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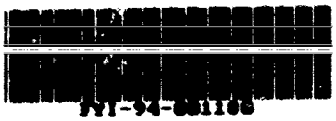

INIT 07/14/94

CHEMICALS

The Sherwin-Williams Company
501 Murray Road
Cincinnati, Ohio 45217
Phone (513) 242-3300

Document Control No for CBI → 20-8480200-1

74I-0794-00180

84940000246

January 9, 1984

Contains No CBI

Mr. Martin Greif
Executive Secretary
Toxic Substances Control Act
Interagency Testing Committee
401 M Street, SW
Washington, D.C. 20460

Dear Mr. Greif:

This is in response to your letter of November 18, 1983 to K.H. Wilkinson requesting information on 1H-Benzotriazole (95-14-7) for the TSCA-ITC.

We have enclosed our Material Safety Data Sheet and a draft of our newest Technical Data Sheet for the referenced chemical. We have also enclosed the summaries of two government reports which are:

"Investigation of Selected Potential Environmental Contaminants, Benzotriazoles", NTIS No. PB-266 366, Report No. EPA 560/2-77-001, February 1977.

"Bioassay of 1H-Benzotriazole for Possible Carcinogenicity", DHEW Publication No. (NIH)78-1338, Report No. NCI-CG-TR-88, 1978.

Additional material is enclosed which is to be treated as Confidential Business Information. This material is in a separate sealed envelope and is marked "TSCA-CBI". Included is information on production, the process and toxicity studies.

We have included all of the information on the referenced chemical that we have available, that is suggested in the Federal Register, Vol. 48, No. 218, p. 51521. We believe the information we are submitting will satisfy your requirements.

Sincerely yours,

Gilbert K. Meloy

Gilbert K. Meloy, Ph.D.
Manager, Technical Services

cc: K.H. Wilkinson
GKM/es

Enclosure

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[redacted]

GENERAL DESCRIPTION

COBRATEC®99 is a corrosion inhibitor for copper and copper-base alloys. It functions by reacting with copper ions on the surface of copper or copper alloys forming a strong, insoluble complex. This complex formation results in a protective layer or film on the copper surface, 10 to 30 molecules thick, that provides 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. COBRATEC®99 complexes copper in solution, protecting other metals from galvanic corrosion.

SUGGESTED USES

COBRATEC®99 can be used in many applications for protecting copper and copper alloys.

Direct Treatment such as on mill products, fabricated and decorative items, statuary.

Circulating Cooling Systems such as cooling towers, air conditioning systems, cutting and grinding fluids.

Functional Fluids such as hydraulic fluids, specialty lubricants and automotive coolants.

Wrapping Tissue and box board for wrapping, interleaving, shipping and storing mill products or fabricated items.

Corrosion Preventive Coatings such as lacquers and waxes.

Cleaners such as soaps, detergents and strong alkali or acid cleaners.

METHODS OF APPLICATION

COBRATEC®99 is incorporated in liquids at concentrations between 0.1% and 2.0%. Liquids may be either aqueous or non-aqueous. It may also be used as a solid or vapor. Convenience forms are available such as TT-20-I, TT-45-I, and TT-35-G solutions.

DESCRIPTION

Chemical Name	Benzotriazole
Synonyms	1,2,3-benzotriazole Azimidobenzene Benzene azimide
Molecular Wt.	119.12
Formula	$C_6H_5N_3$
Code	CO-99F
Order Entry No.	X188T5585
CAS Registry No.	95-14-7

PROPERTIES

Appearance	Off white to light yellow flake
Specific Gravity (100°C/25°C)	1.19

	Specif.	Typical
Assay	98.0% min	99.5%
Moisture	0.5% max	0.1%
Ash	0.5% max	0.2%

Solubility, wt.%, 25°C:

Water	1.98
Water (60°C)	7.4
Methanol	71.6
1-Methoxy-2-Propanol	55.0
Isopropanol	53.9
Heptanol	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

* Petroleum oil formulations containing polar additives such as tricresyl phosphate and alkylbenzenesulfonic acid derivatives will increase the apparent solubility.

TOXICITY

The acute toxicity data for tolyltriazole are as follows:

LD_{50} Oral (rats)	560 mg/Kg
LD_{50} Dermal (rabbits)	>2g/Kg
LC_{50} Inhalation (rats)	5.7 mg/L*
Skin Irritant	Not a skin irritant
Eye Irritant	Caused irritation

* Actual concentration measured at breathing zone.

The fish aquatic toxicity data are:

96 Hr. TLm:

Bluegill sunfish	28 mg/L.
Trout	12 mg/L.
Minnow	28 mg/L.

SAFE HANDLING

Good ventilation and other engineering controls should be used to minimize exposure to tolyltriazole dust. If controls are not adequate, use a respirator approved by NIOSH/MESA in dust laden areas. Wear protective clothing and gloves. Follow rules of good personal hygiene regarding handling of any chemical such as a shower and change of clothing each day after work.

AVAILABILITY

Readily available from stock in 200 lb. fiber drums. Other forms available are:

CO-99P	Benzotriazole powder
CO-20-I	20% Benzotriazole in isopropanol
CO-45-I	50% Benzotriazole in isopropanol
CO-35-G	35% Benzotriazole in propylene glycol
CO-BT-PG	Photograde, meets ANSI specification

Sherwin-Williams Chemicals

MATERIAL SAFETY DATA SHEET

(Approved by U.S. Department of Labor "Essentially Similar" to Form OSHA-20)

Form 11815

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO
SHERWIN WILLIAMS CHEMICALS	513-242-3300
ADDRESS (Number, Street, City, State, and ZIP Code)	
501 Murray Road, Cincinnati, Ohio 45217	
CHEMICAL NAME AND SYNONYMS	**TRADE NAME AND SYNONYMS**
1-H-Benzotriazole, Benzotriazole	COBRATEC® 99 Flake
CHEMICAL FAMILY	**FORMULA**
Triazole	$C_6H_5N_3$

SECTION II HAZARDOUS INGREDIENTS

MATERIAL	%	TLV (Units)
Benzotriazole	99	Not Available
(See attached sheet for Toxicology Data)		

SECTION III PHYSICAL DATA

BOILING POINT, 760 mm. Hg	350° C	FREEZING POINT	94-99°C
SPECIFIC GRAVITY (H_2O = 1)	1.36 (solid)	VAPOR PRESSURE at 20° C.	0.04 mm
VAPOR DENSITY (air = 1)	4.1 (calculated)	SOLUBILITY IN WATER, % by wt. at 20° C.	2.0
PER CENT VOLATILES BY VOLUME	Essentially nonvolatile at ambient.	EVAPORATION RATE (Butyl Acetate = 1)	Non-Volatile
APPEARANCE AND ODOR	Off white flakes. Slight characteristic odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (test method) (cc)	~ 340° F	AUTOIGNITION TEMPERATURE		Not Available	
FLAMMABLE LIMITS IN AIR, % by volume	LOWER	Dust mec. 0.03oz/cu.ft.	UPPER	Not Available	

EXTINGUISHING MEDIA	Water, foam, dry chemical, carbon dioxide.
SPECIAL FIRE FIGHTING PROCEDURES	Water may be used to cool and protect material exposed to fire. Self-contained breathing apparatus should be work when the concentration of combustion products is high or unknow.
UNUSUAL FIRE AND EXPLOSION HAZARDS	Airborne dust is rated a severe explosion hazard at a minimum concentration of 0.03 ounce per cubic feet (30 grams per cubic meter).

MATERIAL SAFETY DATA SHEET

COBRATEC® 99 Flake

Section II Hazardous Ingredients (continued)

Toxicity Data:

Oral LD_{50} (rats): 560 mg/kg.
Primary Skin Irritation (rabbit): Not a primary skin irritant.
Dermal LD_{50} (rabbit): > 2 gm/kg
Eye Irritation (rabbit): caused eye irritation.
Inhalation 1 hour LC_{50}: (rats) 5.7 mg/liter.*

Per 16 CFR (rev.1/1/78) 1500.3 (b)(4)(i)

* Actual concentration measured in breathing zone.

Section V Health Hazard Data (continued)

Contact with the eyes is likely to cause irritation.
Detailed information about the effects of overexposure in the human being is unavailable. Experience thus far has not provided any example of obvious overexposure with resultant symptoms.

Section VIII Special Protection Information (continued)

Respiratory Protection:

Adequate ventilation or other engineering controls should be used to reduce employee exposure below OSHA permissible limits. If controls are not adequate or available, use a respirator approved by NIOSH/MESA under schedule TC-23C for protection against not more than 1000 ppm organic vapors, dusts, fumes, and mists with a permissible exposure limits of not less than 0.05 mg/m^3 or 2 mppcf based on an eight hour time-weighted average.

If airborne concentrations exceed 10 times the permissible limits, air supplied respirators are required. Exposures to combinations of contaminants must be controlled according to OSHA per 29 CFR (rev. 7/1/77) 1910.1000 (d)(2)(i) and (ii).

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sherwin williams chemicals

MATERIAL SAFETY DATA SHEET

(Approved by U.S. Department of Labor "Essentially Similar" to Form OSHA-20)

Form 11818

SECTION I

MANUFACTURER'S NAME: Sherwin Williams Chemicals	EMERGENCY TELEPHONE NO.: 513-242-3300
ADDRESS (Number, Street, City, State, and ZIP Code): 501 Murray Road, Cincinnati, Ohio 45217	
CHEMICAL NAME AND SYNONYMS: 1-H-Benzotriazole, Benzotriazole	TRADE NAME AND SYNONYMS: COBRATEC® 99, CO-99
CHEMICAL FAMILY: Triazole	FORMULA: $C_6H_5N_3$

SECTION II HAZARDOUS INGREDIENTS

MATERIAL	%	TLV (Units)
Benzotriazole	99	Not Available
(See attached sheet for Toxicology Data)		

SECTION III PHYSICAL DATA

BOILING POINT, 760 mm. Hg	350°	FREEZING POINT	94-99°C
SPECIFIC GRAVITY (H_2O = 1)	1.36 (solid)	VAPOR PRESSURE at 20° C.	0.04 mm
VAPOR DENSITY (air = 1)	4.1 (calculated)	SOLUBILITY IN WATER, % by wt. at 20° C.	2.0
PER CENT VOLATILES BY VOLUME	Essentially nonvolatile at ambient	EVAPORATION RATE (Butyl Acetate = 1)	Nonvolatile
APPEARANCE AND ODOR	Off white powder. Slight characteristic odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Test method)	~ 340°F	AUTOIGNITION TEMPERATURE		Not Available	
FLAMMABLE LIMITS IN AIR, % by volume		LOWER	Dust Sec. 0.03 oz/cu.ft	UPPER	Not Available

EXTINGUISHING MEDIA	Water, foam, dry chemical, carbon dioxide.
SPECIAL FIRE FIGHTING PROCEDURES	Water may be used to cool and protect material exposed to fire. Self contained breathing apparatus should be worn when the concentration of combustion products is high or unknown.
UNUSUAL FIRE AND EXPLOSION HAZARDS	Airborne dust is rated a severe explosion hazard at a minimum concentration of 0.03 ounce per cubic feet (30 grams per cubic meter).

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MATERIAL SAFETY DATA SHEET

CORBANIC® 99

SECTION II Hazardous Ingredients (continued)

Toxicity Data:

Oral LD_{50} (rats): 560 mg/kg.
Primary Skin Irritation (rabbit): Not a primary skin irritant.
Dermal LD_{50} (rabbit): 2 grams/kilogram.
Eye Irritation (rabbit): caused eye irritation
Inhalation 1 hour LC_{50}: (rats) 5.7 mg/liter.*

Per 16 CFR (rev. 1/1/78) 1500.3 (b)(4)(i)

* Actual concentration measured in breathing zone.

SECTION V Health Hazard Data (continued)

Effects of Overexposure:

Contact with the eyes is likely to cause irritation.
Detailed information about the effects of overexposure in the human being is unavailable.
Experience thus far has not provided any example of obvious overexposure with resultant symptoms.

SECTION VIII Special Protection Information (continued)

Respiratory Protection:

Adequate ventilation or other engineering controls should be used to reduce employee exposure below OSHA permissible limits. If controls are not adequate or available, use a respirator approved by NIOSH/MESA under schedule TC-23C for protection against not more than 1000 ppm organic vapors, dusts, fumes and mists with a permissible exposure limits of not less than 0.05 mg/m^3 or 2mmpcf based on an eight hour time-weighted average.

If airborne concentrations exceed 10 times the permissible limits, air supplied respirators are required. Exposures to combinations of contaminants must be controlled according to OSHA per 29 CFR (rev. 7/1/77) 1910.100 (d)(2)(i) and (ii).

11/3/78

EPA 560/2-77-001

TR 76-585

INVESTIGATION OF SELECTED POTENTIAL ENVIRONMENTAL CONTAMINANTS:

BENZOTRIAZOLES

Leslie N. Davis
Joseph Santodonato
Philip H. Howard
Jitendra Saxena

Contract No. 68-01-3416
SRC No. L1255-09

February 1977

Project Officer - Frank J. Letkiewicz

Prepared for:

Office of Toxic Substances
U.S. Environmental Protection Agency
Washington, D.C. 20460

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EXECUTIVE SUMMARY

The current total production of benzotriazoles is estimated to be approximately 36 million pounds per year in the United States. Benzotriazoles are used in three main applications: to prevent the corrosion of metals, especially copper and materials containing copper (such as brass or bronze); to stabilize plastics and similar materials against the decomposition which would otherwise take place upon exposure of these materials to sunlight, fluorescent light, or other sources of ultraviolet radiation; and in photography, mainly as a constituent of films (antifoggant) to improve their photographic characteristics.

The majority of benzotriazoles produced go into anticorrosion applications. Typical applications include the protection of copper-containing parts (for which benzotriazole excels) by inclusion of benzotriazoles in automobile antifreeze solutions, in recirculating water systems such as power plant and commercial air conditioning cooling systems, and in coatings for the protection of copper alloys in architectural and decorative applications.

Approximately 20-30% of all benzotriazole production is used for the stabilization of plastics, paints, clear coatings, fabrics, and certain oil-based solvents against degradation on exposure to ultraviolet light. A variety of chemical derivatives (substitute at the 2-position) of benzotriazole are used in these applications, generally possessing chemical and possibly biological properties quite different from the parent compound.

The various photographic applications of benzotriazole consume only a small quantity of the total production (considerably less than one million pounds per year).

Only limited information is available on the possible release of benzotriazoles to the environment or the fate of benzotriazoles in the environment. Some 2-substituted benzotriazoles have been detected in ppb in river water and ppm in river sediment several miles downstream from a production plant. On the basis of their chemical properties, it is likely that the other benzotriazoles will be relatively stable and fairly persistent if released to the environment. Data on monitoring of the other benzotriazoles in the environment is unavailable.

Some benzotriazoles can inhibit the growth of bacterial cells and also cause mutations in some types of bacteria. This is significant because chemicals which are mutagenic frequently are carcinogenic as well. No studies of the potential carcinogenicity of benzotriazole have been completed yet, although work in this area is presently being carried out. It is therefore not now known what hazard, if any, benzotriazole may present with respect to the induction of tumors.

Animal studies have shown that benzotriazole dusts, if inhaled, may damage the lungs and severely interfere with breathing. The dust is also an explosion hazard. Benzotriazole dusts are not likely to be a hazard in current end use applications of these materials; dust hazard is most likely in places of manufacturing, packaging, and unpackaging of these chemicals. Current regulations do not set limits for benzotriazole dusts, but do limit the concentrations for some of the compounds used as ultraviolet light stabilizers in certain plastics consumed in food packaging.

BIOASSAY OF

1H-BENZOTRIAZOLE

FOR POSSIBLE CARCINOGENICITY

Carcinogenesis Testing Program
Division of Cancer Cause and Prevention
National Cancer Institute
National Institutes of Health
Bethesda, Maryland 20014

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
National Institutes of Health

DHEW Publication No. (NIH) 78-1338

SUMMARY

A bioassay of 1H-benzotriazole for possible carcinogenicity was conducted by administering the test chemical in feed to Fischer 344 rats and B6C3F1 mice.

Groups of 50 rats of each sex were administered 1H-benzotriazole at one of two time-weighted average doses, either 6,700 or 12,100 ppm, for 78 weeks. Except for five control and five high-dose rats of each sex, which were killed at week 78, all animals surviving at that time were observed for 26-27 additional weeks. Controls consisted of groups of 50 untreated rats of each sex and were observed for 105-106 weeks. All rats surviving to weeks 104-106 were then killed.

Groups of 50 mice of each sex were administered 1H-benzotriazole at one of two time-weighted average doses, either 11,700 or 23,500 ppm, for 104 weeks, then observed for 2 additional weeks. Controls consisted of groups of 50 untreated mice of each sex and were observed for 109 weeks. All mice surviving to weeks 106-109 were then killed.

Mean body weights of the dosed male and female rats and mice were lower than those of the corresponding controls throughout most of the bioassay. Survival of animals in dosed and control groups of both rats and mice was at least 60%, and sufficient numbers of animals were at risk for development of late-appearing tumors.

In male rats, neoplastic nodules of the liver occurred at a statistically significant incidence ($P = 0.024$) in the high-dose group when compared with the control group (controls 0/48, low-dose 0/46, high-dose 5/45 [11%]). The incidence of this tumor in control Fischer 344 rats used in similar bioassays of other test chemicals at the same laboratory has varied from 0 to 11%, with 2/13 historical-control groups having incidences of 10-11%. Since the incidence in the high-dose group is no higher than has been observed in some control groups, these tumors cannot be clearly associated with administration of the test chemical.

Brain tumors occurred in three dosed male rats, in one dosed female rat, and in none of the controls. The occurrence of this rare tumor in dosed animals of each sex is suggestive of, but not considered as sufficient evidence of, carcinogenicity.

In female rats, the incidence of endometrial stromal polyps in the low-dose group was significantly higher (P = 0.010) than that in the corresponding controls (controls 2/48, low-dose 10/45, high-dose 8/50). However, the incidence in the high-dose group was not significant, and when the incidences of endometrial stromal polyps and endometrial stromal sarcomas were combined, they were not significant in either the low- or high-dose groups. Thus, these tumors cannot be associated with administration of the chemical.

In male mice, no tumors occurred in dosed groups at incidences that were significantly higher than those in controls.

In female mice, alveolar/bronchiolar carcinomas occurred at a statistically significant incidence (P = 0.001) only in the low-dose group when compared with the control group (controls 0/49, low-dose 9/49 [18%], high-dose 3/49 [6%]). The incidence in the high-dose group was not significant, and the data did not show a dose-related trend. It should be noted that the incidence of these tumors in control B6C3F1 female mice from other bioassays at this laboratory has varied from 0 to 7%, with a mean of 4%. Therefore, the occurrence of this tumor in the female mice cannot be clearly related to the administration of the test chemical.

In female B6C3F1 mice there was an increased incidence of alveolar/bronchiolar carcinomas, suggesting a possible carcinogenic effect of 1H-benzotriazole. In Fischer 344 rats there was an increased incidence of brain tumors, suggesting a possible carcinogenic effect. However, there was no convincing evidence that under the conditions of this bioassay 1H-benzotriazole was carcinogenic in B6C3F1 mice or Fischer 344 rats of either sex.

AMTEK CORP.

CERTIFICATE OF AUTHENTICITY

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