

TEST REPORT: 7191156223-CHM17-MA-CR2

Date: 10 MAR 2017

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SUBJECT

Evaluation of VOC Emissions from office Furniture Systems, Components and Seating

CLIENT

Ferco Seating Systems (M) Sdn. Bhd.
No. 7 Jalan Sungai Besar 26/7, Section 26,
40400 Shah Alam, Selangor, Malaysia

Attn: Mr Steven Gong

DESCRIPTION OF SAMPLE

One piece of sample was received on 20 Dec 2016:

Sample Description: Paragon Series



Picture 1: Sample after Installation

DATE OF ANALYSIS

23 Jan 2017 – 10 Feb 2017



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METHOD OF TEST

The following emission tests were conducted according to ANSI/BIFMA M7.1-2007 – *Standard Test Method For Determining VOC Emissions from Office Furniture Systems, Components and Seating*, as reference.

1. Emission Test

- 1) Total Volatile Organic Compounds (TVOC) Emission
- 2) Formaldehyde Emission
- 3) Total Aldehyde Emission
- 4) 4-Phenylcyclohexene Emission

Emission Test Condition

- 1) Chamber Volume: about 1 m³
- 2) Temperature: 23°C
- 3) Relative Humidity: 50%
- 4) Air Exchange Rate: n=1 (air change rate per hour in the chamber)
- 5) Chamber Loading Ratio: 0.4-1.0 m²/m³ (total exposed surface area of the test specimen divided by the net air volume of the emission test chamber)
- 6) Air Velocity: 0.1 m/s to 0.3 m/s (over the surface of the test specimen)

Acceptance Criteria

According to ANSI/BIFMA X7.1-2007 - *Standard for Formaldehyde and TVOC Emissions of Low-emitting Office Furniture Systems and Seating*, at the time point of interest 168 h, the criteria for assessing the acceptability of the emissions of VOCs from office furniture systems and seating are shown in below table.

The same criteria are used by the U.S. Green Building Council (USGBC) in *Green Building Rating System for Commercial Interiors*, (LEED CI Version 2, December 2005) EQ Credit 4.5 Low Emitting Materials, Systems Furniture and Seating.

Chemical Contaminant	Emissions Limits Systems Furniture	Emissions Limits Seating
TVOC	≤ 0.5 mg/m ³	≤ 0.25 mg/m ³
Formaldehyde	≤ 50 parts per billion	≤ 25 parts per billion
Total Aldehydes	≤ 100 parts per billion	≤ 50 parts per billion
4-Phenylcyclohexene	≤ 0.0065 mg/m ³	≤ 0.00325 mg/m ³

2. Analysis of Hazardous Substances

1) Elemental Analysis of Mercury (Hg), Lead (Pb), Cadmium (Cd)

The sample was digested by inorganic acid, followed by analysis using Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES).

2) Analysis of Hexavalent Chromium (Cr⁶⁺)

The sample was analysed by UV-Vis spectrometer using 1,5-Diphenylcarbohydrazide as derivatizing agent.

RESULTS

Table 1. Emission Test Result Calculated as Seating

Sample	Test Result Calculated as Seating (After 168 hours)	Criteria for ANSI/BIFMA M7.1-2007 (Seating)	Inferred Result
TVOC ^a	0.024 mg per m ³	≤ 0.25 mg/m ³	Pass
Formaldehyde	< 5 ppb	≤ 25 parts per billion	Pass
Total Aldehydes	< 20 ppb	≤ 50 parts per billion	Pass
4-Phenylcyclohexene ^b	< 0.002 mg per m ³	≤ 0.00325 mg/m ³	Pass

^a TVOC was calculated using the response factor of toluene

^b The method detection limit was 0.002 mg per m³

Table 2. The elemental analytical results for "Paragon 755NB Cup 1"

Test	Result	Inferred Result
Lead, Pb	Not Detected ^b	Pass
Cadmium, Cd	Not Detected ^b	Pass
Mercury, Hg	Not Detected ^b	Pass
Hexavalent Chromium, Cr ⁶⁺	Not Detected ^b	Pass

^b The method detection limit was 50 ppm.



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July 2011

