

## NOROX<sup>®</sup> 400

tert. Butylperoxy-(2-ethylhexyl)carbonate  
CAS#34443-12-4  
Liquid, technically pure

### Structural Formula

### Description

Colourless, mobile liquid, consisting of technically pure tert. butylperoxy-(2-ethyl-hexyl) carbonate. This thermally stable mono-perester of the carbonic acid is used as an initiator (radical source) in the curing of unsaturated polyester resins. Main application: hot press moulding of SMC or BMC at 130-160°C.

### Technical Data

Appearance	colourless liquid
Peroxide content	ca. 99 % w/w
Active oxygen	ca. 6.43 % w/w
De-sensitising agent	none
Density at 20°C	ca. 0.93 g/cm <sup>3</sup>
Viscosity at 20°C	ca. 6 mPa•s
Refractive index at 20°C	ca. 1.428
Critical temperature (SADT)	ca. 70 °C
Cold storage stability	to below -30 °C
Kick-off temperature	ca. 90 °C
Recommended storage temperature	below 30 °C
Maintenance of activity as from date of delivery	3 months

This product is in compliance with the ElektroG (EU-Directives: RoHS 2002/95/EG, WEEE 2002/96/EG)

### Half-life Data

10h/1h/1min (0.1 m / benzene): 100/122/175 °C

### Application

#### POLYESTER CURING:

Curing agent for all types of UP resins. Temperature range: 130-160°C. Usage level: 1-2% as supplied. "Shelf life" (gel time of resin + peroxide) several weeks or months at ambient temperature. Sensitive to some fillers and heavy metal salts. "Shelf life" can be considerably prolonged by adding 0.1-0.3% Inhibitor BC-500.

#### CURING CHARACTERISTICS:

In the range of 85-95°C ("kick-off" temperature) the curing rate is not very high unless there is a reaction exotherm (e.g. within a heat retaining mould). Short

cure times of a few minutes can be achieved only in the optimum temperature range for hot press moulding at 130-160°C.

**PROCESSING METHODS:**

In particular hot press moulding of SMC or BMC, impregnation (dipping) of wire windings (e.g. transformers).

**Measurements**

**Activity**

Influence of temperature and peroxide dosage<sup>1)</sup> on curing performance and degree of cure. Hot press moulding of 16 mm thick SMC pellets and 3 mm thick SMC sheets.

Temperature of mould	130°C	130°C	140°C	140°C	150°C	150°C	160°C	160°C
Formulation (parts of weight)								
Standard SMC (resin proportion)	100	100	100	100	100	100	100	100
Norox® 400	1.25	2.5	1.25	2.5	1.25	2.5	1.25	2.5
Curing performance (SMC pellets)								
Flow time (min)	1.2	1.05	0.95	0.8	0.65	0.6	0.55	0.45
Time to peak tmax (min)	2.4	2.1	1.7	1.6	1.4	1.2	1.2	1.1
Peak exotherm Tmax (°C)	191	189	194	194	196	198	198	199
Degree of cure (SMC sheets <sup>2)</sup> )								
Barcol (934) hardness	10	15	15	20	20	25	30	30
Residual styrene content (%)	0.3	0.1	0.04	0.01	0.02	0.01	0.07	0.01

<sup>1)</sup>The amounts added are equivalent to 1% or 2% w/w techn. pure t-butyl perbenzoate

<sup>2)</sup>The press cycles for the SMC sheets are equal to the tmax. of the corresponding SMC pellets.

Further information on suitable curing agents for unsaturated polyester resins is given in our application brochures on this subject.

## Packaging

Standard packaging of Norox 400 is 25 kg.

## Disclaimer

This information and all further technical advice are reflecting our present knowledge and experience based on internal tests with local raw materials with the purpose to inform about our products and applications. The information should not be construed as guaranteeing specific properties of products described or their suitability for a particular application, nor as providing complete instructions for use. The information implies no guarantee for product and shelf life properties, nor any liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. We reserve the right to make any changes according to technological progress or further developments.

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