



BISPHENOLS

Other Names Multiple

CAS Number	Substance
80-05-7	Bisphenol-A (BPA)
80-09-1	Bisphenol-S (BPS)
620-92-8	Bisphenol-F (BPF)
1478-61-1	Bisphenol-AF (BPAF)

May Be Found In

- Polycarbonate bottles
- Food and beverage cans
- Thermal paper
- Storage containers
- Plastic sunglasses
- Impact resistant safety equipment
- Adhesives, coatings, trims
- Dye-fixing agents for polyamide textiles

Bisphenols are precursor chemicals used along with other chemicals to create some plastics and resins. They are commonly used to harden plastics.

Uses in the Supply Chain

Bisphenol-A (BPA) occurs in its pure form as white flakes with a faint phenol-like smell and is often used in the production of polycarbonate plastics and epoxy resins. Polycarbonate plastic is used across various product types for its durability, clarity, and shatter resistance, making it an important component in medical appliances or optical lenses.¹ Epoxy resins are used to prevent rust and corrosion (e.g. in the linings of food and drink cans). BPA is also known to be used in the development of dyes that are used with thermal paper (commonly seen in cash register receipts). BPA is also used in the production of flame retardants and in PVC production and processing.

The other Bisphenols listed here have similar properties to BPA and can be used as alternatives to BPA in the supply chain. BPS may be used as an ingredient in dye-fixing agents for polyamide textiles.

Why Bisphenols are Restricted

- Numerous countries in the European Union, Americas and Asia have adopted restrictions on the use of BPA in infant products, namely baby bottles.
- Human exposure to BPA is pervasive. A national health survey conducted in 2003-2004, reported that 93% of Americans aged 6 years or older had detectable levels of BPA.²
- BPA is an endocrine disrupter, associated with risks that may include metabolic changes, cardiovascular diseases, impact to reproductive systems, and others.
- At the manufacturing level, human exposure can result from inhalation or contact to the skin.
- At the consumer level, BPA exposure is a result of migration that occurs when BPA penetrates food or beverage from the lining of the container or containers made from BPA-containing plastics. Additional exposure routes can occur through leaching from dental fillings that contain BPA or contact with thermal paper.
- Bisphenol-S has endocrine disrupting properties and is regulated in Food Contact Materials.^{3,4,5,6}
- Bisphenol-F is suspected to have endocrine-disrupting properties similar to BPA.⁶



Sourcing Compliant Materials from Your Suppliers

- Contact your suppliers and communicate that you require materials that do not contain BPA in amounts that exceed AFIRM RSL limits in products intended to come into contact with the mouth.⁷ While not formally restricted by the AFIRM RSL, the use or presence of other listed bisphenols should be communicated to brands for information gathering purposes.
- Require suppliers to submit confirmation that their manufactured materials meet the AFIRM RSL BPA limit with a certification or, if necessary, by providing a test report from a third-party laboratory.
- When materials are received, consider performing risk-based checks of your suppliers' materials by submitting samples to a third-party laboratory for testing to ensure BPA is not present above AFIRM limits, and to see whether Bisphenol-S and Bisphenol-F are present. Test methodology has not yet been formalized for Bisphenol-AF so understanding whether it is used will require detailed engagement with suppliers.
- Share this information sheet with your material suppliers and instruct them to work with their chemical suppliers to source BPA-free chemical formulations using the guidance in the next section.
- Pay special attention to suppliers of polycarbonate plastics in products such as food and beverage containers and impact resistant plastic products such as sunglasses and other products intended or likely to come in contact with the mouth.

Sourcing Compliant Formulations from Your Chemical Suppliers

- Contact your chemical suppliers and explain that you require chemical formulations with no intentionally-added BPA.
- Check the Safety Data Sheets (SDS) of all chemical formulations to ensure that BPA is not listed as an ingredient, and to see whether other bisphenols are included as ingredients.
- Perform risk-based checks of your chemical suppliers' formulations by submitting samples to a third-party laboratory for testing to ensure that BPA is not present and if other bisphenols are being used.
- Discuss with your chemical supplier whether the below safer alternatives are suitable substitutes for your production needs.
- Prior to procuring any formulation, the chemical properties must be reviewed to ensure that proper protective equipment, chemical storage facilities, facility engineering controls, and associated treatment/disposal facilities are appropriate for the chemical(s).

Safer Alternatives

- Bottles and containers made of Bisphenol-containing polycarbonate can be made of other polymers that do not represent the same hazards. Alternative materials would include glass or stainless steel as well as other plastic materials such as polyethylene, polypropylene, polyester or polyamide.

Additional Information

See References Below

References

¹ Bisphenol-A in Polycarbonates. (n.d.). Retrieved February 07, 2017, from <https://bisphenol-a-europe.org/what-is-bpa/>

² National Institute of Environmental Health Sciences NIH-HHS (August 2010). National Toxicology Program: Bisphenol A (BPA) Factsheet https://www.niehs.nih.gov/research/supported/assets/docs/a_c/bpa_fact_sheet_508.pdf



Chemical Information Sheet

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- ³ Exploring the Interaction of Bisphenol-S with Serum Albumins: A Better or Worse Alternative for Bisphenol A?, <https://pubs.acs.org/doi/10.1021/jp500404u>
- ⁴ Replacement Bisphenols Adversely Affect Mouse Gametogenesis with Consequences for Subsequent Generations, <https://doi.org/10.1016/j.cub.2018.06.070>
- ⁵ Plastics in contact with food (Commission Regulation (EU) No. 10/2011), <https://eur-lex.europa.eu/eli/reg/2011/10/oj>, Retrieved April 2019.
- ⁶ Bisphenol S and F: A Systematic Review and Comparison of the Hormonal Activity of Bisphenol A Substitutes, <https://doi.org/10.1289/ehp.1408989>
- ⁷ Apparel and Footwear International RSL Management Group Restricted Substances List (AFIRM RSL) <http://afirm-group.com/afirm-rsl/>