Alkylphenol Ethoxylates (APEOs)

Other Names:	Nonylphenol ethoxylates (NPEOs; NPEs) Polyethylene glycol nonylphenyl ether Octylphenol ethoxylates (OPEOs; OPEs) Polyethylene glycol octylphenyl ether

CAS Number	Substance
9002-93-1	Polyethylene glycol 4-(tert-octylphenyl) ether
9036-19-5	Polyethylene glycol mono(octyl)phenyl ether
68987-90-6	Poly (oxy-1,2-ethanediyl), alpha-(octylphenyl)-omega-hydroxy-, branched

List continued in “Additional Information”

May Be Found In:

- Industrial laundry detergent
- Scouring agents (e.g. wool and leather)
- Wetting agents
- Softeners
- Spinning oils (yarn and fabric)
- Emulsifier/dispersing agents for dyes and prints
- Impregnating agents
- Degreasing agents for leather hides
- Leather-finishing preparations
- De-gumming agents for silk production
- Dyes and pigment preparations
- Polyester padding
- Down/feather fillings
- Binders for interlinings
- Facility cleaning products

APEOs are a group of nonionic surfactants primarily used as detergents in the textile wet processing industry. They are also used in the leather industry as degreasing products, emulsifiers (in small quantities), or wetting agents in some dyestuff and pigment preparations.

Uses in the Supply Chain

Due to their good emulsification, dispersion and solubilising characteristics, APEOs are an important surface-active agent with a wide use in the textile and leather goods industry. APEOs can be found in emulsifiers, detergents, scouring agents, dye-dispersing agents, printing pastes, spinning oils, and wetting agents.

Why Alkylphenol Ethoxylates (APEOs) are Restricted

Legislation in major markets around the world restricts the presence of APEOs in final products.

Leading apparel and footwear brands have restricted or banned using APEOs in the production of their products. They represent a class of high concern chemicals for human health and the environment.

APEOs can degrade in the environment into alkylphenols (APs). These are resistant and toxic to aquatic systems as they disrupt endocrine behavior.

Some APs are suspected of damaging human fertility and unborn children.

See the guidance sheets on alkylphenols for more information on their restriction and potential harm.

Sourcing Compliant Materials from Your Suppliers

- Explain that you require materials to be compliant with current AFIRM RSL limits.""2
- Pay special attention to suppliers of wool, wool blends and leather. APEOs have been widely used for scouring and as dispersing agents for dyeing.
- Since APEOs have been widely used in spinning lubricants, sizing, pretreatment, dyeing, printing, finishing, and coating, the restriction is also valid for all types of fibres, yarns and fabrics. APEOs have also been widely used in industrial laundry detergents.
- Suppliers who use APEOs in production for other clients may have contaminated machinery, which can cross contaminate other materials with APEOs. This includes the use of equipment cleaning and maintenance agents. Aim to only use suppliers who have phased out the use of APEOs for all clients in their entire production chain.
- Share this guidance sheet with your material suppliers. Using the guidance in the next section, instruct them to work with their chemical suppliers to source chemical formulations that comply with these requirements. If needed, highlight the existence of harmful substances in materials via chemical management trainings from the ZDHC Academy, existing guidelines, and laws.
- Request suppliers to submit a confirmation of material compliance and/or a test report from a third-party laboratory. When materials are received, consider performing random, risk-based testing to ensure current AFIRM RSL limits are met.
- Make sure all your suppliers have a solid chemical management system in place.

Sourcing Compliant Formulations from Your Chemical Formulators

- Explain to chemicals suppliers that you require chemical formulations to comply with current ZDHC MRSL limits.
  - Search for formulations on the ZDHC Gateway Chemical Module. If your preferred formulations are not listed, encourage providers to register their formulations.
  - Ask for a ZDHC ChemCheck report.
- Pay special attention to textile and leather auxiliary production and supply chemicals for dyeing, printing, finishing, laundering, scouring, and coating formulations. Inform frequently about existing regulations and adjustments thereto.
- Become familiar with sources of APEOs. They are often used as dispersing agents in solvent-free, synthetic-leather manufacturing. APEOs are also found in many fibre/yarn/fabrics spinning lubricants and sizing agents.
- Perform random risk-based checks of your chemical formulators' formulations by submitting samples to a third-party laboratory for testing to ensure APs do not exceed ZDHC MRSL limit values.
- Discuss with your chemical formulators what safer alternatives are available that are suitable substitutes for your production needs.

Safer Alternatives

The following substances have been identified as examples of safer alternatives by the U.S. Environmental Protection Agency's Design for the Environment Program (DfE). They may be suitable for your production needs. Any chosen alternative must be compliant with the limits stated above and any brand specific limits.

CAS Number	Substance
68439-46-3	C9-11 alcohols, ethoxylated (6EO)
68131-39-5	C12-15 alcohols, ethoxylated (9EO)
64366-70-7	Oxirane, methyl, polymer with oxirane, mono(2-ethylhexyl ether), Ecosurf EH-9
68515-73-1	Glucopyranose, oligomeric, decyl octyl glycosides
68411-30-3	Benzenesulfonic acid, C10-13-alkyl derivatives, sodium salt
151-21-3	Sodium lauryl sulfate
9004-82-4	Polyoxy (1,2-ethanediyl), alpha-sulfo-omegadodecyloxy, sodium salt
1338-41-6	Sorbitan monostearate

Additional Information

US EPA Design for the Environment Alternatives Assessment for Nonylphenol Ethoxylates
https://www.epa.gov/sites/production/files/2014-06/documents/npe_final.pdf

There are many potential CAS Numbers which comprise the APEO class of chemistry. Some of the more common ones are listed below:

CAS Number	Substance
9002-93-1	Polyethylene glycol 4-(tert-octylphenyl) ether
9036-19-5	Polyethylene glycol mono(octyl)phenyl ether
68987-90-6	Poly (oxy-1,2-ethanediyl), alpha-(octylphenyl)-omega-hydroxy-, branched
9016-45-9	Poly (oxy-1,2-ethanediyl), alpha-(nonylphenyl)-omega-hydroxy-
26027-38-3	Poly (oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-
37205-87-1	Poly (oxy-1,2-ethanediyl), alpha-(isononylphenyl)-omega-hydroxy-
68412-54-4	Poly (oxy-1,2-ethanediyl), alpha-(nonylphenyl)-omega-hydroxy-, branched
127087-87-0	Poly (oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-, branched

References

1 Hazard Information Per Harmonized Classification and Labelling Approved by the European Union. Source: European Chemicals Agency, http://echa.europa.eu/.

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

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