



MARCHAND FLOORING VOC TEST REPORT

Product: Engineered Wood Flooring
Test Report Number: ZX-WJJ21-0489

Test Standards:

CDPH/EHLB Standard Method V1.2 (Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chamber Version 1.2)

Test Standards:

- Test Specimen Expose Area (Ac): 0.086 m²
- Chamber Volume (Vc): 0.120 m³
- Loading Ratio (L): 0.720 m²/m³
- Air Change Rate (n): 1.0 ± 0.1 h⁻¹
- Inlet Flow Rate (Q): 0.120 m³/h
- Area Specific Flow Rate (qA): 1.388 m/h
- Temperature (T): 23 ± 0.5 °C
- Relative Humidity (RH): 50 ± 5 %

Test Results:

The product sample was tested for VOC emissions and found to be compliant with the CDPH/EHLB Standard Method V1.2. Key findings are summarised below.

Table 1: Chamber concentrations and emission factors (24h and 48h)

Compound Name	CAS No.	24h Chamber Concentration (µg/m ³)	48h Chamber Concentration (µg/m ³)	24h Emission Factor (µg m ⁻² h ⁻¹)	48h Emission Factor (µg m ⁻² h ⁻¹)
TVOC	-	51.32	69.55	71.25	96.56
Formaldehyde	50-00-0	2.93	2.82	4.07	3.92



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Table 2.1 :Chamber concentrations of target VOC and emission factors (96h)

Compound Name	CAS No.	96h Chamber Concentration (µg/m ³)	96h Emission Factor (µg m ⁻² h ⁻¹)
Formaldehyde	50-00-0	2.18	3.03
Carbon tetrachloride	56-23-5	LQ	
Isopropanol	67-63-0	LQ	
Chloroform	67-66-3	LQ	
Dimethyl formamide(N,N-)	68-12-2	LQ	
Benzene	71-43-2	LQ	
Methyl chloroform	71-55-6	LQ	
Acetaldehyde	75-07-0	LQ	
Methylene chloride	75-09-2	LQ	
Carbon disulfide	75-15-0	LQ	
Dichloroethylene(1,1-)	75-35-4	LQ	
Isophorone	78-59-1	LQ	
Trichloroethylene	79-01-6	LQ	
Naphthalene	91-20-3	LQ	
Ethylbenzene	100-41-4	LQ	
Styrene	100-42-5	LQ	
Dichlorobenzene(1,4-)	106-46-7	LQ	
Epichlorohydrin	106-89-8	LQ	
Ethylene glycol	107-21-1	LQ	
Propylene glycol monomethyl ether	107-98-2	LQ	
Vinyl acetate	108-05-4	LQ	

Note: "LQ" indicates that the test result is below the lower limit of quantitation, which is 2 µg/m³ for individual VOCs.



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Table 2.1 : Continued Chamber concentrations of target VOC and emission factors (96h)

Compound Name	CAS No.	96h Chamber Concentration (µg/m ³)	96h Emission Factor (µg m ⁻² h ⁻¹)
Toluene	108-88-3	LQ	
Chlorobenzene	108-90-7	LQ	
Phenol	108-95-2	LQ	
Ethylene glycol monomethyl ether	109-86-4	LQ	
Ethylene glycol monomethyl ether acetate	110-49-6	LQ	
Hexane(n-)	110-54-3	LQ	
Ethylene glycol monoethyl ether	110-80-5	LQ	
Ethylene glycol monoethyl ether acetate	111-15-9	LQ	
Dioxane(1,4-)	123-91-1	LQ	
Tetrachloroethylene	127-18-4	LQ	
Methyl t-butyl ether	1634-04-4	LQ	
Xylene (m-,o-,p-xylene combined)	108-38-3, 95-47-6, 106-42-3	LQ	

Note: "LQ" indicates that the test result is below the lower limit of quantitation, which is 2 µg/m³ for individual VOCs.

Table 2.2 : Chamber concentrations of other VOC and emission factors (96h)

Compound Name	CAS No.	96h Chamber Concentration (µg/m ³)	96h Emission Factor (µg m ⁻² h ⁻¹)
Acetic acid	64-19-7	3.14	4.36
Unidentified Compound	-	37.52	52.09
TVOC	-	40.66	56.45



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Table 3.1 : Concentration estimation and results evaluation of target VOC

Compound Name	CAS No.	Allowable Standard Value - Classroom (µg/m3)	Classroom Estimated Value (µg/m3)	Classroom Evaluation (Pass/Fail)	Allowable Standard Value - Office (µg/m3)	Office Estimated Value (µg/m3)	Office Evaluation (Pass/Fail)
Formaldehyde	50-00-0	9	1.4	Pass	1.6	1.6	Pass
Carbon tetrachloride	56-23-5	20					
Isopropanol	67-63-0	3500					
Chloroform	67-66-3	150					
Dimethylformamide (N,N-) *	68-12-2	40					
Benzene	71-43-2	1.5					
Methyl chloroform	71-55-6	500					
Acetaldehyde	75-07-0	70					
Methylene chloride	75-09-2	200					
Carbon disulfide	75-15-0	400					
Dichloroethylene (1,1-)	75-35-4	35					
Isophorone	78-59-1	1000					
Trichloroethylene	79-01-6	300					
Naphthalene	91-20-3	4.5					
Ethylbenzene	100-41-4	1000					
Styrene	100-42-5	450					
Dichlorobenzene (1,4-)	106-46-7	400					
Epichlorohydrin	106-89-8	1.5					
Ethylene glycol	107-21-1	200					
Propylene glycol monomethyl ether	107-98-2	3500					
Vinyl acetate	0108-05-04	100					



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Table 3.1 : Continued : Concentration estimation and results evaluation of target VOC

Compound Name	CAS No.	Allowable Standard Value - Classroom (µg/m3)	Classroom Estimated Value (µg/m3)	Classroom Evaluation (Pass/Fail)	Allowable Standard Value - Office (µg/m3)	Office Estimated Value (µg/m3)	Office Evaluation (Pass/Fail)
Toluene	108-88-3	150					
Chlorobenzene	108-90-7	500					
Phenol	108-95-2	100					
Ethylene glycol monomethyl ether	109-86-4	30					
Ethylene glycol monomethyl ether acetate	110-49-6	45					
Hexane (n-)	110-54-3	3500					
Ethylene glycol monoethyl ether	110-80-5	35					
Ethylene glycol monoethyl ether acetate	111-15-9	150					
Dioxane (1,4-)	123-91-1	1500					
Tetrachloroethylene	127-18-4	17.5					
Methyl tert-butyl ether	1634-04-04	4000					
m-,o-,p-xylene (combined)	108-38-3, 95-47-6, 106-42-3	350					



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Table 3.2 : Concentration estimation and results evaluation of other VOC

Compound Name	CAS No.	Estimated Classroom Value ($\mu\text{g}/\text{m}^3$)	Estimated Office Value ($\mu\text{g}/\text{m}^3$)
Acetic acid	64-19-7	2.3	2.3
Unidentified Compound	-	24.3	28
TVOC	-	26.4	30.3

Conclusion :

The tested sample of engineered wood flooring complies with the requirements of CDPH/EHLB Standard Method V1.2 for VOC emissions.