TECHNICAL BULLETIN

Emissions analysis for TVOC

SN-108-2016

1. Test method

• ASTM D5116-97
Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products.

• Test sample
Sample selected for testing is representative of the product manufactured and produced under typical operating conditions.

• Test procedure
The principle of the test is to determine the specific emission rate of VOCs emitted from prepared specimens of building products. The test is conducted in a small-scale environmental chamber at specified constant conditions of temperature, relative humidity, ventilation rate, and product loading factor.

• Chamber conditions for test period

PARAMETER	SYMBOL	UNITS	VALUE
Product exposed area	Ac	m2	0.0316
Chamber volume	Vc	m3	0.067
Loading ratio	Lc	m2 m-3	0.47
Inlet air flow rate	Q	m3 m-1	0.067
Ventilation rate	ac	h-1	1
Temperature		ºC	23.3
Relative humidity		%	48.6

• Analytical methods
TVOC (Total Volatile Organic Compounds) : quantified by GC/MS TIC method using toluene as calibration reference.

Formaldehyde and acetaldehyde: volatile aldehydes were quantified by HPLC following ASTM Method D 5197-97.
Individual VOCs, other than formaldehyde and acetaldehyde, were quantified by thermal desorption GC/MS following EPA Methods TO-1 and TO-17. Compounds are quantified using multipoint calibrations prepared with pure substances.

2. Test result

• Emission Test results for individual VOCs

SUBSTANCE	CAS	CHAMBER CONCENTRATION(µg m-3)	EMISSION FACTOR(µg m-2 h-1)
		24 hour Test Period	
Methyl Methacrylate	80-62-6	6.6	14.0

• TOVC Chamber concentrations and emission factors

TEST DURATION	CHAMBER CONCENTRATION (µg m-3)	EMISSION FACTOR (µg m-2 h-1)
24 hours	LQ	Not applicable

"LQ" indicates calculated value is below quantitation base on concentration LOQ (Lower Limit of quantitation).
LOQ for TVOC is 20 µg m-3. Most standards and guidelines (Ex: EPA, OSHA, etc.) consider 200-500 µg m-3 TVOC an acceptable level in buildings. Levels higher than this may result in irritation to some occupants.