Chemical Information Document
Version 2.0 August 2019

# PHTHALATES

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|---|---|
| **Other Names** | Phthalate esters |

| 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"***

**May Be Found In**

- Plastics
- Polyvinyl chloride (PVC)
- Cellulose acetate
- Coatings (e.g. polyurethane)
- Screen print & heat transfer inks
- Adhesives
- Solvents
- Cosmetics and personal care products
- Insecticides

**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.[1]**

## 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 the material. 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 in order 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.[1] They can be used in screen print, heat transfer inks, and plastisol inks.[1,2]

## 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.[2]
- 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)
  - USA EPA Occupational Chemical Database: Here (external link)

## 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 limit.
- 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 limit whenever applicable.
- Discuss with your chemical supplier whether any safer alternatives are available that are suitable substitutes for your production needs.
- 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[3].

## 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) |
| **642286-2** | Bis(2-ethylhexyl) terephthalate (DEHT/DOTP) |
| **103-23-1** | Di(ethylhexyl) adipate (DEHA) |
| **166412-788-8** | Diisononyl cyclohexane-1,2-dicarboxylate (DINCH) |
| **122-62-3** | Dioctyl sebacate (DIDS) |
| **3319-31-1** | Trioctyl trimetallitate (TOTM) |
| **6846-50-0** | Trimethyl pentanyl diisobutyrate (TXIB) |

## Additional Information

- United States Product Consumer Safety Commission – Phthalates – https://www.cpsc.gov/Business--Manufacturing/Business-Education/Business-Guidance/Phthalates-Information

- 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 from first page:

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|---|---|
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| | |
|---|---|
| **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** | Diisohexyl phthalate (DIHP) |
| **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 |

## References

[1] Centers for Disease Control and Prevention. National Biomonitoring Program – Phthalate Fact Sheet. Retrieved from https://www.cdc.gov/biomonitoring/Phthalates_FactSheet.html, April 2019.

[2] Hohenstein Institute & Textile Exchange. (2017). Chemical Snapshots – Phthalates. Revision 0.2. Retrieved March 17, 2017.

[3] Online ZDHC Manufacturing Restricted Substances List (ZDHC e-MRSL) Version 1.1. (Retrieved April 2019) https://www.roadmaptozero.com/mrsl_online/