- MAY CAUSE EYE AND SKIN IRRITATION
- LONG-TERM EXPOSURE TO VAPOR HAS CAUSED CANCER IN LABORATORY ANIMALS
- KEEP OUT OF REACH OF CHILDREN

****

IMMEDIATE HEALTH EFFECTS

EYE:
Contact with the eyes causes irritation. Eye contact with the vapors, fumes, or spray mist from this substance could also cause similar signs and symptoms.

SKIN:
Contact with the skin causes irritation. Not expected to be harmful to internal organs if absorbed through the skin. Prolonged or frequently repeated contact may cause the skin to become cracked or dry from the defatting action of this material.

INGESTION:
Because of the low viscosity of this substance, it can directly enter the lungs if it is swallowed (this is called aspiration). This can occur during the act of swallowing or when vomiting the substance. Once in the lungs, the substance is very difficult to remove and can cause severe injury to the lungs and death.

INHALATION:
May be harmful if inhaled. Breathing the vapors at concentrations above the recommended exposure standard can cause central nervous system effects. The vapor or fumes from this material may cause respiratory irritation.

SIGNS AND SYMPTOMS OF EXPOSURE:
Eye damage or irritation: may include pain, tearing, reddening, swelling, and impaired vision. Skin injury: may include pain, discoloration, swelling, and blistering. Respiratory irritation: may include coughing and difficulty breathing. Central nervous system effects may include headache, dizziness, nausea, vomiting, weakness, loss of coordination, blurred vision, drowsiness, confusion, or disorientation. At extreme exposures, central nervous system effects may include respiratory depression, tremors or convulsions, loss of consciousness, coma or death.

CARCINOGENICITY:
Risk depends on duration and level of exposure. See Section 11 for additional information. Gasoline has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC). Contains chemical(s) known to the State of California to cause cancer. Contains benzene, which has been classified as a carcinogen by the National Toxicology Program (NTP), and a Group 1 carcinogen (carcinogenic to humans) by the International Agency for Research on Cancer (IARC). Contains ethylbenzene which has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on

Cancer (IARC).
Whole gasoline exhaust was reviewed by the International Agency for Research on Cancer (IARC) in their Monograph Volume 46 (1989). Evidence for causing cancer was considered inadequate in animals and inadequate in humans. IARC placed whole gasoline exhaust in Category 2B, considering it possibly carcinogenic to humans.

4. FIRST AID MEASURES

EYE:
Flush eyes with water immediately while holding the eyelids open. Remove contact lenses, if worn, after initial flushing, and continue flushing for at least 15 minutes. Get medical attention if irritation persists.

SKIN:
Wash skin immediately with soap and water and remove contaminated clothing and shoes. Get medical attention if irritation persists. Discard contaminated clothing and shoes or thoroughly clean before reuse.

INGESTION:
If swallowed, give water or milk to drink and telephone for medical advice. DO NOT make person vomit unless directed to do so by medical personnel. If medical advice cannot be obtained, then take the person and product container to the nearest medical emergency treatment center or hospital.

INHALATION:
Move the exposed person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if breathing difficulties continue.
NOTE TO PHYSICIANS:
Ingestion of this product or subsequent vomiting can result in aspiration of light hydrocarbon liquid which can cause pneumonitis.

5. FIRE FIGHTING MEASURES

FIRE CLASSIFICATION:
OSHA Classification (29 CFR 1910.1200): Flammable liquid. See section 7 for appropriate handling and storage conditions.
FLAMMABLE PROPERTIES:
FLASH POINT: (TCC) < -49F (<-45C)
AUTOIGNITION: 536F (280C)
FLAMMABILITY LIMITS (% by volume in air): Lower: 1.4 Upper: 7.6

EXTINGUISHING MEDIA:
CO2, Dry Chemical, Fire Fighting Foam, AFFF.
NFPA RATINGS: Health 1; Flammability 3; Reactivity 0.

FIRE FIGHTING INSTRUCTIONS:
Use water spray to cool fire-exposed containers and to protect personnel. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.

COMBUSTION PRODUCTS:
Normal combustion forms carbon dioxide and water vapor; incomplete combustion can produce carbon monoxide.

6. ACCIDENTAL RELEASE MEASURES

CHEMTREC EMERGENCY NUMBER (24 hr): (800)424-9300 or (703)527-3887
International Collect Calls Accepted

ACCIDENTAL RELEASE MEASURES:
Eliminate all sources of ignition in the vicinity of the spill or released vapor. Stop the source of the leak or release. Clean up releases as soon as possible, observing precautions in Exposure Controls/Personal Protection. Contain liquid to prevent further contamination of soil, surface water or groundwater. Clean up small spills using appropriate techniques such as sorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Follow prescribed procedures for reporting and responding to larger releases. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations. Contact local environmental or health authorities for approved disposal of this material.

Release of this product should be prevented from contaminating soil and water and from entering drainage and sewer systems. U.S.A. regulations require reporting spills of this material that could reach any surface waters. The toll free number for the U.S. Coast Guard National Response Center is (800) 424-8802.

7. HANDLING AND STORAGE

This product presents an extreme fire hazard. Liquid very quickly evaporates, even at low temperatures, and forms vapor (fumes) which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights,

welding equipment, and electrical motors and switches.

Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating an accumulation of electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106, "Flammable and Combustible Liquids", National Fire Protection Association (NFPA) 77, "Recommended Practice on Static Electricity", and/or the American Petroleum Institute (API) Recommended Practice 2003, "Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents".

Improper filling of portable gasoline containers creates danger of fire. Only dispense gasoline into approved and properly labeled gasoline containers. Always place portable containers on the ground. Be sure pump nozzle is in contact with the container while filling. Do not use a nozzle's lock-open device. Do not fill portable containers that are inside a vehicle or truck/trailer bed.

Never siphon gasoline by mouth. Use only as a motor fuel. Do not use for cleaning, pressure appliance fuel, or any other such use. DO NOT USE OR STORE near heat, sparks or open flames. USE AND STORE ONLY IN WELL VENTILATED AREA. Keep container closed when not in use. READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL.

Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner, or properly disposed of.

Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Do not breathe vapor or fumes. Do not breathe mist. Wash thoroughly after handling.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:
Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should

read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

ENGINEERING CONTROLS
Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below the recommended exposure limits.

PERSONAL PROTECTIVE EQUIPMENT
EYE/FACE PROTECTION:
No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.

SKIN PROTECTION:
No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted,

physical requirements and other substances. Suggested materials for protective gloves include: <Nitrile> <Polyurethane> <Viton> <Chlorinated Polyethylene (or Chlorosulfonated Polyethylene or CPE)>

RESPIRATORY PROTECTION:
Determine if airborne concentrations are below the recommended exposure limits. If not, wear a NIOSH approved respirator that provides adequate protection from measured concentrations of this material. Use the following respirators: Organic Vapor. Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DESCRIPTION:
Variable colored liquid with a petroleum hydrocarbon odor.

pH:	NA
VAPOR PRESSURE:	5 - 15 PSI @ 100F (REID)
VAPOR DENSITY (AIR=1):	3-4
BOILING POINT:	25 - 225C (range)
FREEZING POINT:	NA
MELTING POINT:	NA
SOLUBILITY:	Soluble in hydrocarbons; insoluble in water.
SPECIFIC GRAVITY:	0.7 - 0.8 @ 15.6/15.6C
PERCENT VOLATILE (VOL):	99+%

10. STABILITY AND REACTIVITY

HAZARDOUS DECOMPOSITION PRODUCTS:
None known
CHEMICAL STABILITY:
Stable.
CONDITIONS TO AVOID:
See section 7.
INCOMPATIBILITY WITH OTHER MATERIALS:
May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
HAZARDOUS POLYMERIZATION:
Polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS:
The mean 24-hour Draize eye irritation score in rabbits is 0.

SKIN EFFECTS:
This material was not a skin sensitizer in the modified Buehler Guinea Pig Sensitization Test. For a 4-hour exposure, the Primary Irritation Index (PII) in rabbits is: 4.8.

ACUTE ORAL EFFECTS:
The oral LD50 in rats is > 5 ml/kg.

ACUTE INHALATION EFFECTS:
No product toxicology data available.

ADDITIONAL TOXICOLOGY INFORMATION:
When vapor exposures are low, or short duration and infrequent, such as during refuelling and tanker loading/unloading, neither total hydrocarbon nor components such as benzene are likely to result in any adverse health effects. In situations such as accidents or spills where exposure to gasoline vapor and liquid is potentially high, attention should be paid to potential toxic effects of specific components in addition to those of total hydrocarbons. Information about specific components in gasoline are found in Section 1 and Section 15 of this MSDS. More detailed information on the health hazard of specific gasoline components can be obtain from the Chevron Emergency Information Center (see Section 1 for telephone numbers).

A study was done in which ten volunteers were exposed for 30 minutes to about 200, 500 or 1000 ppm concentrations of the vapor of three different

unleaded gasolines. Irritation of the eyes was the only significant effect observed, based on both subjective and objective assessments.

An inhalation study with rats exposed to 0, 400 and 1600 ppm of wholly vaporized unleaded gasoline, 6 hours per day on day 6 through 16 of gestation, showed no teratogenic effects nor indication of toxicity to either the mother or the fetus (sex ratio, embryotoxicity, fetal growth and development).

An inhalation study with pregnant rats exposed to 0, 1000, 3000, and 9000 ppm of unleaded gasoline vapor, 6 hours per day on days 6 through 20 of gestation, showed no teratogenic effects nor indications of toxicity to either the mother or the fetus.

In an inhalation study, groups of 6 Fischer rats (3 male, 3 female) were exposed to 2056 ppm of wholly vaporized unleaded gasoline for 6 hours per day, 5 day per week for up to 18 months. Histopathology of the peripheral nervous system and spinal cord revealed no distal axonal neuropathy of the type associated with exposure to n-hexane even though gasoline contained 1.9% n-hexane. The authors concluded that gasoline treatment may have amplified the incidence and prominence of some naturally occurring age related changes in the nervous system.

Wholly vaporized unleaded gasoline was used in a 3 month inhalation study. Groups of 40 rats (20 males, 20 female) and 8 squirrel monkeys (4 male, 4 female) were exposed 6 hours per day and 5 days per week for 13 weeks to 384 or 1552 ppm gasoline. One group of each species served as unexposed controls. The initial conclusion of this study was that inhalation of gasoline at airborne concentrations of up to 1522 ppm caused no toxicity in rats or monkeys. However, further histopathological examination of male rat kidneys on the highest dose group revealed an increased incidence and severity of regenerative epithelium and dilated tubules containing proteinaceous deposits.

Rabbits were exposed to unleaded gasoline 24 hour per day, 5 days per week for two weeks; 0, 2.5, 5 or 8 ml were applied to the skin under an occlusive dressing. Applied in such a way, this motor gasoline was corrosive to the rabbit skin and animals in all dose groups had decreased bodyweights. The slight and/or isolated systemic effects noted in the study were judged to be not significant.

Unleaded gasoline was assayed for mutagenic and cytogenetic activity. Gasoline was not mutagenic, either with or without activation, in Ames assay (Salmonella typhimurium), Saccharamyces cerevisesae, or mouse lymphoma assays. In addition, point mutations were not induced in human lymphocytes exposed to gasoline in vivo. The gasoline was not mutagenic when tested in the mouse dominant lethal assay. Administration of gasoline to rats did not cause chromosomal aberrations in their bone marrow cells.

In a lifetime skin painting study, 50 male Swiss mice were treated with 0.05 ml of unleaded gasoline three times per week. Positive control groups were treated with benzo(a)pyrene in acetone; an untreated negative

control group was also included. The repeated exposure to gasoline caused severe skin irritation, ulceration, hyperkeratosis and abscesses. There was no statistically significant increase in the incidence of skin tumors. Histopathology at the end of the study showed that unleaded gasoline did not increase the incidence of tumors in other organs.

Lifetime inhalation of wholly vaporized unleaded gasoline at 2056 ppm has caused increased liver tumors in female mice. The mechanism of this response is still being investigated but is thought to be an epigenetic process unique to the female mouse. This exposure also caused kidney damage and eventually kidney cancer in male rats. No other animal model studied has shown these adverse kidney effects and there is no physiological reason to believe that they would occur in man. EPA has concluded that the mechanism by which wholly vaporzied unleaded gasoline causes kidney damage is unique to the male rat. The response in that species (kidney damage and cancer) should not be used in human risk assessment.

In their 1988 review of carcinogenic risk from gasoline, The Internatioal Agency for Research on Cancer (IARC) noted that, because published epidemiology studies did not include any exposure data, only occupations where gasoline exposure may have occurred were reviewed. These included gasoline service station attendants and automobile mechanics. IARC also noted that there was no opportunity to separate effects of combustion products from those of gasoline itself. Although IARC allocated gasoline a final overall classification of Group 2B, i.e. possibly carcinogenic to humans, this was based on limited evidence in experimental animals plus supporting evidence including the presence in gasoline of benzene and 1, 3-butadiene. The actual evidence for cacinogenicity in humans was considered inadequate.

To explore the health effects of workers potentially exposed to gasoline vapors in the marketing and distribution sectors of the petroleum industry, the American Petroleum Institute sponsored a cohort mortality, a nested case-control, and an exposure assessment study. Histories of exposure to gasoline were reconstructed for a cohort of more than 18,000 employees from four companies for the time period between 1946 and 1985. Data were analyzed based on length of employment, length of exposure, job category, age at first exposure and estimated cumulative and peak exposures. Cumulative exposure was defined as the sum of products of TWA exposure and duration of exposure of each job in an employee's work history. Amoung cohort members, cumulative exposure ranged from 2 to 8,000 ppm-years. In general, long-term drivers at small terminals had the highest exposures, and short-term workers with "other terminal jobs" had the lowest. A peak exposure was defined as an episode in excess of 500 ppm lasting 15 to 90 minutes.

The results of the cohort study indicated that there was no increased mortality from either kidney cancer or leukemia among marketing and marine distribution employees who were exposed to gasoline in the petroleum industry, when compared to the general population. More importantly, based on internal comparisons, there was no association between mortality from kidney cancer or leukemia and various indices of gasoline exposure.

For acute myeloid leukemia (AML), a non-significant mortality increase was

found in land-based terminal employees, but no trend was detected when the data were analyzed by various gasoline exposure indices. This non-significant excess was limited to land-based terminal employees hired prior to 1948. On the other hand, a deficit of mortality from AML was observed among marine employees.

In addition to the cohort study, a subsequent nested case-control study was also conducted. Four diseases were selected for analysis in the case-control study: Leukemia (all cell types), AML, kidney cancer and multiple myeloma. For each case, five individually matched controls were randomly selected from the cohort. In the original cohort study, broad generic job categories were used as part of exposure assessment. In the case-control study, a finer and more homogeneous job classification was developed. In addition to job category, several quantitative gasoline exposure indices were used in the case-control analysis: length of exposure, cumulative exposure (ppm-years in terms of total hydrocarbons) and frequency of peak exposure. Time period of first exposure to gasoline (1948 or before and 1949 or after) was also included as an exposure index. Results of the nested case-control study confirmed the findings of the original cohort study. That is, exposure to gasoline at the levels experienced by this cohort of distribution workers is not a significant risk factor for leukemia (all cell types), acute myeloid leukemia, kidney cancer or multiple myeloma.

12. ECOLOGICAL INFORMATION

ECOTOXICITY:
Gasoline studies have been conducted in the laboratory under a variety of test conditions with a range of fish and invertebrate species. An even more extensive database is available on the aquatic toxicity of individual aromatic constituents. The majority of published studies do not identify the type of gasoline evaluated, or even provide distinguishing characteristics such as aromatic content or presence of lead alkyls. As a result, comparison of results among studies using open and closed vessels, different ages and species of test animals and different gasoline types, is difficult.

The bulk of the available literature on gasoline relates to the environmental impact of monoaromatic (BTEX) and diaromatic (naphthalene, methylnaphthalenes) constituents. In general, non-oxygenated gasoline exhibits some short-term toxicity to freshwater and marine organisms, especially under closed vessel or flow-through exposure conditions in the laboratory. The components which are the most prominent in the water soluble fraction and cause aquatic toxicity, are also highly volatile and can be readily biodegraded by microorganisms.

The 96-hour LC50 in rainbow trout (Oncorhynchus mykiss) is 2.7 mg/l (BTEX). The 48-hour LC50 in daphnia (Daphnia magna) is 3.0 mg/l (BTEX). The 96-hour LC50 in sheepshead minnow (Cyprinodon variegatus) is 8.3 mg/l

(BTEX). The 96-hour LC50 in mysid shrimp (Mysidopsis bahia) is 1.8 mg/l (BTEX).

ENVIRONMENTAL FATE:
Following spillage, the more volatile components of gasoline will be rapidly lost, with concurrent dissolution of these and other constituents into the water. Factors such as local environmental conditions (temperature, wind, mixing or wave action, soil type, etc), photo-oxidation, biodegradation and adsorption onto suspended sediments, can contribute to the weathering of spilled gasoline. The aqueous solubility of non-oxygenated unleaded gasoline, based on analysis of benzene, toluene, ethylbenzene+xylenes and naphthalene, is reported to be 112 mg/l. Solubility data on individual gasoline constituents also available.

13. DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible.

This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by USEPA under RCRA (40CFR261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

14. TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

DOT SHIPPING NAME: GASOLINE
DOT HAZARD CLASS: 3 (FLAMMABLE LIQUID)
DOT IDENTIFICATION NUMBER: UN1203
DOT PACKING GROUP: II

15. REGULATORY INFORMATION

SARA 311 CATEGORIES:

1. Immediate (Acute) Health Effects: YES
2. Delayed (Chronic) Health Effects: YES
3. Fire Hazard: YES
4. Sudden Release of Pressure Hazard: NO
5. Reactivity Hazard: NO

REGULATORY LISTS SEARCHED:

01=SARA 313	11=NJ RTK	22=TSCA Sect 5(a)(2)
02=MASS RTK	12=CERCLA 302.4	23=TSCA Sect 6
03=NTP Carcinogen	13=MN RTK	24=TSCA Sect 12(b)
04=CA Prop 65-Carcin	14=ACGIH TWA	25=TSCA Sect 8(a)
05=CA Prop 65-Repro Tox	15=ACGIH STEL	26=TSCA Sect 8(d)
06=IARC Group 1	16=ACGIH Calc TLV	27=TSCA Sect 4(a)
07=IARC Group 2A	17=OSHA PEL	28=Canadian WHMIS
08=IARC Group 2B	18=DOT Marine Pollutant	29=OSHA CEILING
09=SARA 302/304	19=Chevron TWA	30=Chevron STEL
10=PA RTK	20=EPA Carcinogen	

The following components of this material are found on the regulatory lists indicated.

BENZENE, ETHYL-
  is found on lists: 01,02,08,10,11,12,13,14,15,17,26,28,
N-BUTANE
  is found on lists: 02,10,11,13,14,28,
CYCLOHEXANE, METHYL
  is found on lists: 02,10,11,13,14,17,26,28,
TOLUENE
  is found on lists: 01,02,05,10,11,12,13,14,17,26,28,29,
N-HEXANE
  is found on lists: 01,02,10,11,12,13,14,17,27,28,
CYCLOHEXANE
  is found on lists: 01,02,10,11,12,13,14,17,26,28,
BENZENE, DIMETHYL-
  is found on lists: 01,02,10,11,12,13,14,15,17,
N-HEPTANE
  is found on lists: 02,10,11,13,14,15,17,26,28,
2-METHOXY-2-METHYL PROPANE
  is found on lists: 01,02,10,11,12,14,24,26,27,30,
BENZENE, TRIMETHYL-
  is found on lists: 02,10,11,13,14,26,28,
2,2,4-TRIMETHYLPENTANE
  is found on lists: 02,10,11,12,26,
2-ETHOXY-2-METHYL PROPANE

is found on lists: 25,26,
ETHYL ALCOHOL
is found on lists: 02,10,11,13,14,17,28,
BENZENE
is found on lists: 01,02,03,04,06,10,11,12,13,14,15,17,20,28,29,
2-METHOXY-2-METHYL-BUTANE
is found on lists: 24,25,26,27,30,
GASOLINE (GENERIC)
is found on lists: 04,08,14,15,17,
PENTANES
is found on lists: 14,15,17,
HEXANES
is found on lists: 14,15,

WHMIS CLASSIFICATION:
Class B, Division 2: Flammable Liquids
Class D, Division 2, Subdivision A: Very Toxic Material
-Carcinogenicity
Class D, Division 2, Subdivision B: Toxic Material
-Skin or Eye Irritation

16. OTHER INFORMATION

NFPA RATINGS: Health 1; Flammability 3; Reactivity 0;
(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

REVISION STATEMENT:
This revision updates Sections 1, 3, 5, 7, 9, 15, & 16.

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV	- Threshold Limit Value	TWA	- Time Weighted Average
STEL	- Short-term Exposure Limit	TPQ	- Threshold Planning Quantity
RQ	- Reportable Quantity	PEL	- Permissible Exposure Limit
C	- Ceiling Limit	CAS	- Chemical Abstract Service Number
A1-5	- Appendix A Categories	()	- Change Has Been Proposed
NDA	- No Data Available	NA	- Not Applicable

Prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1) by the Toxicology and Health Risk Assessment Unit, CRTC, P.O. Box 1627, Richmond, CA 94804

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modification of the information, we do not assume any responsibil-ity for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

THIS IS THE LAST PAGE OF THIS MSDS

Revision Number: 14 Revision Date: 07/22/00 MSDS Number: 002914

GREASE

M S D S

Canadian Centre for Occupational Health and Safety

Issue : 2001-1 (February, 2001)

*** IDENTIFICATION ***

MSDS RECORD NUMBER : 287372
PRODUCT NAME(S) : Inland 16350 High Vacuum Grease (Perfluorinated polyether thickened with fluorotelomer)
DATE OF MSDS : 1986-12-19
CURRENCY NOTE : MSDS Confirmed Current: 1997-05-13

*** MANUFACTURER INFORMATION ***

MANUFACTURER : Inland Vacuum Industries
ADDRESS : 35 Howard Avenue
Churchville New York
U.S.A. 14428
EMERGENCY TELEPHONE NO. : 716-293-3330 (Days)
803-548-2346 (Evenings)

*** MATERIAL SAFETY DATA ***

IDENTITY Inland 16350 High Vacuum Grease (Perfluorinated polyether thickened with fluorotelomer)

SECTION I

PREPARATION DATE 12-19-86
PREPARER'S SIGNATURE

SECTION II HAZARDOUS INGREDIENTS AND IDENTITY INFORMATION

HAZARDOUS COMPONENT	OSHA PEL	ACGIH TLV	OTHER LIMITS	%(OPT)
Fluorine end-capped homopolymers of hexafluoropropylene epoxide thickened with fluorotelomers				100

SECTION III PHYSICAL AND CHEMICAL CHARACTERISTICS

BOILING POINT (deg C)	>200
SPECIFIC GRAVITY (H2O=1)	>1.90
VAPOR PRESSURE (Torr)	<.0001
MELTING POINT (deg C) (pour point)	-45 to -5
VAPOR DENSITY (AIR=1)	~70
EVAPORATION RATE (BUTYL ACETATE=1)	Nil
SOLUBILITY IN WATER	Nil
APPEARANCE AND ODOR	white dense, viscous fluid

SECTION VI FIRE AND EXPLOSION DATA

FLASH POINT (METHOD USE) None (Pensky-Martens Closed Cup)
FLAMMABLE LIMITS Not applicable LEL UEL
EXTINGUISHING MEDIA As appropriate for other combustibles in the area
SPECIAL FIRE FIGHTING PROCEDURES Wear breathing gear when fighting fires in enclosed areas because decomposition of Krytox at flame temperatures may form toxic fluorine compounds.
UNUSUAL FIRE AND EXPLOSION HAZARDS None

SECTION V REACTIVITY DATA

STABLE (Y/N) [Y] CONDITIONS TO AVOID
HAZARDOUS POLYMERIZATION (Y/N) [N] CONDITIONS TO AVOID
INCOMPATIBILITY No Incompatibilities are reasonably foreseen
HAZARDOUS DECOMPOSITION PRODUCTS See Health Hazard Information

SECTION VI HEALTH HAZARD DATA

ROUTES OF ENTRY: INHALATION: Not normally
SKIN: Yes
INGESTION: Not normally

HEALTH HAZARDS (ACUTE AND CHRONIC) Acute: May cause mild eye irritation and mild skin irritation. Inhalation of smoke from tobacco contaminated with this compound may cause throat irritation, cough and tightness in chest.
The known physiological effects of the separate ingredients of these materials indicate a very low order of toxicity in animals by skin contact (ALD >17000 mg/kg rabbits); by ingestion (ALD >25000mg/kg rats); and at-room-temperature inhalation (4 hr ALC 19.54 mg/l rats). Decomposition products formed at temperatures above 260 C are irritating to the lungs of animals. Pulmonary edema and death occurred in rats exposed to decomposition products may include lung irritation. Inhalation of decomposition products formed at ~290 C may required treatment of lung irritation for fluorine compounds which can cause

delayed pulmonary edema. Prolonged skin contact may cause redness and inflammation of hair follicles without sensitization.

CARCINOGENICITY NTP IARC MONOGRAPHS OSHA REGULATED
None of the components of this chemical is listed by IARC, NTP, or OSHA as a carcinogen.

SYMPTOMS OF EXPOSURE See above

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE Unknown

EMERGENCY FIRST AID PROCEDURES Inhalation - if inhaled remove to fresh air. If not breathing, give artificial respiration and call a physician. Skin contact - flush skin with water after prolonged or repeated contact. Eye contact - immediately flush eyes with plenty of water for at least 15 minutes. Call a physician. Ingestion - do not induce vomiting. Immediately give two glasses of water or activated charcoal slurry. Never give anything by mouth to an unconscious person.

SECTION VII PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Soak up spill with sawdust sand, oil-dry or other absorbent material. Remove sources of heat and flame. At 260-290 C material forms potentially toxic fluorine compounds. Avoid breathing any decomposition products. Place in container for disposal. Review other areas of this sheet for additional information.

WASTE DISPOSAL METHOD Dispose of in accordance with appropriate Federal, State and Local regulations. Do not flush liquid to surface water or sanitary sewer system.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING No special precautions..not regulated by DOT

OTHER PRECAUTIONS

SECTION VIII CONTROL MEASURES

RESPIRATORY PROTECTION (TYPE) should not be required when working with material under normal conditions

VENTILATION LOCAL SPECIAL
MECHANICAL OTHER

PROTECTIVE GLOVES Impermeable rubber gloves

EYE PROTECTION Goggles or safety glasses with side shields

GREASE

OTHER PROTECTIVE EQUIPMENT n.a.

WORK/HYGENIC PRACTICES Keep containers tightly closed. Do not consume food or tobacco in areas where they could become contaminated with this material. Provide adequate ventilation. Keep material from heat and flame.

ISN: 287372

HALON

* *
* M S D S *
* *
* Canadian Centre for Occupational Health and Safety *
* * * * * * * * * * * * Issue : 2001-1 (February, 2001) *

*** IDENTIFICATION ***

MSDS RECORD NUMBER : 950167
PRODUCT NAME(S) : HALON 1211, BCF
PRODUCT IDENTIFICATION : Form No. F-85320-7
DATE OF MSDS : 1995-03-08

*** MANUFACTURER INFORMATION ***

MANUFACTURER : ANSUL INCORPORATED
ADDRESS : One Stanton Street
Marinette Wisconsin
U.S.A. 54143-2542
Telephone: 715-735-7411 (Other Information Calls)
EMERGENCY TELEPHONE NO. : 800-424-9300 (CHEMTREC)

HALON 1211

QUICK IDENTIFIER (In Plant Common Name)

Prepared By: Safety and Health Department
Date Prepared: March 8, 1995

SECTION 1 - IDENTITY

Common Name: (used on label) Halon 1211, BCF
(Trade Name and Synonyms)
CAS No.: N/A
Chemical Name: Bromochlorodifluoromethane
Chemical Family: Halogenated Hydrocarbon
Formula: CF2ClBR

SECTION 2 - INGREDIENTS

PART A - HAZARDOUS INGREDIENTS

Principal Hazardous Component(s) (chemical and common name(s)):	%	CAS No.
Bromochlorodifluoromethane Chemical Listed Under SARA Title	Greater than 99	353-59-3

III - Section 311

ACGIH TLV: Not listed

Acute Toxicity Data:

ihl rat LCLO 32 pph/15 M

WARNING:

Bromochlorodifluoromethane is a substance which harms public health and environment by destroying ozone in the upper atmosphere.

PART B - OTHER INGREDIENTS

Other Component(s) (chemical and common name(s)):	%	CAS No.
None	N/A	N/A

Acute Toxicity Data: N/A

SECTION 3 - PHYSICAL AND CHEMICAL CHARACTERISTICS

(Fire and Explosion Data)

Boiling Point: 26 deg F

Specific Gravity (H2O=1): 1.83

Vapor Pressure (mm Hg): 37.5 psi @ 70 deg F

Percent Volatile by Volume (%): 100

Vapor Density (Air = 1): 5.7

Evaporation Rate (Butyl acetate = 1): Gas at room temperature

Solubility in Water: Negligible

Reactivity in Water: Unreactive

Appearance and Odor: Colorless gas, sweet odor.

Flash Point: None to boiling

Flammable Limits in Air % by Volume: N/A

Extinguisher Media: N/A

Auto-Ignition Temperature: N/A

Special Fire Fighting Procedures: THIS IS A FIRE EXTINGUISHING AGENT. Use water to cool fire-exposed cylinders or other containers. Self-contained breathing apparatus with full facepiece and protective clothing when re-entering unventilated fire areas where product has been used.

Unusual Fire and Explosion Hazards: Containers are equipped with pressure and temperature relief devices, but rupture may occur under fire conditions and toxic decomposition by-products may be formed if used in fires over 900 deg F.

SECTION 4 - PHYSICAL HAZARDS

Stability:	Unstable [ ]	Conditions to Avoid:	Decomposes under fire conditions above 900 deg F.
	Stable [x]		

Incompatibility (Materials to Avoid): Active metals and fires involving metal hydrides.

Hazardous Decomposition Products: Thermal decomposition; BCF begins decomposing at temperatures above 900 def F to give free halogens, halogen acids, and small amounts of carbonyl halides. These by-products have a sharp irritating odor. They are dangerous even in low concentrations, can result in personal injury or death.

Hazardous Polymerization:	May Occur [ ]	Conditions to Avoid:	N/A
	Will Not Occur [x]		

NOTE: As used in Ansul extinguishers or cylinders, Halon 1211 is a gas compressed under pressure up to 150 psi at 70 deg F.

SECTION 5 - HEALTH HAZARDS

Threshold Limit Value: None listed in ACGIH or OSHA. NOTE: The effects of exposure to Halon 1211 should disappear quickly upon removal from exposure.

Routes of Entry:

- Eye Contact: The liquid form of this material can produce chilling sensations and discomfort.
- Skin Contact: Systemically toxic concentrations are unlikely to be absorbed through the skin in man. Evaporation of liquid from the skin can produce chilling sensations. Skin injury does not result.
- Inhalation: Exposures to concentrations of this material above 4% for longer than one (1) minute can cause toxic side effects.
- Ingestion: Ingestion is not likely to occur since this material is gas at room temperature.

Signs and Symptoms:

- Acute Overexposure: Dizziness, impaired coordination, reduced mental acuity, and cardiac effects above 4 % concentration in excess of one minute. Unconsciousness or even death in high concentrations with longer exposures.
- Chronic Overexposure: Unknown

Medical Conditions Generally Aggravated by Exposure: Cardiac problems

Chemical Listed as Carcinogen or Potential:

National Toxicology Yes [ ] I.A.R.C. Yes [ ] OSHA: Yes [ ]