

ACETOPHENONE & 2-PHENYL-2-PROPANOL

Other Names

Acetophenone:	Methyl phenyl ketone, Acetylbenzene
2-phenyl-2-propanol:	1-Hydroxycumene, Dimethylphenyl-methanol

Acetophenone and 2-Phenyl-2-Propanol are potential byproducts that may be found in Ethyl-vinyl-acetate (EVA) foams when specific peroxide initiators are in use.

CAS Number	Substance
98-86-2	Acetophenone
617-94-7	2-Phenyl-2-Propanol

May Be Found In

- Ethyl-vinyl-acetate (EVA) foams produced with dicumyl peroxide as a crosslinking initiator
- Fragrances and solvents, cleaners

Uses in the Supply Chain

There are few direct uses of acetophenone or 2-phenyl-2-propanol in the supply chain. These two chemicals are byproducts when a peroxide initiator called dicumyl peroxide (DCP) is used in ethyl-vinyl-acetate (EVA) foam production. DCP initiates a crosslinking reaction in EVA foam by creating peroxide radicals, and both acetophenone and 2-phenyl-2-propanol are potential endpoints for the radicals once they have been deactivated.

Why Acetophenone & 2-Phenyl-2-Propanol are Restricted

- Neither of these chemicals is legally regulated in finished products at this time, but multiple brand RSLs and the AFIRM RSL restrict these chemicals.
- The German Federal Institute for Risk Assessment (BfR) has written a comment about Acetophenone and 2-Phenyl-2-Propanol: 2-Phenyl-2-Propanol can potentially cause allergenic reactions. There are complaints by German authority labs when these substances are found in high concentrations in shoes.
- Acetophenone has a sweet pungent odor of orange blossom or jasmine, with an odor threshold of about 0.83 milligrams per cubic meter (mg/m³)¹.
- AFIRM has voluntarily restricted acetophenone and 2-phenyl-2 propanol due to this odor which has prompted concerns from some enforcement agencies.²
- Acetophenone is classified as:
 - Acute Tox 4 - H302
 - Eye Irrit. 2 - H319
- 2-Phenyl-2-propanol is classified as: No classification at this time

Sourcing Compliant Materials from Your Suppliers

- EVA polymers created using DCP as a crosslinker may contain some level of acetophenone and 2-phenyl-2-propanol. Engaging in a conversation with your material supplier to discuss this issue is the best way to procure materials with the lowest levels of Acetophenone and 2-phenyl-2-propanol possible.



Chemical Information Document

Sourcing Compliant Formulations from Your Chemical Suppliers

- In this special case, there is no “compliant formulation” that can be sourced. Rather, to avoid the creation of acetophenone and 2-phenyl-2-propanol, a different manufacturing approach that utilizes a crosslinking agent other than DCP would need to be utilized. Caution should be used if an alternative to DCP is used, as some available alternatives are suspected of creating more hazardous byproducts.
- While it may be possible to reduce the amount of the byproducts with stringent processing controls, it is unlikely that a complete absence of these two chemistries will be achieved when DCP is used.

Safer Alternatives

There are alternative recipes for creating EVA polymers that do not require DCP for use as a cross-linker, but each has the potential to create other additional byproducts and should be carefully reviewed.

Additional Information

Visit ECHA's Candidate List of substances of very high concern to view dossiers for many restricted substances <https://echa.europa.eu/candidate-list-table>.

References

¹ United States Environmental Protection Agency. (2000). *Acetophenone*. Retrieved from <https://www.epa.gov/sites/production/files/2016-09/documents/acetophenone.pdf>

² Apparel and Footwear International RSL Management Group (Ed.). (2018, January 31). Restricted Substances List Retrieved <http://afirm-group.com/afirm-rsl/>