Chapter 2 Results of the Detailed Environmental Survey in FY2024

1. Purpose of the survey

The Detailed Environmental Survey is implemented to provide as required under the Law Concerning the Examination and Regulation of Manufacture, etc. of Chemical Substances (Law 117, 1973) (hereafter, the Chemical Substances Control Law), the data and details required for risk assessments et al. of chemical substances prioritized for evaluations. This compiled material is intended to allow for nationwide assessments of exposure in the general environment.

2. Target chemicals

In the FY2024 Detailed Environmental Survey, 4 chemicals (groups) that were selected and designated as target chemicals. The combinations of target chemicals and the surveyed media are given below.

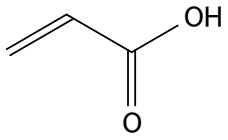
No.	Name	The Chemical Substances Control Law *1		The PRTR Law *2, 3			Surveyed media		
		Before the revision	After the revision	2000-	2008-	2021-	Surface water	Sedi-ment	Air
[1]	Acrylic acid and its esters								
	[1-1] Acrylic acid		Priority Assessment Chemical Substances	I 3	I 4	I 6	○		○
	[1-2] Methyl acrylate	II Monitored	Priority Assessment Chemical Substances	I 6	I 8	I 10	○		
	[1-3] Eethyl acrylate	II Monitored	Priority Assessment Chemical Substances	I 4	I 3	I 4	○		
	[1-4] Butyl acrylate	III Monitored			I 7	I 9	○		
	[1-5] Isobutyl acrylate						○		
	[1-6] *tert*-Butyl acrylate						○		
	[1-7] Octyl acrylate						○		
	[1-8] Isooctyl acrylates						○		
	[1-8-1] 2-Ethylhexyl acrylate					I 5	○		
	[1-9] Isononyl acrylates						○		
	[1-10] Decyl acrylate						○		
	[1-11] Dodecyl acrylate						○		
	[1-12] Octadecyl acrylate						○		
[2]	Alkanols (The alkyl group is linear with 10 - 16 carbon atoms.)		Priority Assessment Chemical Substances						
	[2-1] 1-Decanol				I 257	I 34		○	
	[2-2] 1-Undecanol							○	
	[2-3] 1-Dodecanol				I 273	I 315		○	
	[2-4] 1-Tridecanol							○	
	[2-5] 1-Tetradecanol							○	
	[2-6] 1-Pentadecanol							○	
	[2-7] 1-Hexadecanol							○	
[3]	Alkyl sulfates (The alkyl group has 8, 9, 10, 12, 14, 16 or 18 carbon atoms.) and those salts								
	[3-1] Octyl sulfate and its salts						○		
	[3-2] Nonyl sulfate and its salts						○		
	[3-3] Decyl sulfate and its salts						○		
	[3-4] Dodecyl sulfate and its salts				I 275	I 318	○		
	[3-5] Tetradecyl sulfate and its salts						○		
	[3-6] Hexadecyl sulfate and its salts						○		
	[3-7] Octadecyl sulfate and its salts						○		
[4]	*N*,*N*,*N*-Trimethyldodecan-1-aminium salts		Priority Assessment Chemical Substances			I 341	○		

(Note 1) “Before the revision” in “The Chemical Substances Control Law” means designation before the May 20, 2009 revison of tha low (enforced April 1, 2011), and “After the revision” means designation after the law revison.
(Note 2) “The PRTR Law” hereafter means “Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (Law No. 86 of 1999).”
(Note 3) “2000-” in the “The PRTR Law” means designation at the time of enactment of government ordinance of tha low on June 7, 2000, "2008-" means the designation after the revision of the government ordinance on November 21, 2008, and "2021-" means the designation after the revision of the government ordinance on October 20, 2021.

Chemical and physical properties of target chemicals of the Detailed Environmental Survey are as follows.

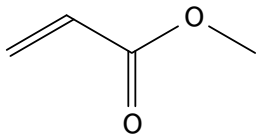
[1] Acrylic acid and its esters

[1-1] Acrylic acid



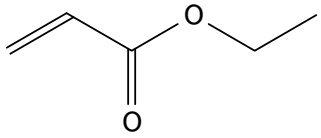
Molecular formula:	$C_3H_4O_2$
CAS:	79-10-7
ENCS:	2-984
MW:	72.06
mp:	14°C [1)]
bp:	141°C (101.3 kPa) [2)]
sw:	Miscible [1)]
Specific gravities:	1.0621 (16°C/4°C) [1)]
logPow:	0.46 (25°C) [2)]

[1-2] Methyl acrylate



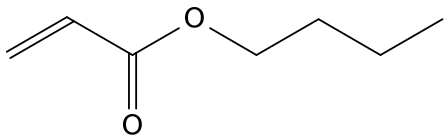
Molecular formula:	$C_4H_6O_2$
CAS:	96-33-3
ENCS:	2-987
MW:	86.09
mp:	-76.5°C [3)]
bp:	80.5°C [3)]
sw:	49.4 g/L (25°C) [3)]
Specific gravities:	0.9561 (20°C/4°C) [3)]
logPow:	0.739 (25°C) [2)]

[1-3] Ethyl acrylate



Molecular formula:	$C_5H_8O_2$
CAS:	140-88-5
ENCS:	2-988
MW:	100.12
mp:	-71.2°C [2)]
bp:	99.8°C (101.3 kPa) [2)]
sw:	20 g/L (20°C) [4)]
Specific gravities:	0.9234 g/cm^3 (20°C) [5)]
logPow:	1.18 (25°C) [2)]

[1-4] Butyl acrylate

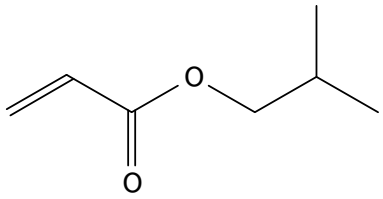


Molecular formula:	$C_7H_{12}O_2$
CAS:	141-32-2
ENCS:	2-989 [*1]
MW:	128.17
mp:	-64.6°C [4)]
bp:	138 ~ 148°C (760 mmHg) [5)]
sw:	1.7 g/L (20°C) [2)]
Specific gravities:	0.8898 g/cm^3 (20°C) [5)]
logPow:	2.38 (25°C) [2)]

(Note 1) Alkyl acrylate (The alkyl group has 3 or 4 carbon atoms)

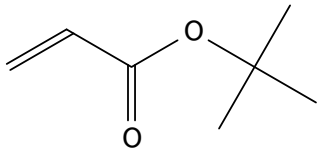
(Abbreviations) CAS CAS registry number, ENCS registry number in the Existing and New Chemical Substances List, MW molecular weight, mp melting point, bp boiling point, SW solubility in water, Specific gravities Specific gravity(no unit) or density, logPow octanol-water partition coefficient, kPa kilopascal (1 atom approximately equal to 101.3kPa).

[1-5] Isobutyl acrylate



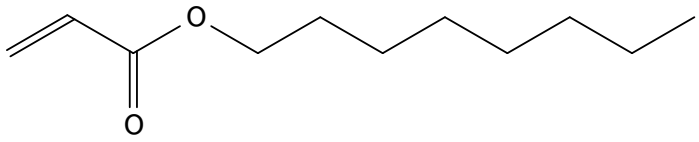
Molecular formula:	$C_7H_{12}O_2$
CAS:	106-63-8
ENCS:	2-989 *1
MW:	128.17
mp:	-61°C 2)
bp:	137.8°C (101.3 kPa) 2)
sw:	1.8 g/L (25°C) 2)
Specific gravities:	08896 (20°C/4°C) 2)
logPow:	2.38 (25°C) 2)

[1-6] *tert*-Butyl acrylate



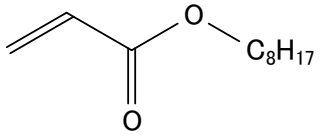
Molecular formula:	$C_7H_{12}O_2$
CAS:	1663-39-4
ENCS:	2-989 *1
MW:	128.17
mp:	-69°C 2)
bp:	119.2°C (101.3 kPa) 2)
sw:	2.01 g/L (25°C) 2)
Specific gravities:	0.89 g/cm^3 (10°C), 0.87 g/cm^3 (30°C) 2)
logPow:	2.32 (25°C) 2)

[1-7] Octyl acrylate



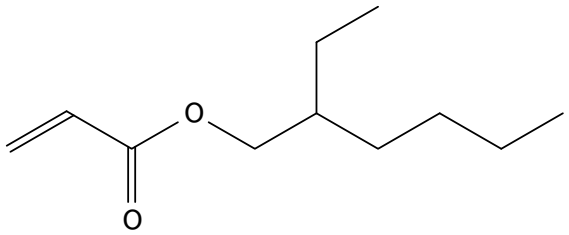
Molecular formula:	$C_{11}H_{20}O_2$
CAS:	2499-59-4
ENCS:	2-990 *2
MW:	184.28
mp:	Uncertain
bp:	Uncertain
sw:	Uncertain
Specific gravities:	Uncertain
logPow:	Uncertain

[1-8] Isooctyl acrylates



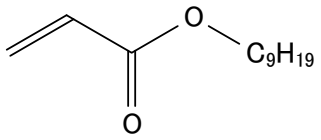
Molecular formula:	$C_{11}H_{20}O_2$
CAS:	29590-42-9
ENCS:	2-990 *2
MW:	184.28
mp:	<-90°C (100.4 kPa) 2)
bp:	196.8 (761.8 mmHg) 2)
sw:	12.44 mg/L (23.1°C) 2)
Specific gravities:	0.885 g/cm^3 (20°C) 2)
logPow:	4.5 ~ 4.7 (25°C) 2)

[1-8-1] 2-Ethylhexyl acrylate



Molecular formula:	$C_{11}H_{20}O_2$
CAS:	103-11-7
ENCS:	2-990 *2
MW:	184.28
mp:	-90°C 2)
bp:	215°C (101.3 kPa) 2)
sw:	9.6 mg/L (25°C) 2)
Specific gravities:	0.88 (20°C) 2)
logPow:	4.64 (25°C) 2)

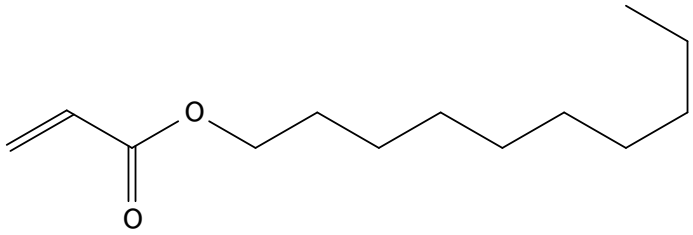
[1-9] Isononyl acrylates



Molecular formula:	$C_{12}H_{22}O_2$
CAS:	51952-49-9
ENCS:	2-990 *2
MW:	198.30
mp:	Uncertain
bp:	Uncertain
sw:	Uncertain
Specific gravities:	Uncertain
logPow:	Uncertain

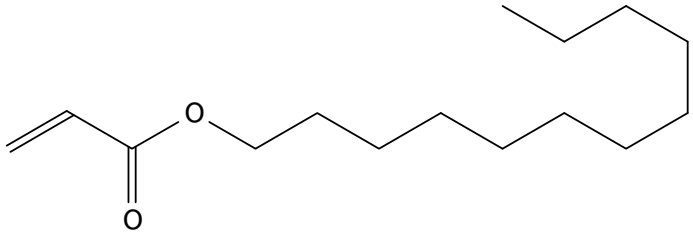
(Note 2) Alkyl acrylate (The alkyl group have 5 ~ 38 carbon atoms)

[1-10] Decyl acrylate



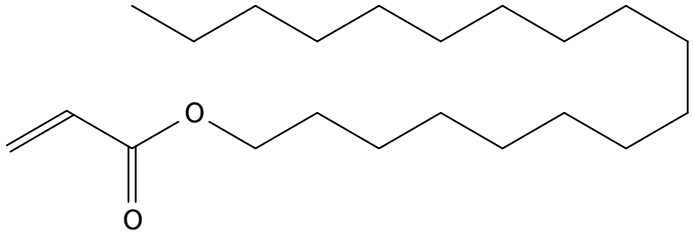
Molecular formula: $C_{13}H_{24}O_2$
CAS: 2156-96-9
ENCS: 2-990 *2
MW: 212.33
mp: -100°C 6)
bp: 245°C (760 mmHg) 7)
sw: Poor 8)
Specific gravities: 0.8900 (20°C/4°C) 6)
logPow: Uncertain

[1-11] Dodecyl acrylate



Molecular formula: $C_{15}H_{28}O_2$
CAS: 2156-97-0
ENCS: 2-990 *2
MW: 240.38
mp: 4°C 9)
bp: 370.4 9)
sw: <1 µg/L (20°C) 2)
Specific gravities: 0.875 (20°C/4°C) 6)
logPow: >6.5 (23°C) 2)

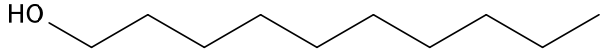
[1-12] Octadecyl acrylate



Molecular formula: $C_{21}H_{40}O_2$
CAS: 4813-57-4
ENCS: 2-990 *2
MW: 324.55
mp: 28°C 9)
bp: Uncertain
sw: <20 µg/L 2)
Specific gravities: 0.8 g/cm^3 9)
logPow: >6.5 (23°C) 2)

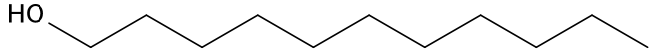
[2] Alkanols (The alkyl group is linear with 10 - 16 carbon atoms.)

[2-1] 1-Decanol



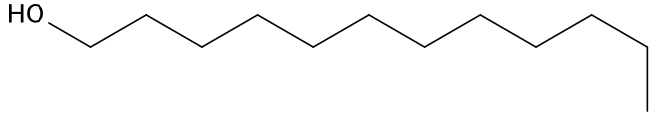
Molecular formula: $C_{10}H_{22}O$
CAS: 112-30-1
ENCS: 2-217 *3
MW: 158.29
mp: 6.4°C 10)
bp: 229°C (101.3 kPa) 10)
sw: 36 mg/L (20°C) 10)
Specific gravities: 0.83 g/cm^3 (20°C) 2)
logPow: 4.5 10)

[2-2] 1-Undecanol



Molecular formula: $C_{11}H_{24}O$
CAS: 112-42-5
ENCS: 2-217 *3
MW: 172.31
mp: 12.5°C (1 atm) 2)
bp: 247°C (101.1 kPa) 2)
sw: 6.3 mg/L (20°C) 2)
Specific gravities: 0.83 g/cm^3 (20°C) 2)
logPow: 4.9 (20°C) 2)

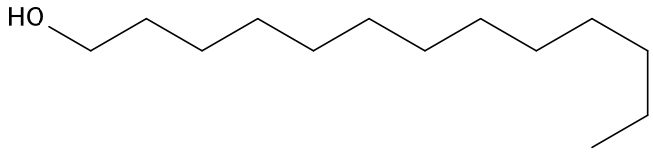
[2-3] 1-Dodecanol



Molecular formula: $C_{12}H_{26}O$
CAS: 112-53-8
ENCS: 2-217 *3
MW: 186.34
mp: 24°C (101.3 kPa) 2)
bp: 229°C (101.3 kPa) 2)
sw: 1 mg/L (23°C) 2)
Specific gravities: 0.9 g/cm^3 (16°C) 2)
logPow: 5.4 (23°C) 2)

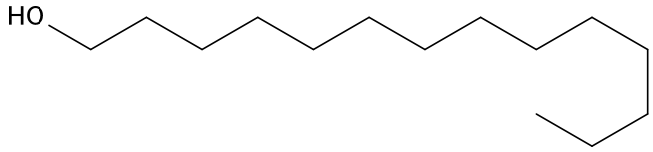
(Note 3) Alkanols (The alkyl group has 5 ~ 38 carbon atoms)

[2-4] 1-Tridecanol



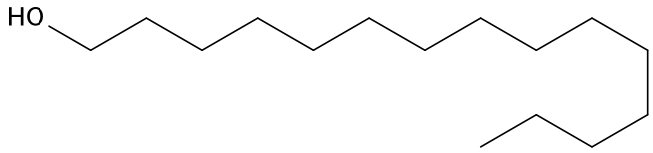
Molecular formula: $C_{13}H_{28}O$
CAS: 112-70-9
ENCS: 2-217 *3
MW: 200.37
mp: 32°C (97.69 kPa) 2)
bp: 233.3°C (97.59 kPa) 2)
sw: 131.86 mg/L (25°C) 2)
Specific gravities: 0.82 g/cm^3 (20°C) 2)
logPow: 4.25 (25°C) 2)

[2-5] 1-Tetradecanol



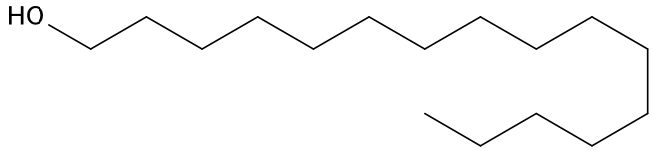
Molecular formula: $C_{14}H_{30}O$
CAS: 112-72-1
ENCS: 2-217 *3
MW: 214.39
mp: 39°C (ca. 1 atm) 2)
bp: 294°C (ca. 1 atm) 2)
sw: 1.3 mg/L (23°C) 2)
Specific gravities: 0.905 g/cm^3 (16°C) 2)
logPow: 5.5 (25°C) 2)

[2-6] 1-Pentadecanol



Molecular formula: $C_{15}H_{32}O$
CAS: 629-76-5
ENCS: 2-217 *3
MW: 228.42
mp: 43.9°C 7)
bp: 300°C (760 mmHg) 7)
sw: 0.103 mg/L (25°C) 11)
Specific gravities: 0.829 (50°C) 7)
logPow: Uncertain

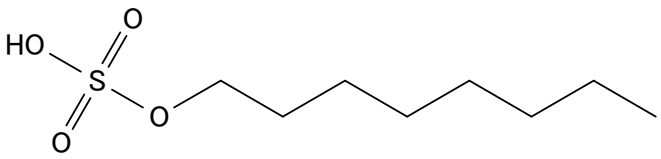
[2-7] 1-Hexadecanol



Molecular formula: $C_{16}H_{34}O$
CAS: 36653-82-4
ENCS: 2-217 *3
MW: 242.45
mp: 51°C (101.3 kPa) 2)
bp: 319°C (101.3 kPa) 2)
sw: <1 mg/L (23°C) 2)
Specific gravities: 0.889 g/cm^3 (16°C) 2)
logPow: 6.7 2)

[3] Alkyl sulfates (The alkyl group has 8, 9, 10, 12, 14, 16 or 18 carbon atoms.) and those salts

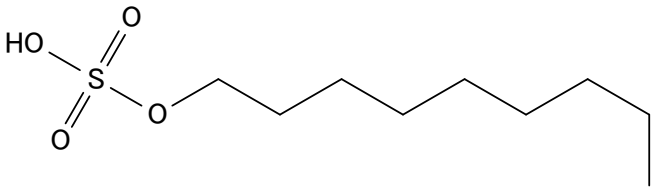
[3-1] Octyl sulfate and its salts



Molecular formula: $C_8H_{18}O_4S$
CAS: 142-31-4 (Sodium salt)
ENCS: 2-217 *4
MW: 210.29
mp: 181 ~ 183°C (Sodium salt) 12)
bp: Decomposition at 218°C (103.6 kPa, Sodium salt) 2)
sw: >450 g/L (20°C、Sodium salt) 2)
Specific gravities: 1.268 (20°C/4°C、Sodium salt) 2)
logPow: ≤-2.31 (20°C、Sodium salt) 2)

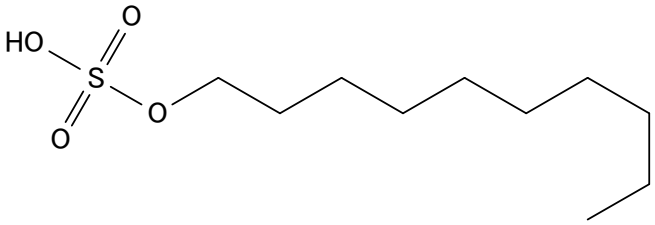
(Note 4) Sulfuric acid mono (or di) ester of alkanol (or alkenol) and those salts (The alkanol (or alkenol) has 6 ~ 24 carbon atoms, and only Na, K, Mg or Ca salt)

[3-2] Nonyl sulfate and its salts



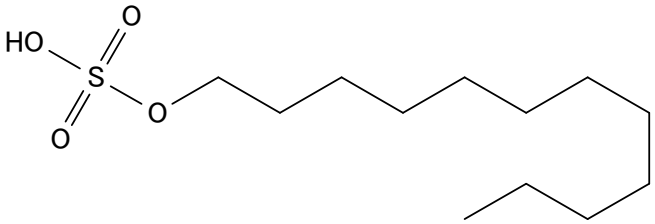
Molecular formula: $C_9H_{20}O_4S$
CAS: 1072-15-7 (Sodium salt)
ENCS: 2-1679 *4
MW: 224.32
mp: Decomposition at 181°C (Sodium salt) 2)
bp: Same as above
sw: 180 g /L (20°C, Sodium salt) 2)
Specific gravities: 1.207 (20°C/4°C、Sodium salt) 2)
logPow: Uncertain

[3-3] Decyl sulfate and its salts



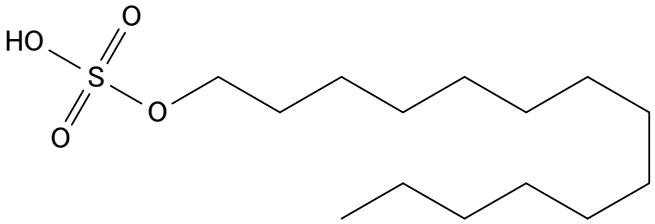
Molecular formula: $C_{10}H_{22}O_4S$
CAS: 142-87-0 (Sodium salt)
ENCS: 2-1679 *4
MW: 238.35
mp: Decomposition at >168°C (Sodium salt) 2)
bp: Decomposition at ca. 215°C (102.6 kPa, Sodium salt) 2)
sw: >330 g/L (20°C、Sodium salt) 2)
Specific gravities: 1.209 (20°C/4°C、Sodium salt) 2)
logPow: 1.72 (25°C, Sodium salt) 2)

[3-4] Dodecyl sulfate and its salts



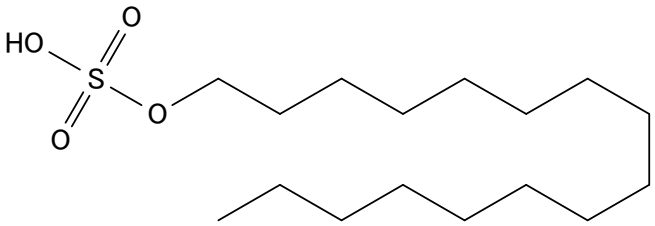
Molecular formula: $C_{12}H_{26}O_4S$
CAS: 151-21-3 (Sodium salt)
ENCS: 2-1679 *4
MW: 266.40
mp: 205°C (101.3 kPa, Sodium salt) 2)
bp: Decomposition at >216°C (102.2 kPa, Sodium salt)2)
sw: >130 g/L (20°C、Sodium salt) 2)
Specific gravities: 0.63 g/cm^3 (Sodium salt) 2)
logPow: ≤-2.03 (20°C、Sodium salt) 2)

[3-5] Tetradecyl sulfate and its salts



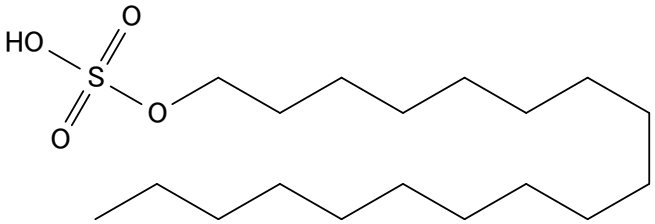
Molecular formula: $C_{14}H_{30}O_4S$
CAS: 1191-50-0 (Sodium salt)
ENCS: 2-1679 *4
MW: 294.46
mp: ca. 196°C 12)
bp: Uncertain
sw: 2.37 g/L (25°C, Sodium salt) 12)
Specific gravities: Uncertain
logPow: 2.2 (Sodium salt) 12)

[3-6] Hexdecyl sulfate and its salts



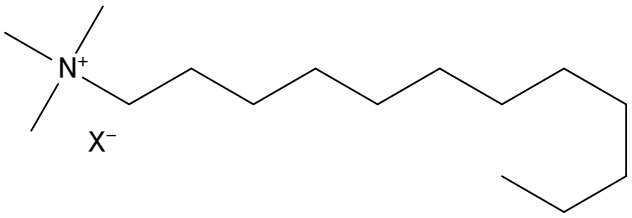
Molecular formula: $C_{16}H_{34}O_4S$
CAS: 1120-01-0 (Sodium salt)
ENCS: 2-1679 *4
MW: 322.51
mp: ca. 193°C (Sodium salt) 12)
bp: Uncertain
sw: 300 mg/L (30°C、Sodium salt) 12)
Specific gravities: Uncertain
logPow: Uncertain

[3-7] Octadecyl sulfate and its salts



Molecular formula: $C_{18}H_{38}O_4S$
CAS: 1120-04-3 (Sodium salt)
ENCS: 2-1679 *4
MW: 350.56
mp: 176 ~ 180°C or 211 ~ 213°C (Sodium salt) 9)
bp: Uncertain
sw: Uncertain
Specific gravities: Uncertain
logPow: Uncertain

[4] *N*,*N*,*N*-Trimethyldodecan-1-aminium salts



X^-: Anion of halogen etc.

Molecular formula: $C_{15}H_{34}ClN$ (Chloride), $C_{15}H_{34}BrN$ (Bromide)
CAS: 112-00-5 (Chloride), 1119-94-4 (Bromide)
ENCS: 2-184 *5, 9-1971 *6
MW: 263.89 (Chloride), 308.35 (Bromide)
mp: 246°C (ca. 1 atm, Chloride), Decomposition at 217°C (101.3 kPa, Bromide) 2)
bp: Uncertain
sw: >954 g/L (20°C, Bromide) 2)
Specific gravities: ca. 1 g/cm^3 (20°C, Chloride), 1.17 (20°C/4°C, Bromide) 2)
logPow: -1.6 ~ -1.2 (20°C, Bromide) 2)

(Note 5) *N*,*N*,*N*-Tetraalkyl (or alkenyl) quaternary ammonium salt (At least one of the alkyl (or alkenyl) groups has 8 ~ 24 carbon atoms, and others have 1 ~ 5 carbon atoms)
(Note 6) Aliphatic alkyl quaternary ammonium salt (At least one of the alkyl (or alkenyl) groups has 8 ~ 24 carbon atoms, and others have 1 ~ 5 carbon atoms)

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3. Surveyed site and procedure

In the Detailed Environmental Survey, the sampling and analysis of specimens was entrusted to prefectural governments and government-designated cities across Japan, and some specimens were sampled and analysed by private analytical laboratories.

(1) Organisations responsible for sampling

Local communities	Organisations responsible for sampling *	Surveyed media		
		Surface water	Sedi-ment	Air
Hokkaido	Recycling-based Society Promotion Division, Environment and Lifestyle Department, Environmental Conservation Bureau, Hokkaido Prefectural Government and Research Institute of Energy, Environment and Geology, Hokkaido Research Organization	○	○	
Sapporo City	Sapporo City Institute of Public Health	○	○	○
Iwate Pref.	Research Institute for Environmental Sciences and Public Health of Iwate Prefecture	○	○	
Miyagi Pref.	Miyagi Prefectural Institute of Public Health and Environment	○		
Sendai City	Sendai City Institute of Public Health		○	○
Akita Pref.	Akita Research Center for Public Health and Environment	○	○	
Yamagata Pref.	Yamagata Environmental Science Research Center	○		○
Ibaraki Pref.	Ibaraki Kasumigaura Environmental Science Center	○	○	
Tochigi Pref.	Tochigi Prefectural Institute of Public Health and Environmental Science	○		
Gunma Pref.	Gunma Prefectural Institute of Public Health and Environmental Sciences	○	○	
Saitama Pref.	Center for Environmental Science in Saitama	○		○
Tokyo Met.	Environmental Improvement Division, Bureau of Environment, Tokyo Metropolitan Government and Tokyo Metropolitan Research Institute for Environmental Protection	○	○	○
Yokohama City	Yokohama Environmental Science Research Institute	○		○
Kawasaki City	Kawasaki Environment Research Institute	○	○	○
Niigata Pref.	Niigata Prefectural Institute of Public Health and Environmental Sciences	○		
Toyama Pref.	Toyama Prefectural Environmental Science Research Center	○	○	
Ishikawa Pref.	Ishikawa Prefectural Institute of Public Health and Environmental Science	○	○	
Nagano Pref.	Nagano Lake Suwa Environmental Research Center		○	
Shizuoka Pref.	Shizuoka Institute of Environment and Hygiene	○		
Aichi Pref.	Aichi Environmental Research Center	○	○	○
Nagoya City	Nagoya City Environmental Science Research Center, Regional Environmental measures Division, Environmental Bureau, Nagoya city	○	○	○
Mie Pref.	Mie Prefecture Health and Environment Research Institute	○		○
Shiga Pref.	Lake Biwa Environmental Research Institute		○	
Kyoto Pref.	Kyoto Prefectural Institute of Public Health and Environment			○
Kyoto City	Kyoto City Institute of Health and Environmental Sciences	○		
Osaka Pref.	Environment Preservation Division, Environment Management Office, Department of Environment, Agriculture, Forestry and Fisheries, Osaka Prefectural Government	○	○	
Osaka City	Osaka City Institute of Public Health and Environmental Sciences	○		
Hyogo Pref.	Water and Air Division, Environment Department, Hyogo Prefectural Government and Hyogo Prefectural Institute of Environmental Sciences, Hyogo Environmental Advancement Association	○		○
Kobe City	Environmental Conservation Division, Environment Bureau, Kobe City and Kobe City Institute of Health and Environmental Science	○		
Nara Pref.	Nara Prefecture Landscape and Environment Center	○		
Wakayama Pref.	Wakayama Prefectural Research Center of Environment and Public Health	○	○	
Okayama Pref.	Okayama Prefectural Institute for Environmental Science and Public Health	○		
Hiroshima Pref.	Hiroshima Prefectural Technology Research Institute Health and Environment Center	○		○
Yamaguchi Pref.	Yamaguchi Prefectural Institute of Public Health and Environment	○		
Tokushima Pref.	Tokushima Prefectural Public Health, Pharmaceutical and Environmental Sciences Center			○
Ehime Pref.	Ehime Prefectural Institute of Public Health and Environmental Science	○		
Fukuoka Pref.	Fukuoka Institute of Health and Environmental Sciences	○	○	
Saga Pref.	Saga Prefectural Environmental Research Center	○	○	○
Kumamoto Pref.	Kumamoto Prefectural Institute of Public-Health and Environmental Science	○		
Oita Pref.	Environment Preservation Division, Department of Environment, Oita Prefectural	○	○	○

Local communities	Organisations responsible for sampling *	Surveyed media		
		Surface water	Sedi-ment	Air
	Government and Oita Prefectural Institute of Health and Environment			
Miyazaki Pref.	Miyazaki Prefectural Institute for Public Health and Environment	○	○	
Kagoshima Pref.	Kagoshima Prefectural Institute for Environmental Research and Public Health	○		
Okinawa Pref.	Okinawa Prefectural Institute of Health and Environment	○	○	

(Note) *1: Organisations responsible for sampling are described by their official names in FY 2024.

(2) Surveyed sites and target chemicals

The numbers of target chemicals (groups) and the numbers of surveyed sites, etc. by surveyed medium in the detailed environmental survey were as shown in the following table.

The target chemicals and the national distribution map of the survey sites for each medium are shown in Table 2-1-1 and Figures 2-1 for surface water, Table 2-1-2 and Fig.2-1 for sediment, Table 2-1-3 and Fig.2-2 for air.

In addition, about 20 sites were selected as survey sites per target chemical. To obtain data for areas to be expected to high concentrations in the general environment survey sites are selected based on information regarding releases and emissions. Among the sites considering to rank in the top of PRTR emissions, it was included the surrounding sites where samples can be taken in the survey sites.

Surveyed media	Numbers of local communities	Numbers of target chemicals (groups)	Numbers of surveyed sites	Numbers of samples at a surveyed site
Surface water	38	3	66	1
Sediment	22	1	27	3
Air	16	1	18	3
All media	43	4	90	

(3) Sampling method of specimens

The sampling of specimens and the preparation of samples were carried out following the “Guidelines on Conducting of Environmental Surveys and Monitoring of Chemicals” (published on March 2021) by the Environment Health and Safety Division, Environmental Health Department, Ministry of the Environment of Japan (MOE).

(4) Detection limit

The detection limits of analysed values reported by the analytical laboratory are not necessarily the same because of differences in the properties of specimens and in the available measurement equipment. To enable summarisation, therefore, a unified detection limit is predetermined and the analytical values reported by the analytical laboratory are summarised by the following procedure.

Treatment of measured value as an undetected value in high-sensitivity analysis

In the case of high-sensitivity analysis, in which the detection limit of the analytical laboratory is lower than the unified detection limit, any measured value lower than the unified detection limit is treated as an undetected value in the nationwide summary (see schematic (A)).

Elimination of undetected values in low-sensitivity analysis from summary subject

When the detection limit of the analytical laboratory is higher than the unified detection limit, any target chemical not detected is eliminated from the subject of the summary (see schematic (B)).

When the instrument detection limit (IDL) and the method detection limit (MDL) are given in the analytical method, which is described in reports on the investigation of the development of analytical methods for chemicals and adopted in the Initial Environmental Survey (hereafter, the Initial Environmental Survey Analytical Method), if the IDL measured by the analytical laboratory is lower than the given IDL, the MDL of the Initial Environmental Survey

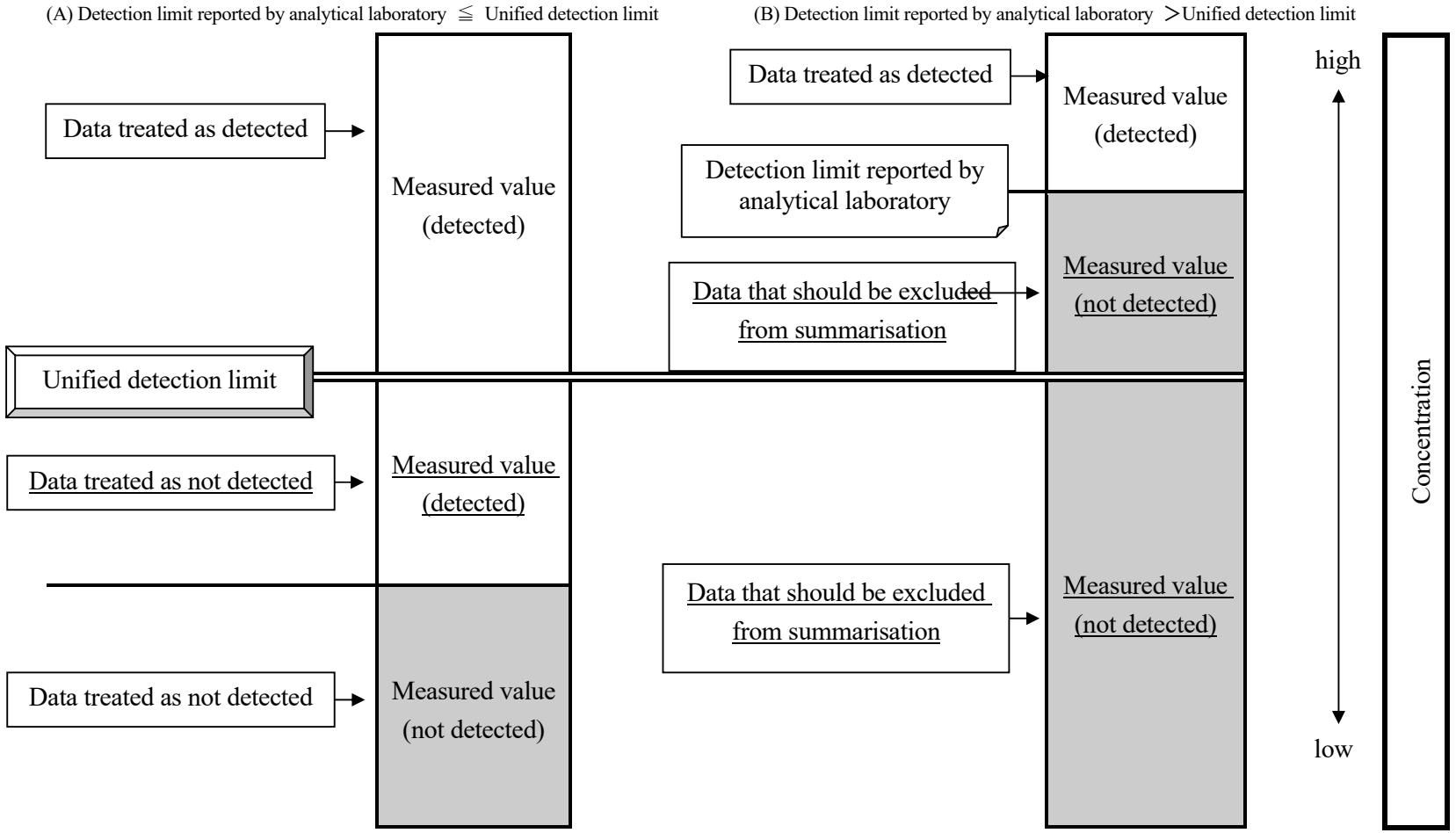
Analytical Method is used as the detection limit by the analytical laboratory.

When IDL and MDL are not given in the Initial Environmental Survey Analytical Method, the detection limit is predetermined by the following procedure.

When the analytical laboratory calculates the appropriate IDL and MDL following the calculation method stated in the analytical method development instruction manuals, this calculated MDL is used as the detection limit by the analytical laboratory.

When the appropriate IDL and MDL are not calculated by the analytical laboratory, one of the following procedures was employed to establish the detection limit by the analytical laboratory.

- deduction from the IDL and MDL calculated for the corresponding chemical by Initial Environmental Survey Analytical Method or other analytical laboratories
- deduction from the lowest calibration curve concentration and the results of recovery tests
- deduction from the results of addition and collection tests, the results of operation blank tests, and the signal/noise ratio (S/N ratio) obtained from the chromatogram of environmental specimens



Schematic of procedure for data summarisation

Table 2-1-1 List of surveyed sites (surface water) and target chemicals in the Detailed Environmental Survey in FY2024

Local communities	Surveyed sites	Target chemicals *		
		[1]	[3]	[4]
Hokkaido	Suzuran-ohashi Bridge, Riv. Tokachi (Obihiro City)	○	○	○
	Inou-ohashi Bridge, Riv. Ishikari (Asahikawa City)		○	○
	Osamunai-bashi Bridge, Riv. Ishikari (Fukagawa City)	○	○	○
	Ishikarikakokyo Bridge, Mouth of Riv. Ishikari (Ishikari City)	○		○
Sapporo City	Nakanuma of Riv.Toyohira (Sapporo City)	○	○	
	Daiichishinkawa-bashi Bridge, Riv. Shin (Sapporo City)	○	○	
Iwate Pref.	Toyosawa-bashi Bridge, Riv. Toyosawa (Hanamaki City)			○
Miyagi Pref.	Futatsuya-bashi Bridge, Riv. Hasama (Tome City)	○		
	Sakura-hodoukyou Bridge, Riv.Shiroishi (Shibata Town)	○		
Akita Pref.	Akita Canal (Akita City)	○	○	○
Yamagata Pref.	Goten-bashi Bridge, Riv. Mogami (Murayama City)			○
Ibaraki Pref.	Isohara-bashi Bridge, Riv. Hanazono (Kitaibaraki Ciyt)		○	
	Tonekamome-ohasi Bridge, Mouth of Riv. Tone (Kamisu City)		○	
Tochigi Pref.	Tagawa Kyubun Area Head Works, Riv. Tagawa (Utsunomiya City)			○
Gunma Pref.	Yata-gawa-bashi Bridge, Riv. Yata (Tatebayashi City)		○	
	Furutone-bashi Bridge, Riv. Ishida (Ota City)	○	○	○
Saitama Pref.	Kachi-hashi Bridge, Riv. Ichino (Yoshimi Town)	○	○	
	Akigaseshusuizeki of Riv. Arakawa (Shiki City)	○	○	
	Shiki-ohasi Bridge, Riv. Yanase (Miyoshi Town)	○	○	○
Tokyo Met.	Mouth of Riv. Arakawa (Koto Ward)	○	○	○
	Mouth of Riv. Sumida (Minato Ward)	○	○	○
Yokohama City	Kamenoko-bashi Bridge, Riv.Tsurumi (Yokohama City)	○	○	○
	Yokohama Port		○	○
	Yoshikura-bashi Bridge, Riv.Kashio (Yokohama City)		○	○
Kawasaki City	Mouth of Riv. Tama (Kawasaki City)		○	○
	Front of Chidori Town, Keihin Canal, Port of Kawasaki			○
	Front of Ougi Town, Keihin Canal, Port of Kawasaki	○	○	○
Niigata Pref.	Lower Riv. Shinano (Niigata City)	○		○
Toyama Pref.	Offshore of Uozu City, Toyama Bay	○		
	Jyokoji-hashi Bridge, Riv. Koyabu (Takaoka City)		○	
Ishikawa Pref.	Mouth of Riv. Sai (Kanazawa City)	○	○	○
Shizuoka Pref.	Kusunoki-bashi Bridge, Riv. Urui (Fujinomiya Ciyt)	○	○	
	Shimizu Port			○
Aichi Pref.	Kinuura Port			○
	West of Shiomi Wharf, Nagoya Port	○		
Nagoya City	Hinode-bashi Bridge, Riv.Shin-hori (Nagoya City)	○	○	○
	Minatoshinbashi Bridge, Riv. Hori (Nagoya City)	○	○	○
Mie Pref.	Oinokawa-bashi Bridge, Riv. Tenpaku (Yokkaichi Ciyt)	○		
Kyoto City	Miyamae-bashi Bridge, Riv. Katsura (Kyoto City)	○		
Osaka Pref.	Mouth of Riv. Yamato (Sakai City)	○	○	○
Osaka City	Kema-bashi Bridge, Riv. Oh-kawa (Osaka City)		○	
	Osaka Port		○	
Hyogo Pref.	Offshore of Takasago West Port	○	○	
Kobe City	Kobe Port (center)			○
Nara Pref.	End of Riv. Okazaki (Ando Town)	○		
	Taisho-bashi Bridge, Riv. Yamato (Oji Town)			○
Wakayama Pref.	Kinokawa-ohashi Bridge, Mouth of Riv. Kinokawa (Wakayama City)	○		○
Okayama Pref.	Sasagase-bashi Bridge, Riv. Sasagase (Okayama City)	○		
	Off the East Coast of Dezaaki, Kojima Bay	○		
	Offshore of Mizushima	○		
Hiroshima Pref.	Front of Miyukicho Otake City, Hiroshima Bay		○	

Local communities	Surveyed sites	Target chemicals *		
		[1]	[3]	[4]
Yamaguchi Pref.	Front of Higashitoyoi, Kasado Bay		○	
	Tokuyama Bay	○		
	Offshore of Hagi	○		
Ehime Pref.	Niihama Port	○		
	Sawadu Fishing Port	○		○
	Front of Kitagawara Masaki Town, Iyo-nada	○		
Fukuoka City	Hakata Bay	○	○	
Saga Pref.	Imari Bay	○		
Kumamoto Pref.	Ubujima-bashi Bridge, Mizunashi River (Yatsushiro City)	○		
Oita Pref.	Mouth of Riv. Oita (Oita City)	○		○
Miyazaki Pref.	Off the Mouth of Riv. Hiroto		○	
Kagoshima Pref.	Kawaharada-bashi Bridge, Riv. Kimotsuki (Kanoya City)	○	○	○
	Gotanda-bashi Bridge, Riv. Gotanda (Ichikikushikino City)	○		
Okinawa Pref.	Naha Port		○	
	Ryutou-bashi Bridge, Riv. Nagadou (Tomigusuku City, Haebaru Town)	○		

(Note 1) The number in the "Target chemicals" column indicates the following chemicals.
[1] Acrylic acid and its esters, [3] Alkyl sulfates (The alkyl group has 8, 9, 10, 12, 14, 16 or 18 carbon atoms.) and those salts, [4] *N*,*N*,*N*-Trimethyldodecan-1-aminium salts

Table 2-1-2 List of surveyed sites (sediment) and target chemical in the Detailed Environmental Survey in FY2024

Local communities	Surveyed sites	Target chemicals
		[2] Alkanols (The alkyl group is linear with 10 - 16 carbon atoms.)
Hokkaido	Ishikarikakokyo Bridge, Mouth of Riv. Ishikari (Ishikari City)	○
Sapporo City	Daiichishinkawa-bashi Bridge, Riv. Shin (Sapporo City)	○
Iwate Pref.	Toyosawa-bashi Bridge, Riv. Toyosawa (Hanamaki City)	○
Sendai City	Hirose-ohashi Bridge, Riv. Hirose (Sendai City)	○
Akita Pref.	Akita Canal (Akita City)	○
Ibaraki Pref.	Tonekamome-ohasi Bridge, Mouth of Riv. Tone (Kamisu City)	○
Gunma Pref.	Yata-gawa-bashi Bridge, Riv. Yata (Tatebayashi City)	○
Tokyo Met.	Mouth of Riv. Arakawa (Koto Ward)	○
	Mouth of Riv. Sumida (Minato Ward)	○
Kawasaki City	Mouth of Riv. Tama (Kawasaki City)	○
	Front of Ougi Town, Keihin Canal, Port of Kawasaki	○
Toyama Pref.	Hagiura-bashi Bridge, Mouth of Riv. Jintsu (Toyama City)	○
Ishikawa Pref.	Mouth of Riv. Sai (Kanazawa City)	○
Nagano Pref.	Lake Suwa (center)	○
Aichi Pref.	Kinuura Port	○
	West of Shiomi Wharf, Nagoya Port	○
Nagoya City	Minatoshinbashi Bridge, Riv. Hori (Nagoya City)	○
	Hinode-bashi Bridge, Riv.Shin-hori (Nagoya City)	○
Shiga Pref.	Lake Biwa (center, offshore of Minamihira)	○
	Lake Biwa (center, offshore of Karasaki)	○
Osaka Pref.	Mouth of Riv. Yamato (Sakai City)	○
Wakayama Pref.	Kinokawa-ohashi Bridge, Mouth of Riv. Kinokawa (Wakayama City)	○
Fukuoka City	Hakata Bay	○
Saga Pref.	Imari Bay	○
Oita Pref.	Mouth of Riv. Oita (Oita City)	○
Miyazaki Pref.	Mouth of Riv. Oyodo (Miyazaki City)	○
Okinawa Pref.	Naha Port	○

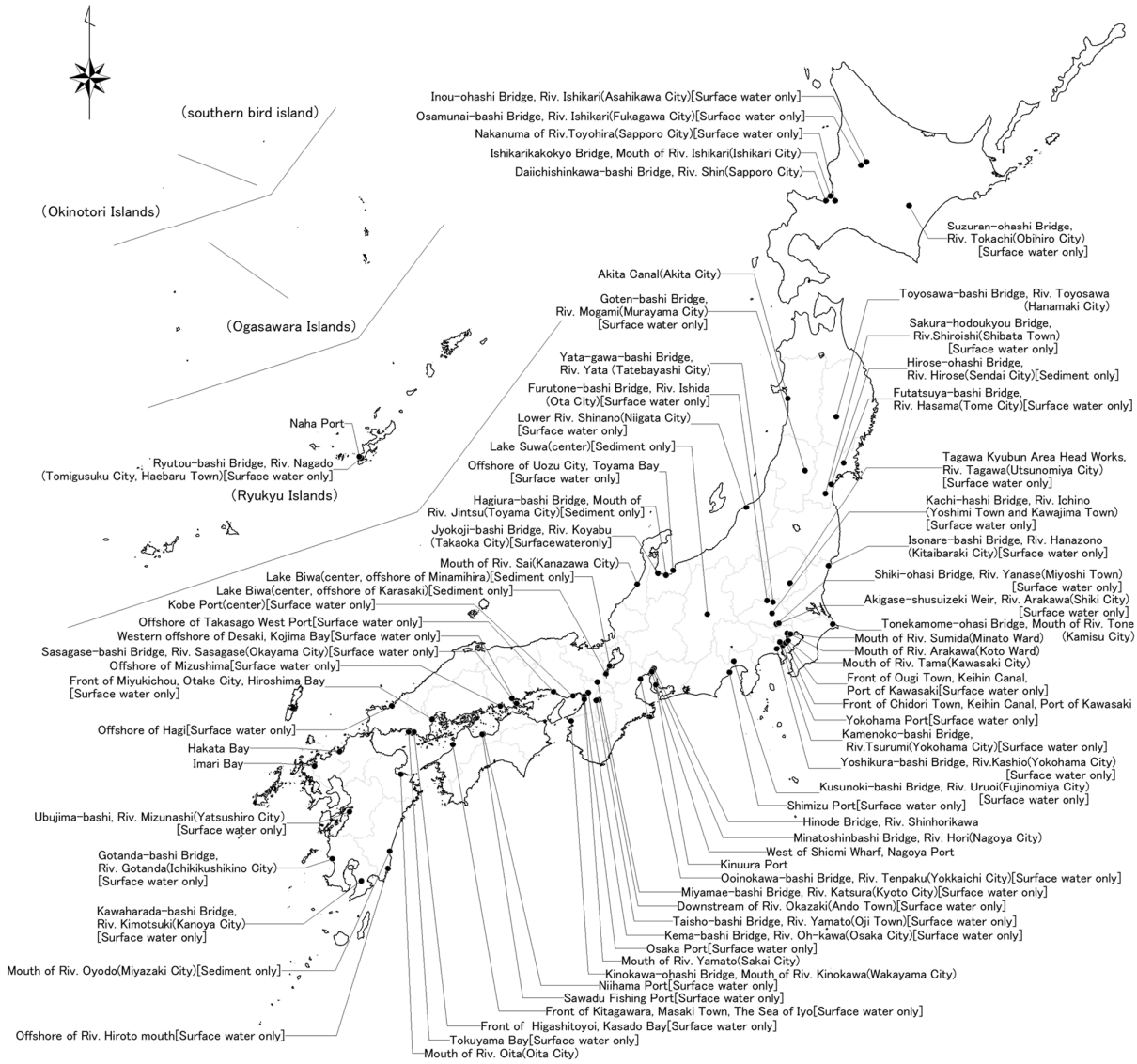


Figure 2-1 Surveyed sites (surface water and sediment) in the Detailed Environmental Survey in FY2024

Table 2-1-3 List of surveyed sites (air) and target chemicals in the Detailed Environmental Survey in FY2024

Local Communities	Surveyed sites	Target chemicals
		[1-1] Acrylic acid
Sapporo City	Sapporo City Institute of Public Health (Sapporo City)	○
Sendai City	Tsutsujigaoka Park (Sendai City)	○
Yamagata Pref.	Yamagata Institute of Environmental Sciences (Murayama City)	○
Saitama Pref.	Center for Environmental Science in Saitama (Kazo City)	○
Tokyo Met.	Tokyo Metropolitan Research Institute for Environmental Protection (Koto Ward)	○
	Chichijima Island (Ogasawara Village)	○
Yokohama City	Yokohama Environmental Science Research Institute (Yokohama City)	○
Kawasaki City	Daishi Air Quality Monitoring Station (Kawasaki City)	○
Aichi Pref.	Tokaishi-Nawamachi Air Quality Monitoring Station (Tokai City)	○
Nagoya City	Chikusa Ward Heiwa Park (Nagoya City)	○
Mie Pref.	Mie Prefecture Health and Environment Research Institute (Yokkaichi City)	○
Kyoto Pref.	Uji Prefectural Government Building (Uji City)	○
Hyogo Pref.	Shikama Air Quality Monitoring Station (Himeji City)	○
	Aboshi Air Quality Monitoring Station (Himeji City)	○
Hiroshima Pref.	Otake-Yumi Park (Otake City)	○
Tokushima Pref.	Tokushima Prefectural Public Health, Pharmaceutical and Environmental Sciences Center (Tokushima City)	○
Saga Pref.	Saga Prefectural Environmental Research Center (Saga City)	○
Oita Pref.	Oita City Misa Elementary School (Oita City)	○

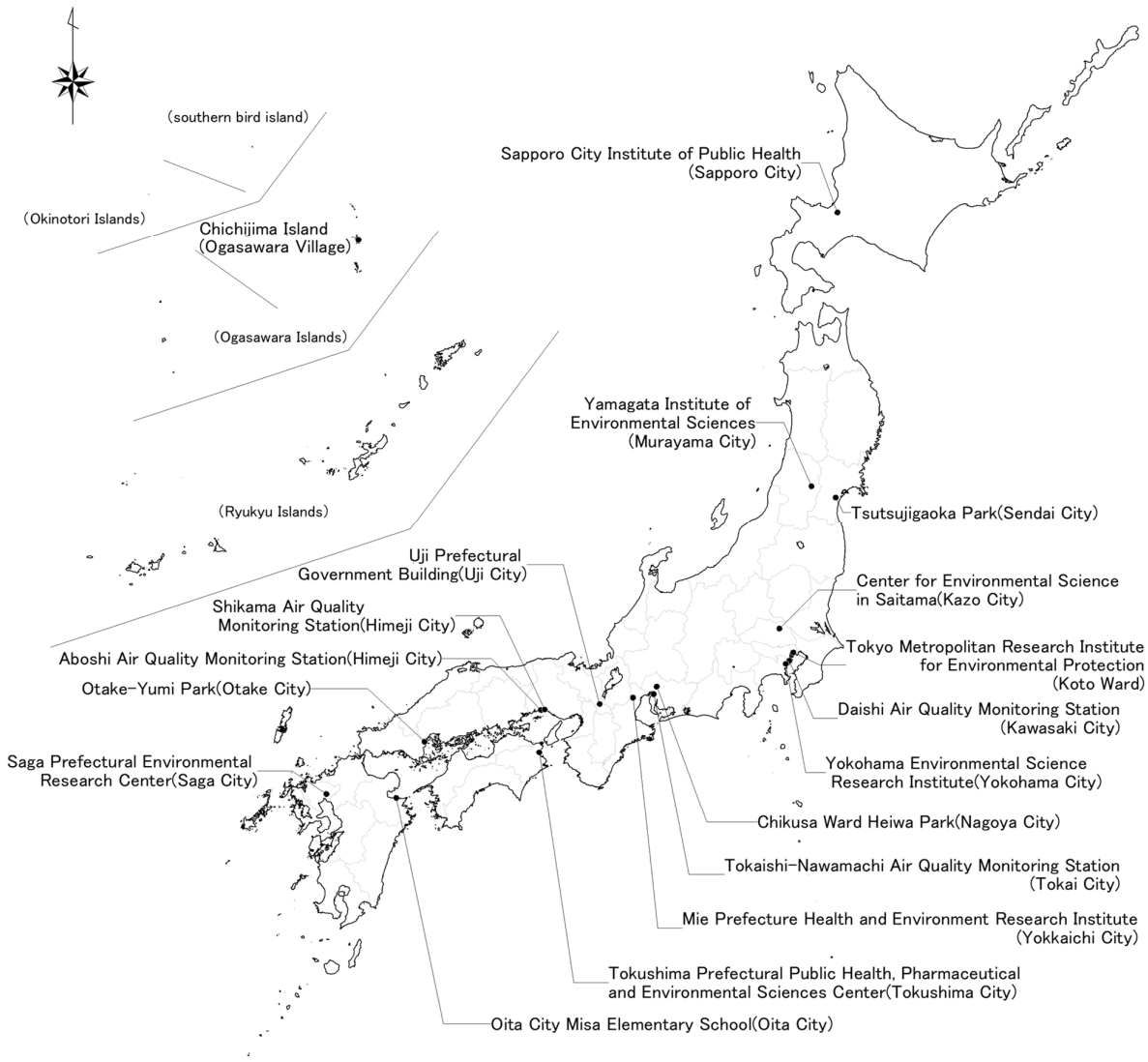


Figure 2-2 Surveyed sites (air) in the Detailed Environmental Survey in FY2024

4. Summary of survey results

The detection ranges and the detection limits are shown in Table 1-2. The survey results are summarized as follows.

In surface water, all 3 target chemicals (groups) were detected. Target chemicals were categorized by analytical methods such as structurally similar chemicals capable of simultaneous analyses.

[1] Acrylic acid and its esters
- [1-1] Acrylic acid: all 43 valid sites
- [1-2] Methyl acrylate: 1 of the 44 valid sites
- [1-5] Isobutyl acrylate: 1 of the 44 valid sites
- [1-8-1] 2-Ethylhexyl acrylate: 3 of the 44 valid sites
- [1-10] Decyl acrylate: 2 of the 41 valid sites
- [1-11] Dodecyl acrylate: 5 of the 42 valid sites

[3] Alkyl sulfates (The alkyl group has 8, 9, 10, 12, 14, 16 or 18 carbon atoms.) and those salts
- [3-2] Nonyl sulfate and its salts: 1 of the 35 valid sites
- [3-3] Decyl sulfate and its salts: 2 of the 35 valid sites
- [3-4] Dodecyl sulfate and its salts: 21 of the 35 valid sites
- [3-5] Tetradecyl sulfate and its salts: 19 of the 35 valid sites
- [3-6] Hexadecyl sulfate and its salts: 22 of the 35 valid sites
- [3-7] Octadecyl sulfate and its salts: 12 of the 35 valid sites

[4] *N*,*N*,*N*-Trimethyldodecan-1-aminium salts: 12 of the 30 valid sites

In sediment, the target chemicals group was detected. Target chemicals were categorized by analytical methods such as structurally similar chemicals capable of simultaneous analyses.

[2] Alkanols (The alkyl group is linear with 10 - 16 carbon atoms.)
- [2-1] 1-Decanol: 25 of the 26 valid sites
- [2-2] 1-Undecanol: 3 of the 26 valid sites
- [2-3] 1-Dodecanol: 25 of the 27 valid sites
- [2-4] 1-Tridecanol: 13 of the 27 valid sites
- [2-5] 1-Tetradecanol: 26 of the 27 valid sites
- [2-6] 1-Pentadecanol: 24 of the 27 valid sites
- [3-7] 1-Hexadecanol: all 27 valid sites

In air, the target chemical was detected.

[1] Acrylic acid and its esters
- [1-1] Acrylic acid: all 5 valid sites

Table 1-2 Summary of the detection ranges and the detection limits in the Detailed Environmental Survey in FY 2024

No.	Target chemicals	Surface water [ng/L]		Sediment [ng/g-dry]		Air [ng/m^3]	
		Detection range and frequency	Detection limit	Detection range and frequency	Detection limit	Detection range and frequency	Detection limit
[1]	Acrylic acid and its esters *						
	[1-1] Acrylic acid	86 ~ 1,400 43/43	61			8.2 ~ 39 5/5	3.8
	[1-2] Methyl acrylate	nd ~ 8.8 1/44	8.1				
	[1-3] Ethyl acrylate	nd 0/44	3.6				
	[1-4] Butyl acrylate	nd 0/44	4.3				
	[1-5] Isobutyl acrylate	nd ~ 4.3 1/44	1.1				
	[1-6] *tert*-Butyl acrylate	nd 0/44	2.1				
	[1-7] Octyl acrylate	nd ~ 28 1/44	17				
	[1-8] Isooctyl acrylates	nd 0/26	72				
	[1-8-1] 2-Ethylhexyl acrylate	nd ~ 210 3/44	23				
	[1-9] Isononyl acrylates	nd 0/40	48				
	[1-10] Decyl acrylate	nd ~ 110 2/41	54				
	[1-11] Dodecyl acrylate	nd ~ 78 5/42	22				
	[1-12] Octadecyl acrylate	nd 0/42	17				
[2]	Alkanols (The alkyl group is linear with 10 - 16 carbon atoms.) *						
	[2-1] 1-Decanol			nd ~ 360 25/26	1.1		
	[2-2] 1-Undecanol			nd ~ 6.2 3/26	1.4		
	[2-3] 1-Dodecanol			nd ~ 51 25/27	0.72		
	[2-4] 1-Tridecanol			nd ~ 120 13/27	1.1		
	[2-5] 1-Tetradecanol			nd ~ 390 26/27	0.76		
	[2-6] 1-Pentadecanol			nd ~ 400 24/27	0.91		
	[2-7] 1-Hexadecanol			nd ~ 1,200 27/27	0.81		
[3]	Alkyl sulfates (The alkyl group has 8, 9, 10, 12, 14, 16 or 18 carbon atoms.) and those salts *						
	[3-1] Octyl sulfate and its salts	nd 0/35	71				
	[3-2] Nonyl sulfate and its salts	nd ~ 200 1/35	40				
	[3-3] Decyl sulfate and its salts	nd ~ 5,000 2/35	69				
	[3-4] Dodecyl sulfate and its salts	nd ~ 2,800 21/35	81				
	[3-5] Tetradecyl sulfate and its salts	nd ~ 1,100 19/35	35				
	[3-6] Hexadecyl sulfate and its salts	nd ~ 2,900 22/35	48				
	[3-7] Octadecyl sulfate and its salts	nd ~ 1,600 12/35	25				

No.	Target chemicals	Surface water [ng/L]		Sediment [ng/g-dry]		Air [ng/m^3]	
		Detection range and frequency	Detection limit	Detection range and frequency	Detection limit	Detection range and frequency	Detection limit
[4]	*N*,*N*,*N*-Trimethyldodecan-1-aminium salts (as bromide) *	nd ~ 6.4 12/30	1.1				

(Note 1) Detection frequency is based on the number of sites, thus means (the number of detected sites/the number of surveyed sites). A site where data was not available was excluded from the number of surveyed sites. A site where the data became invalid under a unified detection limit was also excluded. In sediment, wildlife and air, 3 samples were measured for a site, and the detection in more than one out of samples from a site can be defined as one detected site.

(Note 2) Detection range is based on the number of samples and therefore can be shown as "nd~" even if a target chemical is detected in all sites.

(Note 3) ▢ means the medium was not surveyed.

(Note 4) *: The substances were surveyed including the points selected for survey in light of documentation or submittals regarding emissions.