

# Phosflex® 31L



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**Phosflex®**  
Flame Retardant Plasticizers

**Chemical Name:** Isopropylated triphenyl phosphate ester

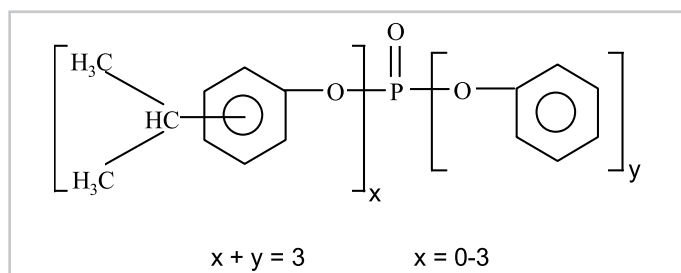
**CAS #**

Triphenyl phosphate

115-86-6

Propylated triphenyl phosphate

68937-41-7



## Overview

Phosflex® 31L 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 non-flame retarding plasticizers, resulting in favorable economics and wide flexibility to formulators.

While used primarily in PVC formulations, Phosflex® 31L finds compatibility and utility in other resin systems as well.

## Phosflex® Product Selector

	Key applications	Key characteristics
4	<ul style="list-style-type: none"> <li>Primary plasticizer for nitrocellulose, chlorinated rubber</li> <li>Anti-foam agent</li> </ul>	<ul style="list-style-type: none"> <li>Low viscosity</li> <li>Low density</li> </ul>
31L	<ul style="list-style-type: none"> <li>PVC film and sheet compounds</li> <li>Dispersant for plastisols</li> </ul>	<ul style="list-style-type: none"> <li>Low color</li> <li>Blendable with non-FR plasticizers</li> </ul>
41L	<ul style="list-style-type: none"> <li>PVC film and sheet compounds</li> <li>Dispersant for plastisols</li> </ul>	<ul style="list-style-type: none"> <li>Low color</li> <li>Blendable with non-FR plasticizers</li> </ul>
71B	<ul style="list-style-type: none"> <li>Flame retardant plasticizer for PVC</li> </ul>	<ul style="list-style-type: none"> <li>Excellent flame retardant properties</li> <li>Low volatility</li> </ul>
362	<ul style="list-style-type: none"> <li>Flame retardant plasticizer for PVC alloys</li> </ul>	<ul style="list-style-type: none"> <li>Low temperature and low smoke</li> <li>Excellent vinyl solvating properties</li> <li>Approved for packaging materials in food contact</li> </ul>
390	<ul style="list-style-type: none"> <li>Flame retardant plasticizer for PVC sheets and coatings</li> </ul>	<ul style="list-style-type: none"> <li>Excellent low temperature flexibility</li> <li>Low smoke, good weathering properties</li> </ul>
314, 318, 321, 327	<ul style="list-style-type: none"> <li>Blended plasticizer for film and sheet vinyl goods</li> </ul>	<ul style="list-style-type: none"> <li>High efficiency</li> <li>High solvating</li> </ul>

## 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
CaCO <sub>3</sub>	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.

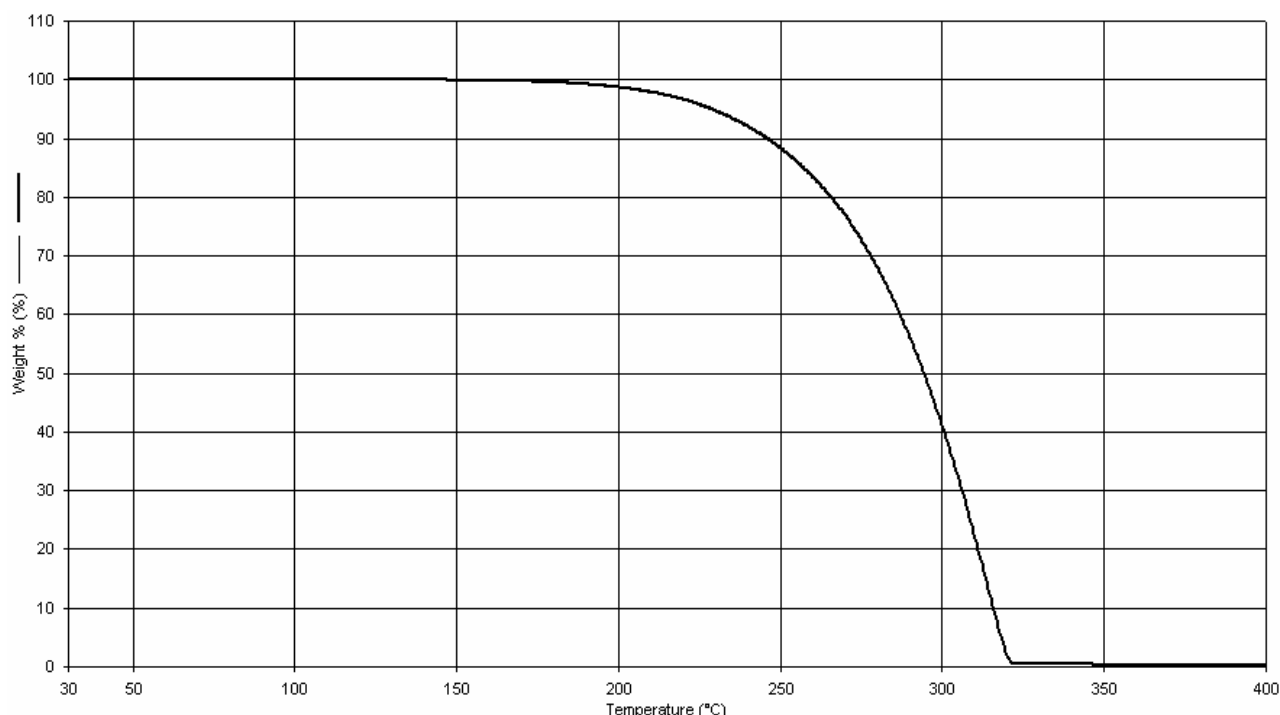
### Phosflex® 31L in Suspension PVC (GEON 103EP)

Component	Additive phr	Tensile Properties			Hardness		LOI 100	UL-94
		Strength psi (MPa)	E Mod. psi (MPa)	Elong. %	Shore "A" Initial	Creep (15 sec.)	Mils	1.6mm
DIDP	50 phr	1844(12.7)	858(5.9)	426	88	85	23	FAIL
ZB	3	2018(13.9)	907(6.2)	461	88	84	23.2	FAIL
ZB	6	1824(12.6)	906(6.2)	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	1940(13.4)	1128(7.8)	305	92	88	30.4	V-0
ZB	3	1906(13.1)	1074(7.4)	314	92	88	31	V-0
ZB	6	1972(13.6)	1118(7.7)	324	92	87	31.6	V-0
ZB/ATH	3/20	1543(10.6)	1127(7.8)	286	92	88	32.8	V-0
ZB/ATH	6/40	1713(11.8)	1170(8.1)	242	93	90	35.5	V-0

## Typical Properties

Physical appearance	Clear, transparent liquid
Phosphorus content, wt. %	8.3
Specific gravity, 20°C/20°C	1.179
Density @ 20°C, lbs/gal	9.84
kg/m <sup>3</sup>	1179
Viscosity @ 25°C, mPa.s	60
Acidity, mg KOH/g	0.10
Water content, wt. %	0.10
Color, APHA	<75

## Thermogravimetric Analysis: Phosflex® 31L (10°C rise/minute in nitrogen)



2% wt. Loss                    208°C  
 5% wt. Loss                    229°C  
 10% wt. Loss                  248°C

### Safety & Handling

Consult the Material Safety Data Sheet for this product.

### Shipping Information

Available in bulk tank trucks, isocontainers, 2,500 lb totes, and 535 lb drums.

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**For more information about our products and to place an order, please contact one of our regional sales offices.**

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