



# PHTHALATES

<b>Other Names</b>	Phthalate esters, Ortho-phthalates
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CAS Number	Substance
28553-12-0	Di-iso-nonylphthalate (DINP)
117-84-0	Di-n-octylphthalate (DNOP)
117-81-7	Di(2-ethylhexyl)-phthalate (DEHP)

*List continued in "Additional Information"*

<b>May Be Found In</b>	<ul style="list-style-type: none"><li>• Plastics</li><li>• Polyvinyl chloride (PVC)</li><li>• Cellulose acetate</li><li>• Coatings (e.g. polyurethane)</li><li>• Screen print &amp; heat transfer inks</li><li>• Adhesives</li><li>• Solvents</li><li>• Cosmetics and personal care products</li><li>• Insecticides</li></ul>
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Phthalates encompass many esters of phthalic acid. Phthalates are incorporated into plastics to improve durability, flexibility, and transparency. Phthalates are typically mixed into polymers as an external plasticizer with no chemical bonding. As a result, phthalates may migrate out of the material resulting in exposure to people or the environment.<sup>1</sup>

## Uses in the Supply Chain

Phthalates are a class of chemicals that may be blended as an additive into plastics to manipulate the performance of materials. They are used to soften plastics to make them more flexible or more durable. Phthalates are sometimes used to decrease the melting temperature of plastics to aid the molding process.

Phthalates are used in a wide variety of products, such as vinyl flooring, adhesives, detergents, lubricating oils, automotive plastics, plastic clothes (raincoats), and personal-care products (soaps, shampoos, hair sprays, and nail polishes). Phthalates are used widely in polyvinyl chloride plastics, which are used to make products such as plastic packaging film and sheets, garden hoses, inflatable toys, blood-storage containers, medical tubing, and some children's toys.<sup>1</sup> They can be used in screen print, heat transfer inks, and plastisol inks.<sup>1</sup>

## Why Phthalates are Restricted

- Legislation in major markets around the world restricts the presence of phthalates in finished products. These regulations vary on the individual phthalates restricted depending on country and locality.
- Phthalates have been linked to adverse health impacts including hormone disruption and reproductive and developmental issues.
- Phthalates can be released to the environment through use or directly from manufacturing processing facilities, generally through wastewater.
- There is potential for bioaccumulation in smaller aquatic animals such as fish and oysters.
- Chemical hazard information for many chemicals can be found at the following external databases:
  - GESTIS Substance Database: [Here \(external link\)](#)
  - US National Library of Medicine: [Here \(external link\)](#)
  - US OSHA Occupational Chemical Database: [Here \(external link\)](#)



## Chemical Information Sheet

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### Sourcing Compliant Materials from Your Suppliers

- Contact your suppliers and explain that you require their manufactured materials to be compliant with the current AFIRM RSL limits.<sup>2</sup>
- Require suppliers to submit a confirmation of material compliance or a test report from a third-party laboratory.
- When materials are received, consider performing risk-based testing to ensure the current AFIRM RSL limits are met.
- Share this information sheet with your material suppliers so they have full visibility and understand your sourcing requirements.
- Pay special attention to materials with polymeric coatings or finishes because phthalates are common ingredients in coatings, screen printing inks, and finishing treatments.
- Additionally, plastic trims, such as buttons and shoelace tips (aglets), should be reviewed for phthalates.

### Sourcing Compliant Formulations from Your Chemical Suppliers

- For all formulations, request SDS documentation that meets current GHS requirements.
- Contact your suppliers and explain that you require formulations to be compliant with the current ZDHC MRSL limits whenever applicable.<sup>3</sup>
- Discuss with your chemical supplier whether any safer alternatives are available that 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).
- Communicate with your suppliers the potential for cross-contamination when using phthalates in production for other customers.
- Any chosen alternative must be ZDHC MRSL compliant whenever applicable.<sup>3</sup>

### Safer Alternatives

The chemicals listed below have been identified as potential alternatives by the U.S. Environmental Protection Agency and/or by the Danish Environmental Protection Agency. Any substitution using the chemistries below must be vetted to ensure a regrettable substitution is not made.

CAS Number	Substance
77-90-7	Acetyl tributyl citrate (ATBC)
6422-86-2	Bis(2-ethylhexyl) terephthalate (DEHT/DOTP)
103-23-1	Di(ethylhexyl) adipate (DEHA)
166412-78-8	Di-isononyl cyclohexane-1,2-dicarboxylate (DINCH)
122-62-3	Dioctyl sebacate (DOS)
3319-31-1	Trioctyl trimellitate (TOTM)
6846-50-0	Trimethyl pentanediol diisobutyrate (TXIB)

### Additional Information

- United States Consumer Product Safety Commission – Phthalates Business Guidance & Small Entity Compliance Guide –  
<https://www.cpsc.gov/Business--Manufacturing/Business-Education/Business-Guidance/Phthalates-Information>



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- United States Environmental Protection Agency – Assessing and Managing Chemicals under TSCA – Phthalates – <https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/phthalates>

Full list of CAS numbers and substance names:

CAS Number	Substance
28553-12-0	Di-iso-nonylphthalate (DINP)
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	Di-hexylphthalate, branched and linear (DHxP)
71850-09-4	Diisohexyl phthalate (DIHxP)
68515-42-4	1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters (DHNUP)
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 decyl and hexyl and octyl diesters; 1,2-Benzenedicarboxylic acid, di-C6-10-alkyl esters
68515-51-5	1,2-Benzenedicarboxylic acid, di-C6-10-alkyl esters
776297-69-9	n-pentyl-isopentylphthalate (nPIPP)

## References

<sup>1</sup> Centers for Disease Control and Prevention. National Biomonitoring Program – Phthalate Fact Sheet

[https://www.cdc.gov/biomonitoring/Phthalates\\_FactSheet.html](https://www.cdc.gov/biomonitoring/Phthalates_FactSheet.html)

<sup>2</sup> Apparel and Footwear International RSL Management Group Restricted Substances List (AFIRM RSL) <http://afirm-group.com/afirm-rsl/>

<sup>3</sup> ZDHC Manufacturing Restricted Substances List (ZDHC MRSL) [https://www.roadmaptozero.com/mrsl\\_online/](https://www.roadmaptozero.com/mrsl_online/)