

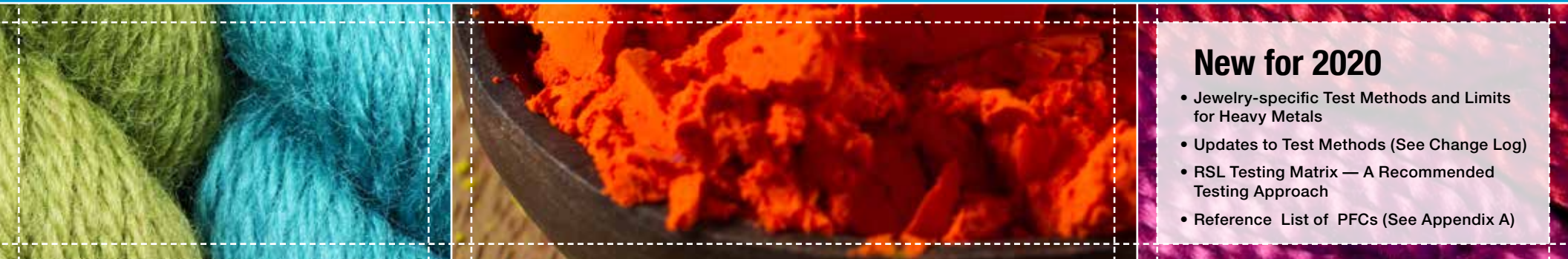


Apparel and Footwear International RSL Management Group



# RESTRICTED SUBSTANCES LIST

Version 05 | 2020



## New for 2020

- Jewelry-specific Test Methods and Limits for Heavy Metals
- Updates to Test Methods (See Change Log)
- RSL Testing Matrix — A Recommended Testing Approach
- Reference List of PFCs (See Appendix A)

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For more information about AFIRM,  
visit [www.afirm-group.com](http://www.afirm-group.com).

## AFIRM Mission

AFIRM is the Apparel and Footwear International RSL Management (AFIRM) Working Group, established in 2004.

AFIRM's mission is "to reduce the use and impact of harmful substances in the apparel and footwear supply chain."

AFIRM's purpose is to provide a forum to advance the global management of restricted substances in apparel and footwear, communicate information about chemical management to the supply chain, discuss concerns, and exchange ideas for improving chemical management.

## AFIRM Vision

AFIRM continues to be a recognized global center of excellence, providing resources to enable continuous advancement of chemical management best practices.

We do this based on transparency, science, and collaboration with relevant industries and experts to build safer and more sustainable chemistry within the apparel and footwear supply chains.

It is understood that in adopting this vision, AFIRM's mission, objectives, and projects will continue to be product-focused or RSL-related.

## Legal Statement

The AFIRM RSL constitutes information from AFIRM only and does not represent any individual AFIRM member. Individual brand RSLs may differ in specific parameters.

The AFIRM RSL is not intended to and does not establish any industry standard of care. The AFIRM RSL may not always provide the most appropriate approach for any individual company's chemical management program. Many brands have implementation guidelines, and suppliers must follow those guidelines where required. The AFIRM RSL does not constitute legal advice and is not a substitute for legal advice. There is no warranty, express or implied, as to the completeness or utility of the information contained in this AFIRM RSL, including, without limitation, that the information is current and error-free. AFIRM disclaims liability of any kind whatsoever resulting from any use of or reliance on the AFIRM RSL.

## Policy Statement

AFIRM has created the following Restricted Substances List ("AFIRM RSL") to assist and guide supply chain participants seeking to increase product quality and safety or reduce their environmental impact by limiting the use of certain substances in apparel and footwear. AFIRM acknowledges that a brand's offerings may include closely related products utilizing the same or similar materials, such as accessories, jewelry, sporting good equipment, wearables, and home textiles. The AFIRM RSL may be applied to these additional product types, and examples are included in the scope of this document for guidance; however, the primary focus of the AFIRM RSL remains apparel and footwear. AFIRM recommends that suppliers check with their brand customers for specific requirements regarding additional product categories.

## Scope of the AFIRM RSL

Per the Policy Statement on the previous page, the primary focus of the AFIRM Group and the AFIRM RSL is apparel and footwear. However, the AFIRM RSL may also be applied to accessories, jewelry, sporting good equipment, wearables, and home textiles.

- **Apparel.** Any garment worn on the body intended to protect, cover, or adorn.
- **Footwear.** Any durable covering for the feet intended to protect, cover, or comfort.
- **Accessories.** Any product intended to complement apparel, both carried and worn.
- **Jewelry.** Small decorative items worn for personal adornment such as rings, necklaces, earrings, pendants, bracelets and cufflinks. Jewelry may be attached to the body or clothing.
- **Sporting Good Equipment.** Any product intended for use in sport or exercise, including protective equipment.
- **Wearables.** Battery-powered electronic devices intended to be worn on the body during normal use. The AFIRM RSL covers components used on the external portion (i.e. skin contact) of the wearable product. Please note that certain wearable products, such as fitness trackers worn on the wrist, could also be classified as jewelry. AFIRM recommends that suppliers check with their brand customers regarding specific testing requirements for wearable components.
- **Home Textiles.** Any product intended for functional or decorative purposes in the home.

For guidance purposes, AFIRM provides examples of products to which the AFIRM RSL may be applied, including but not limited to those listed in Table 1, on the next page.

### Additional Product-specific Regulatory Requirements

Please note that the following items have additional product-specific regulatory requirements that fall outside the scope of the AFIRM RSL. Suppliers must take additional steps to ensure products produced in their facilities comply with all such requirements—which include safety, flammability, and more.

- **Toys.** These products have regulatory and specific chemical requirements.
- **Sunglasses and Children’s Jewelry.** These types of accessories have non-chemical safety requirements.
- **Protective Equipment.** These products have non-chemical safety and performance standards (e.g. NOCSAE).
- **Food-contact Materials.** These products have regulatory and specific chemical requirements.
- **Electrical and Electronic Components.** Components of products that do not come into contact with the skin are subject to other regulatory requirements (e.g. RoHS, EU Battery Directive).

Because AFIRM member brands may differ on the types of products classified under each of these categories, suppliers are advised to check with their customers regarding brand-specific definitions, requirements, and product applicability.

**Table 1. Examples of Products within the Scope of the AFIRM RSL**

Apparel	Footwear	Accessories	Equipment	Wearables	Home Textiles
<ul style="list-style-type: none"> <li>• Shirts</li> <li>• Pants/trousers</li> <li>• Shorts</li> <li>• Skirts</li> <li>• Dresses</li> <li>• Swimwear</li> <li>• Socks</li> <li>• Jackets</li> <li>• Vests</li> <li>• Sweatshirts and hoodies</li> <li>• Sweaters</li> <li>• Underwear</li> <li>• Sleepwear and loungewear</li> </ul>	<ul style="list-style-type: none"> <li>• Lifestyle</li> <li>• Athletic (e.g. running, training)</li> <li>• Sports (e.g. basketball, soccer, football, baseball)</li> <li>• Sandals</li> <li>• Flip flops</li> <li>• Boots</li> <li>• Slippers</li> </ul>	<ul style="list-style-type: none"> <li>• Hats</li> <li>• Headbands</li> <li>• Scarves</li> <li>• Handbags</li> <li>• Backpacks</li> <li>• Sunglasses</li> <li>• Shoelaces</li> <li>• Belts</li> <li>• Hair clips</li> <li>• Gloves (e.g. winter)</li> <li>• Jewelry</li> </ul>	<ul style="list-style-type: none"> <li>• Shin and leg guards</li> <li>• Gloves (e.g. baseball, football, golf)</li> <li>• Chest protectors</li> <li>• Balls (e.g. basketball, football, soccer)</li> <li>• Helmets</li> <li>• Shoulder, knee, and elbow pads</li> <li>• Yoga mats and blocks</li> <li>• Rackets (e.g. tennis, racquetball, badminton)</li> <li>• Fitness equipment (e.g. treadmills)</li> <li>• Bicycles</li> </ul>	<ul style="list-style-type: none"> <li>• Fitness trackers (worn on wrist, chest, finger, ear, etc.)</li> <li>• Heart-rate monitors</li> <li>• Digital watches</li> <li>• Smart watches</li> <li>• Smart apparel and footwear</li> <li>• Wireless headphones and earbuds</li> </ul>	<ul style="list-style-type: none"> <li>• Towels</li> <li>• Bathrobes</li> <li>• Bed linens (e.g. sheets, pillowcases, duvets)</li> <li>• Blankets</li> </ul>

## Uses of the AFIRM RSL

AFIRM member brands may differ on individual parameters; suppliers are advised to check with the customer regarding brand-specific requirements. The AFIRM RSL leverages AFIRM's mission — “to reduce the use and impact of harmful substances in the apparel and footwear supply chain” — by providing a single set of information for maximum and in-depth implementation within the supply chain. Some examples of uses for the AFIRM RSL, depending on the objectives of the user, include:

- Providing a tool for vendors to establish chemical management knowledge and processes.
- Building full or base compliance with AFIRM member chemical restrictions.
- Providing a common base for testing, which may be accepted by multiple AFIRM brands. AFIRM member companies determine and communicate to their vendors their testing requirements and acceptance of test reports.

## Links and References

Be proactive! These links provide additional important information regarding chemical management and should be visited on a regular basis.

### **AFIRM Packaging Restricted Substances List**

[www.afirm-group.com/packaging-restricted-substance-list/](http://www.afirm-group.com/packaging-restricted-substance-list/)

- English, Chinese, Vietnamese, and Spanish versions

### **AFIRM Chemistry Toolkit**

[www.afirm-group.com/toolkit](http://www.afirm-group.com/toolkit)

- English, Chinese, Vietnamese, and Spanish versions

### **AFIRM Chemical Information Sheets**

[www.afirm-group.com/chemical-information-sheets](http://www.afirm-group.com/chemical-information-sheets)

- English, Chinese, Vietnamese, Japanese, and Spanish versions

### **Overview of legal chemical limits and country of origin**

[https://www.aafaglobal.org/AAFA/Solutions\\_Pages/Restricted\\_Substance\\_List](https://www.aafaglobal.org/AAFA/Solutions_Pages/Restricted_Substance_List)

### **Regulated fluorinated greenhouse gases; Regulation (EU) No 517/2014**

[https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2014.150.01.0195.01.ENG&toc=OJ:L:2014:150:FULL](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.150.01.0195.01.ENG&toc=OJ:L:2014:150:FULL)

### **Regulated substances that deplete the ozone layer; EC 1005/2009**

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:286:0001:0030:EN:PDF>

### **Zero Discharge of Hazardous Chemicals (ZDHC) Foundation — Manufacturing Restricted Substances List (MRSL)**

<https://mrsl.roadmaptozero.com/>

## Additional Substances and Parameters to Consider

### EU REACH Substances of Very High Concern

Based on scientific evidence indicating potential hazards to human health or the environment, the European Commission (EC) and European Union (EU) member states propose substances of very high concern (SVHCs) for placement on the European Chemicals Agency (ECHA) “Candidate List of Substances of Very High Concern for Authorisation.” Placing a substance on the Candidate List triggers specific obligations for importers, producers, and suppliers of any article that contains one or more of these substances above 0.1 percent by weight per component. The obligations include providing sufficient information to allow safe use of the article to brand and retail customers or, upon request, to a consumer within 45 days of receipt of the request.

In addition, ECHA must be notified if the substance(s) are present in article components above 0.1 percent in quantities totaling over one ton per producer or importer per year. Notification is not required if the substance has already been registered for that use or when the producer or importer of an article can exclude exposure of humans and the environment during the use and disposal of the article. In such cases, the producer or importer must supply appropriate instructions to the recipient of the article.

ECHA periodically updates the Candidate List; find the most current version at <https://www.echa.europa.eu/candidate-list-table>.

AFIRM member brands may differ on how they address SVHCs as well as the legal obligations. AFIRM advises suppliers to consult with their customers regarding brand-specific requirements for SVHCs.

### California Proposition 65 Substances

Each year, California publishes a list of chemicals known to the state to cause cancer or reproductive toxicity. Businesses that expose individuals to one or more of these chemicals must provide a clear and reasonable warning before the exposure occurs. For consumer products, this is typically through warning labels on the products or retail signage. Note that this warning is not the same as a regulatory requirement indicating that the product is “unsafe” if a specific concentration is exceeded. Enforcement is carried out through civil lawsuits brought by the California attorney general, district attorneys, or private parties acting in the public interest.

Additional information can be found at <https://oehha.ca.gov/proposition-65>.

AFIRM member brands may differ on how they address warning-label requirements. AFIRM advises suppliers to consult with their customers regarding brand-specific requirements for Proposition 65 substances.

### Specific In-country Testing and Certification Requirements

Some countries—such as Korea, Russia, and Saudi Arabia—have specific requirements for certain products. This includes requiring that testing be performed at an approved laboratory in-country, special certification marks, and even unique testing not required by any other country. The AFIRM RSL covers these substance limit requirements, but test methods may vary, and AFIRM member brands may differ on how they address these legal obligations. AFIRM advises suppliers to consult with their customers regarding brand-specific requirements for countries which may have specific testing and/or certification requirements.

### Biocides, Nanoparticles, Etc.

Some brands may have specific requirements regarding the use of substances of concern such as biocides or nanoparticles. AFIRM recommends checking with your customers regarding individual policies or requirements.

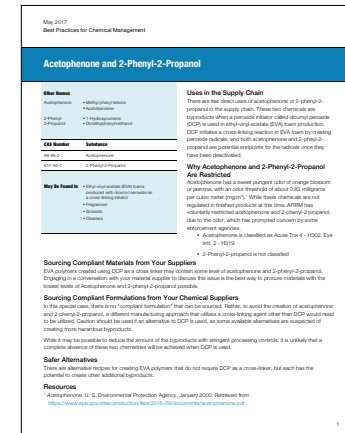
## AFIRM Chemical Information Sheets

AFIRM member brands have produced a comprehensive set of educational materials advising suppliers about best practices for chemicals management. Each chemical information sheet covers a chemical or class of chemicals, giving an overview of the substance(s), where they are likely to be found in the material manufacturing process, and how to maintain compliance with the AFIRM RSL.

The sheets contain some information relevant to packaging, and future revisions will include more specific information.

The complete library of chemical information sheets is available on the AFIRM website at <http://afirm-group.com/information-sheets>; additionally, links to individual information sheets are embedded in the pages that follow.

- ✚ The plus symbol next to a chemical or class of chemicals in the AFIRM RSL indicates that an information sheet is available; simply click on the chemical name, and your web browser will load a PDF of the information sheet for that substance.



## Definition of Ages

Various countries define the terms “babies,” “children,” and “adults” differently. Based on legislation, the age ranges listed in Table 2 satisfy the most restrictive global requirements.

**Table 2. Definition of Ages**

	Age Range
Babies	0 to 36 months
Children	36 months to 14 years
Adults	14 years and older

## Definition of “Child Care Article”

Various countries define the term “child care article” differently. The most restrictive definition (based on global chemical legislation) includes articles designed or intended by the manufacturer to facilitate sleeping, relaxation, hygiene, feeding, sucking, or teething for children three years of age or younger.



## Definition of Reporting Limits

Values above which labs should report substances detected for purposes of data capture and harmonization. By reporting these values, instead of a simple PASS/FAIL, the supply chain can capture information regarding the presence of substances below the RSL limit. The reporting limits also allow data to be harmonized between various testing labs.

Reporting limits are values at or above the method Practical Quantification Limit (PQL). The PQL represents the lowest level at which accurate, precise, and robust data can be reported. AFIRM RSL reporting limits are widely achievable by laboratories across the global analytical testing industry and allow for combined (composite) testing where applicable.

## Definition of Material Types

For the purpose of this RSL, AFIRM offers these definitions of material types and provides examples of materials in Table 3, on the next page.

**Natural fibers.** Animal or vegetable fibers (including semi-synthetics).

**Blended fibers.** Woven or knitted materials created by blending two or more fiber types. For the purpose of this RSL, a blended fiber consists of a natural and a synthetic fiber.

**Synthetic fibers.** Human-made fibers based on synthetic chemicals (often from petroleum sources) such as polymers and extruded fibers.

**Artificial leather.** A leather-like material composed of a textile backing and, typically, a PU or PVC coating.

**Natural leather.** Created by tanning animal rawhides.

**Coating.** A fluid, semi-fluid, or other material, with or without a suspension of finely divided coloring matter, which changes to a solid film when a thin layer is applied to a metal, wood, stone, paper, leather, cloth, plastic, or other surface.

Coatings do not include printing inks or those materials which actually become a part of the substrate, such as the pigment in a plastic article or those materials which are actually bonded to the substrate, such as by electroplating or ceramic glazing.

**Printing.** The process of applying color to a fabric in definite patterns or designs.

**Natural materials.** Material derived from animals or plants that have undergone very little modification. Includes horn, bone, cork, wood, paper, and straw. Excludes natural fibers, natural leather, feathers, down, and metals.

**Polymers and plastics.** Plastics are composed of various polymers (typically from petroleum sources) usually mixed with additives including colorants, plasticizers, stabilizers, and fillers. These additives affect the chemical composition, chemical properties, and mechanical properties of the plastic.

**Natural rubber.** Elastic material made from latex sap or trees that can be vulcanized.

**Synthetic rubber.** Material made from petroleum-based monomers with properties similar to natural rubber.

**Foam.** Spongy material made by trapping air bubbles in a solid. These can be open cell or closed cell.

**Metals.** Chemical elements that can be lustrous, ductile, malleable, and good conductors of heat and electricity. Includes metals deposited by physical vapor deposition (PVD), chemical vapor deposition (CVD), or electroplating.

**Feathers and down.** Includes the smaller down feathers as well as the larger contour and flight feathers. See the International Down and Feather Bureau for specific down and feather definitions.

**Glue.** A substance capable of holding materials together by surface attachment.

**Table 3. Examples of Materials within the Scope of the AFIRM RSL**

NOTE: This list provides examples of materials within each category but is not all-inclusive.

Natural Fibers <small>Including semi-synthetics</small>	Blended Fibers	Synthetic Fibers	Artificial Leather	Natural Leather	Coatings & Prints	Natural Materials	Polymers, Plastics, Foams, Natural Rubber & Synthetic Rubber	Metal	Feathers & Down	Glue
<ul style="list-style-type: none"> <li>• Cotton</li> <li>• Wool</li> <li>• Silk</li> <li>• Hemp</li> <li>• Cashmere</li> <li>• Linen</li> <li>• Fur</li> <li>• Rayon (Semi-synthetic)</li> <li>• Lyocell (Semi-synthetic)</li> </ul>	<ul style="list-style-type: none"> <li>• Cotton-Polyester</li> <li>• Wool-Nylon</li> <li>• Ramie-Polyester</li> </ul>	<ul style="list-style-type: none"> <li>• Polyester</li> <li>• Acrylic</li> <li>• Nylon</li> <li>• Polyamide</li> </ul>	<ul style="list-style-type: none"> <li>• Polyurethane (PU)</li> <li>• Polyvinyl Chloride (PVC)</li> </ul>	<ul style="list-style-type: none"> <li>• Leather</li> </ul>	<p>Printing techniques such as:</p> <ul style="list-style-type: none"> <li>• Heat transfers</li> <li>• Dye sublimation printing</li> <li>• Screen printing</li> <li>• Direct-to-garment printing</li> <li>• Discharge printing</li> <li>• Plastisol transfers</li> </ul> <p>Coatings such as:</p> <ul style="list-style-type: none"> <li>• Polyvinyl chloride (PVC)</li> <li>• Polyurethane (PU)</li> <li>• UV-cured</li> </ul>	<ul style="list-style-type: none"> <li>• Horn</li> <li>• Bone</li> <li>• Cork</li> <li>• Wood</li> <li>• Paper</li> <li>• Straw</li> <li>• Stone</li> </ul>	<ul style="list-style-type: none"> <li>• Ethylene vinyl acetate (EVA)</li> <li>• Polystyrene (PS)</li> <li>• Polyethylene (PE)</li> <li>• Acrylonitrile butadiene styrene (ABS)</li> <li>• Neoprene</li> <li>• Polypropylene (PP)</li> <li>• Polycarbonate (PC)</li> <li>• Polyamide (PA)</li> <li>• Polyurethane (PU)</li> <li>• Polyvinyl chloride (PVC)</li> <li>• Thermoplastic polyurethane (TPU)</li> <li>• Thermoplastic elastomer (TPE)</li> <li>• Styrene ethylene butylene styrene (SEBS)</li> </ul>	<ul style="list-style-type: none"> <li>• Stainless steel</li> <li>• Brass</li> <li>• Copper</li> <li>• Gold</li> <li>• Silver</li> <li>• Aluminum</li> </ul>	<ul style="list-style-type: none"> <li>• Feathers</li> <li>• Down</li> </ul>	<ul style="list-style-type: none"> <li>• Hot melt adhesive</li> <li>• Powdered adhesive</li> <li>• Flock adhesive</li> <li>• Contact adhesive</li> <li>• Latex glue</li> <li>• Polyurethane glue</li> <li>• Neoprene cement</li> <li>• Epoxies</li> <li>• Silicone adhesive</li> <li>• UV-cured adhesive</li> </ul>

## Change Log for the 2020 AFIRM RSL

CAS No.	Substance	Modification	Page
Various	Alkylphenols (APs)	Changed test method to EN ISO 21084:2019 for Textiles and Leather. Analysis for Polymers and all other materials changed to EN ISO 21084:2019.	16
Various	Alkylphenol Ethoxylates (APEOs)	Changed test method to EN ISO 18218-1:2015 with quantification according to EN ISO 18254-1:2016 for Leather	16
Various	Chlororganic Carriers	Changed test method to EN 17137:2018 for all materials.	20
84852-53-9	Flame Retardants	Called out Decabromodiphenyl Ethane (DBDPE) specifically in list of Flame Retardants.	23
Various	Heavy Metals for Jewelry	Added new section for Heavy Metals in Jewelry with test method ASTM F2923:2014.	27
100-42-5	Monomers	Deleted GS/MS headspace method for Styrene	29
Various	Perfluorinated and Polyfluorinated Chemicals (PFCs)	Changed test method for Leather to EN 23702-1: 2018; for all other materials to CEN/TS 15968:2010; Added appendix of PFOA- and PFOS-related substances.	31, 36
68648-93-1	Phthalates	Added new SVHC Phthalates under REACH: <ul style="list-style-type: none"> <li>• 1,2-Benzenedicarboxylic acid, di-C6-10-alkyl esters or mixed decyl and hexyl and octyl diesters with <math>\geq 0.3\%</math> of dihexyl phthalate;</li> <li>• 1,2-Benzenedicarboxylic acid, mixed decyl and hexyl and octyl diesters;</li> <li>• 1,2-Benzenedicarboxylic acid, di-C6-10-alkyl esters, and n-pentyl-isopentylphthalate (nPIPP)</li> </ul>	32
68515-51-5			
776297-69-9			
91-22-5	Quinoline	Changed test method to DIN 54231:2005 with methanol extraction at 70 degrees C.	33
2440-22-4	UV Absorbers and Stabilizers	Added Drometrizole for informational purposes only.	34




## AFIRM RSL Testing Matrix

In 2020, AFIRM has redefined the recommended testing approach included in the RSL. In previous years, AFIRM published a Risk Matrix, which gave guidance on risks for each listed substance or class of substances in different materials.

In this update, AFIRM is publishing a Testing Matrix (see Table 4, on the next page), replacing the Risk Matrix. The Testing Matrix is a more prescriptive approach to help brands and suppliers effectively manage chemical risks by adopting a common testing approach for use and acceptance across different brands. Chemicals assigned a Level 1 in materials should be viewed as the minimum amount of testing required to satisfy AFIRM member requirements, and chemicals assigned a Level 2 are recommended for additional testing and may be required at brand discretion. Regular and self-governed testing of all relevant substances by suppliers will help to ensure the widest acceptance of third-party test reports by international brands.

The Testing Matrix was developed by AFIRM brands utilizing multiple sources of information, including industry RSL testing information, a broad understanding of global supply chain operations, and from nearly two decades of managing restricted substances across a wide range of materials.

The Testing Matrix uses the following color codes:

-  **1 Red = Higher risk.** Testing required.
-  **2 Orange = Lower risk.** Testing recommended and may be required at brand discretion.
-  **Blank = Lowest risk.** Not anticipated in material.

Suppliers must check with their brand customers to understand if they will accept test reports according to this AFIRM Testing Matrix. Individual brand testing programs, to the extent they are different, supersede the AFIRM RSL Testing Matrix unless a brand indicates otherwise.

It is a goal of the AFIRM Group to reduce the testing burden on suppliers and streamline the RSL testing approach, while further reducing risk of restricted substances in materials and products. As brands adopt the AFIRM Testing Matrix into their RSL process, suppliers and AFIRM brands will be able to share test reports and data more easily, reducing the need for multiple RSL test submissions to satisfy different RSL requirements.

### NOTE:

The test methods listed in the RSL for specific materials correspond to the Testing Matrix. A blank color code for any material will not have a corresponding test method. For example, Metal has a blank color code for APEOs and therefore no test method is listed for APEOs in Metal in the RSL. If the RSL states “All Materials” or “All Materials Except,” this means the test method is applicable to all materials listed with a color of 1 or 2 that do not have a specific test method listed. AFIRM recommends consulting your testing laboratory to determine the best test method for any material not currently listed in this document.

**Table 4. AFIRM RSL Testing Matrix**

NOTE: Porcelain, Ceramic, and Glass materials do not fit into the categories below. AFIRM recommends testing for Total Heavy Metals (Pb and Cd at a minimum).

NOTE: For Recycled materials, additional testing may be required at Level 1; check with each brand on requirements.

Substance	Natural Fibers	Synthetic Fibers	Natural & Synthetic Blends	Artificial Leather	Natural Leather	Natural Materials	Metals	Feathers & Down	Polymers								Coatings & Prints	Glue
									EVA	PU Foams	All other PU & TPU	Rubber Excludes Latex and Silicon Rubbers	Polycarbonate	ABS	PVC	All Other Foams, Plastics & Polymers		
Acetophenone and 2-Phenyl-2-Propanol									2									
Acidic and Alkaline Substances (pH)	1	1	1	1	1				2	2	2	2	2	2	2	2		
Alkylphenol (AP) and Alkylphenol Ethoxylates (APEOs), including all isomers	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1
Azo-amines and Aryl Amine salts	1	1	1	1A	1	1A		1A									1	
Bisphenols									2	2	2	2	1	2	2	2		
Chlorinated Paraffins				2	1				2	2	1	1	2	2	1	2		
Chlorophenols	2	2	2		2													
Chlororganic Carriers		2	2	2														
Dimethylfumarate (DMFu)					2													
Dyes, Forbidden and Disperse		1	1	1													2	
Dyes, Navy Blue		2	2															
Flame Retardants	2B																	
Fluorinated Greenhouse Gases																		
Formaldehyde	1	1	1	2	1	1C						2					1	1

**A** Level 1 for dyed/colored materials. **D** Level 2 for Wool materials. **G** Level 1 for PVC materials. **K** Level 1 if Rubber or black Polymeric materials.  
**B** Level 2 if Flame Retardants are applied. **E** Level 2 if extractable Chrome above 1 ppm. **H** Level 2 for Styrene/Butadiene Rubbers (SBRs) only. **L** Level 1 for PU-based materials.  
**C** Level 1 for Wood, Paper, and Straw materials. **F** Level 2 for plant-based fibers; N/A for animal-based fibers. **J** Level 1 if a Fluorinated finish is applied.

Substance	Natural Fibers	Synthetic Fibers	Natural & Synthetic Blends	Artificial Leather	Natural Leather	Natural Materials	Metals	Feathers & Down	Polymers								Coatings & Prints	Glue
									EVA	PU Foams	All other PU & TPU	Rubber <small>Excludes Latex and Silicon Rubbers</small>	Polycarbonate	ABS	PVC	All Other Foams, Plastics & Polymers		
Heavy Metals, Chromium VI	2D	2E			1													
Heavy Metals, Extractable	1	1	1	2	1		2		2	2	2	2	2	2	2	2	2	
Heavy Metals, Nickel Release							1											
Heavy Metals, Total	2F		2F	1	2		1		1	1	1	1	1	1	1	1	1	2
Monomers, Styrene & Vinyl Chloride				1G								2H		2	1		1G	
N-Nitrosamines												2						
Organotin Compounds		2	2	1	2					1	1	1			1	1	1	1
Ortho-phenylphenol (OPP)	2	2	2	2	2												2	
Ozone-depleting Substances																		
Perfluorinated and Polyfluorinated Chemicals (PFCs)	1J																	
Pesticides, Agricultural																		
Phthalates				1					1	1	1	1	2	2	1	1	1	1
Polycyclic Aromatic Hydrocarbons (PAHs)				2					1K	1K	1K	1			1K	1K	1K	1K
Quinoline		2	2															
Solvents / Residuals, DMFa				1						1	1						1L	1L
Solvents / Residuals, DMAC and NMP				1						2	2					2	2	2
Solvents / Residuals, Formamide									2								2	
UV Absorbers / Stabilizers									2	2	2	2	2	2	2	2		
Volatile Organic Compounds (VOCs)				2					2	2	2	2	2	2	2	2	2	1

**A** Level 1 for dyed/colored materials.

**B** Level 2 if Flame Retardants are applied.

**C** Level 1 for Wood, Paper, and Straw materials.

**D** Level 2 for Wool materials.

**E** Level 2 if extractable Chrome above 1 ppm.

**F** Level 2 for plant-based fibers; N/A for animal-based fibers.

**G** Level 1 for PVC materials.

**H** Level 2 for Styrene/Butadiene Rubbers (SBRs) only.

**J** Level 1 if a Fluorinated finish is applied.

**K** Level 1 if Rubber or black Polymeric materials.

**L** Level 1 for PU-based materials.

## AFIRM Restricted Substances List

CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
	<b>Acetophenone and 2-Phenyl-2-Propanol †</b>				
98-86-2	Acetophenone	50 ppm each	Potential breakdown products in EVA foam when using Dicumyl Peroxide as a cross-linking agent.	Extraction in acetone or methanol GC/MS, sonication for 30 minutes at 60 degrees C	25 ppm each
617-94-7	2-Phenyl-2-Propanol				
	<b>Acidic and Alkaline Substances</b>				
Various	pH value	Textiles: 4.0–7.5 Leather: 3.5–7.0	<p>pH value is a characteristic number, ranging from pH 1 to pH 14, which indirectly shows the content of acidic or alkaline substances in a product.</p> <p>pH values less than 7 indicate sources of acidic substances, and values greater than 7 indicate sources of alkaline substances. To avoid irritation or chemical burns to the skin, the pH value of products must be in the range of human skin—approximately pH 5.5.</p> <p>AFIRM recommends the limits cited to comply with all global regulations for all products.</p>	Textiles and Artificial Leather: EN ISO 3071:2006 (KCI Solution) Leather: EN ISO 4045:2018	N/A

CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
	<b>Alkylphenols (APs) + Alkylphenol Ethoxylates (APEOs) + including all isomers</b>				
Various	Nonylphenol (NP), mixed isomers	Total: 100 ppm	<p>APEOs can be used as or found in detergents, scouring agents, spinning oils, wetting agents, softeners, emulsifying/dispersing agents for dyes and prints, impregnating agents, de-gumming for silk production, dyes and pigment preparations, polyester padding and down/feather fillings.</p> <p>APs are used as intermediaries in the manufacture of APEOs and antioxidants used to protect or stabilize polymers. Biodegradation of APEOs into APs is the main source of APs in the environment.</p>	Textiles and Leather: EN ISO 21084:2019	Sum of NP & OP: 10 ppm
Various	Octylphenol (OP), mixed isomers			Polymers and all other materials: 1 g sample/20 mL THF, sonication for 60 minutes at 70 degrees C, analysis according to EN ISO 21084:2019	
Various	Nonylphenol ethoxylates (NPEOs)	Total: 100 ppm	<p>APEOs and formulations containing APEOs are prohibited from use throughout supply chain and manufacturing processes. We acknowledge that residual or trace concentrations of APEOs may still be found at levels exceeding 100 ppm and that more time is necessary for the supply chain to phase them out completely. This limit covers EU legislation restricting NPEOs, effective 3 February 2021, and provides advance warning to suppliers.</p>	All materials except Leather: EN ISO 18254-1:2016 with determination of APEO using LC/MS or LC/MS/MS	Sum of NPEO & OPEO: 20 ppm
Various	Octylphenol ethoxylates (OPEOs)			Leather: Sample prep and analysis using EN ISO 18218-1:2015 with quantification according to EN ISO 18254-1:2016	



CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
	<b>Azo-amines + and Arylamine Salts</b>				
92-67-1	4-Aminobiphenyl	20 ppm each	<p>Azo dyes and pigments are colorants that incorporate one or several azo groups (-N=N-) bound with aromatic compounds.</p> <p>Thousands of azo dyes exist, but only those which degrade to form the listed cleavable amines are restricted.</p> <p>Azo dyes that release these amines are regulated and should no longer be used for dyeing textiles.</p>	<p>All materials except Leather: EN ISO 14362-1:2017 Leather: EN ISO 17234-1:2015</p> <p>p-Aminoazobenzene: All materials except Leather: EN ISO 14362-3:2017 Leather: EN ISO 17234-2:2011</p>	5 ppm each
92-87-5	Benzidine				
95-69-2	4-Chloro-o-toluidine				
91-59-8	2-Naphthylamine				
97-56-3	o-Aminoazotoluene				
99-55-8	2-Amino-4-nitrotoluene				
106-47-8	p-Chloraniline				
615-05-4	2,4-Diaminoanisole				
101-77-9	4,4'-Diaminodiphenylmethane				
91-94-1	3,3'-Dichlorobenzidine				
119-90-4	3,3'-Dimethoxybenzidine				
119-93-7	3,3'-Dimethylbenzidine				
838-88-0	3,3'-dimethyl-4,4'-diaminodiphenylmethane				
120-71-8	p-Cresidine				
101-14-4	4,4'-Methylen-bis(2-chloraniline)				
101-80-4	4,4'-Oxydianiline				
139-65-1	4,4'-Thiodianiline				
95-53-4	o-Toluidine				
95-80-7	2,4-Toluediamine				
137-17-7	2,4,5-Trimethylaniline				
95-68-1	2,4 Xylidine				
87-62-7	2,6 Xylidine				
90-04-0	2-Methoxyaniline (= o-Anisidine)				
60-09-3	p-Aminoazobenzene				
3165-93-3	4-Chloro-o-toluidinium chloride				
553-00-4	2-Naphthylammoniumacetate				
39156-41-7	4-Methoxy-m-phenylene diammonium sulphate				
21436-97-5	2,4,5-Trimethylaniline hydrochloride				

CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
<b>Bisphenols +</b>					
80-05-7	Bisphenol-A (BPA)	1 ppm	Used in the production of epoxy resins, polycarbonate plastics, flame retardants, and PVC.  Restricted in items intended to come into contact with the mouth.	All materials: Extraction: 1 g sample/20 ml THF, sonication for 60 minutes at 60 degrees C, analysis with LC/MS	1 ppm
80-09-1	Bisphenol S (BPS)	For informational purposes only.	Applicable to items intended to come into contact with the mouth.		1 ppm each
620-92-8	Bisphenol F (BPF)	AFIRM recommends testing polycarbonate materials to assess content levels.	BPA alternatives with known or suspected similar hazards are used in the production of epoxy resins, polycarbonate plastics, flame retardants, and PVC.		
1478-61-1	Bisphenol AF (BPAF)				
<b>Chlorinated Paraffins +</b>					
85535-84-8	Short-chain Chlorinated Paraffins (SCCPs) (C10-C13)	1000 ppm	May be used as softeners, flame retardants, or fat-liquoring agents in leather production; also as a plasticizer in polymer production.	All materials: Combined CADS/ISO 18219:2015 method V1:06/17 (extraction ISO 18219 and analysis by GC/NCI/MS)	100 ppm
85535-85-9	Medium-chain Chlorinated Paraffins (MCCPs) (C14-C17)	1000 ppm		For more information on the standard method, click <a href="#">here</a> .	100 ppm

CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
	<b>Chlorophenols †</b>				
15950-66-0	2,3,4-Trichlorophenol (TriCP)	0.5 ppm each	<p>Chlorophenols are polychlorinated compounds used as preservatives or pesticides.</p> <p>Pentachlorophenol (PCP), Tetrachlorophenol (TeCP), and Trichlorophenols (TriCP) are sometimes used to prevent mold and kill insects when growing cotton and when storing/transporting fabrics.</p> <p>PCP, TeCP, and TriCP can also be used as in-can preservatives in print pastes and other chemical mixtures.</p>	<p>All materials: 1 M KOH extraction, 16 hours at 90 degrees C, derivatization and analysis § 64 LFGB B 82.02-08 or DIN EN ISO 17070:2015</p>	0.5 ppm each
933-78-8	2,3,5-Trichlorophenol (TriCP)				
933-75-5	2,3,6-Trichlorophenol (TriCP)				
95-95-4	2,4,5-Trichlorophenol (TriCP)				
88-06-2	2,4,6-Trichlorophenol (TriCP)				
609-19-8	3,4,5-Trichlorophenol (TriCP)				
4901-51-3	2,3,4,5-Tetrachlorophenol (TeCP)				
58-90-2	2,3,4,6-Tetrachlorophenol (TeCP)				
935-95-5	2,3,5,6-Tetrachlorophenol (TeCP)				
87-86-5	Pentachlorophenol (PCP)				

CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
	<b>Chlororganic Carriers †</b>				
95-49-8	2-Chlorotoluene	Total: 1 ppm	Chlorobenzenes and Chlorotoluenes (Chlorinated Aromatic Hydrocarbons) can be used as carriers in the dyeing process of polyester or wool/polyester fibers. They can also be used as solvents.	All materials: EN 17137:2018	0.2 ppm each
108-41-8	3-Chlorotoluene				
106-43-4	4-Chlorotoluene				
32768-54-0	2,3-Dichlorotoluene				
95-73-8	2,4-Dichlorotoluene				
19398-61-9	2,5-Dichlorotoluene				
118-69-4	2,6-Dichlorotoluene				
95-75-0	3,4-Dichlorotoluene				
2077-46-5	2,3,6-Trichlorotoluene				
6639-30-1	2,4,5-Trichlorotoluene				
76057-12-0	2,3,4,5-Tetrachlorotoluene				
875-40-1	2,3,4,6-Tetrachlorotoluene				
1006-31-1	2,3,5,6-Tetrachlorotoluene				
877-11-2	Pentachlorotoluene				
541-73-1	1,3-Dichlorobenzene				
106-46-7	1,4-Dichlorobenzene				
87-61-6	1,2,3-Trichlorobenzene				
120-82-1	1,2,4-Trichlorobenzene				
108-70-3	1,3,5-Trichlorobenzene				
634-66-2	1,2,3,4-Tetrachlorobenzene				
634-90-2	1,2,3,5-Tetrachlorobenzene				
95-94-3	1,2,4,5-Tetrachlorobenzene				
608-93-5	Pentachlorobenzene				
118-74-1	Hexachlorobenzene				
5216-25-1	p-Chlorobenzotrichloride				
98-07-7	Benzotrichloride				
100-44-7	Benzyl Chloride				
95-50-1	1,2-Dichlorobenzene	10 ppm			1 ppm

CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
	<b>Dimethylfumarate †</b>				
624-49-7	Dimethylfumarate (DMFu)	0.1 ppm	DMFu is an anti-mold agent that may be used in sachets in packaging to prevent the buildup of mold, especially during shipping.	Textiles: EN 17130:2019 All other materials: CEN ISO/TS 16186:2012	0.05 ppm
	<b>Dyes (Forbidden † and Disperse †)</b>				
2475-45-8	C.I. Disperse Blue 1	50 ppm each	Disperse dyes are a class of water-insoluble dyes that penetrate the fiber system of synthetic or manufactured fibers and are held in place by physical forces without forming chemical bonds. Disperse dyes are used in synthetic fiber (e.g., polyester, acetate, polyamide).  Restricted disperse dyes are suspected of causing allergic reactions and are prohibited from use for dyeing of textiles.	All materials: DIN 54231:2005	15 ppm each
2475-46-9	C.I. Disperse Blue 3				
3179-90-6	C.I. Disperse Blue 7				
3860-63-7	C.I. Disperse Blue 26				
56524-77-7	C.I. Disperse Blue 35A				
56524-76-6	C.I. Disperse Blue 35B				
12222-97-8	C.I. Disperse Blue 102				
12223-01-7	C.I. Disperse Blue 106				
61951-51-7	C.I. Disperse Blue 124				
23355-64-8	C.I. Disperse Brown 1				
2581-69-3	C.I. Disperse Orange 1				
730-40-5	C.I. Disperse Orange 3				
82-28-0	C.I. Disperse Orange 11				
12223-33-5	C.I. Disperse Orange 37/76/59				
13301-61-6					
51811-42-8					
85136-74-9	C.I. Disperse Orange 149				
2872-52-8	C.I. Disperse Red 1				
2872-48-2	C.I. Disperse Red 11				

CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
	<b>Dyes, continued</b>				
3179-89-3	C.I. Disperse Red 17	50 ppm each	<p>Disperse dyes are a class of water-insoluble dyes that penetrate the fiber system of synthetic or manufactured fibers and are held in place by physical forces without forming chemical bonds. Disperse dyes are used in synthetic fiber (e.g., polyester, acetate, polyamide).</p> <p>Restricted disperse dyes are suspected of causing allergic reactions and are prohibited from use for dyeing of textiles.</p>	All materials: DIN 54231:2005	15 ppm each
61968-47-6	C.I. Disperse Red 151				
119-15-3	C.I. Disperse Yellow 1				
2832-40-8	C.I. Disperse Yellow 3				
6300-37-4	C.I. Disperse Yellow 7				
6373-73-5	C.I. Disperse Yellow 9				
6250-23-3	C.I. Disperse Yellow 23				
12236-29-2	C.I. Disperse Yellow 39				
54824-37-2	C.I. Disperse Yellow 49				
54077-16-6	C.I. Disperse Yellow 56				
3761-53-3	C.I. Acid Red 26				
569-61-9	C.I. Basic Red 9				
569-64-2	C.I. Basic Green 4				
2437-29-8					
10309-95-2					
548-62-9	C.I. Basic Violet 3				
632-99-5	C.I. Basic Violet 14				
2580-56-5	C.I. Basic Blue 26				
1937-37-7	C.I. Direct Black 38				
2602-46-2	C.I. Direct Blue 6				
573-58-0	C.I. Direct Red 28				
16071-86-6	C.I. Direct Brown 95				
60-11-7	4-Dimethylaminoazobenzene (Solvent Yellow 2)				
6786-83-0	C.I. Solvent Blue 4				
561-41-1	4,4'-bis(dimethylamino)-4''-(methylamino)trityl alcohol				

CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
	<b>Dyes, Navy Blue †</b>				
118685-33-9	Component 1: C <sub>39</sub> H <sub>23</sub> ClCrN <sub>7</sub> O <sub>12</sub> S <sub>2</sub> Na	50 ppm each	Navy blue colorants are regulated and prohibited from use for dyeing of textiles. Index 611-070-00-2	All materials: DIN 54231:2005	15 ppm each
Not allocated	Component 2: C <sub>46</sub> H <sub>30</sub> CrN <sub>10</sub> O <sub>20</sub> S <sub>2</sub> ·3Na				
	<b>Flame Retardants †</b>				
84852-53-9	Decabromodiphenyl ethane (DBDPE)	10 ppm each	With very limited exceptions, flame-retardant chemicals, including the entire class of Organohalogen flame retardants, should no longer be applied to materials during production.  The examples of flame-retardant substances listed here have been used historically across the footwear and apparel industry.	All materials: EN ISO 17881-1:2016	5 ppm each
32534-81-9	Pentabromodiphenyl ether (PentaBDE)				
32536-52-0	Octabromodiphenyl ether (OctaBDE)				
1163-19-5	Decabromodiphenyl ether (DecaBDE)				
Various	All other Polybrominated diphenyl ethers (PBDEs)				
79-94-7	Tetrabromobisphenol A (TBBP A)				
59536-65-1	Polybromobiphenyls (PBB)				
3194-55-6	Hexabromocyclododecane (HBCDD)				
3296-90-0	2,2-bis(bromomethyl)-1,3-propanediol (BBMP)				
13674-87-8	Tris(1,3-dichloro-isopropyl) phosphate (TDCPP)				
25155-23-1	Trixylyl phosphate (TXP)				
126-72-7	Tris(2,3-dibromopropyl) phosphate (TRIS)				
545-55-1	Tris(1-aziridinyl)phosphine oxide (TEPA)				
115-96-8	Tris(2-chloroethyl)phosphate (TCEP)				
5412-25-9	Bis(2,3-dibromopropyl) phosphate (BDBPP)				
				All materials: EN ISO 17881-2:2016	

CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
	<b>Fluorinated Greenhouse Gases †</b>				
Various	See Regulation (EU) No 517/2014 for a complete list.	0.1 ppm each	Prohibited from use. May be used as foam blowing agents, solvents, fire retardants, and aerosol propellants.	Sample preparation: Purge and trap — thermal desorption or SPME Measurement: GC/MS	0.1 ppm each
	<b>Formaldehyde †</b>				
50-00-0	Formaldehyde	Adults and children: 75 ppm Babies: 16 ppm	Used in textiles as an anti-creasing and anti-shrinking agent. It is also often used in polymeric resins. Although very rare in Apparel and Footwear, composite wood materials (such as particle board and plywood) must comply with existing California and forthcoming U.S. formaldehyde emission requirements (40 CFR 770). Suppliers are advised to refer to brand-specific requirements for these materials.	All materials except Leather: JIS L 1041-2011 A (Japan Law 112) or EN ISO 14184-1:2011 Leather: EN ISO 17226-2:2019 with EN ISO 17226-1:2019 confirmation method in case of interferences. Alternatively, EN ISO 17226-1:2019 can be used on its own.	16 ppm
	<b>Heavy Metals (Non-Jewelry) Extractable † and Total Content †</b>				
7440-36-0	Antimony (Sb)	Extractable: 30 ppm	Found in or used as a catalyst in polymerization of polyester, flame retardants, fixing agents, pigments, and alloys.	All materials except Leather: DIN EN 16711-2:2016 Leather: DIN EN ISO 17072-1:2017	Extractable: 3 ppm
7440-38-2	Arsenic (As)	Extractable: 0.2 ppm Total: 100 ppm	Arsenic and its compounds can be used in preservatives, pesticides, and defoliants for cotton, synthetic fibers, paints, inks, trims, and plastics.	Extractable: All materials except Leather: DIN EN 16711-2:2016 Leather: DIN EN ISO 17072-1:2017 Total: All materials except Leather: DIN EN 16711-1:2016 Leather: DIN EN ISO 17072-2:2017	Extractable: 0.1 ppm Total: 10 ppm



CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
	<b>Heavy Metals (Non-Jewelry), continued</b>				
7440-39-3	Barium (Ba)	Extractable: 1000 ppm	Barium and its compounds can be used in pigments for inks, plastics, and surface coatings, as well as in dyeing, mordants, filler in plastics, textile finishes, and leather tanning.	All materials except Leather: DIN EN 16711-2:2016 Leather: DIN EN ISO 17072-1:2017	Extractable: 100 ppm
7440-43-9	Cadmium (Cd)	Extractable: 0.1 ppm Total: 40 ppm	Cadmium compounds may be used as pigments (especially in red, orange, yellow and green); as a stabilizer for PVC; and in fertilizers, biocides, and paints.	Extractable: All materials except Leather: DIN EN 16711-2:2016 Leather: DIN EN ISO 17072-1:2017 Total: All materials except Leather: DIN EN 16711-1:2016 Leather: DIN EN ISO 17072-2:2017	Extractable: 0.05 ppm Total: 5 ppm
7440-47-3	Chromium (Cr)	Extractable: Textiles: 2 ppm Leather footwear for babies: 60 ppm	Chromium compounds can be used as dyeing additives; dye-fixing agents; color-fastness after-treatments; dyes for wool, silk, and polyamide (especially dark shades); and leather tanning.	Textiles: DIN EN 16711-2:2016 Leather: EN ISO 17072-1:2017	Extractable: 0.5 ppm
18540-29-9	Chromium VI +	Extractable: Leather: 3 ppm Textiles 1 ppm	Though typically associated with leather tanning, Chromium VI also may be used in the "after-chroming" process for wool dyeing (Chrome salts applied to acid-dyed wool to improve fastness).	Textiles: DIN EN 16711-2:2016 with EN ISO 17075-1:2017 if Cr is detected Leather: EN ISO 17075-1:2017 and EN ISO 17075-2:2017 for confirmation in case the extract causes interference. Alternatively, EN ISO 17075-2:2017 may be used on its own. Ageing test: ISO 10195:2018 Method A2 is used at brand discretion.	Extractable: Leather: 3 ppm Textiles: 0.5 ppm
7440-48-4	Cobalt (Co)	Extractable: Adults: 4 ppm Children and babies: 1 ppm	Cobalt and its compounds can be used in alloys, pigments, dyestuff, and the production of plastic buttons.	All materials except Leather: DIN EN 16711-2:2016 Leather: DIN EN ISO 17072-1:2017	Extractable: 0.5 ppm

CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
7440-50-8	Copper (Cu)	Extractable: Adults: 50 ppm Children and babies: 25 ppm	Copper and its compounds can be found in alloys and pigments, and in textiles as an antimicrobial agent.	All materials except leather: DIN EN 16711-2:2016 Leather: DIN EN ISO 17072-1:2017	Extractable: 5 ppm
7439-92-1	Lead (Pb)	Extractable: Adults and children: 1 ppm Babies: 0.2 ppm Total: 90 ppm	May be associated with alloys, plastics, paints, inks, pigments and surface coatings.	Extractable: All materials except Leather: DIN EN 16711-2:2016 Leather: DIN EN ISO 17072-1:2017 Total: Non-metal: CPSC-CH-E1002-08.3 Metal: CPSC-CH-E1001-08.3 Lead in paint and surface coatings: CPSC-CH-E1003-09.1	Extractable: 0.1 ppm Total: 10 ppm
7439-97-6	Mercury (Hg)	Extractable: 0.02 ppm Total: 0.5 ppm	Mercury compounds can be present in pesticides and as contaminants in caustic soda (NaOH). They may also be used in paints.	Extractable: All materials except leather: DIN EN 16711-2:2016 Leather: DIN EN ISO 17072-1:2017 Total: All materials except leather: DIN EN 16711-1:2016 Leather: DIN EN ISO 17072-2:2017	Extractable: 0.02 ppm Total: 0.1 ppm
7440-02-0	Nickel (Ni) †	Extractable: 1 ppm Release (metal parts): Prolonged skin contact: 0.5 µg/cm <sup>2</sup> /week Eyewear frames: 0.5 µg/cm <sup>2</sup> /week	Nickel and its compounds can be used for plating alloys and improving corrosion-resistance and hardness of alloys. They can also occur as impurities in pigments and alloys.	Extractable: All materials except leather: DIN EN 16711-2:2016 Leather: DIN EN ISO 17072-1:2017 Release: EN 12472:2005+ A1:2009 and EN 1811:2011+A1:2015 Release (eyewear frames): EN 16128:2015	Extractable: 0.1 ppm Release: 0.5 µg/cm <sup>2</sup> /week
7782-49-2	Selenium (Se)	Extractable: 500 ppm	May be found in synthetic fibers, paints, inks, plastics and metal trims.	All materials except leather: DIN EN 16711-2:2016 Leather: DIN EN ISO 17072-1:2017	Extractable: 50 ppm

CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
<b>Heavy Metals (Jewelry)</b>					
7440-36-0	Antimony (Sb)	Paints & Coatings: Extractable: 60 ppm	Antimony and its compounds can be used as a Flame Retardant in paints, as well as a colorant in pigments.	ASTM F2923:2014 ★	Extractable: 5 ppm
7440-38-2	Arsenic (As)	Paints & Coatings: Extractable: 25 ppm	Arsenic and its compounds can be used in paints and inks.	ASTM F2923:2014 ★	Extractable: 5 ppm
7440-39-3	Barium (Ba)	Paints & Coatings: Extractable: 1000 ppm	Barium and its compounds can be used in pigments for inks	ASTM F2923:2014 ★	Extractable: 100 ppm
7440-43-9	Cadmium (Cd)	Paints & Coatings: Extractable: 75 ppm Total: 40 ppm	Cadmium and its compounds are used as pigments (especially in red, orange, yellow, and green). It can also be used in alloys to improve hardness or be found as a contaminant	ASTM F2923:2014 ★	Extractable and Total: 5 ppm
7440-47-3	Chromium (Cr)	Paints & Coatings: Extractable: 60 ppm	Chromium and its compounds can be used as pigments in paints. It can also be used as part of alloys such as stainless steel.	ASTM F2923:2014 ★	Extractable: 5 ppm

★ Sample preparation for jewelry and wearables:  
Wax areas not intended for skin-contact:  
EN 1811:2011+A1:2015.

CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
	<b>Heavy Metals (Jewelry), continued</b>				
7439-92-1	Lead (Pb)	Substrates, Paints & Coatings: Total: 90 ppm	Lead and its compounds may be associated with plastics, paints, inks, pigments, and surface coatings. It can also be found in metals as a contaminant.	ASTM F2923:2014 ★	Total: 10 ppm
7439-97-6	Mercury (Hg)	Paints & Coatings: Extractable: 60 ppm	Mercury and its compounds may be used in paints and can be found as a contaminant in alloys.	ASTM F2923:2014 ★	Extractable: 5 ppm
7440-02-0	Nickel (Ni) †	Release (metal parts): Prolonged skin contact: 0.5 µg/cm <sup>2</sup> /week Pierced part: 0.2 µg/cm <sup>2</sup> /week	Nickel and its compounds can be used for plating alloys and improving the corrosion-resistance and hardness of alloys. They can also occur as impurities in pigments and alloys.	EN 12472:2005+A1:2009 and EN 1811:2011+A1:2015 ★	Release: Prolonged skin contact: 0.5 µg/cm <sup>2</sup> /week Pierced part: 0.2 µg/cm <sup>2</sup> /week
7782-49-2	Selenium (Se)	Paints & Coatings: Extractable: 500 ppm	Selenium and its compounds may be found in paints and inks.	ASTM F2923:2014 ★	Extractable: 50 ppm

★ Sample preparation for jewelry and wearables:  
Wax areas not intended for skin-contact:  
EN 1811:2011+A1:2015.

CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
	<b>Monomers +</b>				
100-42-5	Styrene, Free	500 ppm	Styrene is a precursor for polymerization and may be present in various Styrene copolymers like plastic buttons. Free styrene is restricted, not total styrene.	Extraction in Methanol GC/MS, sonication at 60 degrees C for 60 minutes	50 ppm
75-01-4	Vinyl Chloride	1 ppm	Vinyl Chloride is a precursor for polymerization and may be present in various PVC materials like prints, coatings, flip flops, and synthetic leather.	EN ISO 6401:2008	1 ppm
	<b>N-Nitrosamines +</b>				
62-75-9	N-nitrosodimethylamine (NDMA)	0.5 ppm each	Can be formed as by-product in the production of rubber.	GB/T 24153-2009: determination using GC/MS, with LC/MS/MS verification if positive. Alternatively, LC/MS/MS may be performed on its own. EN ISO 19577:2019	0.5 ppm each
55-18-5	N-nitrosodiethylamine (NDEA)				
621-64-7	N-nitrosodipropylamine (NDPA)				
924-16-3	N-nitrosodibutylamine (NDBA)				
100-75-4	N-nitrosopiperidine (NPIP)				
930-55-2	N-nitrosopyrrolidine (NPYR)				
59-89-2	N-nitrosomorpholine (NMOR)				
614-00-6	N-nitroso N-methyl N-phenylamine (NMPPhA)				
612-64-6	N-nitroso N-ethyl N-phenylamine (NEPhA)				

CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
<b>Organotin Compounds</b> †					
Various	Dibutyltin (DBT)	1 ppm each	Class of chemicals combining tin and organics such as butyl and phenyl groups.  Organotins are predominantly found in the environment as antifoulants in marine paints, but they can also be used as biocides (e.g., antibacterials), catalysts in plastic and glue production, and heat stabilizers in plastics/rubber.  In textiles and apparel, organotins are associated with plastics/rubber, inks, paints, metallic glitter, polyurethane products and heat transfer material.	All materials: CEN ISO/TS 16179:2012	0.1 ppm each
Various	Diocetyl tin (DOT)				
Various	Monobutyltin (MBT)				
Various	Tricyclohexyltin (TCyHT)				
Various	Trimethyltin (TMT)				
Various	Trioctyltin (TOT)				
Various	Tripropyltin (TPT)	0.5 ppm each			
Various	Tributyltin (TBT)				
Various	Triphenyltin (TPhT)				
<b>Ortho-phenylphenol</b> †					
90-43-7	Ortho-phenylphenol (OPP)	1000 ppm	OPP is used for its preservative properties in leather or as a carrier in polyester dyeing processes.	All materials: 1 M KOH extraction, 16 hours at 90 degrees C, derivatization and analysis § 64 LFGB B 82.02-08 or DIN EN ISO 17070:2015	100 ppm
<b>Ozone-depleting Substances</b> †					
Various	See Regulation (EC) No 1005/2009 for a complete list.	5 ppm	Prohibited from use.  Ozone-depleting substances have been used as a foaming agent in PU foams as well as a dry-cleaning agent.	All materials: GC/MS headspace 120 degrees C for 45 minutes	5 ppm

CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
	<b>Perfluorinated and Polyfluorinated Chemicals (Regulated PFCs) †</b>				
Various	Perfluorooctane Sulfonate (PFOS) and related substances	1 µg/m <sup>2</sup>	PFOA and PFOS may be present as unintended byproducts in long-chain and short-chain commercial water-, oil-, and stain-repellent agents. PFOA may also be used in polymers like Polytetrafluoroethylene (PTFE).	Leather: EN 23702-1: 2018  All other materials: CEN/TS 15968:2010	1 µg/m <sup>2</sup> each
Various	Perfluorooctanoic Acid (PFOA) and its salts	1 µg/m <sup>2</sup> 25 ppb total	The area-based limit for PFOA will be superseded by Commission Regulation (EU) 2017/1000 and removed in 2023.		
Various	PFOA-related substances	1000 ppb total	Refer to Appendix A for the full list of substances and CAS Numbers included in this restriction. In addition to this list, all PFOA-related substances are prohibited from use.		1000 ppb total
	<b>Pesticides and Herbicides, Agricultural †</b>				
Various	See Appendix B for a complete list.	0.5 ppm each	May be found in natural fibers, primarily cotton.	All materials: ISO 15913/DIN 38407 F2 or EPA 8081/EPA 8151A or BVL L 00.00-34:2010-09	0.5 ppm each

CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
	<b>Phthalates +</b>				
28553-12-0	Di-Iso-nonylphthalate (DINP)	500 ppm each Total: 1000 ppm	<p>Esters of ortho-phthalic acid (Phthalates) are a class of organic compound commonly added to plastics to increase flexibility. They are sometimes used to facilitate the molding of plastic by decreasing its melting temperature.</p> <p>Phthalates can be found in:</p> <ul style="list-style-type: none"> <li>• Flexible plastic components (e.g., PVC)</li> <li>• Print pastes</li> <li>• Adhesives</li> <li>• Plastic buttons</li> <li>• Plastic sleeveings</li> <li>• Polymeric coatings</li> </ul> <p>The REACH substances of very high concern (SVHC) candidate list is updated frequently. Suppliers should assume that the AFIRM RSL includes all Phthalates on the SVHC list—whether itemized here or not.</p>	<p>Sample preparation for all materials: CPSC-CH-C1001-09.4</p> <p>Measurement:</p> <p>Textiles: GC-MS, EN ISO 14389:2014 (7.1 Calculation based on weight of print only; 7.2 Calculation based on weight of print and textile if print cannot be removed).</p> <p>All materials except textiles: GC/MS</p>	50 ppm each
117-84-0	Di-n-octylphthalate (DNOP)				
117-81-7	Di(2-ethylhexyl)-phthalate (DEHP)				
26761-40-0	Diisodecylphthalate (DIDP)				
85-68-7	Butylbenzylphthalate (BBP)				
84-74-2	Dibutylphthalate (DBP)				
84-69-5	Diisobutylphthalate (DIBP)				
84-75-3	Di-n-hexylphthalate (DnHP)				
84-66-2	Diethylphthalate (DEP)				
131-11-3	Dimethylphthalate (DMP)				
131-18-0	Di-n-pentyl phthalate (DPENP)				
84-61-7	Dicyclohexyl phthalate (DCHP)				
71888-89-6	1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich				
117-82-8	Bis(2-methoxyethyl) phthalate				
605-50-5	Diisopentyl phthalate (DIPP)				
131-16-8	Dipropyl phthalate (DPRP)				
27554-26-3	Diisooctyl phthalate (DIOP)				
68515-50-4	Diisohexyl phthalate (DIHP)				
68515-42-4	1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters (DHNU)				
84777-06-0	1,2-Benzenedicarboxylic acid Dipentyl ester, branched and linear				
68648-93-1	1,2-Benzenedicarboxylic acid, di-C6-10-alkyl esters or mixed decyl and hexyl and octyl diesters with $\geq 0.3\%$ of dihexyl phthalate; 1,2-Benzenedicarboxylic acid, mixed dihexyl and hexyl and octyl diesters; 1,2-Benzenedicarboxylic acid, di-C6-10-alkyl esters				
68515-51-5					
776297-69-9	n-Pentyl-isopentylphthalate (nPIPP)				



CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
<b>Polycyclic Aromatic Hydrocarbons (PAHs) †</b>					
83-32-9	Acenaphthene	No individual restriction	PAHs are natural components of crude oil and are common residues from oil refining. PAHs have a characteristic smell similar to that of car tires or asphalt. Oil residues containing PAHs are added to rubber and plastics as a softener or extender and may be found in rubber, plastics, lacquers and coatings. PAHs are often found in the outsoles of footwear and in printing pastes for screen prints. PAHs can be present as impurities in Carbon Black. They also may be formed from thermal decomposition of recycled materials during reprocessing	All materials: AFPS GS 2019	0.2 ppm each
208-96-8	Acenaphthylene				
120-12-7	Anthracene				
191-24-2	Benzo(g,h,i)perylene				
86-73-7	Fluorene				
206-44-0	Fluoranthene				
193-39-5	Indeno(1,2,3-cd)pyrene				
91-20-3	Naphthalene**				
85-01-8	Phenanthrene				
129-00-0	Pyrene				
56-55-3	Benzo(a)anthracene				
50-32-8	Benzo(a)pyrene				
205-99-2	Benzo(b)fluoranthene				
192-97-2	Benzo[e]pyrene				
205-82-3	Benzo[j]fluoranthene				
207-08-9	Benzo(k)fluoranthene				
218-01-9	Chrysene				
53-70-3	Dibenzo(a,h)anthracene	1 ppm each Child care articles: 0.5 ppm each			
<b>Quinoline †</b>					
91-22-5	Quinoline	50 ppm	Found as an impurity in polyester and some dyestuffs. Quinoline can be included with disperse dye testing, as the same method is used for both.	All materials: DIN 54231:2005 with methanol extraction at 70 degrees C	10 ppm

CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
<b>Solvents and Residuals +</b>					
68-12-2	Dimethylformamide (DMFa)	500 ppm	Solvent used in plastics, rubber, and polyurethane (PU) coating. Water-based PU does not contain DMFa and is therefore preferable.	Textiles: EN 17131:2019 All other materials: DIN CEN ISO/TS 16189:2013	50 ppm each
75-12-7	Formamide	1000 ppm each	Byproduct in the production of EVA foams.		
127-19-5	Dimethylacetamide (DMAC)		Solvent used in the production of elastane fibers and sometimes as substitute for DMFa.		
872-50-4	N-Methyl-2-pyrrolidone (NMP)		Industrial solvent used in production of water-based Polyurethanes and other polymeric materials. May also be used as a surface treatment for textiles, resins, and metal-coated plastics, or as a paint stripper.		
<b>UV Absorbers / Stabilizers +</b>					
3846-71-7	UV 320	1000 ppm each	PU foam materials such as open cell foams for padding. Used as UV-absorbers for plastics (PVC, PET, PC, PA, ABS, and other polymers), rubber, polyurethane.	DIN EN 62321-6:2016-05 (Extraction in THF, analysis by GC/MS)	500 ppm each
3864-99-1	UV 327				
25973-55-1	UV 328				
36437-37-3	UV 350				
2440-22-4	Drometrizole	For informational purposes only. AFIRM recommends testing to assess content levels.	Used as UV Absorbers for Plastics (PVC, PET, PC, PA, ABS, and other Polymers), Rubber, and Polyurethane.		

CAS No.	Substance	Limits Component Materials in Finished Product	Potential Uses	Suitable Test Method Sample Preparation & Measurement	Reporting Limit Limits above which test results should be reported
	<b>Volatile Organic Compounds (VOCs) †</b>				
71-43-2	Benzene	5 ppm	<p>These VOCs should not be used in textile auxiliary chemical preparations.</p> <p>They are associated with solvent-based processes such as solvent-based polyurethane coatings and glues/adhesives.</p> <p>They should not be used for any kind of facility cleaning or spot cleaning.</p>	<p>For general VOC screening: GC/MS headspace 45 minutes at 120 degrees C</p>	<p>Benzene: 5 ppm Other: 20 ppm each</p>
75-15-0	Carbon Disulfide	Total: 1000 ppm			
56-23-5	Carbon Tetrachloride				
67-66-3	Chloroform				
108-94-1	Cyclohexanone				
107-06-2	1,2-Dichloroethane				
75-35-4	1,1-Dichloroethylene				
100-41-4	Ethylbenzene				
76-01-7	Pentachloroethane				
630-20-6	1,1,1,2- Tetrachloroethane				
79-34-5	1,1,2,2- Tetrachloroethane				
127-18-4	Tetrachloroethylene (PERC)				
108-88-3	Toluene				
71-55-6	1,1,1- Trichloroethane				
79-00-5	1,1,2- Trichloroethane				
79-01-6	Trichloroethylene				
1330-20-7	Xylenes (meta-, ortho-, para-)				
108-38-3					
95-47-6					
106-42-3					

## Appendix A. Perfluorinated and Polyfluorinated Chemicals (PFCs)

CAS No.	PFC Name	CAS No.	PFC Name
	<b>PFOS and Related Substances</b>		<b>PFOA and Its Salts</b>
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	335-67-1	Perfluorooctanoic acid (PFOA)
2795-39-3	Perfluorooctanesulfonic acid, potassium salt (PFOS-K)	335-95-5	Sodium perfluorooctanoate (PFOA-Na)
29457-72-5	Perfluorooctanesulfonic acid, lithium salt (PFOS-Li)	2395-00-8	Potassium perfluorooctanoate (PFOA-K)
29081-56-9	Perfluorooctanesulfonic acid, ammonium salt (PFOS-NH <sub>4</sub> )	335-93-3	Silver perfluorooctanoate (PFOA-Ag)
70225-14-8	Perfluorooctane sulfonate diethanolamine salt (PFOS-NH(OH) <sub>2</sub> )	335-66-0	Perfluorooctanoyl fluoride (PFOA-F)
56773-42-3	Perfluorooctanesulfonic acid, tetraethylammonium salt (PFOS-N(C <sub>2</sub> H <sub>5</sub> ) <sub>4</sub> )	3825-26-1	Ammonium pentadecafluorooctanoate (APFO)
4151-50-2	N-Ethylperfluoro-1-octanesulfonamide (N-Et-FOSA)		<b>PFOA-related Substances</b>
31506-32-8	N-Methylperfluoro-1-octanesulfonamide (N-Me-FOSA)		
1691-99-2	2-(N-Ethylperfluoro-1-octanesulfonamido)-ethanol (N-Et-FOSE)	39108-34-4	1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)
24448-09-7	2-(N-Methylperfluoro-1-octanesulfonamido)-ethanol (N-Me-FOSE)	376-27-2	Methyl perfluorooctanoate (Me-PFOA)
307-35-7	Perfluoro-1-octanesulfonyl fluoride (POSF)	3108-24-5	Ethyl perfluorooctanoate (Et-PFOA)
754-91-6	Perfluorooctane sulfonamide (PFOSA)	678-39-7	2-Perfluorooctylethanol (8:2 FTOH)
		27905-45-9	1H,1H,2H,2H-Perfluorodecyl acrylate (8:2 FTA)
		1996-88-9	1H,1H,2H,2H-Perfluorodecyl methacrylate (8:2 FTMA)

## Appendix B. Pesticides and Herbicides, Agricultural

CAS No.	Pesticide Name	CAS No.	Pesticide Name	CAS No.	Pesticide Name
93-72-1	2-(2,4,5-trichlorophenoxy) propionic acid, its salts and compounds; 2,4,5-TP	333-41-5	Diazinone	118-74-1	Hexachlorobenzene
93-76-5	2,4,5-T	1085-98-9	Dichlofluanide	465-73-6	Isodrine
94-75-7	2,4-D	120-36-5	Dichloroprop	4234-79-1	Kelevane
309-00-2	Aldrine	115-32-2	Dicofol	143-50-0	Kepone
86-50-0	Azinophosmethyl	141-66-2	Dicrotophos	58-89-9	Lindane
2642-71-9	Azinophosethyl	60-57-1	Dieldrine	121-75-5	Malathione
4824-78-6	Bromophos-ethyl	60-51-5	Dimethoate	94-74-6	MCPA
2425-06-1	Captafol	88-85-7	Dinoseb, its salts and acetate	94-81-5	MCPB
63-25-2	Carbaryl	63405-99-2	DTTB (4, 6-Dichloro-7 (2,4,5-trichloro-phenoxy) -2-Trifluoro methyl benz imidazole)	93-65-2	Mecoprop
510-15-6	Chlorbenzilat	115-29-7	Endosulfan	10265-92-6	Metamidophos
57-74-9	Chlordane	959-98-8	Endosulfan I (alpha)	72-43-5	Methoxychlor
6164-98-3	Chlordimeform	33213-65-9	Endosulfan II (beta)	2385-85-5	Mirex
470-90-6	Chlorfenvinphos	72-20-8	Endrine	6923-22-4	Monocrotophos
1897-45-6	Chlorthalonil	66230-04-4	Esfenvalerate	298-00-0	Parathion-methyl
56-72-4	Coumaphos	106-93-4	Ethylendibromid	1825-21-4	Pentachloroanisole
68359-37-5	Cyfluthrin	56-38-2	Ethylparathione; Parathion	7786-34-7	Phosdrin/Mevinphos
91465-08-6	Cyhalothrin	51630-58-1	Fenvalerate	72-56-0	Perthane
52315-07-8	Cypermethrin	Various	Halogenated naphthalenes, including polychlorinated naphthalenes (PCNs)	31218-83-4	Propethamphos
78-48-8	S,S,S-Tributyl phosphorotrithioate (Tribufos)			41198-08-7	Profenophos
52918-63-5	Deltamethrin	76-44-8	Heptachlor	13593-03-8	Quinalphos
53-19-0	DDD	1024-57-3	Heptachloroepoxide	82-68-8	Quintozene
72-54-8		319-84-6	a-Hexachlorocyclohexane with & without Lindane	8001-50-1	Strobane
3424-82-6	DDE	319-85-7	b-Hexachlorocyclohexane with & without Lindane	297-78-9	Telodrine
72-55-9		319-86-8	g-Hexachlorocyclohexane with & without Lindane	8001-35-2	Toxaphene
50-29-3	DDT	319-86-8	g-Hexachlorocyclohexane with & without Lindane	731-27-1	Tolyfluanide
789-02-6				1582-09-8	Trifluraline



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