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BUZZISPACE, INC.
Date: July 19, 2016
P.O.: N/A
Revision Date: August 1, 2016

Report No.: 102430007GRR-008R
Quote No: Qu-00702520-1

Furniture VOC Emissions

Test Summary	
Test Method	ANSI/BIFMA M7.1
Modeling Scenario	Seating

Test Results	
Acceptance Criteria	Pass/Fail
ANSI/BIFMA e3-2014 Section 7.6.1	Pass
ANSI/BIFMA e3-2014 Section 7.6.2	Pass
ANSI/BIFMA e3-2014 Section 7.6.3	Pass

Customer Information	
Organization	BuzziSpace, Inc.
Address	1200 Redding Drive High Point, NC 27260-7362
Contact Name	Hilde Corneillie
Phone Number	336.740.5366
Email	hilde.corneillie@buzzi.space

Product Sample Information	
Manufacturer / Location	BuzziSpace Manufacturing / Bladel, Netherlands
Product Name	BuzziCube 3D Wooden Bottom
Product Category	Office Furniture
Date of Manufacture	06/13/2016
Date of Collection	06/13/2016
Date of Shipment	06/24/2016
Date Received by Lab	06/28/2016
Date of Test Start and Duration	07/05/2016; 168 hours
As Received Sample Condition	Good condition
Lab Sample ID	GRR1606281202-001

TAYLOR GEBBEN
Project Engineer

JESSE ONDERSMA, PhD
Reviewer / Senior Chemist

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DESCRIPTION OF SAMPLES:

Part Description:	BuzziCube 3D Wooden Bottom
Material Submitted:	One (1) Cube

WORK REQUESTED:

Test Method:	ANSI/BIFMA M7.1-2011
Acceptance Criteria:	ANSI/BIFMA X7.1, ANSI/BIFA e3-2014e Sections 7.6.1, 7.6.2, and 7.6.3.
Method Deviations:	N/A

Test Summary:
The emissions testing were performed according to ANSI/BIFMA M7.1-2011 "*Standard Test Method for Determining VOC Emissions from Office Furniture Systems, Components and Seating*". The sample was placed as received in the testing chamber for 7 days with all surfaces exposed. A photograph of the tested sample in the chamber is included herein. Air samples were collected prior to the sample being placed in the chamber (0 hours), at 72 hours, and at 168 hours after initiating the test. The 72 h and the 168 h air samples were collected in duplicate. Samples analyzed for individual VOCs and TVOC were collected on multi-sorbent tubes containing Tenax TA 35/60 backed by Carbograph 1 TD 40/60. These VOC samples were analyzed by thermal desorption-gas chromatography/mass-spectroscopy, TD-GC/MS. $TVOC_{Toluene}$ represents the total of all identified and unidentified VOCs between n-C6 and n-C16 as measured by the GC/MS TIC method and expressed as a toluene equivalent value as defined in ANSI/BIFMA M7.1-2011. Individual VOCs were calculated using calibration curves based on pure standards. Samples analyzed for low molecular weight aldehydes were collected on tubes treated with 2,4-di-nitrophenylhydrazine (DNPH). Low molecular weight aldehydes were analyzed using high pressure liquid chromatography, HPLC. Total aldehydes were calculated as the sum of individual aldehyde concentrations as determined by HPLC and/or GC/MS.

Table 1: Sample and chamber conditions during test period.

Parameter	Symbol	Value	Units
Sample Units	-	1	Chair
Chamber Volume	V	0.968	m^3
Chamber Loading Factor	L	1.003	unit m^{-3}
Inlet Air Flow Rate	Q	1.002	$m^3\,h^{-1}$
Air Change Rate	N_{ACH}	1.035	h^{-1}
Testing Duration	t	168	h
Chamber Pressure (Range)	P	17.5 (16.3-18.4)	Pa
Average Temperature (Range)	T	23 (22.8-23.2)	°C
Average Humidity (Range)	RH	48.5 (47.7-49)	% RH

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Table 2: Summary and Pass/Fail Criteria based on the VOC estimated building concentration at 168 h for seating in ANSI/BIFMA e3-2014, section 7.6.1.

Chemical Name	Acceptance Criteria	Estimated Building Concentration	Pass/Fail
Formaldehyde (ppb)	≤ 25	1.96	Pass
TVOC (mg/m^3)	≤ 0.25	0.004	Pass
Total Aldehyde (ppb)	≤ 50	2.02	Pass
4-phenylcyclohexene (mg/m^3)	≤ 0.00325	BDL**	Pass

*As defined in ANSI/BIFMA M7.1-2011.
**Below Detection Limit.

Table 3: Summary and Pass/Fail Criteria based on the VOC estimated building concentration at 336 hours for seating in ANSI/BIFMA e3-2014, section 7.6.2. Only detected VOCs with acceptance criteria are listed.

Chemical Name	Acceptance Criteria (µg/m^3)	Estimated Building Concentration (µg/m^3)	Pass/Fail
Formaldehyde	≤ 8.25	2.38	Pass
Acetaldehyde	≤ 35	< 0.1	Pass
Toluene	≤ 75	1.2	Pass
Ethylbenzene	≤ 500	0.9	Pass
Xylenes (*o-,m-,p-*)	≤ 175	8.4	Pass
Styrene	≤ 225	1.8	Pass
Naphthalene	≤ 2.25	0.9	Pass

*As defined in ANSI/BIFMA M7.1-2011.

Table 4: Summary and Pass/Fail Criteria based on the VOC estimated building concentration at 336 hours for seating in ANSI/BIFMA e3-2014, section 7.6.3.

Chemical Name	Acceptance Criteria (µg/m^3)	Estimated Building Concentration (µg/m^3)	Pass/Fail
Formaldehyde	≤ 4.5	2.38	Pass

*As defined in ANSI/BIFMA M7.1-2011.

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Table 5: Measured concentrations of VOCs specified in ANSI/BIFMA X7.1-2011, ANSI/BIFMA e3-2014e and CDPH Standard Method V1.1 table 4-1. Values presented in µg/m^3.

Chemical Name	72 hour Air Samples				168 hour Air Samples			
	#1	#2	Mean	Diff (%)	#1	#2	Mean	Diff (%)
Formaldehyde	59.0	57.8	58.4	2.1	60.1	59.2	59.7	1.4
Acetaldehyde	0.9	1.0	0.9	11.8	0.8	1.1	1.0	32.4*
Toluene	4.4	4.4	4.4	0.2	2.2	2.1	2.1	6.2
Ethylbenzene	1.6	1.6	1.6	4.6	1.2	1.1	1.2	3.2
Xylenes (*o-,m-,p-*)	9.8	9.9	9.9	0.8	7.1	6.7	6.9	5.5
Styrene	1.9	1.9	1.9	2.3	1.7	1.6	1.7	1.9
Naphthalene	0.8	0.8	0.8	0.1	1.1	0.9	1.0	19.4*
$TVOC_{Toluene}$	122.1	124.7	123.4	2.1	106.0	98.1	102.1	7.7

*Relative difference between samples 1 and 2 exceeds 15% due to proximity to the detection limit.

Table 6: Calculated chamber emission factors (EF) of VOCs specified in ANSI/BIFMA X7.1-2011 and ANSI/BIFMA e3-2014e.

Chemical Name	Emission Factor (µg/unit·h)		Power Law Coefficients	
	72 hour	168 hour	a	b
Formaldehyde	58.5	59.8	52.384	-0.026*
Acetaldehyde	0.9	1.0	0.619	-0.091*
Toluene	4.4	2.1	172.608	0.858
Ethylbenzene	1.6	1.2	8.376	0.387
Xylenes (*o-,m-,p-*)	9.9	7.0	57.920	0.414
Styrene	1.9	1.7	3.713	0.156
Naphthalene	0.8	1.0	0.218	-0.304
$TVOC_{Toluene}$	123.6	102.3	321.764	0.224

If the “b” coefficient is in the range $-0.15 < b < 0.15$ the emission source is considered to be constant and the 336 h result is calculated by averaging the 72 and 168 h results.

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Table 7: Molar basis calculated emission factors (EF) of identified individual and total aldehydes specified in ANSI/BIFMA M7.1-2011.

Aldehydes	CAS #	Molecular Weight (g/mol)	Emission Factor (µmol/unit·h)	
			72 hour	168 hour
Formaldehyde	50-00-0	30.03	1.95	1.99
Acetaldehyde	75-07-0	44.05	0.02	0.02
Propionaldehyde	123-38-6	58.08	0.03	0.03
Hexaldehyde	66-25-1	100.16	0.01	0.005
Total Aldehydes	-	-	2.15	2.18

Table 8: Calculated chamber emission factors (EF) at 336 hours of VOCs specified in ANSI/BIFMA X7.1-2011 and ANSI/BIFMA e3-2014e.

Chemical Name	336 hour EF (µg/unit·h)
Formaldehyde	59.1
Acetaldehyde	0.9
Toluene	1.2
Ethylbenzene	0.9
Xylenes (*o*-,*m*-,*p*-)	5.2
Styrene	1.5
Naphthalene	1.3

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Table 9: Facilities and Equipment:

Instrumentation Used:	Markes TD-100 Thermal Desorption Agilent 7890A GC Agilent 5975C MS Agilent 1260 HPLC
Column Used:	Agilent HP-ULTRA2 (GC) Poroshell 120 EC-C18 (HPLC)

Table 10: HPLC Parameters.

Parameter	Value
Solvent A	Water
Solvent B	Acetonitrile
Solvent C	Tetrahydrofuran
Flow Rate	0.62 mL/min
Initial	56:30:14 A:B:C
Final	21:70:9 A:B:C
End Time	10.25 min
Detector wavelength	360 nm

Table 11: TD-GC/MS Parameters.

Parameter	Value
Thermal Desorption	
Tube Desorb Temperature	285 °C
Trap Temperature	-10 °C
Trap Desorb Temperature	310 °C
Gas Chromatograph	
Initial Temperature	30 °C
Initial Time	5 min
Ramp Rate 1	5 °C/min
Temperature 2	100 °C
Ramp Rate 2	10 °C/min
Final Temperature	300 °C
Final Temperature Hold	5 min

All data, including but not limited to raw instrument files, calibration fits, and quality control checks used to generate the test results are available to the client upon request.

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Photo Documentation

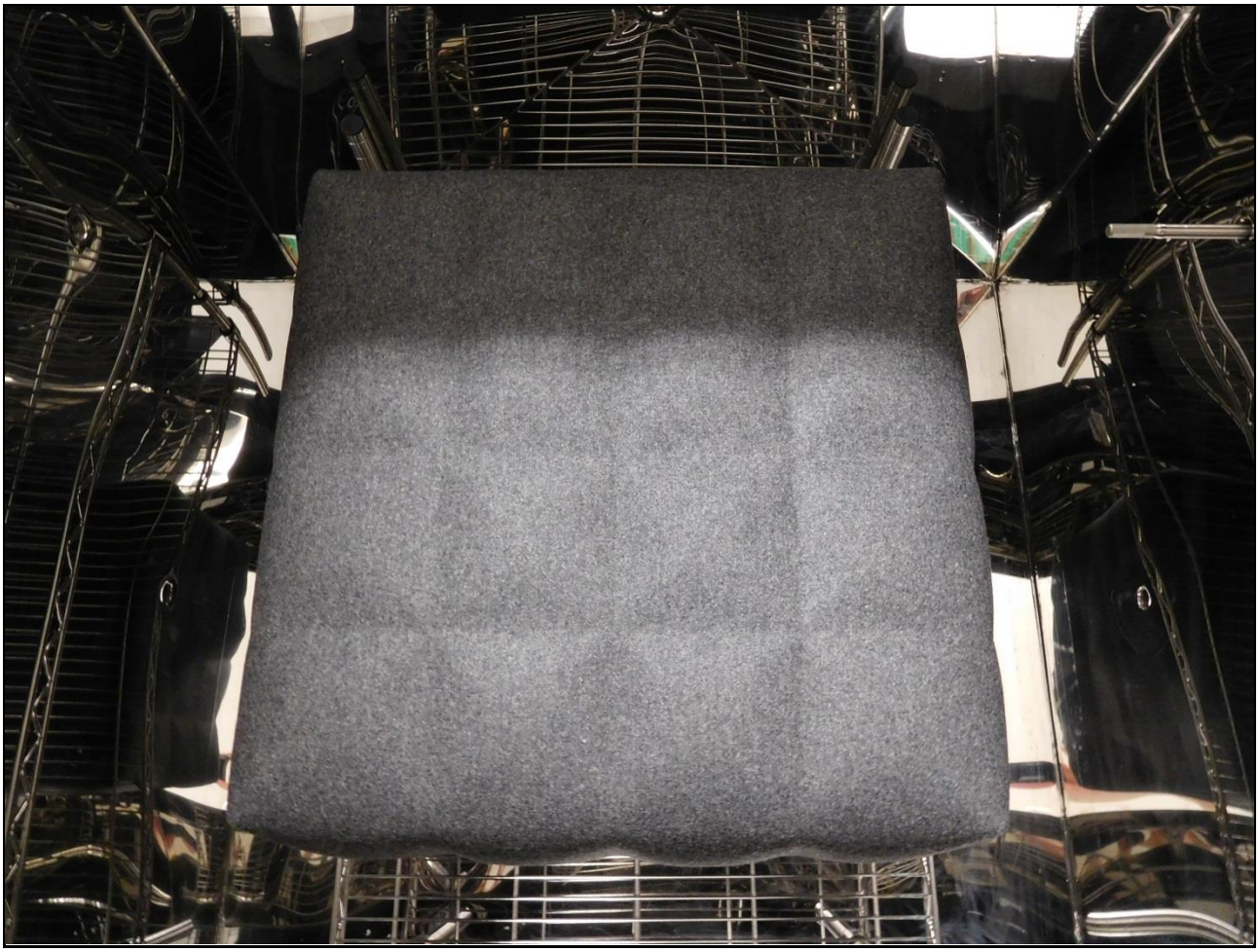

Figure 1: Photograph of BuzziCube sample as tested in air chamber.

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Intertek

Ship To:
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Phone: 616-656-7403

Chain of Custody for Chemical Testing

A Separate COC must be completed for EACH product/material sample.

Intertek's Terms & Conditions are included in this workbook. By submitting samples,customer acknowledges and accepts these terms & conditions unless a prior written contract is in effect.

Intertek Quotation Number: Qu-00702520	
Purchase Order (enter company & number):	Buzzispace ELT VOC Cube

Customer Information*

Company: Buzzispace Inc
Street Address: 1200 Redding Drive
City/State/Zip(postal code): 27260
Country: USA
Contact Name & Title (for reporting): Hilde Corneillie
Contact Phone/Fax Numbers: 336.821.3155
Contact E-mail Address: hilde.corneillie@buzzi.space
Financially Responsible Co. (if different):

Requested Test*

Test method to be performed:	ETL VOC

Special Instructions for Sample Prep., Test Type, Schedule, etc.

Manufacturer Information (if different from customer)

Company: Buzzispace Manufacture
City/State/Country: Bladel, The Netherlands
Contact Name/Title:
Phone Number/E-mail Address:

Shipping Details*

Packed & Shipped By:	Warehouse High Point NC
Shipping Date:	06/24/2016
Carrier/Airbill Number:	1ZR603210342824670

Sample Details

Product Commercial BuzziCube 3D wooden bottom	
Product Commercial Part No.(if not part of the name)*:	
Manufacturer Sample Tracking ID:	
Date Manufactured*: 06/13/2016	
Product Category & Use*: Furniture	
Sample Construction Material*: MDF, foam, dacron, fabric	
Plant Name & Location*: Buzzispace Manufacture, Bladel, NL	
Collection Location within Plant: Warehouse Reusel, NL	
Date & Time Collected* : 06/13/2016	
Number of Sample Pieces*: 1	Photo(s) of Collection Location: Attach
Sample Collected by*:	
Phone/Fax Numbers*:	
E-mail Address*:	

Customer Authorizes Laboratory to Submit Copies of Test Report to:

Contact/E-mail Address: Hilde.corneillie@buzzi.space
Organization: Buzzispace Inc
Contact/E-mail Address: Tom.vandessel@buzzi.space
Organization: Buzzispace Inc

Intertek Use Only

Condition of Shipping Package:	Good Condition
Condition of Sample:	Good Condition
GIN:	G102430007

Sample Handling

	Printed Name*	Signature*	Date*	Company*
Relinquished By:				
Received By:	Taylor Gebken	Taylor Gebken	6/30/16	Intertek

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Revisions Made To Test Report

Index	Date	Revision Description	Revised by	Reviewed by
001	7/22/16	Original report issued	Taylor Gebben	Jesse Ondersma
002	7/25/16	Change of test spec from BIFMA e3 2012 to 2014.	Taylor Gebben	Jesse Ondersma
003	8/01/16	Test scenario changed from individual furniture component to seating.	Taylor Gebben	Jesse Ondersma

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