

Dynamic Small-Scale Chamber Emissions Test

Classroom Desk

Compliance Report

Per LEED for Schools & CHPS
Low-Emitting Furniture Criteria

flipIT® Desks



flipIT® Desk

(Exemplar for certification and product bracketing)

Prepared for:

SMARTdesks®

83 Jacobs Road
Rockaway, NJ 07866

Submitted by:

Materials Analytical Services, LLC

3945 Lakefield Court
Suwanee, Georgia 30024

June 26, 2014

MAS Project No.: 1400714



Testing Cert.#2925.01



June 26, 2014



Jeff Korber
CEO
83 Jacobs Road
Rockaway, NJ 07866

**Subject: Dynamic Small-Scale Chamber Emissions Test
 LEED for Schools and CHPS Low Emitting Furniture Criteria
 Smartdesks flipIT[®] Desk
 MAS Project No.: 1400714**

Dear Mr. Korber:

Materials Analytical Services, LLC (MAS) is pleased to submit this report for emissions testing relative to potential VOC off-gassing from a Smartdesks flipIT[®] Desk submitted for analysis in May 2014. This report summarizes our testing procedures and the results of our analytical measurements.

This project was conducted in general accordance with the ANSI/BIFMA M7.1-2011 Standard Test Method. Construction of the desk was specified by MAS to serve as a representative sample for bracketed smaller scale, lower emitting desks. The desk submitted is representative of the construction materials and finishes used in the manufacture of the bracketed products.

Based on our test results summarized herein, the flipIT[®] Desk is **compliant** with the ANSI/BIFMA e3-2012, LEED, and the CDPH and CHPS performance standards established for classroom furniture. Qualified uses of the desk and all desks bracketed under this emissions testing program may be eligible for LEED for Schools IEQ Credit 4.5 under Option 2 and CHPS EQ2.2.5 Furniture and Furnishings credit. Further, by successful conformance with the ANSI/BIFMA e3, LEED, and CDPH/CHPS standards, the desk and all specifically bracketed desks also meet the criteria of **MAS Certified Green[®]**.

MAS is pleased to have been of service to you. If you have any questions or comments, or if we can be of further assistance to you, please do not hesitate to contact us.

Sincerely,

MATERIALS ANALYTICAL SERVICES, LLC

Robert D. Schmitter
Manager, Emissions Group

William R. Stapleton
Analytical Chemist

Appendices: Appendix A – Chain-of-Custody
 Appendix B – List of Certified Products
 Appendix C – General Testing Parameters and Data

MAS LLC - ATLANTA
Corporate Headquarters
3945 Lakefield Court · Suwanee, GA 30024
(770) 866-3200 · Fax (770) 866-3259



COMPLIANCE EMISSIONS TEST

By ANSI/BIFMA M7.1-2011

Desk Evaluation

MAS Project No.: 1400714

SAMPLE DESCRIPTION & TESTING PARAMETERS

Sample specifics as described in the accompanying chain-of custody (Appendix A) and a timeline of milestone dates relative to sampling and analysis are summarized below:

Product Name: flipIT® Desk	MAS Assigned ID: 1400714
Manufacturer: See Appendix A for manufacturers of individual desk components	Product Description: FIK-19-KIT-BL; Computer top comprised of MDF top with thermafoil finish; black powder coat metal legs and supports with a keyboard tray and modesty panel Approx.: 36" x 26" x 30.5" H
Manufacture Date: May 19, 2014	Testing Period: June 3-10, 2014
Collection Date: May 19, 2014	In-Chamber Sampling Dates: June 6 @ 72 hrs and June 10 @ 168 hrs
Shipping Date: May 19, 2014	Date of Sample Analysis: June 12, 2014
Laboratory Arrival Date: May 27, 2014	Age of Sample at Testing: 15 days



Smartdesks flipIT® Desk as Submitted and Tested

The desk was received in three different shipments of a kit, top and legs (See Appendix A for chains-of-custody). Testing was initiated by assembling the desk inside MAS's small-scale (1.0 m³) stainless steel emissions chamber. The desk was placed in the center of the chamber floor beneath ceiling-mounted recirculation fans to facilitate even air movement around the sample during testing.

The operational parameters used for small-scale chamber testing were in general accordance with those specified in ASTM D5116-10 *Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products*. Emissions from the desk were sampled and



analyzed in accordance with the American National Standards Institute/Business and Institutional Furniture Manufacturer’s Association (ANSI/BIFMA) M7.1-2011 *Standard Test Method for Determining VOC Emissions from Office Furniture Systems, Components and Seating* for compliance with the Leadership in Energy and Environmental Design (LEED) for Schools criteria; the California Department of Public Health (CDPH) *Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.1* for compliance with provisions of the Collaborative for High Performing Schools (CHPS) EQ2.2.5 Furniture and Furnishings credit; the ANSI/BIFMA e3-2012 *Furniture Sustainability Standard*; and MAS’s standard emissions testing procedures under the **MAS Certified Green®** Low VOC Emitting Materials Certification Program. General testing protocols and parameters are presented in Appendix C.

TESTING RESULTS

The data (both measured and predicted) obtained from emissions testing of the desk as compared to the LEED for Schools, CHPS, and ANSI/BIFMA e3 standards for classroom furniture is presented on the following pages in Tables I, II and III respectively.

Table I
Comparison of Modeled Air Concentration for use of the flipIT® Desk
to the ANSI/BIFMA e3-2012 Section 7.6.1 and LEED Emission Limits for Classroom Furniture

Chemical Compound	Predicted Airborne Concentration Based on the 7-day Measured Emission Factor*	ANSI/BIFMA and LEED Referenced Emissions Limits	Compliance Comments
TVOC _{Toluene}	4.6 µg/m ³	500µg/m ³	PASS/PASS
4-Phenylcyclohexene	<0.10 µg/m ³	6.5 µg/m ³	PASS/PASS
Formaldehyde	0.65 ppb	50 ppb	PASS/PASS
Total Aldehydes	1.8 ppb	100 ppb	PASS/PASS

* Assumes a ventilation rate and classroom parameters as defined by CDPH Standard Method Version 1.1 Tables 4-2 and 4-3. Also compliant with ANSI/BIFMA X7.1-2011 when modeled to CDPH classroom scenario.



Table II
Predicted Individual VOC Concentrations ($\mu\text{g}/\text{m}^3$) at 336 Hours Comparison to ANSI/BIFMA e3-2012 Section 7.6.2 Concentration Limits

Compound Name	Predicted Concentration from Desk	Maximum Allowable Concentration for Classroom Furniture*	Testing Comments
Ethylbenzene	<0.19	1000	PASS
Styrene	<0.19	450	PASS
1,4-Dichlorobenzene	<0.19	400	PASS
Epichlorohydrin	<0.10	1.5	PASS
Ethylene glycol	<0.19	200	PASS
1-Methoxy-2-propanol	<0.19	3500	PASS
Vinyl acetate	<0.19	100	PASS
Toluene	<0.19	150	PASS
Chlorobenzene	<0.19	500	PASS
Phenol	<0.19	100	PASS
2-Methoxyethanol	<0.19	30	PASS
Ethylene glycol monomethyl ether acetate	<0.19	45	PASS
n-Hexane	<0.19	3500	PASS
2-Ethoxyethanol	<0.19	35	PASS
2-Ethoxyethyl acetate	<0.19	150	PASS
1,4-Dioxane	<0.19	1500	PASS
Tetrachloroethylene	<0.19	17.5	PASS
Formaldehyde	0.84	16.5	PASS
Isopropanol	<0.19	3500	PASS
Chloroform	<0.19	150	PASS
N,N-Dimethyl formamide	<0.19	40	PASS
Benzene	<0.19	30	PASS
1,1,1-Trichloroethane	<0.19	500	PASS
Acetaldehyde	0.42	70.0	PASS
Methylene chloride	<0.19	200	PASS
Carbon disulfide	<0.19	400	PASS
Trichloroethylene	<0.19	300	PASS
1-Methyl-2-pyrrolidone	<0.19	160	PASS
Naphthalene	<0.19	4.5	PASS
Xylenes (m-, o-, p-xylene combined)	<0.19	350	PASS

* Criteria based on California Office of Environmental Health Hazards reference exposure VOC limits in the CDPH Standard Method. Compared to ANSI/BIFMA e3-2012 workstation limits when modeled to classroom scenario as specified in Section 7.6

Table III
Predicted Formaldehyde Concentrations ($\mu\text{g}/\text{m}^3$) at 336 Hours Comparison to ANSI/BIFMA e3-2012 Section 7.6.3 Concentration Limits

	Predicted Concentrations from Table	Maximum Allowable Concentration for Workstations	Testing Comments
Formaldehyde	0.84	$\leq 9 \mu\text{g}/\text{m}^3$	PASS



Table IV
Comparison of Modeled Air Concentrations for a flipIT® Desk to the
CDPH/CHPS Emission Limits for Desks in a Classroom*

VOC Name	Airborne Concentration based on 14-Day Predicted Emission Factor	Referenced Emissions Limits for Desks	CHPS Compliance Comments
	CHPS Classroom** Modeling ($\mu\text{g}/\text{m}^3$)	CDPH $\frac{1}{2}$ Calif. CREL ($\mu\text{g}/\text{m}^3$)	
Acetaldehyde	0.42	70	PASS
Benzene	<0.19	30	PASS
Carbon disulfide	<0.19	400	PASS
Carbon tetrachloride	<0.19	20	PASS
Chlorobenzene	<0.19	500	PASS
Chloroform	<0.19	150	PASS
Dichlorobenzene (1,4-)	<0.19	400	PASS
Dichloroethylene (1,1)	<0.19	35	PASS
Dimethylformamide (N,N-)	<0.19	40	PASS
Dioxane (1,4-)	<0.19	1,500	PASS
Epichlorohydrin	<0.10	1.5	PASS
Ethylbenzene	<0.19	1,000	PASS
Ethylene glycol	<0.19	200	PASS
2-ethoxyethanol	<0.19	35	PASS
2-ethoxyethylacetate	<0.19	150	PASS
2-methoxyethanol	<0.19	30	PASS
2-methoxyethanol acetate	<0.19	45	PASS
Formaldehyde	0.84	9	PASS
Hexane (n-)	<0.19	3,500	PASS
Isophorone	<0.19	1,000	PASS
Isopropanol	<0.19	3,500	PASS
1,1,1-trichloroethane	<0.19	500	PASS
Methylene chloride	<0.19	200	PASS
MTBE	<0.19	4,000	PASS
Naphthalene	<0.10	4.5	PASS
Phenol	<0.19	100	PASS
1-methoxy-2-propanol	<0.19	3,500	PASS
Styrene	<0.19	450	PASS
Tetrachloroethylene	<0.19	17.5	PASS
Toluene	<0.19	150	PASS
Trichloroethylene	<0.19	300	PASS
Vinyl acetate	<0.19	100	PASS
Xylenes (m-,o-,p-)	<0.19	350	PASS

* Assuming a classroom ventilation rate as defined by CDPH Tables 4.2 and 4.3, and 27 desks per classroom.



CONCLUSIONS

Based on both the measured and extrapolated data, the flipIT® Desk is **compliant** with:

- ANSI/BIFMA e3-2012 Furniture Sustainability Standard Sections 7.6.1, 7.6.2, and 7.6.3 (Tables I, II, and III) when modeled to the CDPH classroom standard.
- The CDPH and CHPS Freestanding Furniture for classroom criteria (Table IV)
- LEED v4 and LEED for Schools by virtue of ANSI/BIFMA e3-2012 Section 7.6 and X7.1-2011 compliance.

Qualified project uses of the Smartdesks flipIT® Desk may be eligible for ANSI/BIFMA e3, CDPH/CHPS, and LEED credits.

By successful conformance with the ANSI/BIFMA e3, LEED, and CDPH/CHPS standards, the desk and all bracketed tables meet the criteria of **MAS Certified Green®**.

Note: 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.

LIMITATIONS

This report is intended for the use of Smartdesks only. If other parties wish to rely on this report, please have them contact us so that a mutual understanding and agreement of the terms and conditions for our services can be established prior to their use of this information. This report shall not be reproduced, except in full, without the written approval of Materials Analytical Services, LLC.

Product emissions generally decay over time, and the representativeness of the analytical data reported is directly dependant upon the age and conditions under which the tested sample was received.

All MAS-issued certifications for product emissions testing are valid for a period of one year from the date of this emissions testing compliance report. Compliance certifications are strictly limited to only the referenced product tested and/or specific variations and bracketed products explicitly referenced in the Emissions Testing Compliance Report.

APPENDIX A

Chains-of-Custody



Materials Analytical Services LLC

3945 Lakefield Court
Suwanee, Georgia 30024
Phone: 770-868-3200
Fax: 770-868-3259

FURNITURE EMISSIONS TESTING CHAIN OF CUSTODY PER



Standard Practice
(Section 01350)

BIFMA International

FES M7.1

Client Information
Company: CBT SUPPLY, INC. DBA SMARTDESKS
Street Address: 83 JACOBS ROAD
City/State: ROCKAWAY, NJ
Zip/Postal Code: 07866
Country: USA
Contact Name: JEFF KORBER
Title: CEO
Phone Number: 410-960-8027
Fax Number:
Email Address: JKORBER@SMARTDESKS.COM

Manufacturer Information (if different than client)
Company: WEBER KNAPP
City/State/Country: JAMESTOWN, NY USA
Contact Name/Title: DAVE BACKUS
Phone Number: 716-484-9135

Sample Details
Product Name & Catalog #: FIK-19-KIT-BL
Product Type: Finish System only <input type="checkbox"/> , Substate Board only <input type="checkbox"/> , Finished Casegoods exemplar <input type="checkbox"/> , Hard Seating exemplar <input type="checkbox"/> , Seat covering only <input type="checkbox"/> , Upholstered cushion <input type="checkbox"/> , Assembled Furniture (systems workstation <input type="checkbox"/> , desk <input type="checkbox"/> , chair <input type="checkbox"/> , other <input type="checkbox"/>) Other <input type="checkbox"/>
Date of Product Manufacturing Completion: 05/19/14
Sample Collection Location: Factory <input type="checkbox"/> , Warehouse <input type="checkbox"/> , Vendor Supplied <input type="checkbox"/>
Date of Sample Shipment: 5/19/2014
Number of Boxes or Pallets: 1

Shipping Details
Packed By:
Shipping Date: 05/19/14
Carrier/Airbill Number: UPS 1Z12979603001533367

Testing Specifications (per MAS) check appropriate test below
<input type="checkbox"/> R&D (custom) Specify Details
<input type="checkbox"/> 24-hour R&D Test: BIFMA 4 Compounds + Top 10 IVOCs <input type="checkbox"/> , CDPH/ BIFMA 35 Compounds <input type="checkbox"/>
<input type="checkbox"/> 72-hour R&D Test: BIFMA 4 Compounds + Top 10 IVOCs <input type="checkbox"/> , CDPH/ BIFMA 35 Compounds <input type="checkbox"/>
<input type="checkbox"/> Cleanroom: Testing and Certification <input type="checkbox"/>
<input type="checkbox"/> 7-day BIFMA M7.1 Test only: Sys. Workstation <input type="checkbox"/> , Seating <input type="checkbox"/> , Ind. Component <input type="checkbox"/> , Other <input type="checkbox"/>
<input type="checkbox"/> 7-day BIFMA M7.1 w/ Power Law to 14-day Standards: Sys. Workstation <input type="checkbox"/> , Seating <input type="checkbox"/> , Ind. Component <input type="checkbox"/> , Other <input type="checkbox"/>

Furniture Construction Details (as applicable)
Covering Type: Fabric <input type="checkbox"/> (Primary Fiber type: _____), Vinyl <input type="checkbox"/> , Leather <input type="checkbox"/>
Plastic Type(s): Nylon <input type="checkbox"/> , PVC <input type="checkbox"/> , PE <input type="checkbox"/> , PP <input type="checkbox"/> , PU <input type="checkbox"/> , PS <input type="checkbox"/> , PC <input type="checkbox"/> , ABS <input type="checkbox"/> , Acrylic <input type="checkbox"/> , Lexan <input type="checkbox"/>
Substrate Type(s): MDF <input type="checkbox"/> , Particle Board <input type="checkbox"/> , Plywood <input type="checkbox"/> , Solid Wood <input type="checkbox"/> , Other <input type="checkbox"/>
Outer Finish Type(s): Oil Base <input type="checkbox"/> , Water Base <input type="checkbox"/> , Catalyzed/Conversion Var <input type="checkbox"/> , Polyurethane <input type="checkbox"/> , Plastic Laminate <input type="checkbox"/> , Melamine <input type="checkbox"/> , UV <input type="checkbox"/> , Other <input type="checkbox"/>
Foam Type: Polyurethane <input type="checkbox"/> , Memory <input type="checkbox"/> , Latex <input type="checkbox"/> , Evlon <input type="checkbox"/> , High Resilience <input type="checkbox"/> , High Density <input type="checkbox"/>
Paint Type: Latex <input type="checkbox"/> , Oil <input type="checkbox"/> , Low VOC <input type="checkbox"/> , No VOCs <input type="checkbox"/> , PowderCoat <input type="checkbox"/> , Chrome <input type="checkbox"/>

Special Notes or Comments from Manufacturer:
<input type="checkbox"/> Residential/Dorm Furniture
<input type="checkbox"/> Concentration Room Modeling, <input type="checkbox"/> Maximum Emission Factors
Alt. Email Address for Reporting of Data:

Laboratory Receipt (to be completed by Laboratory Representative)
Received By: <i>Seas</i>
Received Date: <i>5/21/14</i>
Condition of Shipping Package: <i>OK</i>
Condition of Sample: <i>OK</i>
Sample Location:
Sample Disposition:
Remarks:

Sample Handling				
Relinquished By	Company	Received By	Company	Date/Time
		<i>Seas</i>	<i>MAS</i>	<i>5/21/14</i>



1400714

Materials Analytical

Services LLC

3945 Lakefield Court
 Suwanee, Georgia 30024
 Phone: 770-866-3200
 Fax: 770-866-3259

**FURNITURE EMISSIONS TESTING
 CHAIN OF CUSTODY PER**



Standard Practice
 (Section 01350)

BIFMA International

FES M7.1

Client Information
Company: CBT SUPPLY, INC. DBA SMARTDESKS
Street Address: 83 JACOBS ROAD
City/State: ROCKAWAY, NJ
Zip/Postal Code: 07866
Country: USA
Contact Name: JEFF KORBER
Title: CEO
Phone Number: 410-960-8027
Fax Number:
Email Address: JKORBER@SMARTDESKS.COM

Testing Specifications (per MAS) check appropriate test below
<input type="checkbox"/> R&D (custom): Specify Details
<input type="checkbox"/> 24-hour R&D Test: BIFMA 4 Compounds + Top 10 IVOCs <input type="checkbox"/> CDPH/ BIFMA 35 Compounds <input type="checkbox"/>
<input type="checkbox"/> 72-hour R&D Test: BIFMA 4 Compounds + Top 10 IVOCs <input type="checkbox"/> CDPH/ BIFMA 35 Compounds <input type="checkbox"/>
<input type="checkbox"/> Cleanroom: Testing and Certification <input type="checkbox"/>
<input type="checkbox"/> 7-day BIFMA M7.1 Test only: Sys. Workstation <input type="checkbox"/> Seating <input type="checkbox"/> Ind. Component <input type="checkbox"/> Other <input type="checkbox"/>
<input type="checkbox"/> 7-day BIFMA M7.1 w/ Power Law to 14-day Standards: Sys. Workstation <input type="checkbox"/> Seating <input type="checkbox"/> Ind. Component <input type="checkbox"/> Other <input type="checkbox"/>

Manufacturer Information (if different than client)
Company: VALLEY DESIGN
City/State/Country: FOUNTAIN, MN USA
Contact Name/Title: SHELLY TOPNESS
Phone Number: 800-738-1918 X 36

Furniture Construction Details (as applicable)
Covering Type: Fabric <input type="checkbox"/> (Primary Fiber type: _____), Vinyl <input type="checkbox"/> Leather <input type="checkbox"/>
Plastic Type(s): Nylon <input type="checkbox"/> PVC <input type="checkbox"/> PE <input type="checkbox"/> PP <input type="checkbox"/> PU <input type="checkbox"/> PS <input type="checkbox"/> PC <input type="checkbox"/> ABS <input type="checkbox"/> Acrylic <input type="checkbox"/> Lexan <input type="checkbox"/>
Substrate Type(s): MDF <input type="checkbox"/> Particle Board <input type="checkbox"/> Plywood <input type="checkbox"/> Solid Wood <input type="checkbox"/> Other <input type="checkbox"/>
Outer Finish Type(s): Oil Base <input type="checkbox"/> Water Base <input type="checkbox"/> Catalyzed/Conversion Var <input type="checkbox"/> Polyurethane <input type="checkbox"/> Plastic Laminate <input type="checkbox"/> Melamine <input type="checkbox"/> UV <input type="checkbox"/> Other <input type="checkbox"/>
Foam Type: Polyurethane <input type="checkbox"/> Memory <input type="checkbox"/> Latex <input type="checkbox"/> Evlon <input type="checkbox"/> High Resilience <input type="checkbox"/> High Density <input type="checkbox"/>
Paint Type: Latex <input type="checkbox"/> Oil <input type="checkbox"/> Low VOC <input type="checkbox"/> No VOCs <input type="checkbox"/> PowderCoat <input type="checkbox"/> Chrome <input type="checkbox"/>

Sample Details
Product Name & Catalog #: SHL-3626-K19-LEGS
Product Type: Finish System only <input type="checkbox"/> Substrate Board only <input type="checkbox"/> Finished Casegoods exemplar <input checked="" type="checkbox"/> Hard Seating exemplar <input type="checkbox"/> Seat covering only <input type="checkbox"/> Upholstered cushion <input type="checkbox"/> Assembled Furniture (systems workstation <input type="checkbox"/> desk <input type="checkbox"/> chair <input type="checkbox"/> other <input type="checkbox"/> Other <input type="checkbox"/>
Date of Product Manufacturing Completion: 05/22/14
Sample Collection Location: Factory <input type="checkbox"/> Warehouse <input type="checkbox"/> Vendor Supplied <input checked="" type="checkbox"/>
Date of Sample Shipment: 5/22/2014
Number of Boxes or Pallets: 1

Special Notes or Comments from Manufacturer:
<input type="checkbox"/> Residential/Dorm Furniture
<input type="checkbox"/> Concentration Room Modeling <input type="checkbox"/> Maximum Emission Factors
All Email Address for Reporting of Data:

Shipping Details
Packed By:
Shipping Date:
Carrier/Airbill Number:

Laboratory Receipt (to be completed by Laboratory Representative)
Received By: Sean
Received Date: 5/21/14
Condition of Shipping Package: OK
Condition of Sample: OK
Sample Location:
Sample Disposition:
Remarks:

Sample Handling				
Relinquished By	Company	Received By	Company	Date/Time
JEFF KORBER	CBT SUPPLY	Sean	MAS	5/21/14



Materials Analytical

Services LLC

3945 Lakefield Court
 Suwanee, Georgia 30024
 Phone: 770-866-3200
 Fax: 770-866-3259

**FURNITURE EMISSIONS TESTING
 CHAIN OF CUSTODY PER**



Standard Practice
 (Section 01350)

BIFMA International

FES M7.1

Client Information
Company: CBT SUPPLY, INC. DBA SMARTDESKS
Street Address: 83 JACOBS ROAD
City/State: ROCKAWAY, NJ
Zip/Postal Code: 07866
Country: USA
Contact Name: JEFF KORBER
Title: CEO
Phone Number: 410-960-8027
Fax Number:
Email Address: JKORBER@SMARTDESKS.COM

Manufacturer Information (if different than client)
Company: NORTHERN CONTOURS
City/State/Country: FERGUS FALLS, MN USA
Contact Name/Title: MATT DAVIS
Phone Number: 218-736-2973

Sample Details
Product Name & Catalog #: SHL-3626-K19-TOP & MP
Product Type: Finish System only <input type="checkbox"/> Substrate Board only <input type="checkbox"/> Finished Casegoods exemplar <input type="checkbox"/> Hard Seating exemplar <input type="checkbox"/> Seat covering only <input type="checkbox"/> Upholstered cushion <input type="checkbox"/> Assembled Furniture (systems workstation <input type="checkbox"/> desk <input type="checkbox"/> chair <input type="checkbox"/> other <input type="checkbox"/> Other <input type="checkbox"/>
Date of Product Manufacturing Completion: 05/21/14
Sample Collection Location: Factory <input type="checkbox"/> Warehouse <input type="checkbox"/> Vendor Supplied <input type="checkbox"/>
Date of Sample Shipment: 5/21/2014
Number of Boxes or Pallets: 1

Shipping Details
Packed By: MARC
Shipping Date: 05/21/14
Carrier/Airbill Number: OLD DOMINION BOL#5042768

Testing Specifications (per MAS) check appropriate test below
<input type="checkbox"/> R&D (custom): Specify Details
<input type="checkbox"/> 24-hour R&D Test: BIFMA 4 Compounds + Top 10 IVOCs <input type="checkbox"/> CDPH/ BIFMA 35 Compounds <input type="checkbox"/>
<input type="checkbox"/> 72-hour R&D Test: BIFMA 4 Compounds + Top 10 IVOCs <input type="checkbox"/> CDPH/ BIFMA 35 Compounds <input type="checkbox"/>
<input type="checkbox"/> Cleanroom: Testing and Certification <input type="checkbox"/>
<input type="checkbox"/> 7-day BIFMA M7.1 Test only: Sys. Workstation <input type="checkbox"/> Seating <input type="checkbox"/> Ind. Component <input type="checkbox"/> Other <input type="checkbox"/>
<input type="checkbox"/> 7-day BIFMA M7.1 w/ Power Law to 14-day Standards: Sys. Workstation <input type="checkbox"/> Seating <input type="checkbox"/> Ind. Component <input type="checkbox"/> Other <input type="checkbox"/>

Furniture Construction Details (as applicable)
Covering Type: Fabric <input type="checkbox"/> (Primary Fiber type: _____), Vinyl <input type="checkbox"/> Leather <input type="checkbox"/>
Plastic Type(s): Nylon <input type="checkbox"/> PVC <input type="checkbox"/> PE <input type="checkbox"/> PP <input type="checkbox"/> PU <input type="checkbox"/> PS <input type="checkbox"/> PC <input type="checkbox"/> ABS <input type="checkbox"/> Acrylic <input type="checkbox"/> Lexan <input type="checkbox"/>
Substrate Type(s): MDF <input type="checkbox"/> Particle Board <input type="checkbox"/> Plywood <input type="checkbox"/> Solid Wood <input type="checkbox"/> Other <input type="checkbox"/>
Outer Finish Type(s): Oil Base <input type="checkbox"/> Water Base <input type="checkbox"/> Catalyzed/Conversion Var <input type="checkbox"/> Polyurethane <input type="checkbox"/> Plastic Laminate <input type="checkbox"/> Melamine <input type="checkbox"/> UV <input type="checkbox"/> Other <input type="checkbox"/>
Foam Type: Polyurethane <input type="checkbox"/> Memory <input type="checkbox"/> Latex <input type="checkbox"/> Evlon <input type="checkbox"/> High Resilience <input type="checkbox"/> High Density <input type="checkbox"/>
Paint Type: Latex <input type="checkbox"/> Oil <input type="checkbox"/> Low VOC <input type="checkbox"/> No VOCs <input type="checkbox"/> PowderCoat <input type="checkbox"/> Chrome <input type="checkbox"/>

Special Notes or Comments from Manufacturer:
<input type="checkbox"/> Residential/Dorm Furniture
<input type="checkbox"/> Concentration Room Modeling <input type="checkbox"/> Maximum Emission Factors
Alt. Email Address for Reporting of Data:

Laboratory Receipt (to be completed by Laboratory Representative)
Received By: <i>Seas</i>
Received Date: <i>5/21/14</i>
Condition of Shipping Package: <i>OK</i>
Condition of Sample: <i>OK</i>
Sample Location:
Sample Disposition:
Remarks:

Sample Handling				
Relinquished By	Company	Received By	Company	Date/Time
	CBT SUPPLY	<i>Seas</i>	<i>MAS</i>	<i>5/21/14</i>

APPENDIX B

Scope of ANSI/BIFMA, LEED and CHPS Emissions Bracketing Program for Smartdesks Products

Qualified Products & Options¹

Effective: June 2014 through June 2015

Classroom Systems

MacTable™
Pi™ Collaboration Tables
Newpath™ Laptop Desks
HorizonLine™ Tables
flipIT® Computer Desks*

Conference Tables

Piano Solo™ Conference Tables
Piano Duet™ Conference Tables
Piatto™ Conference Tables
Motif™ Modular Tables
Equator™ Modular Tables

Podiums

flipIT® Podiums
MVC Podiums
flipIT® Plus Storage
FP Series
Quark™

Teleconferencing

Qstar™ Mobile Tables
Equator™ Teleconference Table
Boomerang™ Conferencing
Mobile Equipment Cabinets
exchange™ Collaboration Tables

Monitor Supports

eMotion™ Monitor Lift Cabinet
flipIT® Monitor Support
Monitor Lift Computer Table

1 - Inclusive of all edge profiles, wood finish species and colors, tops, and metal options

* Product tested as a representative exemplar of the entire product line of listed desks and desk combinations

APPENDIX C

GENERAL TESTING PROTOCOL AND DATA

Under the provisions of the testing methods referenced in this report, testing consisted of the following procedural steps:

- Specific procedures for specimen receiving, handling, and preparation.
- Storage of test specimens in original shipping containers prior to emissions testing for up to 10 days in a ventilated and conditioned room maintained at a temperature of $23 \pm 2^\circ\text{C}$ and a relative humidity of $50\% \pm 10\%$.
- For quality assurance purposes the emission chamber is purged and the interior thoroughly cleaned to remove residual compounds prior to all new product tests. Air samples were collected and analyzed from the chamber exhaust prior to loading to establish background levels.
- Collection of air samples at method-specified intervals from the chamber exhaust port utilizing mass flow controllers calibrated at 200cc/min for VOCs and 300cc/min for aldehydes.
- Tenax TA® tubes were used for VOC analysis which was performed by thermal desorption gas chromatography/mass spectrometry (TD-GC/MS) using a modified EPA TO-17 method. For quality assurance purposes all thermal desorption samples were drawn in duplicate and analyzed separately. Samples were also collected on DNPH tubes for aldehyde analysis which was performed using High Performance Liquid Chromatography (HPLC) using a modified NIOSH 2016 method.
- Instrument calibration, analysis of quality control samples and quantitation of the CDPH Standard Practice and ANSI/BIFMA target list of chemicals of concern.
- Tentative identification of top 10 individual volatile organic compounds (IVOCs).

No additions to, deviations from, or exclusions from the test methods referenced in this report were made.

Summary of Operational Parameters used During Testing

Parameter	Symbol	Units	Value
Chamber Volume	V	m^3	1.0
Loading Factor	L	Unit m^{-3}	1.208
Air Exchange Rate	a	h^{-1}	1.0 ± 0.05
Clean Air Supply Flow Rate	q_A	m h^{-1}	0.828
Temperature	T	$^\circ\text{C}$	23 ± 1
Relative Humidity	RH	%	50 ± 5

Table C-I
Chamber Concentration of VOCs between n-C₆ and n-C₁₆ Measured by GC/MS and Chamber Concentration of Formaldehyde, Acetaldehyde & Total Aldehydes Measured by HPLC (µg/m³)

VOC Name	72 nd hour				168 th hour			
	#1	#2	Mean	% diff.	#1	#2	Mean	% diff.
TVOC _{Toluene} *	49	41	45	19.0%**	30	33	32	8.4%
4-Phenylcyclohexene	<0.7	<0.7	<0.7	0.0%	<0.7	<0.7	<0.7	0.0%
Formaldehyde	3.9	2.8	3.3	32.8%**	4.9	4.2	4.5	15.4%**
Acetaldehyde	3.2	2.7	2.9	16.9%**	2.8	2.8	2.8	0.0%
Total Aldehydes ¹	34	33	33	3.0%	37	35	36	5.6%
Top 10 IVOCs	#1	#2	Mean	% diff.	#1	#2	Mean	% diff.
hexanal	18	19	18	2.8%	20	19	19	5.4%
pentanal	6.8	6.8	6.8	0.0%	7.4	7.2	7.3	3.1%
1-ethyl-2-pyrrolidinone ‡	6.2	6.4	6.3	1.9%	4.9	5	4.9	1.0%
1-methyl-2-pyrrolidone	3.6	3.4	3.5	2.4%	3.2	3.2	3.2	1.2%
caprolactam ‡	2.2	1.9	2	7.2%	1.5	1.4	1.4	6.1%
nonanal	2.1	2.4	2.2	6.3%	1.7	1.6	1.6	10.2%
1-butanol	1.8	2.2	2	9.6%	1.5	1.8	1.7	14.0%
No other IVOCs were detected above laboratory limits								

* - TVOC values are background corrected

** - Values between duplicate samples exceed 15% variability; as such statistical reliability of data may be an issue

‡ - Chemical compounds tentatively identified by library search using the average response factor of toluene calibration standards

1- Total aldehydes is defined as the sum of all normal aldehydes between n-C₁ and n-C₉ plus benzaldehyde.

Table C-II
Calculated and Predicted Emission Factors (µg/m²hr) for TVOC_{Toluene}, 4-PC, Formaldehyde, Acetaldehyde, Total Aldehydes and Top 10 IVOCs and Power-Law Model Coefficient

VOC Name	Emission Factor		Power-law Model Coefficients for E=a t ^{-b}		Predicted Emission Factor
	72 nd hour	168 th hour	a	b*	336 th hour
TVOC _{Toluene}	37	26	219.5	0.415	20
4-Phenylcyclohexene	<0.60	<0.60	0.550	0.000	<0.60
Formaldehyde	2.8	3.8	0.5846	-0.3629	4.8
Acetaldehyde	2.4	2.4	2.8370	0.0363	2.4
Total Aldehydes	28	30	NA	NA	30
TOP 10 IVOCs	72nd hour	168th hour	a	b	336th hour
hexanal	15	16	11	-0.073	16
pentanal	5.6	6.0	3.8	-0.09	5.8
1-ethyl-2-pyrrolidinone ‡	5.2	4.1	17.8	0.287	3.4
1-methyl-2-pyrrolidone	2.9	2.6	4.7	0.115	2.8
caprolactam ‡	1.7	1.2	9.6	0.41	0.89
nonanal	1.9	1.4	9	0.369	1.0
1-butanol	1.7	1.4	4.5	0.232	1.2
No other IVOCs were detected above laboratory limits					

* - If power law coefficient "b" is -0.15<b<0.15, the emission factor trend is considered to be steady state and the predicted 336th hour emission factor is the average of the 72nd and 168th hour emission factors.

‡ - Chemical compounds tentatively identified by library search using the average response factor of toluene calibration standards

Table C-III
Predicted Concentrations in a Typical Classroom* Environment
For the Smartdesks flipIT® Desk ($\mu\text{g}/\text{m}^3$)

VOC Name	Based on the Measured Data		Based on the Predicted Data
	72 nd hour (3 days)	168 th hour (7 days)	336 th hour (14 days)
TVOC	6.5	4.6	3.4
4-phenylcyclohexene	<0.10	<0.10	<0.10
Formaldehyde	0.48	0.65	0.84
Acetaldehyde	0.42	0.41	0.42
Total Aldehydes	4.8	5.1	5.2
Top 10 IVOCs			
hexanal	2.6	2.8	2.7
pentanal	0.97	1.1	1.0
1-ethyl-2-pyrrolidinone ‡	0.91	0.71	0.58
1-methyl-2-pyrrolidone	0.51	0.46	0.48
caprolactam ‡	0.29	0.20	0.15
nonanal	0.32	0.24	0.18
1-butanol	0.29	0.24	0.20
No other IVOCs were detected above laboratory limits			

* - Assuming 27 desks in a classroom with a volume of 231 cubic meters, a ventilated volume fraction of 0.9% (or 90% of the room volume being exchanged) and an airflow rate of 191 m^3/hr as defined by CHPS criteria, 2010, for low emitting furniture & furnishings.

‡ - Chemical compounds tentatively identified by library search using the average response factor of toluene calibration standards