

Technical Data Sheet (TDS)

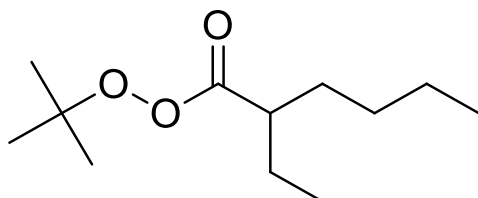
TBPEH
Thermoset (TS)



TBPEH

tert-Butyl peroxy-2-ethylhexanoate
CAS#3006-82-4
Colourless liquid

Structural Formula



Description

Colourless liquid, consisting of technically pure *tert*-butyl peroxy-2-ethylhexanoate.

This branched, aliphatic perester functions as a radical initiator in curing process of unsaturated polyester resins at 70 - 150 °C and can be used in combination with cobalt accelerators if required.

Technical Data

| | |
|--|--------------------------------|
| Appearance | colourless liquid |
| Assay | approx. 99 % w/w |
| Active oxygen (AO) | approx. 7.32 % w/w |
| Density at 20 °C | approx. 0.90 g/cm ³ |
| Viscosity at 20 °C | approx. 4 mPa·s |
| Refractive index at 20 °C | approx. 1.428 |
| Flash point | approx. 78 °C |
| Vapour pressure at 20 °C | approx. 0.02 mbar |
| Critical temperature (SADT) | approx. 35 °C |
| Cold storage stability | approx. - 25 °C |
| Recommended storage temperature | max. 10 °C ● |
| Maximum transport temperature | 20 °C |
| Storage stability as from date of delivery | 3 months |

Standard Packaging

5 kg / 15 kg / 25 kg in HDPE canister

Half-life Data

10 h / 1 h / 1 min (benzene, 0.1 mol/L) 74 °C / 92 °C / 130 °C

Application

POLYESTERCURING:

Curing agent for UP resins, possibly in combination with cobalt accelerators
Temperature range: 70 - 150 °C

Usage level: 1 - 2 %, possibly together with 0.5 - 1 % cobalt accelerator

"Shelf life"(gel time of resin + peroxide) at ambient temperature several weeks,
(depending on resin type, filler, pigment)

"Pot life" (gel time of resin + peroxide + accelerator) up to several days
(depending on temperature and peroxide level)

Shelf or pot life can be prolonged considerably by adding 0.1 - 0.3 %
Inhibitor BC 500.

CURING CHARACTERISTICS:

In the range of 65 - 75 °C ("kick-off" temperature) the curing rate is not very high
unless there is an exothermic reaction (e.g. within a heat-retaining mould). Short
cure times of a few minutes can be achieved only in the optimum temperature
range for wet press moulding at 110 - 130 °C.

PROCESSING METHODS:

- Impregnating (paper laminates)
- Wet or hot press moulding
- Surface coating with wood varnishes
- Dripping electrical insulating varnishes with infrared heating

Decomposition Products

Possible detectable decomposition products: *tert*-butyl alcohol; acetone, 2-
ethylhexanoic acid, heptane, 2-heptene

Storage

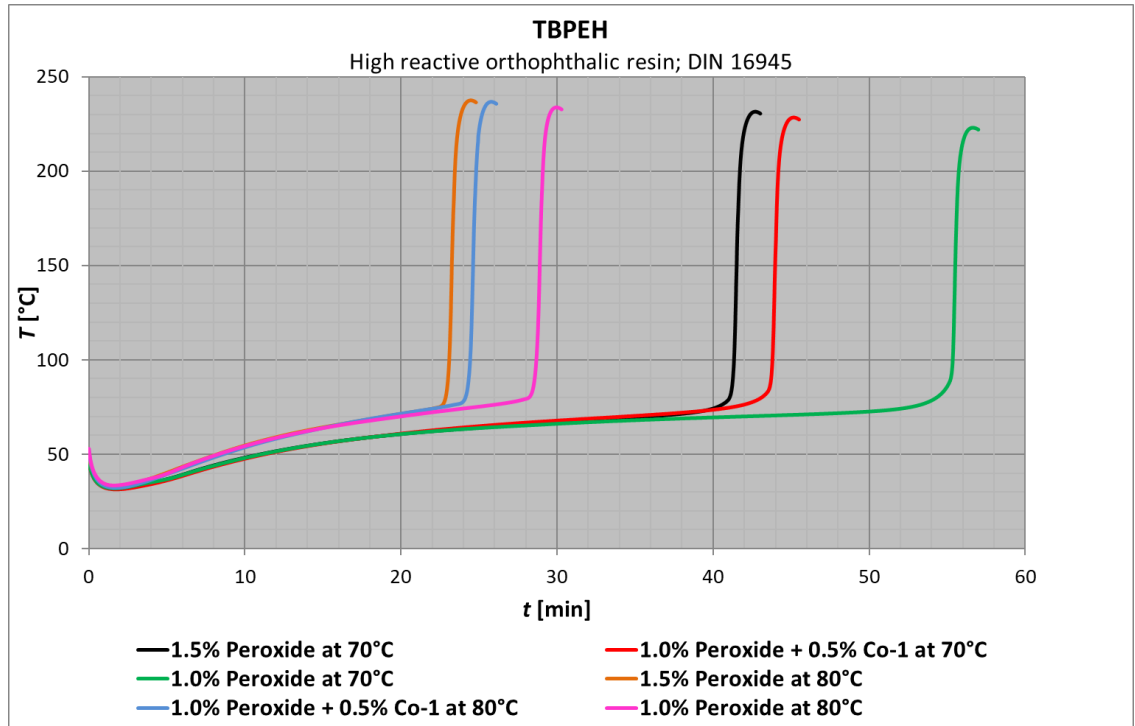
Avoid any source of heat, light, humidity and protect the product from impurities.
Keep within save temperature limits.

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Measurements



| Formulation (parts per weight) | | | | | | | |
|---------------------------------------|---------|------|------|------|------|------|------|
| Resin | | 100 | 100 | 100 | 100 | 100 | 100 |
| TBPEH | [Vol-%] | 1.5 | 1.0 | 1.0 | 1.5 | 1.0 | 1.0 |
| Co-1 | [Vol-%] | | 0.5 | | | 0.5 | |
| Curing Data | | | | | | | |
| Gel time +5 °C t_{gel} | [min] | 40.3 | 41.2 | 52.6 | 23.0 | 24.3 | 28.5 |
| Curing time t_{max} | [min] | 42.7 | 45.2 | 56.6 | 24.5 | 25.8 | 30.0 |
| Peak temperature T_{max} | [°C] | 232 | 229 | 223 | 238 | 237 | 234 |

ACTIVITY for SMC:

Influence of temperature and peroxide dosage on curing performance and degree of cure. Hot press moulding of 16 mm thick SMC pellets and 3 mm thick SMC sheets.

| | | | | | | | | |
|--|------|------|------|------|------|------|------|------|
| Moulding tool temperature [°C] | 120 | 120 | 130 | 130 | 140 | 140 | 150 | 150 |
| Standard SMC (resin proportion) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| TBPEH [%] | 1.1 | 2.2 | 1.1 | 2.2 | 1.1 | 2.2 | 1.1 | 2.2 |
| Curing performance (SMC pellets) | | | | | | | | |
| Flow time [min] | 1.05 | 0.90 | 0.90 | 0.80 | 0.70 | 0.65 | 0.60 | 0.55 |
| Time to peak temperature T_{max} [min] | 1.75 | 1.50 | 1.45 | 1.25 | 1.20 | 1.10 | 1.00 | 0.95 |
| Maximum peak temperature (T_{max}) | 157 | 158 | 165 | 162 | 167 | 164 | 168 | 165 |
| Degree of cure (SMC sheets) | | | | | | | | |
| Barcol hardness (934) | 15 | 20 | 20 | 20 | 25 | 25 | 30 | 30 |
| Residual styrene content [%] | 2.0 | 1.2 | 0.9 | 0.7 | 0.7 | 0.4 | 0.5 | 0.3 |

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