WESTERN OPTICAL SUPPLY, INC.

Material Safety Data Sheet

TROOP-BALAS LABORATORIES ONE-DIP®

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION
   24-Hour Emergency Phone Number: 989-636-4400
   Product: One-Dip®* Solvent
   Product Code: 40174
   Effective Date: 06/14/04 Date Printed: 06/15/04 MSD: 002289

2. COMPOSITION/INFORMATION ON INGREDIENTS
   Trichloroethylene Proprietary Blend CAS# 000079-01-6 99.9%

3. HAZARDS IDENTIFICATION
   EMERGENCY OVERVIEW

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- Colorless liquid. Irritating odor. Toxic fumes are released in fire situations.
- Harmful if inhaled. Can cause death if too much is breathed. Clear all
- personnel from spill area. Wear full protected equipment. Contain liquid to
- prevent contamination of soil, surface water or ground water.

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POTENTIAL HEALTH EFFECTS (See Section 11 for toxicological data.)

EYE: May cause pain and slight eye irritation. Corneal injury is unlikely. Vapors may irritate eyes.

SKIN: Prolonged or repeated exposure may cause skin irritation. May cause drying or flaking of skin. May cause more severe response if confined to skin. A single prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts. One-Dip® may be absorbed through the skin and may cause numbness in fingers immersed in the liquid.

INGESTION: Single dose oral toxicity is considered to be low. Small amounts swallowed incidental to normal handling operations are not likely to cause injury; however, swallowing amounts larger than that may cause serious injury, even death. If aspirated (liquid enters the lung), may be rapidly absorbed through the lungs and result in injury to other body systems.

INHALATION: In confined or poorly ventilated areas, vapors can readily accumulate and can cause unconsciousness and death. Excessive exposure may cause irritation to upper respiratory tract. Excessive exposure may increase sensitivity to epinephrine and increase myocardial irritability (irregular heartbeats). May cause alcohol intolerance often manifested by temporary reddening of the skin called 'degreaser's flush'.
Minimal anesthetic or irritant effects may be seem around 200-400 ppm. Levels in the range of 1000-2000 ppm may rapidly cause dizziness or drunkenness. Progressively higher levels or longer exposure may cause unconsciousness and death and may be immediately hazardous to life.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: Alcohol consumed before or after exposure may increase adverse effects. Trichloroethylene is reported to have caused hearing loss in laboratory animals upon repeated exposure to 2500 ppm or higher (orders of magnitude greater than the current occupational exposure standards). However, the relevance of this to humans is unknown. High levels have caused liver or kidney effects in laboratory animals.

CANCER INFORMATION: Tumors were observed in mice given large doses of trichloroethylene. A very low incidence of tumors has been observed in male rats at high levels of trichloroethylene which caused reduced survival, rendering these studies inadequate. Data suggest a nongenotoxic mechanism for tumor formation that implies that nontoxic doses of trichloroethylene should pose little or no carcinogenic hazard. Human data have not established an association between trichloroethylene exposure and cancer. Trichloroethylene is not believed to pose a measurable carcinogenic risk to man when handled as recommended. For hazard communication purposes under OSHA Standard 29 CFR Part 1910.1200, this chemical is listed as a potential carcinogen by IARC.

TERATOLOGY (BIRTH DEFECTS): Birth defects are unlikely. Exposures having no effect on the mother should have no effect on the fetus. Did not cause birth defects in animals; other effects were seen in the fetus only at doses which caused toxic effects to the mother.

REPRODUCTION EFFECTS: In animal studies, has been shown not to interfere with reproduction.

4. FIRST AID

EYE: Flush eyes with plenty of water.

SKIN: Wash off in flowing water or shower.

INGESTION: Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

NOTE TO PHYSICIAN: Because rapid absorption may occur through lungs if aspirated and cause systemic effects, the decision of whether to induce vomiting or not should be made by a physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach.

Exposure may increase "myocardial irritability". Do not administer sympathomimetic drugs unless absolutely necessary. No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT: None

METHOD USED: TCC

AUTOIGNITION TEMPERATURE: 788F, 420C

FLAMMABILITY LIMITS

LFL: 8.0% @ 100C; 8.0% @ 25C

UFL: 44.8% @ 100C; 10.5% @ 25C

HAZARDOUS COMBUSTION PRODUCTS: During a fire, smoke may contain the original material in addition to unidentified toxic and/or irritating compounds. Hazardous combustion products may include and are not limited to hydrogen chloride. Hazardous combustion products may include trace amounts of phosgene, chlorine and carbon monoxide.

OTHER FLAMMABILITY INFORMATION: Container may vent and/or rupture due to fire. Although this material does not have a flash point, it can burn at room temperature. Vapors are heavier than air and may travel a long distance and accmulate in low lying areas.

EXTINGUISHING MEDIA: Water fog or fine spray. Carbon dioxide chemical. Foam. Water fog, applied gently may be used as a blanket for fire extinguishment.

FIRE FIGHTING INSTRUCTIONS: Keep people away. Isolate fire area and deny unnecessary entry. Contain fire water run-off if possible. Fire water run-off, if not contained may cause environmental damage. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Water fog applied gently may be used as a blanket for fire extinguishment. Stay upwind. Keep out of low areas where gases (fumes) can accumulate.

PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots, and gloves). If protection equipment is not available or not used, fight fire from a protected location or safe distance.

6. ACCIDENTAL RELEASE MEASURES (See Section 15 for Regulatory Information)

PROTECT PEOPLE: Clear all personnel from area. Do not breathe vapors. Ventilate area of leak or spill. Wear protective equipment including positive pressure self contained or air supplied breathing apparatus. Follow confined space entry procedures: ASTM D-4276 and OSHA (29 CFR 1910.146).

PROTECT THE ENVIRONMENT: Contain liquid to prevent contamination of soil, surface water or ground water. Material is heavier than water and has limited water solubility. It will collect on the lowest surface.

CLEANUP: For large spills: Evacuate spill area. Contain liquid; transfer to properly labeled closed metal containers. For small spills: Mop or soak-up immediately. Place in properly labeled metal containers.

7. HANDLING AND STORAGE

HANDLING: To avoid uncontrolled emissions vent vapor from container to storage tank. Do not eat, drink, or smoke in working area. Refer to Exposure Controls/Personal Protection, Section 8, of the MSDS. Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers due to possible fire/explosive hazard. Vapors of this product are heavier than air and will collect in low areas such as pits, degreasers, storage tanks, and other confined areas. Do not enter these areas where vapors of this product are suspected unless special breathing apparatus is used and an observer is present for assistance.

STORAGE: Keep containers tightly closed when not in use. For more Storage and Handling information refer to bulletin #100-06170. Store in a dry place. Do not store in aluminum, zinc, aluminum alloys and plastics. Product should not be packaged in aluminum aerosol cans or with finely divided aluminum or its alloys in an aerosol can. Product is denser than water. Design storage containers appropriately.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION
   ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines. Lethal concentrations may exist in areas with poor ventilation.
   PERSONAL PROTECTIVE EQUIPMENT
   EYE/FACE PROTECTION: Use safety glasses. If vapor exposure causes eye discomfort, use a full-face respirator.
   SKIN PROTECTION: Use protective clothing impervious to this material. Selection of specific items such as faceshield, gloves, boots, apron, or full-body suit will depend on operation. Remove contaminated clothing immediately, wash skin area with soap and water, and launder clothing before reuse.
   RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required, use an approved air-purifying or positive-pressure supplied-air respirator depending on the potential airborne concentration. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. In confined or poorly ventilated areas, use an approved positive-pressure supplied-air respirator.
   EXPOSURE GUIDELINE(S): Trichloroethylene: ACGIH TLV is 50 ppm
   TWA, 100 ppm STEL, A5. OSHA PEL is 50 ppm TWA, 200 ppm STEL.
   PELs are in accord with those recommended by OSHA, as in the 1989 revision of PELs.

9. PHYSICAL AND CHEMICAL PROPERTIES
   APPEARANCE: Colorless liquid.
   ODOR: Irritating odor at high concentrations.
   VAPOR PRESSURE: 60 mmHg @ 20C
   VAPOR DENSITY: 4.53
   BOILING POINT: 189F (87C)
   SOLUBILITY IN WATER: 0.1 g/100g @ 25C
   SPECIFIC GRAVITY: 1.46 @ 25/25C

10. STABILITY AND REACTIVITY
   CHEMICAL STABILITY: Stable under normal conditions of use.
   CONDITIONS TO AVOID: Avoid open flames, welding arcs, or other high temperature sources which induce thermal decomposition to irritating and corrosive HCl from solvent vapor. High energy sources such as welding arcs can cause degradation generating chlorine, hydrogen chloride and possibly phosgene, and should be avoided.
   INCOMPATIBILITY WITH OTHER MATERIALS: Avoid contact with metals such as: aluminum powders, magnesium powders, potassium, sodium, and zinc powder. Avoid unintended contact with amines. Avoid contact with strong bases and strong oxidizers. Avoid prolonged contact with or storage in aluminum or its alloys. Dichloroacetylene may be formed by reaction with strong bases.
   HAZARDOUS DECOMPOSITION PRODUCTS: Hazardous decomposition products may include and are not limited to hydrogen chloride and trace amounts of chlorine and phosgene.
   HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION (See Section 3 for Potential Health Effects. For detailed toxicological data, write or call the address or non-emergency number shown in Section 1).
    SKIN: The LD50 for skin absorption in rabbits is approx. 10,000 mg/kg.
    INGESTION: The oral LD50 for rats is 4920 mg/kg.
    INHALATION: The LC50 for rats is 12,500 ppm for 4 hours.
    MUTAGENICITY: For epoxide-free trichloroethylene: in vitro mutagenicity studies were negative. Animal mutagenicity studies were predominantly negative. Pure trichloroethylene (without additives) lacks mutagenic potential in most tests.

12. ECOLOGICAL INFORMATION (For detailed Ecological data, write or call the address or non-emergency number shown in Section 1).
    ENVIRONMENTAL FATE
    MOVEMENT & PARTITIONING: Bioconcentration potential is low (BCF less tha 100 or Log Kow less than 3). Log octanol/water partition coefficient (log Pow) is 2.42. Potential for mobility in soil is high (Koc between 50 and 150). Log soil organic carbon partition coefficient (log Koc) is 1.6-2.0. Bioconcentration factor (BCF) in fish is between 17-90. Henry's Law Constant (H) is 1.03E-02 atm-m3/mol.
    DEGRADATION & PERSISTANCE: Biodegradation under aerobic laboratory conditions is below detectalbe limits. Biodegradation rate may increase in soil and/or water with acclimation. Biodegradation may occur under both aerobic and anaerobic conditions (in the presence or absence of oxygen). Degradation is expected in the atmospheric environment within days to weeks. Inhibitory concentration (IC50) in OECD Activated Sludge Respiration Inhibition Test (OECD Test No. 209) is 260 mg/L.
    ECOTOXICITY: Material is moderately toxic to aquatic organisms on an acute basis (LC50 between 1 and 10 mg/L in most sensitive species). Acute LC50 for grass shrimp (Palaemonetes pugio) is 2 mg/L. Acute LC50 for water flea (Daphnia magna) is 2.2-100 mg/L. Acute LC50 for mysid (Mysidopsis bahia) is 14 mg/L. Acute LC50 for sheepshead minnow (Cyprinodon variegatus) is 20 mg/L. Acute LC50 for American flagfish (Jordenella floridae) is 28.28 mg/L. Acute LC50 for fathead minnow (Pimephales promelas) is 41-67 mg/L. Acute LC50 for bluegill (Lepomis macrochirus) is 41 mg/L. Acute LC50 for clawed toad (Xenopus laevis) is 45 mg/L. Acute LC50 for Japanese medaka or rice fish (Oryzias latipes) is 84 mg/L.
13. DISPOSAL CONSIDERATIONS (See Section 15 for Regulatory Information)
    DISPOSAL: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State/provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. WESTERN OPTICAL SUPPLY AND THE DOW CHEMICAL COMPANY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (Composition/Information On Ingredients).
    FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: recycler, reclaimer, incinerator or other thermal destruction device.

14. TRANSPORT INFORMATION
DEPARTMENT OF TRANSPORTATION (D.O.T.):
For DOT regulatory information, if required, consult transportation regulations, product shipping papers.
CANADIAN TDG INFORMATION:
For TDG regulatory information, if required, consult transportation regulations, product shipping Papers.

15. REGULATORY INFORMATION (Not meant to be all-inclusive--selected regulations represented).
NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws.
The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See other sections for health and safety information.
U.S. REGULATIONS
SARA 313 INFORMATION: This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

CHEMICAL NAME	CAS NUMBER	CONCENTRATION
TRICHLOROETHYLENE Blend	000079-01-6	99.9%

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:
An immediate health hazard
A delayed health hazard

CALIFORNIA PROPOSITION 65: The following statement is made in order to comply with the California Safe Drinking Water and Toxic Enforcement Act of 1986: WARNING: This product contains a chemical(s) known to the State of California to cause cancer.

TOXIC SUBSTANCES CONTROL ACT (TSCA):
All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

CHEMICAL NAME	CAS NUMBER	LIST
TRICHLOROETHYLENE	000079-01-6	NJ3 PA1 NJ1 NJ2 PA3

NJ1=New Jersey Special Health Hazard Substance (present at greater than or equal to 0.1%).
NJ2=New Jersey Environmental Hazardous Substance (present at greater than or equal to 1.0%).
NJ3=New Jersey Workplace Hazardous Substance (present at greater than or equal to 1.0%).
PA1=Pennsylvania Hazardous Substance (present at greater than or equal to 1.0%).

PA3=Pennsylvania Environmental Hazardous Substance (present at greater than or equal to 1.0%).

OSHA HAZARD COMMUNICATION STANDARD:
This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND):
This product contains the following substance(s) listed as "Hazardous Substances" under CERCLA which may require reporting of releases:
Category:

Chemical Name	CAS#	RQ	% in Product
Trichloroethylene	000079-01-6	100 lbs	99.9%

CANADIAN REGULATIONS
WHMIS INFORMATION: The Canadian Workplace Hazardous Materials Information System (WHMIS) Classification for this product is:
D1B - poisonous substance defined by TDG regulations
D2A - possible, probable or known human carcinogen according to classifications by IARC or ACGIH
D2B - eye or skin irritant
Refer elsewhere in the MSDS for specific warnings and safe handling information. Refer to the employer's workplace education program.

CPR STATEMENT: This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

HAZARDOUS PRODUCTS ACT INFORMATION: This product contains the following ingredients that are Controlled Products and/or on the Ingredient Disclosure List (Canadian HPA section 13 & 14):

COMPONENTS:	CAS #	AMOUNT(%w/w)
Trichloroethylene	000079-01-6	99.9%

16. OTHER INFORMATION
NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:
Health 2
Flammibility 1
Reactivity 0

PRODUCT USE INFORMATION: Process water in contact with solvent and/or water separators of cleaning or distillation equipment should be treated as hazardous waste. Do not discharge water from water separators to drain. Dow does NOT recommend the use of this product in applications where:
soil or ground water contamination is likely (direct applications to the ground, sink drains, sewers, or septic tanks)

where over exposure is likely (small rooms or confined space, or where there would be inadequate ventilation)
where skin contact is likely (adhesive tape removal from skin or as hand cleaner to remove oils and greases)
where there is direct food contact and where vapor concentrations would be in the flammable range.
where disposal of waste would pose an environmental or health risk.
where chemical reactivity poses a danger (contact with strong alkali, or in areas where welding is done).

These data are offered in good faith as typical values and not as product specifications. No warranty, either expressed or implied, is hereby made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate. The information relates to this specific material. It may not be valid for this material if used in combination with any other materials or in any process. It is the users responsibility to satisfy oneself as to the suitability and completeness of this information for his own particular use. (R) Indicates Registered Trademark