CITGO Leaded Gasolines, All Grades

Material Safety Data Sheet

CITGO Petroleum Corporation
P.O. Box 3758
Tulsa, OK 74102-3758

MSDS No. LEADED

Revision Date 08/19/2002

IMPORTANT: Read this MSDS before handling or disposing of this product and pass this information on to employees, customers and users of this product.

Hazard Rankings

	HMIS	NFPA
Health Hazard	* 2	1
Fire Hazard	3	3
Reactivity	0	0

*** = Chronic Health Hazard**

Protective Equipment

Minimum Recommended
See Section 8 for Details

Emergency Overview

Physical State Liquid.

Color Transparent, amber or red. **Odor** Pungent, characteristic gasoline.

DANGER:
Extremely flammable liquid; vapor may cause flash fire or explosion.
Use Only as a Motor Fuel. Do Not Siphon by Mouth.
Harmful or fatal if swallowed - Can enter lungs and cause damage.
High concentrations of vapor reduce oxygen available for breathing and may cause suffocation.
May be harmful if inhaled or absorbed through the skin.
Mist or vapor may irritate the eyes, mucous membranes, and respiratory tract.
Liquid contact may cause mild to moderate eye and/or mild to severe skin irritation.
Overexposures may cause central nervous system (CNS) depression and target organ effects (See Section 3).
Inhalation overexposure can increase the heart's susceptibility to arrhythmias (irregular beats).
Contains Benzene - Cancer Hazard.
Long term exposure to gasoline vapor has caused cancer in laboratory animals.
Toxic to aquatic organisms.
Spills may create a slipping hazard.

SECTION 1: IDENTIFICATION

Trade Name CITGO Leaded Gasolines, All Grades

Product Number LEADED

CAS Number Mixture.

Technical Contact (918) 495-5940 or (918) 495-5933

Medical Emergency (918) 495-4700

CHEMTREC Emergency (United States Only) (800) 424-9300

Product Family Motor fuels.

Synonyms Leaded gasoline; Motor gasoline; Petrol; Automobile motor fuels; Finished gasolines; Racing gasoline

SECTION 2: COMPOSITION

Component Name(s)	CAS Registry No.	Concentration (%)
1) Methyl tertiary-Butyl Ether (MTBE)	1634-04-4	0 - 15
2) tertiary-Amyl Methyl Ether (TAME)	994-05-8	0 - 15
3) Ethyl tertiary-butyl ether (ETBE)	637-92-3	0 - 15
4) tertiary-Amyl Ethyl Ether (TAEE)	919-94-8	0 - 15
5) Di-isopropyl Ether (DIPE)	108-20-3	0 - 15
6) Ethanol	64-17-5	0 - 10
7) Pentane, all isomers	Mixture.	5 - 20
8) Octane, all isomers	Mixture.	5 - 20
9) Toluene	108-88-3	1 - 20
10) Xylene, all isomers	1330-20-7	1 - 18
11) Hexane, other isomers	Mixture.	5 - 15
12) Heptane, all isomers	Mixture.	5 - 15
13) Nonane, all isomers	Mixture.	0 - 10
14) Isopentane	78-78-4	0 - 10
15) n-Butane	106-97-8	0 - 10
16) n-Hexane	110-54-3	1 - 8
17) Methylcyclohexane	108-87-2	1 - 5
18) Trimethylbenzene, all isomers	25551-13-7	1 - 5
19) Benzene	71-43-2	0 - 4.9
20) Cumene	98-82-8	0.5 - 4
21) Ethylbenzene	100-41-4	0.2 - 4
22) Hexene, all isomers	Mixture.	1 - 3
23) Methylcyclopentane	96-37-7	1 - 3
24) Cyclohexane	110-82-7	1 - 3
25) Ethylmethylbenzenes (Ethyltoluenes)	25550-14-5	1 - 3
26) Cyclopentane	287-92-3	1 - 2
27) Naphthalene	91-20-3	0.1 - 2
28) Indene	95-13-6	0.5 - 1.5
29) n-Propylbenzene	103-65-1	0.5 - 1.5
30) Styrene	100-42-5	0 - 1
31) Tetraethyl Lead	78-00-2	0 - 0.2

SECTION 3: HAZARDS IDENTIFICATION

Also see Emergency Overview and Hazard Ratings on the top of Page 1 of this MSDS.

Major Route(s) of Entry Skin contact. Eye contact. Skin Absorption. Inhalation.

Signs and Symptoms of Acute Exposure

Inhalation Overexposure to gasoline vapor can cause upper respiratory tract irritation, headache, nausea, vomiting and/or central nervous system (CNS) depression. Also, effects of components of this mixture can include euphoria, excitation, giddiness, abdominal pain, loss of appetite, fatigue, muscular weakness and staggered gait. CNS effects include dizziness, drowsiness, disorientation, vertigo, memory loss, visual disturbances, difficulty breathing, convulsions, unconsciousness, paralysis, coma and death. High vapor concentrations (such as in confined spaces) can displace the amount of oxygen in air available to breathe below that level necessary to sustain life. Gasoline vapor concentrations in the range of 20,000 ppm (2% by volume) in air can be fatal to humans in five minutes. In addition, exposures by susceptible individuals to concentrations as low as 5,000 ppm can result in death by cardiac arrest (heart attack).

Eye Contact This material can cause mild to moderate eye irritation as a result of short-term contact with liquid, mist or vapor. Symptoms can include stinging, watering, redness or swelling (conjunctivitis). In severe cases, permanent eye damage can result.

Skin Contact

This material can cause mild to severe skin irritation with short-term exposure. The degree of irritation will depend on the amount of material that is applied to the skin and the speed and thoroughness that it is removed. Signs and symptoms can include pain, sensation of heat, discoloration, swelling or blistering. Repeated or prolonged skin contact can produce moderate irritation or dermatitis. Signs and symptoms can include drying, swelling, scaling, blistering, cracking or other skin changes. Certain components of this material can be absorbed through the skin and produce target organ effects. If the skin is damaged, absorption increases.

Ingestion

If swallowed, this material may irritate the mucous membranes of the mouth, throat, and esophagus. It can be readily absorbed by the stomach and intestinal tract. Symptoms include a burning sensation of the mouth and esophagus, nausea, vomiting, dizziness, staggering gait, drowsiness, loss of consciousness and delirium, as well as additional central nervous system (CNS) effects (see "Inhalation" above).

Due to its light viscosity, there is a danger of aspiration into the lungs during swallowing and subsequent vomiting. Aspiration can result in severe lung damage or death. Cardiovascular effects include shallow rapid pulse and pallor followed by flushing. Also, progressive CNS depression, respiratory insufficiency and ventricular fibrillation may result in death.

Chronic Health Effects Summary

Intentional misuse by deliberately concentrating and inhaling gasoline can be harmful or fatal. Altered mental state, drowsiness, peripheral motor neuropathy, irreversible brain damage ("Petrol Sniffers Encephalopathy"), delirium, fetal development effects, seizures and sudden death are associated with gasoline abuse. Chronic effects of ingestion and subsequent aspiration of gasoline into the lungs has been associated with the formation of lung cavities (pneumatoceles) and chronic lung dysfunction. Gasoline has been associated with cancer in experimental animals, however, the data are generally not considered relevant to humans.

Prolonged or repeated overexposure to n-hexane, a component of gasoline, may cause damage to the peripheral nervous system that is characterized by numbness, tingling or pain in the extremities. These effects can progressively worsen to neuromuscular motor coordination difficulty or partial paralysis. Prolonged or repeated overexposure to benzene, a potential component of gasoline, has been associated with depletion of red blood cells (anemia), damage to white blood cells (leukopenia) and bone marrow (aplastic anemia). In addition, long term overexposure to benzene has been associated with a cancer of the blood forming tissues (acute myelogenous leukemia or AML). Prolonged or repeated overexposure to toluene, a component of gasoline, has been associated with reproductive effects in experimental animals and in long-term chemical abuse situations. Long-term overexposures to toluene and xylene have been associated with hearing damage.

This material and/or its components have been associated with developmental toxicity, reproductive toxicity, genotoxicity, immunotoxicity and carcinogenicity. Refer to Section 11 of this MSDS for additional health-related information.

Conditions Aggravated by Exposure

Medical conditions aggravated by exposure to this material may include central nervous system (CNS) disease, chronic respiratory diseases, skin disorders, blood disorders, impaired cardiovascular systems, liver or kidney function.

Exposure to high concentrations of this material may increase the sensitivity of the heart to epinepherine (adrenalin) and catecholamine-like drugs. Personnel with pre-existing cardiac disorders may be more susceptible to this effect (see Section 4, "Note to Physicians").

Target Organs

This material causes damage to the following organs: kidneys, lungs, heart, cardiovascular system, eyes, central nervous system (CNS).
This material may cause damage to the following organs: blood, the reproductive system, liver, mucous membranes, peripheral nervous system, upper respiratory tract, skin, bone marrow.

Carcinogenic Potential

This material may contain benzene, ethylbenzene or styrene at concentrations above 0.1%. Benzene is considered to be a known human carcinogen by OSHA, IARC and NTP. IARC has identified ethylbenzene, styrene, gasoline and gasoline engine exhaust as possibly carcinogenic to humans (Group 2B) based on laboratory animal studies.

OSHA Hazard Classification is indicated by an "X" in the box adjacent to the hazard title. If no "X" is present, the product does not exhibit the hazard as defined in the OSHA Hazard Communication Standard (29 CFR 1910.1200).

OSHA Health Hazard Classification				OSHA Physical Hazard Classification					
Irritant	X	Toxic		Combustible		Explosive		Pyrophoric	
Sensitizer		Highly Toxic		Flammable	X	Oxidizer		Water-reactive	
Corrosive		Carcinogenic	X	Compressed Gas		Organic Peroxide		Unstable	

SECTION 4: FIRST AID MEASURES

Take proper precautions to ensure your own health and safety before attempting rescue or providing first aid. For more specific information, refer to Exposure Controls and Personal Protection in Section 8 of this MSDS.

Inhalation	Immediately move victim to fresh air. If victim is not breathing, immediately begin rescue breathing. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR). If breathing is difficult, 100 percent humidified oxygen should be administered by a qualified individual. Seek medical attention immediately. If exposed to benzene in an emergency situation, a medical evaluation should be completed at the end of the work-shift in accordance with OSHA requirements.
Eye Contact	Check for and remove contact lenses. If irritation or redness develops, flush eyes with cool, clean, low-pressure water for at least 15 minutes. Hold eyelids apart to ensure complete irrigation of the eye and eyelid tissue. Do not use eye ointment. Seek medical attention immediately.
Skin Contact	Remove contaminated shoes and clothing. Flush affected area with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. Do not use ointments. If skin surface is not damaged, clean affected area thoroughly with mild soap and water. Seek medical attention if tissue appears damaged or if pain or irritation persists.
Ingestion	Do not induce vomiting. If spontaneous vomiting is about to occur, place victim's head below knees. If victim is drowsy or unconscious, place on the left side with head down. Never give anything by mouth to a person who is not fully conscious. Do not leave victim unattended. Seek medical attention immediately.
Notes to Physician	Inhalation overexposure can produce toxic effects. Monitor for respiratory distress. If cough or difficulty in breathing develops, evaluate for upper respiratory tract inflammation, bronchitis, and pneumonitis. Vigorous anti-inflammatory or steroid treatment may be required at first evidence of upper airway or pulmonary edema. Administer 100 percent humidified supplemental oxygen with assisted ventilation, as required. If ingested, this material presents a significant aspiration and chemical pneumonitis hazard. Accordingly, induction of emesis is not recommended. Consider administration of an aqueous slurry of activated charcoal followed by a cathartic such as magnesium citrate or sorbitol. Also, treatment may involve careful gastric lavage if performed soon after ingestion or in patients who are comatose or at risk of convulsing. Protect the airway by cuffed endotracheal intubation or by placement of the body in a Trendelenburg and left lateral decubitus position. Obtain chest X-ray and liver function tests. Monitor for cardiac function, respiratory distress and arterial blood gases in severe exposure cases. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of this material (e.g., in enclosed spaces or with deliberate abuse). If used, monitor heart action closely. Consider use of other drugs with less arrhythmogenic potential.

SECTION 5: FIRE FIGHTING MEASURES

NFPA Flammability Classification	NFPA Class-IB flammable liquid. Extremely flammable.
Flash Point Method	CLOSED CUP: -43°C (-45°F). (Tagliabue [ASTM D-56])
Lower Flammable Limit	AP 1.4 % **Upper Flammable Limit** AP 7.6 %
Autoignition Temperature	280°C (536°F)
Hazardous Combustion Products	Carbon dioxide, carbon monoxide, smoke, fumes, unburned hydrocarbons, aldehydes and other products of incomplete combustion.
Special Properties	Flammable Liquid! This material releases vapors at or below ambient temperatures. When mixed with air in certain proportions and exposed to an ignition source, its vapor can cause a flash fire. Use only with adequate ventilation. Vapors are heavier than air and may travel long distances along the ground to an ignition source and flash back. A vapor and air mixture can create an explosion hazard in confined spaces such as sewers. If container is not properly cooled, it can rupture in the heat of a fire.

Extinguishing Media

SMALL FIRE: Use dry chemicals, carbon dioxide, foam, water fog, or inert gas (nitrogen).
LARGE FIRE: Use foam, water fog, or water spray. Water fog and spray are effective in cooling containers and adjacent structures. However, water can cause frothing and/or may not extinguish the fire. Water can be used to cool the external walls of vessels to prevent excessive pressure, autoignition or explosion. DO NOT use a solid stream of water directly on the fire as the water may spread the fire to a larger area.

Protection of Fire Fighters

Firefighters must use full bunker gear including NIOSH-approved positive pressure self-contained breathing apparatus to protect against potential hazardous combustion or decomposition products and oxygen deficiencies. Evacuate area and fight the fire from a maximum distance or use unmanned hose holders or monitor nozzles. Cover pooling liquid with foam. Containers can build pressure if exposed to radiant heat; cool adjacent containers with flooding quantities of water until well after the fire is out. Withdraw immediately from the area if there is a rising sound from a venting safety device or discoloration of vessels, tanks, or pipelines. Be aware that burning liquid will float on water. Notify appropriate authorities if liquid enter sewers or waterways.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Take proper precautions to ensure your own health and safety before attempting spill control or clean-up. For more specific information, refer to the Emergency Overview on Page 1, Exposure Controls and Personal Protection in Section 8 and Disposal Considerations in Section 13 of this MSDS.

Flammable Liquid! Release causes an immediate fire or explosion hazard. Evacuate all non-essential personnel from immediate area and establish a "regulated zone" with site control and security. A vapor-suppressing foam may be used to reduce vapors. Eliminate all ignition sources. All equipment used when handling this material must be grounded. Stop the leak if it can done without risk. Do not touch or walk through spilled material. Remove spillage immediately from hard, smooth walking areas. Prevent its entry into waterways, sewers, basements, or confined areas. Absorb or cover with dry earth, sand, or other non-combustible material and transfer to appropriate waste containers. Use clean, non-sparking tools to collect absorbed material.

For large spills, secure the area and control access. Dike far ahead of a liquid spill to ensure complete collection. Water mist or spray may be used to reduce or disperse vapors; but, it may not prevent ignition in closed spaces. This material will float on water and its run-off may create an explosion or fire hazard. Verify that responders are properly HAZWOPER-trained and wearing appropriate respiratory equipment and fire-resistant protective clothing during cleanup operations. In an urban area, cleanup spill as soon as possible; in natural environments, cleanup on advice from specialists. Pick up free liquid for recycle and/or disposal if it can be accomplished safely with explosion-proof equipment. Collect any excess material with absorbant pads, sand, or other inert non-combustible absorbent materials. Place into appropriate waste containers for later disposal. Comply with all laws and regulations.

SECTION 7: HANDLING AND STORAGE

Handling

A static electrical charge can accumulate when this material is flowing through pipes, nozzles or filters and when it is agitated. A static spark discharge can ignite accumulated vapors particularly during dry weather conditions. Always bond receiving containers to the fill pipe before and during loading. Always keep nozzle in contact with the container throughout the loading process. Do not fill any portable container in or on a vehicle. Special precautions, such as reduced loading rates and increased monitoring, must be observed during "switch loading" operations (i.e., loading this material in tanks or shipping compartments that previously contained middle distillates or similar products).

A spill or leak can cause an immediate fire or explosion hazard. Keep containers closed and do not handle or store near heat, sparks, or any other potential ignition sources. Do not contact with oxidizable materials. Do not breathe vapor. Use only with adequate ventilation and personal protection. Never siphon by mouth. Avoid contact with eyes, skin, and clothing. Prevent contact with food and tobacco products. Do not take internally.

When performing repairs and maintenance on contaminated equipment, keep unnecessary persons away from the area. Eliminate all potential ignition sources. Drain and purge equipment, as necessary, to remove material residues. Use gloves constructed of impervious materials and protective clothing if direct contact is anticipated. Provide ventilation to maintain exposure potential below applicable exposure limits. Promptly remove contaminated clothing. Wash exposed skin thoroughly with soap and water after handling.

Empty containers may contain material residues which can ignite with explosive force. Misuse of empty containers can be dangerous if used to store toxic, flammable, or reactive materials. Cutting or welding of empty containers can cause fire, explosion, or release of toxic fumes from residues. Do not pressurize or expose empty containers to open flame, sparks, or heat. Keep container closed and drum bungs in place. All label warnings and precautions must be observed. Return empty drums to a qualified reconditioner. Consult appropriate federal, state and local authorities before reusing, reconditioning, reclaiming, recycling, or disposing of empty containers and/or waste residues of this material.

Storage

Store and transport in accordance with all applicable laws. Keep containers tightly closed. Store in a cool, dry, well-ventilated place. Clearly label all containers. Do not allow containers to be kept in enclosed vehicles. Keep away from all ignition sources. Ground all equipment containing this material. Containers must be able to withstand pressures that are created from changes in product temperature. Product samples and other small containers of this flammable liquid should be stored in a separate safety cabinet or room. All electrical equipment in areas where this material is stored or handled should be installed and operated in accordance with applicable regulatory requirements and the National Electrical Code.

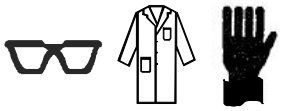
SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapor or mists below the applicable workplace exposure limits indicated below. All electrical equipment should comply with the National Electric Code. An emergency eye wash station and safety shower should be located near the work-station.

Personal Protective Equipment

Personal protective equipment should be selected based upon the conditions under which this material is used. A hazard assessment of the work area for PPE requirements should be conducted by a qualified professional pursuant to OSHA regulations. The following pictograms represent the minimum requirements for personal protective equipment. For certain operations, additional PPE may be required.



Eye Protection

Chemical goggles should be worn during transfer operations or when there is a likelihood of misting, splashing, or spraying of this material. Suitable eye wash water should be readily available.

Hand Protection

Avoid skin contact. Use gloves (e.g., disposable PVC, neoprene, nitrile, vinyl, or PVC/NBR). Wash hands with plenty of mild soap and water before eating, drinking, smoking, use of toilet facilities or leaving work. DO NOT use this material as a skin cleaner.

Body Protection

This may include an apron, boots and additional facial protection.

Respiratory Protection

For unknown vapor concentrations use a positive-pressure, pressure-demand, self-contained breathing apparatus (SCBA). Due to fire and explosion hazards, do not enter atmospheres containing concentrations greater than 20% of the lower flammable limit under any circumstances. For known vapor concentrations above the occupational exposure guidelines (see below), use a NIOSH-approved organic vapor respirator if adequate protection is provided. Protection factors vary depending upon the type of respirator used. Respirators should be used in accordance with OSHA requirements (29 CFR 1910.134).

General Comments

Warning! Use of this material in spaces without adequate ventilation may result in generation of hazardous levels of combustion products and/or inadequate oxygen levels for breathing. Odor is an inadequate warning for hazardous conditions.

Occupational Exposure Guidelines

Substance	**Applicable Workplace Exposure Levels**

1) Gasoline	TWA: 300 (ppm) STEL: 500 (ppm) from ACGIH (TLV)
2) Petroleum Distillates (Naphtha)	TWA: 500 (ppm) from OSHA (PEL)
3) Methyl tert-Butyl Ether (MTBE)	TWA: 40 (ppm) from ACGIH (TLV)
4) Ethanol	TWA: 1000 (ppm) from ACGIH (TLV) TWA: 1000 (ppm) from OSHA (PEL)
5) Butane	TWA: 800 (ppm) from ACGIH (TLV)
6) Pentane, all isomers	TWA: 600 (ppm) from ACGIH (TLV) TWA: 1000 (ppm) from OSHA (PEL)
7) Cyclopentane	TWA: 600 (ppm) from ACGIH (TLV)
8) Hexane Isomers	TWA: 500 (ppm) STEL: 1000 (ppm) from ACGIH (TLV)
9) 1-Hexene	TWA: 30 (ppm) from ACGIH (TLV)
10) Hexane (n-Hexane)	TWA: 50 (ppm) from ACGIH (TLV) - SKIN TWA: 500 (ppm) from OSHA (PEL)
11) Cyclohexane	TWA: 300 (ppm) from ACGIH (TLV) TWA: 300 (ppm) from OSHA (PEL)
12) Heptane (n-Heptane)	TWA: 400 (ppm) STEL: 500 (ppm) from ACGIH (TLV) TWA: 500 (ppm) from OSHA (PEL)
13) Methylcyclohexane	TWA: 400 (ppm) from ACGIH (TLV) TWA: 500 (ppm) from OSHA (PEL)
14) Benzene	TWA: 0.5 (ppm) STEL: 2.5 (ppm) from ACGIH (TLV) - SKIN TWA: 1 (ppm) STEL: 5 AL: 0.5 (ppm) from OSHA (PEL) - SKIN (See Table Z-2 in 29 CFR 1910.1028 for exclusions to PEL.)
15) Toluene	TWA: 50 (ppm) from ACGIH (TLV) - SKIN TWA: 200 (ppm) CEIL: 300 (ppm) 500* (ppm) from OSHA (PEL) (*10-min peak per 8 hour shift)
16) Octane, all isomers	TWA: 300 (ppm) from ACGIH (TLV) TWA: 500 (ppm) from OSHA (PEL)
17) Xylene, all isomers	TWA: 100 (ppm) STEL: 150 (ppm) from ACGIH (TLV) TWA: 100 (ppm) from OSHA (PEL)
18) Ethylbenzene	TWA: 100 (ppm) STEL: 125 (ppm) from ACGIH (TLV) TWA: 100 (ppm) from OSHA (PEL)
19) Nonane, all isomers	TWA: 200 (ppm) from ACGIH (TLV)
20) Cumene	TWA: 50 (ppm) from ACGIH (TLV) TWA: 50 (ppm) from OSHA (PEL) - SKIN
21) Trimethylbenzene (mixed isomers)	TWA: 25 (ppm) from ACGIH (TLV)
22) Indene	TWA: 10 (ppm) from ACGIH (TLV)
23) Naphthalene	TWA: 10 (ppm) STEL: 15 (ppm) from ACGIH (TLV) - SKIN TWA: 10 (ppm) from OSHA (PEL)
24) Styrene	TWA: 20 (ppm) STEL: 40 (ppm) from ACGIH (TLV) - BEI TWA: 100 (ppm) STEL C 200; 600* from OSHA (PEL) (*5-minute peak in any three hours)
25) Tetraethyl Lead	**ACGIH TLV (United States). Skin** TWA: 0.1 mg/m^3 **OSHA PEL Z2 (United States). Skin** TWA: 0.075 mg/m^3

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid.	**Color**	Transparent, amber or red.	**Odor**	Pungent, characteristic gasoline.
Specific Gravity	0.72 - 0.77 (Water = 1)	**pH**	Not Applicable.	**Vapor Density**	3 to 4 (Air = 1)
Boiling Point/Range	38° to 204°C (100° to 400°F) (ASTM D-86)			**Melting/Freezing Point**	Not available.
Vapor Pressure	220 to 450 mm Hg at 20°C (68°F) or 6 to 15 Reid-psia at 37.8°C (100°F).			**Viscosity (cSt @ 40°C)**	0.35 to 1.0 [ASTM D-445]
Solubility in Water	Ethanol is readily soluble in water. Other oxygenate components are moderately soluble and the hydrocarbon components are slightly soluble in water.			**Volatile Characteristics**	720 - 770 g/l VOC's W/V.

Additional Properties Average Density at 60°F = 6.2 lbs./gal. (ASTM D-2161)

SECTION 10: STABILITY AND REACTIVITY

Chemical Stability Stable. **Hazardous Polymerization** Not expected to occur.

Conditions to Avoid Keep away from heat, flame and other potential ignition sources. Keep away from strong oxidizing conditions and agents.

Materials Incompatibility Strong acids, alkalies and oxidizers such as liquid chlorine, other halogens, hydrogen peroxide and oxygen.

Hazardous Decomposition Products No additional hazardous decomposition products were identified other than the combustion products identified in Section 5 of this MSDS.

SECTION 11: TOXICOLOGICAL INFORMATION

For other health-related information, refer to the Emergency Overview on Page 1 and the Hazards Identification in Section 3 of this MSDS.

Toxicity Data

Gasoline:
VAPOR (TELo) Acute: 140 ppm (Human) (8 hours) - Mild eye irritant.
VAPOR (TELo) Acute: 500 ppm (Human) (1 hour) - Moderate eye irritant.
INHALATION (TCLo) Acute: 900 ppm (Human) (1 hour) - CNS and pulmonary effects.
DERMAL (TDLo) Acute: 53 mg/kg (Human) - Skin allergy effects.
INHALATION (LC50) Acute: 101,200 ppm (Rat, Mouse, & Guinea Pig) (5 minutes).

Gasoline Containing 15% MTBE:
ORAL (LD50) Acute: >5,000 mg/kg (Rat screen level).
DERMAL (LD50) Acute: >2,000 mg/kg (Rabbit screen level).
INHALATION (LC50) Acute: >5,200 ppm (Rat screen level) (8 hours).
DRAIZE EYE Acute: Mild eye irritant. (Rabbit).
DRAIZE DERMAL Acute: Moderate skin irritant. (Rabbit).
BUEHLER DERMAL Acute: Non-sensitizing. (Guinea Pig).
28-Day DERMAL Sub-Chronic: Severe skin irritant. (Rabbit).

A major epidemiological study concluded that there was no increased risk of kidney cancer associated with gasoline exposures for petroleum refinery employees or neighboring residents. Another study identified a slight trend in kidney cancers among service station employees following a 30-year latency period. Two-year inhalation toxicity studies with fully vaporized unleaded gasoline (at concentrations of 67, 292 and 2,056 ppm in air) produced kidney damage and kidney tumors in male rats, but not in female rats or mice of either sex. Results from subsequent scientific studies suggest that the kidney damage, and probably the kidney tumor response, is limited to the male rat. The kidney tumors apparently were the result of the formation of alpha-2u-globulin, a protein unique to male rats. This finding is not considered relevant to human exposure. Under conditions of the study, there was no evidence that exposure to unleaded gasoline vapor is associated with developmental toxicity. Experimental studies with laboratory animals did suggest that overexposure to gasoline may adversely effect male reproductive performance. Also, in laboratory studies with rats, the maternal and developmental "no observable adverse effect level" (NOAEL) was determined to be 9,000 ppm (75% of the LEL value). Female mice developed a slightly higher incidence of liver tumors compared to controls at the highest concentration. IARC has listed gasoline as possibly carcinogenic to humans (Group 2B).

Methyl tertiary-Butyl Ether (MTBE):
Acute symptoms associated with human exposure to MTBE appear to be mild and transient. In laboratory studies, rodents exposed to high doses of MTBE exhibited blood chemistry changes and liver and kidney abnormalities. In laboratory studies, MTBE vapor exposure at the high dose concentration was associated with an increased incidence of liver tumors in female mice. Also, at high dose concentration exposures, MTBE was associated with an increased incidence of kidney and testicular (Leydig cell) tumors in male rats. Additional oncogenicity studies on rats resulted in testicular tumors following administration by ingestion. These data are not generally considered relevant to humans. In the Ninth edition (2000) of its Report on Carcinogens, NTP has not identified MTBE as either a known carcinogen or reasonably anticipated to be carcinogenic to humans. In animal studies, developmental and reproductive toxicity related to MTBE inhalation exposures was observed only at concentrations that were maternally toxic. MTBE was shown to be maternal toxic at 4,000 and 8,000 ppm levels when

mice were exposed for six hours per day during their pregnancy. Also, a decrease in the number of successful pregnancies and a reduction in birth weights were observed at these exposure levels. Birth defects (cleft palate) were observed at the high dose level. These data suggest that the risk of developmental and reproductive toxicity in humans is negligible as a result of anticipated exposures to MTBE.

Tertiary-Amyl Methyl Ether (TAME):
TAME was found to be negative for the induction of structural chromosome aberrations (both S9-activated and non-activated) in Chinese hamster ovary (CHO) cells. Inhalation of TAME vapors at concentrations above 250 ppm produced reversible CNS depression in rats and mice. In a four week inhalation study, increases in liver weights with no tissue injury were observed in rats exposed to a TAME concentration of 500 ppm. Birth defects in mice and fetotoxicity in both rats and mice were observed after inhalation exposures to maternally toxic concentrations of TAME.

Diisopropyl Ether (DIPE):
Increased kidney and liver weights were observed in rats and mice in subchronic and chronic inhalation studies of DIPE. Also, evidence of microscopic changes (hyaline droplets) were reported in liver tissue and kidney tubules of rabbits and male rats exposed to DIPE at concentrations of 7,100 ppm. These findings were similar those found in gasoline studies. Overexposure by inhalation of pregnant rats to DIPE at concentrations of 3,095 and 6,745 ppm increased the frequency of rudimentary 14th ribs in the offspring. This effect was not observed at exposure concentrations of 430 ppm. The significance of these findings to human exposure is unclear.

Ethanol:
Inhalation exposure to ethanol vapor at concentrations above applicable workplace exposure levels is expected to produce eye and mucus membrane irritation. Human exposure at concentrations from 1,000 to 5,000 ppm produced symptoms of narcosis, stupor and morbid drowsiness. Subjects exposed to ethanol vapor in concentrations between 500 and 10,000 ppm experienced coughing and smarting of the eyes and nose. At 15,000 ppm there was continuous lacrimation and coughing. While extensive acute and chronic effects can be expected with ethanol consumption, ingestion is not expected to be a significant route of exposure to this product.

Pentanes, all isomers:
n-Pentane was associated with cardiac sensitization in rabbits at a concentration of 100,000 ppm in air within four hours of exposure. Pentane can act as an aesthetic by inhalation. Mice exhibited signs of respiratory irritation and mild central nervous system effects at concentrations of 32,000 to 69,000 ppm for five minutes.

Toluene:
Deliberate long-term inhalation of toluene at high concentrations (e.g., glue sniffing) has been associated with reversible liver effects, permanent kidney damage, CNS depression, brain damage and cardiac sensitization. In addition, intentional abuse behavior increases the risk for reproductive effects including pre-term delivery, prenatal death and growth retardation. Also, case studies of persons abusing toluene have revealed isolated incidences of birth defects. Long-term inhalation studies with toluene produced kidney damage, enlargement of the liver and thymus, heart palpitations, brain damage, general weakness and impaired reaction time in laboratory animals. Also, in long-term laboratory studies, rats exposed to high concentrations of toluene exhibited high-frequency hearing loss. Case studies have reported hearing damage in humans exposed elevated concentrations of toluene and other mixed solvents.

Xylene, all isomers:
Overexposure to xylene may cause upper respiratory tract irritation, headache, cyanosis, blood serum changes, CNS damage and narcosis. Effects may be increased by the use of alcoholic beverages. Also, ototoxicity has been associated with chronic overexposure to xylene. An inhalation study with laboratory rats indicated an association between elevated exposures to mixed xylenes and hearing loss. Animal studies have associated embryo and feto-toxicity with maternally toxic dose exposures of mixed xylene isomers and ethylbenzene. Lung inflammation and liver damage were identified as health effects in chronic studies using guinea pigs. The significance of these animal study results to humans is not known.

Heptane, all isomers:
n-Heptane was not mutagenic in the Salmonella/microsome (Ames) assay and is not considered to be carcinogenic.

n-Butane:
An n-butane exposure of 5,000 ppm in air has been shown to affect the heart in dogs, causing lower contractile force and other effects. Also, butane may decrease the myocardial threshold to

epinephrine-induced arrhythimias.

n-Hexane:
Intentional abuse of products containing n-hexane have been associated with permanent brain and nervous system damage. Adverse effects include numbness, tingling, pain, and loss of muscle control in the extremities, disorientation, impaired vision and reflexes, decline in motor function and even paralysis. These neurological effects are pronounced in combination with lack of oxygen supply, especially among women. Chronic repeated or prolonged overexposure to n-hexane, either by inhalation or skin absorption, has been associated with peripheral neuropathy in both human workers and rodents. The neurotoxic properties of n-hexane may increase with concurrent exposure to methyl ethyl ketone, methyl isobutyl ketone or toluene. n-Hexane has been associated with testicular degeneration and epididymal lesions in rats. Also, n-hexane produced fetal toxicity and reduced fetal weight in mice at maternally toxic doses.

Methylcyclohexane:
Rats inhaling methylcyclohexane at an airborne concentration of 15,250 ppm for one hour displayed tremors, loss of coordination, anesthesia and convulsions. Experimental animals exposed to 10,050 ppm for six hours per day for 14 days exhibited weight loss or decreased weight gain and changes in the structure of their salivary glands. In experimental studies with rabbits, the LD50 for methylcyclohexane was estimated to be between 3,300 ppm and 7,300 ppm. Death was preceded by conjunctival congestion with mucoid secretion and lacrimation, salivation, coughing, sneezing, labored breathing and diarrhea. Lethal oral dosing of rabbits caused lethargy, severe diarrhea and circulatory collapse. Vascular and degenerative lesions were observed in the kidneys and liver.

Trimethylbenzenes, all isomers:
The TCLo for humans is 10 ppm, with somnolence and respiratory tract irritation noted. In inhalation studies with rats, four of ten animals died after exposures of 2400 ppm for 24 hours. An oral dose of 5 mL/kg resulted in death in one of ten rats. Minimum lethal intraperitoneal doses were 1.5 to 2.0 mL/kg in rats and 1.13 to 12 mL/kg in guinea pigs. Levels of total hydrocarbon vapors present in the breathing atmosphere of these workers ranged from 10 to 60 ppm. Mesitylene (1, 3, 5 Trimethylbenzene) inhalation at concentrations of 1.5, 3.0, and 6.0 mg/L for six hours was associated with dose-related changes in white blood cell counts in rats. No significant effects on the complete blood count were noted with six hours per day exposure for five weeks, but elevations of alkaline phosphatase and SGOT were observed. Central nervous system depression and ataxia were noted in rats exposed to 5,100 to 9,180 ppm for two hours.

Benzene:
Prolonged and repeated exposure to high concentrations of benzene is associated with injury to blood forming organs and anemia. It is linked to the development of acute myelogenous leukemia (AML) in humans. Studies of workers exposed to high levels of benzene have identified humoral and cellular immunity impairment and a decrease in levels of circulating leukocytes. NTP, IARC and OSHA list benzene as carcinogenic to humans. Consumption of alcohol may increase the blood system changes related to benzene exposure. Animal studies have shown testicular effects and alterations in reproductive cycles, but teratogenic effects have not been reported even at maternally toxic doses. Also, animal studies show some evidence of fetotoxic and developmental effects.

Ethylbenzene:
NTP completed a 2-year inhalation bioassay of ethylbenzene in rodents. The study was conducted in rats and mice at exposure concentrations of 0, 75, 200 and 750 ppm. No significant effects were observed at the 75 and 200 ppm levels. However, compared to chamber controls, the severity of nephropathy was increased in rats at the 750 ppm level; and male rats had higher incidences of renal tubule carcinomas. Step section analyses of the kidneys found a significant increase hyperplasia and renal tubule adenomas in both male and female rats. Also at this 750 ppm level, male mice had a higher incidence of alveolar/bronchiolar adenomas and carcinomas and female mice had increased hepatocellular adenomas and carcinomas when compared to chamber controls. Also, hyperplasia was observed in the thyroid gland of both sexes of mice and in the pituitary gland of female mice. The relevance of these findings to human health is unclear. However, based upon this data, the IARC has designated ethylbenzene as possibly carcinogenic to humans (Group 2B).

Cyclohexane:
Cyclohexane can cause eye, skin and mucous membrane irritation, CNS depressant and narcosis at elevated concentrations. In experimental animals exposed to lethal concentrations by inhalation or oral route, there was generalized vascular damage and severe degenerative changes in the heart, lungs, liver, kidneys and brain. Cyclohexane does not act as a promotor for tumors on mice when exposed to dimethylbenzanthracene. Further, it did not induce unscheduled DNA synthesis in cultured human lymphocytes. It is not mutagenic in the Salmonella/microsome (Ames) or the mouse lymphoma L5178Y assays, with or without metabolic activation. However, it did increase the number of chromosomal

aberrations in bone marrow cells of rats exposed to between 100 and 300 ppm for six hours/day for five days. These chromosomal aberrations did not appear to be dose-related.

Naphthalene:
Naphthalene is a potential irritant to eyes, skin and lungs. Ingestion of naphthalene has been associated with severe red blood cell and liver damage leading to death. Following prolonged or repeated exposures, naphthalene has been shown to cause cataracts, optical neuritis, hemolytic and aplastic anemia, jaundice and possibly neurotoxicity. In animal studies, naphthalene caused fetal effects and decreased spleen weights in pregnant female mice. In an NTP sponsored study, naphthalene produced a dose related increase in tumors at the 30 and 60 ppm exposure level in both male and female rats. Higher incidences of respiratory epithelial adenomas, olfactory epithelial neuroblastomas and non-neoplastic lesions of the nose were observed as compared to controls. Cytogenic studies with Chinese hamster ovary cells have demonstrated sister chromatid exchanges and chromosomal aberrations. The relevance of these studies to human health is unclear.

Indene:
Indene and ethylmethylbenzenes are primary skin irritants. Overexposure has been associated with kidney damage and increased blood cholinesterase levels. In inhalation developmental studies, indene and other C9 aromatic hydrocarbons have been associated with decreased fetal and newborne pup weights.

Tetraethyl Lead:
Tetraethyl lead is toxic by ingestion, intraperitoneal, intravenous, subcutaneous, and parenteral routes. It is moderately toxic by inhalation and skin contact. Teratogenic and reproductive effects have been associated with tetraethyl lead in experimental animals. Lead compounds, such as tetraethyl lead, can affect the central nervous system.

Styrene:
Neurological injury associated with chronic styrene exposure include distal hypesthesia, decreased nerve conduction velocity, and altered psychomotor performance. These effects did not occur with exposures to airborne concentrations that were less than 100 ppm. Increased deaths from degenerative neurological disorders were found in a comprehensive epidemiological study of Danish reinforced plastics workers. These workers were reported to have a 2.5-fold increased risk for myeloid leukemia with clonal chromosome aberrations. Also, there are several studies that suggest potential reproductive effects in humans and experimental animals from overexposure to styrene. Styrene was not mutagenic in the standard (liquid phase) Ames Salmonella/microsome assay, but was weakly positive when tested in the vapor phase. IARC has listed styrene as possibly carcinogenic to humans (Group 2B).

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity

Leaded gasoline is potentially toxic to freshwater and saltwater ecosystems.

Environmental Fate

Gasoline contains components that are potentially toxic to freshwater and saltwater ecosystems. It will normally float on water. The lighter components of gasoline will evaporate rapidly. In stagnant or slow-flowing waterways, a hydrocarbon layer can cover a large surface area. As a result, this covering layer might limit or eliminate natural atmospheric oxygen transport into the water. With time, if not removed, oxygen depletion in the waterway might be enough to cause a fish kill or create an anaerobic environment. This coating action can also be harmful or fatal to plankton, algae, aquatic life, and water birds.

This material can be hazardous to human health or the environment. If spilled, this material will normally evaporate rapidly. Hydrocarbon components may contribute to atmospheric smog. The atmospheric half-life of the butane components under photochemical smog conditions are estimated to be between three and seven days. Isopentane, n-pentane, hexane isomers, n-heptane, heptane isomers and iso-octane have estimated half-lives of between two and five days in air when photochemical hydroxyl or nitrate radicals are present. Toluene has a half-life of from three hours to approximately one day. Cyclohexane has a half-life of from six hours to over four days when hydroxyl radicals are present.

SECTION 13: DISPOSAL CONSIDERATIONS

Hazard characteristic and regulatory waste stream classification can change with product use. Accordingly, it is the responsibility of the user to determine the proper storage, transportation, treatment and/or disposal methodologies for spent materials and residues at the time of disposition.

Maximize material recovery for reuse or recycling. If spilled material is introduced into a wastewater treatment system, chemical and biological oxygen demand (COD and BOD) will likely increase. This material is biodegradable if gradually exposed to microorganisms, preferably in an aerobic environment. In sewage- seeded wastewater, at or below concentrations of 0.2 vol.% of this naphtha, there is little or no effect on bio-oxidation and/or digestion. However, at 1 vol.%, it doubles the required digestion period. Higher concentrations interfere with floc formation and sludge settling and also plug filters or exchange beds. Vapor emissions from a bio-oxidation process contaminated with this material might prove to be a health hazard.

Recovered non-usable material may be regulated by US EPA as a hazardous waste due to its ignitibility (D001) and/or its toxic (D008 and/or D018) characteristics. In addition, conditions of use may cause this material to become a hazardous waste, as defined by Federal or State regulations. It is the responsibility of the user to determine if the material is a hazardous waste at the time of disposal. Transportation, treatment, storage, and disposal of waste material must be conducted in accordance with RCRA regulations (see 40 CFR Parts 260 through 271). State and/or local regulations might be even more restrictive. Contact the RCRA/Superfund Hotline at (800) 424-9346 or your regional US EPA office for guidance concerning case specific disposal issues.

SECTION 14: TRANSPORT INFORMATION

DOT Status A U.S. Department of Transportation regulated material.

Proper Shipping Name Gasoline

Hazard Class 3 DOT Class: Flammable liquid.

Packing Group(s) II

UN/NA ID UN1203

Reportable Quantity A Reportable Quantity (RQ) has not been established for this material.

Placards

Emergency Response Guide No. 128

HAZMAT STCC No. 4908177

MARPOL III Status DOT Class: Marine Pollutant. (Leaded Gasoline)

SECTION 15: REGULATORY INFORMATION

TSCA Inventory This product and/or its components are listed on the Toxic Substances Control Act (TSCA) inventory.

SARA 302/304 The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to Subparts 302 and 304 to submit emergency planning and notification information based on Threshold Planning Quantities (TPQs) and Reportable Quantities (RQs) for "Extremely Hazardous Substances" listed in 40 CFR 302.4 and 40 CFR 355. No components were identified.

SARA 311/312 The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to this subpart to submit aggregate information on chemicals by "Hazard Category" as defined in 40 CFR 370.2. This material would be classified under the following hazard categories:

Fire, Acute (Immediate) Health Hazard, Chronic (Delayed) Health Hazard

SARA 313

This product contains the following components in concentrations above de minimis levels that are listed as toxic chemicals in 40 CFR Part 372 pursuant to the requirements of Section 313 of SARA:
Methyl tertiary-Butyl Ether (MTBE) [CAS No.: 1634-04-4] Concentration: 0 - 15%
Toluene [CAS No.: 108-88-3] Concentration: 1 - 20%
Xylene, all isomers [CAS No.: 1330-20-7] Concentration: 1 - 18%
n-Hexane [CAS No.: 110-54-3] Concentration: 1 - 8%
1, 2, 4 Trimethylbenzene [CAS No.: 95-63-6] Concentration: 1 - 3%
Benzene [CAS No.: 71-43-2] Concentration: 0 - 4.9%
Ethylbenzene [CAS No.: 100-41-4] Concentration: 0.2 - 4%
Cumene [CAS No.: 98-82-8] Concentration: 0.5 - 4%
Styrene [CAS No.: 100-42-5] Concentration: 0 - 1%
Cyclohexane [CAS No.: 110-82-7] Concentration: 1 - 3%
Naphthalene [CAS No.: 91-20-3] Concentration: 0.1 - 2%
Lead and Lead Compounds, Concentration: 0 - 0.2%

CERCLA

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center concerning release of quantities of "hazardous substances" equal to or greater than the reportable quantities (RQ's) listed in 40 CFR 302.4. As defined by CERCLA, the term "hazardous substance" does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically designated in 40 CFR 302.4. Chemical substances present in this product or refinery stream that may be subject to this statute are:
Methyl tertiary-Butyl Ether (MTBE) [CAS No.: 1634-04-4] RQ = 1000 lbs. (453.6 kg) Concentration: 0 - 15%
Toluene [CAS No.: 108-88-3] RQ = 1000 lbs. (453.6 kg) Concentration: 1 - 20%
Xylene, all isomers [CAS No.: 1330-20-7] RQ = 100 lbs. (45.36 kg) Concentration: 1 - 18%
n-Hexane [CAS No.: 110-54-3] RQ = 5000 lbs. (2268 kg) Concentration: 1 - 8%
2,2,4-Trimethylpentane [CAS No.: 540-84-1] RQ = 1000 lbs. (453.6 kg) Concentration: 1 - 5%
Benzene [CAS No.: 71-43-2] RQ = 10 lbs. (4.536 kg) Concentration: 0 - 4.9%
Ethylbenzene [CAS No.: 100-41-4] RQ = 1000 lbs. (453.6 kg) Concentration: 0.2 - 4%
Cumene [CAS No.: 98-82-8] RQ = 5000 lbs. (2268 kg) Concentration: 0.5 - 4%
Cyclohexane [CAS No.: 110-82-7] RQ = 1000 lbs. (453.6 kg) Concentration: 1 - 3%
Naphthalene [CAS No.: 91-20-3] RQ = 100 lbs. (45.36 kg) Concentration: 0.1 - 2%
Styrene [CAS No.: 100-42-5] RQ = 1000 lbs. (453.6 kg) Concentration: 0 - 1%
Lead and Lead Compounds, Concentration: 0 - 0.2%

CWA

This material is classified as an oil under Section 311 of the Clean Water Act (CWA) and the Oil Pollution Act of 1990 (OPA). Discharges or spills which produce a visible sheen on waters of the United States, their adjoining shorelines, or into conduits leading to surface waters must be reported to the EPA's National Response Center at (800) 424-8802.

California Proposition 65

This material contains the following components which are known to the State of California to cause cancer, birth defects or other reproductive harm; and therefore, it is subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5): Lead and Lead Compounds, Gasoline (Wholly Vaporized and Engine Exhaust), Benzene [CAS No. 71-43-3] and Toluene [CAS No. 108-88-3]

New Jersey Right-to-Know Label

Gasoline

Additional Regulatory Remarks

As minimum requirements, CITGO recommends that the following advisory information be displayed on equipment used to dispense gasoline in motor vehicles. Additional warnings specified by various regulatory authorities may be required: "DANGER: Extremely Flammable. Use as a Motor Fuel Only. No Smoking. Stop Engine. Turn Off All Electronic Equipment including Cellular Telephones. Do Not Overfill Tank. Keep Away from Heat and Flames. Do Not leave nozzle unattended during refueling. **Static Sparks Can Cause a Fire, especially when filling portable containers.** Containers must be metal or other material approved for storing gasoline. PLACE CONTAINER ON GROUND. DO NOT FILL ANY PORTABLE CONTAINER IN OR ON A VEHICLE. Keep nozzle spout in contact with the container during the entire filling operation. **Harmful or Fatal if Swallowed. Long-Exposure Has Caused Cancer in Laboratory Animals.** Avoid prolonged breathing of vapors. Keep face away from nozzle and gas tank. Never siphon by mouth."
Section 12(b) of Toxic Substances Control Act: This material may contain detectable concentrations of **Methyl tertiary-Butyl Ether (MTBE) [CAS No. 1634-04-4], tertiary-Amyl Methyl Ether (TAME) [CAS No. 994-05-8], Methylcyclopentane [CAS No. 96-37-7], Cyclohexane [CAS No. 110-82-7], n-Hexane {CAS No. 110-54-3] and 1,3,5-Trimethylbenzene (Mesitylene) [CAS No. 108-67-8].** Accordingly, this product may be subject to US EPA's one-time only per country export notification requirements.

SECTION 16: OTHER INFORMATION

Refer to the top of Page 1 for the HMIS and NFPA Hazard Ratings for this product.

REVISION INFORMATION

Version Number	6.0
Revision Date	08/19/2002
Print Date	Printed on 08/19/2002.

ABBREVIATIONS

AP: Approximately EQ: Equal >: Greater Than <: Less Than NA: Not Applicable ND: No Data NE: Not Established

ACGIH: American Conference of Governmental Industrial Hygienists

AIHA: American Industrial Hygiene Association

IARC: International Agency for Research on Cancer

NTP: National Toxicology Program

NIOSH: National Institute of Occupational Safety and Health

OSHA: Occupational Safety and Health Administration

NPCA: National Paint and Coating Manufacturers Association

HMIS: Hazardous Materials Information System

NFPA: National Fire Protection Association

EPA: US Environmental Protection Agency

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