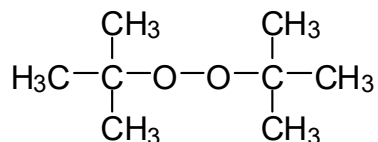


DTBP

Di(tert.-butyl)peroxide
CAS#110-05-4
Liquid, techn. pure
Molar mass: 146.2 g/mol

Structural Formula



Description

Colourless, mobile liquid, consisting of technically pure di-(tert.butyl) peroxide. This highly volatile dialkyl peroxide is used as an initiator (radical source) in the polymerisation of monomers, crosslinking of polyethylene, and rheology control of polypropylene.

Technical Data

| | |
|--|---|
| Appearance | colourless liquid |
| Purity (GC) | > 99% |
| Active oxygen (calculated) | > 10.8% |
| Density at 20 °C | approx. 0.79 g/cm ³ |
| Viscosity at 20 °C | approx. 0.8 mPa.s |
| Refractive index at 20 °C | approx. 1.389 |
| Miscibility | immiscible with water, miscible with organic solvents |
| Vapour pressure at 20/40/110 °C | 25/75/1000 mbar |
| Critical temperature (SADT) | above 80 °C |
| Cold storage stability | liquid to below -25 °C |
| Recommended storage temperature | below 40 °C |
| Storage stability as from date of delivery | 12 months |

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

Half-life-time

10 h/1 h/1 min (0.1 m/benzene): 125/146/190 °C

Application

POLYMER CROSSLINKING:

A peroxidic crosslinking agent for polyethylene (HDPE and LDPE). Crosslinking temperature: above 180°C. At below 150°C no premature crosslinking (scorch) occurs. Usage level: 0.5-2% w/w of product as supplied on the material to be crosslinked.

Special advantages: Extremely effective and relatively scorch free. Volatile, odour free decomposition products, and no blooming of the vulcanisate surface. The high volatility of the product demands that closed systems are applied during compounding and diffusion processes with polyethylene powder. DTBP is used especially in extrusion processes (RAM-Extrusion for pressure pipes)

CR-POLYPROPYLENE:

A radical source to control the rheology of polypropylene. Temperature range: 200°C - 220°C. Dosage level: 0.01% - 0.1% w/w of product as supplied, based on the polymer. This degradation (e.g. in an extruder) lowers the molecular weight mean, and permits easier (re-)processing of the polypropylene.

Table 1: The melt-flow index of the controlled rheology is dependent on the peroxide levels employed. (Table 1).

(Table 2.) Stabilizers, such as phenolic antioxidants and UV-additives can react as radical scavenger and reduce efficiency of the degradation process.

Crosslinking properties of HDPE (LUpolen 4261A):

with Monsanto-Rheometer 100-S (torsionsangle 3°)

| Influence of temperature on crosslinking activity (0.56% DTBP/0.06% AO) | | | | | | | |
|---|-----|-----|-----|-----|-----|-----|-----|
| Temperature [°C] | 150 | 160 | 170 | 180 | 190 | 200 | 210 |
| Scorch-time [min] | 10 | 4.5 | 2.5 | 1.8 | 1.4 | 1.0 | 0.7 |
| Crosslinking time t_{50} [min] | - | 20 | 10 | 5.6 | 3.3 | 2.2 | 1.6 |
| Crosslinking time t_{90} [min] | - | 60 | 25 | 12 | 6.5 | 3.8 | 2.5 |

| Influence of dosage on degree of crosslinking (Temperature: 200 °C) | | | | | |
|---|------|------|------|------|------|
| DTBP [% AO] | 0.03 | 0.06 | 0.09 | 0.12 | 0.15 |
| DTBP[%w/w] | 0.28 | 0.56 | 0.85 | 1.13 | 1.41 |
| Crosslinking time t_{90} [min] | 4.4 | 4.0 | 3.7 | 3.4 | 3.2 |
| Torque Tmax [Nm] | 5.7 | 7.6 | 9.2 | 11 | 12 |
| *) Gel content [%] | 93 | > 99 | > 99 | > 99 | > 99 |
| *) Swelling index | 4.0 | 2.7 | 2.0 | 1.7 | 1.5 |

*) Extraction in xylene: 6 h at 135 °C

“Vis-breaking”-Efficiency

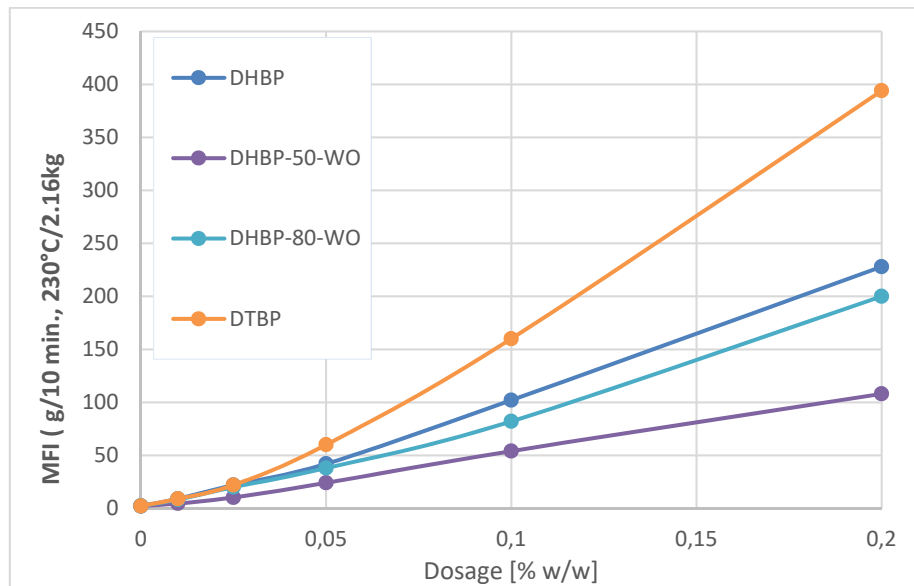


Table 1: Influence of Peroxide dosage
Degradation of an unstabilized standard Polypropylene homopolymer (MFI 2g/10min at 230°C/2.16kg) in a single screw extrusion line at 230°C (40 rpm)

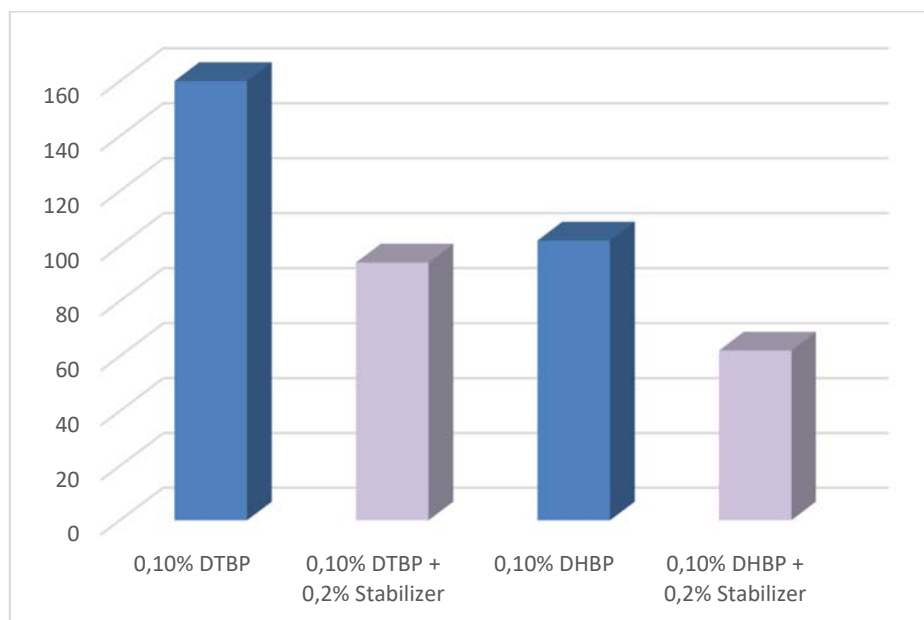


Table 2: Influence of stabilizer package (UV / Antioxidant – combination)
Polypropylene homopolymer (MFI 2g/10min at 230°C/2.16kg) Trials in a single screw extrusion line at 230°C (40 rpm)

Standard Packaging

20 kg (44,1 lb) in polyethylene cans

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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