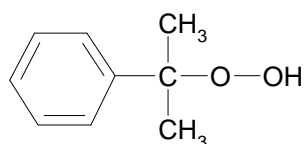




Trigonox[®] K-90

Product description Cumyl hydroperoxide, 90% in aromatic solvent mixture



Molecular weight : 152.2
 Active oxygen content peroxide : 10.51%
 CAS No. : 80-15-9
 EINECS/ELINCS No. : 201-254-7
 TSCA status : listed on inventory

Specifications Appearance : Clear liquid
 Assay : 87.0-90.0%
 Color : 200 Pt-Co max.
 Active Oxygen : 9.14-9.46%

Characteristics Density, 20°C : 1.06 g/cm³
 Viscosity, 20°C : 10.9 mPa.s

Storage Due to the relatively unstable nature of organic peroxides a loss of quality can be detected over a period of time. To minimize the loss of quality, AkzoNobel recommends a maximum storage temperature (T_s max.) for each organic peroxide product.

For *Trigonox* K-90 T_s max. = 40°C and
 T_s min. = -30°C to prevent crystallization

When stored under these recommended storage conditions, *Trigonox* K-90 will remain within the AkzoNobel specifications for a period of at least 3 months after delivery.

Thermal stability Organic peroxides are thermally unstable substances, which may undergo self-accelerating decomposition. The lowest temperature at which self-accelerating decomposition of a substance in the original packaging may occur is the Self-Accelerating Decomposition Temperature (SADT). The SADT is determined on the basis of the Heat Accumulation Storage Test.

For *Trigonox* K-90 SADT : 70°C

The Heat Accumulation Storage Test is a recognized test method for the determination of the SADT of organic peroxides (see Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria - United Nations, New York and Geneva).

Major decomposition products Acetophenone, 2-Phenylisopropanol, Methane

Packaging and transport

Trigonox K-90 is packed in a 30-liter HDPE can (Nourytainer®) for 25 kg peroxide and 200 kg steel drums of 180 kg net weight.

Both packaging and transport meet the international regulations. For the availability of other packed quantities contact your AkzoNobel representative.

Trigonox K-90 is classified as Organic peroxide type F; liquid, Division 5.2; UN 3109; PG II.

Safety and handling

Keep containers tightly closed. Store and handle *Trigonox* K-90 in a dry well-ventilated place away from sources of heat or ignition and direct sunlight. Never weigh out in the storage room.

Avoid contact with reducing agents (e.g. amines), acids, alkalis and heavy metal compounds (e.g. accelerators, driers and metal soaps).

Please refer to the Material Safety Data Sheet (MSDS) for further information on the safe storage, use and handling of *Trigonox* K-90. This information should be thoroughly reviewed prior to acceptance of this product.

The MSDS is available at www.akzonobel.com/polymer.

Applications

Trigonox K-90 may be used as curing agent for unsaturated polyester resins.

Without the addition of an accelerator the polymerization starts only above the activation temperature of 90°C. For the cure at lower temperature *Trigonox* K-90 must be accelerated by cobalt or vanadium. Together with cobalt accelerators the gel time at room temperature is very long and is therefore particularly suitable for those applications where a long production time is required, for instance in the production of large parts and in filament winding. Sufficiently fast gel and cure times are only obtained above 35°C.

Together with vanadium accelerators *Trigonox* K-90 gives a short gel time and a fast cure at room temperature. This can be improved further by adding a special promotor, like pyruvic acid. With such a system it is possible to get a fast cure of UP resins, even at low temperature. Also for resins like vinyl ester resin, these combinations are very suitable.

Dosage

Depending on working conditions, the following peroxide and accelerator dosage levels are recommended:

<i>Trigonox</i> K-90	1 - 3 phr
Accelerator VN-2	0.5 - 3 phr
Accelerator NL-51P	0.1 - 0.5 phr

Cure Characteristics in pure UP resin

In a high reactive standard orthophthalic resin the following characteristics were determined:

Activation temperature

1 phr *Trigonox* K-90 90°C

Gel times at 20°C

1.5 phr *Trigonox* K-90 + 0.5 phr Accelerator NL-51P 1230 min.

The following table indicates the performance of *Trigonox* K-90, in comparison with usual *Butanox*[®] systems, in a vinylester resin:

Vinylester resin	100	100
<i>Trigonox</i> K-90	1.8	-
<i>Butanox</i> LPT	-	2
Accelerator NL-49P	-	2
Accelerator NL-63-10P	-	2
Accelerator VN-2	1	-
Gel time at 20°C (min.)	12	17

Cure at 20°C in 2 mm laminate

Time to achieve a Barcol hardness (934-1) of 25-30 in hours	0.5	1
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Residual styrene (%)		
after 24 hours	4.8	7.1
after 1 month	0.6	4.2

Cure Characteristics at elevated temperatures

The fact that processing times of several hours can be achieved with low cobalt dosages makes *Trigonox* K-90 very suitable for use in e.g. filament winding techniques. Simulating the manufacture of a pipe at 50°C consisting of a laminate of 10 mm with a glass content of 30% and an epoxy vinylester resin gave the following results:

<i>Trigonox</i> K-90	1.8 phr
Accelerator NL-49P	0.25 phr
Gel time at 20°C	330 minutes

Curing data at 50°C

Gel time	62 minutes
Time to Peak	118 minutes
Peak exotherm	117 °C

Barcol hardness (934-1) 10 minutes after reaching the peak: 50.

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