

Phosflex 390™



www.iclfr.com

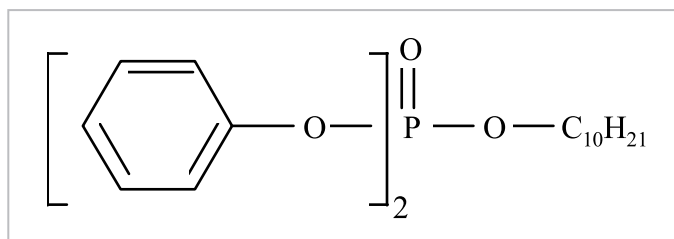
Phosflex®
Flame Retardant Plasticizers

Chemical Name: Isodecyl diphenyl phosphate

CAS #:

Isodecyl diphenyl phosphate 29761-21-5

Triphenyl phosphate 115-86-6



Phosflex® Product Selector

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

Overview

Phosflex® 390 is isodecyl diphenyl phosphate made from synthetic feedstocks. It is a highly efficient plasticizer for PVC, with very good low temperature flexibility, and excellent solvating properties for fast fusion.

One of the unique characteristics of Phosflex® 390 is its ability to reduce flammability while also reducing smoke. Typically when flame retardants are used, the combustion efficiency of the compound is decreased and as a result, smoke (incomplete combustion particles and gases) increase. Phosflex® 390 does both exceeding well in many types of polymer systems, especially flexible vinyl and vinyl alloys.

Phosflex® 390 has excellent compatibility in PVC and other plastics. Formulated correctly, this product performs well in vinyl composites for outdoor applications where exposure to UV irradiation and weathering is critical. Phosflex® 390 has been found useful in FR foamed vinyl and vinyl alloys (PVC/nitrile rubber), calendared sheet goods, vinyl wire and cable and outdoor PVC applications. In certain elastomers, Phosflex® 390 can be useful as a solvator to improve the tactile feel of the rubber composites.

Key Application

Formulations for Flexible Suspension PVC at 50 phr Plasticizer

| | 1 | 2 | 3 | 4 | 5 |
|-------------------------------------|-----|-----|-----|-----|-----|
| PVC Geon (103EP) | 100 | 100 | 100 | 100 | 100 |
| CaCO ₃ | 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 (parts): | 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®390 in PVC Suspension Resin (GEON 103GP)

| Component | Additive phr | Tensile Properties | | | Hardness | | LOI 100 Mils | UL-94 1.6mm |
|--------------|-----------------|-----------------------|--------------------|-------------|----------------------|--------------------|--------------------|----------------|
| | | Strength psi (MPa) | E Mod psi (MPa) | Elong. % | Shore "A" Initial | Creep (15 sec.) | | |
| DIDP | 50 | 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 |
| A-O | 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®390 | 50 | 1608(11.1) | 752(5.2) | 373 | 86 | 83 | 27.2 | V-0 |
| ZB | 3 | 1320(9.1) | 756(5.2) | 291 | 88 | 84 | 27.8 | V-0 |
| ZB | 6 | 1510(10.4) | 777(5.4) | 352 | 90 | 86 | 28 | V-0 |
| ZB/ATH | 3/20 | 1535(10.6) | 863(5.9) | 364 | 91 | 86 | 28.2 | V-0 |
| ZB/ATH | 6/40 | 1460(10.1) | 995(6.9) | 236 | 93 | 89 | 29.6 | V-0 |

Typical Properties

| | |
|--------------------------------|---------------------------|
| Physical appearance | Clear, transparent liquid |
| Phosphorus content, wt. % | 7.9 |
| Specific gravity, 20°C/20°C | 1.070 |
| Density @ 20°C, lbs/gal | 8.9 |
| kg/m ³ | 1070 |
| Viscosity @ 25°C, mPa.s | 26 |
| Acidity, as phosphoric acid, % | 0.10 |
| Water content, wt. % | 0.10 |
| Color, APHA | <100 |

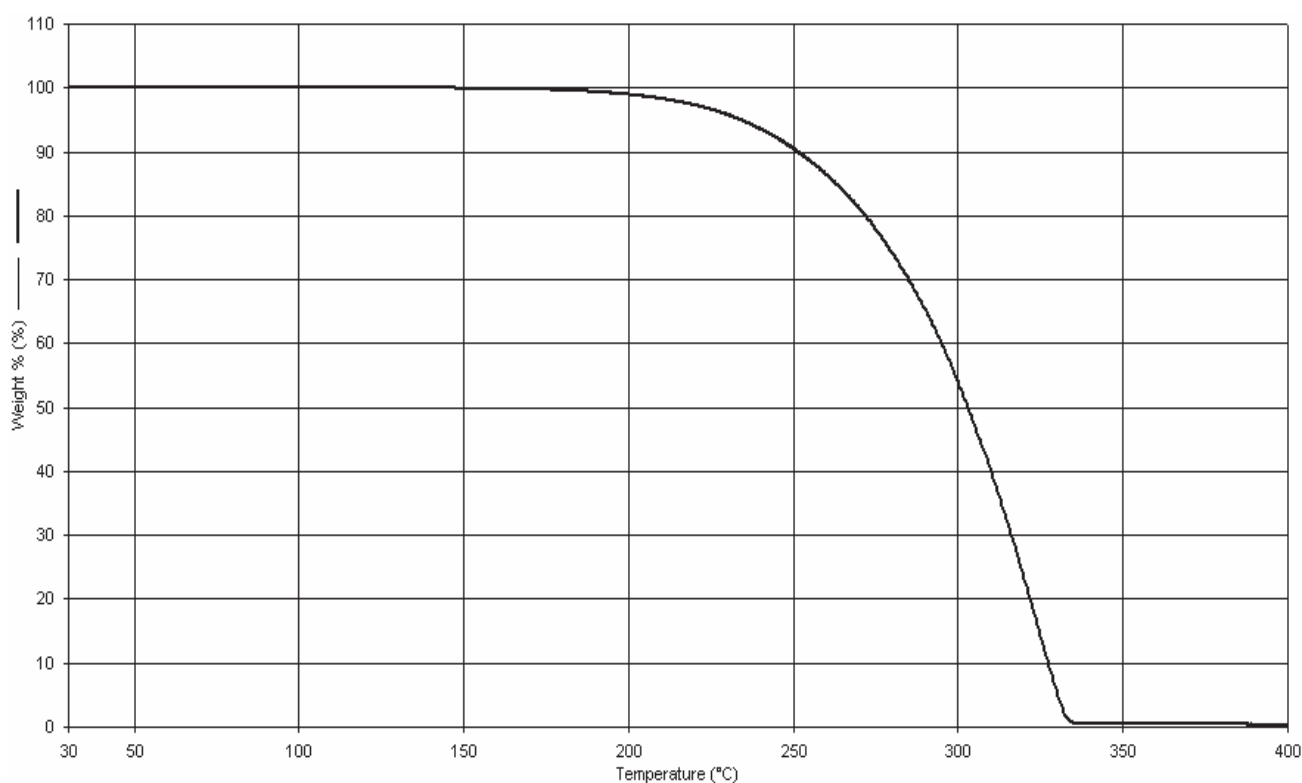
Safety & Handling

Consult the Material Safety Data Sheet for this product.

Shipping Information

Available in bulk tank trucks, isocontainers, 2,300 lb totes, and 480 lb drums.

Thermogravimetric Analysis: Phosflex® 390 (10°C rise/minute in nitrogen)



| | |
|--------------|-------|
| 2% wt. Loss | 204°C |
| 5% wt. Loss | 221°C |
| 10% wt. Loss | 234°C |

Visit our Website: www.icl-ip.com

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

Europe

ICL-IP Europe B.V.
E-mail: fr@europe.icl-ip.com

South America

ICL Brasil
E-mail: fr@brasil.icl-ip.com

Japan

ICL-IP Japan Ltd.
E-mail: fr@japan.icl-ip.com

North America

ICL-IP America INC
E-mail: fr@america.icl-ip.com

China & Pacific

ICL China CO Ltd.
E-mail: fr@china.icl-ip.com

Asia & Other Pacific

ICL Asia Ltd.
E-mail: fr@asia.icl-ip.com

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 as of the date of publication. However, no warranty is made as to the accuracy of and/or sufficiency of such information and/or suggestions as to the merchantability or fitness of the product for any particular purpose, or that any suggested use will not infringe any patent. Nothing herein shall be construed as granting or extending any license under any patent. Buyer must determine for itself, by preliminary tests or otherwise, the suitability of this product for its purposes, including mixing this product with other products. The information contained herein supersedes all previously issued bulletins on the subject matter covered.