SEPARATION SYSTEMS, INC.
Experts in Gas Chromatography
100 Nightingale Lane *US Sales: (850) 932-1433*
Gulf Breeze, Florida 32561 *Fax: (850) 934-8642*
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SAFETY DATA SHEET

Creation Date 05-Apr-2007 **Revision Date** 10-June-2017 **Revision** 2.1

1. Identification

Product Name: **Detailed Hydrocarbon Analysis (DHA) Standard**

Product Part Number: **SD-053; SD-053-XXX; CS-CRC-053-250**

Synonyms DHA Standard (PIANO), DHA Standard (PIANO + Oxy), Gravimetric DHA Standard, PIANO, DHA Reference Standard Kit, DHA Standard (Light Naphtha), DHA Standard (Heavy Naphtha I), DHA Standard (Heavy Naphtha II), DHA Standard (Alkylate), DHA Standard (Reformate Feed), DHA Standard (Reformate Product), DHA Standard (FCC Treated Gasoline), DHA Standard (FCC Untreated Gasoline), DHA Standard (PIANO) for CRC, Unleaded Gasolines, Motor Gasolines, Petrol, Automobile Motor Fuels, Finished Gasolines, Gasoline (Regular Unleaded), Gasoline (Mid-grade Unleaded), Gasoline (Premium Unleaded), Reformulated Gasoline (RFG), Reformulated Motor Fuels, Oxygenated Motor Spirits, Gasoline (Regular Reformulated), Gasoline (Mid-grade Reformulated), Gasoline (Premium Reformulated)

Recommended Use Analytical Chemistry

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Separation Systems, Inc.
100 Nightingale Lane
Gulf Breeze, FL 32561
Tel: (850) 932-1433

Emergency Telephone Number
Call CHEMTREC, day or night:
Domestic North America 800-424-9300
International (703) 527-3887 (collect calls accepted)

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 1
Skin Corrosion/irritation	Category 2
Germ cell mutagenicity	Category 1B
Carcinogenicity	Category 1B
Reproductive Toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 3
Aspiration Toxicity	Category 1
Acute aquatic toxicity	Category 2
Chronic aquatic toxicity	Category 2

Label Elements

Signal Word
Danger

Hazard Statements
EXTREMELY FLAMMABLE LIQUID AND VAPOR
May accumulate electrostatic charge and ignite or explode
May be fatal if swallowed and enters airways
Causes skin irritation
May cause genetic defects
May cause cancer
Suspected of damaging fertility or the unborn child
May cause respiratory irritation

May cause drowsiness or dizziness
Toxic to aquatic life with long lasting effects

Precautionary Statements
Prevention
Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Wear protective gloves/protective clothing/eye protection/face protection.
Do not eat, drink or smoke when using this product.
Do not breathe mist/vapors/spray.
Use only outdoors or in a well-ventilated area.
Wash hands thoroughly after handling.
Avoid release to the environment.
Response
IF exposed or concerned: Get medical attention/advice.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation occurs: Get medical attention.
Wash contaminated clothing before reuse.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Call a POISON CENTER or doctor if you feel unwell.
IF SWALLOWED: Immediately call a POISON CENTER or doctor.
Do NOT induce vomiting.
In case of fire: Use water spray, fog or regular foam for extinction.
Collect spillage.
Storage
Store locked up.
Store in a well-ventilated place. Keep container tightly closed.
Keep cool.
Disposal
Dispose of contents/container to an approved waste disposal plant.

Hazards not otherwise classified (HNOC)
Static accumulating flammable liquid

3. Composition / information on ingredients

Product Information:		
Substance Name	**CAS #**	**Percent**
Gasoline	86290-81-5	100
Component Information:		
Ingredient Name	**CAS #**	**Percent**
n-Butane	106-97-8	0-10
n-Hexane	110-54-3	0-8
Cyclohexane	110-82-7	0-3
Saturated Hydrocarbons	Mixture	45-85
Unsaturated Hydrocarbons	Mixture	1-15
Benzene	71-43-2	0-5

Toluene	108-88-3	1-25
1,2,4-Trimethylbenzene	95-63-6	0-6
Trimethylbenzenes, all isomers	25551-13-7	0-5
Ethyl benzene	100-41-4	0-4
Xylene, mixed isomers	1330-20-7	1-18
Cumene	98-82-8	0-4
Naphthalene	91-20-3	0-2
Styrene	100-42-5	0-1
Aromatic Hydrocarbons	Mixture	8-40
Ethyl Alcohol (Ethanol)	64-17-5	0-10
Methyl-tertiary butyl ether (MTBE)	1634-04-4	0-15
Tertiary-amyl methyl ether (TAME)	994-05-8	0-17
Ethyl tertiary butyl ether (ETBE)	637-92-3	0-15
Tertiary-amyl ethyl ether (TAEE)	919-94-8	0-15
Diisopropyl ether (DIPE)	108-20-3	0-15

4. First-aid measures

General Advice

In case of accident or if you feel unwell, seek medical advice immediately (show directions for use or safety data sheet if possible).

Eye Contact

Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Gently remove contacts while flushing. Get medical attention if irritation persists.

Skin Contact

Immediately wash exposed skin with plenty of soap and water while removing contaminated clothing and shoes. May be absorbed through the skin in harmful amounts. Get medical attention if irritation persists. Any injection injury from high pressure equipment should be evaluated immediately by a physician as potentially serious.

Place contaminated clothing in closed container until cleaned or discarded. If clothing is to be laundered, inform the person performing the operation of contaminant's hazardous properties. Destroy contaminated, non-chemical resistant footwear.

Inhalation

Move to fresh air. If not breathing, institute rescue breathing. If breathing is difficult, ensure airway is clear, give oxygen and continue to monitor. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR). Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

Ingestion

Do not induce vomiting because of danger of aspirating liquid into lungs, causing serious damage and chemical pneumonitis. If spontaneous vomiting occurs, keep head below hips, or if patient is lying down, turn body and head to side to prevent aspiration and monitor for breathing difficulty. Never give anything by mouth to an unconscious person. Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

Most important symptoms/effects

Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.
Delayed: Dry skin and possible irritation with repeated or prolonged exposure.

Notes to Physician

INHALATION: This material sensitizes the myocardium to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. Administration of sympathomimetic drugs should be avoided.

SKIN: Leaks or accidents involving high-pressure equipment may inject a stream of material through the skin and initially produce an injury that may not appear serious. Only a small puncture wound may appear on the skin surface but, without proper treatment and depending on the nature, original pressure, volume, and location of the injected material, can compromise blood supply to an affected body part. Prompt surgical debridement of the

wound may be necessary to prevent irreversible loss of function and/or the affected body part. High pressure injection injuries may be SERIOUS MEDICAL EMERGENCIES.

INGESTION: This material represents a significant aspiration and chemical pneumonitis hazard. Induction of emesis is not recommended.

5. Fire-fighting measures

Suitable Extinguishing Media For small fires, Class B fire extinguishing media such as CO_2, dry chemical, foam (AFFF/ATC) or water spray can be used. For large fires, water spray, fog or foam (AFFF/ATC) can be used. Firefighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Unsuitable Extinguishing Media Do not use straight water streams to avoid spreading fire.

Explosion Data

Sensitivity to Mechanical Impact No

Sensitivity to Static Discharge Yes

Specific Hazards Arising from the Chemical

This product has been determined to be an extremely flammable liquid per the OSHA Hazard Communication Standard and should be handled accordingly. May accumulate electrostatic charge and ignite or explode. Vapors may travel along the ground or be moved by ventilation and ignited by many sources such as pilot lights, sparks, electric motors, static discharge, or other ignition sources at locations distant from material handling. Flashback can occur along vapor trail.

Hazardous Combustion Products

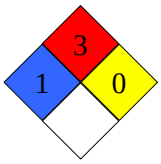
Smoke, carbon monoxide, and other products of incomplete combustion.

Protective Equipment and Precautions for Firefighters

Firefighters should wear full protective clothing and positive-pressure self-contained breathing apparatus (SCBA) with a full face-piece, as appropriate. Avoid using straight water streams. Water may be ineffective in extinguishing low flash point fires, but can be used to cool exposed surfaces. Avoid excessive water spray application. Water spray and foam (AFFF/ATC) must be applied carefully to avoid frothing and from as far a distance as possible. Keep run-off water out of sewers and water sources.

NFPA

Health	Flammability	Instability	Physical hazards
1	3	0	N/A



6. Accidental release measures

Personal Precautions Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources.

Environmental Precautions Ethanol in gasoline phase separates in contact with water. Monitor downstream for dissolved ethanol or other appropriate indicators. Avoid release to the environment. Avoid subsoil penetration.

Methods for Containment and Clean Up Use suitable absorbent materials such as vermiculite, sand, or clay to clean up residual liquids. Recover and return free product to proper containers. When recovering free liquids ensure all equipment is grounded and bonded. Use only non-sparking tools.

7. Handling and storage

Handling Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Comply with all applicable EPA, OSHA, NFPA and consistent state and local requirements. Use appropriate grounding and bonding

practices. Use with adequate ventilation. Avoid skin contact. Avoid contact with eyes, skin, and clothing. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water.

Storage

Store in properly closed containers that are appropriately labeled and in a cool well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code." Avoid storage near incompatible materials. Keep container closed when not in use. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Do not cut, drill, grind or weld on empty containers since they may contain explosive residues.

Incompatible Materials

Strong oxidizing agents

8. Exposure controls / personal protection

Exposure Guidelines

Component (CAS No.)	*Source*	*TWA (ppm)*	*STEL (ppm)*	*Note*
Gasoline (86290-81-5)	ACGIH	300	500	A3
Benzene (71-43-2)	OSHA	1	5	Carcinogen
	ACGIH	0.5	2.5	A1, Skin
	USCG	1	5	
n-Butane (106-97-8)	ACGIH	800	--	2003 NOIC: 1000 ppm (TWA) Aliphatic Hydrocarbon Gases Alkane (C1-C4)
Ethyl Alcohol (ethanol) (64-17-5)	OSHA	1000	--	
	ACGIH	1000	--	A4
Ethyl benzene (100-41-4)	OSHA	100	--	
	ACGIH	100	125	A3
n-Hexane (110-54-3)	OSHA	500	--	
	ACGIH	50	--	Skin
Methyl-tertiary butyl ether [MTBE] (1634-04-4)	ACGIH	50		A3
Tertiary-amyl methyl ether [TAME] (994-05-8)				None established
Toluene (108-88-3)	OSHA	200		Ceiling: 300 ppm; Peak: 500 ppm (10 min.)
	ACGIH	50	--	A4 (Skin)
1,2,4- Trimethylbenzene (95-63-6)	ACGIH	25	--	
Xylene, mixed isomers (1330-20-7)	OSHA	100	--	
	ACGIH	100	150	A4

Engineering Measures

Local or general exhaust required in an enclosed area or when there is inadequate ventilation. Use mechanical ventilation equipment that is explosion-proof.

Personal Protective Equipment

Eye/face Protection

Safety glasses equipped with side shields are recommended as minimum protection in industrial settings. Chemical goggles should be worn during transfer operations or when there is a likelihood of misting, splashing, or spraying of this material. A suitable emergency eye wash and safety shower should be located near the work station.

Skin and body protection

Wear long-sleeved fire-retardant garments (e.g., Nomex®) while working with flammable and combustible liquids. Additional chemical-resistant protective gear may be required if splashing or spraying conditions exist. This may include an apron, boots and additional facial protection. If product comes in contact with clothing, immediately remove soaked clothing and shower. Promptly remove and discard contaminated leather goods.

Respiratory Protection

Approved organic vapor chemical cartridge or supplied air respirators should be worn for exposures to any components exceeding the established exposure limits. Observe

	respirator assigned protection factors (APFs) criteria cited in federal OSHA 29 CFR 1910.134. Self-contained breathing apparatus should be used for fire fighting.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing. Wash hands before eating, drinking or smoking.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Transparent, clear to amber or red
Odor	Strong Hydrocarbon
Odor Threshold	No available data
pH	Not applicable
Melting Point/Range	No available data
Boiling Point/Range	32-225 °C / 90-437 °F
Flash Point	-45.5 °C / -50 °F
Evaporation Rate	No available data
Flammability (solid, gas)	Not applicable
Flammability Limit in Air (%)	
Upper	7.6
Lower	1.4
Vapor Pressure	403-776 mm Hg @ 100 °F
Vapor Density	3-4 (Air = 1.0)
Relative Density	0.70-0.77 g/cm^3
Solubility	Negligible
Partition coefficient; n-octanol/water	2.13-4.5
Auto-ignition Temperature	257 °C / 495 °F
Decomposition Temperature	No available data
Viscosity	<1 cP at 40 °C
VOC Content (%)	100%
Density	5.9-6.3 lbs/gal

10. Stability and reactivity

Reactive Hazard	The product is non-reactive under normal conditions.
Stability	The material is stable at 70 °F, 760 mm Hg pressure.
Conditions to Avoid	Excessive heat, sources of ignition, open flame
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	None known under normal conditions of use.
Hazardous Polymerization	Will not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Potential short-term adverse effects from overexposures

Inhalation	Irritating to the respiratory system. May cause drowsiness or dizziness. Breathing high concentrations of this material in a confined space or by intentional abuse can cause irregular heartbeats which can cause death.
Eye contact	Causes mild eye irritation.
Skin contact	Causes skin irritation. Effects may become more serious with repeated or prolonged contact. May be absorbed through the skin in harmful amounts.
Ingestion	May be fatal if swallowed or vomited and enters airways. May cause irritation of the mouth, throat and gastrointestinal tract.

Acute Toxicity

Gasoline			
Vapor (TELo) Acute	Human	140 ppm (8 hours)	Mild eye irritant
Vapor (TELo) Acute	Human	500 ppm (1 hour)	Moderate eye irritant
Inhalation (TCLo) Acute	Human	900 ppm (1 hour)	CNS and pulmonary effects
Dermal (TDLo) Acute	Human	53 mg/kg	Skin allergy effects
Inhalation (LC50) Acute	Rat, mouse &Guinea pig	101, 200 ppm (5 minutes)	

Delayed and immediate effects as well as chronic effects from short and long-term exposure

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 affect 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. In a four week inhalation study of Sprague Dawley® rats, gasoline vapor condensate was determined to induce sister chromatid exchanges in peripheral lymphocytes. IARC has listed gasoline as possibly carcinogenic to humans (Group 2B).

Summary of health effect information on gasoline engine exhaust:

Chronic inhalation studies of gasoline engine exhaust in mice, rats and hamsters did not produce any carcinogenic effects. Condensates/extracts of gasoline engine exhaust produced an increase in tumors compared to controls when testing by skin painting, subcutaneous injection, intratracheal instillation or implantation into the lungs. Combustion of gasoline produces gases and particulates which include carbon monoxide, carbon dioxide, oxides of nitrogen and/or sulfur and hydrocarbons. Significant exposure to carbon monoxide vapors decreases the oxygen carrying capacity of the blood and may cause tissue hypoxia via formation of carboxyhemoglobin. Overexposure to CO can cause headache, nausea, nervous system depression, coma and death.

Summary of health effect information on gasoline components:

Pentanes, all isomers

Studies of pentane isomers in laboratory animals indicate exposure to extremely high levels (roughly 10 vol.%) may induce cardiac arrhythmias (irregular heartbeats) which may be serious or fatal.

Toluene

Effects from Acute Exposure:

Deliberate inhalation of toluene at high concentrations (e.g., glue sniffing and solvent abuse) has been associated with adverse effects on the liver, kidney and nervous system and can cause CNS depression, cardiac arrhythmias and death. Case studies of persons abusing toluene suggest isolated incidences of adverse effects on the fetus including birth defects.

Effects from Repeated or Prolonged Exposure:

Studies of workers indicate long-term exposure may be related to impaired color vision and hearing. Some studies of workers suggest long-term exposure may be related to neurobehavioral and cognitive changes. Some of these effects have been observed in laboratory animals following repeated exposure to high levels of toluene. Several studies of workers suggest long-term exposure may be related to small increases in spontaneous abortions and changes in some gonadotropic hormones. However, the weight of evidence does not indicate toluene is a reproductive hazard to humans. Studies in laboratory animals indicate some changes in reproductive organs following high levels of exposure, but no significant effects on mating performance or reproduction were observed. Case studies of persons abusing toluene suggest isolated incidences of adverse effects on the fetus including birth defects. Findings in laboratory animals were largely negative. Positive findings include small increases in minor skeletal and visceral malformations and developmental delays following very high levels of maternal exposure. Studies of workers indicate long-term exposure may be related to effects on the liver, kidney and blood, but these appear to be limited to changes in serum enzymes and decreased leukocyte counts. Studies in laboratory animals indicate some evidence of adverse effects on the liver, kidney, thyroid, and pituitary gland following very high levels of exposure. The relevance of these findings to humans is not clear at this time.

Heptane, all isomers

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

Xylene, all isomers

Oral (LD50) Acute	Rat	4,300 mg/kg
Inhalation (LC50) Acute	Rat	4,550 ppm for four hours
Dermal (LD50) Acute	Rabbit	14,100 uL/kg

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. Evidence of liver and kidney impairment were reported in workers recovering from a gross over-exposure.

Effects from Prolonged or Repeated Exposure:

Impaired neurological function was reported in workers exposed to solvents including xylene.

Studies in laboratory animals have shown evidence of impaired hearing following high levels of exposure.

Studies in laboratory animals suggest some changes in reproductive organs following high levels of exposure but no significant effects on reproduction were observed.

Studies in laboratory animals indicate skeletal and visceral malformations, developmental delays, and increased fetal resorptions following extremely high levels of maternal exposure.

Adverse effects on the liver, kidney, bone marrow (changes in blood cell parameters) were observed in laboratory animals following high levels of exposure. The relevance of these observations to humans is not clear at this time.

Ethyl tertiary Butyl Ether (ETBE)

ETBE can cause eye, skin and mucous membrane irritation. In a four week inhalation study, moderate ataxia was observed in rats at the highest dose level (4,000 ppm). The test animals appeared normal within 15 minutes of termination of exposure. A no observed adverse effect level (NOAEL) of 500 ppm was indicated by the study authors based on neurotoxic effects. In two unpublished 90 day inhalation studies, rats and mice were exposed six hour/day, five days/week at concentrations of 0, 500, 1750 and 5000 ppm of ETBE vapor. The male rats exhibited time and concentration-dependent nephropathy consistent with alpha-2µ-globulin formation. An ETBE NOAEL for male rats of 500 ppm was suggested based on a finding of testicular lesions. In human studies with eight males, slight, but significant ($p<0.05$) decreases in objective pulmonary function measures after exposure to ETBE at concentrations of 25 and 50 ppm for two hours.

Tertiary-Amyl Methyl Ether (TAME)

TAME was found to be negative for the induction of structural chromosome aberrations (both metabolically-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.

Methyl tertiary-Butyl Ether (MTBE)

Acute symptoms associated with human exposure to MTBE appear to be mild and transient. In laboratory studies, rats and mice 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. 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 maternally 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.

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 1000 to 5000 ppm produced symptoms of narcosis, stupor and unconsciousness. 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.

Butane, all isomers

Studies in laboratory animals indicate exposure to extremely high levels of butanes (1-10 or higher vol.% in air) may cause cardiac arrhythmias (irregular heartbeats) which may be serious or fatal.

n-Hexane

This material contains n-hexane. Long-term or repeated exposure to n-hexane can cause permanent peripheral nerve damage. Initial symptoms are numbness of the fingers and toes. Also, motor weakness can occur in the digits, but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. Co-exposure to methylethyl ketone or methyl isobutyl ketone increases the neurotoxic

properties of n-hexane. In laboratory studies, prolonged exposure to elevated concentrations of n-hexane was associated with decreased sperm count and degenerative changes in the testicles of rats.

Cumene

Effects from Acute Exposure:

Overexposure to cumene may cause upper respiratory tract irritation and severe CNS depression.

Effects from Prolonged or Repeated Exposure:

Studies in laboratory animals indicate evidence of adverse effects on the kidney and adrenal glands following high level exposure. The relevance of these findings to humans is not clear at this time.

Trimethylbenzenes, all isomers

Studies of Workers:

Levels of total hydrocarbon vapors present in the breathing atmosphere of these workers ranged from 10 to 60 ppm. The TCLo for humans is 10 ppm, with somnolence and respiratory tract irritation noted.

Studies in Laboratory Animals:

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. 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

Oral (LD50) Acute	Rat	930 mg/kg
	Mouse	4700 mg/kg
Inhalation (LC50) Acute	Rat	10000 ppm 7 hours
Dermal (LD50) Acute	Mouse	9980 ppm 8 hours

Studies of Workers Over-Exposed to Benzene:

Studies of workers exposed to benzene show clear evidence that over-exposure can cause cancer of the blood forming organs (acute myelogenous leukemia) and aplastic anemia, an often fatal disease. Studies also suggest over-exposure to benzene may be associated with other types of leukemia and other blood disorders. Some studies of workers exposed to benzene have shown an association with increased rates of chromosome aberrations in circulating lymphocytes. One study of women workers exposed to benzene suggested a weak association with irregular menstruation. However, other studies of workers exposed to benzene have not demonstrated clear evidence of an effect on fertility or reproductive outcome in humans. Benzene can cross the placenta and affect the developing fetus. Cases of aplastic anemia have been reported in the offspring of persons severely over-exposed to benzene.

Studies in Laboratory Animals:

Studies in laboratory animals indicate that prolonged, repeated exposure to high levels of benzene vapor can cause bone marrow suppression and cancer in multiple organ systems. Studies in laboratory animals show evidence of adverse effects on male reproductive organs following high levels of exposure but no significant effects on reproduction have been observed. Embryotoxicity has been reported in studies of laboratory animals but effects were limited to reduced fetal weight and skeletal variations.

Ethylbenzene

Oral (LD50) Acute	Rat	3,500 mg/kg
Dermal (LD50) Acute	Rabbit	17,800 uL/kg
Intraperitoneal (LD50), Acute	Rat	2,624 mg/kg

Effects from Prolonged or Repeated Exposure:

Findings from a 2-year inhalation study in rodents conducted by NTP were as follows: Effects were observed only at the highest exposure level (750 ppm). At this level the incidence of renal tumors was elevated in male rats (tubular carcinomas) and female rats (tubular adenomas). Also, the incidence of tumors was elevated in male mice (alveolar and bronchiolar carcinomas) and female mice (hepatocellular carcinomas). IARC has classified ethyl benzene as “possibly carcinogenic to humans” (Group 2B). Studies in laboratory animals indicate some evidence of post-implantation deaths following high levels of maternal exposure. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals indicate limited evidence of renal malformations, resorptions, and developmental delays following high levels of maternal exposure. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals indicate some evidence of adverse effects on the liver, kidney, thyroid, and pituitary gland.

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, generalized vascular damage and degenerative changes in the heart, lungs, liver, kidneys and brain were identified.

Cyclohexane has been the focus of substantial testing in laboratory animals. Cyclohexane was not found to be genotoxic in several tests including unscheduled DNA synthesis, bacterial and mammalian cell mutation assays, and in vivo chromosomal aberration. An increase in chromosomal aberrations in bone marrow cells of rats exposed to cyclohexane was reported in the 1980’s. However, a careful re-evaluation of slides from this study by the laboratory which conducted the study indicates these findings were in error, and that no significant chromosomal effects were observed in animals exposed to cyclohexane. Findings indicate long-term exposure to cyclohexane does not promote dermal tumorigenesis.

Naphthalene

Studies in Humans Overexposed to Naphthalene:

Severe jaundice, neurotoxicity (kernicterus) and fatalities have been reported in young children and infants as a result of hemolytic anemia from over-exposure to naphthalene. Persons with Glucose 6-phosphate dehydrogenase (G6PD) deficiency are more prone to the hemolytic effects of naphthalene. Adverse effects on the kidney have also been reported from over-exposure to naphthalene but these effects are believed to be a consequence of hemolytic anemia, and not a direct effect.
Studies in Laboratory Animals:
Hemolytic anemia has been observed in laboratory animals exposed to naphthalene. Laboratory rodents exposed to naphthalene vapor for 2 years (lifetime studies) developed non-neoplastic and neoplastic tumors and inflammatory lesions of the nasal and respiratory tract. Cataracts and other adverse effects on the eye have been observed in laboratory animals exposed to high levels of naphthalene. Findings from a large number of bacterial and mammalian cell mutation assays have been negative. A few studies have shown chromosomal effects (elevated levels of Sister Chromatid Exchange or chromosomal aberrations) *in vitro.*

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).

Adverse effects related to the physical, chemical and toxicological characteristics

Signs & Symptoms Nausea, vomiting, signs of nervous system depression: headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.

Sensitization Not expected to be a skin or respiratory sensitizer.

Mutagenic effects May cause genetic defects.

Carcinogenicity Cancer designations are listed in the table below.

Name	ACGIH (Class)	IARC (Class)	NTP	OSHA
Gasoline 86290-81-5	Confirmed animal carcinogen (A3)	Possibly Carcinogenic (2B)	Not Listed	Not Listed
Toluene 108-88-3	Not Classifiable (A4)	Not Classifiable (3)	Not Listed	Not Listed
Ethyl Alcohol 64-17-5	Confirmed animal carcinogen (A3)	Carcinogenic (1) Alcoholic Beverages	Known to be human carcinogen – Alcoholic Beverage Consumption	Not Listed
Xylene (mixed isomers) 1330-20-7	Not Classifiable (A4)	Not Classifiable (3)	Not Listed	Not Listed
1,2,4-Trimethylbenzene 95-63-6	Not Listed	Not Listed	Not Listed	Not Listed
Benzene 71-43-2	Confirmed human carcinogen (A1)	Carcinogenic to humans (1)	Known to be human carcinogen	Known carcinogen
n-Hexane 110-54-3	Not Listed	Not Listed	Not Listed	Not Listed
Ethylbenzene 100-41-4	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Not Listed	Not Listed
Naphthalene 91-20-3	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Reasonably anticipated to be a human carcinogen	Not Listed

Reproductive toxicity Suspected of damaging fertility or the unborn child.

Specific Target Organ Toxicity (STOT) – single exposure Respiratory system. Central nervous system.

Specific Target Organ Toxicity (STOT) – repeated exposure Not classified.

Aspiration hazard May be fatal if swallowed or vomited and enters airways.

12. Ecological information

Ecotoxicity This product should be considered toxic to aquatic organisms, with the potential to cause long lasting adverse effects in the aquatic environment.

Name	Algae/aquatic plants	Fish	Toxicity to Microorganisms	Crustacea
Gasoline 86290-81-5	72-hr EC50 = 56 mg/L Algae	96-hr LC50 = 11 mg/L Rainbow trout (static)	-	48-hr LC50 = 7.6 mg/L Daphnia magna
Toluene 108-88-3	72-hr EC50 = 12.5 mg/L Algae	96-hr LC50 <= 10 mg/L Rainbow trout	-	48-hr EC50 = 5.46-9.83 mg/L Daphnia magna 48-hr EC50 = 11.5 mg/L Daphnia magna (static)
Ethyl Alcohol 64-17-5	-	96-hr LC50 > 1,000 mg/L Rainbow Trout (static)L 96-hr LC50 > 100 mg/L Fathead minnow (static)	-	48-hr LC50 > 1,000 mg/L Daphnia magna
Xylene (mixed isomers) 1330-20-7	72-hr EC50 = 11 mg/L Algae	96-hr LC50 = 8 mg/L Rainbow trout	-	48-hr EC50 = 6.14 mg/L
1,2,4-Trimethylbenzene 95-63-6	-	96-hr LC50 = 7.19-8.28 mg/L Fathead minnow (flow-through)	-	48-hr EC50 = 6.14 mg/L Daphnia magna
Benzene 71-43-2	72-hr EC50 = 29 mg/L Algae	96-hr LC50 = 5.3 mg/L Rainbow trout (flow-through)	-	48-hr EC50 = 8.76-15.6 mg/L Daphnia magna (static)
n-Hexane 110-54-3	-	96-hr LC50 = 2.5 mg/L Fathead minnow	-	-
Ethylbenzene 100-41-4	72-hr EC50 = 1.7-7.6 mg/L Algae	96-hr LC50 = 4 mg/L Rainbow trout	-	48-hr EC50 = 1-4 mg/L Daphnia magna
Naphthalene 91-20-3	-	96-hr LC50 = 0.91-2.82 mg/L Rainbow trout (static) 96-hr LC50 = 1.99 mg/L Fathead minnow (static)	-	48-hr LC50 = 1.6 mg/L Daphnia magna

Persistence and Degradability Expected to be inherently biodegradable. The presence of ethanol in this product may impede the biodegradation of benzene, toluene, ethylbenzene and xylene in groundwater, resulting in elongated plumes of these constituents.

Bioaccumulation Has the potential to bioaccumulate.

Mobility in soil May partition into air, soil and water.

Other adverse effects No information available.

13. Disposal considerations

Description of Waste Residues This material may be a flammable liquid waste.

Safe Handling of Wastes Handle in accordance with applicable local, state, and federal regulations. Use personal protection measures as required. Use appropriate grounding and bonding practices. Use only non-sparking tools. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. No smoking.

Disposal of Wastes/Methods Of Disposal The user is responsible for determining if any discarded material is a hazardous waste (40 CFR 262.11). Dispose of in accordance with federal, state and local regulations.

Methods of Contaminated Packaging Disposal Empty containers should be completely drained and then discarded or recycled, if possible. Do not cut, drill, grind or weld on empty containers since explosive residues may be present. Dispose of in accordance with federal, state and local regulations.

14. Transport information

Transport Information This material when transported via US commerce would be regulated by DOT Regulations.

DOT

UN No.	UN1203
Proper Shipping Name	Gasoline
Hazard Class	3
Packing Group	II

IATA / ICAO

UN No.	UN1203
Proper Shipping Name	Gasoline
Hazard Class	3
Packing Group	II

TDG (Canada)

UN No.	UN1203
Proper Shipping Name	Gasoline
Hazard Class	3
Packing Group	II

15. Regulatory information

US Federal Regulatory Information:

US TSCA Chemical Inventory Section 8(b): This product and/or its components are listed on the TSCA Chemical Inventory.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product does not contain any component(s) included on EPA's Extremely Hazardous Substance (EHS) List.

Name	CERCLA/SARA – Section 302 Extremely Hazardous Substances and TPQs
Gasoline	N/A
Toluene	N/A
Ethyl Alcohol	N/A
Xylene (mixed isomers)	N/A
1,2,4-Trimethylbenzene	N/A
Benzene	N/A
n-Hexane	N/A
Ethylbenzene	N/A
Naphthalene	N/A

SARA Section 304: This product may contain component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

Name	CERCLA/SARA – Hazardous Substances and their Reportable Quantities
Gasoline	N/A
Toluene	1000 lb final RQ 454 kg final RQ
Ethyl Alcohol	N/A
Xylene (mixed isomers)	100 lb final RQ 45.5 kg final RQ
1,2,4-Trimethylbenzene	N/A
Benzene	10 lb final RQ 4.54 final RQ
n-Hexane	5000 lb final RQ 2270 kg final RQ
Ethylbenzene	1000 lb final RQ 454 kg final RQ
Naphthalene	100 lb final RQ 45.4 final RQ

SARA: The following EPA hazard categories apply to this product:

Acute Health Hazard
Chronic Health Hazard
Fire Hazard

SARA Section 313: This product may contain component(s), which if in exceedance of the de minimis threshold, may be subject to the reporting requirements of SARA Title III Section 313 Toxic Release Reporting (Form R).

Name	CERCLA/SARA – 313 Emission reporting
Gasoline	None
Toluene	1.0% de minimis concentration
Ethyl Alcohol	None
Xylene (mixed isomers)	1.0% de minimis concentration
1,2,4-Trimethylbenzene	None
Benzene	1.0% de minimis concentration
n-Hexane	1.0% de minimis concentration
Ethylbenzene	1.0% de minimis concentration
Naphthalene	1.0% de minimis concentration

Canada DSL/NDSL Inventory This product and/or its components are listed either on the Domestic Substances List (DSL) or are exempt.

Canadian Regulatory Information "This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations."

Name	Canada – WHMIS: Classification of Substances	Canada – WHMIS: Ingredient Disclosure
Gasoline	B2, D2A, D2B	0.1%
Toluene	B2, D2A, D2B	0.1%
Ethyl Alcohol	B2, D2B	0.1%
Xylene (mixed isomers)	B2, D2A, D2B	m-, o-isomers 1.0%; p-isomer 0.1%
1,2,4-Trimethylbenzene	B3	1%
Benzene	B2, D2A, D2B	0.1%
n-Hexane	B2, D2A, D2B	1%
Ethylbenzene	B2, D2A, D2B	0.1%
Naphthalene	B4, D2A	0.1%
WHMIS – Workplace Hazardous Materials Information System		

16. Other information

References: Not Available

Creation Date 05-Apr-2007

Revision Date 10-June-2017

Version: 2.1

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