



Phthalate Standards

Phthalates are esters produced by esterification of phthalic acid with different alcohols. They are the most commonly used plasticisers, which are added to plastics to increase their flexibility, transparency and durability. Phthalates may be classified into two groups, based on molecular weight, comprising low molecular weight phthalates (ester side-chain lengths, one to four carbons) which include dibutyl phthalate (DBP), diethyl phthalate (DEP) and dimethyl phthalate (DMP) and high-molecular-weight phthalates (ester side-chain lengths, five or more carbons), which include bis (2-n-ethylhexyl) phthalate (DEHP) and dinonyl phthalate (DINP). These compounds can be found in a wide range of products, including adhesives and glues, electronics, medical devices, tubing, packaging, cosmetics, children's toys and food. Their presence in different products of everyday use means they can be found in all parts of the environment.

Since phthalates are incorporated in the polymer matrix in almost all plastic materials, these can easily migrate into foods and drinking water from the packaging or bottling material. Thus phthalates can bioaccumulate in tissues and in the food chain. Phthalates are poorly biodegradable and are potentially toxic. They have been associated with a number of health problems that include endocrine, respiratory, neurological and reproductive disorders. Several phthalates have been prioritised as significantly hazardous substances by many protection organisations.⁽¹⁾ For example, certain phthalates have been identified as priority hazardous substances by the European Union (EU), the US Environmental Protection Agency (EPA) and other international organisations.

In order to protect the consumers, sensitive and reliable methods for rapid detection of phthalates present in food and food contact materials are clearly needed. Although, liquid chromatography-mass spectrometry (LC-MS) methods for phthalates have been described, gas chromatography-mass spectrometry (GC-MS) is the preferred method for phthalate measurement due to the high reproducibility and specificity obtained.

Irrespective of analytical methodology, there is a requirement for high quality, pure, well characterised phthalate standards. Such standards have recently been developed in this laboratory and we have as part of this work, participated in a significant study on the quantification of phthalates in commercially available drinking water from different producers. Furthermore, this study provides specific data about the concentration of DBP and DEHP attributable to the migration of phthalates from food contact materials.⁽¹⁾

⁽¹⁾ Improved method for rapid detection of phthalates in bottled water by gas chromatography–mass spectrometry Paz Otero^a, Sushanta Kumar Saha^a, Siobhan Moane^a, John Barron^b, Gerard Clancy^b, Patrick Murray^a

^a Shannon Applied Biotechnology Centre, Limerick Institute of Technology, Moylish Park, Limerick, Ireland

^b Reagecon Diagnostics Limited Shannon Free Zone, Shannon, Co. Clare, Ireland.

Monophthalate Esters

Product No.	Analyte	Concentration & Matrix	Pack size
REPHT023	Monomethyl phthalate	1000µg/ml in Isooctane	1ml
REPHT024	Monoethyl phthalate	1000µg/ml in Isooctane	1ml
REPHT025	Mono-n-butyl phthalate	1000µg/ml in Isooctane	1ml
REPHT026	Mono-iso-butyl phthalate	1000µg/ml in Isooctane	1ml
REPHT027	Mono-n-pentyl phthalate	1000µg/ml in Isooctane	1ml
REPHT028	Mono-iso-pentyl phthalate	1000µg/ml in Isooctane	1ml
REPHT029	Monobenzyl phthalate	1000µg/ml in Dischloromethane	1ml
REPHT030	Mono-n-hexyl phthalate	1000µg/ml in Isooctane	1ml
REPHT031	Mono(2-ethylhexyl) phthalate	1000µg/ml in Isooctane	1ml
REPHT032	Monobornyl phthalate	1000µg/ml in Isooctane	1ml
REPHT033	Monocholesteryl phthalate	1000µg/ml in Isooctane	1ml

Diphthalate Esters

Product No.	Analyte	Concentration & Matrix	Pack size
REPHT011	Bis(2-ethylhexyl) phthalate	1000µg/ml in Purge & Trap Methanol	1ml
REPHT012	Bis(2-ethylhexyl) phthalate	2000µg/ml in Purge & Trap Methanol	1ml
REPHT013	Butyl benzyl phthalate	1000µg/ml in Methylene Chloride	1ml
REPHT014	Butyl benzyl phthalate	2000µg/ml in Methylene Chloride	1ml
REPHT015	Diethyl phthalate	1000µg/ml in Purge & Trap Methanol	1ml
REPHT016	Diethyl phthalate	2000µg/ml in Purge & Trap Methanol	1ml
REPHT017	Dimethyl phthalate	1000µg/ml in Purge & Trap Methanol	1ml
REPHT018	Dimethyl phthalate	2000µg/ml in Purge & Trap Methanol	1ml
REPHT019	Di-n-butyl phthalate	1000µg/ml in Purge & Trap Methanol	1ml
REPHT020	Di-n-butyl phthalate	2000µg/ml in Purge & Trap Methanol	1ml
REPHT021	Di-n-octyl phthalate	1000µg/ml in Purge & Trap Methanol	1ml
REPHT022	Di-n-octyl phthalate	2000µg/ml in Purge & Trap Methanol	1ml
REPHT034	Dimethyl phthalate	1000µg/ml in Isooctane	1ml
REPHT035	Dimethyl phthalate	neat	10mg
REPHT036	Diethyl phthalate	1000µg/ml in Isooctane	1ml
REPHT037	Diethyl phthalate	neat	10mg
REPHT038	Di-n-propyl phthalate	1000µg/ml in Isooctane	1ml
REPHT039	Di-n-propyl phthalate	neat	10mg
REPHT040	Di-iso-propyl phthalate	1000µg/ml in Isooctane	1ml
REPHT041	Bis(2-methoxyethyl) phthalate	1000µg/ml in Isooctane	1ml
REPHT042	Bis(2-methoxyethyl) phthalate	neat	10mg
REPHT043	Di-iso-butyl phthalate (Di-2-methylpropyl phthalate)	1000µg/ml in Isooctane	1ml

Diphthalate Esters

Product No.	Analyte	Concentration & Matrix	Pack size
REPHT044	Di-iso-butyl phthalate (Di-2-methylpropyl phthalate)	neat	10mg
REPHT045	n-Butyl iso-butyl phthalate (n-Butyl 2-methylpropyl phthalate)	1000µg/ml in Isooctane	1ml
REPHT046	n-Butyl iso-butyl phthalate (n-Butyl 2-methylpropyl phthalate)	neat	10mg
REPHT047	n-Butyl n-pentyl phthalate	100µg/ml in Isooctane	1ml
REPHT048	n-Butyl n-pentyl phthalate	1000µg/ml in Isooctane	1ml
REPHT049	n-Butyl n-pentyl phthalate	neat	10mg
REPHT050	iso-Butyl n-pentyl phthalate	100µg/ml in Isooctane	1ml
REPHT051	iso-Butyl n-pentyl phthalate	1000µg/ml in Isooctane	1ml
REPHT052	iso-Butyl n-pentyl phthalate	neat	10mg
REPHT053	n-Butyl iso-pentyl phthalate (n-Butyl 3-methylbutyl phthalate)	100µg/ml in Isooctane	1ml
REPHT054	n-Butyl iso-pentyl phthalate (n-Butyl 3-methylbutyl phthalate)	1000µg/ml in Isooctane	1ml
REPHT055	n-Butyl iso-pentyl phthalate (n-Butyl 3-methylbutyl phthalate)	neat	10mg
REPHT056	Bis(2-ethoxyethyl) phthalate	1000µg/ml in Isooctane	1ml
REPHT057	Bis(2-ethoxyethyl) phthalate	neat	10mg
REPHT058	Di-n-pentyl phthalate	1000µg/ml in Isooctane	1ml
REPHT059	Di-n-pentyl phthalate	neat	10mg
REPHT060	Diisopentyl phthalate (diisoamyl phthalate)	1000µg/ml in Isooctane	1ml
REPHT061	Diisopentyl phthalate (diisoamyl phthalate)	neat	10mg
REPHT062	n-Pentyl iso-pentyl phthalate (n-Pentyl 3-methylbutyl phthalate)	100µg/ml in Isooctane	1ml
REPHT063	n-Pentyl iso-pentyl phthalate (n-Pentyl 3-methylbutyl phthalate)	1000µg/ml in Isooctane	1ml
REPHT064	n-Pentyl iso-pentyl phthalate (n-Pentyl 3-methylbutyl phthalate)	neat	10mg
REPHT065	n-Pentyl benzyl phthalate	100µg/ml in Isooctane	1ml
REPHT066	n-Pentyl benzyl phthalate	1000µg/ml in Isooctane	1ml

Diphthalate Esters

Product No.	Analyte	Concentration & Matrix	Pack size
REPHT067	n-Pentyl benzyl phthalate	neat	10mg
REPHT068	Iso-pentyl benzyl phthalate (3-Methylbutyl benzyl phthalate)	100µg/ml in Isooctane	1ml
REPHT069	Iso-pentyl benzyl phthalate (3-Methylbutyl benzyl phthalate)	1000µg/ml in Isooctane	1ml
REPHT070	Iso-pentyl benzyl phthalate (3-Methylbutyl benzyl phthalate)	neat	10mg
REPHT071	iso-Butyl benzyl phthalate (2-Methylpropyl benzyl phthalate)	100µg/ml in Isooctane	1ml
REPHT072	iso-Butyl benzyl phthalate (2-Methylpropyl benzyl phthalate)	1000µg/ml in Isooctane	1ml
REPHT073	iso-Butyl benzyl phthalate (2-Methylpropyl benzyl phthalate)	neat	10mg
REPHT074	Diphenyl phthalate	100µg/ml in Isooctane	1ml
REPHT075	Dicyclohexyl phthalate	1000µg/ml in Isooctane	1ml
REPHT076	Dicyclohexyl phthalate	neat	10mg
REPHT077	Bis(2-n-butoxyethyl) phthalate	1000µg/ml in Isooctane	1ml
REPHT078	Bis(2-n-butoxyethyl) phthalate	neat	10mg
REPHT079	Bis(4-methyl-2-pentyl) phthalate	1000µg/ml in Isooctane	1ml
REPHT080	Bis(4-methyl-2-pentyl) phthalate	neat	10mg
REPHT081	n-Butyl n-octyl phthalate	1000µg/ml in Isooctane	1ml
REPHT082	n-Butyl n-octyl phthalate	neat	10mg
REPHT083	2-Ethylhexyl n-octyl phthalate	100µg/ml in Isooctane	1ml
REPHT084	2-Ethylhexyl n-octyl phthalate	1000µg/ml in Isooctane	1ml
REPHT085	2-Ethylhexyl n-octyl phthalate	neat	10mg
REPHT086	Di-n-hexyl phthalate	1000µg/ml in Isooctane	1ml
REPHT087	Di-n-hexyl phthalate	neat	10mg
REPHT088	Dibenzyl phthalate	100µg/ml in Isooctane	1ml
REPHT089	Dibenzyl phthalate	neat	10mg
REPHT090	Di-n-heptyl phthalate	1000µg/ml in Isooctane	1ml
REPHT091	Di-n-heptyl phthalate	neat	10mg
REPHT092	Di-n-nonyl phthalate	1000µg/ml in Isooctane	1ml
REPHT093	Di-n-nonyl phthalate	neat	10mg