

MAYZO

Benefos[®] 1680
Phosphite Stabilizer



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Benefos[®] 1680 Phosphite Stabilizer

Introduction: Benefos[®] 1680 is a phosphite type antioxidant of low volatility and extremely resistant to hydrolysis. This secondary antioxidant provides excellent heat stability and antioxidation, with good compatibility with resins and excellent extraction resistance. Benefos[®] 1680 performs best when combined with a primary antioxidant (i.e. BNX[®] 1010 or BNX[®] 1076).

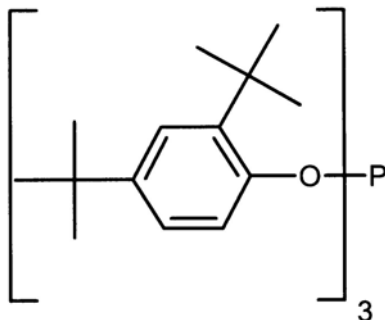
Material Description: Phosphite Stabilizer

Chemical Name: Tris(2, 4-di-tert-butylphenyl)phosphite

Empirical Formula: C₄₂H₆₃O₃P

CAS #: 31570-04-4

Chemical Structure:



| | | |
|-----------------------------|----------------------------------|------------------------------------|
| Physical Properties: | Molecular Weight: | 647 |
| | Melting Range | 183 - 187 °C |
| | Assay: | 99% Min. |
| | Volatile Matter: | < 0.3% Max |
| | Specific Gravity (20°C): | 1.03 g/m ³ |
| | Vapor Pressure (20°C): | 1 x 10 ⁻¹⁰ mm Hg |
| | Solubility (10 g/100ml Toluene): | Clear (25°C) |
| | Decomposition Temperature: | > 300°C |
| | % Transmittance: | 425nm – 97% Min 500nm – 98% Min |

Solubility at 20°C (g/100ml solvent):

| Solvent | Solubility |
|---------------|------------|
| Acetone | 1.8% |
| Benzene | 34% |
| Chloroform | 36% |
| Cyclohexane | 16% |
| Ethyl Acetate | 4% |
| n-Hexane | 11% |
| Methanol | < 0.01% |

| | |
|--------------------|---------|
| Methylene Chloride | 36% |
| Toluene | 40.5% |
| Water | < 0.01% |

Applications:

This secondary antioxidant when combined with Mayzo's antioxidants, address a broad range of stabilization needs. Benefos[®] 1680, is an organophosphite of low volatility and particularly resistant to hydrolysis and provides excellent protection to organic polymers which are prone to oxidation. It is particularly useful in polyolefins and olefin-copolymers such as polyethylene, polypropylene, polybutene and ethylene vinyl acetate copolymers as well as polycarbonate and polyamides. Other applications include use in linear polyesters, high impact polystyrene, ABS, SAN, adhesives, natural and synthetic tackifier resins, elastomers such as BR, IR, and other organic substrates. Benefos[®] 1680 can also be used in combination with UV absorbers and light stabilizers to provide enhanced performance.

Advantages:

- Extends performance of primary antioxidants (i.e. BNX[®] 1010 or BNX[®] 1076)
- Highly compatible with a wide range of organic substrates
- Improvement of long-term stability
- Low volatility
- Maintenance of original melt flow
- Prevents discoloration
- Protects polymers from chain scission and crosslinking
- Resistant to hydrolysis

Loading**Instructions:**

The loading data and results are based on laboratory work (and field testing) under controlled conditions and do not necessarily indicate the result that the buyer or user will attain. For this reason we strongly recommend testing of your own system under the actual conditions of processing and end-use prior to full scale testing. The recommended loading concentrations range between 0.05% and 0.25% when combined with the appropriate levels of antioxidants. The specific loading concentration of Benefos[®] 1680 in polyolefins range between 0.1% and 0.25% when combined with the appropriate levels of other additives. Loading levels will vary depending on substrate and processing conditions. Exact loading must be determined by compositions of the specific polymer system.

Packaging:

Benefos[®] 1680 is available in powder form in a 50 kg (110.2 pound) fiber drum, net weight, with an inner PE liner.

Storage:

This product may be stored up to two years in a sealed container. Containers should be stored in a cool, dry area. Extended storage at elevated temperatures or exposure to direct heat or sunlight could reduce product life. Keep containers sealed when not in use.

Toxicity & Safety:

This material is not intended for use in products for which prolonged contact with mucous membranes or abraded skin, or implantation within the human body is specially intended, unless the finished product has been tested in accordance with the Food and Drug Administration and/or other applicable safety testing requirements. Because of wide range of such potential uses, Mayzo, Inc. is not able to recommend this material as safe and effective for such uses and assumes no liability for any such uses. Read and understand the Material Safety Data Sheet before using or handling this product. Benefos[®] 1680 is considered to be a hazardous chemical under the OSHA Hazard Communication (29 CFR 1910.1200).

FDA Regulations: Supplement

| <u>Existing Regulations</u> | <u>Maximum Concentration</u> | <u>Thickness</u> | <u>Food Allowed</u> | <u>Temperatures Allowed</u> |
|---|------------------------------|--|--|--|
| Stabilizer for polymers, 178.2010 Tris (2,4-di-tert-butylpheny) phosphite | | | | |
| Olefin polymers complying with 177.1520 (c), item 1.1, 1.2, or 1.3 | 0.25% | no restrictions | no restrictions | no restrictions |
| Olefin polymers complying with 177.1520 (c), item 2.1, 2.2, or 2.3, where the density of such polymers is ≥ 0.94 g/cc | 0.2% | ≤ 2 mil | no restrictions | no restrictions |
| Olefin polymers complying with 177.1520 (c), item 2.1, 2.2, or 2.3, where the density of such polymers is < 0.94 g/cc | 0.2% | > 2 mil | no restrictions | room temperature or below fill and storage |
| Olefin polymers complying with 177.1520 (c), item 3.1 or 3.2 | 0.2% | no restrictions | no restrictions | no restrictions |
| Olefin copolymers complying with 177.1520 (c), item 3.3 | 0.5% | no restrictions | no restrictions | 250°F |
| Olefin polymers complying with 177.1520 (c), item 4 | 0.2% | ≤ 2 mil | no restrictions | no restrictions |
| Olefin polymers complying with 177.1520 (c), item 4 | 0.2% | > 2 mil | no restrictions | room temperature or below fill and storage |
| Polycarbonate resins complying with 177. 1580 | 0.3% | no restrictions | no restrictions | no restrictions |
| Elastomers used in rubber articles complying with 177.2600 | 0.5% | no restrictions | no restrictions | no restrictions |
| Nylon resins complying with 177.1500 | 1% | no restrictions | no restrictions | room temperature or below fill and storage |
| Polystyrene and rubber modified polystyrene complying with 177.1640 | 0.2% | no restrictions | no restrictions | 212°F max. |
| Ethylene-vinyl acetate copolymers complying with 177.1350 | 0.2% | no restrictions except for fatty foods for fatty foods | no restrictions except for fatty foods | Room temperature or below fill and storage |
| <i>The average thickness of such polymers in the form in which they contact fatty foods shall not exceed 4 mls</i> | | | | |
| Poly-1-butene resins and butene ethylene copolymers complying with 177.1570 | 0.15% | no restrictions | no restrictions | 212°F max |
| Acrylic and modified acrylic plastics, semi-rigid and rigid, complying with 177.1010 | 0.5% | no restrictions | no restrictions | no restrictions |
| Isobutylene polymers complying with 177.1420 | 0.1% | no restrictions | no restrictions | no restrictions |
| Adhesives complying with 175.105 | no restrictions | no restrictions | no restrictions | no restrictions |
| Pressure sensitive adhesives complying with 175.125 | 0.5% | no restrictions | no restrictions | no restrictions |
| Can end cements complying with 175.300 (b) (3) (xxxii) | 0.5% | no restrictions | no restrictions | no restrictions |
| Side seam cements complying with 175.300 (b) (3) (xxxii) | 0.5% | no restrictions | no restrictions | no restrictions |
| Petroleum alicyclic hydrocarbon resins complying with 175.320 (b) (3) | 0.5% | no restrictions | no restrictions | no restrictions |
| Petroleum alicyclic hydrocarbon resins or their hydrogenated products complying with 176.170 (b) (2) | 0.5% | no restrictions | no restrictions | no restrictions |
| Resins and polymers complying with 176.180 | 0.5% | no restrictions | no restrictions | no restrictions |
| Rosins and rosin derivatives complying with 176.210 (d) (3) | 0.5% | no restrictions | no restrictions | no restrictions |
| Closures with sealing gaskets complying with 177.1210 | 0.5% | no restrictions | no restrictions | no restrictions |
| Petroleum hydrocarbon resins, rosins, and rosin derivatives complying with 178.3800 (b) | 0.5% | no restrictions | no restrictions | no restrictions |

| <u>Existing Regulations</u> | <u>Maximum Concentration</u> | <u>Thickness</u> | <u>Food Allowed</u> | <u>Temperatures Allowed</u> |
|--|------------------------------|------------------|---------------------|-----------------------------|
| Reinforced wax complying with 178.3850 | 0.5% | no restrictions | no restrictions | no restrictions |

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