DIDP
DINP

Scientific Facts on

Phthalate

Di-isodecyl & Di-isononyl phthalates

Source document:
ECB (2003)

Summary & Details:
GreenFacts

Level 2 - Details on Phthalate

This Digest is a faithful summary of two leading scientific consensus reports produced in 2003 by the European Chemicals Bureau (ECB):
"Summary Risk Assessment Report (RAR 041) on Di-"isodecyl" Phthalate (DIDP), 2003" and "Summary Risk Assessment Report (RAR 046) on Di-"isononyl" Phthalate (DINP), 2003"

The full Digest is available at: https://www.greenfacts.org/en/dinp-didp/

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- Level 3 consists of the Source document, the internationally recognised scientific consensus report which is faithfully summarised in Level 2 and further in Level 1.

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Introduction: What are phthalates?

Phthalates are plasticisers that are added to other materials to make them softer and more flexible.

They are widely used in a range of polymers such as PVC that are found in a wide variety of consumer products including floor- and wall covering, furnishing, toys, car interior, clothing, hoses etc. Phthalates are also added to paints and lacquers, adhesives and sealants, printing inks etc.

Because phthalates are not chemically bound to the material they are added to, they can be released from the products that contain them, for instance into water and air. The emission of phthalates occurs during all the stages of the life cycle of a product from production, through use, to disposal. There is public concern about phthalates because of their widespread use and occurrence in the environment as well as their potential effects on human health.

A range of different phthalates exist, which each have specific properties, applications, and potential health effects.

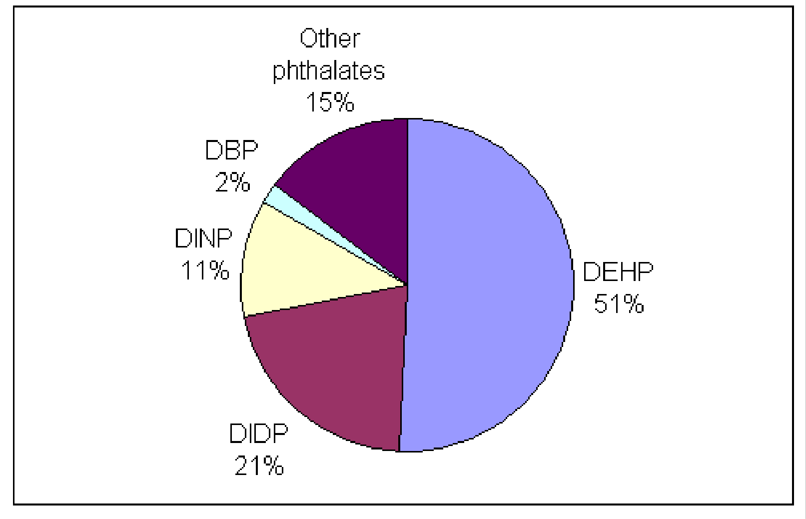
Table: Some examples of phthalates and their applications [see Annex 4, p. 11]

Five of the most widely used phthalates are di-(2-ethylhexyl) phthalate (DEHP), dibutyl phthalate (DBP), di-isononyl phthalate (DINP), di-isodecyl phthalate (DIDP) and benzyl butyl phthalate (BBP). These phthalates have been assessed within an EU program on Risk Assessment for new and existing chemical substances.

By 2004, the final reports on DBP, DIDP and DINP had been published. The content of these reports was summarised by GreenFacts.

In Europe, between 1990 and 1995, the average annual consumption of plasticisers was 970 000 tonnes, of which 894 000 tonnes were phthalates. For comparison, the worldwide plasticiser consumption is estimated at 3.5 million tonnes.

Approximation of the relative importance of the consumption of four of the main phthalates in the European Union in the 1990s



Because of the strong similarities between DIDP and DINP, they will be described together for the rest of the present study. The three phthalates described in this study are used mainly as plasticisers in PVC products. The total amount of these phthalates produced for use in PVC in Western Europe was 877 000 tonnes in 1994, of which 191 000 tonnes was DIDP, 101 500 tonnes was DINP, and around 18 000 tonnes was DBP.

GreenFacts comment:
It should be noted that in 2008 the EU Risk Assessments on the most commonly used phthalate, DEHP (51% in the 1990s), and on BBP have been released.

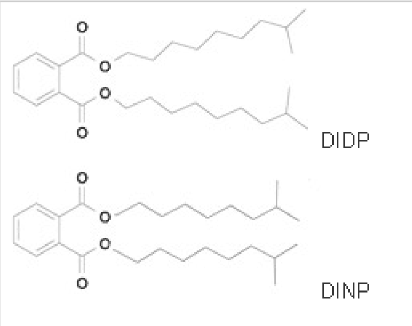
The Risk Assessment Reports (not yet summarised by GreenFacts) are available on the website of the European Chemicals Bureau:

- DEHP [see http://ecb.jrc.it/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/SUMMARY/dehpsum042.pdf]
- BBP [see http://ecb.jrc.it/documents/Existing-Chemicals/RISK_ASSESSMENT/SUMMARY/benzylbutylphthalatesum318.pdf]

1. What are the properties of DIDP and DINP?

DIDP and DINP are viscous, oily liquids that are soluble in fat and not very soluble in water. They are not very volatile so they do not vaporise readily into the atmosphere.

Under the European Union classification system that applies to labelling of chemicals in commerce, DIDP and DINP are not classified as "dangerous to the environment or human health.



The acronym DIDP refers to di-isodecyl phthalate. It is a mixture of closely related substances known as isomer which have two carbon chains that can be 9 to 11 carbons long, with the largest portion having 10 carbon atoms in the side chains. The acronym DINP similarly refers to di-isononyl phthalates which is a mixture of isomers that have alkyl chains form 8 to 10 carbons long, but the largest portion of the mixture have chains composed of 9-carbons. The close similarities between DIDP and DINP, both in their properties and their end uses, means that they will be treated together in the present study.

See overview table for DIDP, DINP and DBP [see Annex 5, p. 12]

2. How are DIDP and DINP used?

There are currently four producers of DIDP and DINP in the European Union. The estimated production in 1994 was around 200 000 tonnes of DIDP and 107 000 tonnes of DINP per year (for the then twelve EU Member States) and the amounts have probably increased since then.

Around 95% of DIDP and DINP is used in PVC as a plasticizer. More than half of the remaining 5% involves polymer-related uses other than PVC (e.g. rubbers). The remaining DIDP and DINP are used in non-polymer applications including anti-corrosion paints, anti-fouling paints, lacquers, inks, adhesives and sealants.

To estimate releases to the environment, the amount of phthalates included in articles being used outdoors or indoors as well as their technical lifetime has to be estimated.

Technical lifetimes of different articles containing DIDP or DINP range from 5 to 30 years and the largest quantities are used in wires and cables, flooring, shoe soles and car undercoating.

Table 2.1 Volumes of DIDP in different articles and their respective lifetimes
[see Annex 6, p. 12]

3. Can DIDP and DINP affect the environment?

As DIDP and DINP are each mixtures of closely related substances (isomers), the fate and behaviour of the whole mixture cannot be determined with accuracy by chemical analysis. Each component of the mixture would tend to behave differently in the environment. Nevertheless, an overall picture can be drawn.

3.1 What happens to DIDP and DINP released into the environment?

DIDP and DINP do not react with water (hydrolysis).

The breakdown of DIDP and DINP in the environment cannot be measured directly, but can be estimated by using results from a related phthalate, DEHP. The estimated time that it takes for half of the initial amount to be degraded (half-life) for both DIDP and DINP are 0.6 days and 0.7 days respectively in air, 50 days in surface water, 300 days in soil and 3 000 days sediment.

Laboratory testing indicates a high potential for bioaccumulation of DIDP and DINP in animal tissues, strong binding to sewage sludge, soils and sediments and very low mobility in soil. Tests on certain freshwater organisms have shown that high amounts can be concentrated in the body (bioconcentration).

3.2 When are DIDP and DINP released?

Where available industry information has been used to estimate releases.

DIDP and DINP production facilities release significant amounts of these phthalates into waste water but not into surface water and very little into air. **PVC processing** causes significant releases into waste water and air. However, most of the releases into waste water, surface water and air come from the use (outdoors or indoors) **and disposal of PVC products containing DIDP and DINP**.

In Europe, DIDP and DINP production and the manufacture, use and disposal of products containing those phthalates are estimated to release:

Table 3.2 PECs calculated for the various stages of the life cycle of DIDP [see Annex 7, p. 13]

3.3 What levels of DIDP and DINP are expected near the sources?

Predicted Environmental Concentrations (PECs) have been estimated for various environmental media located near sources of DIDP and DINP.

For DIDP: In **water** predicted concentrations are: • 5-6 µg/l near sites using DIDP in paints, sealants and textiles • 9 µg/l near to polymer processing sites (other than PVC), • 16 µg/l near to PVC processing sites and • 45 µg/l close to DIDP production sites.	For DINP: In **water**, predicted concentrations are: • 1-8 µg/l near sites using DINP in paints, adhesives, sealants, and inks, • 3.4 µg/l near to non-PVC processing, • 9.7 µg/l near to PVC processing sites, and • 2.2 µg/l close to DINP production sites,
Concentrations in **sediment** follow a similar pattern, ranging from 79 to 718 mg/kg dry weight. Levels in **soil** range from 4 to 5.3 mg/kg dry weight near sites using DIDP in paints, sealants and textiles, up to 8.2 mg/kg dry weight near to polymer processing sites (other than PVC), and 16.4 mg/kg dry weight near to PVC processing sites, with no localised deposition in soil around DIDP production sites. Concentrations present in aquatic **organisms** near to sources range from 12 to 31 mg/kg wet weight and in soil dwelling organisms from 0.02 to 6 mg/kg wet weight. The calculated levels in **air** are very low	Concentrations of DINP in **sediment** follow a similar pattern, ranging from 10.7 to 150 mg/kg dry weight. Levels in **soil** range from 0.66 to 8.9 mg/kg dry weight near to uses, 3.3 mg/kg dry weight near to polymer processing sites (other than PVC) and 10.9 mg/kg dry weight near to PVC processing sites, with no localised deposition in soil around DINP production sites. Concentrations of DINP present in aquatic **organisms** near to sources range from 3 to 18 mg/kg wet weight and in soil dwelling organisms from 0.01 to 4 mg/kg wet weight. The calculated levels in **air** are very low

3.4 What are the possible effects of DIDP and DINP on the environment?

According to laboratory tests, DIDP and DINP do not have adverse effects on **organisms living in water or in sediments**. This has been tested at concentrations up to the maximum amounts of DIDP and DINP that will dissolve in water. Tests were conducted on fish, invertebrates, algae, activated sludge, sediment dwellers and frog eggs and no adverse effect was seen in any of them. Therefore no Predicted No Effect Concentrations (PNECs) could be derived.

Moreover, there do not appear to be any **endocrine disrupting** effects of DIDP or DINP on fish populations. This conclusion was based on the results of a study looking at several generations of fish, which showed no effects of DIDP or DINP on survival, egg production or ability to produce offspring.

Experiments performed with DIDP and DINP **in air** did not reveal any effects upon plants, but due to experimental shortcomings they do not allow to conclude an absence of toxicity of DIDP to plants through the atmosphere. Therefore no Predicted No Effect Concentration for the atmosphere can be determined for DIDP. A similar result has been estimated for DINP.

Laboratory experiments have tested for possible effects of DIDP and DINP on plants and earthworms **in soil** containing concentrations of these phthalates of 1 500 up to 10 000 mg/kg dry weight. No effects were observed. Predicted No Effect Concentration (PNECsoil) of 100 mg/kg dry weight for DIDP and 30 mg/kg dry weight for DINP. **Secondary poisoning** refers to the poisoning of animals consuming food, such as fish, contaminated by phthalates. For DIDP, a Predicted No Effect Concentration (PNECoral) of 50 mg/kg of food was estimated for top predators based on the lowest overall No Observed Adverse Effect Level (NOAEL) from a study with dogs. A PNECoral of 150 mg/kg of food was estimated for DINP based on the lowest overall No Observed Adverse Effect Level (NOAEL) from a study with rats. This implies that harmful effects may be observed at doses higher than the NOAELs.

Note: The CSTEE published an opinion on the risk assessment on DINP : "Opinion on the results of the Risk Assessment of: 1,2-Benzenedicarboxylic acid, di-C8-10-branched alkyl esters, C9-rich and di-"isononyl" phthalate" [see http://ec.europa.eu/comm/health/ph_risk/committees/sct/documents/out120_en.pdf]

3.5 What are the risks of DIDP and DINP to the environment?

A Predicted No Effect Concentration could be calculated for top predators and soils, but the environmental concentrations are much lower than those PNECs in all cases. In many other cases, the absence of observed effects did not allow to estimate PNECs.

It can therefore tentatively be concluded, that DIDP and DINP do not cause adverse effects to organisms. The assessment also concluded that there is at present no need for further information and/or testing or for further risk reduction measures beyond those being applied already.

4. How can humans be exposed to DIDP and DINP?

4.1 How can workers be exposed to DIDP and DINP?

Exposure to DIDP or DINP in certain **workplaces** may occur by skin contact or by inhalation. Skin may come into contact with DIDP, or with formulations or end products containing it, but absorption is very low through the skin. Exposure through inhalation is due to air-borne particles carrying DIDP or DINP, since these phthalates are not present in vapour form at room temperatures.

The United Kingdom and Sweden are among the few countries which have set Occupational Exposure Limits for DIDP and DINP present in air.

In PVC formulations, the typical amount of DIDP or DINP is about 20 - 40% but may be as high as 55%. In end products, the amount varies greatly from less than 1% to more than 50%.

4.2 How can consumers be exposed to DIDP and DINP?

Exposure of consumers to DIDP and DINP can occur from their use as a plasticizer in flexible PVC end products (such as synthetic leather and cables and wires) as well as in several non-PVC products (such as paints and rubbers). Consumer exposure may also occur through food, water and beverages because of contamination from packaging and processing equipment containing DIDP or DINP.

DINP is found in toys and child care articles and DIDP has been used in toys in the past. [1] [see Annex 2, p. 10]

Internal exposure to DIDP or DINP of adults, infants and newborns were calculated by estimating how much DIDP and DINP can be absorbed into the bloodstream from swallowing them or breathing them in, taking into account differences between children and adults.

Sources of DIDP and DINP considered were building materials, furniture, car and public transport interiors, gloves, clothes and footwear, food and food-related uses. The calculated internal exposures were as follows:

Consumer exposure to DIDP and DINP [see Annex 1, p. 10]

4.3 What are the estimated overall exposures to DIDP and DINP

The total calculated internal exposures to DIDP and DINP for adults and infants are as follows:

Internal exposure for adults, children and infants. [see Annex 3, p. 11]

5. What health effects can DIDP and DINP cause in laboratory animals?

If DIDP or DINP are swallowed, about 50% of it is absorbed from the gut into the blood. Absorption through the skin is very low in rats (about 4%) and even lower in humans. About 75% of DIDP or DINP inhaled as aerosols are absorbed. DIDP and DINP are rapidly eliminated and do not accumulate in tissues. DIDP and DINP themselves are not found in the urine but their breakdown products (metabolites) are excreted in urine. In faeces, both DIDP and DINP as well as their major breakdown product can be detected. A study on female rats suggests that swallowed DIDP may possibly transfer into mother's milk.

A single dose of DIDP or DINP which is breathed in, swallowed (for example as a contaminant in food) or absorbed through the skin has a low toxicity. DIDP and DINP are not irritant to skin, eyes or respiratory system, nor do they cause skin or respiratory sensitization.

In rodents and dogs, toxicity to the liver is the main result of repeated oral exposure to DIDP or DINP. No liver changes are observed at exposures of up to 60 mg/kg body weight/day in rats or 15 mg/kg body weight/day in dogs for DIDP. For DINP, no effects were observed at up to 88 mg/kg body weight/day. Effects on the kidney are only seen at higher exposures.

DIDP and DINP have not been shown to cause damage to the inherited genetic material in cells (chromosomes and DNA) as shown by several laboratory tests.

DIDP was found to cause liver cancer through a mechanism that is specific to rodents and does not affect humans. It also causes a certain type of leukaemia in rats which never occurs in humans. Similarly it causes tumour in the kidney of male rats by a mechanism which does not operate in humans. Thus, there does not seem to be a concern about cancer in humans through those processes. DIDP has not been tested in mice or rats to see if it causes cancer, but in-vitro tests suggest it may cause the same type of tumours in the liver of rodents as DINP.

No adverse effects of DINP or DIDP on human fertility are anticipated, based on the results of studies on rats, mice and monkeys.

Exposure of pregnant rats to high doses of DIDP or DINP (1 000 mg/kg body weight/day) caused slight malformations in the fetuses, but there were no effects at 500 mg/kg body weight/day.

In rat reproduction studies, reduced survival of the offspring was seen, but there were no effects at concentrations up to 33 mg DIDP/kg body weight/day or159 mg DINP/kg body weight/day.

DIDP does not affect reproductive hormones. DINP does not have an effect on female hormones, however in a rat reproduction study, the development of male offspring, monitored specially for effects controlled by male hormones, was abnormal in a small proportion (7.7%) of the offspring.

6. Do DIDP and DINP pose risks to human health?

Harmful effects to the liver and reproductive effects due to repeated exposure are considered to be the critical health effects in the risk assessment of DIDP and DINP.

Risks are assessed by comparing worst case exposures to the exposures at which no harmful effects were observed in animal studies. The difference between the two is the margin of safety (MOS).

6.1 Are workers at risk from exposure to DIDP and DINP?

For **workplace exposure**, the margins of safety are considered sufficient. It is concluded that exposures to DINP or DIDP are of no concern for workers because they are well below the amounts that would cause harmful effects. The assessment concluded that there is at present no need for further information and/or testing or for further risk reduction measures beyond those being applied already.

6.2 Are consumers at risk from exposure to DIDP and DINP?

Consumer exposure from various products containing DIDP or DINP can occur by different routes (inhalation, skin, ingestion) in different situations.

Scenarios were built for three sub-populations:

- For adults and children (3-15 years old) the estimated exposures to DIDP and DINP are well below the doses without effects in animal studies.
- For infants (6 months to 3 years old), if DIDP were to be used as a substitute for other phthalates in toys, the margin of safety would not be considered sufficient to protect infants. In such a case it is concluded that there would be a need to limit the risks, taking into account the risk reduction measures which already apply. However, if DINP were to be used as a substitute for other phthalates in toys, the margin of safety is considered sufficient to protect infants. It is then concluded that there is at present no need for further information and/or testing or for further risk reduction measures beyond those being applied already.
- For newborns (0 to 6 months old), the exposure scenarios and conclusions are the same as for infants. That is, the margins of safety are considered sufficient to protect newborns, except for the scenario with DIDP-containing toys.

(See exposure table, question 4.2 [see https://www.greenfacts.org/en/dinp-didp/l-2/4-human-exposure.htm#2])

The **environmental exposure** assessment of DIDP and DINP has shown that the exposure of adults and infants via the environment is within the margins of safety when considering liver toxicity and developmental effects. It is concluded that there is at present no need for further information and/or testing or for further risk reduction measures beyond those being applied already.

As **combined exposure** of **adults** to DIDP and DINP is almost exclusively related to occupational exposure, the margins of safety are considered sufficient for adults. For **children 3 to 15 years old**, the margins of safety are also considered sufficient. However, if DIDP should be used as a substitute for other phthalates in toys, there would be a need to limit the risks, taking into account the risk reduction measures which already apply. Because DIDP and DINP are not explosive, flammable or oxidizing, these properties are not considered to pose a hazard. For those properties, there is at present no need for further information and/or testing or for further risk reduction measures beyond those being applied already.

7. Is further research needed?

The production and use of DIDP and DINP are unlikely to pose a risk to the environment. In addition, risks to the function of sewage treatment plants and the atmosphere are expected to be very low for both production and use. DIDP and DINP are not considered a risk for workers or consumers, so there is at present no need for further information and/or testing and for risk reduction measures beyond those which are being applied already.

However, there would be a need for limiting the risks in case DIDP were used as a substitute for other phthalates in toys[1] [see Annex 2, p. 10] . This conclusion is based on concerns regarding liver toxicity as a consequence of repeated exposure of infants and newborn babies occurring when they put toys and baby equipment into their mouth. Risk reduction measures which are already being applied shall be taken into account.

For DINP, The Scientific Committee on Toxicity, Ecotoxicity and the Environment (CSTEE) has commented on the European Union Risk Assessment Report on DINP. It did not agree with several of the conclusions about environmental effects and considers that more research is necessary. In particular, the CSTEE considered that the following information was needed

(1) more information on transfer of DINP in the aquatic food web,
(2) better estimates of Predicted Environmental Concentration in sediment,
(3) more reliable information for estimating Predicted No Effect Concentrations in terrestrial organisms and modelling of potential concentration up the food chain,
(4) better characterisation of the risks to humans via environmental exposure, and
(5) a risk assessment on the most relevant metabolite monoisononylphthalate.

Annex

Annex 1:

Consumer exposure to DIDP and DINP

Human internal exposure	Without toys		With toys	
	mg/kg body weight/day			
	DIDP	DINP	DIDP	DINP
Adults	0.0058	0.011	Not applicable	Not applicable
Infants (6 months to 3 years old)	0.026	0.049	0.227	0.250
Newborns (0 to 6 months old)	0.026	0.049	0.227	0.250

Source: ECB

Annex 2:

Directive on Phthalate-containing soft PVC toys and childcare articles

"Since 1999 the European Commission has prohibited the use of phthalates in children's toys. This product is especially dangerous in toys placed in the mouth by babies and small children, because the absorption of phthalates may exceed the maximum daily dose and have a long-term impact on health.

Six phthalates are prohibited in this type of toy: di-iso nonyl phthalate (DINP), di (2-ethylhexyl) phthalate (DEHP), dibutyl phthalate (DBP), di-iso-decyl phthalate (DIDP), di-n-octyl phthalate (DNOP) and butylbenzyl phthalate (BBP).

In 2005, the ban was made permanent by an EU Directive (2005/84/EC). The Directive broadened the ban to include not only toys but also childcare articles as they can be placed in the mouth by small children. A childcare article is any product intended to facilitate sleep , relaxation, hygiene, the feeding of children, or sucking on the part of children.

This decision to prohibit phthalates in the European Union can be seen at: http://ec.europa.eu/scadplus/leg/en/lvb/l32033.htm [see http://ec.europa.eu/scadplus/leg/en/lvb/l32033.htm]

Annex 3:

Internal exposure for adults, children and infants.

Sources of exposure	Internal exposure (mg/kg bw/d)					
	Adults		Infants without toys		Infants with toys	
	DIDP	DINP	DIDP	DINP	DIDP	DINP
Occupational sources	1.10	1.10				
Consumer sources	0.01	0.01	0.01	0.01	0.23	0.25
Via the environment	0.01	0.01	0.01	0.01	0.17	0.16
Total with occupational exposure	1.12	1.12				
Total without occupational exposure	0.02	0.02	0.02	0.02	0.40	0.41

Source: ECB "2003 Risk Assessment Report (RAR 041) on Di-"isodecyl" Phthalate (DIDP), Summary of the Report, chapter 4: Human Health [see http://ecb.jrc.it/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/SUMMARY/didpsum041.pdf]

Annex 4:

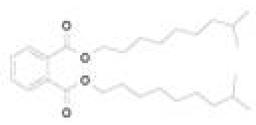
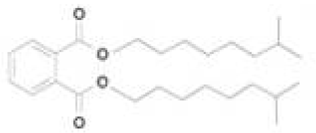
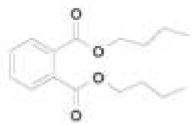
Some phthalates and their applications

Acronym	Full name	Examples of applications
BBP	Butyl-Benzyl-Phthalate	perfumes, hair sprays, adhesives and glues, automotive products, vinyl floor coverings
DBP*	Di-Butyl-Phthalate	[PVC], perfumes, deodorants, hair sprays, nail polish, printer inks, insecticides
Di(2-ethylhexyl) phthalate (DEHP)	Di-Ethyl-Hexyl-Phthalate	Perfumes, flexible PVC products (shower curtains, garden hoses, diapers, food containers, plastic film for food packaging, bloodbags, catheters, gloves, and other medical equipments such as tubes for fluids, etc.)
DIDP*	Di-Isodecyl-Phthalate	vinyl wall and floor coverings, gloves, wrapping food packaging
DINP*	Di-Isononyl Phthalate	Toys, vinyl floor coverings, gloves, wrapping food packaging, drinking straws, graden hoses
DEP	Di-Ethyl-Phthalate	Perfumes, deodorants, hair gels and mousses, shampoos, soaps, hair sprays, nail polish, body lotions
DCHP	Di-Cyclo-Hexyl-Phthalate	Laboratory research
DOP	Di-Octyl-Phthalate	Flexible plastic-based products
DMP	Di-Methyl-Phthalate	Deodorants

Source: Institut national de Santé Publique Québec

Annex 5:

Structure and uses of the three phthalates assessed by the ECB

	DIDP	DINP	DBP
Other names	di-isodecyl phthalate	di-isononyl phthalate	di-butyl phthalate
	1,2-benzenedicarboxylic acid, di-C9-11-branched alkyl esters, C10 rich	1,2-benzenedicarboxylic acid, di-C8-10-branched alkyl esters, C9 rich	1,2-benzenedicarboxylic acid, dibutyl ester (9CI)
Average formula	$C_{28}H_{46}O_4$	$C_{26}H_{42}O_4$	$C_{16}H_{22}O_4$
			
Description	Oily liquid, low water solubility, non-volatile		
Uses	95% : PVC *plasticiser* 5% : *polymer*-related uses other than PVC (e.g. rubbers), non-polymer applications including paints, *sealing compounds*, textile inks, lacquers, adhesives		75%: polymer plasticiser (PVC and others) 14%: adhesives, 7%: printing inks 3%: other uses, including cosmetics
EU Production	1994: 200 000 tonnes (EU-12)	1994: 107 000 tonnes (EU-12)	1998: 26 000 tonnes (EU-15)
Largest uses in quantity			
wires and cables	27 400 tonnes/year	14 510 tonnes/year	na
flooring	20 055 tonnes/year	10 658 tonnes/year	na
shoe soles	15 843 tonnes/year	8 313 tonnes/year	na
car undercoating	14 516 tonnes/year	7 714 tonnes/year	na

Source: GreenFacts based on ECB Summary Risk Assessment Reports on DIDP [see http://ecb.jrc.it/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/SUMMARY/didpsum041.pdf] (2003), DINP [see http://ecb.jrc.it/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/SUMMARY/dinpsum046.pdf] (2003), and DBP [see http://ecb.jrc.it/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/SUMMARY/dibutylphthalatesum003.pdf] (2003-2004)

Annex 6:

Table 2.1 Volumes of DIDP in different articles and their respective lifetimes

Largest uses in quantity (Tonnes/year)	DIDP	DINP
wires and cables	27 400	14 510
flooring	20 055	10 658
shoe soles	15 843	8 313
car undercoating	14 516	7 714

Source: ECB "2003 Risk Assessment Report (RAR 041) on Di-"isodecyl" Phthalate (DIDP), Summary of the Report, chapter 2: General Information on Exposure [see http://ecb.jrc.it/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/SUMMARY/didpsum041.pdf]

Annex 7:

Table 3.2 PECs calculated for the various stages of the life cycle of DIDP

	DIDP	DINP
Waste water	891 tonnes	405 tonnes
Surface water	1 761 tonnes	1 017 tonnes
Air	222 tonnes	133 tonnes

Source: ECB