

MARKETED BY
**HARWICK STANDARD
DISTRIBUTION CORPORATION**

60 S. Seiberling Street • Akron, Ohio 44305

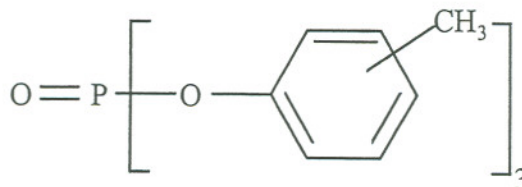
Issue Date: 1-Nov-98
Supersedes: all other versions
Page: 1 of 1

Phosflex® Flame Retardant Plasticizer

Lindol

Chemical Name: Tricresyl Phosphate

Structural formula



Typical properties:

Physical appearance	Clear, transparent liquid
Phosphorus content, wt. %	8.4
Specific gravity, 20°C/20°C	1.170
Density @ 20°C, lbs/gal	9.7
kg/m ³	1170
Viscosity @ 25°C, mPa.s	65
Acidity, mg KOH/g	0.10
Water content, wt. %	0.10
Colour, APHA	<75

Applications:

LINDOL is the standard flame-retardant plasticizer used in vinyl and cellulosic plastics; and in vinyl, cellulose nitrate and ethyl cellulose coatings LINDOL has low volatility and good resistance to extraction by oil.

All information concerning this product and/or suggestions for handling and use contained herein are offered in good faith and are believed to be reliable. Supresta U.S. LLC, however, makes no warranty as to the accuracy and/or sufficiency of such information and/or suggestions, as to the product's merchantability or fitness for any particular purpose, or that any suggested use will not infringe any patent. Nothing contained herein shall be construed as granting or extending any license under any patent. Buyer must determine for himself, by preliminary tests or otherwise, the suitability of this product for his purposes. The information contained herein supersedes all previously issued bulletins on the subject matter covered.

Supresta U.S. LLC
420 Saw Mill River Road
Ardsley, NY 10502
914-269-5900
800-666-1200
Fax: 914-674-9735



Harwick Standard Distribution Corporation

Plasticizers

Harwick Standard offers a broad line of plasticizers to meet the needs of both rubber compounders and flexible PVC formulators. By offering a large range of products, we provide our customers the versatility of identifying a plasticizer family that is effective with various polymers, and gives several product options from which to choose for optimum performance characteristics - from general use to most demanding requirements.

Harwick Standard's experienced technical and sales staff can assist in selecting the best plasticizer to meet your requirements. Please contact us for assistance with your compounding needs.

Non-Phthalate C-9

Tradename(s)	Chemical Name	Polymer Usage	General Purpose	Low Temperature/ Flexibility	Low Volatility	Low Extraction	Heat Aging Resistance	High Solvating	Miscellaneous
Polycizer® DHIN	1-2 cyclohexane dicarboxylic acid diisononyl ester	R-1,2/P-1	✓						Performance similar to DOP in NBR compounds

Adipates

Tradename(s)	Chemical Name	Polymer Usage	General Purpose	Low Temperature/ Flexibility	Low Volatility	Low Extraction	Heat Aging Resistance	High Solvating	Miscellaneous
Polycizer® DOA	Di-2 ethylhexyl adipate	R-1,2/P-1,2	✓	✓					FDA, low water extraction, UV stability
Merrol® 4206 (DBEA)	Dibutoxyethyl adipate	R-1,2,3/P-2		✓					
Polycizer DBEEA Merrol 4226	Dibutoxyethoxyethyl adipate	R-1,2,3		✓	✓	✓	✓		

Azelates

Tradename(s)	Chemical Name	Polymer Usage	General Purpose	Low Temperature/ Flexibility	Low Volatility	Low Extraction	Heat Aging Resistance	High Solvating	Miscellaneous
Merrol DOZ-E	Di-2 ethylhexyl azelate	R-1,2/P-1,2	✓	✓	✓				Excellent low temp

Polymer Usage Key

R-1	NBR, NBR/PVC
R-2	CR, CPE, CSM
R-3	ECO, Fluoroelastomers, Polyacrylates

Polymer Usage Key

P-1	PVC
P-2	PVAC, PS, ABS, Cellulosics
P-3	Eng, Resins, Polyester, Alloys

Benzoates

Tradename(s)	Chemical Name	Polymer Usage	General Purpose	Low Temperature/ Flexibility	Low Volatility	Low Extraction	Heat Aging Resistance	High Solvating	Miscellaneous
Benzoflex® 9-88	Dipropylene glycol dibenzoate	R-1/P-1,2			✓			✓	Polyurethanes
Benzoflex 50	Diethylene/ dipropylene glycol dibenzoate	R-1/P-1,2			✓			✓	Water-based adhesives
Benzoflex 2088	Diethylene glycol dibenzoate, triethylene glycol dibenzoate, dipropylene glycol dibenzoate	R-1/P-1,2			✓	✓		✓	High solvator, low VOC's, FDA

Chlorinated Paraffins

Tradename(s)	Chemical Name	Polymer Usage	General Purpose	Low Temperature/ Flexibility	Low Volatility	Low Extraction	Flame Resistance	High Solvating	Miscellaneous
Chloro Flo/ Paroil Series	Liquid chlorinated paraffins	R-2/P-1	✓		✓		✓		

Mono-Esters

Tradename(s)	Chemical Name	Polymer Usage	General Purpose	Low Temperature/ Flexibility	Low Volatility	Low Extraction	Heat Aging Resistance	High Solvating	Miscellaneous
Polycizer Butyl Oleate	N-butyl oleate	R-2/P-2		✓					Primary light color plasticizer for polychloroprene
Polycizer MO	Vegetable Oil	R-2		✓	✓		✓	✓	Low & high temp for polychloroprene
Plasticizer OLN	Oleyl nitrile	R-1				✓		✓	Low & high temp for polychloroprene
Natoflex® IOT	Isooctyl tallate	R-1,2	✓	✓					
Merrol 818T	Alkyl tallate	R-1/P-2	✓	✓					

Polymer Usage Key

R-1	NBR, NBR/PVC
R-2	CR, CPE, CSM
R-3	ECO, Fluoroelastomers, Polyacrylates
P-1	PVC
P-2	PVAC, PS, ABS, Cellulosics
P-3	Eng, Resins, Polyester, Alloys

Petroleum Process Oils

Tradename(s)	Chemical Name	Polymer Usage	General Purpose	Low Temperature/ Flexibility	Low Volatility	Low Extraction	Heat Aging Resistance	High Solvating	Miscellaneous
Stan-Lube Series	Paraffinic oils	Non-polar	✓						Light color, good for EPRs
Stan-Plas Series	Naphthenic oils	R-1	✓						General Processability
Duoprime® Series	White oils	Non-polar	✓						FDA

Phosphate Esters

Tradename(s)	Chemical Name	Polymer Usage	General Purpose	Low Temperature/ Flexibility	Low Volatility	Low Extraction	Flame Resistance	High Solvating	Miscellaneous
Lindol®	Tricresyl phosphate	P-1,2	✓		✓		✓	✓	
Phosflex® 41L Merrol 521	Isopropylated triaryl phosphate	R-1,2/P-1					✓		
Phosflex T-BEP	Tributoxyethyl phosphate	R-1,2,3/P-1,2		✓			✓	✓	
Phosflex 71-B	Butylated triphenyl phosphate	R-1,2/P-1					✓		
Phosflex 362	2-ethyhexyl diphenyl phosphate	R-1,2/P-1,2					✓		
Phosflex 390	Isodecyl diphenyl phosphate	R-1,2/P-1,2					✓		

Disclaimer of Liability

The information and recommendations contained herein are based upon data that are believed to be accurate and reliable to be the best of Harwick's knowledge and belief. Application and performance information are provided only as a guide, since the conditions of use are beyond Harwick's control. No warranty is made of the merchantability or fitness for a particular purpose, and Harwick Standard Distribution Corporation shall not be liable for any cost, loss, damage, or liability arising from the failure to achieve a particular result by the application of any method or process that is recommended herein.

Polymer Usage Key

R-1	NBR, NBR/PVC
R-2	CR, CPE, CSM
R-3	ECO, Fluoroelastomers, Polyacrylates
P-1	PVC
P-2	PVAC, PS, ABS, Cellulosics
P-3	Eng, Resins, Polyester, Alloys

Phthalates

Tradename(s)	Chemical Name	Polymer Usage	General Purpose	Low Temperature/Flexibility	Low Volatility	Low Extraction	Heat Aging Resistance	High Solvating	Miscellaneous
Merrol DAP	Diallyl phthalate	R-1,2/P-3						✓	Co-curing
Polycizer DBP Merrol DBP	Di-n-butyl phthalate	R-1,2/P-1,2	✓					✓	Good emollient for cosmetics
Polycizer DIDP	Diisodecyl phthalate	R-1,2/P-1,2			✓	✓			Also E grade
Polycizer DINP Merrol DINP	Disisononyl phthalate	R-1,2/P-1,2			✓				
Polycizer DOP Merrol DOP	Di-2-ethylhexyl phthalate	R-1,2/P-1,2	✓						
Polycizer DUP	Diundecyl phthalate	R-1,2/P-1,2		✓	✓		✓		Low fogging Also CA grade

Polymeric

Tradename(s)	Chemical Name	Polymer Usage	General Purpose	Low Temperature/Flexibility	Permeability	Migration Resistance	Low Extraction	Heat Aging	Miscellaneous
Admex® P-27	Polyester adipate	R-1/P-1,2				✓			High purity, good electrical properties
Admex 409	Polyester adipate	R-1/P-1,2	✓			✓		✓	Good electrical properties
Admex 412	Polyester adipate	R-1/P-1		✓	✓				Low viscosity, easy processing
Amdex 429	Polyester adipate	R-1,2/P-1,2				✓			Non-fogging, humidity resistance
Admex 523	Mixed polyester	R-1/P-1,2	✓			✓	✓		Low viscosity
Admex 760	Polyester adipate	R-1,2/P-1,2			✓	✓			Excellent permanence, low water extractability
Admex 761	Polyester adipate	R-1/P-1,2					✓		
Admex 770	Mixed polyester	R-1,2/P-1,2			✓	✓			Excellent weatherability (decals)
Admex 775	Mixed polyester	R-1/P-1,2							Excellent resistance to aqueous & organic solvents
Admex 910-001	Mixed polyester	R-1/P-1,2					✓		Low water extraction
Admex 1723	Mixed polyester	R-1/P-1,2			✓				Printability
Admex 2632	Mixed polyester	R-1/P-1,2	✓						FDA

Polymeric (continued)

Tradename(s)	Chemical Name	Polymer Usage	General Purpose	Low Temperature/ Flexibility	Permeability	Migration Resistance	Low Extraction	Heat Aging	Miscellaneous
Admex 6187	Polyester adipate	R-1/P-1,2				✓	✓		Solvent & oil resistance
Admex 6985	Polyester adipate	R-1/P-1,2				✓	✓	✓	Very low volatility
Admex 6994	Mixed polyester	R-1/P-1,2				✓			Mar resistance, low fogging
Admex 6995	Polyester adipate	R-1/P-1,2			✓				UV weatherability
Admex 6996	Polyester adipate	R-1/P-1,2		✓					Printability
Tradename(s)	Chemical Name	Polymer Usage	General Purpose	Low Temperature/ Flexibility	Low Volatility	Low Extraction	Heat Aging Resistance	High Solvating	Miscellaneous
Merrol P-6320	Polyester adipate	R-1,2/P-1		✓		✓			Solvent & oil resistance, low temp flexibility
Merrol P-6412	Polyester adipate	R-1,2/P-1,2				✓			Medium viscosity, FDA
Merrol P-6410	Polyester adipate	P-1,2			✓	✓			
Merrol P-6420	Polyester adipate	P-1				✓			Good color

Sebacates

Tradename(s)	Chemical Name	Polymer Usage	General Purpose	Low Temperature/ Flexibility	Low Volatility	Low Extraction	Heat Aging Resistance	High Solvating	Miscellaneous
Polycizer DBS	Di-n-butyl sebacate	R-1,2/P-1,2		✓				✓	FDA
Polycizer DOS Merrol DOS	Di-2-ethylhexyl sebacate	R-2/P-1,2	✓	✓		✓			Low temp greases & caulks

Harwick Standard Distribution Corporation

www.harwickstandard.com

330-798-9300

Polymer Usage Key

R-1	NBR, NBR/PVC
R-2	CR, CPE, CSM
R-3	ECO, Fluoroelastomers, Polyacrylates
P-1	PVC
P-2	PVAC, PS, ABS, Cellulosics
P-3	Eng, Resins, Polyester, Alloys

Specialty

Tradename(s)	Chemical Name	Polymer Usage	General Purpose	Low Temperature/ Flexibility	Permeability	Migration Resistance	Low Extraction	Heat Aging	Miscellaneous
Plasticizer SC-B	Triethyleneglycol dicaprate/caprylate	R-1,2,3		✓				✓	FDA
Plasticizer SC-E	Triethyleneglycol di 2-ethylhexanoate	R-1,2,3		✓					Flexibility over a wide temp range
Hercoflex® 600	Pentaerythritol ester of fatty acids	R-1,2		✓	✓	✓	✓	✓	Excellent low and high temp
Hercoflex 707, 707A	Pentaerythritol ester of fatty acids	R-1,2		✓	✓	✓	✓	✓	Excellent low and high temp
Polycizer ESO Merrol E-68	Epoxidized soybean oil	R-1/P-1,2,3			✓	✓		✓	Good heat stabilizer

Trimellitates

Tradename(s)	Chemical Name	Polymer Usage	General Purpose	Low Temperature/ Flexibility	Permeability	Migration Resistance	Low Extraction	Heat Aging	Miscellaneous
Polycizer TOTM	Tri-2-ethylhexyl trimellitate	R-1,2/P-1,2			✓		✓	✓	Also E&CA grades, excellent water resistance
Merrol 810TM-E	Tri(n-octyl/n-decyl) trimellitate	R-2		✓	✓		✓	✓	Oxidation resistance, excellent water resistance
Polycizer TINTM	Trisononyltrimellitate	R-1,2/P-1,2			✓	✓	✓	✓	



Harwick Standard Distribution Corporation

60 South Seiberling Street

P.O. Box 9360

Akron, OH 44305-0360

Phone: 330-798-9300

Fax: 330-798-0214

Technical Fax: 330-798-9328

Sales Fax: 330-798-4089

www.harwickstandard.com

Polymer Usage Key	
R-1	NBR, NBR/PVC
R-2	CR, CPE, CSM
R-3	ECO, Fluoroelastomers, Polyacrylates
P-1	PVC
P-2	PVAC, PS, ABS, Cellulosics
P-3	Eng, Resins, Polyester, Alloys

® Permission to use registered tradename(s) of products with such registration indicated has been granted by the rightful owners.