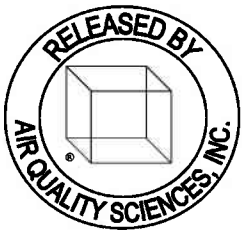
AIR QUALITY SCIENCES

OZONE EVALUATION OF AN AIR CLEANER DEVICE "GCS – 25 REV 3"

PREPARED FOR:

AKIDA HOLDINGS, LLC



May 8, 2012
Date

AQS Report 17131-11D

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EXECUTIVE SUMMARY

Project Description

Air Quality Sciences, Inc. (AQS) is pleased to present the results of its indoor air quality (IAQ) evaluation of ozone emissions from an air cleaner device identified as "GCS – 25 Rev 3," as provided by Akida. The air cleaner was tested in a 1 m^3 dynamic environmental chamber following the guidelines of ASTM D 5116 (1). Testing was conducted using standard environmental chamber operating conditions of 23°C, 50% RH and 1.0 air changes per hour (ACH). The chamber air was continuously monitored for ozone over a five hour period. The ozone testing was conducted concurrently with chemical reduction testing, whereby toluene and decane were introduced in to the chamber throughout the test to create steady state concentrations of approximately 100 $\mu g/m^3$ for each chemical.

Results

Continuous Ozone

The chamber concentration of ozone was measured continuously during the test, including a one hour unpowered period and a four hour powered operating period. No quantifiable levels of ozone were observed during the test. The maximum ozone concentration is provided in Table 2.

METHODOLOGIES

Environmental Chamber

The air cleaner was tested in an environmental chamber, 1.0 m^3 in volume, and ozone emissions were continuously monitored. Environmental chamber operation and control measures used in this study followed ASTM D 5116. The chamber is manufactured from stainless steel and aluminum, with the interior polished to a mirror-like finish to minimize contaminant adsorption. The air cleaner was placed on the floor of the environmental chamber. The ozone monitor sampling tube was located in the center of the chamber.

Air supply to the chamber was maintained at a temperature of 23ºC ± 1ºC and relative humidity at 50% ± 5% and included levels of toluene and decane required to achieve a chamber concentration of approximately 100 $\mu g/m^3$ for each chemical. The air exchange rate was 1.00 ± 0.05 air change/hour (ACH). Environmental chamber study parameters are presented in Table 1.

Test Protocol

Empty chamber background and loaded chamber background ozone measurements were taken prior to the start of testing. Following the loaded chamber background measurement period, the air cleaner was turned on and ozone concentrations were measured continuously for an additional four hours.

Analytical Methodology

Ozone

Ozone monitoring was conducted with a Thermo Environmental Model 49 Ozone Analyzer. This analyzer operates based on the strong UV absorbance of ozone at 254 nm. A ratio of the sample absorbance to that of air with ozone catalytically removed is used to determine the concentration in the sample. The instrument is calibrated annually, and satisfies ISO/IEC 28360 (2) ozone analyzer requirements, including an analytical range of 4 $\mu g/m^3$ to 1 mg/m^3.

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REFERENCES

1. ASTM D 5116, "Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products." ASTM, Philadelphia, PA, 2010.

2. ISO/IEC 28360: 2012 (E) “Information technology - Office equipment - Determination of chemical emission rates from electronic equipment,” 2012.

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TABLE 1

ENVIRONMENTAL CHAMBER TEST PARAMETERS FOR AKIDA HOLDINGS, LLC

PRODUCT 17131-160AA

Product Description:	GCS - 25 Rev 3
AQS Sample Identification:	AQS17131-160AA
Product Loading:	1 air cleaner per 1 m^3 of chamber volume
Test Conditions:	1.00 ± 0.05 ACH 50% RH ± 5% RH 23° C ± 1° C
Test Period:	03/13/2012
Test Description:	The product was received by AQS on 02/23/12 as packaged and shipped by the customer. The package was visually inspected and stored in a controlled environment immediately following sample check-in. Just prior to loading, the product was unpackaged and prepared for the required loading. The air cleaner was placed inside the environmental chamber, and tested according to the specified protocol.

Environmental chamber test following ASTM D 5116 in a 1.0 ± 0.05 m^3 chamber.

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TABLE 2

SUMMARY OF OZONE EMISSIONS DATA DURING AIR CLEANER OPERATION

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AQS PRODUCT NUMBER	PRODUCT DESCRIPTION	TESTING DURATION (HOURS)	OZONE CONC. PRIOR TO UNIT OPERATION ($\mu g/m^3$)	MAX. OZONE CONC. ($\mu g/m^3$)
17131-160AA	GCS – 25 Rev 3	4	BQL	BQL

BQL = Below quantifiable level of 10 $\mu g/m^3$.

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