 - T) ÷ 100	kg/year W = S × U ÷ 100
% T'	% U'	kg/year V'	kg/year W'

-1 When released to air by effluent treatment

Air emission by effluent treatment	
kg/year X	
= S × (T - U) ÷ 100	
→ Fill out AC' ()	

-2 When waste is generated by effluent treatment

Name of waste generated by effluent treatment	Quantity of B in Y	Classification of transfer of Y
Y	kg/year Z = S × (T - U) ÷ 100	AA
Y'	kg/year Z'	AA'

Sum up Z/Z' as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.

Calculation of air emission

Medium to which larger quantity is released

Enter the medium to which larger quantity is released (air or water)

Air

Potential air emission

kg/year AC *

kg/year AC'

Fill out when the substance is released to air by effluent treatment (the same for the following columns)

* Calculate "potential air emission AH" as follows by the method of "calculation of release to water."

-1: AC = O - S
-2: AC = O - V - W - X

When exhaust gas treatment is not performed

Release to air = AC	1,670
Air emission by effluent treatment = AC'	

Sum up AC/AC' when exhaust gas treatment is not performed and AF/AF' when it is performed as "air emission."

When exhaust gas treatment is performed

Removal rate of exhaust gas treatment	Decomposition rate of exhaust gas treatment	Air emission after treatment	Quantity decomposed by treatment
% AD	% AE	kg/year AF = AC × (100 - AD) ÷ 100	kg/year AG = AC × AE ÷ 100
% AD'	% AE'	kg/year AF'	kg/year AG'

-1 When released to water by exhaust gas treatment

Release to water by exhaust gas treatment	
kg/year AH	
= AC × (AD - AE) ÷ 100	
→ Fill out S' ()	

-2 When waste is generated by exhaust gas treatment

Name of waste generated by waste gas treatment	Quantity of B in AI	Classification of transfer of AI
AI	kg/year AJ = AC × (AD - AE) ÷ 100	AK
AI'	kg/year AJ'	AK'

Sum up AJ/AJ' as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.

Worksheet for Adhesion Process (additives)

Use this worksheet to calculate the quantity of additives released to the environment contained in adhesives or in waste in adhesion process. (Use one copy per substance).
Refer to the calculation example given in 1-7 Adhesion process in Part III of this manual (pIII-74).

Use the formula "adhesion area" x "content in coated film."

If the content of the specified substance in spent adhesive is not know use the content in the adhesive used.

Name of specified substance and process where it is handled		Calculation of annual quantity of specified substance handled					Calculation of the quantity of specified substance released as manufactured goods			Calculation of the quantity of specified substance in waste					Calculation of maximum potential discharge of specified substance to the environment		
Name of process where raw materials of materials containing the specified substance is handled A	Name of specified substance contained in raw materials or materials handled in A B	Name of raw materials or materials that contain B C	Annual quantity of C handled kg/year D	Content of B in C % E	Annual quantity of B contained in C handled kg/year F =D x E ÷ 100	Annual quantity of B handled kg/year G (Sum of F)	Name of manufactured goods that contain B manufactured in A H	Method to calculate the quantity of specified substance released as manufactured goods I	Quantity of B in H released as manufactured goods kg/year J	Sum of the quantity of B taken out as manufactured goods kg/year K (Sum of J)	Name of waste containing B generated in A L	Quantity of L generated kg/year M	Content of B in L % N	Classification of transfer of L O	Quantity of B in L kg/year P =M x N ÷ 100	Sum of B in waste kg/year Q (Sum of P)	Maximum potential discharge of B to the environment kg/year R =G-K-Q
Adhesion	Bis phthalate (2-ethyl-hexyl)	Adhesive agent A	11,100	10	1,110	1,110	Plastic plates	$1,000 \times (100 - 3) \div 100$	1,077	1,077	Catt off chips	1,110 <small>(Quantity of handled)</small>	3 <small>(Cut off rate)</small>	Off-site transfer	33	33	0
																Sum them up as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.	

Calculation of air emission		Calculation of release to water																	
Judgment of the medium (air or water) to which smaller quantity is released S Enter the medium (air or water) to which smaller quantity is released.	air emission kg/year T	Medium to which larger quantity is released U Enter the medium to which larger quantity is released (air or water)	Potential released to water kg/year V =R																
Air	0 ↓ Sum up as "air emission."	Water	0	When effluent treatment is not performed Release to water = V 0 Sum up V when effluent treatment is not performed and Y when it is performed as "surface water discharge" or "transfer to sewage."															
				When effluent treatment is performed <table border="1"> <thead> <tr> <th>Removal rate of effluent treatment %</th> <th>Decomposition rate of effluent treatment %</th> <th>Release to water after treatment kg/year Y =V x (100 - W) ÷ 100</th> <th>Quantity decomposed by treatment kg/year Z =V x X ÷ 100</th> <th>Name of waste generated by effluent treatment AA</th> <th>Quantity of B in AA kg/year AB =V x (W - X) ÷ 100</th> <th>Classification of transfer of AA AC</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> Sum up as "off-site transfer in waste" or "landfills in the business establishment" by classification of transfer.		Removal rate of effluent treatment %	Decomposition rate of effluent treatment %	Release to water after treatment kg/year Y =V x (100 - W) ÷ 100	Quantity decomposed by treatment kg/year Z =V x X ÷ 100	Name of waste generated by effluent treatment AA	Quantity of B in AA kg/year AB =V x (W - X) ÷ 100	Classification of transfer of AA AC							
Removal rate of effluent treatment %	Decomposition rate of effluent treatment %	Release to water after treatment kg/year Y =V x (100 - W) ÷ 100	Quantity decomposed by treatment kg/year Z =V x X ÷ 100	Name of waste generated by effluent treatment AA	Quantity of B in AA kg/year AB =V x (W - X) ÷ 100	Classification of transfer of AA AC													

Worksheet for Plating Process

Use this worksheet to calculate the quantity of metallic compounds released to the environment contained in plating liquid or in waste in plating process. (Use one copy per substance.)
Refer to the calculation example in 1-8 Plating process in Part III of this manual (pIII-81).

If the content in manufactured goods is not known, make calculations using the following formulas.

- (1) Plating thickness × Plated area × Density of metallic compound
 - (2) Electric current × Duration of plating × Current efficiency
- (Refer to 4-3-5 in Part III of this manual (pIII-282)).

If the content of the specified substance in spent plating liquid is not known the content in the plating liquid used.

Name of specified substance and process where it is handled			Calculation of annual quantity of specified substance handled					Calculation of the quantity of specified substance released as manufactured goods				Calculation of the quantity of specified substance in waste					Calculation of maximum potential discharge of specified substance to the environment	
Name of process where raw materials or materials containing the specified substance is handled	Name of specified substance contained in raw materials or materials handled in A	Name of individual substance in the case where material group name is entered in B	Name of raw materials or materials that contain B	Annual quantity of C handled kg/year D	Content of B in C % E	Annual quantity of B contained in C handled kg/year F =D × E ÷ 100	Annual quantity of B handled kg/year G (Sum of F)	Name of manufactured goods that contain B manufactured in A	Method to calculate the quantity of specified substance released as manufactured goods	Quantity of B in H released as manufactured goods kg/year J	Sum of the quantity of B taken out as manufactured goods kg/year K (Sum of J)	Name of waste containing B generated in A	Quantity of L generated kg/year M	Content of B in L % N	Classification of transfer of L O	Quantity of B in L kg/year P =M × N ÷ 100	Sum of B in waste kg/year Q (Sum of P)	Maximum potential discharge of B to the environment kg/year R =G-K-Q
Plating	Nickel compound	Nickel sulfate	Plating liquid	9,920	7.0	694	3,360	Plated object	$0.05 \times 10^{-5} \times 600,000 \times 8,900$ (Area of plated material × average plating thickness × number of pieces plated × density of nickel)	2,670	2,670	Spent plating liquid	5,000	7	Off-site transfer	350	350	340
			Quantity of dissolved from electrode	$0.05 \times 10^{-5} \times 600,000 \times 8,900$ (Area of plated material × average plating thickness × number of pieces plated × density of nickel)		2,670											Sum them up as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.	

Calculation of air emission		Calculation of release to water		When effluent treatment is performed						
Judgment of the medium (air or water) to which smaller quantity is released	air emission kg/year T	Medium to which larger quantity is released	Potential released to water kg/year V =R	Removal rate of effluent treatment % W	Decomposition rate of effluent treatment % X	Release to water after treatment kg/year Y =V × (100 - W) ÷ 100	Quantity decomposed by treatment kg/year Z =V × X ÷ 100	Name of waste generated by effluent treatment AA	Quantity of B in AA kg/year AB =V × (W - X) ÷ 100	Classification of transfer of AA AC
S Enter the medium (air or water) to which smaller quantity is released. Air	0	Water	340	70	0	102	0	Sludge	238	Off-site transfer
	Sum up as "air emission."									
				When effluent treatment is not performed Release to water = V						
				Sum up V when effluent treatment is not performed and Y when it is performed as "surface water discharge" or "transfer to sewage." Sum up as "off-site transfer in waste" or "landfills in the business establishment" by classification of transfer.						

Worksheet for Dyeing Process (dyestuff)

Use this worksheet to calculate the quantity of metallic compounds released to the environment contained in dyestuff or in waste in dyeing process. (Use one copy per substance.)
Refer to the calculation example in 1-9 Dyeing process in Part III of this manual (pIII-95).

If the content in manufactured goods is not known, use the value obtained through experience.

If the content of the specified substance in spent dyestuff is not known, use the content in the dyestuff used.

Name of specified substance and process where it is handled			Calculation of annual quantity of specified substance handled					Calculation of the quantity of specified substance released as manufactured goods					Calculation of the quantity of specified substance in waste					Calculation of maximum potential discharge of specified substance to the environment	
Name of process where raw materials containing the specified substance is handled	Name of specified substance contained in raw materials or materials handled in A	Name of individual substance in the case where material group name is entered in B	Name of raw materials or materials that contain B	Annual quantity of C handled kg/year D	Content of B in C % E	Annual quantity of B (B') contained in C handled kg/year F =D × E ÷ 100	Annual quantity of B handled kg/year G (Sum of F)	Name of manufactured goods that contain B manufactured in A	Quantity of H manufactured kg/year I	Content of B in H % J	Quantity of B in H released as manufactured goods kg/year K =I × J ÷ 100	Sum of the quantity of B taken out as manufactured goods kg/year L (Sum of K)	Name of waste containing B generated in A	Quantity of M generated kg/year N	Content of B in M % O	Classification of transfer of M P	Quantity of B in M kg/year Q =N × O ÷ 100	Sum of B in waste kg/year R (Sum of Q)	Maximum potential discharge of B to the environment kg/year S =G-L-R
Dyeing	Chromium and tarvalent compound	Chrom oxide ()	Dye	34,600	5.0	1,730	1,730	Dyed textile	1,730	90	1,557	1,557	-	-	-	-	0	0	173
									(Quantity of handled)	(Value obtained through experience)								Sum them up as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.	

Calculation of air emission		Calculation of release to water	
Judgment of the medium (air or water) to which smaller quantity is released	air emission kg/year U	Medium to which larger quantity is released	Potential released to water kg/year W = S
T Enter the medium (air or water) to which smaller quantity is released.		V Enter the medium to which larger quantity is released (air or water)	
Air	0	Water	173
	Sum up as "air emission."		
		When effluent treatment is not performed	Release to water = W
		When effluent treatment is performed	
		Sum up W when effluent treatment is not performed and Z when it is performed as "surface water discharge" or "transfer to sewage."	
		Sum up as "off-site transfer in waste" or "landfills in the business establishment" by classification of transfer.	
		Removal rate of effluent treatment % X	Decomposition rate of effluent treatment % Y
		Release to water after treatment kg/year Z =W × (100 - X) ÷ 100	Quantity decomposed by treatment kg/year AA =W × Y ÷ 100
		Name of waste generated by effluent treatment AB	Quantity of B in AB kg/year AC =W × (X - Y) ÷ 100
		Classification of transfer of AB AD	
		80	0
		34.6	0
		Sludge	138.4
			Off-site transfer

Worksheet for Dyeing Process (fabric treatment agent)

Use this worksheet to calculate the quantity of specified substance released to the environment contained in fabric treatment agent or in waste in dyeing process. (Use one copy per substance.)
Refer to the calculation example in 1-9 Dyeing process in Part III of this manual (p111-95).

If the content in the manufactured goods is not known, use the value obtained through experience.

If the content of the specified substance in spent agent is not known, use the content in the fabric treatment agent used.

Name of specified substance and process where it is handled			Calculation of annual quantity of specified substance handled					対象物質の製造品としての搬出量の算出					Calculation of the quantity of specified substance in waste					Calculation of maximum potential discharge of specified substance to the environment	
Name or process where raw materials or materials containing the specified substance is handled	Name of specific substance contained in raw materials or materials handled in A	Name of individual substance in the case where material group name is entered in B	Name of raw materials or materials that contain B	Annual quantity of C handled	Content of B in C	Annual quantity of B (B) contained in C handled	Annual quantity of B handled	Name of manufactured goods that contain B manufactured in A	Quantity of H manufactured	Content of B in H	Quantity of B in H released as manufactured goods	Sum of the quantity of B taken out as manufactured goods	Name of waste containing B generated in A	Quantity of M generated	Content of B in M	Classification of transfer of M	Quantity of B in M	Sum of B in waste	Maximum potential discharge of B to the environment
A	B	B'	C	D	E	F =D × E ÷ 100	G (Sum of F)	H	I	J	K =I × J ÷ 100	L (Sum of K)	M	N	O	P	Q =N × O ÷ 100	R (Sum of Q)	S =G-L-R
Dyeing	Xylene		Detergent	2,000	60	1,200	1,200	-	-	-	0	0	-	-	-	-	0	0	1,200
																		Sum them up as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.	

Calculation of release to water

Judgment of the medium (air or water) to which smaller quantity is released

Enter the medium (air or water) to which smaller quantity is released

Water

To calculate using solubility to water

Concentration of B in effluent	Quantity of effluent	Potential released to water
mg/L	m ³ /year	kg/year
U	V	W =U × V ÷ 1,000
130	1,000	130

Fill out if the substance is released to water by exhaust gas treatment (the same for the following columns)

Enter the actual measurement value if the concentration in effluent is measured.

When effluent treatment is not performed

Release to water = W	130
Release to water by exhaust gas treatment = W'	

Sum up W/W' when effluent treatment is not performed and Z/Z' when it is performed as "surface water discharge" or "transfer to sewage."

When effluent treatment is performed

Removal rate of effluent treatment	Decomposition rate of effluent treatment	Release to water after treatment	Quantity decomposed by treatment
%	%	kg/year	kg/year
X	Y	Z =W × (100-X) ÷ 100	AA =W × Y ÷ 100
X'	Y'	Z'	AA'

-1 When released to air by effluent treatment

Air emission by effluent treatment	kg/year
AB	=W × (X-Y) ÷ 100
Fill out AG' ()	

-2 When waste is generated by effluent treatment

Name of waste generated by effluent treatment	Quantity of B in AC	Classification of transfer of AC
AC	kg/year	AE
	AD =W × (X-Y) ÷ 100	
AC'	kg/year	AE'
	AD'	

Sum up AD/AD' as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.

Calculation of air emission

Medium to which larger quantity is released

Air

Potential air emission kg/year

AG

1,070

kg/year

AG'

Fill out when the substance is released to air by effluent treatment (the same for the following columns)

* Calculate "potential air emission AH" as follows by the method of "calculation of release to water."

:AG = S - W
-1:AG = S - Z - AA - AB
-2:AG = S - Z - AA - AD

When exhaust gas treatment is not performed

Release to air = AG	1,070
Air emission by effluent treatment = AG'	

Sum up AG/AG' when exhaust gas treatment is not performed and AJ/AJ' when it is performed as "air emission."

When exhaust gas treatment is performed

Removal rate of exhaust gas treatment	Decomposition rate of exhaust gas treatment	Air emission after treatment	Quantity decomposed by treatment
%	%	kg/year	kg/year
AH	AI	AJ =AG × (100-AH) ÷ 100	AK =AG × AI ÷ 100
AH'	AI'	AJ'	AK'

-1 When released to water by exhaust gas treatment

Release to water by exhaust gas treatment	kg/year
AL	=AG × (AH - AI) ÷ 100
Fill out X' ()	

-2 When waste is generated by exhaust gas treatment

Name of waste generated by waste gas treatment	Quantity of B in AM	Classification of transfer of AM
AM	kg/year	AO
	AN =AG × (AH - AI) ÷ 100	
AM'	kg/year	AO'
	AN'	

Sum up AN/AN' as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.

Worksheet for Sterilizing and Disinfecting Process

Use this worksheet to calculate the quantity of specified substance released to the environment contained in sterilizing or disinfecting agent or in waste in sterilizing and disinfecting process. (Use one copy per substance.)
Refer to the calculation example in 1-10 Sterilizing or disinfecting process in Part III of this manual (p111-101).

If the content of the specified substance in spent liquid is not known, use the content in the sterilizing or disinfecting agent used.

Name of specified substance and process where it is handled		Calculation of annual quantity of specified substance handled						Calculation of the quantity of specified substance in waste				Calculation of maximum potential discharge of specified substance to the environment		
Name of process where raw materials or materials containing the specified substance is	Name of specified substance contained in raw materials or materials handled in A	Name of raw materials or materials that contain B	Annual quantity of C handled	Content of B in C	Annual quantity of B contained in C handled	Annual quantity of B handled	Sum of the quantity of B taken out as manufactured goods	Name of waste containing B generated in A	Quantity of I generated	Content of B in I	Classification of transfer of I	Quantity of B in I	Sum of B in waste	Maximum potential discharge of B to the environment
A	B	C	D	E	F =D × E ÷ 100	G (Sum of F)	H	I	J	K	L	M =J × K ÷ 100	N (Sum of M)	O =G-N
Sterilizing and Disinfecting	Formaldehyde	Sterilizer	4,170	37	1,540	1,540	0	-	-	-	-	0	0	1,540
													Sum them up as "off-site transfer in waste" or "landfills in the business establishment" by category of transfer.	

Calculation of release to water

Judgment of the medium (air or water) to which smaller quantity is released

Enter the medium (air or water) to which smaller quantity is released

Water

To calculate using solubility to water

Concentration of B in effluent	Quantity of effluent	Potential released to water
mg/L	m ³ /year	kg/year
Q	R	S
		=Q × R ÷ 1,000
		1,540
		kg/year S'

Fill out if the substance is released to water by exhaust gas treatment (the same for the following columns)

Enter the actual measurement value if the concentration in effluent is measured.

When effluent treatment is not performed

Release to water = S

Release to water by exhaust gas treatment = S'

Sum up S/S' when effluent treatment is not performed and V/V' when it is performed as "surface water discharge" or "transfer to sewage."

When effluent treatment is performed

Removal rate of effluent treatment	Decomposition rate of effluent treatment	Release to water after treatment	Quantity decomposed by treatment
%	%	kg/year	kg/year
T	U	V	W
		=S	=S × U ÷ 100
		× (100 - T) ÷ 100	
60	0	616	0
T'	U'	V'	W'

-1 When released to air by effluent treatment

Air emission by effluent treatment

kg/year X

=S × (T - U) ÷ 100

924 → Fill out AC'

-2 When waste is generated by effluent treatment

Name of waste generated by effluent treatment	Quantity of B in Y	Classification of transfer of Y
	kg/year	
Z	=S × (T - U) ÷ 100	AA
Y'	kg/year Z'	AA'

Sum up Z/Z' as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.

Calculation of air emission

Medium to which larger quantity is released

Enter the medium (air or water)

Air

Potential air emission

kg/year AC*

0

kg/year AC'

924

Fill out when the substance is released to air by effluent treatment (the same for the following columns)

* Calculate "potential air emission AH" as follows by the method of "calculation of release to water."

:AC = O - S

-1:AC = O - V - W - X

-2:AC = O - V - W - Z

When exhaust gas treatment is not performed

Release to air = AC

0

Air emission by effluent treatment = AC'

924

Sum up AC/AC' when exhaust gas treatment is not performed and AF/AF' when it is performed as "air emission."

When exhaust gas treatment is performed

Removal rate of exhaust gas treatment	Decomposition rate of exhaust gas treatment	Air emission after treatment	Quantity decomposed by treatment
%	%	kg/year	kg/year
AD	AE	AF	AG
		=AC × (100 - AD) ÷ 100	=AC × AE ÷ 100
			00
AD'	AE'	kg/year AF'	kg/year AG'

-1 When released to water by exhaust gas treatment

Release to water by exhaust gas treatment

kg/year AH

=AC × (AD - AE) ÷ 100

→ Fill out S' ()

-2 When waste is generated by exhaust gas treatment

Name of waste generated by waste gas treatment	Quantity of B in AI	Classification of transfer of AI
	kg/year	
AJ	AI	AK
		=AC × (AD - AE) ÷ 100
AJ'	kg/year AJ'	AK'

Sum up AJ/AJ' as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.

Worksheet for the Process Using Other Solvents

Use this worksheet to calculate the quantity of specified substance released to the environment contained in other solvents or in waste in the process using other solvents. (Use one copy per substance.)
 Refer to the calculation example in 1-11 Process using other solvents in Part III of this manual (pIII-106).

If the content of the specified substance in spent solvent is not known, use the content in the solvent used.

Name of specified substance and process where it is handled		Calculation of annual quantity of specified substance handled						Calculation of the quantity of specified substance in waste					Calculation of maximum potential discharge of specified substance to the environment	
Name of process where raw materials of materials containing the specified substance is handled	Name of specified substance contained in raw materials or materials handled in A	Name of raw materials or materials that contain B	Annual quantity of C handled	Content of B in C	Annual quantity of B contained in C handled	Annual quantity of B handled	Sum of the quantity of B taken out as manufactured goods	Name of waste containing B generated in A	Quantity of I generated	Content of B in I	Classification of transfer of I	Quantity of B in I	Sum of B in waste	Maximum potential discharge of B to the environment
A	B	C	kg/year D	% E	kg/year F =D × E ÷ 100	kg/year G (Sum of F)	kg/year H	I	kg/year J	% K	L	kg/year M =J × K ÷ 100	kg/year N (Sum of M)	kg/year O =G-N
Coating peel off	Dichloromethane	Peeling solvent A	1,680	99	1,660	1,660	0	Spent agent	1,500	99	Off-site transfer	1,485	1,485	175
													Sum them up as "off-site transfer in waste" or "landfills in the business establishment" by category of transfer.	

Calculation of release to water

Judgment of the medium (air or water) to which smaller quantity is released: **Water**

Enter the medium (air or water) to which smaller quantity is released: **Water**

Fill out if the substance is released to water by exhaust gas treatment (the same for the following columns)

Enter the actual measurement value if the concentration in effluent is measured.

To calculate using solubility to water		
Concentration of B in effluent	Quantity of effluent	Potential released to water
mg/L Q	m ³ /year R	kg/year S =Q × R ÷ 1000
-	-	0
kg/year S'		

When effluent treatment is not performed			
Release to water = S	0		
Release to water by exhaust gas treatment = S'			

Sum up S/S' when effluent treatment is not performed and V/V' when it is performed as "surface water discharge" or "transfer to sewage."

When effluent treatment is performed			
Removal rate of effluent treatment	Decomposition rate of effluent treatment	Release to water after treatment	Quantity decomposed by treatment
% T	% U	kg/year V =S × (100-T) ÷ 100	kg/year W =S × U ÷ 100
% T'	% U'	kg/year V'	kg/year W'

-1 When released to air by effluent treatment

Air emission by effluent treatment	kg/year X =S × (T-U) ÷ 100
Fill out AC' ()	

-2 When waste is generated by effluent treatment

Name of waste generated by effluent treatment	Quantity of B in Y	Classification of transfer of Y
Y	kg/year Z =S × (T-U) ÷ 100	AA
Y'	kg/year Z'	AA'

Sum up Z/Z' as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.

Calculation of air emission

Medium to which larger quantity is released: **Air**

Potential air emission kg/year AC *

Enter the medium to which larger quantity is released (air or water): **Air**

175

kg/year AC'

Fill out when the substance is released to air by effluent treatment (the same for the following columns)

* Calculate "potential air emission AH" as follows by the method of "calculation of release to water."
 :AC = O - S
 -1 : AC = O - V - W - X
 -2 : AC = O - V - W - Z

When exhaust gas treatment is not performed	
Release to air = AC	175
Air emission by effluent treatment = AC'	

Sum up AC/AC' when exhaust gas treatment is not performed and AF/AF' when it is performed as "air emission."

When exhaust gas treatment is performed			
Removal rate of exhaust gas treatment	Decomposition rate of exhaust gas treatment	Air emission after treatment	Quantity decomposed by treatment
% AD	% AE	kg/year AF =AC × (100-AD) ÷ 100	kg/year AG =AC × AE ÷ 100
% AD'	% AE'	kg/year AF'	kg/year AG'

-1 When released to water by exhaust gas treatment

Release to water by exhaust gas treatment	kg/year AH =AC × (AD - AE) ÷ 100
Fill out S' ()	

-2 When waste is generated by exhaust gas treatment

Name of waste generated by waste gas treatment	Quantity of B in AI	Classification of transfer of AI
AI	kg/year AJ =AC × (AD - AE) ÷ 100	AK
AI'	kg/year AJ'	AK'

Sum up AJ/AJ' as "Off-site transfer in waste" or "Landfills in the business establishment" by category of transfer.