



# U.S. Voluntary Physical Performance and Environmental Guidelines for Prime Flexible Polyether Polyurethane Foam for Use in Furniture and Bedding

DECEMBER 10, 2014 REVISION



CertiPUR-US® is a program of the Alliance for Flexible Polyurethane Foam, Inc.  
[www.certipur.us](http://www.certipur.us)

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**T**hank you for your interest in the CertiPUR-US® program. For foam suppliers interested in certifying flexible polyurethane foam, this is the place to start – with the following pages that are the ***U.S. Voluntary Physical Performance and Environmental Guidelines for Prime Flexible Polyether Polyurethane Foam for Use in Furniture and Bedding.***

This document, we call the *Guidelines*, contains the technical requirements for certification of flexible polyurethane foams through the CertiPUR-US® program. The *Guidelines* were established with guidance from the global foam industry and in conjunction with the leadership of the mattress and upholstered furniture industries. In addition, an advisory panel of scientists, academics, environmentalists and representatives of consumer groups provided invaluable input in the development of the *Guidelines*.

The CertiPUR-US® program is a voluntary testing, analysis and certification program for flexible polyurethane foam used as a cushioning material in home furnishings such as adult mattresses, crib mattresses, upholstered furniture and some accessory comfort products. Certified flexible polyurethane foams are independently laboratory tested and certified to be:

- ▶ Made without ozone depleters
- ▶ Made without PBDE flame retardants
- ▶ Made without mercury, lead and heavy metals
- ▶ Made without formaldehyde
- ▶ Made without prohibited phthalates regulated by the Consumer Product Safety Commission
- ▶ Low VOC (Volatile Organic Compound) emissions for indoor air quality (less than 0.5 parts per million)

It is our policy to be transparent and to be responsive to changes in what we know about components of flexible polyurethane foam. We are continually evaluating information from the science community, stakeholders, and government and regulatory agencies to assess these *Guidelines*.

For that reason, we consider these *Guidelines* to be a living document that may be revised when good science and responsible regulatory concern warrant. Any changes are made by the consent of the Board of Directors of the Alliance for Flexible Polyurethane Foam, Inc., the organization that manages the CertiPUR-US® program.

Policies related to revisions of the document and appropriate forms to request a revision may be obtained through [info@afpf.com](mailto:info@afpf.com). Certification is restricted to prime flexible polyurethane foam made primarily with polyether polyols and intended for furniture and bedding applications. Any questions related to the certification requirements or process should also be directed to [info@afpf.com](mailto:info@afpf.com).

Please contact me for guidance in the certification process. From application to submission of samples to navigating the testing requirements to using the CertiPUR-US® seal if you achieve certification, we are here to assist you every step of the way.

Sincerely,

Executive Director  
CertiPUR-US® program  
Alliance for Flexible Polyurethane Foam, Inc.  
[mcrowell@certipur.us](mailto:mcrowell@certipur.us)  
828.455.6192

## Section 1

### Voluntary Internal Physical Performance Testing

Test	Pass	Test Method
1) Average Density <sup>1</sup>	Report	ASTM D3574 Test A
2) Average 25% IFD <sup>2</sup> and Tolerance	± 3.0 lbs or +/- 10% max <sup>3</sup>	ASTM D3574 Test B <sub>1</sub>
3) 25% IFD loss after Fatigue Test Only applies to foams within 25% IFD range <sup>4</sup> of 24 to 36 lbs (100 – 160 N)	Loss < 6 lbs (26.7 N)	ASTM D3574 Test I <sub>3</sub> (Procedure A) <sup>5</sup>
4) 75% Compression set HR-type and Melamine-filled Foams All others (Conventional, Viscoelastic, etc)	20.0% max 10.0% max	ASTM D3574 Test D
5) Humid Aged 75% Compression Set HR-type and Melamine-filled Foams All others (Conventional, Viscoelastic, etc)	30.0% max 10.0% max	ASTM D3574 Test D and J <sup>6</sup>

<sup>1</sup> Average Density from testing of 15" x 15" x 4" (380 mm x 380 mm x 102 mm) samples prepared by the procedure in Section 7 – "Sampling Procedure for Physical Testing"

<sup>2</sup> Average IFD @ 25% from testing of 15" x 15" x 4" (380 mm x 380 mm x 102 mm) samples prepared by the procedure in Section 7.

<sup>3</sup> Maximum deviation of ± 10% of the Average 25% IFD or of 3.0 lbs (13.3 N) – whichever is greater – by any single sample from the Average 25% IFD.

<sup>4</sup> Based on the Average 25% IFD in Test 2) using 15" x 15" x 4" (380 mm x 380 mm x 102 mm) samples. Test 3) does not apply to foams outside this range.

<sup>5</sup> Constant Force Pounding, 8000 cycles ASTM D3574 Test I3 (Procedure A) / ISO 3385

<sup>6</sup> ASTM 3574 Section J1 with Humid Aging followed by Section D Compression Set.

## Section 2

### Voluntary Manufacturer Certifications

Foam or adhesives processed with CFC or Other Ozone Depleters	No
Foam or adhesives processed with MeCl <sub>2</sub> or nPB (dichloromethane or n-propyl bromide)	No
Foam processed with BHT Polyol Additives	No
Foam processed with any PBDE Additives	No

## Section 3

### Voluntary Independent Laboratory Emissions Testing<sup>7</sup>

Substance	CAS-No.	Guideline Limit [mg/m <sup>3</sup> ]
Formaldehyde	50-00-0	<0.1
Benzene	71-43-2	<0.5
Toluene	108-88-3	<0.5
Styrene	100-42-5	<0.3
Vinylcyclohexene	100-40-3	< LOD*
4-Phenylcyclohexene	4994-16-5	< LOD*
Butadiene	106-99-0	< LOD*
Vinyl Chloride	75-01-4	< LOD*
Aromatic hydrocarbons		< 0.5
TVOC Emissions		< 0.5

<sup>7</sup> Average Density and Average 25% IFD measured using procedures in Section 1 must be reported for the foam production used in Analytical Testing.

\* Below the Limit of Detection

**Test Method:** ISO 16000 – Parts 6, 9 & 11 – with chamber conditioning for 72 hours.

## Section 4

### Voluntary Independent Laboratory Analysis

#### Metals of Concern

Substance	CAS-No.	Guideline Limit [ppm]
Antimony (Sb)	7440-36-0	0.5
Arsenic (As)	7440-38-2	0.2
Cadmium (Cd)	7440-43-9	0.1
Chromium total (Cr)	7440-47-3	1.0
Chromium VI (Cr VI)	18540-29-9	< LOD *
Cobalt (Co)	7440-48-4	0.5
Copper (Cu)	7440-50-8	2.0
Lead (Pb)	7439-92-1	0.2
Nickel (Ni)	7440-20-0	1.0
Mercury (Hg)	7439-97-6	0.02
Selenium (Se)	7782-49-2	0.5

\* Below the Limit of Detection

**Test Method:** The 0.2 in x 0.2 in x 0.2 in (5 mm x 5 mm x 5 mm) sample shall be 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). Determination by Atomic Absorption Spectroscopy (AAS) or Inductively Coupled Plasma (ICP). For Cr VI, by spectrophotometry (SP). The report must contain the measured level or show less than the value of the limit of detection, e.g. <0.05 not < LOD.

#### Tributyltin

Substance	CAS-No.	Guideline Limit [ppm]
Tributyltin (TBT)	688-73-3	0.5

**Test Method:** The 0.2 in x 0.2 in x 0.2 in (5 mm x 5 mm x 5 mm) sample shall be cut 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 extract is analyzed by gas chromatography (GC) or gas chromatography/mass spectrometry (GC/MS).

#### Phthalates

Substance	CAS-No.	Guideline Limit
Sum of 7 phthalates*		≤ 0.01 wt %

**Test Method:** Soxhlet extractor with an organic solvent (i.e. dichloromethane) followed by analysis with gas chromatography/mass spectrometry (GC/MS), or high performance liquid ultraviolet chromatography (HPLC/UV).

\* Phthalates include: Diisononyl phthalate CAS No - 28553-12-0; Di-n-octylphthalate CAS No - 117-84-0; Di-2-ethylhexyl phthalate CAS No -117-81-7; Di-isodecyl phthalate CAS No - 2676 1-40-0; Butylbenzylphthalate CAS No - 85-68-7; Di-butyl phthalate; CAS No - 84-74-2, and Di-n-hexyl phthalate CAS No - 84-75-3

#### TDA/MDA

Substance	CAS-No.	Guideline Limit
2,4 – Toluenediamine (TDA)	95-80-7	≤ 5.0 ppm
4,4' – Diaminodiphenylmethane (MDA)	10 1-77-9	≤ 5.0 ppm
Sum of TDA (2,4) plus MDA (4,4')	95-80-7 + 10 1-77-9	≤ 5.0 ppm

**Test Method:** A subsample shall be cut and extracted with 1% aqueous acetic acid solution. To achieve optimal sensitivity and selectivity, the extracts are analyzed using high pressure liquid chromatography with detection using mass spectrometry/mass spectrometry (HPLC/MS/MS).

## Polybrominated Flame retardant Additives

Substance	CAS-No.	Guideline Limit
pentabromodiphenyl ether	32534-81-9	≤ 0.01 wt %
octabromodiphenyl ether	32536-52-0	≤ 0.01 wt %
decabromodiphenyl ether	1163-19-5	≤ 0.01 wt %

**Test Method:** Analysis with gas chromatography/mass spectrometry (GC/MS)

## Section 5

### Prohibited Substances

#### R-Phrase (Based on European Union Risk Assessments)

R45 (may cause cancer)  
 R46 (may cause heritable genetic damage)  
 R49 (may cause cancer by inhalation)  
 R60 (may impair fertility)  
 R61 (may cause harm to the unborn child)

#### Blowing Agents

CFC  
 HCFC  
 Dichloromethane (methylene chloride)

#### Other Prohibited Substances

Other Prohibited Substances	CAS-No.
Chlorinated or brominated dioxins or furans	
Chlorinated hydrocarbons (1,1-,2,2-Tetrachloroethane; Pentachloroethane; 1,1-,2-Trichloroethane; 1,1-Dichloroethylene)	
Chlorinated phenols (PCP, TeCP)	87-86-5
Hexachlorocyclohexane	58-89-9
Dimethyl Methylphosphonate (DMMP)*	756-79-6
Monomethyldibromo- Diphenylmethane	99688-47-8
Monomethyldichloro- Diphenylmethane	81161-70-8
Nitrites	
Polybrominated Biphenyls (PBB)	59536-65-1
Polychlorinated Biphenyls (PCB)	1336-36-3
Polychlorinated Terphenyls (PCT)	61788-33-8
Tri-(2,3-dibromo-propyl)-phosphate (TRIS)	126-72-7
Trimethylphosphate	512-56-1
Tris-(aziridiny)-phosphin oxide (TEPA)	5455-55-1
Tris-(2-chloroethyl)-phosphate (TCEP)*	115-96-8
Tris-(1,3-dichloro-2-propyl)-phosphate (TDCPP)*	13674-87-8

\*effective January 15, 2015

## Section 6

### Sampling Procedure for Analytical Testing

**Product Selection:** The product selected for Analytical Testing shall be one frequently produced within the Foam Product Group being certified and likely to be highest in emissions. The highest emissions typically are those of high density or those with the highest flame retardant levels if FR.

**Sample Origin:** Central samples no less than 15 inches (35 cm) from a face or side of the bun shall be cut, no later than 7 days after foam production. If the foam bun is not large enough to allow the 15 in (35 cm) distance from the sides, the most central location is appropriate.

**Size of Samples:** 10 in x 8 in x 6 in (25 cm x 20 cm x 15 cm).

**Photo Verification:** Take a photo of the sample block of foam (prior to cutting) that shows the foam type, production date, and size. Include the chemist or supervisor responsible in the photo. This photo will be part of your submittal package to the CertiPUR-US® program. See photos on page 8.

**Number of Samples:** Two adjacent samples shall be prepared for the baseline study and then shall be sent to the laboratory. Care shall be taken to assure that no oils, silicones or other volatile materials are present on the saw blade or saw table. Protective phthalate-free gloves should be worn to prevent sample exposure to soap or hand lotion. The samples each shall be conditioned using standard production procedures, packaged and identified as recommended below.

**Time Constraints:** The samples shall be cut out of the bun, no later than 7 days after production of the foam, and immediately packaged. Samples must be shipped to arrive at the testing lab within 14 days of cutting and the lab must start VOC chamber testing within 35 days of receiving the samples.

**Packaging of Samples:** Each 10 in x 8 in x 6 in (25 cm x 20 cm x 15 cm) sample shall be tightly wrapped and separately sealed in aluminum foil (one sample per foil package) or packaged separately inside sealed aluminized Mylar bags (one sample per bag). See photos on page 8.

**Sample Identification:** Sample Identification shall be recorded and attached to the outside packaging of each individual sample. The information shall include the Foam Product Group (as in Section 8), density and firmness, company production reference code number, production date, date of sampling, and date of mailing to the laboratory. See form on page 7.

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## Section 7

### Sampling Procedure for Physical Testing

**Product Selection:** The product selected for Physical Testing shall be the same as for Analytical Testing (see Section 6).

**Sample Origin:** Central samples no less than 15 inches (35 cm) from a face or side of the bun shall be cut, no later than 7 days after foam production. If the foam bun is not large enough to allow the 15 in (35 cm) distance from the sides, the most central location is appropriate.

**Size of Samples:** 15 in x 15 in x 4 in (380 mm x 380 mm x 100 mm).

A vertical rectangular column 15" x 15" (380 mm x 380 mm) shall be cut to include both the top and the bottom surfaces of the produced foam. The lower 1" (25 mm) portion of the sample column shall be removed. Starting at this lower cut surface, the column shall be cut into 15" x 15" x 4" (380 mm x 380 mm x 100 mm) adjacent samples, discarding the upper trim segment such that the uppermost sample is at least 1" (25 mm) from the top skin of the produced foam. The samples shall be numbered sequentially starting from the upper sample. 25% IFD and density results shall be reported for at least the top, middle, and bottom samples for determination of 25% IFD Variance.

**Physical Testing Report:** The test data shall be submitted initially and with each renewal for each Foam Group to the CertiPUR-US® program on the following "Voluntary Internal Physical Performance Testing Report" form.

# Voluntary Internal Physical Performance Testing Report

Company Name:

Production Location:

Foam Product Group:

Foam Identification (Grade):

Test Results\*

Density and 25% IFD

Test Date:

Sample Number	Density	25% IFD	Limit
1 (Top)			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
Average:			
25% IFD Variance:			± 10% or 3.0 lbs (13.3 N)
Test Date:			< 6 lbs (26.7 N)
25% IFD loss after Fatigue			10% (20% HR or melamine)
Test Date:			10% (30% HR or melamine)
75% Compression Set			10% (30% HR or melamine)
Test Date:			
Humid Aged 75% Compression Set			

*\*See U.S. Voluntary Physical Performance and Environmental Guidelines for Prime Flexible Polyether Polyurethane Foam for Use in Furniture and Bedding, Section 7 for sampling procedure and Section 1 for test methods.*

I confirm the information above is accurate. Name (printed): \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## Section 8

### Voluntary Guidelines – Certification Groupings

The manufacturer may apply voluntary guidelines certification to groups of equivalent qualified flexible polyether polyurethane foam products (i.e. a number of FPF products having various physical characteristics, but sharing the same raw materials). Separate application and registration would be necessary for foam products manufactured from differing raw materials. It is the responsibility of the foam manufacturer to notify raw material suppliers when voluntary registration has been achieved so that they can advise the foam manufacturer if raw material formulation changes are anticipated during the duration of the voluntary guidelines registration period.

#### Foam Product Groups:

- ▶ Conventional polyether foams
- ▶ Conventional FR polyether foams (sharing the same flame retardant package)
- ▶ Super-soft (low density/low index) conventional foams –  
25% IFD  $\leq$  15 lbs. (65 N) and density  $\leq$  1.5 lbs/ft<sup>3</sup> (24 kg/m<sup>3</sup>)
- ▶ High resilience foams
- ▶ High support foams
- ▶ Viscoelastic (memory) foams
- ▶ Viscoelastic (memory) foams with gel
- ▶ Other (please describe in detail – to be reviewed by administrator)

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## Section 9

### Voluntary Registration Duration

To maintain voluntary registration, sample evaluations are necessary at 6 month intervals for each product group category to help demonstrate formulation and raw material content consistency. After completing two consecutive 6 month successful certifications, the registration frequency shall change to an annual basis. Any significant changes to the formulation shall require analysis and re-registration.

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### CertiPUR-US® testing and analysis laboratory options:

Hall Analytical  
Unit A Millbrook Business Centre  
Floats Road  
Manchester M23 9YJ  
United Kingdom  
Attn: Dr. Malcolm Kimber  
Telephone: (Country exit code) +44 161 286 7889  
Fax: (Country exit code) +44 161 286 7676  
[Email: malcolm@hallanalytical.co.uk](mailto:malcolm@hallanalytical.co.uk)

TÜV Rheinland LGA Products GmbH  
Tillystraße 2  
90431 Nuremberg  
Germany  
Attn: Dr. Jelena Galinkina  
Telephone: (Country exit code) +49 911 655 5614  
(Country exit code) +49 911 655 5604  
Fax: (Country exit code) +49 911 655 5604  
[Email: Jelena.Galinkina@de.tuv.com](mailto:Jelena.Galinkina@de.tuv.com)

Eurofins Product Testing A/S  
Smedeskovvej 38  
DK-8464  
Galten, Denmark  
Telephone: (Country exit code) +45 7022 4276  
Fax: (Country exit code) +45 7022 4275  
[Email: voc@eurofins.com](mailto:voc@eurofins.com)





# Sample Submittal and Analytical Request

## CertiPUR-US® Voluntary Certification Program

**Attention:** \_\_\_\_\_

**Ship via express to:**

Lab Name: \_\_\_\_\_

Address 1: \_\_\_\_\_

Address 2: \_\_\_\_\_

City / State / Zip: \_\_\_\_\_

Country: \_\_\_\_\_

**Invoice to:**

Company Name: \_\_\_\_\_

Email: \_\_\_\_\_

Address 1: \_\_\_\_\_

Address 2: \_\_\_\_\_

City / State / Zip: \_\_\_\_\_

Country: \_\_\_\_\_

Attention: \_\_\_\_\_

P.O. Number: \_\_\_\_\_

**Sample Identification:**

Your Product Identification Code	
Foam Product Group *	
Foam Density/IFD	
Production Date	
Date Sample Cut (<7 days from Production)	
Date Sample Shipped	
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-Toluediamine (TDA) and 4,4'-Diaminodiphenylmethane (MDA)
- Specified Volatile Organic Compounds and total Volatile Organic Compounds

## Sample Packaging Instructions

1. Please be sure to wear phthalate-free PU or latex gloves while handling samples. This will keep the samples from contamination by soap or fragrances.
2. Check and clean the knife blade and saw table before cutting samples to prevent contamination from residue.
3. Individually seal three samples tightly in heavy gauge aluminum foil wrappers. Before making the final fold and seal, evacuate as much excess air as possible without resulting in a compressed sample. Submit two samples to the laboratory and keep one packaged sample as a control.
4. Please complete the *Sample Submittal Form* (page 7) and indicate to whom results should be reported.
5. Tape a duplicate *Sample Submittal Form* to the outside of each foil package.
6. Place the samples in a cardboard box, including complete *Sample Submission Forms*, (see Section 6, page 4) and ship to a selected laboratory via express delivery service.

Note: Before taking samples, review details in Section 6, page 4.



Use 18" wide heavy duty aluminum foil.  
Place 2, 26" pieces side-by-side.



Overlap the two pieces by 2" – lengthwise.



Lift the overlap, crease and fold flat for the length of the seam (26").



Place the foam sample in the center of the joined foil sheet lengthwise on top of the seam.



Join the side panels together at the top. Pinch the overlap, roll over twice and fold flat to seal.



Pinch the foil on the ends and squeeze together.



Roll the ends twice and press flat against the foam block.



The finished foil wrapped sample should be tightly sealed on all sides.

Remember: Only one sample per foil package.



Take a photo of chemist or supervisor next to foam block from which sample was taken. On foam block, print on a label, this information:

Foam Identification: (Example: 100)  
Production Date: Month/Day/Year  
Size: Width x Length x Height