

1, 2, 3 Benzotriazole

Corrosion inhibitor for copper metal, ultra violet rays absorbant for paints, dyes & plastics

General Description :

1, 2, 3 Benzotriazole is a corrosion inhibitor for metals. In the case of copper and copper alloys, it functions by forming a strong polymeric complex on reacting with the copper oxide on the surface. This complex formation results in a protective layer or film on the copper surface, 10 to 20 molecules thick, providing both a mechanical and electrochemical barrier against corrosive attack. This protective layer has a high degree of thermal and oxidative stability and cannot be easily removed.

1, 2, 3 Benzotriazole complexes copper ions in solution thereby preventing galvanic corrosion of other metals like aluminium, aluminium alloys, zinc and iron.

1, 2, 3 Benzotriazole also protects steel, grey cast iron, cadmium and nickel alloys and aluminium under certain conditions and in combination with other inhibitors.

Addition of 1, 2, 3 Benzotriazole in various oils, fluids, lubricants, synthetic fluids etc enhances the oxidation resistance and stability of the fluid and leads to better performance and use. It functions as a metal passivator and prevents the catalytic action of the metal, which leads to degradation of all such fluids.

1, 2, 3 Benzotriazole is used as an additive in plastics, paints, inks, dyes etc where it prevents fading and discoloration caused by ultra-violet rays.

Properties :

Appearance	Off white buff coloured powder, flakes or Agglomerates.
Assay %	99%
Molecular	119.13
Formula	$C_6H_4NHN_2$
Moisture	0.5% max
Ash	0.03% max
Melting Point	93°C - 98°C
Boiling Point	160°C (3mm)
PH	5 to 6

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Uses :

Antifogging Agent :	In photographic developer solution.
Anticorrosive Agent :	For copper and copper based alloys, steels and mild steel etc. in cooling water system and radiator cleaning fluids.
Antioxidant :	In lubricating oils, greases, brakes & steering fluids.
Antifading Agent / Ultra-Violet ray absorbant :	In dyes, paints, plastics & printing inks.
As a process tissue additive :	To get increased yields of copper ore.
In wrapping tissue & boxboard :	For wrapping interleaving, shipping & storing mill products & fabricated items.
Corrosion Control Agent :	In air-conditioner, cleaning fluids & industrial cleaning fluids.
Prevents discoloration :	Of bronze, inks & paints by preventing corrosion.
Additive in soaps & detergents :	To prevent discoloration of nickel, silver and cutlery, also prevents corrosion of washing machines.
Anticorrosive additive :	In insulating material for copper wire.
Electrolytic process :	Addition of 0.01% to 0.02% in the copper bath improves the brightness and hardness of the precipitated copper.
Metal Polishes and waxes :	0.5 to 5% 1, 2, 3 Benzotriazole in metal polishes gives lasting protection to copper, brass, bronze, nickel etc.
Detergents :	Addition of 1, 2, 3 Benzotriazole in rinsing agents inhibits the corrosion of metal parts.
Paper Industry :	Addition of 0.01% in the process water for manufacturing paper, protects wire screens made of copper alloys.
Plastics :	0.1% to 5% addition stabilizes plastics and polymers used for electrical insulation. Oxidation of polymers catalyses by copper ions is considerably reduced.
Tyres :	0.1 to 1.0% addition in the rubber blend prevents corrosion of the brass - plated steel cord, improves bonding between rubber and cord ions is considerably reduced.
De-icers, Anti-icing Agents :	1, 2, 3 Benzotriazole is frequently used in deicing solution used in aircraft on runways, rail bound vehicles and other civil and military equipments to prevent corrosion.

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Metalworking Fluids and Lubricants : 1, 2, 3 Benzotriazole is suitable for use in both aqueous and non - aqueous metal working fluids.

Solubility :

(At 25°C, wt%)	
Water :	1.98
Water (60°C):	7.4
Methanol:	71.6
1 Methoxy - 2 propanol :	55.0
Isopropanol :	53.9
Heptanol L :	34.6
Ethylene Glycol :	50.7
Polyethylene Glycol :	47.7
Methyl Ethyl Ketone :	46.1
Benzene :	1.3
Tetrachloroethylene :	0.06
White mineral oil :	0.004
Turbine oil :	0.01

Note : Petroleum oil formulation containing polar additives such as tricresyl phosphate an alkylbenzenesulfonic acid derivatives will increase the apparent solubility.

Method of Application : 1, 2, 3 Benzotriazole is incorporated in liquids at concentrations between 0.1% and 2.0%. Liquids may be either aqueous or nonaqueous. It may also be use as a solid or vapour.

Availability : Readily available from exstock in 10 kgs bags and as per customer requirements. Available in only one form at present.

Toxicity : The acute data for benzotriazole is as follows :

LD 50 oral (rata)	560 mg/kg
LC 50 Dermal (rabbits)	2 g/kg
LC 50 inhalation (rats)	5.7 mg/l
Skin irritant	Not a skin irritant
Eye irritant	Severe irritant

Actual concentration measured at breathing zone.

The acute aquatic toxicity data are :

96 Hr. Tim	28 mg/kg
Bluegill sunfish	
Minnow	28 mg/l
96 Hr LC 50	
Rainbow trout	39.0 mg/l
48 Hr.EC 50	
Daphina Magna	141.6 mg/l
96 Hr.EC 50	
Algae	15.4 mg/l

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Carcinogenicity :

NCI-CG-TR 88 conclude that " there was no convincing evidence that under the conditions of this bioassay 1H-benzotriazole was carcinogenic in B6 C3 F1 mice or Fischer 344 rats of either sex" (NTIS PB 205 202).

Safe Handling :

Good ventilation and other engineering controls should be used to minimize exposure to benzotriazole dust if contains are not adequate, use a respirator approved by NIOSH/MSHA in dust laden areas. Wear protective clothing and gloves. Follow rules of good personal hygiene regarding handling of any chemical such.

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