GG Organics low bisphenol for the leather processing

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What is Bisphenol?

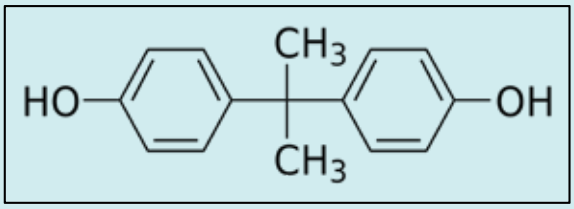
Bisphenol is a synthetic organic compound containing 2 phenol groups (two hydroxyl phenyl groups) and it is used mainly for making plastics and resins.

Types of Bisphenol

Bisphenol A (BPA)
Bisphenol AF (BPAF)
Bisphenol B (BPB)
Bisphenol F (BPF)
Bisphenol S (BPS)

STRUCTURE

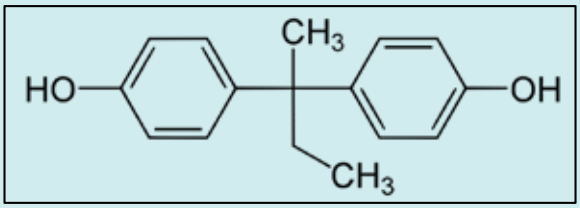
NAME



Bisphenol A

$C_{15}H_{16}O_2$

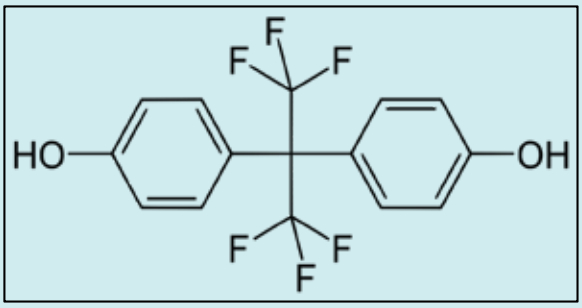
4,4'-(propane-2,2-diyl) diphenol



Bisphenol B

$C_{16}H_{18}O_2$

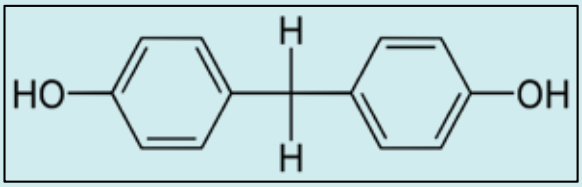
2,2-Bis(4-hydroxyphenyl)butane



Bisphenol AF

$C_{15}H_{10}F_6O_2$

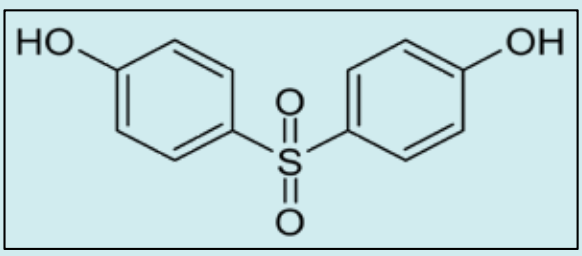
4,4′-(1,1,1,3,3,3-Hexafluoropropane-2,2-diyl)diphenol/ 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]diphenol



Bisphenol F

$(HOC_6H_4)2CH_2$

4,4′-dihydroxydiphenylmethane



Bisphenol S

$C_{12}H_{10}O_4$

4,4'-sulphonyldiphenol

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Why there is a demand for chemicals and leather with low bisphenol content?

- Bisphenol and its derivatives are known endocrine disruptors that are harmful to both human health and the environment, as well as causing reproductive toxicity. Because of the adverse effects caused by Bisphenols, European Chemicals Agency (ECHA) and the EU Member States have started screening data on a large group of Bisphenols in 2020.
- ECHA and the EU Member States assessed a group of 148 bisphenols and recommended that more than 30 bisphenols including BPA, BPB, BPS, BPF and BPAF need to be restricted due to their potential hormonal or reprotoxic effects.
- The "Call for Evidence of BAuA (Federal Institute for Occupational Safety and Health)" for BPA and bisphenols of similar concern (BosC) limitation recommended a new limit (10ppm) for leather and textile auxiliaries including articles.
- Though the limitation of bisphenols in leather is expected to be implemented between 2024 and 2026, manufacturers and brands have started asking for leather with less bisphenol without compromising product quality.
- Due to that, there is an increasing demand for Bisphenol-free or low-bisphenol leather and chemicals in the global leather market.

Aromatic Syntans:

Receives much attention due to their advantages of filling property, dispersibility, and bleachability.

Well suited for all color shades and result in leathers with a better lightfastness, compared to leathers retanned with vegetable tannins.

Generally prepared through condensation, sulfonation, and other reactions by using phenol or naphthalene, formaldehyde, and concentrated sulfuric acid as raw materials.

Common compounds in aromatic syntans:

- Phenolic monomers such as phenol
- Phenol sulfonic acid
- bisphenol S (dihydroxy diphenyl sulphone)
- bisphenol F
- These compounds are used as either starting materials or intermediate molecules formed during the manufacturing process.

Application of Bisphenols in Leather Processing

- In general, aromatic syntans are condensates of phenolsulfonic acid and/or phenol and/or dihydroxydiphenylsulfone (DHDPS or Bisphenol S) with formaldehyde where urea is optionally used.
- Bisphenol S (dihydroxy diphenyl sulphone) is used as raw materials for the manufacturing of sulphone syntans.
- Depending upon the efficiency of the condensation process, a certain amount of phenolic monomers are left unreacted during the manufacturing process. This unreacted phenol may react with formaldehyde, resulting in the formation of bisphenol F.
- In the leather industry, these phenol/sulphone syntans are primarily used for pre-tanning, tanning, retanning, and dyeing.
- These unreacted phenolic monomers such as phenol, phenolsulfonic acid and bisphenol S/F that are present in the syntans, will be transferred to the leather during the (re)-tanning processes.

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