



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

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 an approved independent, accredited testing laboratory 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 representative 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. 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.

Additional Resources

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

Overview of Steps in Certifying a Foam

Translations of this page, *Overview of Steps in Certifying a Foam*, are available in Chinese, French, Hindi, Indonesian and Spanish at certipur.us/translations.

The process of certifying foam 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 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).
6. Submit an **Application/Renewal** form online or download at certipur.us/producerforms
7. To complete your application, submit the following documents (if possible, together in one email):
 - 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. 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
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 ≤15 lbs. (65 N) and density ≤1.5 lbs/ft³ (24 kg/m³)
- ▶ 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, for instance, would need to be recertified six months later in July. The following January, the foam would be recertified again — moving to an annual recertification schedule every January.

Section 3
Approved Testing and Analysis Laboratories

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

Eurofins Product Testing A/S

Smedskovvej 38
DK-8464
Galten, Denmark
Phone: (country code) +45 7022 4276
Fax: (country code) +45 7022 4275
Email: DK-VOC@CPT.eurofinseu.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

TECHNICAL GUIDELINES FOR MOLDED FOAM

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Section 4

Foam Producer Declarations

| | |
|---|----|
| Foam or adhesives processed with CFC or other ozone depleters | No |
| Foam or adhesives processed with MeCl ₂ 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

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 |

Exception: Although the antimicrobial additive Zinc Pyrithione (CAS Reg. No. 13463-41-7) is classified as a GHS Category 1B reproductive toxin, it is currently approved by the U.S. Food & Drug Administration and widely used in products with direct contact to skin, such as dandruff shampoos. For that reason, the CertiPUR-US® Program allows it to be used in the limited instances when an antimicrobial is specified.

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 |

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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) | 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 ³] |
|---|------------|--------------------------------------|
| Formaldehyde | 50-00-0 | <0.015 |
| 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 [†] |
| 2-ethyl hexanoic acid (2-EHA) (relevant metal salts, e.g. stannous octoate) | 149-57-5 | <0.005 |

*Limit of Detection

†Although the CertiPUR-US® limits for VOC emissions and the results reported by laboratories are in mg/m³ 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/m³ are actually lower than 0.5 ppm. Conversion from mg/m³ 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 |

Colorants: While the pure metals are unlikely foam formulation components, Cadmium, Chromium and Lead containing adducts can be components of pigments or similar coloring agents. Suppliers of color additives should be asked to provide information on the concentration of these metals (present as residual or otherwise) in the additives they deliver to facilitate compliance with the requirements specified in this section.

(Continued)

TECHNICAL GUIDELINES FOR MOLDED FOAM

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Pigments and Dyes

Dyes, Azo-based colorants and Azodyes, which are restricted by the European Chemicals Agency (ECHA), should not be used in foams submitted for certification.

Tributyltin

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

Phthalates

| Substance | CAS Number | Guideline Limit (ppm) |
|----------------------|-----------------|-----------------------|
| Sum of 13 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 ¹ | Report | ASTM D3574 Test A |
| 2) Average 25% IFD ² and Tolerance | ± 3.0 lbs or +/- 10% max ³ | ASTM D3574 Test B ₁ |
| 3) 25% IFD loss after fatigue test only applies to foams within 25% IFD range ⁴ of 24 to 36 lbs (100 – 160 N) | Loss < 6 lbs (26.7 N) | ASTM D3574 Test I ₃ (Procedure A) ⁵ |
| 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 ⁶ |

¹ 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.

² 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.

³ 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.

⁴ 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.

⁵ Constant force pounding, 8000 cycles ASTM D3574 Test I₃ (Procedure A) / ISO 3385

⁶ ASTM 3574 Section J₁ 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.

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

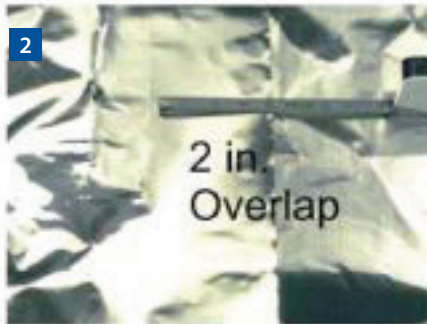
Instructions For Packaging Samples of Molded Foam Three samples are required for submission.

- ▶ 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



1 Use 18" wide heavy-duty aluminum foil. Place two 26" pieces side-by-side.



2 Overlap the two pieces by 2" — lengthwise.



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



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



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



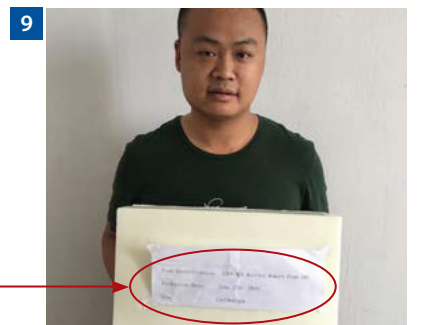
6 Pinch the foil on the ends and squeeze together.



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



8 The finished foil wrapped sample should be tightly sealed on all sides.
Remember: Only one sample per foil package.



9 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 for a Foam Certification Submission

- Application/Renewal** form available online or download at certipur.us/apply_renew
- Add Required Photo** (See Section 10, photo 9, for example)
- Sample Submittal and Analytical Request** form (Molded) available in the Forms section of the **Technical Guidelines** or download at 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. 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 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 m³ (preferred) or 1 m³. 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 m²/m³ (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/m³. The TVOC_{TIC} value is the sum of all components with a concentration ≥ 1µg/m³ 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:

- | | |
|--|--|
| 1. Di-(2-ethylhexyl) phthalate (DEHP) (CAS No. 117-81-7) | 9. Di-n-octyl phthalate* (DNOP) (CAS No. 117-84-0) |
| 2. Dibutyl phthalate (DBP) (CAS No. 84-74-2) | 10. Diisodecyl phthalate* (DIDP) (CAS No. 26761-40-0) |
| 3. Benzyl butyl phthalate (BBP) (CAS No. 85-68-7) | 11. Diisopentyl phthalate* (DIPP) (CAS No. 605-50-5) |
| 4. Diisononyl phthalate (DINP) (CAS No. 28553-12-0) | 12. Bis(methylcyclohexyl) phthalate* (MDCHP) (CAS No. 27987-25-3) |
| 5. Diisobutyl phthalate (DIBP) (CAS No. 84-69-5) | 13. Bis(2-propylheptyl) phthalate* (DPPH) (CAS No. 53306-54-0) |
| 6. Di-n-pentyl phthalate (DPENP) (CAS No. 131-18-0) | |
| 7. Di-n-hexyl phthalate (DHEXP) (CAS No. 84-75-3) | |
| 8. Dicyclohexyl phthalate (DCHP) (CAS No. 84-61-7) | |

*The individual weight of the five phthalates numbered 9-13 above should also be reported by laboratories, but will only count toward the total limit of ≤ 0.01 wt % for all phthalates required for certification beginning January 1, 2026. Until that time the results should be reported in two separate tables.

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 (see Section 1) |
| | <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 |

Analytical Request:

- Emissions Testing
- Extractable Heavy Metals
- Tributyltin (TBT)
- Sum of 13 Phthalates (see Section 13d of Technical Guidelines 2025 v1 for details about reporting phthalates 1–8 and 9–13 in separate tables. Only 1–8 will count toward total limit until January 1, 2026.)
- 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

2025 v1

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

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

Signature: _____ Date: _____