Phosflex® 41L

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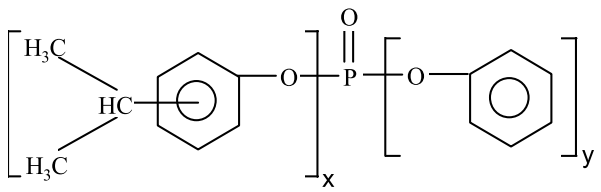
Phosflex®
Flame Retardant Plasticizers

Chemical Name: Isopropylated triphenyl phosphate ester
CAS #

Triphenyl phosphate	115-86-6
Propylated triphenyl phosphate	68937-41-7



x + y = 3 x = 0-3

Phosflex® Product Selector

	Key applications	Key characteristics
4	• Primary plasticizer for nitrocellulose, chlorinated rubber • Anti-foam agent	• Low viscosity • Low density
31L	• PVC film and sheet compounds • Dispersant for plastisols	• Low color • Blendable with non-FR plasticizers
41L	• PVC film and sheet compounds • Dispersant for plastisols	• Low color • Blendable with non-FR plasticizers
71B	• Flame retardant plasticizer for PVC	• Excellent flame retardant properties • Low volatility
362	• Flame retardant plasticizer for PVC alloys	• Low temperature and low smoke • Excellent vinyl solvating properties • Approved for packaging materials in food contact
390	• Flame retardant plasticizer for PVC sheets and coatings	• Excellent low temperature flexibility • Low smoke, good weathering properties
314, 318, 321, 327	• Blended plasticizer for film and sheet vinyl goods	• High efficiency • High solvating

Overview

Phosflex® 41L is a substituted triaryl phosphate ester made exclusively from synthetic feedstocks. It has excellent flameretarding characteristics, which are typical of the triaryls. This flame retarding efficiency permits back-blending with nonflame retarding plasticizers, resulting in favorable economics and wide flexibility to formulators.
While used primarily in PVC formulations, Phosflex® 41L finds compatibility and utility in other resin systems as well.

Key Applications

PVC Applications:
Formulations for Flexible Suspension PVC at 50 phr Plasticizer

	1	2	3	4	5
PVC Geon (103EP)	100	100	100	100	100
CaCO3	50	50	50	50	50
Zinc Borate (Firebrake ZB)		3	6	3	6
ATH (Hydral 710)				20	40
Plasticizers	50	50	50	50	50
ESO (Plastoflex 2307)	5	5	5	5	5
Stabilizers (Ba/Zn mixed metals)	5	5	5	5	5
Totals:	210	213	216	233	256

These five formulations represent basic formulation and component variations typically seen for FR-PVC. The resultant flammability and physical properties are shown in the following tables on the next page with comparisons to similar flame retarded vinyl systems.

Phosflex® 41L in Suspension PVC (GEON 103EP)

		Tensile Properties			Hardness		LOI	UL-94
							100	
Component	Additive phr	Strength psi (MPa)	E Mod. psi (MPa)	Elong. %	Shore "A" Initial	Creep (15 sec.)	Mils	1.6mm
DIDP	50	1844(12.7)	858(5.9)	426	88	85	23	FAIL
ZB	3	2018(13.9)	907(6.3)	461	88	84	23.2	FAIL
ZB	6	1824(12.6)	906(6.3)	417	90	86	23.2	FAIL
ZB/ATH	3/20	1635(11.3)	945(6.5)	359	91	86	23.6	FAIL
ZB/ATH	6/40	1715(11.8)	1081(7.4)	374	93	89	25	FAIL
Phosflex® 31L	50	2230(15.4)	1102(7.6)	383	92	86	30.7	V-0
ZB	3	2146(14.8)	1118(7.7)	350	93	87	31	V-0
ZB	6	1934(13.3)	1099(7.6)	305	92	87	31.6	V-0
ZB/ATH	3/20	2008(13.8)	1190(8.2)	334	93	88	32.8	V-0
ZB/ATH	6/40	1832(12.6)	1273(8.8)	290	93	90	35.5	V-0

Typical Properties

Physical appearance	Clear, transparent liquid
Phosphorus content, wt. %	8.3
Specific gravity, 20°C/20°C	1.160
Density @ 20°C, lbs/gal	9.7
kg/m^3	1160
Viscosity @ 25°C, mPa.s	100
Acidity, as phosphoric acid, %	0.10
Water content, wt. %	0.10
Color, APHA	<75

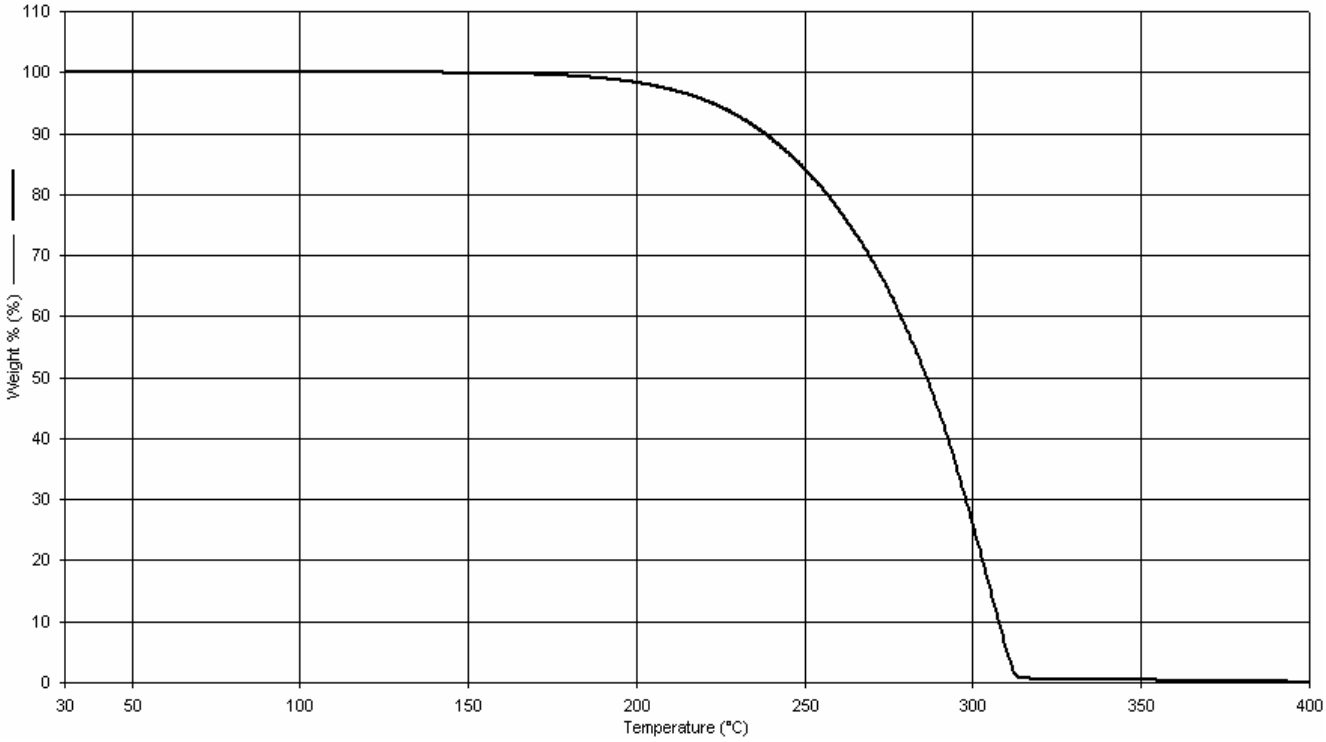
Safety & Handling

Consult the Material Safety Data Sheet for this product.

Shipping Information

Available in bulk tank trucks, isocontainers, 2,500 lb totes, and 534 lb drums.

Thermogravimetric Analysis: Phosflex® 41L
(10°C rise/minute in nitrogen)



2% wt. Loss	203°C
5% wt. Loss	222°C
10% wt. Loss	238°C

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