BAUSCH & LOMB

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

PART I *What is the material and what do I need to know in an emergency?*

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED):	**UV ABSORBER**
PRODUCT USE:	Preparation of Contact/IntraOccular Lenses
MANUFACTURED FOR: BY:	**BAUSCH & LOMB** 9342 Jeronimo Road Irvine, CA 92718
EMERGENCY PHONE:	CHEMTREC: 800-424-9300
BUSINESS PHONE:	1-800-338-2020
DATE OF PREPARATION:	July 13, 1998; updated Company info 3-02

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	% w/w	EXPOSURE LIMITS IN AIR					
		ACGIH		OSHA		IDLH	OTHER
		TLV	STEL	PEL	STEL		
2-(2'-Hydroxy-3'-Allyl-5'-Methylphenyl)-2H-Benzotriazole There are no specific exposure limits established for this substance. It is recommended that the following exposure limits for "Particulates, Not Otherwise Classified" be used.	1-2	10 mg/m^3; (Inhalable Fraction) 3 mg/m^3, (Respirable Fraction)	NE	15 mppcf or 5 mg/m^3 (Respirable Fraction) 50 mppcf or 15 mg/m^3 (Total Dust)	NE	NE	NE

NE = Not Established C = Ceiling Limit See Section 16 for Definitions of Terms Used

NOTE: All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-1993 format.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This substance consists of an off-white, odorless powder. The primary health hazard associated with emergency response to this material is the potential for mild irritation of skin, eyes, and other contaminated tissue. 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole requires substantial pre-heating before ignition occurs. When involved in a fire, this material may decompose and produce irritating vapors and toxic compounds (including carbon monoxide, carbon dioxide, nitrogen oxides, and benzene). This substance is not reactive. Emergency responders must wear adequate personal protective equipment for the situations to which they are responding.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: The main routes of occupational over-exposure to 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole are via inhalation of dusts, as well as contact with skin or eyes. Currently, the anticipated symptoms of over-exposure are as follows:

INHALATION: Inhalation is not anticipated to be a significant route of over-exposure for 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole. If dusts of this substance are inhaled, mild irritation of the nose and upper respiratory system may develop. Symptoms of such over-exposure may include sneezing, coughing, and nasal congestion.

CONTACT WITH SKIN or EYES: It is anticipated that 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole may be mildly irritating to contaminated skin or eyes. Symptoms of eye contact can include redness, pain, and watering. Symptoms of skin contact may include itching and redness.

SKIN ABSORPTION: Skin absorption is not currently reported to be a significant route of overexposure to this substance.

INGESTION: Ingestion of 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole is not anticipated to be a significant route of occupational over-exposure. Ingestion of 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole (i.e., through poor hygiene practices) may cause mild irritation of the mouth, throat, and other tissues of the gastrointestinal system; symptoms of overexposure may include nausea and vomiting.

INJECTION: Accidental injection of 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole, via laceration or puncture by a contaminated object may cause intense pain, irritation, and local swelling (in addition to the wound).

HAZARDOUS MATERIAL INFORMATION SYSTEM

HEALTH	(BLUE)	1
FLAMMABILITY	(RED)	1
REACTIVITY	(YELLOW)	0
PROTECTIVE EQUIPMENT		X

EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		S EE SECTION 8

For research and development use only!

See Section 16 for Definition of Ratings

HEALTH EFFECTS OR RISKS FROM EXPOSURE (An explanation in **lay terms)**.

ACUTE: 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole may be mildly irritating to contaminated skin, eyes, mucous membranes, and other contaminated tissue.

CHRONIC: Persistent skin irritation may result from prolonged or repeated skin contact with this substance. Refer to Section 11 (Toxicological Information) for additional data.

TARGET ORGANS: Skin, eyes.

PART II *What should I do if a hazardous situation occurs?*

4. FIRST-AID MEASURES

SKIN EXPOSURE: If 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole contaminates the skin, immediately begin decontamination with warm, running water. Minimum flushing is for 15 minutes. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek medical attention if any adverse effect occurs.

EYE EXPOSURE: If dusts or powders of 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole enter the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Victim must seek immediate medical attention.

INHALATION: If dusts of 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Remove or cover gross contamination to avoid exposure to rescuers.

4. FIRST-AID MEASURES (Continued)

INGESTION: If 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, do not induce vomiting. Victim should drink milk, egg whites, or large quantities of water. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or unable to swallow.

Victims of chemical exposure must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take a copy of the label and the MSDS to health professional with victim.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not flammable.
AUTOIGNITION TEMPERATURE: Not applicable.
FLAMMABLE LIMITS (in air by volume, %): Not applicable.

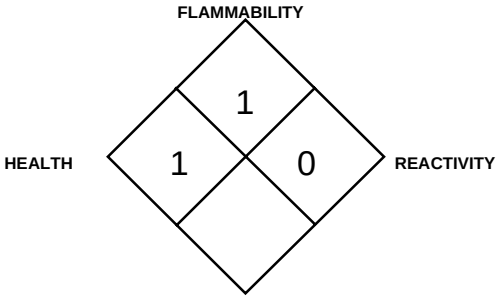
FIRE EXTINGUISHING MATERIALS:

Water Spray: OK	Carbon Dioxide: OK	Other: "ABC" type
Foam: OK	Dry Chemical: OK	Halon: OK

UNUSUAL FIRE AND EXPLOSION HAZARDS: This material must be substantially pre-heated before ignition can occur. When involved in a fire, this material may decompose and produce irritating vapors and toxic compounds (including carbon monoxide, carbon dioxide, and benzene). It is important to note that as with all organic solids, large dusts clouds of this product have the potential to ignite explosively.

Explosion Sensitivity to Mechanical Impact: Not applicable.
Explosion Sensitivity to Static Discharge: Not applicable.

NFPA RATING



See Section 16 for Definition of Ratings

SPECIAL FIRE-FIGHTING PROCEDURES: Structural fire fighters must wear Self-Contained Breathing Apparatus and full protective equipment. All personal protective gear and contaminated fire-response equipment should be decontaminated with soapy water before being returned to service. Move fire-exposed containers, if it can be done without risk to firefighters. If possible, prevent run-off water from entering storm drains, bodies of water, or other environmentally sensitive areas.

6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: In case of a spill, clear the affected area and protect people. Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used.

The minimum personal protective equipment for incidental releases includes gloves, goggles, dust mask, and appropriate body protection. In the event of a release of 4.5 kg or more of 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole, minimum Personal Protective Equipment should be Level C: triple-gloves (rubber gloves and nitrile gloves, over latex gloves), chemically resistant suit and boots, hard-hat, and a high-efficiency particulate filter. Level B, which includes a Self-Contained Breathing Apparatus, must be worn in situations where the oxygen level is below 19.5% or is unknown. Wet spilled solid with water before clean-up, to minimize the generation of dusts. Sweep-up or vacuum spilled material carefully, avoiding the generation of dusts. Rinse the contaminated area with soapy water. Decontaminate the area thoroughly. Place all spill residue in an appropriate, labeled container and seal immediately. Dispose of in accordance with U.S. Federal, State, and local hazardous waste disposal regulations, or those of Canada and its Provinces (see Section 13, Disposal Considerations).

PART III *How can I prevent hazardous situations from occurring?*

7. HANDLING and STORAGE

WORK AND HYGIENE PRACTICES: As with all chemicals, avoid getting 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole ON YOU or IN YOU. Do not eat, drink, smoke or apply cosmetics while using this material. Ensure this substance is used with adequate ventilation and personal protective equipment (see Section 8, Engineering Controls and Personal Protection). Areas in which 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole is used should be wiped-down, so that this substance is not allowed to accumulate.

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Minimize all exposures to this substance.

7. HANDLING and STORAGE (Continued)

STORAGE AND HANDLING PRACTICES (Continued): Open containers slowly, on a stable surface, in areas which have been designated for use of 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole. Containers of 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole must be properly labeled.

Store containers in a cool, dry location, away from direct sunlight and sources of intense heat. Store away from incompatible materials (see Section 10, Stability and Reactivity). Keep containers tightly closed when not in use. Empty containers contain residual material; therefore, empty containers should be handled with care.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Ensure eyewash/safety shower stations are in areas where 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole is used. Ventilation must be adequate to ensure that exposures to this substance are kept below the limits recommended in Section 2 (Composition and Information on Ingredients).

RESPIRATORY PROTECTION: Respiratory protection is generally not needed under normal circumstances of use or handling. A full-face Air-Purifying Respirator with high-efficiency particulate filter or a Supplied-Air Respirator should be worn during operations in which excessive amounts of 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole dusts are generated. When respiratory protection is needed, use only protection authorized in U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the appropriate standards of Canada and its Provinces. Always use supplied air respiration protection during emergency response situations in which oxygen levels are below 19.5% or are unknown.

EYE PROTECTION: Splash goggles or safety glasses.

HAND PROTECTION: Wear appropriate, chemically-resistant gloves (i.e. N-Dex; Solvex) for routine use. Use triple gloves for spill response, as stated in Section 6 (Accidental Release Measures) of this MSDS.

BODY PROTECTION: Use body protection appropriate for task (i.e. lab coat, Tyvek Suit).

9. PHYSICAL and CHEMICAL PROPERTIES

RELATIVE VAPOR DENSITY (air = 1): Not applicable.
SPECIFIC GRAVITY (water = 1): 0.8
SOLUBILITY IN WATER: Insoluble.
VAPOR PRESSURE, mm Hg @ 20°C (68°F): Not applicable.
EVAPORATION RATE (n-BuAc=1): Not applicable.
MELTING/FREEZING POINT: 100-102°C (212-215°F)
BOILING POINT: Decomposes.
pH: Not applicable.
ODOR THRESHOLD: Not applicable.
COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT): Not available.

APPEARANCE and COLOR: 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole is an off-white, odorless powder.
HOW TO DETECT THIS SUBSTANCE (warning properties): The appearance may be a distinguishing characteristic of 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole.

10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: When exposed to extremely high temperatures, this material will decompose and produce irritating vapors and toxic gases (including carbon monoxide, carbon dioxide, and benzene).

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong oxidizing agents.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid exposure or contact to extreme temperatures and incompatible chemicals.

PART IV *Is there any other useful information about this material?*

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: Cytotoxicity assays performed on 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole indicate that this substance is non-toxic.

11. TOXICOLOGICAL INFORMATION (Continued)

TOXICITY DATA (Continued): Additional toxicology data for Benzotriazole (a related compound) are provided below for additional data.

BENZOTRIAZOLE:

LD_{50} - Oral - rat: 560 mg/kg
LC_{50} - Inhalation - rat: 1910 mg/m3/3 hours
LD_{50} - skin - rat: >1 gm/kg
LD_{50} - Oral - mouse: 615 mg/kg
LD_{50} - Intraperitoneal - mouse: 400 mg/kg
LD_{50} - Intravenous - mouse: 238 mg/kg
LDLo - skin - rabbit: 450 mg/kg
LD_{50} - Oral - guinea pig: 500 mg/kg

BENZOTRIAZOLE (continued):

TDLo - Oral - rat: 109 mg/kg/26 weeks (intermittent); Endocrine - other changes; normocytic anemia; Blood - leukopenia
TDLo - Oral - rat: 220 gm/kg/78 weeks (intermittent); Tumorigenic - equivocal tumorigenic agent
TDLo - Oral - mouse: 770 gm/kg/78 weeks (intermittent); Tumorigenic - equivocal tumorigenic
Mutation in microorganisms - Salmonella typhimurium: 100 ug/plate
Mutation in microorganisms - Escherichia coli: 33300 ng/plate
Morphological transformation - rat Embryo: 94 ug/plate

SUSPECTED CANCER AGENT: 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole is not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, or CAL/OSHA and therefore is not considered to be, nor suspected to be, a cancer-causing agent by these agencies.

IRRITANCY OF PRODUCT: 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole may cause mild irritation of the respiratory system, mucous membranes, skin, and eyes. Persistent skin irritation may result from prolonged or repeated skin contact with this substance.

SENSITIZATION TO THE PRODUCT: This substance is not currently reported to cause sensitization effects in humans after prolonged or repeated exposure.

REPRODUCTIVE TOXICITY INFORMATION: The toxicological properties of 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole have not been fully investigated. It is currently not known if 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole produces reproductive effects in humans.

Mutagenicity: Mutagenicity data that are available for 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole indicate that this substance is non-mutagneic.

Embryotoxicity: There are currently no human embryotoxicity data available for 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole.

Teratogenicity: There are currently no human teratogenicity data available for 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole.

Reproductive Toxicity: There are currently no human reproductive toxicity data available for 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole.

A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.

ACGIH BIOLOGICAL EXPOSURE INDICES: Currently, there are no ACGIH Biological Exposure Indices (BEIs) associated with 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Dermatitis and other skin disorders may be aggravated by exposure to 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate over-exposure.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole may slowly degrade under ambient environmental conditions to generate a variety of organic compounds.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole may be harmful to contaminated terrestrial plant and animal life. Refer to Section 11 (Toxicological Information) for additional information pertinent to animal exposures.

EFFECT OF CHEMICAL ON AQUATIC LIFE: Releases of large quantities of 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole may be detrimental to an aquatic environment.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations or those of Canada and its Provinces. 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local waste regulatory authority.

U.S. EPA WASTE NUMBER: Not applicable to wastes consisting only of 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole.

14. TRANSPORTATION INFORMATION

THIS MATERIAL IS NOT HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME:	Not applicable.
HAZARD CLASS NUMBER and DESCRIPTION:	Not applicable.
UN IDENTIFICATION NUMBER:	Not applicable.
PACKING GROUP:	Not applicable.
DOT LABEL(S) REQUIRED:	Not applicable.

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER, 1996: Not applicable.

MARINE POLLUTANT: 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole is not designated as a marine pollutant, per Appendix B to U.S. EPA, 49 CFR 172.101.

TRANSPORT CANADA, TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: THIS MATERIAL IS NOT CONSIDERED AS DANGEROUS GOODS.

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole is not subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act.

U.S. SARA THRESHOLD PLANNING QUANTITY: Not applicable.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

U.S. TSCA INVENTORY STATUS: This product is regulated under Food and Drug Administration Standards and is not subject to the requirements of TSCA.

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

U.S. STATE REGULATORY INFORMATION: 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole is not covered under specific State regulations, as denoted below:

Alaska - Designated Toxic and Hazardous Substances: No.
California - Permissible Exposure Limits for Chemical Contaminants: No.
Florida - Substance List: No.
Illinois - Toxic Substance List: No.
Kansas - Section 302/313 List: No.
Massachusetts - Substance List: No.
Michigan - Critical Materials Register: No.
Minnesota - List of Hazardous Substances: No.
Missouri - Employer Information/Toxic Substance List: No.
New Jersey - Right to Know Hazardous Substance List: No.
North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.
Pennsylvania - Hazardous Substance List: No.
Rhode Island - Hazardous Substance List: No.
Texas - Hazardous Substance List: No.
West Virginia - Hazardous Substance List: No.
Wisconsin - Toxic and Hazardous Substances: No.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole is not on the California Proposition 65 lists.

ANSI LABELING (Z129.1; to summarize occupational-use hazards): **CAUTION!** MAY CAUSE RESPIRATORY SYSTEM, EYE, AND SKIN IRRITATION. Do not take internally. Avoid contact with skin, eyes and clothing. Keep container closed. Wear gloves, goggles, and suitable body protection. **FIRST-AID:** If swallowed, do not induce vomiting. Never give anything by mouth to an unconscious person. In case of contact, immediately flush skin with copious amounts of warm water for 15 minutes. Remove contaminated clothing and shoes. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If ingested, do not induce vomiting. Seek medical attention. **IN CASE OF FIRE**: Use water fog, dry chemical or CO_2, or alcohol foam. **IN CASE OF SPILL:** Sweep-up or vacuum spilled product. Decontaminate area with soapy water. Place in a suitable container. Refer to MSDS for additional information.

15. REGULATORY INFORMATION (Continued)

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: 2-(2'-Hydroxy-3'-allyl-5'-methylphenyl)-2H-benzotriazole is regulated under the Canadian Food and Drugs Act; the requirements of CEPA are not applicable to this product.

OTHER CANADIAN REGULATIONS: Not applicable.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: This substance is not on the CEPA Priorities Substances Lists.

CANADIAN WHMIS SYMBOLS: Not applicable.

16. OTHER INFORMATION

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc.
9163 Chesapeake Drive, San Diego, CA 92123-1002
(619) 565 - 0302

DATE OF PRINTING: Updated company information only on 3-11-02. No Technical information was changed or updated.

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. Bausch & Lomb assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, Bausch & Lomb assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

CAS #: This is the Chemical Abstract Service Number which uniquely identifies each constituent. It is used for computer-related searching.

EXPOSURE LIMITS IN AIR:

ACGIH - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. **TLV -** Threshold Limit Value - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average **(TWA)**, the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level **(C)**. Skin absorption effects must also be considered.

OSHA - U.S. Occupational Safety and Health Administration.

PEL - Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL which was vacated by Court Order. **IDLH -** Immediately Dangerous to Life and Health **-** This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. **The DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). NIOSH issues exposure guidelines called Recommended Exposure Levels (**REL**s). When no exposure guidelines are established, an entry of **NE** is made for reference.

HAZARD RATINGS:

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: Health Hazard: **0** (minimal acute or chronic exposure hazard); **1** (slight acute or chronic exposure hazard); **2** (moderate acute or significant chronic exposure hazard); **3** (severe acute exposure hazard; onetime overexposure can result in permanent injury and may be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). Flammability Hazard: **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); **3** (Class IB and IC flammable liquids with flash points below 38°C [100°F]); **4** (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 38°C [100°F]. Reactivity Hazard: **0** (normally stable); 1 (material that can become unstable at elevated temperatures or which can react slightly with water); **2** (materials that are unstable but do not detonate or which can react violently with water); **3** (materials that can detonate when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures).

NATIONAL FIRE PROTECTION ASSOCIATION: Health Hazard: **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure causes death or major residual injury). Flammability Hazard and Reactivity Hazard: Refer to definitions for "Hazardous Materials Identification System".

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (**NFPA**). Flash Point - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:

Human and Animal Toxicology: Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD_{50}** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC_{50}** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m^3** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **Cancer Information:** The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. **Other Information: BEI** - ACGIH Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV. **Ecological Information:** EC is the effect concentration in water. **BCF** = Bioconcentration Factor, which is used to determine if a substance will concentrate in lifeforms which consume contaminated plant or animal matter. Coefficient of Oil/Water Distribution is represented by **log K_{ow}** or **log K_{oc}** and is used to assess a substance's behavior in the environment.

REGULATORY INFORMATION:

This section explains the impact of various laws and regulations on the material. **U.S.: EPA** is the U.S. Environmental Protection Agency. **DOT** is the U.S. Department of Transportation. **SARA** is the Superfund Amendments and Reauthorization Act. **TSCA** is the U.S. Toxic Substance Control Act. **CERCLA (or Superfund)** refers to the Comprehensive Environmental Response, Compensation, and Liability Act. Labeling is per the American National Standards Institute (**ANSI Z129.1**). **CANADA: CEPA** is the Canadian Environmental Protection Act. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **TC** is Transport Canada. **DSL/NDSL** are the Canadian Domestic/Non-Domestic Substances Lists.