

# HIGH PHTHALATES: A PRIMER ON DINP AND DIDP



## ABOUT HIGH PHTHALATES

Phthalates are a family of compounds some of which primarily are used to soften or “plasticize” polyvinyl chloride (PVC), or vinyl. Phthalates are used in hundreds of products in our homes, hospitals, cars and businesses. Not all phthalates are the same, however. High phthalates refer to those phthalates with a higher molecular weight, with  $\geq 7$  carbon atoms in their chemical backbone, which gives them increased permanency and durability.

The most common types of high phthalates include diisononyl phthalate (DINP) and diisodecyl phthalate (DIDP). These phthalates are tightly bound in the structure of the vinyl. This fact, together with their low vapor pressure, contributes to their long service life to help keep products flexible.



## UNIQUE BENEFITS AND USES OF DINP AND DIDP

One of the most important attributes of these high phthalates is that they are colorless, odorless liquids that, when combined with PVC, change and improve vinyl’s physical properties. This creates opportunities for new products that demand high performance and benefit consumers in a variety of ways.

The chemical properties of DINP and DIDP make them highly suitable for many flexible vinyl products. Some of their key characteristics include:

- Durability — extends a product’s lifetime wear
- Flexibility — allows vinyl to bend and twist without cracking, an essential safety feature in products such as electrical and automotive cables
- Low volatility — using phthalates in applications where products are exposed to high temperatures enables products to be more resistant to degradation
- Weather resistance — makes products especially suitable for many outdoor applications



## HIGH PHTHALATES ARE FOUND IN EVERYDAY ITEMS CONSUMERS DEPEND UPON FOR

With a wide range of physical and chemical properties, high phthalates can be found in everyday items consumers depend on to function properly, including: electrical cables, artificial leather for automobile interiors, flexible hoses, flooring, wall coverings, coated textiles, luggage, sports equipment, roofing membranes, pool liners, and footwear.

While they can be employed in a variety of applications, phthalates are not necessarily interchangeable. The characteristics of an individual phthalate often make it well suited to a particular product, allowing manufacturers to meet unique requirements for its use (function and safety specifications), appearance (texture, color, size and shape), and durability and wear. For this reason, substitutions could sacrifice the functionality, quality, longevity, cost or performance of a product.



## HIGH PHTHALATES ARE SAFE FOR USE IN ALL CURRENT APPLICATIONS

The structural distinction between phthalates extends to their safety attributes. High Phthalates have been thoroughly studied and reviewed by a number of government scientific agencies and regulatory bodies worldwide. These agencies agree that high phthalates are safe for existing uses.

DINP and DIDP are registered for use in the European Union under the EU's REACH regulation. They are not classified for hazards or listed on the REACH Candidate List. This means that there are no restrictions on their use in any existing applications on the European market. However, for precautionary reasons DINP and DIDP are restricted by weight to 0.1% in toys and childcare articles that can be placed in the mouth by children:

- In 2013, the European Chemicals Agency (ECHA) published the most up-to-date evaluation of possible risks associated with everyday use of DINP and DIDP by the general public. They concluded that there is no public health concern with the current uses of DINP and DIDP for children and adults, including use in gloves, footwear, wet weather gear, children's school materials (pencil cases, school bags and erasers), shower curtains, artificial leather in homes and automobile interiors, wall and floor covering, wire and cables, etc. They also found that the presence of DINP and DIDP in food or household dust did not result in a health concern.
- In 2017, Environment and Climate Change Canada (ECCC) published a similarly extensive draft risk evaluation of DINP and DIDP. ECCC found no concerns with the use of DINP and DIDP in articles like coated fabrics (upholstery and artificial leather), pool liners, gloves, PVC clothing, adhesives, sealants and coatings, etc. for children and adults. They also found no concern with the potential presence of DINP and DIDP in food and household dust. Overall, ECCC proposed to conclude that DINP and DIDP (among other phthalates) "do not meet the criteria under paragraph 64(c) of CEPA as they are not entering the environment in a quantity or concentration or under conditions that constitute or may constitute a danger in Canada to human life or health."
- In 2017, the U.S. Consumer Product Safety Commission (CPSC) confirmed that DIDP can be used in sensitive applications like toys and childcare articles without any restrictions. It based this conclusion on the finding that DIDP poses no harm to children or pregnant women.
- In 2018, the European Chemicals Agency's (ECHA) Risk Assessment Committee unanimously concluded that DINP does not show adverse effects on the sexual function, fertility or development of the fetus. As a result, DINP is not classified for a reproductive and developmental hazard in the European Union.
- Australia remains one of the few countries that does not impose a precautionary restriction on the use of DINP and DIDP in toys and childcare articles. This policy is based on rigorous risk evaluations published in 2012 and 2015, which did not find a health concern from exposure to DINP and DIDP in toys and childcare articles, even at the highest exposure scenarios considered.