CITGO Antifreeze and Coolant

Material Safety Data Sheet

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

MSDS No. 657201001

Revision Date 09/13/2001

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

*** = Chronic Health Hazard**

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

Emergency Overview

Physical State Liquid.

Color Blue-green. **Odor** Faint Odor

WARNING:
Harmful or Fatal if Swallowed.
Can Cause Liver and Kidney Damage.
Can be absorbed through the skin.
Can cause eye irritation.
Overexposure to vapor can cause temporary blurring of vision.
Spills may create a slipping hazard!

Protective Equipment

Minimum Requirements
See Section 8 for Details

SECTION 1: IDENTIFICATION

Trade Name CITGO Antifreeze and Coolant

Product Number 657201001

CAS Number Mixture.

Product Family Coolant and antifreeze.

Synonyms Ethylene Glycol, Glycol;
Coolant and antifreeze;
Former ILS Code: 57201;
CITGO SAP Product Code No.: 657201001

Technical Contact (918) 495-5933

Medical Emergency (918) 495-4700

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

SECTION 2: COMPOSITION

Component Name(s)	CAS Registry No.	Concentration (%)
1) Ethylene glycol	107-21-1	90 - 95
2) Diethylene glycol	111-46-6	0 - 5
3) Proprietary Ingredients	Proprietary Mixture	0 - 5
4) Dipotassium phosphate	7758-11-4	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. Inhalation. Ingestion

Signs and Symptoms of Acute Exposure

Inhalation	Short-term harmful health effects are not expected from vapor generated at ambient temperatures. Overexposure to glycol and glycol ether vapors or mists can cause respiratory tract irritation. In general, this effect becomes noticeable with airborne concentrations of approximately 60 ppm. Cough and a burning sensation in the trachea are symptoms of inhalation exposures above 80 ppm. Overexposure to glycols and glycol ethers can cause central nervous system depression. Symptoms include headache, weakness, nausea, vomiting, dizziness, loss of coordination and increased heart rate. Seisures, convulsions, coma and death are possible at extremely high concentrations.
Eye Contact	This product can cause transient mild eye irritation with short-term contact with liquid sprays or mists.
Skin Contact	This product can cause mild, transient skin irritation with short-term exposure. Certain components of this material can be absorbed through the skin and produce target organ effects. If the skin is damaged, absorption increases.
Ingestion	The predominant hazard associated with this product is ingestion of large quantities at a single time. During the first 12 hours, the patient may experience central nervous system effects such as headache, weakness, nausea, dizziness, loss of judgement and coordination. In mild cases, the patient may appear to be drunk but without the breath odor of alcohol. In more severe cases the patient will experience cardiopulmonary symptoms including mild high blood pressure, abnormally fast heartbeat and elevated breathing rate. Convulsions and coma are possible. Kidney complications, including slow or no production of urine may be expected 24 to 72 hours after ingestion. Also, injury to the liver can occur.
Chronic Health Effects Summary	Certain glycols and glycol ethers have been associated with birth defects in laboratory animals at doses which were toxic to the mother. In repeated exposure studies, certain glycols produced skin irritation and severe eye irritation with corneal damage in laboratory animals. Chronic ingestion studies with lower molecular weight glycols resulted in kidney damage with calcium deposits. Also, calcium oxalate crystals were identified in brain tissue of experimental animals. Limited information is available regarding the effects of chronic inhalation of glycol and glycol ethers in humans. Overexposure to vapor, aerosol or mist generated can result in eye and respiratory tract irritation, dizziness and nausea.
Conditions Aggravated by Exposure	Persons with preexisting kidney or liver diseases may have their conditions aggravated by ingestion of or overexposure to this product.
Target Organs	Contains material which causes damage to the following organs: kidneys, liver.
Carcinogenic Potential	This product does not contain any components at concentrations above 0.1% which are considered carcinogenic by OSHA, IARC or NTP.

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**		**Oxidizer**		**Water-reactive**	
Corrosive		**Carcinogenic**		**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	Move victim to fresh air. If victim is not breathing, immediately begin rescue breathing. If breathing is difficult, 100 percent humidified oxygen should be administered by a qualified individual. Seek medical attention immediately. Keep the affected individual warm and at rest.
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. Wash exposed skin with mild soap and water. Seek medical attention if tissue appears damaged or if pain or irritation persists. Thoroughly clean contaminated clothing before reuse. Discard contaminated leather goods.

Ingestion	If swallowed, give two glasses of water to drink. Never give anything by mouth to a person who is not fully conscious. Induce vomiting only upon the advise of a physician. Seek medical attention immediately.
Notes to Physician	Ingestion of lower molecular weight glycols have produced an accumulation of glycolate and glyoxalate which form lactate and results in metabolic acidosis, renal failure, heart failure, and pulmonary edema. Kidney insufficiency has been reported after two to three days of ingestion. The kidney failure may be caused by accumulation of calcium oxalate crystals. Crystalluria can be an early sign of glycol poisoning. Carefully consider the decision to induce or not to induce emesis in ingestions. Measures to decrease absorption may be useful. Avoid induction of emesis if the patient has signs of esophageal or gastrointestinal tract irritation or burns, or has evidence of a decreased sensorium, a depressed gag reflex, or impending shock.

SECTION 5: FIRE FIGHTING MEASURES

NFPA Flammability Classification	NFPA Class-IIIB combustible material. Slightly combustible!
Flash Point Method	CLOSED CUP: 119°C (246°F). (Setaflash.)
Lower Flammable Limit	AP 3.2 % **Upper Flammable Limit** AP 22 %
Autoignition Temperature	398°C (748°F) (Ethylene glycol).
Hazardous Combustion Products	Carbon dioxide, carbon monoxide, smoke, fumes, unburned hydrocarbons, aldehydes and other products of incomplete combustion.
Special Properties	This material will release vapors when heated above the flash point temperature that can ignite when exposed to a source of ignition. In enclosed spaces, vapors can ignite with explosive force. Mists or sprays may burn at temperatures below the flash point.
Extinguishing Media	Use dry chemical, "alcohol" foam, Carbon Dioxide or Halon.
Fire Fighting Protective Clothing	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. Withdraw immediately from the area if there is a rising sound from a venting safety device or discoloration of vessels, tanks, or pipelines.

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.

Do not touch damaged containers or spilled material unless wearing appropriate protective equipment. Slipping hazard; do not walk through spilled material. Stop leak if you can do so without risk. For small spills, absorb or cover with dry earth, sand, or other inert non-combustible absorbent material and place into waste containers for later disposal. Contain large spills to maximize product recovery or disposal. Prevent entry into waterways or sewers. In urban area, cleanup spill as soon as possible. In natural environments, seek cleanup advice from specialists to minimize physical habitat damage. This material is miscible in water. Absorbent pads and similar materials can be used. Comply with all laws and regulations.

SECTION 7: HANDLING AND STORAGE

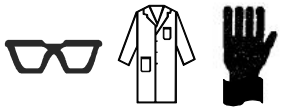
Handling	Avoid water contamination and extreme temperatures to minimize product degradation. Empty containers may contain product residues that can ignite with explosive force. Do not pressurize, cut, weld, braze solder, drill, grind or expose containers to flames, sparks, heat or other potential ignition sources. Consult appropriate federal, state and local authorities before reusing, reconditioning, reclaiming, recycling or disposing of empty containers and/or waste residues of this product.

Storage Store in resin-coated, stainless steel or aluminum containers. Iron containers are acceptable for short durations although lower molecular weight glycols can cause corrosion. Keep container tightly closed and dry. Protect against physical damage. Do not store with strong oxidizing agents. Keep away from heat, flame and all other potential ignition sources. Do not store at temperatures above 49º C (120° F) or in direct sunlight. Consult appropriate federal, state and local authorities before reusing, reconditioning, reclaiming, recycling or disposing of empty containers or waste residues of this product.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of mists and/or vapors below the recommended exposure limits (see below). An 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 Safety glasses equipped with side shields should be adequate protection under most conditions of use. Wear goggles and/or face shield if splashing or spraying is anticipated. Wear goggles and face shield if material is heated above 125°F (51°C). Have suitable eye wash water available.

Hand Protection Use gloves constructed of glycol-resistant materials such as butyl rubber if frequent or prolonged contact is expected. Use heat-protective gloves when handling product at elevated temperatures.

Body Protection Use clean and impervious protective clothing (e.g., neoprene or Tyvek®) if splashing or spraying conditions are present. Protective clothing may include long-sleeve outer garment, apron, or lab coat. If significant contact occurs, remove oil-contaminated clothing as soon as possible and promptly shower. Launder contaminated before reuse or discard. Wear heat protective boots and protective clothing when handling material at elevated temperatures.

Respiratory Protection Vaporization is not expected at ambient temperatures. Therefore, the need for respiratory protection is not anticipated under normal use conditions and with adequate ventilation. If elevated airborne concentrations above applicable workplace exposure levels are anticipated, a NIOSH-approved organic vapor respirator equipped with a dust/mist prefilter should be used. 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 Use good personal hygiene practices. Wash hands and other exposed skin areas with plenty of mild soap and water before eating, drinking, smoking, use of toilet facilities, or leaving work. DO NOT use gasoline, kerosene, solvents, or harsh abrasive skin cleaners.

Occupational Exposure Guidelines

Substance	Applicable Workplace Exposure Levels
1) Ethylene glycol	**ACGIH (United States).** CEIL: 100 mg/m^3 Form: Aerosol only
2) Diethylene glycol	**AIHA (WEEL) (United States).** TWA: 10 mg/m^3 Form: Aerosol only.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid.	**Color**	Blue-green.	**Odor**	Faint Odor
Specific Gravity	Not available.	**pH**	Not Applicable.	**Vapor Density**	2.1 (Air = 1)
Boiling Point/Range	173°C (343.4°F)			**Melting/Freezing Point**	-37°C (-35°F)

Vapor Pressure	<0.01 kPa (<0.1 mmHg) (at 20°C)	**Viscosity (cSt @ 40°C)**	Not available
Solubility in Water	Easily soluble in cold water, diethyl ether.	**Volatile Characteristics**	1080 g/l VOC's W/V.
Additional Properties	Density = 9.3 lbs/gal.		

SECTION 10: STABILITY AND REACTIVITY

Chemical Stability Stable.

Hazardous Polymerization Not expected to occur.

Conditions to Avoid Keep away from heat and flame.

Materials Incompatibility Strong oxidizers.

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

Ethylene Glycol:
ORAL (LD50): Acute: 4700 mg/kg [Rat]. 5500 mg/kg [Mouse].
Diethylene glycol:
ORAL (LD50): Acute: 12565 mg/kg [Rat]. 13300 mg/kg [Mouse]. 2690 mg/kg [Rabbit].
DERMAL (LD50): Acute: 11890 mg/kg [Rabbit].

Ethylene Glycol:
The lowest published oral lethal dose (LDLo) for a human is 398 mg/kg (RTECS, 2000). Also, the estimated lethal oral dose is 1.4 mL/kg or 1.56 g/kg (Clayton & Clayton, 1994; Lewis, 1998). One fatal case study involved ingestion of one-fourth to one-half pint of antifreeze solution. In that case, acute meningoencephalitis followed by anuria resulted in death from renal failure after 12 days (OSHA, 1990). Rats maintained for two years on diets containing 1% and 2% ethylene glycol exhibited shortened life span, calcium oxalate bladder stones, severe renal injury particularly of tubules and centrolobular degeneration of the liver.
Ethylene glycol has been shown to produce dose-related teratogenic effects in rats and mice when given by gavage or in drinking water at high concentrations. Currently, no information has been identified indicating that ethylene glycol is associated with birth defects in humans.
In vitro and animal mutagenicity studies of ethylene glycol were negative.
In tests on rabbits, splash contact of ethylene glycol to eye resulted in moderate symptoms of discomfort with mild temporary conjunctival reaction. No significant corneal damage was noted.

Diethylene glycol:
The major hazard from diethylene glycol occurs following the ingestion of relatively large single doses. Diethylene glycol can cause central nervous system depression and hydropic degenerative lesions in the liver and kidney. Anuria from tubular degeneration can prove fatal within a few days. In a 1937 case study, 105 fatalities occured among 353 people who ingested a solution of sulfanilamide in an aqueous mixture containing 72% diethylene glycol. The symptoms included nausea, dizziness, and pain in the kidney region. In a few days, oliguria and anuria, with death resulting from uremic poisoning. (Amdur, Doull and Klaasen, 1991). Autopsies revealed that the principal signs of intoxication were in the kidneys and liver (cortical necroses, nephrosis with severe vacuolization of the tubular epithelium, liver congestion and fatty degeneration. (AIHA, 1999)
Reproductive toxicity was noted in a mouse continuous breeding study with large doses of diethylene glycol in drinking water. In addition, health effects including liver and kidney disease were noted in studies with pregnant rats receiving undiluted diethylene glycol. The relevance of these large dose studies to human health is not certain.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity

Ethylene glycol:
LD50 Goldfish, > 5,000 mg/L/24 hour, modified ASTM D 1345
LC50 Guppies (*Poecilia reticulata*) 49,300 ppm/7 days.
LC50 Rainbow trout, 18,500 mg/L/96 hrs.
LC50 Rainbow trout, 41,000 mg/L/96 hrs at 20º C.
LC50 Brown shrimp, >100 mg/L/48 hrs, aerated salt water
Toxicity threshold (cell multiplication inhibition test): Bacteria (*Pseudomonas putida*): 10,000 mg/L
Toxicity threshold (cell multiplication inhibition test): Protozoa (*Entosiphon sulcatum* and *Uronema parduczi Chatton-Lwoff*), >10,000 mg/L
Algae (*Chlorella pyrenoidosa*), 180,000 mg/L toxic
Toxicity threshold (cell multiplication inhibition test): Algae (*Microcystis aeruginosa*), 2,000 mg/L; Green algae (*Scenedesmus quandricauda*), >10,000 mg/L .

Diethylene glycol:
LC50 Fathead Minnows, >100 ppm/96 hrs (Static Test Environment)
LC50 *Daphnia Magna*, 0.3 - 1 ppm/96 hrs (Static Test Environment)
No Effect Level, *Selenastrum Capricornutum*, 100 ppm (Static Test Environment)

Environmental Fate

Ethylene glycol will react in the atmosphere with hydroxyl radicals with a half-life of about one day. This product is miscible in water and is expected to readily disperse in marine environments. The component ethylene glycol will readily biodegrade in water, with a half-life of approximately three days. At water temperatures of 8º C, nearly complete degradation of ethylene glycol occurs in approximately seven days.

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.

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 260 through 40 CFR 271). State and/or local regulations may be more restrictive. Contact the RCRA/Superfund Hotline at (800) 424-9346 or your regional US EPA office for guidance concerning case specfic disposal issues. Empty drums and pails retain residue. DO NOT pressurize, cut, weld, braze, solder, drill, grind, or expose this product's empty container to heat, flame, or other ignition sources. DO NOT attempt to clean it. Empty drums and pails should be drained completely, properly bunged or sealed, and promptly sent to a reconditioner.

SECTION 14: TRANSPORT INFORMATION

DOT Status A U.S. Department of Transportation regulated material only when transported in bulk.

Proper Shipping Name RQ, Environmentally hazardous substances, Liquid, n.o.s. (Ethylene Glycol), 9, UN 3082, PG III

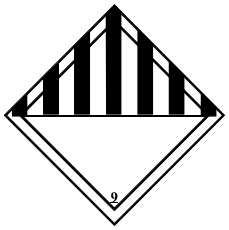
Hazard Class 9

Packing Group(s) III

UN/NA ID UN 3082

Reportable Quantity 5000 lbs. (2268 kg)

Placards



Emergency Response Guide No.	171
HAZMAT STCC No.	Not assigned.
MARPOL III Status	Not a DOT "Marine Pollutant" per 49 CFR 171.8.

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:

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:
Ethylene Glycol [CAS No.: 107-21-1] Concentration: 90 - 95%

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:
Ethylene Glycol [CAS No.: 107-21-1] RQ = 5000 lbs. (2268 kg) Concentration: 90 - 95%

CWA
Discharges or spills of this material onto or in waters of the United States, adjoining shorelines, or into conduits leading to surface waters of the US without proper Federal or State permits should be reported to the National Response Center at (800) 424-8802.

California Proposition 65
This material may contain the following components which are known to the State of California to cause cancer, birth defects or other reproductive harm, and may be subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):
1, 4-Dioxane: 0.009%
Ethylene glycol monomethyl ether: 0.001%

New Jersey Right-to-Know Label
For New Jersey R-T-K labeling requirements, refer to components listed in Section 2.

Additional Regulatory Remarks
This product contains ethylene glycol. Ethylene glycol is listed as a Hazardous Air Pollutant (HAP) pursuant to the Clean Air Act Amendments of 1991. Accidental releases of concentrations of ethylene glycol above the Reportable Quantity (RQ) must be reported immediately to the National Response Center at (800) 424-8802.

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	1.0
Revision Date	09/13/2001
Print Date	Printed on 09/13/2001.

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 = Environmental Protection Agency

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