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HEALTHCARE CO., LTD.
TEST REPORT

SCOPE OF WORK
CertiPUR-US® Technical Guidelines for Slabstock Foam (January 2019) on Regular Foam

REPORT NUMBER
103814770GRR-001

ISSUE DATE
08-February-2019

PAGES
15

DOCUMENT CONTROL NUMBER
Per GFT-OP-10 (6-March-2017)

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TEST REPORT FOR HEALTHCARE CO.,LTD

Report No.: 103814770GRR-001
Date: 08-February-2019
P.O.: 2019-01-17

SECTION 1

CLIENT INFORMATION

Attention: Sunny
Healthcare Co., LTD.
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Rugao City, Jiangsu, China
Phone: +86-0513-68169457
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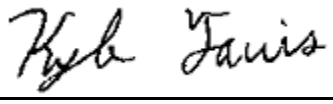
Taylor Gebben
Project Engineer



Kyle Tanis
Project Reviewer

SECTION 2
SUMMARY AND CONCLUSION

Test Method:	CertiPUR-US® Technical Guidelines for Slabstock Foam (January 2019)
Dates Tested:	22-January-2019 to 05-February-2019

DESCRIPTION OF SAMPLES

Product Name	Regular Foam
Product Category	Not Specified
Manufacturer / Location	Healthcare Co. / China
Date of Manufacture	03-January-2019
Date of Collection	07-January-2019
Date of Shipment	08-January-2019
Date Received by Lab	15-January-2019
Sample Condition	Good Condition
Samples Submitted	Five (5) Blocks of Foam
Lab Sample ID	GRR1901150006

WORK REQUESTED/APPLICABLE DOCUMENTS

VOC Emissions Analysis:	CertiPUR-US® Technical Guidelines for Slabstock Foam (January 2019) Section 3 and Section 4.
Intertek Quote:	Qu-00949047-1

TEST RESULTS

ACCEPTANCE CRITERIA	DISPOSITION (PASS/FAIL)
3 Emissions	**PASS**
4 Substances of Concern	
4.1 Metals of Concern	**PASS**
4.2 Tributyltin	**PASS**
4.3 Phthalates	**PASS**
4.4 TDA/MDA	**PASS**
4.5 Flame Retardant	**PASS**

SAMPLE DISPOSITION

At the completion of testing, samples were disposed of in a routine manner.

SECTION 3

3. CHAMBER EMISSIONS

Date Received:	15-January-2019
Dates Tested:	22-January-2019 to 05-February-2019

DESCRIPTION OF SAMPLES:

Product Name:	Regular Foam
Material Submitted:	Five (5) Blocks of Foam

TEST PROCEDURE:

Test Method:	CertiPUR-US® Technical Guidelines for Slabstock Foam (January 2019) Section 3 and ISO 16000 (2011) Sec. 6, 9, & 11
Sample Preparation:	Samples were cut from the original part using clean scissors and razor knife.
Number of Samples:	One (1) sample per material

ACCEPTANCE CRITERIA:

CertiPUR-US® Technical Guidelines Section 3 (January 2019)

TEST SUMMARY:

The emissions testing was performed according to ISO 16000 (2011). For cut sample, two sides were trimmed to obtain a loading factor of 0.4 m^2 m^{-3} using a vertical band saw. The sample was placed in the testing chamber for 72 hours 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 test chamber (0 hours) and at 72 hours after placement in the test chamber. The 72 hour samples were collected in duplicate. Samples analyzed for individual VOCs and TVOC were collected on multi-sorbent tubes containing Tenax TA 35/60. Substances not retained by this sorbent system could not be monitored with reliability, including butadiene and vinyl chloride. The VOC samples were analyzed by thermal desorption-gas chromatography/mass-spectroscopy, TD-GC/MS. TVOC was calculated using toluene as a surrogate. Individual VOCs were calculated using calibration curves based on pure standards. Samples analyzed for formaldehyde were collected on tubes treated with 2,4-di-nitrophenylhydrazine (DNPH). Formaldehyde was analyzed using high performance liquid chromatography, HPLC. All observed concentrations preceded by a “<” sign provide the method detection limit and indicate that the chemical concentration was found to be below this limit.

RESULTS:

Table 1: Sample and Chamber Conditions During Test Period

PARAMETER		SYMBOL	VALUE	UNITS
Sample Dimensions	Length	-	0.152	m
	Width	-	0.064	m
	Thickness	-	0.063	m
Exposed Sample Surface Area		*A*	0.047	m^2
Chamber Volume		*V*	0.116**	m^3
Chamber Loading Factor		*L*	0.4	$m^2\ m^{-3}$
Inlet Air Flow Rate		*Q*	0.0582	$m^3\ h^{-1}$
Air Change Rate		N_{ACH}	0.50	h^{-1}
Area Specific Flow Rate		q_A	1.25	$m\ h^{-1}$
Testing Duration		t	72	h
Chamber Pressure (Range)		P	18.9 (17.1-21.1)	Pa
Average Temperature (Range)		T	23.2 (22.9-23.5)	°C
Average Humidity (Range)		RH	50.0 (48.5-50.7)	% RH

**Chamber volume is a deviation from the 0.5 or 1 m^3 chamber volume specified in CertiPUR-US® Section 3 (January 2019). Sample surface area was adjusted appropriately to meet the loading factor requirement of 0.4 $m^2\ m^{-3}$.

Table 2: Summary and Pass/Fail Criteria based on the VOC emissions at 72 h in Section 3.

CHEMICAL NAME	CAS No.	ACCEPTANCE CRITERIA (mg/m^3)	OBSERVED CONCENTRATION (mg/m^3)
Formaldehyde	50-00-0	< 0.1	0.003
Benzene	71-43-2	< 0.5	< 0.001
Toluene	108-88-3	< 0.5	< 0.001
Styrene	100-42-5	< 0.3	< 0.001
4-Vinylcyclohexene	100-40-3	BDL*	< 0.001
4-Phenylcyclohexene	4994-16-5	BDL*	< 0.001
Butadiene	106-99-0	BDL*	BDL**
Vinyl Chloride	75-01-4	BDL*	BDL**
Aromatic Hydrocarbons	-	< 0.5	< 0.002
TVOC Emissions	-	< 0.5	0.029

All observed concentrations preceded by a "<" sign provide the method detection limit and indicate that the chemical concentration was found to be below this limit.
*BDL – Below Detection Limit
**Note: Butadiene and Vinyl Chloride are not retained by Tenax TA 35/60.

SECTION 4

4.1.1 METALS OF CONCERN

Date Received:	15-January-2019
Dates Tested:	24-January-2019 to 29-January-2019

DESCRIPTION OF SAMPLES:

Product Name:	Regular Foam
Material Submitted:	Five (5) Blocks of Foam

TEST PROCEDURE:

Test Method:	CertiPUR-US® Technical Guidelines for Slabstock Foam (January 2019) Section 4
Sample Preparation:	Samples were cut from the original part using clean scissors and razor knife.
Number of Samples:	One (1) sample per material

ACCEPTANCE CRITERIA:

CertiPUR-US® Technical Guidelines for Slabstock Foam (January 2019) Section 4

TEST SUMMARY:

The 0.2 in x 0.2 in x 0.2 in (5 mm x 5 mm x 5 mm) sample was cut by the laboratory and extracted for 8 hours with an artificial acidic sweat solution (cf. ISO 105-E04 (1994)) at 40°C on a shaking water bath using a ratio S/L=1/20 (S=solid, L=liquid) followed by Inductively Coupled Plasma (ICP) analysis. All observed concentrations preceded by a "<" sign provide the method detection limit and indicate that the chemical concentration was found to be below this limit.

RESULTS:

Table 3: Summary and Pass/Fail Criteria based on metal concentrations in Section 4.1.

CHEMICAL NAME	CAS No.	ACCEPTANCE CRITERIA (ppm)	OBSERVED CONCENTRATION (ppm)
Antimony (Sb)	7440-36-0	0.5	< 0.050
Arsenic (As)	7440-38-2	0.2	< 0.050
Cadmium (Cd)	7440-43-9	0.1	< 0.050
Chromium total (Cr)	7440-47-3	1.0	< 0.050
Cobalt (Co)	7440-48-4	0.5	< 0.050
Copper (Cu)	7440-50-8	2.0	0.138
Lead (Pb)	7439-92-1	0.2	< 0.050
Nickel (Ni)	7440-20-0	1.0	< 0.050
Mercury (Hg)	7439-97-6	0.02	< 0.005
Selenium (Se)	7782-49-2	0.5	< 0.4

All observed concentrations preceded by a "<" sign provide the method detection limit and indicate that the chemical concentration was found to be below this limit.
ppm = parts per million = mg/kg

SECTION 5

4.1.2 HEXAVALENT CHROMIUM

Date Received:	15-January-2019
Dates Tested:	24-January-2019 to 29-January-2019

DESCRIPTION OF SAMPLES:

Product Name:	Regular Foam
Material Submitted:	Five (5) Blocks of Foam

TEST PROCEDURE:

Test Method:	CertiPUR-US® Technical Guidelines for Slabstock Foam (January 2019) Section 4
Sample Preparation:	Samples were cut from the original part using clean scissors and razor knife.
Number of Samples:	One (1) sample per material

ACCEPTANCE CRITERIA:

CertiPUR-US® Technical Guidelines for Slabstock Foam (January 2019) Section 4

TEST SUMMARY:

Hexavalent Chromium Content was determined by UV-Visible Spectrophotometer (UV-Vis). All observed concentrations preceded by a "<" sign provide the method detection limit and indicate that the chemical concentration was found to be below this limit.

RESULTS:

Table 4: Summary and Pass/Fail Criteria based on chromium VI concentrations in Section 4.1.

CHEMICAL NAME	CAS No.	ACCEPTANCE CRITERIA (ppm)	OBSERVED CONCENTRATION (ppm)
Chromium VI (Cr VI)	18540-29-9	BDL*	< 2.5

All observed concentrations preceded by a "<" sign provide the method detection limit and indicate that the chemical concentration was found to be below this limit.
ppm = parts per million = mg/kg
*BDL – Below Detection Limits

SECTION 6

4.2 TRIBUTYLTIN

Date Received:	15-January-2019
Dates Tested:	24-January-2019 to 29-January-2019

DESCRIPTION OF SAMPLES:

Product Name:	Regular Foam
Material Submitted:	Five (5) Blocks of Foam

TEST PROCEDURE:

Test Method:	CertiPUR-US® Technical Guidelines for Slabstock Foam (January 2019) Section 4
Sample Preparation:	Samples were cut from the original part using clean scissors and razor knife.
Number of Samples:	One (1) sample per material

ACCEPTANCE CRITERIA:

CertiPUR-US® Technical Guidelines for Slabstock Foam (January 2019) Section 4

TEST SUMMARY:

The 0.2 in x 0.2 in x 0.2 in (5 mm x 5 mm x 5 mm) sample was by the laboratory and extracted for 1 hour with an artificial acidic sweat solution (cf. ISO 105-E04 (1994)) at 40°C by means of ultrasonic techniques, using a ratio S/L=1/20 (S=solid, L=liquid). The resulting extract was derivatized and analyzed by gas chromatography/mass spectrometry (GC/MS). All observed concentrations preceded by a "<" sign provide the method detection limit and indicate that the chemical concentration was found to be below this limit.

RESULTS:

Table 5: Summary and Pass/Fail Criteria based on tributyltin (TBT) concentrations Section 4.2.

CHEMICAL NAME	CAS No.	ACCEPTANCE CRITERIA (ppm)	OBSERVED CONCENTRATION (ppm)
Tributyltin (TBT)	688-73-3	< 0.5	< 0.5

All observed concentrations preceded by a "<" sign provide the method detection limit and indicate that the chemical concentration was found to be below this limit.
ppm = parts per million = mg/kg

SECTION 7

4.3 PHTHALATES

Date Received:	15-January-2019
Dates Tested:	24-January-2019 to 29-January-2019

DESCRIPTION OF SAMPLES:

Product Name:	Regular Foam
Material Submitted:	Five (5) Blocks of Foam

TEST PROCEDURE:

Test Method:	CertiPUR-US® Technical Guidelines for Slabstock Foam (January 2019) Section 4
Sample Preparation:	Samples were cut from the original part using clean scissors and razor knife.
Number of Samples:	One (1) sample per material

ACCEPTANCE CRITERIA:

CertiPUR-US® Technical Guidelines for Slabstock Foam (January 2019) Section 4

TEST SUMMARY:

Soxhlet extractor with an organic solvent (i.e. dichloromethane) followed by analysis with gas chromatography/mass spectrometry (GC/MS). All observed concentrations preceded by a "<" sign provide the method detection limit and indicate that the chemical concentration was found to be below this limit.

RESULTS:

Table 6: Summary and Pass/Fail Criteria based on phthalate concentrations in Section 4.3.

CHEMICAL NAME	CAS No.	ACCEPTANCE CRITERIA (wt %)	OBSERVED CONCENTRATION (wt %)
Di-2-ethylhexyl phthalate (DEHP)	117-81-7	Sum of 8 phthalates ≤ 0.01	< 0.001
Diisononyl phthalate (DINP)	28553-12-0		< 0.001
Diisobutyl phthalate (DIBP)	84-69-5		< 0.001
Di-n-pentyl phthalate (DPENP)	131-18-0		< 0.001
Butylbenzylphthalate (BBP)	85-68-7		< 0.001
Di-butyl phthalate (DBP)	84-74-2		< 0.001
Di-n-hexyl phthalate (DHEXP)	84-75-3		< 0.001
Dicyclohexyl phthalate (DCHP)	84-61-7		< 0.001

All observed concentrations preceded by a "<" sign provide the method detection limit and indicate that the chemical concentration was found to be below this limit.
wt % = percentage by weight

SECTION 8
4.4 TDA/MDA

Date Received:	15-January-2019
Dates Tested:	24-January-2019 to 25-January-2019

DESCRIPTION OF SAMPLES:

Product Name:	Regular Foam
Material Submitted:	Five (5) Blocks of Foam

TEST PROCEDURE:

Test Method:	CertiPUR-US® Technical Guidelines for Slabstock Foam (January 2019) Section 4
Sample Preparation:	Samples were cut from the original part using clean scissors and razor knife.
Number of Samples:	One (1) sample per material

ACCEPTANCE CRITERIA:

CertiPUR-US® Technical Guidelines for Slabstock Foam (January 2019) Section 4

TEST SUMMARY:

A sample was cut and extracted with 1% aqueous acetic acid solution. To achieve optimal sensitivity and selectivity, the extracts were analyzed using high pressure liquid chromatography with detection using mass spectrometry/mass spectrometry (HPLC/MS/MS). All observed concentrations preceded by a "<" sign provide the method detection limit and indicate that the chemical concentration was found to be below this limit.

RESULTS:

Table 7: Summary and Pass/Fail Criteria based on TDA and MDA concentrations in Section 4.4.

CHEMICAL NAME	CAS No.	ACCEPTANCE CRITERIA (ppm)	OBSERVED CONCENTRATION (ppm)
2,4-Toluenediamine (TDA)	95-80-7	≤ 5.0	0.42
4,4'-Diaminodiphenylmethane (MDA)	101-77-9	≤ 5.0	< 0.01
Sum of TDA (2,4) plus MDA (4,4')	-	≤ 5.0	0.42

All observed concentrations preceded by a "<" sign provide the method detection limit and indicate that the chemical concentration was found to be below this limit.
ppm = parts per million = mg/kg

SECTION 9

4.5 POLYBROMINATED FLAME RETARDANT ADDITIVES

Date Received:	15-January-2019
Dates Tested:	24-January-2019 to 29-January-2019

DESCRIPTION OF SAMPLES:

Product Name:	Regular Foam
Material Submitted:	Five (5) Blocks of Foam

TEST PROCEDURE:

Test Method:	CertiPUR-US® Technical Guidelines for Slabstock Foam (January 2019) Section 4
Sample Preparation:	Samples were cut from the original part using clean scissors and razor knife.
Number of Samples:	One (1) sample per material

ACCEPTANCE CRITERIA:

CertiPUR-US® Technical Guidelines for Slabstock Foam (January 2019) Section 4

TEST SUMMARY:

Extraction using heat and solvent under reflux. Resulting extract was analyzed by gas chromatography/mass spectrometry (GC/MS). All observed concentrations preceded by a "<" sign provide the method detection limit and indicate that the chemical concentration was found to be below this limit.

RESULTS:

Table 8: Summary and Pass/Fail Criteria based on Polybrominated Flame Retardant Additives concentrations in CertiPUR-US® Technical Guidelines for Slabstock Foam (January 2019) Section 4.5.

CHEMICAL NAME	CAS No.	ACCEPTANCE CRITERIA (wt %)	OBSERVED CONCENTRATION (wt %)
Pentabromodiphenyl ether	32534-81-9	≤ 0.01	< 0.01
Octabromodiphenyl ether	32536-52-0	≤ 0.01	< 0.01
Decabromodiphenyl ether	1163-19-5	≤ 0.01	< 0.01

All observed concentrations preceded by a "<" sign provide the method detection limit and indicate that the chemical concentration was found to be below this limit.
wt % = percentage by weight

PHOTOGRAPHS:

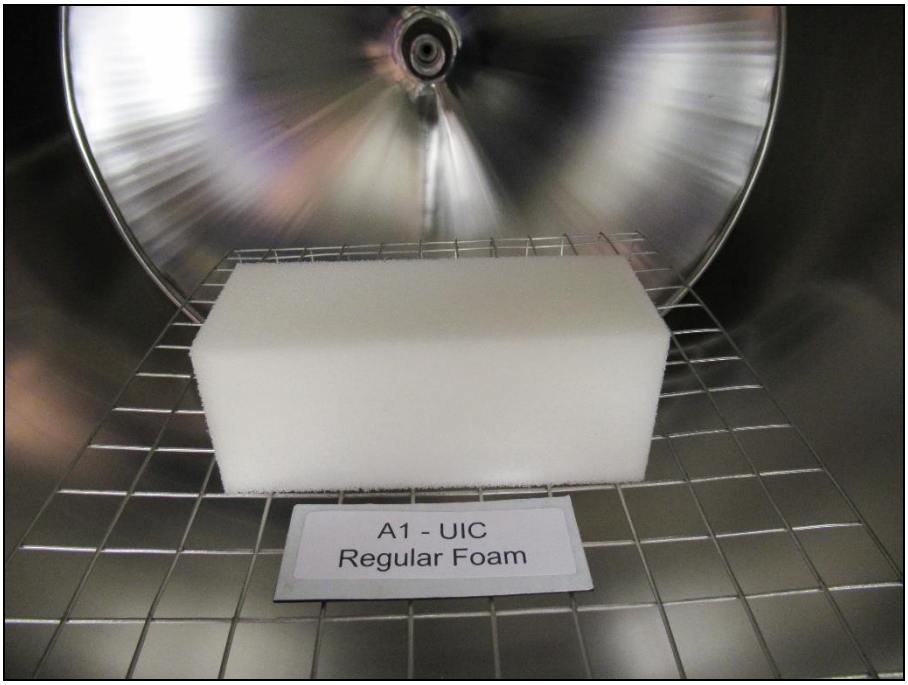


Figure 1: Photograph of sample in test chamber

SECTION 10

FACILITIES AND EQUIPMENT:

GCMS	
INSTRUMENTATION USED:	Markes TD-100 Thermal Desorption Agilent 7890A GC Agilent 5975C MS
COLUMN USED:	Agilent HP-Ultra 2 (GC)
HPLC	
INSTRUMENTATION USED:	Agilent 1260 Infinity Series
COLUMN USED:	Poroshell 120 EC-C18

SECTION 11
SAMPLE SUBMITTAL FORM

JANUARY 2, 2017 • UPDATE

Sample Submittal and Analytical Request CertiPUR-US® Certification Program

Attention: _____

Ship via express to:

Lab Name: _____

Address 1: _____

Address 2: _____

City / State / Zip: _____

Country _____

Invoice to:

Company Name: United (Qingdao) International Commerce

Email: Cynthia.guo@united-test.cn

Address 1: Room 1802, 39-1 DongTing South Road, Xishan District, Wuxi Jiangsu China

Address 2: _____

City / State / Zip: Wuxi / Jiangsu / China

Country: China

Attention: Cynthia Guo

P.O. Number: 1596180432Y

SAMPLE IS [CHECK ONE]:

☐ **Slabstock** Flexible Polyurethane Foam

☐ **Molded** Flexible Polyurethane Foam

Sample Identification:

Your Product Identification Code	regular foam
Foam Product Group *	regular foam
Brand Name of Foam (optional)	
Foam Density/IFD	28-30D / 40Ibf
Production Date	Jan. 03. 2019
Date Sample Cut (<7 days from Production)	Jan. 07. 2019
Date Sample Shipped	Jan. 08. 2019
Sample Arrival Date (<21 days from Production)	This information will be reported by the testing laboratory
Date VOC Chamber Testing Started (<42 days from Production)	This information will be reported by the testing laboratory

*See Section 8 for Product Grouping – If "other," please specify

Analytical Request:

TVOC Emissions Testing Extractable heavy metals
Tributyltin (TBT)
Sum of seven specified phthalates
Penta, Octa, Deca bromodiphenylethers (PBDE's) – flame retardants
2,4-Toluenediamine (TDA) and 4,4'-Diaminodiphenylmethane (MDA)
Specified Volatile Organic Compounds and total Volatile Organic Compounds