

DuPont™ Tyzor® Organic Titanates

Product Information - Tyzor® TOT

Description

DuPont™ TYZOR® TOT Tetra-2-ethylhexyl Titanate
CAS: 1070-10-6

titanium tetrakis(2-ethylhexanolate)-6 is a highly reactive organic alkoxy titanate with 100 % active content. TYZOR® TOT is a colorless to yellowish organic flammable liquid. It is very sensitive to moisture. Main use of TYZOR® TOT is for catalysis and surface modification.

TYZOR® TOT is soluble or miscible with many organic solvents or products.. Examples of solvents are: aliphatic and aromatic hydrocarbons, alcohols, esters, ketones; (e.g. butanol, ethylacetate, acetone, hexane, heptane, toluene). To prevent undesired pre-reactions the products must be anhydrous.

Typical Properties of TYZOR® TOT *

Property	Value	Unit
Molecular weight	565	g/mol
TiO ₂ content	ca. 14.0	%
Content	100	%
Density (20 °C)	ca. 0.937	g/cm ³
Viscosity (20 °C)	ca. 140	mPa*s
Refractive index (20 °C)	ca 1.482	
Pour point	ca -49	°C
Flash point	ca. 50	°C

* This table gives typical properties. DuPont does not make any express or implied warranty that these products will continue to have these typical properties.

Reactions

TYZOR® TOT reacts very fast with water under hydrolysis forming 2-ethylhexanol and hydrous titanium dioxide. An exchange of alkoxy groups occurs but more slowly than with TYZOR® TPT or TNBT. TYZOR® TOT acts as Lewis acid catalyst under mild conditions in many applications such as esterification or transesterification, polycondensation etc. The high reactivity of TYZOR® TOT enables

the interaction with low reactive functional groups such as OH or COOH groups of polymers, mineral substrates or metals effecting coating, adhesion promotion or cross-linking of polymers. Thermal treatment at > 350 °C of TYZOR® TOT films and coatings gives TiO₂ with very thin TiO₂ layers on different substrates such as glass, minerals, pigments, metals.

Applications

TYZOR® TOT is used in many applications as a catalyst or as an additive:

- ◆ **Esterification Catalyst**
(Plasticizer, different esters) elimination of by products, high yield, easy work up
- ◆ **Transesterification Catalyst**
((meth)acrylic esters & polyester for different applications such as fibers, films, UP resins, paint binder with different esters) mild conditions, no by products, high yield, easy work up, low catalyst concentrations
- ◆ **Coating Additive**
Treatment of glass, metal, filler, pigment. Increased surface hardness, adhesion promotion, improved dispersibility, coloring effects, heat and light reflection, iridescence, hydrophobation, corrosion resistance
- ◆ **Paint additive**
crosslinking of paint binders, adhesion promotion, binder for high temperature paints
- ◆ **Source of Oxides via sol-gel process:**
simple process for special oxides as coatings, glasses or for encapsulating of different materials

Functions

TYZOR® TOT can be used as additive, as coating primer or in sol-gel systems as the base material.

- **Catalyst:** As esterification catalyst TYZOR® TOT is used in an amount of ca 0.01-1 %. The titanate is often added as the last ingredient of the reaction components to prevent undesired pre-reactions. Transesterifications run at low temperatures < 100 °C. Esterifications (e.g. plasticizer preparation) need temperatures of > 180 °C. For Ziegler-Natta catalysis TYZOT TOT is mainly used in combination with Al compounds.
- **Crosslinking:** For cross-linking reactions TYZOR® TOT is added to the polymer / binder in concentrations of ca. 0.5 - 5 %. The reactivity of TYZOR® TOT is very high, depending on the polymer sometimes other less reactive TYZOR® products have to be used.
- **Coating:** Titanium dioxide layers can be prepared by thermal or hydrolytic processes. Thermal decomposition occurs at > 350 - 600 °C. By spraying, dipping or brushing of

the substrate from solutions and subsequent hydrolysis by moisture TiO₂ layers are formed.

- **Primer:** As primer TYZOR® TOT is applied normally in very low concentrations of ca. 0.1-5 % in an organic solvent. Heating after appliance to ca. 80-100 °C for a short time might be of advantage.
- **Sol-Gel:** Total or partial hydrolysis of TYZOR® TOT preferably in the presence of chelating agents or in combination with other metal alkoxides affords via a sol-gel step metal oxides for use as binder or coating.

Contact Information:

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