

Hydroquinone and hydroquinone derivatives

Hydroquinone and hydroquinone derivatives

Inhibitor mechanism

Polymerization is initiated by free radicals. Inhibitors tie up these free radicals by reacting with them to form stable compounds. Hydroquinone and certain derivatives form these stable compounds in the presence of oxygen. The free radical first reacts with oxygen to form a peroxy free radical. Hydroquinone then reacts with this peroxy free radical to form a free radical complex. After that, the complex reacts with another peroxy free radical to form a stable compound.

Eastman offers hydroquinone and derivatives that are practical storage and process inhibitors alone or in combinations. Evaluate your specific system or application to pick the most suitable inhibitor. This publication can help you find the most likely candidates and remind you that this family of compounds can be used for more than stopping undesirable reactions.

Hydroquinone (HQ)

HQ is a good general-purpose inhibitor, stabilizer, antioxidant and intermediate. It is offered in photographic and United States Pharmacopeia (USP) grades. One of HQ's major uses is as an intermediate to make other inhibitors, stabilizers, antioxidants, agricultural chemicals and dyes.

Mono-tertiary-butylhydroquinone (MTBHQ)

MTBHQ is an effective storage inhibitor for unsaturated polyesters. It's also a suitable antioxidant for nonfood fats and oils and unstable organic solvents. MTBHQ can be used as a cook stabilizer for highly reactive unsaturated polyesters.

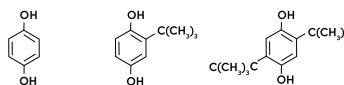
2,5-Di-tertiary-butylhydroquinone (DTBHQ)

DTBHQ is an effective inhibitor, antioxidant and stabilizer. It is useful as an antioxidant for rubber articles and as a stabilizer against odor and color development in various compositions. It also works — when combined with other inhibitors — as a storage inhibitor for unsaturated polyesters. In addition, DTBHQ is used as a stopping agent in rubber emulsions and an anti-skinning agent in paints.

Applications

	HQ	MTBHQ	DTBHQ
Antioxidant			
for nonfood fats and oils	•	•	
Inhibitors			
for vinyl monomers	•	•	•
for acrylic monomers	•		
for unsaturated polyesters	•	•	•
against peroxides in certain solvents	•	•	
Intermediates			
for antioxidants and antiozonants	•		•
for agricultural chemicals	•		
for dyes	•		
Stabilizers			
against skinning in paints	•		
against color in emulsion polymerizations			•
against color in detergents			
against color in polyether polyols			
against UV in certain compounds		•	•
Depigmenting agents			
for cosmetic creams	•		
Stopping agents			
for polymerization reactions			•
Catalysts			
for oxidation of mercaptans			

Typical properties^a



	HQ ^b	MTBHQ	DTBHQ
Empirical formula	C ₆ H ₆ O ₂	C ₁₀ H ₁₄ O ₂	C ₁₄ H ₂₂ O ₂
Molecular weight	110.11	166.21	222.31
Physical form	crystals	crystals	crystals
Color	white to off-white	white to tan	white to tan
Specific gravity	1.328	1.109	1.084
Bulk density, g/mL	0.66	0.22	0.61
Assay, wt%	99.0 min	98.0 min	99.0 min
Ash, wt%	0.004	—	—
Water, wt%	0.36	0.13	0.06
Melting point, °C (°F)	171 (340)	125 (257)	216 (421)
Boiling point, °C (°F)	286 (547)	300 (572)	313 (595)
Flash point, °C (°F)	177 (351)	171 (340)	216 (421)
Fire point, °C (°F)	191 (921)	174 (345)	216 (421)
Autoignition temp., °C (°F)	494 (921)	457 (855)	421 (790)
Angle of repose	33	58	34
Solubility at 25°C, g/100 g, in			
Water	7	insoluble	insoluble
Acetone	20	112	39
Ethyl acetate	22	575	48
Ethyl alcohol	57	605	35
Benzene	insoluble	insoluble	2

^aReported for information only. Eastman makes no representation that material in any particular shipment will conform to the values listed.
^bTypical property bulletins are available for all grades of hydroquinone and derivatives.



Eastman Corporate Headquarters

P.O. Box 431

Kingsport, TN 37662-5280 U.S.A.

U.S.A. and Canada, 800-EASTMAN (800-327-8626)

Other locations, +(1) 423-229-2000

eastman.com/locations

Although the information and recommendations set forth herein are presented in good faith, Eastman Chemical Company ("Eastman") and its subsidiaries make no representations or warranties as to the completeness or accuracy thereof. You must make your own determination of its suitability and completeness for your own use, for the protection of the environment, and for the health and safety of your employees and purchasers of your products. Nothing contained herein is to be construed as a recommendation to use any product, process, equipment, or formulation in conflict with any patent, and we make no representations or warranties, express or implied, that the use thereof will not infringe any patent. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS AND NOTHING HEREIN WAIVES ANY OF THE SELLER'S CONDITIONS OF SALE.

Safety Data Sheets providing safety precautions that should be observed when handling and storing our products are available online or by request. You should obtain and review available material safety information before handling our products. If any materials mentioned are not our products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be observed.

© 2024 Eastman. Eastman brands referenced herein are trademarks of Eastman or one of its subsidiaries or are being used under license. Non-Eastman brands referenced herein are trademarks of their respective owners.