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PRODUCT DATA SHEET

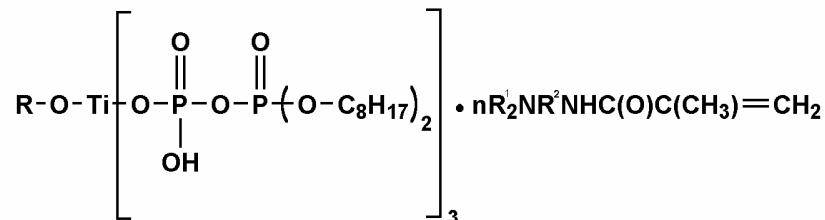
BIOchem[®] C-3 PT20

BIOchem[®] C-3 PelleT Masterbatch Form of **20%** Active in LLDPE Binder *

*Binder = 11% Hydrated Amorphous Silica (CAS #112926-00-8) / 69% LLDPE (CAS#25087-34-7)

CHEMICAL DESCRIPTION: neopentyl(diallyl)oxy, tri(dioctyl)pyrophosphato titanate (adduct) N-substituted methacrylamide or (CAS # 117002-37-6) (Titanium IV 2,2 (bis 2-propenolatomethyl)butanolato, tris (dioctyl) pyrophosphato-O (adduct) 3 moles N, N-dimethylamino-alkyl propenoamide) or Titanate (3-), [P,P-bis(2-ethylhexyl) diphosphato (2-)-κO''']bis[P,P-bis(2-ethylhexyl) diphosphato (2-)-κO'', κO'''''] [2,2-bis[(2-propenyloxy) methyl]-1-butanolato- κO]-, trihydrogen compound with N-[3-(dimethylamino) propyl] -2-methyl -2-propenamido (1:3)

CHEMICAL STRUCTURE:



TITANATE TYPE: Neoalkoxy

TYPICAL PROPERTIES:

Physical Form
Activity
Color, descriptive

BIOchem C-3 PT20 PROPERTIES
Solid Pellet or Chip
20% BIOchem C-3 Titanate
Off-White Pellets

Physical Form
Solids (in IPA Solvent), %
Color – Descriptive
Gardner
Viscosity, cps @ 25°C (77°F)
Specific Gravity @ 16°C (60°F)
Flash Point, °F (TCC)
Initial Boiling Point, °F, ASTM
pH (saturated solution)

20% BIOchem C-3 PROPERTIES
Liquid
99+
Reddish Brown
18
2,000 – 8,000
1.05± 0.04
160
220
7.5 – 9.5

BIOchem C-3 PT20 is a palletized dispersion, 20% active in LLDPE, that, under anaerobic landfill conditions of warmth, moisture, darkness and little or no oxygen, enables anaerobic microbes to consume the polymer and organic additives, as described in US 7,390,841. In the process, the microbes convert the composition to biomass, methane, CO₂ – and soluble chloride salts when halogenated polymers, such as PVC, are being consumed. Under aerobic conditions of oxygen and light, BIOchem additives will not affect durability and will behave as beneficial titanate coupling agents, aiding dispersion and processability.

Applicable Polymers – BIOchem C-3 PT20 has been shown to work in PVC, CPE and PVC copolymers, with no evidence of chlorine-containing compounds released into the gas phase. The conversion of chlorine content to soluble chloride has been shown to improve the fertilizer value of the solid phase. Efficacy has been also demonstrated with styrenics and polyolefins. Work is ongoing. BIOchem is not effective in PET.

Use Level – Generally, 5.0 phr (parts per hundred of resin) BIOchem C-3 PT20 will enable landfill biodegradation of a thin sheet of plastic in a few weeks. Thicker parts may require 10.0 phr. The more surface area to the plastic part, the shorter the time to biodegradation. If the use of LLDPE as the binder is not appropriate, others, such as EVA, can be supplied – a minimum run of 500 lbs. is required.

Biocides Inhibit BIOchem – Since BIOchem functions by enabling microbes to consume plastics, biocides will inhibit effectiveness. For example, zinc-based stabilizers inhibit landfill biodegradation because they are known biocides. BIOtech can provide suggestions as to heat stabilizers appropriate for specific applications.

Phthalocyanine pigments inhibit landfill biodegradation and should be avoided. BIOtech can provide suggestions for replacements. In polyolefins, color forming antioxidants, such as BHT and Bisphenol, should be avoided in favor of high efficiency stabilizers, such as Irganox® 1010.

Product Forms – BIOchem C-3 comes in three forms: BIOchem C-3 LD100 (LiquiD-100% active); BIOchem C-3 PD65 (PowDer-65% active); & BIOchem C-3 PT20 (PelleT-20% active).

Processing Considerations – BIOchem C-3 PT20 should be dispersed uniformly throughout the polymer matrix by blending with other compound pellets or fed gravimetrically just like a color concentrate. Since BIOchem C-3 PT20 has the favorable effect of increasing polymer flow while not diminishing mechanic properties, it is necessary to reduce process temperatures ~6% to maintain reactive compounding shear. Using torque as a guide: compound, extrude or mold to equivalent Work Energy (the Area under the Torque vs. Time Curve). In PVC, lubrication packages and plasticizer levels (up to 18%) may have to be reduced. Also, since the IBP of BIOchem C-3 is 220°F (104°C), it is advisable to keep the hopper and first zone of the extruder below 220°F (104°C) to allow the BIOchem C-3 to be dispersed into the heat sink of the polymer. Temperatures can be raised in subsequent zones to ~6 % lower than normal.