



# CertiPUR-US® Technical Guidelines for Molded Foam

## Physical Property and Environmental Criteria for Certification of Molded Flexible Polyurethane Foam for Use in Furniture and Bedding

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CertiPUR-US® is a program of the nonprofit  
Alliance for Flexible Polyurethane Foam, Inc.

[www.certipur.us](http://www.certipur.us)

[info@certipur.us](mailto:info@certipur.us)

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## About the CertiPUR-US® Program

Administered by a nonprofit organization, the CertiPUR-US® program was established in 2008 as a testing, analysis and certification program for slabstock and molded flexible polyurethane foam, including memory foam. Our certification is specific to foam cushioning material in home furnishings such as adult mattresses, crib mattresses, mattress toppers, pillows, pet beds, upholstered furniture (such as sofas and accent chairs) and some accessory comfort products.

Since the program's beginning, the number of participating foam producers has grown to nearly 100 worldwide, encompassing much of the foam supplied to the U.S. bedding and upholstered furniture markets. In establishing global standards and requiring participating foams to meet or exceed U.S. federal, state or local requirements, the program gives consumers confidence in knowing what is — and isn't — in the home furnishings they purchase that contain polyurethane foam, whether that foam is manufactured in the U.S. or imported from abroad.

Certified foams are:

- ✓ Made without formaldehyde
- ✓ Made without ozone depleters
- ✓ Made without phthalates regulated by the U.S. Consumer Product Safety Commission
- ✓ Made without mercury, lead and other heavy metals
- ✓ Low VOC (volatile organic compound) emissions for indoor air quality (less than 0.5 parts per million)
- ✓ Screened for relevant chemicals, including flame retardants, that are classified as carcinogens, mutagens or reproductive toxins and are harmful to human health

To become CertiPUR-US® certified, foam samples are taken at the manufacturing stage and sent to one of four approved independent, accredited testing laboratories to be analyzed for content and emissions.

Samples are screened for relevant chemicals (chemicals that could potentially be used in the manufacture of flexible polyurethane foam) that are classified as carcinogenic (may cause cancer), mutagenic (may cause genetic defects) or reprotoxic (may damage fertility or an unborn child) by the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). GHS is an internationally agreed-upon standard managed by the United Nations that was set up to replace the assortment of hazardous material classification and labeling systems previously used around the world.

Additional testing of foam samples is done to detect the presence of lead, mercury and other heavy metals. Certified foams meet the Consumer Product Safety Commission toy standard for lead.

Certified foams are subject to random verification testing. CertiPUR-US® program representatives make virtual and on-site visits to participating foam production plants to obtain samples of certified foam, which are then tested at the program's expense to confirm compliance.

It is our policy to be transparent. Everything about the program is readily available on our website at [www.certipur.us](http://www.certipur.us). We continually evaluate information from the science community, government and regulatory agencies and update our criteria for certification as good science and regulatory concern warrant. The complete criteria for certification of flexible polyurethane foam, including laboratory testing methodology and protocols, are outlined in the following pages and downloadable at [certipur.us/technicalguidelines](http://certipur.us/technicalguidelines).

### Additional Resources

- ▶ Directory of participating companies and brands: [certipur.us/directory](http://certipur.us/directory)
- ▶ Participating foam producers by name and country: [certipur.us/producers](http://certipur.us/producers)
- ▶ Website: [www.certipur.us](http://www.certipur.us)

## Overview of Steps in Certifying a Foam

The certification process generally takes 2 to 3 months from start to completion, including the laboratory emissions and analytical testing which takes about 1 month.

1. Notify CertiPUR-US® of your company's interest in certifying a foam. We will send you an introductory email along with preliminary screening questions that will determine whether your company's foam production meets basic qualifications to certify a foam.
2. Review the **Technical Guidelines** at [certipur.us/technicalguidelines](https://certipur.us/technicalguidelines) carefully to determine whether your foam is likely to meet the criteria for certification based on your current formulation — or re-formulate as needed.
3. Determine which foam family/families your company intends to certify (see Section 1 of **Technical Guidelines**).
4. Select which of the approved laboratories you will use and contact them regarding costs and procedures. The analytical testing is paid directly to the lab of your choice and is not included in CertiPUR-US® registration or renewal fees. Follow the foam family sampling procedures outlined in Section 9 and submit 3 foam samples using the **Sample Submittal and Analytical Request** form. We recommend sending a foam sample to one of the approved labs before beginning the application process to assess the likelihood of meeting the certification before application fees are incurred. Once you are sure you want to test for registration, begin by securing a few production samples of the molded foam. Take the photo required (see Sections 9 and 10) since these production samples will be the source from which samples for testing will be taken.
5. Conduct the physical property testing of the foam to be certified. This can be done by your internal lab or by any accredited lab that can perform the ASTM testing required. Details about the physical property test are described in Section 7 and 8. The results must be recorded on the **Physical Property Testing Report** form (see Forms section or download at [certipur.us/producerforms](https://certipur.us/producerforms)).
6. Submit an **Application/Renewal** form online or download at [certipur.us/producerforms](https://certipur.us/producerforms)
7. To complete your application, submit the following documents:
  - Application/Renewal** form (be sure to initial and sign as indicated)
  - Photo of molded production samples for all test submittals (see Section 10)
  - Laboratory Report on Emissions and Analysis of Content** (provided by your chosen laboratory)
  - Physical Property Testing Report** (see Forms section — choose appropriate form for molded foam)
  - Take the 20-minute online **Certificate of Knowledge** course at [certipur.us/certificatecourse](https://certipur.us/certificatecourse). You will need the 16-digit number that appears on your certificate of course completion to complete the **Terms of Use Agreement (Form B)**.
  - Sign and submit the **Terms of Use Agreement (Form B)** at [certipur.us/FormB](https://certipur.us/FormB)
8. If your completed application is approved, you will receive an invoice that must be paid before final certification is granted.
9. Once payment is received, CertiPUR-US® will send an email to welcome you to the program with a request for the following information needed to create an individual page for your company on the CertiPUR-US® website. That website page will include:
  - ▶ Company name, logo and website
  - ▶ Certificate including foam families certified, lab report I.D. and date of renewal
  - ▶ Contact information
10. Your company will receive reminder notifications 90 days, 60 days and 30 days before your foam family is due for renewal. Renewals must be completed on a timely basis for the foam family to maintain certification. If your certification lapses, permission to use the CertiPUR-US® name and logo will be rescinded.

## Section 1 Foam Families

The foam producer may certify foam families of equivalent qualified flexible polyurethane products (i.e. a number of flexible polyurethane foam 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 producer to notify raw material suppliers when registration has been achieved so that they can advise the foam producer if raw material formulation changes are anticipated during the duration of the registration period.

Foam producers have the option to add a branded name for any foam family category, including using that branded name as the sole identifier in the “other” foam family category. This enables customers to recognize a branded name as being certified. The branded names may appear in two places on the CertiPUR-US® website: 1) foam producer’s individual page and 2) foam producer’s certificate.

## Molded Foam Families:

- ▶ Conventional foams
- ▶ Conventional FR foams (sharing the same flame retardant package)
- ▶ High resilience foams
- ▶ 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>)
- ▶ Viscoelastic (memory) foams
- ▶ Viscoelastic (memory) foams with gel
- ▶ Branded foams (any of the categories listed above with an exclusive branded name)
- ▶ Other foams (subject to approval)

*For slabstock foams, see separate **Technical Guidelines** for certification of slabstock (including biobased) foam.*

## Section 2 Registration Duration

To demonstrate consistency of formulation and raw material content, each foam family is required to be certified twice in its first year and annually thereafter. A foam certified for the first time in January 2024, for instance, would need to be recertified six months later in July 2024. In January 2025, the foam would be recertified again — moving to an annual recertification schedule every January.

## Section 3 Approved Testing and Analysis Laboratories

### Enthalpy Analytical

Attn: CertiPUR-US Sample Receiving  
2625 Denison Drive, Ste. D  
Mount Pleasant, MI 48858 USA  
Phone: (country code) +1 989.772.5088  
Fax: (country code) +1 989.772.5870  
Email: [mtpinfo@enthalpy.com](mailto:mtpinfo@enthalpy.com)

### Intertek

Attn: VOC Lab/CertiPUR-US Testing  
4700 Broadmoor, Ste. 200  
Kentwood, MI 49512 USA  
Attn: Dr. Jesse Ondersma  
Phone: (country code) +1 616.656.7401  
Email: [certipur.us@intertek.com](mailto:certipur.us@intertek.com)

### Eurofins Product Testing A/S

Smedeskovvej 38  
DK-8464  
Galten, Denmark  
Phone: (country code) +45 7022 4276  
Fax: (country code) +45 7022 4275  
Email: [voc@eurofins.com](mailto:voc@eurofins.com)

### TÜV Rheinland LGA Products GmbH

Tillystraße 2  
90431 Nuremberg, Germany  
Attn: Dr. Jelena Galinkina  
Phone: (country code) +49 911 655 5614  
Alt. Phone: (country code) +49 911 655 5604  
Fax: (country code) +49 911 655 5604  
Email: [jelena.galinkina@de.tuv.com](mailto:jelena.galinkina@de.tuv.com)

# TECHNICAL GUIDELINES FOR MOLDED FOAM

2023 v4

## Section 4

### Foam Producer Declarations

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, TDCPP, TCEP, TEPA or TDBPP Tris flame retardants	No

## Section 5

### Prohibited Substances

**Important Change:** Effective November 23, 2023, 2-ethyl hexanoic acid (2-EHA CAS: 149-57-5) and most of its salts, including stannous octoate (CAS: 301-10-0), will be added to the list of prohibited substances, and foams submitted for certification that contain 2-EHA will not be certified. For more information: [certipur.us/stannous](https://certipur.us/stannous)

#### Prohibited Chemicals Based On GHS\* (Globally Harmonized System of Classification and Labeling of Chemicals)

GHS Hazard Class	Category	United State GHS Hazard Statements
Carcinogen	1A, 1B	May cause cancer
Germ cell mutagen	1A, 1B	May cause genetic defects
Reproductive toxicity	1A, 1B	May damage fertility or the unborn child

\*GHS replaced R-Phrases (Based upon European Union Risk Assessments)

#### Prohibited Blowing Agents

Chlorofluorocarbon (CFC)
Hydrochlorofluorocarbon (HCFC)
Dichloromethane (methylene chloride)

#### Prohibited Flame Retardant Additives

Prohibited Flame Retardant Additives	CAS Number
Antimony (see Section 6)	7440-36-0
Chlorinated or brominated dioxins or furans	Various
Chlorinated hydrocarbons (1,1,2,2-Tetrachloroethane; Pentachloroethane; 1,1,2-Trichloroethane; 1,1-Dichloroethylene)	Various
Decabromodiphenyl ether (PBDE) (see Section 6)	1163-19-5
Dimethyl methylphosphonate (DMMP)	756-79-6
Hexabromocyclododecane or HBCD	3194-55-6
Nitrites	Various
Octabromodiphenyl ether (PBDE) (see Section 6)	32536-52-0
Polybrominated Biphenyls (PBB)	59536-65-1
Polychlorinated Terphenyls (PCT)	61788-33-8
Polychlorinated Biphenyls (PCB)	1336-36-3
Pentabromodiphenyl ether (PBDE) (see Section 6)	32534-81-9
Tris (2,3-dibromopropyl) phosphate (TDBPP)	126-72-7
Tris-1-aziridinylphosphin oxide (TEPA)	545-55-1
Tris (2-chloroethyl)-phosphate (TCEP)	115-96-8
Tris (1,3-dichloro-2-propyl) phosphate (TDCPP)	13674-87-8

Continued

## TECHNICAL GUIDELINES FOR MOLDED FOAM

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Other Prohibited Substances	CAS Number
2-ethyl hexanoic acid (2-EHA) (relevant metal salts, e.g. stannous octoate) — <b>prohibited effective November 23, 2023</b>	149-57-5
Chlorinated phenols (PCP, TeCP)	87-86-5
Trimethylphosphate	512-56-1
Hexachlorocyclohexane	58-89-9
Monomethyl-dibromo-Diphenylmethane	99688-47-8
Monomethyl-dichloro-Diphenylmethane	81161-70-8

### Section 6

#### Independent Laboratory Analysis

Note: See Section 13 for details on Laboratory Testing Methodology and Protocols

#### Emissions Testing

Substance	CAS Number	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*
Aromatic hydrocarbons		<0.5
TVOC emissions		<0.5 <sup>†</sup>
2-ethyl hexanoic acid (2-EHA) (relevant metal salts, e.g. stannous octoate) <b>Prohibited effective November 23, 2023</b>	149-57-5	<0.005

\*Limit of Detection

<sup>†</sup>Although the CertiPUR-US® limits for VOC emissions and the results reported by laboratories are in mg/m<sup>3</sup> units, for simplicity in consumer marketing materials, we convert to parts per million (ppm). For the substances reported, the individual values and TVOC limit of <0.5 mg/m<sup>3</sup> are actually lower than 0.5 ppm. Conversion from mg/m<sup>3</sup> to ppm uses the formula  $(mg/m^3 \times 24.45) / \text{molecular weight} = \text{ppm}$ .

#### Metals of Concern

Substance	CAS Number	Guideline Limits (ppm)
Antimony (Sb)	7440-36-0	60
Arsenic (As)	7440-38-2	25
Barium (Ba)	7440-39-3	1000
Cadmium (Cd)	7440-43-9	75
Chromium (Cr)	7440-47-3	60
Lead (Pb)	7439-92-1	90
Mercury (Hg)	7439-97-6	60
Selenium (Se)	7782-49-2	500

Continued

## TECHNICAL GUIDELINES FOR MOLDED FOAM

2023 v4

### Tributyltin

Substance	CAS Number	Guideline Limit (ppm)
Tributyltin (TBT)	688-73-3	0.5

### Phthalates

Substance	CAS Number	Guideline Limit (ppm)
Sum of 8 Phthalates	See Section 13d	≤ 0.01 wt %

### TDA/MDA

Substance	CAS Number	Guideline Limit (ppm)
2,4 – Toluenediamine (TDA)	95-80-7	≤ 5.0 ppm
4,4' – Diaminodiphenylmethane (MDA)	101-77-9	≤ 5.0 ppm
Sum of TDA (2,4) plus MDA (4,4')	95-80-7 + 101-77-9	≤ 5.0 ppm

### Polybrominated (PBDE) Flame Retardant Additives

Substance	CAS Number	Guideline Limit (ppm)
Pentabromodiphenyl ether	32534-81-9	≤ 0.01 wt %
Octabromodiphenyl ether	32536-52-0	≤ 0.01 wt %
Decabromodiphenyl ether	1163-19-5	≤ 0.01 wt %

## Section 7

### Physical Property Testing

Physical property testing of the foam to be certified (from the same block as the sample sent for laboratory analysis) can be done by a company's internal lab or by any accredited laboratory that can perform the required ASTM testing. The results must be recorded and submitted on the **Physical Property Testing Report** form on page 11.

Test	Limit	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 in x 15 in x 4 in (380 mm x 380 mm x 102 mm) samples prepared as outlined in Section 8.

<sup>2</sup> Average IFD @ 25% from testing of 15 in x 15 in x 4 in (380 mm x 380 mm x 102 mm) samples prepared as outlined in Section 8.

<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 in x 15 in x 4 in (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 I<sub>3</sub> (Procedure A) / ISO 3385

<sup>6</sup> ASTM 3574 Section J<sub>1</sub> with humid aging followed by Section D compression set.

## Section 8

### Preparing Samples for Physical Property Testing

**Product Selection:** The product selected for physical testing shall be the same as for analytical testing.

**Sample Origin:** Two surrogate blocks shall be molded using the same chemical formulation and density as the production parts. The samples shall be crushed 3 times at least 70% of its thickness immediately after demolding using nip rollers or other means. Identify the crushing method used. The blocks shall be submitted for testing no more than 7 days after being molded.

**Size of Samples:** 15 in x 15 in x 4 in (38.1 cm x 38.1 cm x 10.2 cm). The full blocks shall be used for measuring the molded density and for the 25% IFD values. The blocks then shall be sliced horizontally (perpendicular to the foam rise direction) using the top two inches, including the "A" side top skin, for measuring the pounding fatigue. The next one inch slice shall be used for measuring compression sets on the core material.

**Physical Property Testing Report:** The test data shall be submitted initially and with each renewal for each foam family to the CertiPUR-US® program on the appropriate **Physical Property Testing Report** form.

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## Section 9

### Preparing Samples for Analytical Testing for Molded Products Three samples are required for submission.

**Product Selection:** The product selected for analytical testing shall be the same density and chemical formulation as the molded product. Identify the mold release, if any, being used. The mold release shall be the same as that used in production.

**Sample Origin:** Two surrogate blocks shall be molded using the same chemical formulation and density as the production parts. The samples shall be crushed 3 times at least 70% of its thickness immediately after demolding using nip rollers or other means. Identify the crushing method used. The blocks shall be submitted for testing no more than 7 days after being molded.

**Size of Samples:** 10 in x 10 in x 4 in (25.4 cm x 25.4 cm x 10.2 cm). The samples shall be cut out of the surrogate blocks leaving the "A" and "B" surface (top and bottom skins) along with two of the side skins in place, no later than 7 days after production of the foam, and shall be immediately packaged.

**Photo Verification:** Take a photo of the sample blocks of molded 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 in Section 10.

**Number of Samples:** Three adjacent samples shall be prepared and submitted for analysis to the laboratory. Keep an extra (fourth) packaged sample as a control. Take care to ensure 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. Each sample should be conditioned using standard production procedures.

**Time Constraints:** The samples shall be cut from a mold, no later than 7 days after production of the molded foam. Samples must be shipped to arrive at the testing lab less than 21 days after the production date. The testing lab must start the VOC chamber testing within 35 days of receiving the samples.

**Packaging of Samples:** Each 10 in x 10 in x 4 in (25.4 cm x 25.4 cm x 10.2 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 in Section 10.

**Sample Identification:** Be sure to clearly mark the outside of each individually wrapped sample (do not write on the sample itself) with a foam identifier. If submitting more than one foam family for analysis in one shipping box, be sure the samples for each foam family are grouped separately. Include a **Sample Submittal and Analytical Request** form on page 10 with each foam family.



**Section 10**

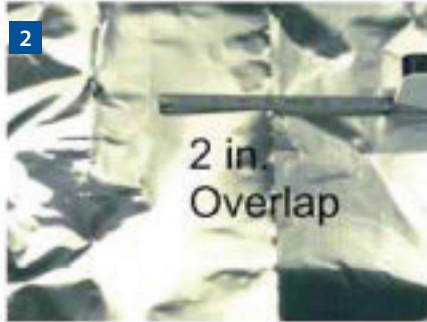
**Instructions For Packaging Samples of Molded Foam** Three samples are required for submission.

- ▶ Please be sure to wear phthalate-free Polyurethane or latex gloves while handling samples. This will keep the samples from contamination by soap or fragrances.
- ▶ Check and clean the knife blade and saw table before cutting samples to prevent contamination from residue.
- ▶ Individually seal four 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 three samples to the laboratory and keep one (1) packaged sample as a control.
- ▶ Please complete the **Sample Submittal and Analytical Request** form (see Forms section).
- ▶ Tape a duplicate **Sample Submittal and Analytical Request** form to the outside of each foil package/sample.
- ▶ Place the samples in a cardboard box, including complete **Sample Submittal and Analytical Request** form and ship to a selected laboratory (Section 3) via express delivery service.

Note: Before taking samples, review details in Section 9



Use 18" wide heavy-duty aluminum foil. Place two 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.



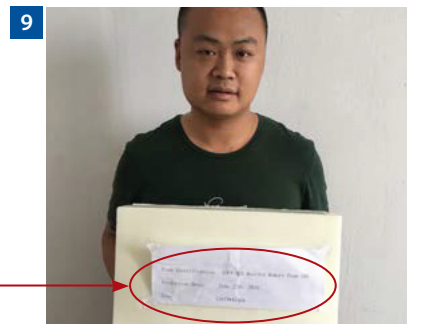
Pinch the foil on the ends and squeeze together.



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 with the molded foam sample. Affix a label to the sample with this information:

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

## Section 11

### Test Failures and Retesting

If a foam producer fails the requirements of the CertiPUR-US® program in one area of the analytical or physical property testing, the company will be allowed to have the same foam formulation retested under either of the following parameters:

- ▶ The CertiPUR-US® program will accept the retesting of the failed item of the program at the foam producer's expense, if:
  - ▶ The failure does not exceed the relative standard deviation of analysis, and
  - ▶ The retest is completed within 30 days of the original analytical or physical property testing.

Or

- ▶ If the failure exceeds the relative standard of deviation of the analysis, the CertiPUR-US® program will accept an entire retest at the foam producer's expense, if the retest is completed within 45 days of the original analytical or physical property testing.

Both the original test results with the failed item and the applicable retest, that now shows a passing result, must be submitted with the remainder of the required paperwork and photos.

## Section 12

### Checklist of Required Forms

- Application/Renewal** form available online or download at [certipur.us/apply\\_renew](https://certipur.us/apply_renew)
- Sample Submittal and Analytical Request** form (Molded) available in the Forms section of the **Technical Guidelines** or download at [certipur.us/forms](https://certipur.us/forms) (to be sent with sample to your chosen laboratory).
- Laboratory Report on Emissions and Analysis of Content** (provided by your chosen laboratory when testing and analysis is complete)
- Physical Property Testing Report** — available in the Forms section of the **Technical Guidelines** or at [certipur.us/forms](https://certipur.us/forms). Note: There is a different form for molded foam.

## Section 13

### Laboratory Testing Methodology and Protocols

This section provides the required test methods and protocols to be used by each of the four independent, accredited CertiPUR-US® approved laboratories to determine whether foams meet the criteria for certification set forth in these Technical Guidelines. Standardization of the process ensures consistent results.

#### 13a Emissions Testing

Testing is to be performed according to ISO 16000-Parts 3, 6, 9 and 11 and should use a chamber volume of 0.5 m<sup>3</sup> (preferred) or 1 m<sup>3</sup>. The foam sample is placed on the bottom of the emission test chamber and conditioned for 72 hours at 23 ± 2°C, 50 ± 5% RH, applying an air exchange rate (n) of 0.5 per hour and a chamber loading (L) of 0.4 m<sup>2</sup>/m<sup>3</sup> (total exposed surface of sample in relation to chamber dimensions without sealing edges and back) in accordance with ISO 16000-9:2006 and ISO 16000-11:2006.

The volatile organic compounds (VOCs) are trapped on Tenax® TA sorbent tubes with a sample volume of 5 L. Subsequent analysis is performed with thermal-desorption-GC-MS in accordance with ISO 16000-6:2021. Specified target analytes (as listed in Section 6) must be quantified and reported using substance specific standards. All other VOC compounds (including Aromatic Hydrocarbons) are semi-quantitatively expressed as toluene equivalents. All individual components are reported that have a concentration ≥ 1 µg/m<sup>3</sup>. The TVOC<sub>TTC</sub> value is the sum of all components with a concentration ≥ 1 µg/m<sup>3</sup> and eluting within the retention time window from n-hexane (C6) to n-hexadecane (C16) inclusive.

Formaldehyde shall be determined by collection of the sampled air onto a DNPH cartridge. Subsequent analysis should use HPLC/UV or HPLC/MS in accordance with ISO 16000-3:2022.

*Continued*

### 13b Metals of Concern

The subsample taken must be a composite of 6 semi-equal volume pieces taken from each sample face (to a maximum of 2 cm from the surface). The mass of the combined subsample must be recorded. The sample preparation must follow the Digestive Test Method: ASTM F963-17 Standard Consumer Safety Specification for Toy Safety, Section 8.3.1: The sample is to be completely digested with acid and analyzed by Inductively Coupled Plasma (ICP). Flexible foam under test to be digested per Consumer Product Safety Commission CPSC-CH-E1002-08.3 (Non-Metal Substrates).

Testing must also comply with Consumer Product Safety Improvement Act (CPSIA), Section 101 for total lead content. Limit of Quantitation (LOQ) should be <2.0 ppm for all substances.

### 13c Tributyltin

The subsample taken must be a composite of 6 semi-equal volume pieces taken from each sample face (to a maximum of 2 cm from the surface). The mass of the combined subsample must be recorded. The sample is cut and extracted for 1 hour with the extracting agent\*\* in an ultrasonic bath at room temperature. After extraction, the alkyl tin species are derivatized by adding sodium tetraethylborate solution in THF. The derivative is then extracted with n-hexane in duplicate. Both hexane extracts are combined and used to determine the organotin compounds by gas chromatography with mass selective detection in SIM mode.

\*\* Extracting agent: 250 ml buffer\*\*\* + 1750 ml methanol + 300 ml acetic acid

\*\*\* Buffer (pH 4,5): 164 g sodium acetate + 1200 ml water + 165 ml acetic acid, to be diluted to 2000 ml with water

### 13d Phthalates

The subsample taken must be a composite of 6 semi-equal volume pieces taken from each sample face (to a maximum of 2 cm from the surface). The mass of the combined subsample must be recorded. Preferably, extraction shall be performed using a Soxhlet extractor or heated ultrasonic bath. Other validated/accredited extraction procedures are allowed if prior validation confirms extraction efficiency. The final extract is analyzed using gas chromatography/mass spectrometry (GC/MS). This same extract can be used for the polybrominated flame retardant additives analysis.

Phthalates include:

- ▶ Di-(2-ethylhexyl) phthalate (DEHP) (CAS No. 117-81-7)
- ▶ Dibutyl phthalate (DBP) (CAS No. 84-74-2)
- ▶ Benzyl butyl phthalate (BBP) (CAS No. 85-68-7)
- ▶ Diisononyl phthalate (DINP) (CAS No. 28553-12-0)
- ▶ Diisobutyl phthalate (DIBP) (CAS No. 84-69-5)
- ▶ Di-n-pentyl phthalate (DPENP) (CAS No. 131-18-0)
- ▶ Di-n-hexyl phthalate (DHEXP) (CAS No. 84-75-3)
- ▶ Dicyclohexyl phthalate (DCHP) (CAS No. 84-61-7)

### 13e TDA/MDA

The subsample taken must be a composite of 6 semi-equal volume pieces taken from each sample face (to a maximum of 2 cm from the surface). The mass of the combined subsample must be recorded. Extraction uses multiple (minimum 4) aliquots of 1% aqueous acetic acid solution to ensure exhaustive extraction. The sample must be compressed in the solvent so that it is repeatedly absorbed and expelled from the foam over a period of five minutes for each aliquot. The final sample should be as much of the solvent that can be squeezed out of the foam and all replicate aliquots should be combined and made up to a known volume. To achieve optimal sensitivity and selectivity, the extracts should be analyzed using high-pressure liquid chromatography with detection using mass spectrometry/mass spectrometry (HPLC/MS/MS). LC-MS is acceptable only if detection limit can be achieved and false positives are shown to be avoided.

### 13f Polybrominated (PBDE) Flame Retardant Additives

The subsample taken must be a composite of 6 semi-equal volume pieces taken from each sample face (to a maximum of 2 cm from the surface). The mass of the combined subsample must be recorded. Preferably, extraction should be performed using a Soxhlet extractor or heated ultrasonic bath. Other validated/accredited extraction procedures are allowed if prior validation confirms extraction efficiency. The final extract is analyzed using gas chromatography/mass spectrometry (GC/MS). This may be the same extract prepared for the phthalates analysis.



# Sample Submittal and Analytical Request CertiPUR-US® Molded Foam Certification Program

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

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

**Ship via express to:**

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

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

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

City: \_\_\_\_\_

State/Province: \_\_\_\_\_

Zip/Postal Code: \_\_\_\_\_

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

**Invoice to:**

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

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

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

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

City: \_\_\_\_\_

State/Province: \_\_\_\_\_

Zip/Postal Code: \_\_\_\_\_

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

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

Purchase Order Number: \_\_\_\_\_

**Sample Identification:**

Your Product Identification Code		
Plant/Location Where Sample Was Produced		
Choose One	<input type="checkbox"/> Foam Family*	
	<input type="checkbox"/> If "Other" or "Brand" Foam, Specify	
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 1

**Analytical Request:**

- Emissions Testing
- Extractable Heavy Metals
- Tributyltin (TBT)
- Sum of Eight Specified Phthalates
- Penta, Octa, Deca Bromodiphenylethers (PBDEs) Flame Retardants
- 2,4-Toluenediamine (TDA) and 4,4'-Diaminodiphenylmethane (MDA)
- Specified Volatile Organic Compounds and Total Volatile Organic Compounds

Submit **three** samples to lab.  
Keep an extra (fourth)  
packaged sample as a control.

**TECHNICAL GUIDELINES FOR MOLDED FOAM**

2023 v4

**Physical Property Testing Report for Molded Foam**

Company Name:

Production Location:

Foam Family:

Foam Identification (Grade):  
Test Results\*

Density and 25% IFD  
Test Date:

Sample Number	Density	25% IFD	Limit
BLOCK 1			± 10% or 3.0 lbs (13.3 N)
BLOCK 2			
BLOCK 3			
Average of above:			
25% IFD Variance:			
25% IFD Loss After Fatigue: Test Date:			< 6 lbs (26.7 N)
75% Compression Set: Test Date:			10% Viscoelastic (20% HR)
Humid Aged 75% Compression Set: Test Date:			10% Viscoelastic (30% HR)

\* For sampling procedures and test methods, see Sections 7 and 8 of the **Technical Guidelines** at [certipur.us/technicalguidelines](http://certipur.us/technicalguidelines)

**I confirm the information above is accurate.** First Name/Last Name (printed): \_\_\_\_\_

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