●Evaluation of Emission from Electric and Electronic Products using Large Chamber Method

TNE0007

Overview

Sick House Syndrome is a social issue, and the importance of evaluating emissions of chemical substances originating from building materials, interior fittings, furniture and electrical and electronic products is growing. Serious efforts are being made to deal with the emissions from computers etc among office equipment out of concern for office and school environments. In Europe, awareness of the problem is particularly high, and regulations requiring the evaluation of emissions from office equipment such as photocopiers and printers are rapidly being introduced.

In Germany, the evaluation of emissions from printers etc is a mandatory part of acquiring the Blue Angel Mark. (The Blue Angel Mark was the world's first environmental label, and carries considerable authority around the world.) This requirement has now extended to gaining the Japanese Eco Mark, and is being applied by Japanese producers of printers for export to Europe.

SCAS has been conducting evaluations of gas emissions from printers etc, based on the Blue Angel Mark testing procedures, for some time. Our efforts were recognized in October 2005, when we were accredited as the first Japanese analysis and testing organization laboratory by the German Federal Institute for Materials Research and Testing (BAM).Tables I and II list the BAM (RAL-UZ 122) and JEITA (Japan Electronics and Information Technology Industries Association: VOC guidelines for PCs) criteria as typical examples of evaluation testing of gas emissions. (As of 2008)

Table I. Maximum permissible values (printers)

mg/h

	Item	Black and white	Color
Pre-operating phase	TVOC*)	1 or 2	1 or 2
Operating phase (Pre-operating phase + operating phase)	TVOC	10	18
	Benzene	<0.05	<0.05
	Styrene	1.0	1.8
	Ozone	1.5	3.0
	Dust	4.0	4.0

*Standalone models(≧ test device 250L), maximum permissible TVOC: 2
*Desktop models (< test device 250L), maximum permissible TVOC: 1

Table II. JEITA guidelines (PCs)

μg/h/unit

Item	・Notebooks ・Tablets	・Desktops ・Displays
Formaldehyde	100	50
Acetaldehyde	48	24
Toluene	260	130
Xylene	870	435
p-dichlorobenzene	240	120
Ethyl benzene	3800	1900
Styrene	220	110

Chamber specifications

SCAS has three sizes of large chamber, enabling us to perform gas emission tests on large objects such as furniture and electrical and electronic goods.

1) Chamber sizes: 1 m^3, 2 m^3 and 20 m^3

2) Temperature control: 20° - 30°C ±2K

3) Humidity control: 50% RH ±5% RH

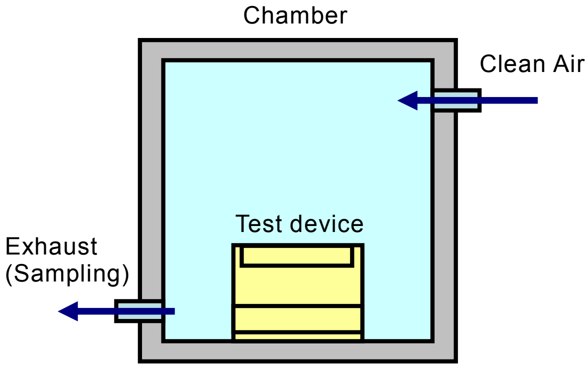
4) Air exchange rate: (a) 0.5 – 5 times/hour (1 and 2 m^3)
(b) 0.5 – 2 times/hour (20 m^3)

5) Cleansing rate: (a) TVOC ≦20 $\mu g/m^3$ (≦ 2 $\mu g/m^3$ each component)

(b) Ozone ≦4 $\mu g/m^3$

(c) Dust ≦10 $\mu g/m^3$

Sampling



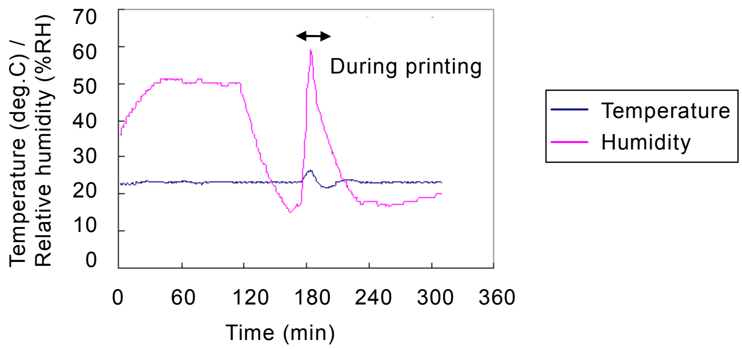
Sampling:

- VOC: TENAX TA
- Aldehydes: DNPH cartridge
- Ozone: Ozone gauge
- Dust: Filter

Clean air is supplied from above and the air is distributed uniformly throughout the chamber by agitator fan. Sampling is normally conducted around the exhaust, although the sampling position can be moved if required.

Changes in heat and humidity from printing

The graph below shows the changes in heat and humidity during the printer tests. The temperature remained generally stable, but the rate of increase in humidity during printing varied with the paper used and the printer. The BAM tests were conducted in an environment with humidity set at not more than 85%.



Additive recovery tests

Table III lists the results of the additive recovery tests for formaldehyde (100 $\mu g/m^3$) and toluene (400 $\mu g/m^3$) with the chamber temperature set to 23°C, and relative humidity of 25%, 50% and 75%. Good results were obtained, with all recovery rates close to 100%.

Table III. Results of additive recovery tests %

Item/Humidity	25% RH	50% RH	75% RH
Formaldehyde	102	105	99
Toluene	87	100	97

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