



Grupo Alvic FR Mobiliario S.L.

Emission Rate Measurement Result Report

[MDF Decorative panel ZENIT]

16th June, 2022

MC Evolve Technologies Corporation

Tsukuba Analysis Center

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Subject: Volatile organic compounds emission rate measurement by the small chamber method

Emission test period	Start date	24 th May, 2022	
	End date	31 st May, 2022	
Sample name	MDF Decorative panel ZENIT	Manufacturing date	5 th May, 2022
		Lot no.	220427-1
		Date received by the test laboratory	17 th May, 2022
Sample air collected by	MC Evolve Technologies Corporation		
Measurement method	JIS A1901: 2015 (Small chamber method) complied		

The results of the above-requested measurement are as follows:

Sample name Measurement item	MDF Decorative panel ZENIT		
	Emission rate [$\mu\text{g}/(\text{m}^2\cdot\text{h})$]		
	1 day later	3 days later	7 days later
Toluene	Less than 1	Less than 1	Less than 1
Ethylbenzene	Less than 1	Less than 1	Less than 1
Xylene	Less than 1	Less than 1	Less than 1
Styrene	Less than 1	Less than 1	Less than 1

Accompanying materials: all 7 sheets

(End)

Request to customer (send us your opinions and requests regarding the measurement results.)
Send your opinions via phone at +81-29-886-3951 or fax at +81-29-886-3952.

Accompanying materials

Grupo Alvic FR Mobiliario S.L.
MDF Decorative panel ZENIT

0.5	2.2
Ventilation frequency (times/h)	Sample load factor (m ² /m ³)

Background

Chemical substance	T-BL	Concentration	Emission rate
	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/(\text{m}^2 \cdot \text{h})$
Toluene	Less than 2.0	Less than 2.0	-
Ethylbenzene	Less than 2.0	Less than 2.0	-
Xylene	Less than 2.0	Less than 2.0	-
Styrene	Less than 2.0	Less than 2.0	-

1 day later

Chemical substance	T-BL	Concentration	Emission rate
	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/(\text{m}^2 \cdot \text{h})$
Toluene	Less than 2.0	Less than 2.0	Less than 1
Ethylbenzene	Less than 2.0	Less than 2.0	Less than 1
Xylene	Less than 2.0	Less than 2.0	Less than 1
Styrene	Less than 2.0	Less than 2.0	Less than 1

3 days later

Chemical substance	T-BL	Concentration	Emission rate
	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/(\text{m}^2 \cdot \text{h})$
Toluene	Less than 2.0	Less than 2.0	Less than 1
Ethylbenzene	Less than 2.0	Less than 2.0	Less than 1
Xylene	Less than 2.0	Less than 2.0	Less than 1
Styrene	Less than 2.0	Less than 2.0	Less than 1

7 days later

Chemical substance	T-BL	Concentration	Emission rate
	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/(\text{m}^2 \cdot \text{h})$
Toluene	Less than 2.0	Less than 2.0	Less than 1
Ethylbenzene	Less than 2.0	Less than 2.0	Less than 1
Xylene	Less than 2.0	Less than 2.0	Less than 1
Styrene	Less than 2.0	Less than 2.0	Less than 1

<<Glossary>>

1. Background concentration

A concentration measured at the chamber outlet after clean air is supplied and with no test sample inside.

2. Travel blank

Mass of the target chemical substance in the collecting tube after all operations are done except air sampling, which is measured in order to take into account contamination from opening/closing and during transportation as well as contamination of the collecting tube itself.

3. Concentration at the chamber outlet

The concentration of the target chemical substance measured at the chamber outlet. The value of the total amount of the target chemical substance sampled at the chamber outlet divided by the amount of collected air during air collecting period.

The lower limit of quantification is the lowest measurable concentration.

Any concentration lower than this limit is indicated as "Less than *.* (lower limit of quantification)."

4. Emission rate

Mass of the target chemical substance emitted per unit time during the defined elapsed time from the test starting point.

The lower limit is the emission rate calculated on the assumption that the concentration inside the chamber is the lower limit of quantification.

Any emission rate lower than this limit is indicated as "Less than *.* (lower limit)."

$$q_A = \frac{\rho_t \times n}{L}$$

q_A : Emission rate per unit area [$\mu\text{g}/(\text{m}^2\cdot\text{h})$]

ρ_t : Concentration of the target chemical substance at the chamber outlet [$\mu\text{g}/\text{m}^3$]

(On condition that any travel blank value is already deducted from the total volume of the chemical substances emitted from the chamber outlet.)

n : Air change rate [times/h]

L : Sample load factor [m^2/m^3]

5. Air change rate

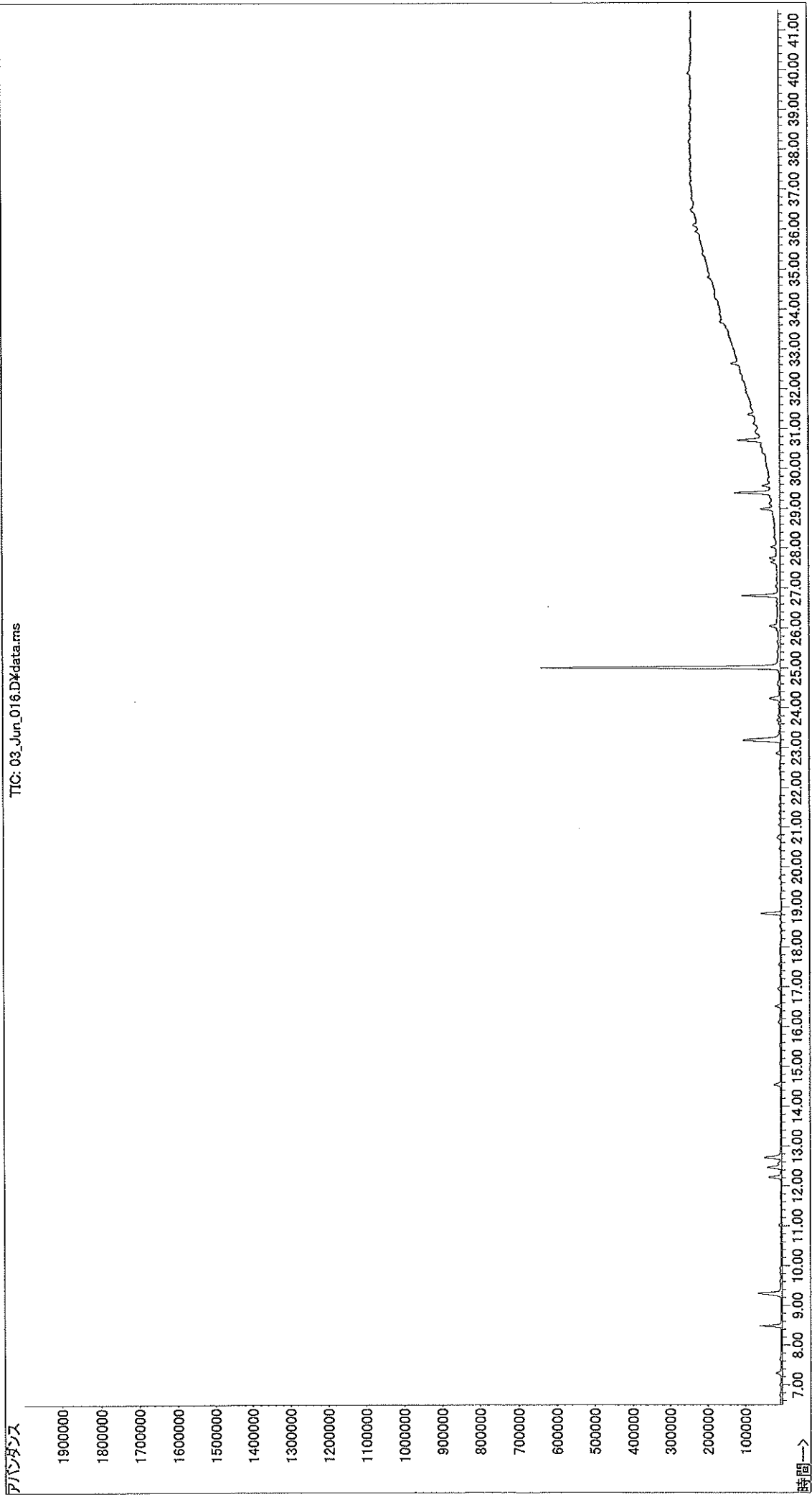
The value obtained by dividing the volume of air supplied into the chamber per unit time (ventilation volume) by the volume of the chamber.

6. Sample load factor

The ratio of the surface area of the test sample to the volume of the chamber.

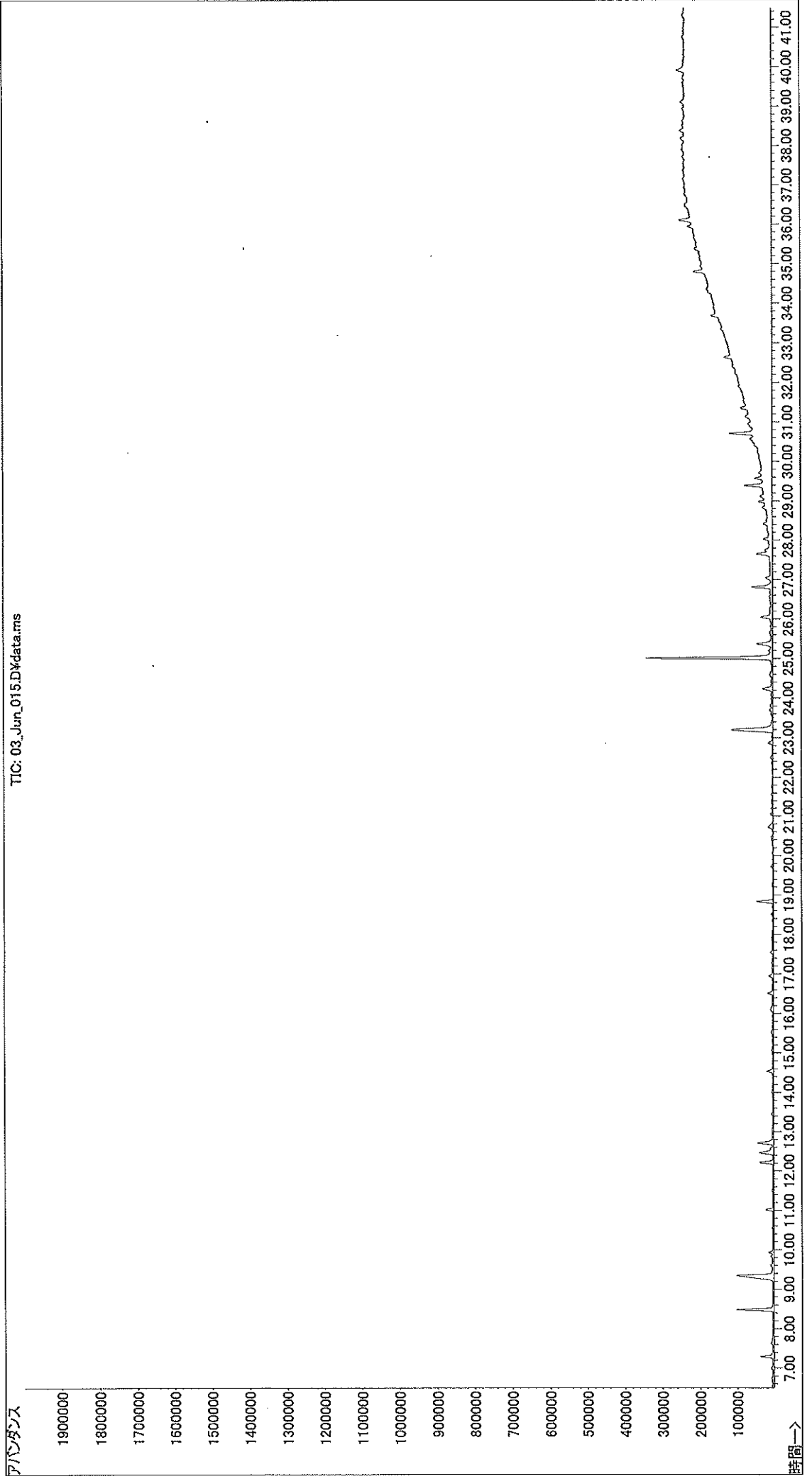
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オペレータ
測定日時
機器: GCMS
サンプル名
一般情報
バイアル番号

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: Grupo Alvic FR Mobiliario S.L. MDF Decorative panel ZENIT_1day later
: E6773V1A M284891
: 17



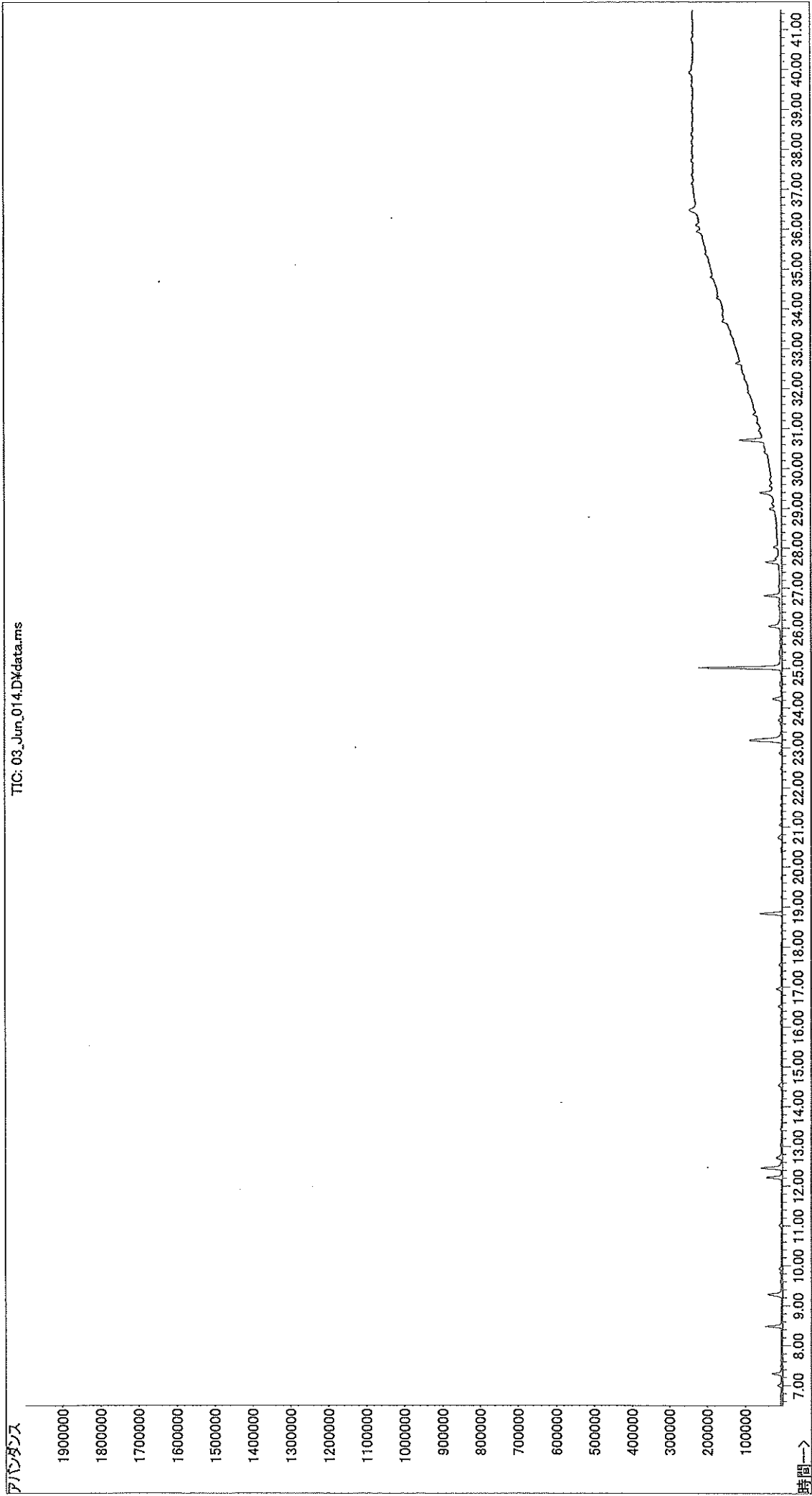
ファイル
オペレータ
測定日時
機器: GCMS
サンプル名
一般情報
バイアル番号

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: Grupo Alvic FR Mobiliario S.L. MDF Decorative panel ZENIT_3days later
: E6773V3A M294037
: 16



ファイル
オペレータ
測定日時
機器: GCMS
サンプル名
一般情報
バイアル番号

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: ID100-xr No. 133_100
: 04 Jun 2022 08:19 (メソッド InertCap-1_atune260_CP_0075verPostrun5.M 使用)
: Grupo Alvic FR Mobiliario S.L. MDF Decorative panel ZENIT 7days later
: E6773V7A MA075785
: 15



Test method

JIS A1901:2015 (the small chamber method) complied: A method to calculate the emission rate of VOC and aldehydes per unit area by measuring the air concentration in the emission test chamber, the air flow rate that passes through the chamber, and the surface area of the sample.

1. Test conditions

Place the sample inside the chamber, and then ventilate air with a certain air change rate.

Small chamber conditions	Temperature and relative humidity	$28 \pm 1^{\circ}\text{C}$ and $50 \pm 5\%$
	Air change rate	0.5 times/h (167mL/min)
	Material and volume	Stainless and 20L
Test sample	Surface area	440cm^2
	Sample load factor	$2.2\text{m}^2/\text{m}^3$
	Sealing process	Yes (Sealed with aluminum tape at our end)
Air supplied		Pure air
Air control		Adpack System

2. Air collection

Attach the collecting tube on the vent side of the chamber and aspirate the air inside the chamber at a certain flow rate for a certain time.

Timing to start collecting	Before placing the sample, 1 day, 3 days, and 7 days after placing the sample
Collecting tube	Tenax TA
Air collection volume	1.0L (167mL/min)
Sampling pump	GSP-400FT (GASTEC)

3. Analysis

Measured the concentration of each component using the analysis instruments

Analysis instruments	Gas chromatography mass spectrometer
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4. Test sample photography



Test sample



Test sample placement conditions