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Technical Information
THIOCURE® PCL4MP 1350

Description

THIOCURE® PCL4MP 1350 is a polymeric, tetrafunctional thiol with medium viscosity. It reacts with epoxy- and isocyanate groups as well as with unsaturated compounds.
The number at the end of the product name indicates the approximate molecular weight of the polythiol.

Chemical Description

Polycaprolactone Tetra(3-mercaptopropionate)

Applications

THIOCURE® PCL4MP 1350 is recommended to improve the flexibility of solvent based paints, but particularly for solvent free coatings, castings and adhesives. Already 5-10 % of the total formulation affects significantly the flexibility of the system.

THIOCURE® PCL4MP 1350 is used for example with epoxy resins in casting compounds, floorings and resin-based mortars for the construction industry, as well as in casting- or potting compounds, adhesives and sealants for the electronic industry. Catalysts such as tertiary amines are of essential importance in this process, but mixtures of THIOCURE® PCL4MP 1350 with amine are prone to degradation reducing the shelf-life time significantly.

For thiourethane-, respectively polyurethane-systems THIOCURE® PCL4MP 1350 can be used in combination with other polythiols or polyols.

In thermal or radiation cured thiol-ene formulations THIOCURE® PCL4MP 1350 can be used (preferably blended with tougher and highly reactive types like THIOCURE® PETMP, TMPMP, TEMPIC) together with acrylates, vinyl-, allylethers etc.. Thiol-ene systems which react via radical initiation and step-growth polymerization do not show oxygen inhibition and provide lower shrinkage compared to standard UV cured systems reacting via chain-growth polymerization.
As a modifier in standard radiation curing systems THIOCURE® PCL4MP 1350 can improve film flexibility.

General Information, Distinctive Feature

THIOCURE® PCL4MP 1350 shows the highest functionality and reactivity of all polymeric thiols like THIOCURE® ETTMP 700, ETTMP 1300 and PPGMP 2200, but also highest viscosity.
The impact on flexibility and mechanical properties are about the same as for ETTMP 700, the benefit lies in the slightly higher reactivity and better resistance.

Compared to monomeric mercaptopropionates like THIOCURE® PETMP, TMPMP, GDMP and TEMPIC it has a significantly lower reactivity.

Solubility

THIOCURE® PCL4MP 1350 can be diluted with most organic solvents such as esters, glycol ethers, alcohols and aromatic hydrocarbons. However, the solutions must be tested for their storage stability.
THIOCURE® PCL4MP 1350 is not miscible with water.

Formulation and Processing Information

- Calculation of hardener content for Epoxy resins:

  THIOCURE® [g] = Epoxy value x SH-equivalent
  (Epoxy value = 100/EP-Equivalent weight)

- Calculation of required Isocyanate-hardener:

$$\text{Isocyanate [g]} = \frac{\text{amount THIOCURE® [g] x SH-content [\%] x 42}}{\text{33 x NCO-content [\%]}}$$

- Chemical conversion with double bonds (e.g. acrylate monomers, -oligomers etc.):

  1 mol SH per mol double bond

During the formulating and the processing of products containing THIOCURE® PCL4MP 1350, care should be taken to avoid heavy metal contamination, especially with iron and nickel, which can lead to discoloration in clear coats and affect the reactivity of the system.

Specifications

Parameter	Unit	Range	Method	SOP-No.
Appearance		Clear to turbid, colorless to faint yellowish	Visual (5cm optical path)	
Mercapto Sulfur	%w/w SH	min. 8.8	Iodometric	PA-QW-303
Acid number	mg KOH/g	max. 10.0	Alkalimetric	PA-QW-302
Color Number	APHA	max. 200	Hazen	PA-QW-013

Other Properties

Parameter	Unit	Range	Method	SOP-No.
Density d^{20}_4	g/cm³	1.145 – 1.160	Oscillating Density Meter	PA-QW-005
H-Equivalentweight	g/mol	348 - 375	calculated	--
Nonvolatile content	% w/w	> 99.0	DIN EN ISO 3251 (1h 125°C)	--
Viscosity	mPas	1500 ± 500	Rotational Viscometer DIN 53019, 20°C	--

Handling, Storage conditions and Shelf-life

Consult the appropriate Material Safety Data Sheet for safety and handling guidelines for this product.

Storage at room temperature up to +25 °C maximum is recommended.

THIOCURE® PCL4MP 1350 can be stored for at least 6 month from the date of manufacture if kept closed in the original packaging. Expiration of shelf life time does not necessarily mean the product is no longer usable. However, prior to using THIOCURE® PCL4MP 1350 we recommend testing it and verifying that it still meets the specification.

THIOCURE® PCL4MP 1350 should be stored in the original container. Alternatively, packaging in glass, HDPE, PP or inside-coated packaging can be used. Opened packaging should be closed tightly after use

Standard Packing

41142	PE-Can	35.0	kg	net
41xxx	PE-Drum	240.0	kg	net
41xxx	IBC	1,150.0	kg	net

Regulatory Status

	Europe	Australia	China	Japan	Canada	Korea	New Zealand	Philip-pines	USA	Taiwan
	REACh	AICS	IECSC	ENCS	DSL	ECL	NZIoC	PICCS	TSCA	CSNN
THIOCURE® PCL4MP 1350	Polymer	-	+	-	-	-	-	-	-	-

+ = registered
- = not registered
n/a = not applicable

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