



VOC TESTING RESULTS

Chemetal 600 Series Inclusive of:

#600, 601, 606, 607, 608, 609, 612, 613, 614, 615, 621, 622, 623 & 625



Test Report

2019/05/10

Dai Nippon Printing Co., Ltd.

Masashi Shigesato
Senior Project Engineer
Sales Engineering Department
UL-Shimadzu Laboratory Corporation

Project No.	4788939077
Subject	CDPH VOC Emission test for Fluoropolymer coated aluminum / Arttec

The measurement results were summarized in the following page.
The results complied with the criteria of California Section 01350.
Please refer to the "ANALYSIS REPORT" (Report No. MKC-17097) about the details.

Feel free to contact the Handler below if you have any questions.

Very truly yours,

Handler	Masashi Shigesato UL-Shimadzu Laboratory Corporation 1, Nishinokyo-Shimoaicho, Nakagyo-ku, Kyoto 604-8436 Japan T: +81-75-803-0789 F: +81-75-803-0779 E-mail: Masashi.Shigesato@ul.com
Lab Technician	Hiroki Kosuga and Noboru Yamashita Shimadzu Techno-Research, Inc. 1, Nishinokyo-Shimoaicho, Nakagyo-ku, Kyoto 604-8436 Japan



Test Results

Compound	CAS#	Test Results						Criteria ¹⁾
		Concentration in Chamber (µg/m ³)			Emission Factor (µg/m ² /hr)			
		11day	12day	14day	11day	12day	14day	-
California Section 01350-All Categories (Category Specific Compounds Identified Below)								
Acetaldehyde	75-07-0	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	52
Benzene	71-43-2	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	1.1
Carbon disulfide	75-15-0	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	296
Carbon tetrachloride	56-23-5	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	15
Chlorobenzene	108-90-7	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	370
Chloroform	67-66-3	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	111
Dichlorobenzene (1,4-)	106-46-7	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	296
Dichloroethylene (1,1-)	75-35-4	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	26
Dimethylformamide (N,N-)	68-12-2	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	30
Dioxane (1,4-)	123-91-1	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	1111
Epichlorohydrin	106-89-8	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	1.1
Ethylbenzene	100-41-4	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	740
Ethylene glycol	107-21-1	< 9	< 9	< 9	< 9.1	< 9.1	< 9.1	148
Ethylene glycol monoethyl ether	110-80-5	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	26
Ethylene glycol monoethyl ether acetate	111-15-9	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	111
Ethylene glycol monomethyl ether	109-86-4	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	22
Ethylene glycol monomethyl ether acetate	110-49-6	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	33
Formaldehyde	50-00-0	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	6.7
Hexane (n-)	110-54-3	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	2592
Isophorone	78-59-1	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	740
Isopropanol	67-63-0	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	2592
Methyl chloroform	71-55-6	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	370
Methylene chloride	75-09-2	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	148
Methyl t-butyl ether	1634-04-4	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	2962
Naphthalene	91-20-3	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	3.3
Phenol	108-95-2	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	74
Propylene glycol monomethyl ether	107-98-2	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	2592
Styrene	100-42-5	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	333
Tetrachloroethylene	127-18-4	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	13
Toluene	108-88-3	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	111
Trichloroethylene	79-01-6	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	222
Vinyl acetate	108-05-4	< 17	< 17	< 17	< 18	< 18	< 18	74
Xylenes,technical mixture (m-,o-,p-xylene combined)	m-:108-38-3 o-: 95-47-6 p-:106-42-3	< 2	< 2	< 2	< 2.1	< 2.1	< 2.1	259
Other								
TVOC ²⁾	-	< 10	< 10	< 10	< 11	< 11	< 11	-

1) Emission Rate Criteria is based on the CA 01350 Office (Applicable Area: 28.1 m², Room Volume: 30.6 m³, Air Exchange Rate: 0.68 ACH)

2) Sum of the concentrations and Emission factors of all identified and unidentified VOCs between and including n-pentane through n-heptadecane (i.e., C₅-C₁₇) as measured by the GC/MS TIC method and expressed as toluene equivalent value.

To: Dai Nippon Printing Co., Ltd.

Date of issue: May 10, 2019

Order No.48100052

SHIMADZU TECHNO-RESEARCH, INC.

1 Nishinokyo-shimoai-cho, Nakagyo, Kyoto 604-8436

Phone(075)811-3181

Fax(075)821-7837

Title : CDPH VOC Emission test for Fluoropolymer coated aluminum / Arttec

Client : UL-Shimadzu Laboratory Corporation
Date of Receipt : Mar. 22, 2019
Date of Test : 04/05/2019 – 04/19/2019
Compounds Measured : Aldehydes, VOCs, TVOC
Test Method : STANDARD METHOD FOR THE TESTING AND EVALUATION OF
VOLATILE ORGANIC CHEMICAL EMISSIONS FROM INDOOR
SOURCES USING ENVIRONMENTAL CHAMBERS VERSION 1.2.
Sample Measured : One Sample
Sample name; 「Fluoropolymer coated aluminum / Arttec」
Results : Shown on the following pages.
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SHIMADZU TECHNO-RESEARCH, INC.

Approved by

Atsuhir Hayakawa

Checked by

Noboru Yamashita

Documented by

Hirosaki Kikawa

1. Purpose

CDPH VOC Emission test for Fluoropolymer coated aluminum / Arttec

2. Test sample

Fluoropolymer coated aluminum / Arttec

3. Test method

STANDARD METHOD FOR THE TESTING AND EVALUATION OF VOLATILE ORGANIC CHEMICAL EMISSIONS FROM INDOOR SOURCES USING ENVIRONMENTAL CHAMBERS VERSION 1.2.

4. Measured compounds

Group	Compounds	CAS No.	Group	Compounds	CAS No.
II	Acetaldehyde	75-07-0	I	Hexane	110-54-3
I	Benzene	71-43-2		Isophorone	78-59-1
	Carbon disulfide	75-15-0		Isopropanol	67-63-0
	Carbon tetrachloride	56-23-5		Methyl chloroform	71-55-6
	Chlorobenzene	108-90-7		Methylene chloride	75-09-2
	Chloroform	67-66-3		Methyl t-butyl ether	1634-04-4
	1,4-dichlorobenzene	106-46-7		Naphthalene	91-20-3
	1,1-dichloroethylene	75-35-4		Phenol	108-95-2
	N,N-dimethylformamide	68-12-2		Propylene glycol monomethyl ether	107-98-2
	1,4-dioxane	123-91-1		Styrene	100-42-5
	Epichlorohydrin	106-89-8		Tetrachloroethylene	127-18-4
	Ethylbenzene	100-41-4		Toluene	108-88-3
	Ethylene glycol	107-21-1		Trichloroethylene	79-01-6
	Ethylene glycol monoethyl ether	110-80-5		Vinyl acetate	108-05-4
	Ethylene glycol monoethyl ether acetate	111-15-9		Xylenes, technical mixture (m-, o-, p-xylene combined)	m- : 108-38-3 o- : 95-47-6 p- : 106-42-3
	Ethylene glycol monomethyl ether	109-86-4		TVOC ¹⁾	-
	Ethylene glycol monomethyl ether acetate	110-49-6			
II	Formaldehyde	50-00-0			

1) Sum of the concentrations and Emission rates of all identified and unidentified VOCs between and including n-pentane through n-heptadecane (i.e., C5 - C17) as measured by the GC/MS TIC method and expressed as toluene equivalent value.

5. Materials/Equipment

Group	Sorbent	Analysis equipment
I	Tenax TA	TD-GC/MS (Thermal desorption – Gas Chromatograph Mass Spectrometry)
II	DNPH sorbent cartridge	HPLC (High Performance Liquid Chromatography)

6. Test information**6-1. Test location**

Test location	Shimadzu Techno-Research, INC.
Address	1, Nishinokyo-Shimoaicho, Nakagyo-ku, Kyoto 604-8436, Japan

6-2. Material specifications

Manufacturer	Dai Nippon Printing Co., Ltd.
Device designation	Fluoropolymer coated aluminum / Arttec
Date of manufacture	03/19/2019
Date of receipt	03/22/2019
Type of packing	Sample bag packing

6-3. Test conditions

Test chamber type	Emission test chamber
Test chamber volume ① [m ³]	0.085
Temperature in the vacant test chamber [°C]	23
Relative humidity in the vacant test chamber [%RH]	50
Temperature (average) in the test chamber during the test [°C]	23.2
Relative humidity (average) in the test chamber during the test [%]	49.9
Air exchange rate in the test chamber during the test [h ⁻¹]	1.0
Exposed area ② [m ²]	0.0841 (=0.29 m × 0.29 m)
Loading factor [m ² / m ³]	0.989 (②/①)

6-4. Experimental procedure

- 1) The entire back surface and edges of the sample were sealed by aluminum foil and foil tape (Low VOC Emission tape) so that 0.29m × 0.29m (Surface area 0.0841m²) of the front surface of the sample was exposed. (Refer to the figure below.)
- 2) The sample (1) was placed in the chamber at 23°C, 50%RH, 1ACH.
- 3) Chamber air samples were collected at average elapsed time of 264, 288 and 336 hours after placing the sample in the chamber. Then, each air sample was analyzed.
- 4) The emission rate was determined based on the measurement results of (3) and sample loading factor.

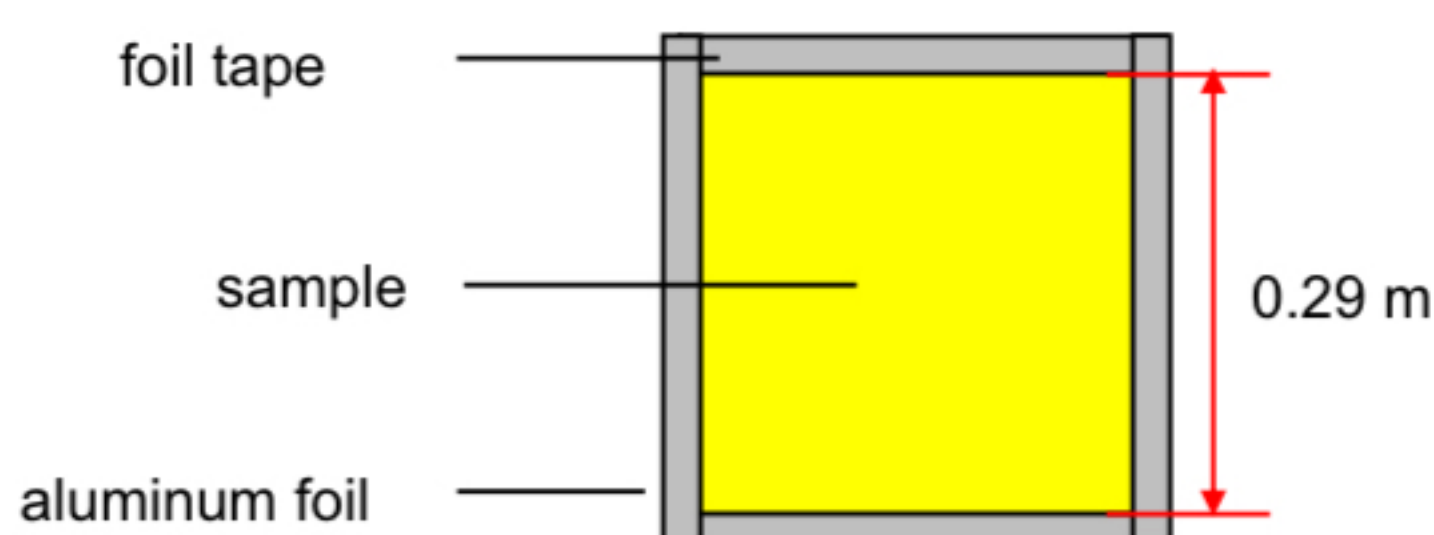


Fig.1. Sample preparation

6-5. Experimental process

Date of test	04/05/2019 – 04/19/2019
Loading the chamber	04/05 10:20

VOCs (Group I) test phase	Start [time]	Duration [min]	Sampling volume [l]	Sampling volume flow [ml/min]
Empty Chamber Blank	04/05 08:35	30	6.00	200
264 hours	04/16 10:05	30	6.00	200
288 hours	04/17 10:05	30	6.00	200
336 hours	04/19 10:05	30	6.01	200

Aldehydes (Group II) test phase	Start [time]	Duration [min]	Sampling volume [l]	Sampling volume flow [ml/min]
Empty Chamber Blank	04/05 08:35	90	45.00	500
264 hours	04/16 09:35	90	45.00	500
288 hours	04/17 09:35	90	45.00	500
336 hours	04/19 09:35	90	45.00	500

7. Test Results

Compound	CAS #	Test Results						Criteria ¹⁾
		Concentration in Chamber (µg/m ³)			Emission Rate (µg/m ² /hr)			
		264 hours	288 hours	336 hours	264 hours	288 hours	336 hours	-
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Other								
TVOC ²⁾	-	< 10	< 10	< 10	< 11	< 11	< 11	-

1) Thermal insulation, Walls; Emission Rate Criteria is based on the CA 01350 Office (Applicable Area: 28.1 m², Room Volume: 30.6 m³, Air Exchange Rate: 0.68 ACH)

2) Sum of the concentrations and Emission rates of all identified and unidentified VOCs between and including n-pentane through n-heptadecane (i.e., C₅ - C₁₇) as measured by the GC/MS TIC method and expressed as toluene equivalent value.