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Value from Innovation

Wako

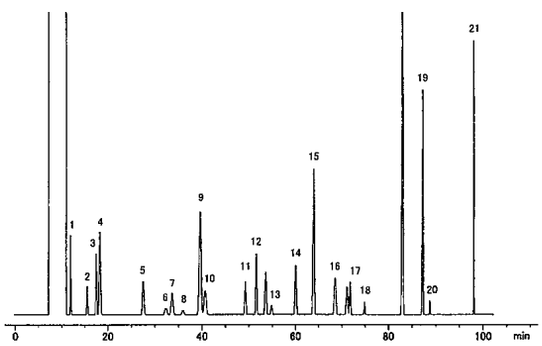
Reagent for VOC Analysis

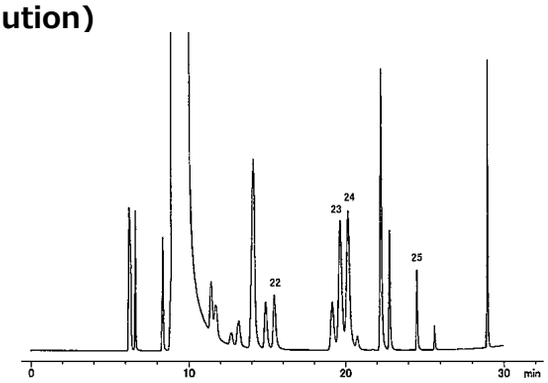
Volatile organic compounds (VOC) are organic chemicals that have a high vapor pressure at ordinary room temperature. VOC are widely used because they are important substances as solvents and fuels. However, when released into the environment, it causes health hazards such as pollution. So VOCs are regulated by law in some countries. We provide a variety of mixture standard solution and columns to analyze VOC.

Mixture Standard Solution of VOC

We provide 4 types of VOC mixture standard solutions. Especially, 25 VOC Mixture Standard Solution is traceable to Japanese measurement standards (Japan Calibration Service System; JCSS ⇒ next page).

■ GC Analysis (25 VOC Mixture Standard Solution)





Column	DB-624 3.0μm 0.53mm×75m		
Column temp.	30℃(40min)→2℃/min→50℃→5℃/min →60℃(18min)→5℃/min→90℃(10min) →5℃/min→150℃(4min)		
Sample	2μL		
Carrier gas	He 4.9mL/min		
Injection	cool on-column	Detector	FID, 250℃
Instrument	Agilent 7890B		

Column	DB-WAX 1.0μm 0.53mm×60m		
Column temp.	40℃(2min)→20℃/min→80℃(16min)→ 10℃/min→180℃		
Sample	2μL		
Carrier gas	He 2.9mL/min (20min) → 4.6mL/min (Flow rate : 1.0mL/min)		
Injection	cool on-column	Detector	FID, 230℃
Instrument	Agilent 7890B		

Peak No.	Constituent	Peak No.	Constituent	Peak No.	Constituent
1	1,1-Dichloroethylene	10	1,2-Dichloroethane	19	*o*-Xylene
2	Dichloromethane	11	Trichloroethylene	20	Bromoform
3	*trans*-1,2-Dichloroethylene	12	1,2-Dichloropropane	21	*p*-Dichlorobenzene
4	*t*-Butyl Methyl Ether	13	Bromodichloromethane	22	1,4-Dioxane
5	*cis*-1,2-Dichloroethylene	14	*cis*-1,3-Dichloropropene	23	*p*-Xylene
6	Chloroform	15	Toluene	24	*m*-Xylene
7	1,1,1-Trichloroethane	16	*trans*-1,3-Dichloropropene	25	1,1,2-Trichloroethane
8	Carbon Tetrachloride	17	Tetrachloroethylene		
9	Benzene	18	Dibromochloromethane		

Product List

Code No.	Product Name	Grade	Volume
229-01651	8 VOC Mixture Standard Solution (each 1mg/mL Methanol Solution) Ref	for Environment Analysis	2mL×5A
228-01481	12 VOC Mixture Standard Solution (each 1mg/mL Methanol Solution) Ref	for Environment Analysis	2mL×10A
220-02421	14 VOC Mixture Standard Solution (each 1mg/mL Methanol Solution) F	for Environment Analysis	2mL×5A
225-02351	25VOC Mixture Standard Solution (Methanol Solution) Ref	JCSS	2mL×5A

■ Composition List

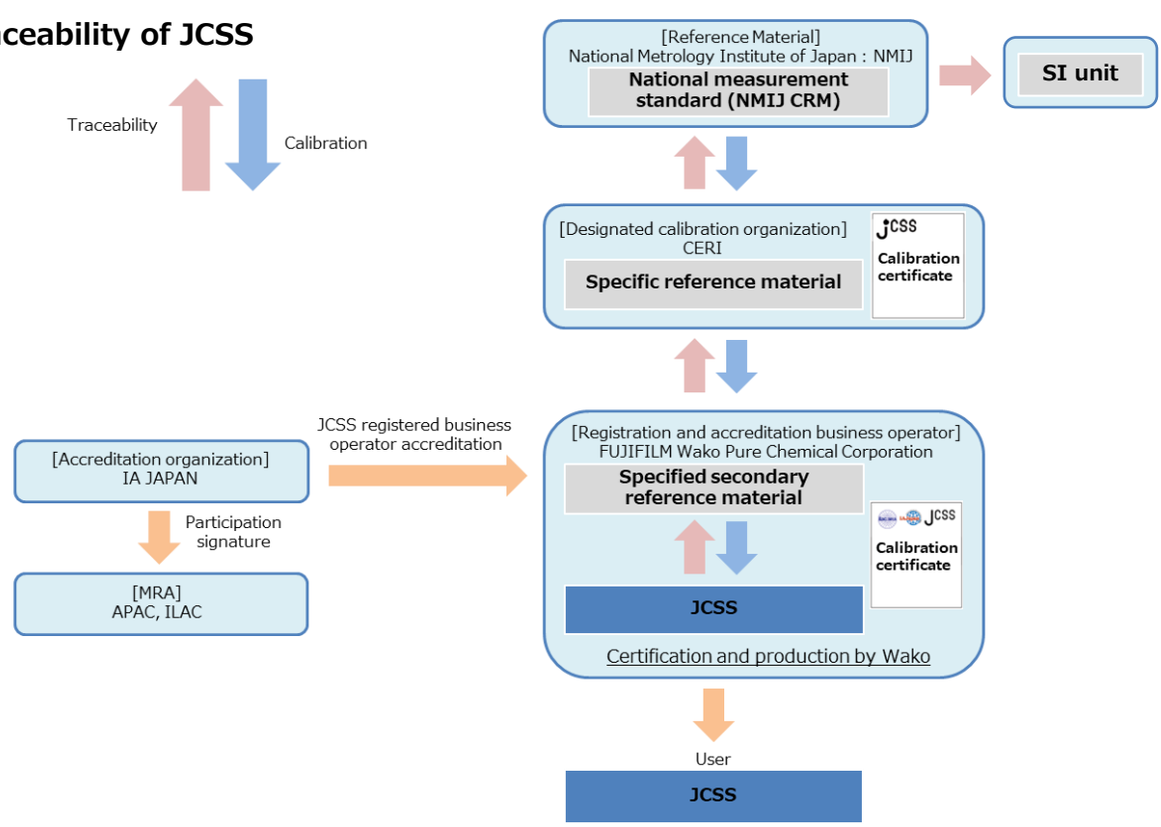
Constituent	for Environment Analysis			JCSS
	8 VOC 229-01651	14 VOC 220-02421	12 VOC 228-01481	25 VOC 225-02351
Ttradecane	○			
Styrene	○			
Ethylbenzene	○			
Chloroethylene		○		
Carbon Tetrachloride		○	○	○
1,2-Dichloroethane		○	○	○
1,1-Dichloroethylene		○	○	○
trans-1,2-Dichloroethylene		○		○
cis-1,2-Dichloroethylene		○	○	○
1,3-Dichloropropene*		○	○	○
Dichloromethane		○	○	○
Tetrachloroethylene		○	○	○
1,1,1-Trichloroethane		○	○	○
1,1,2-Trichloroethane		○	○	○
Trichloroethylene		○	○	○
Benzene		○	○	○
1,4-Dioxane				○
Chloroform				○
Dibromochloromethane				○
Bromodichloromethane				○
Bromoform				○
Toluene	○			○
t-Butyl Methyl Ether				○
o-Xylene	○			○
m-Xylene	○			○
p-Xylene	○			○
1,2-Dichloropropane				○
p-Dichlorobenzene	○			○

* mixture of isomers

What is JCSS ?

The JCSS reference material is traceable to the specified SI traceable reference material, which is the national measurement standard of Japan, manufactured by the designated calibration institute "Chemicals Evaluation and Research Institute : CERI" under the Measurement Law, and has a JCSS symbol by the JCSS registered business operator. It is provided to the user as a reference material, which attached a certificate with JCSS symbol. We have been certified by IA Japan as an international MRA accreditation operator, and we have issued a calibration certificate with the JCSS certification symbol. The values described in this calibration can be accepted internationally through the MRA of ILAC/APAC.

■ Traceability of JCSS



for Stinking Substances Analysis

Stinking substances cause unpleasant odors and may damage the living environment. In Japan, 22 stinking substances have been designated by the Environment Agency, and all factories within the regulated area designated by the each local government are required to measure odor compounds to considerate of the surrounding environment.

■ Measurement Method of Stinking Substances

No.	Stinking Substances	Regulation Value [ppm]	Analytical Method
1	Ammonia	1-5	Absorption Spectrophotometry
2	Methyl Mercaptan	0.02-0.01	GC
3	Hydrogen Sulfide	0.02-0.2	
4	Dimethyl Sulfide	0.01-0.2	
5	Dimethyl Disulfide	0.009-0.1	
6	Trimethylamine	0.005-0.07	GC
7	Acetaldehyde	0.05-0.5	GC, GC/MS, HPLC
8	Propionaldehyde	0.05-0.5	
9	*n*-butyraldehyde	0.009-0.08	
10	Isobutyraldehyde	0.02-0.2	
11	*n*-valeraldehyde	0.009-0.05	
12	Isovaleraldehyde	0.003-0.01	
13	Isobutanol	0.9-20	GC, GC/MS
14	Ethyl Acetate	3-20	
15	Methyl Isobutyl Ketone	1-6	
16	Toluene	10-60	
17	Styrene	0.4-2	
18	Xylene	1-5	
19	Propionic Acid	0.03-0.2	GC
20	*n*-Butyric Acid	0.001- 0.006	
21	*n*-Valeric Acid	0.0009-0.004	
22	Isovaleric Acid	0.001-0.01	

Product List

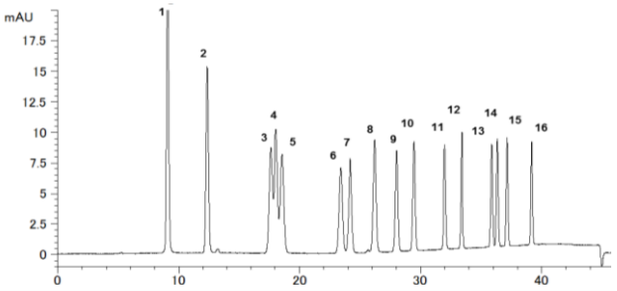
Code No.	Product Name	Grade	Volume
012-08241	Ammonia Standard Solution (0.2μg/μL Water Solution)	for Stinking Substances Analysis	5mL
012-20081	Ammonia Standard Solution II (100μg/μL Water Soluiton)	for Stinking Substances Analysis	5mL
130-06173	Methyl Mercaptan Standard Solution (1μg/μL Benzene Solution)	for Stinking Substances Analysis	2mL×5A
137-06183	Dimethyl Sulfide Standard Solution (0.1μg/μL Benzene Solution)	for Stinking Substances Analysis	2mL×5A
040-17253	Dimethyl Disulfide Standard Solution (0.1μg/μL Benzene Solution)	for Stinking Substances Analysis	2mL×5A
200-06483	Trimethylamine Standard Solution (1μg/μL Ethanol Solution)	for Stinking Substances Analysis	2mL×5A
012-17391	2 Aldehydes-DNPH Mixed Standard Solution (each 0.1μg/μL Acetonitrile Solution)	for Stinking Substances Analysis (HPLC)	2mL×5A
018-17491	2 Aldehydes-DNPH Mixture Standard Solution (each 0.1μg/μL Ethyl Acetate Solution)	for Stinking Substances Analysis (GC)	2mL×5A
012-15451	6 Aldehydes-DNPH Mixture Standard Solution (each 0.1μg/μL Acetonitrile Solution)	for Stinking Substances Analysis (HPLC)	2mL×5A
012-14851	6 Aldehydes Mixture Standard Solution (each 0.1μg/μL Ethyl Acetate Solution)	for Stinking Substances Analysis (GC)	2mL×5A
019-27811	6 Aldehydes-DNPH Mixture Standard Solution Ⅱ (each 0.1mg/mL Acetonitrile Solution)	for Stinking Substances Analysis (HPLC)	2mL×5A
018-18231	16 Aldehydes-DNPH Mixed Standard Solution(each 10μg/mL Acetonitrile Solution)	for HPLC	2mL×5A
153-01861	8 Offensive Odor Organic Solvents Mixture Standard Solution each 1μg/μL Pentane Solution) (Isobutanol, Ethyl Acetate, Methyl Isobutyl Ketone, Toluene, Styrene, *o*-,*m*-,*p*-Xylene)	for Stinking Substances Analysis (GC)	2mL×5A
205-12901	Toluene Standard Solution (1μg/μL Pentane Solution)	for Stinking Substances Analysis (GC)	2mL×5A
197-10751	Styrene Standard Solution (1μg/μL Pentane Solution)	for Stinking Substances Analysis (GC)	2mL×5A
246-00661	Xylene Standard Solution (*o*-,*m*-,*p*-each 1μg/μL Pentane Solution)	for Stinking Substances Analysis (GC)	2mL×5A
168-15141	Propionic Acid Standard Solution (1μg/μL Water Solution)	for Stinking Substances Analysis	2mL×5A
029-10881	*n*-Butyric Acid Standard Solution (1μg/μL Water Solution)	for Stinking Substances Analysis	2mL×5A
221-01111	*n*-Valeric Acid Standard Solution (1μg/μL Water Solution)	for Stinking Substances Analysis	2mL×5A
093-03431	Isovaleric Acid Standard Solution (1μg/μL Water Solution)	for Stinking Substances Analysis	2mL×5A

■ Composition List (Aldehyde Mixture Standard Solution)

Constituent	2 Aldehydes	6 Aldehydes		16 Aldehydes
	012-17391, 018-17491	012-15451	012-14851, 019-27811	018-18231
Formaldehyde	○	○		○
Acetaldehyde	○	○	○	○
Propionaldehyde		○	○	○
Acrolein				○
Acetone				○
n-Butyraldehyde			○	○
Isobutyraldehyde		○	○	○
Crotonaldehyde				○
n-Valeraldehyde		○	○	○
Isovaleraldehyde		○	○	○
Benzaldehyde				○
n-Hexanal				○
o-Tolualdehyde				○
m-Tolualdehyde				○
p-Tolualdehyde				○
2,5-Dimethylbenzaldehyde				○

■ HPLC Column (Wakopak® Wakosil-DNPH)

Wakopak® Wakosil DNPH specializes in the analysis of aldehydes. This column can simultaneous analyze *iso*-, *n*-butyraldehyde (difficult-to-separate) and other aldehydes. In addition, by using the Wakosil® DNPH Eluent, it is possible to suppress baseline fluctuations and elution of unknown peaks.



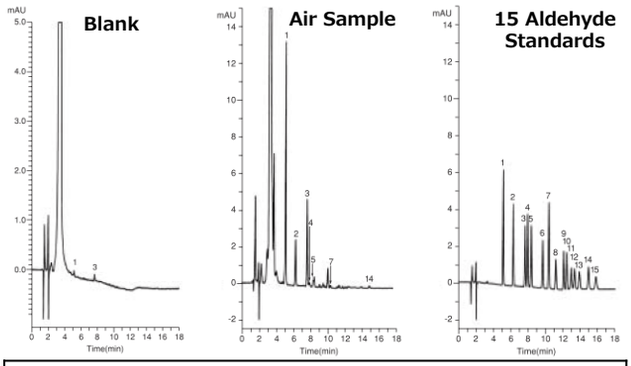
1. Formaldehyde-2,4-DNPH
2. Acetaldehyde-2,4-DNPH
3. Propionaldehyde-2,4-DNPH
4. Acrolein-2,4-DNPH
5. Acetone-2,4-DNPH
6. IsoButyraldehyde-2,4-DNPH
7. *n*-Butyraldehyde-2,4-DNPH
8. Crotonaldehyde-2,4-DNPH
9. IsoValeraldehyde-2,4-DNPH
10. *n*-Valeraldehyde-2,4-DNPH
11. Benzaldehyde-2,4-DNPH
12. Hexaldehyde-2,4-DNPH
13. *o*-Tolualdehyde-2,4-DNPH
14. *m*-Tolualdehyde-2,4-DNPH
15. *p*-Tolualdehyde-2,4-DNPH
16. 2,5-Dimethylbenzaldehyde -2,4-DNPH

Analysis Condition

Column	Wakopak® Wakosil-DNPH (4.6 mmφ x 250 mm)
Eluent	A) Wakosil® -DNPH Elunt A B) Wakosil® -DNPH Elunt B
Gradient	Time (min) / B conc. (%) 0-16 / 10 16-35 / 10-90 35-40 / 90
Flow Rate	0.8mL/min. at 35 ℃
Inj. Vol.	10 µL
Detector	UV 360 nm

■ SPE Column (Presep®-C DNPH)

Presep® DNPH is a SPE column which collects aldehydes and derivatives them with 2,4-dinitrophenylhydrazine (DNPH). This column can reduce noise for lower aldehyde (formaldehyde, acetaldehyde, and acetone).



1. Formaldehyde-2,4-DNPH
2. Acetaldehyde-2,4-DNPH
3. Acetone-2,4-DNPH
4. Acrolein-2,4-DNPH
5. Propionaldehyde-2,4-DNPH
6. Crotonaldehyde-2,4-DNPH
7. *n*-,Isobutyraldehyde -2,4-DNPH
8. Benzaldehyde-2,4-DNPH
9. Isovaleraldehyde-2,4-DNPH
10. *n*-Valeraldehyde-2,4-DNPH
11. *o*-Tolualdehyde-2,4-DNPH
12. *m*-Tolualdehyde-2,4-DNPH
13. p-Tolualdehyde-2,4-DNPH
14. Hexaldehyde-2,4-DNPH
15. 2,5-dimethylbenzaldehyde-2,4-DNPH

Analysis Condition

Column	Wakopak® Wakosil-DNPH-Ⅱ (4.6 mmφ x 150 mm)
Eluent	A) Wakosil® -DNPH-Ⅱ Elunt A B) Wakosil® -DNPH-Ⅱ Elunt B
Gradient	Time (min) / B conc. (%) 0-10 / 0 10-10.01 / 0-100 10.01-16 / 100
Flow Rate	1.0 mL/min. at 35 ℃
Inj. Vol.	10 µL
Detector	UV 360 nm

Product List

Code No.	Product Name	Grade	Volume
238-59411	Wakopak Wakosil-DNPH 4.6*250mm	-	1 column
237-61733	Wakopak Wakosil-DNPH-II 4.6*150mm	-	1 column
290-34251	Presep-C DNPH	for Sample Pretreatment	20 pcs
291-43951	Presep-C DNPH (Short)	for Sample Pretreatment	20 pcs
233-01611	Wakosil® DNPH Eluent A	for HPLC	1 L
230-01621	Wakosil® DNPH Eluent B	for HPLC	1 L
236-02181	Wakosil® DNPH-II Eluent A	for HPLC	1 L
233-02191	Wakosil® DNPH-II Eluent B	for HPLC	1 L

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