Product Data Sheet

Laurox®

Product description
Dilauroyl peroxide

\[
\text{CH}_3\overbrace{\text{(CH}_2\text{)}}_{\text{10}}\overbrace{\text{O} \overbrace{\text{O}}_{\text{CH}_3\overbrace{\text{(CH}_2\text{)}}_{\text{10}}} \text{CH}_3
\]

Molecular weight : 398.6
Active oxygen content peroxide : 4.01%
CAS No. : 105-74-8
EINECS/ELINCS No. : 203-326-3
TSCA status : listed on inventory

Initiator for the (co)polymerization of styrene, ethylene, vinyl chloride, vinylidene chloride, acrylates and methacrylates.

Specifications
Appearance : White flakes without any contamination
Assay : 99.0% min.
Active Oxygen : 3.97% min.

Characteristics
Bulk density : 0.460 g/cm$^3$
Melting point : 54°C

Half-life data
The reactivity of an organic peroxide is usually given by its half-life ($t_{1/2}$) at various temperatures. For Laurox in chlorobenzene:

\[
\begin{align*}
0.1 \text{ hr} & \quad \text{at } 99°C \\
1 \text{ hr} & \quad \text{at } 79°C \\
10 \text{ hr} & \quad \text{at } 61°C
\end{align*}
\]

The half-life at other temperatures can be calculated by using the following equations and constants:

\[
k_d = A \cdot e^{-E_a/RT} \quad \text{E}_a = 123.37 \text{ kJ/mole}
\]

\[
A = 3.92E+14 \text{ s}^{-1}
\]

\[
t_{1/2} = (\ln 2)/k_d \quad \text{R} = 8.3142 \text{ J/mole-K}
\]

\[
T = (273.15+\text{°C}) \text{ K}
\]

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 Laurox $T_s$ max. = 30°C

When stored under these recommended storage conditions, Laurox will remain within the AkzoNobel specifications for a period of at least three 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 Laurox  SADT : 50°C


Major decomposition products

Carbon dioxide, Docosane, Undecane, Undecyl dodecanoate

Packaging and transport

The standard packaging is a cardboard box for 25 kg peroxide.

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

Laurox is classified as Organic peroxide type D; solid, Division 5.2; UN 3106.

Safety and handling

Keep containers tightly closed. Store and handle Laurox 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 Laurox. This information should be thoroughly reviewed prior to acceptance of this product.

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

Polymerization of vinyl chloride

Laurox is a widely used initiator for the suspension and mass polymerization of vinyl chloride between 60°C and 80°C. In many cases Laurox is combined with a more active initiator, such as a peroxycarbonate (e.g. Perkadox® 16) to increase reactor efficiency.

Conversion/time and conversion rate/time curves are given in Figure 1. These experiments were carried out in a 5-liter reactor, using 0.10% (on VCM) polyvinylalcohol (Alcotex® B72), as a protective colloid.

Conversion and conversion rate are determined by means of gas chromatography applying tracer quantities of n-butane (method available on request).

Figure 1. VCM polymerization at 62°C with Laurox

Polymerization of ethylene

Laurox is used as an initiator for the high pressure polymerization of ethylene, but because of its poor solubility in most aliphatics, it is in many cases replaced by other peroxides such as Di(3,5,5-trimethylhexanoyl) peroxide (Trigonox® 36). The advantage of Laurox is the possibility of storing at ambient temperature.

Polymerization of acrylates and methacrylates

Laurox is also used as an initiator for the polymerization of methylmethacrylate at 60-90°C. Laurox is often applied as a replacement for 2,2’-Azobis(isobutyronitril) (Perkadox AIBN).

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