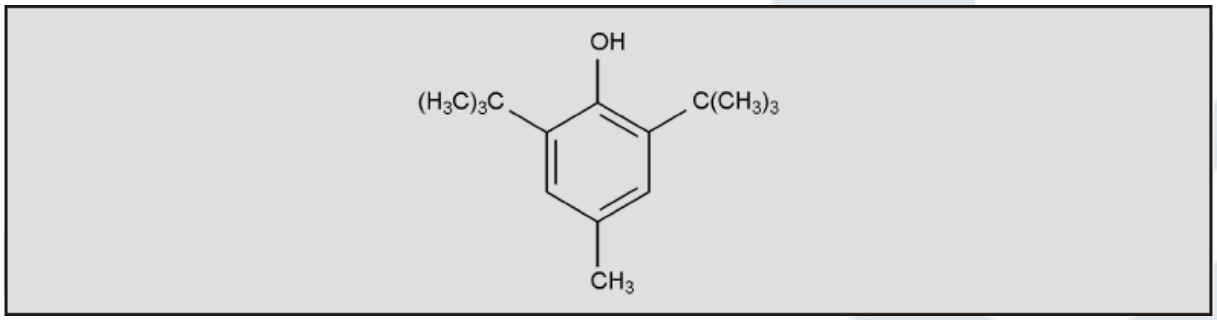
IONOL® CP

$C_{15}H_{24}O$



Synonyms	2,6-Di-tert.-butyl-4-methylphenol
CAS-No.	128-37-0
Molar Mass	220.4 g/mol
Packaging	Standard packaging in: - PE-lined paper bags, 25 kg net, shrink-wrapped on pallets (net weight: 750 kg or 1,000 kg) or 20 kg net, shrink-wrapped on pallets (net weight: 1,000 kg). - fibre kegs, 40 kg net. - big bags, 500 / 1,000 kg net.
Registration	EINECS, TSCA, MITI, DSL
HS-Code	2907 19 90
Storage	IONOL® CP has a 24 months shelf life when properly sealed and stored (in a dry and dark area, at 25 °C). Non-adherance to these requirements may cause yellowing.

Specification

Property	Value	Unit	Method
Purity	min. 99.8	w./w.-%	L_MA_009
Melting point	70 ± 1	°C	L_MA_001
Water content	max 0.12	w./w.-%	L_MA_000 (ASTM E203)
Colour (30 w./w.-% in acetone)	max. 30	apha	L_MA_002 (ASTM D1209)
Sulfate Ash	max. 0.002	w./w.-%	L_MA_003

Safety data, transport regulations and toxicological data are indicated in the safety data sheet.

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Typical Properties

Property	Value	Unit	Method
Appearance (white crystals)			
Boiling point at 1013 hPa	265	°C	
Bulk density	0.66	kg/L	
Density at 80 °C	0.899	g/ml	
Flash point	127	°C	ASTM D93
Refractive index n^{75}_{D}	1.4859		
Solubility in water at 20 °C	1.1	mg/L	
Solubility in acetone at 20 °C	> 50	%	
Solubility in chloroform at 20 °C	> 50	%	
Solubility in heptane at 20 °C	47.8	%	
Solubility in methanol at 20 °C	26.6	%	
Solubility in toluene at 20 °C	> 50	%	

Characteristics

IONOL® CP is a white, crystalline antioxidant and belongs to the group of non-staining, sterically hindered phenols.

IONOL® CP is mainly used for the stabilisation of polymers which come into contact with foodstuffs and/or drinking water, polyols, polyurethanes, adhesives and hot melts for a possible contact with foodstuffs, odourous substances and/or perfumes, foodstuffs and printing inks. There is BfR (formerly BGA, BgVV) and FDA approval for IONOL® CP. Furthermore, IONOL® CP conforms to the analytical requirements of the FCC (Food Chemical Codex) and Pharmacopoeiae.

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Applications

Polymers

IONOL® CP is used for the stabilisation of plastics, natural and synthetic rubber, waxes, synthetic and natural resins as well as for articles and mixtures which are produced from any of the above.

The stabilisation with IONOL® CP starts with the production of plastics and ensures, dependent on the dosage quantity, the storage stability of the polymer raw material until processing to the finished article. During the processing of the polymer raw material to the final product, an additional long-term stabilisation with IONOL® CP can be very effective.

The application field of IONOL® CP is widespread because of its excellent cost-efficiency ratio as well as its almost universal application possibilities in plastics, particularly for articles requiring approval as defined by food contact legislation.

Adhesives and hot melts

Adhesives and hot melts are also subject to autoxidative damage caused by mechanical stress, heat and light. IONOL® CP is used for process as well as for long-term stabilisation.

Odourous substances

In odourous substances, e.g. body-care products, IONOL® CP prevents autoxidation processes which lead to undesired and unpleasant smelling decomposition products.

Foodstuffs

In foodstuff IONOL® CP decelerates the damaging effect in fats, carotenoids, vitamins as well as in further essential food constituents caused by oxidation with atmospheric oxygen.

Polyols

Polyols are subject to oxidative damages by light and heat in the presence of oxygen due to radical reactions. By using IONOL® CP the reactive radicals are captured and transformed into non-reactive compounds. The chain reaction is stopped and a further damage is avoided.

IONOL® CP is used as a long-term stabiliser in order to protect the polyols during storage (e.g. before use in polyurethanes) against decomposition reactions. Depending on application, the optimum dosage amounts to 0.1 - 1.0 %.

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Further Applications

Polyurethanes

IONOL® CP is used for polyurethanes as a processing and long-term stabiliser.

Particularly in the production of polyurethane foams, IONOL® CP is more efficient than many other antioxidants. Due to the high temperatures which arise inside the block foams during production, partially strong scorching can occur. IONOL® CP is very efficient and mobile, and prevents scorching-effects. Hence, the production of undamaged and non-discolouring foams made possible.
Depending on the application, the optimum dosage amounts to 0.1- 1.0 php. According to the BfR regulations chapter XXXIX BHT is recommended as an anti-ageing agent for finished articles produced from polyurethanes.

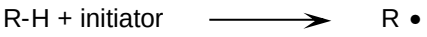
Printing inks

The shelf life of printing inks can be shortened by oxidation. Physical changes during processing may occur. The use of IONOL® CP has a positive effect on the stability, levelling resistance as well as on the brightening and hardening properties of printing inks.

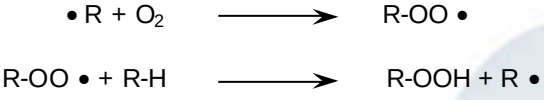
In lithographic printing IONOL® CP prevents skin formation and accelerates the drying process. The average quantities to be employed amount to 0.5 – 1.0 %.

Reaction flow

Today's ideas on the decomposition of organic compounds (e.g. polymers in plastics, synthetic or native oils in lubricants or unsaturated fatty acids in foodstuff) start from the fact that decomposition is initiated by the formation of hydrocarbon radicals R •. This reaction is caused by heat, light and/or mechanical energy:



In the chain propagation reaction the radical R • reacts with atmospheric oxygen to the peroxide radical R-OO • and the latter with a further hydrocarbon molecule to a radical R • and a peroxide compound R-OOH.



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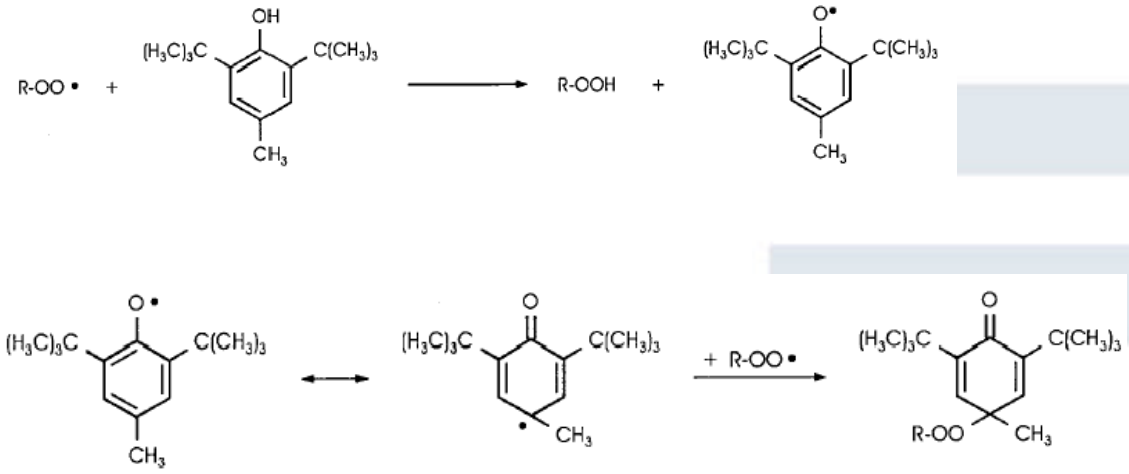
The radical R • formed in the second reaction step further reacts by chain reaction with oxygen according to the reaction equation detailed on previous page. The peroxide ROOH formed in the second reaction step may decompose to aldehydes, ketones and carboxylic acids and, depending on the type of the damaged organic compound, be responsible for discolourations, corrosion or unpleasant odour (e.g. rancid fats).

The chain reaction above can be stopped by a so-called recombination of the radicals.

The probability of such a chain reaction is very small so that the radical decomposition of organic compounds cannot come to a standstill without the addition of anti-ageing agents.

Anti-ageing agents on the basis of sterically hindered phenols act as radical scavengers, i.e. they directly intervene in the radical decomposition process by chemically bonding the radicals and preventing the chain propagation reaction.



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