



MATERIAL SAFETY DATA SHEET

ValAro Aromatic Extract Oils

PAULSBORO REFINING COMPANY LLC

800 Billingsport Road
Paulsboro, NJ 08066

Emergency Phone Numbers

Chemtrec Emergency: 800-424-9300

General Assistance

General Assistance: 856-224-6605

BRAND NAMES: Paulsboro Refining Company LLC, Delaware City Refining Company LLC, PBF Holding Company LLC, PBF Energy Company LLC

Section 1. Chemical Product and Company Identification

Common / Trade name : ValAro Aromatic Extract Oils

Synonym : ValAro Aromatic Extracts - 100, 130, 130A, 45, 65, 180 - CAS# 64742-04-7
ValAro Aromatic Extracts - 220 - CAS# 91995-70-9

SYNONYMS/Common Names: This Material Safety Data Sheet applies to the listed products and synonym descriptions for Hazard Communication purposes only. Technical specifications vary greatly depending on the product and are not reflected in this document. Consult specification sheets for technical information. This product contains ingredients that are considered to be hazardous as defined by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Material uses : This product is intended for use as a refinery feedstock, fuel, or for use in engineered processes. Use in other applications may result in higher exposures and require additional controls, such as local exhaust ventilation and personal protective equipment.

MSDS # : 718

CAS # : Mixture

Section 2. Hazards Identification

CONTAINS AROMATIC PETROLEUM OIL
WARNING!

Harmful if contact with or absorbed through the skin harmful if swallowed. As little as a few drops of this product applied daily without washing may produce serious toxic effects including skin cancer, liver damage, blood effects and effects on the unborn.

Physical state : Liquid.

Emergency overview : Caution!

COMBUSTIBLE LIQUID AND VAPOR.
VAPOR MAY CAUSE FIRE.

Do not ingest. Do not get in eyes or on skin or clothing. Avoid breathing vapor or mist. Keep away from heat, sparks and flame. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Risk of cancer depends on duration and level of exposure.

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Eyes : Irritating to eyes.

Skin : Prolonged or repeated contact may cause moderate irritation, defatting (cracking), redness, itching, inflammation, dermatitis and possible secondary infection. High pressure skin injections are SERIOUS MEDICAL EMERGENCIES. Injury may not appear serious at first. Within a few hours, tissues will become swollen, discolored and extremely painful.

Continued on next page

- Inhalation** : Inhalation of the spray mist may produce irritation of respiratory tract, characterized by coughing.
- Ingestion** : This product may be harmful or fatal if swallowed. This product may cause nausea, vomiting, diarrhea and restlessness. DO NOT INDUCE VOMITING. Aspiration into the lungs can cause severe chemical pneumonitis or pulmonary edema/hemorrhage, which can be fatal. May cause gastrointestinal disturbances. Symptoms may include irritation, depression, vomiting and diarrhea. May cause harmful central nervous system effects, similar to those listed under "inhalation".
- Medical conditions aggravated by over-exposure** : Repeated or prolonged contact with spray mist may produce eye and skin irritation. Repeated or prolonged exposure to spray or mist may produce respiratory tract irritation, leading to frequent attacks of bronchial infection.

Over-exposure signs/symptoms :

See toxicological information (section 11)

Section 3. Composition, information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>Concentration (%)</u>
Heavy Paraffinic Distillate Solvent Extract (petroleum)	64742-04-7	0 - 100
Deasphalted Vacuum Residue Solvent Extract (petroleum)	91995-70-9	0 - 100

Section 4. First Aid Measures

- 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. Seek medical advice if pain or redness continues.
- Skin contact** : In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention. Wash exposed area thoroughly with soap and water. Remove contaminated clothing promptly and launder before reuse. Contaminated leather goods should be discarded. If irritation persists or symptoms described in the MSDS develop, seek medical attention. High pressure skin injections are SERIOUS MEDICAL EMERGENCIES. Get immediate medical attention.
- Inhalation** : If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.
- Ingestion** : If potentially dangerous quantities of this material have been swallowed, call a physician immediately. Do not induce vomiting unless directed to do so by medical personnel.
- Notes to physician** : In case of ingestion, gastric lavage with activated charcoal can be used promptly to prevent absorption. Consideration should be given to the use of an intratracheal tube, to prevent aspiration. Irregular heart beat may occur, use of adrenalin is not advisable. Individuals intoxicated by the product should be hospitalized immediately, with acute and continuing attention to neurological and cardiopulmonary function. Positive pressure ventilation may be necessary. After the initial episode, individuals should be monitored for changes in blood variables and the delayed appearance of pulmonary edema and chemical pneumonitis. Such patients should be monitored for several days or weeks for delayed effects, including bone marrow toxicity, hepatic and renal impairment. Individuals with chronic pulmonary disease will be more seriously impaired, and recovery from inhalation exposure may be complicated. In case of skin injection, prompt debridement of the wound is necessary to minimize necrosis and tissue loss.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

Section 5. Fire Fighting Measures

- Flammability of the product** : Combustible.
- Auto-ignition temperature** : >204.47°C (400°F)
- Flash point** : Open cup: >204.47°C (400°F) (Cleveland.).
- Flammable limits** : Lower: 0.6% Upper: 7%
- Products of combustion** : These products are carbon oxides (CO, CO₂), nitrogen and sulfur oxides (NO_x, SO_x), particulate matter, VOC's.
- Fire hazards in the presence of various substances** : COMBUSTIBLE.
- Explosion hazards in the presence of various substances** : Risk of explosion of the product in the presence of mechanical impact: Not available.
Risk of explosion of the product in the presence of static discharge: Not available.
- Fire-fighting media and instructions**
- Extinguishing media**
- Suitable** : Use an extinguishing agent suitable for the surrounding fire.
- Not suitable** : The use of directly applied water is usually not recommended.
- Collect contaminated fire-fighting water separately. It must not enter the sewage system. Dike area of fire to prevent runoff. Decontaminate emergency personnel and equipment with soap and water.
- Combustible liquid and vapor.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
- Special remarks on fire hazards** : When heated above its flash point, this material will release flammable vapors which, if exposed to a source of ignition, can burn in the open or be explosive in confined spaces. Mists or sprays may be flammable at temperatures below the normal flash point. Dry chemical, halon carbon dioxide are the preferred extinguishing media. Foam and water fog are effective but can cause frothing. Big fires, such as tank fires, should be fought with caution. If the burning liquid is 200F or hotter, the use of water, water spray, or foam can cause frothing and even sudden boilover of the tank, endangering the lives of personnel such as firefighters. If possible, pump the contents from the tank and keep adjoining structures cool with water. Water can be used to cool fire-exposed containers, structures and to protect personnel. If a leak or spill has not ignited, ventilate area and use water spray to disperse gas or vapor and to protect personnel attempting to stop a leak. Use water to flush spills away from sources of ignition. Do not flush down public sewers.

Section 6. Accidental Release Measures

- Personal precautions** : Immediately contact emergency personnel. Eliminate all ignition sources. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Do not touch or walk through spilled material. Tanks, vessels or other confined spaces which have contained product should be freed of vapors before entering. The container should be checked to ensure a safe atmosphere before entry. Empty containers may contain toxic, flammable/combustible or explosive residues or vapors. Do not cut, grind, drill, weld or reuse empty containers that contained this product. Do not transfer this product to another container unless the container receiving the product is labeled with proper DOT shipping name, hazard class and other information that describes the product and its hazards.
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. If facility or operation has an "oil or hazardous substance contingency plan", activate its procedures. Stay upwind and away from spill. Wear appropriate protective equipment including respiratory protection as conditions warrant. Do not enter or stay in area unless monitoring indicates that it is safe to do so. Isolate hazard area and restrict entry to emergency crew. Extremely flammable. Review Fire Fighting Measures section before proceeding with clean up. Keep all sources of ignition (flames, smoking, flares, etc.) and hot surfaces away from release. Contain spill in smallest possible area. Recover as much product as possible (e.g., by vacuuming). Stop leak if it can be done

without risk. Use water spray to disperse vapors. Spilled material may be absorbed by an appropriate absorbent, and then handled in accordance with environmental regulations. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment or drainage systems and natural waterways. Contact fire authorities and appropriate federal, state and local agencies. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, contact the National Response Center at 800-424- 8802. For highway or railway spills, contact Chemtrec at 800-424-9300.

Methods for cleaning up

Small spill

: For small spills, add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion-proof means to transfer material to a sealable, appropriate container for disposal. Stop leak if without risk. Move containers from spill area. Dispose of via a licensed waste disposal contractor.

Large spill

: If emergency personnel are unavailable, contain spilled material. For large spills, dike spilled material or otherwise contain it to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal.

Section 7. Handling and Storage

Handling

: Do not ingest. Do not get in eyes, on skin or on clothing. Keep container closed. Use only with adequate ventilation. Avoid breathing vapor or mist. Keep away from heat, sparks and flame. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Wash thoroughly after handling. Wash thoroughly after handling.

Storage

: Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8. Exposure controls, personal protection

Engineering measures

: If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes

: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin

: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Flame Retardant Clothing is recommended.

Respiratory

: Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands

: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Personal protective equipment (Pictograms)

: Consult your supervisor or S.O.P. for special handling direction.



Personal protection in case of a large spill

: Splash goggles. Full suit. Vapor respirator. Boots. Gloves. Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product. Suggested protective clothing might not be adequate. Consult a specialist before handling this product.

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Component

Polycyclic Aromatic Hydrocarbons

Exposure limits**OSHA PEL (United States, 6/1993).**TWA: 0.2 mg/m³ 8 hour(s). Form: Benzene soluble**ACGIH TLV (United States, 3/2004).**TWA: 0.2 mg/m³ 8 hour(s). Form: Benzene-soluble**ACGIH TLV (United States, 9/2004). Notes: Adopted Values enclosed are those for which changes are proposed. Consult the Notice of Intended Changes for current proposal. See Notice of Intended changes.**STEL: 10 mg/m³ 15 minute(s). Form: All formsTWA: 5 mg/m³ 8 hour(s). Form: All forms**NIOSH REL (United States, 6/2001).**STEL: 10 mg/m³ 15 minute(s). Form: MistTWA: 5 mg/m³ 10 hour(s). Form: Mist**OSHA PEL (United States, 6/1993).**TWA: 5 mg/m³ 8 hour(s). Form: All forms

Oil Mist, Mineral

Consult local authorities for acceptable exposure limits.

Section 9. Physical and Chemical Properties

- Physical state** : Liquid.
- Color** : Dark
- Odor** : Strong Petroleum Odor
- Boiling point** : >157.27°C (315.1°F)
- Specific gravity** : 0.99 (Water = 1) (@ 60 °F)
- Volatility** : Negligible
- Evaporation rate** :

Section 10. Stability and reactivity data

- Stability** : The product is stable.
- Hazardous polymerization** : Will not occur.
- Conditions to avoid** : Avoid exposure - obtain special instructions before use.
- Materials to avoid** : Oxidizing agent.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Conditions of reactivity** : COMBUSTIBLE.
- Risk of explosion of the product in the presence of mechanical impact: Not available.
- Risk of explosion of the product in the presence of static discharge: Not available.

Section 11. Toxicological Information**Toxicity data**

ValAro Aromatic Extract Oils are a complex mixture of hydrocarbons and aromatics from a variety of chemical processes blended to meet standardized product specifications. Composition varies greatly and includes C20 to C50 hydrocarbons with a boiling range of about 315-1300° F.

ACUTE TOXICOLOGY

ORAL TOXICITY (RATS): Practically non-toxic (LD50: greater than 2000 mg/kg). --Based on testing of similar products and/or the components.

DERMAL TOXICITY (RABBITS): Practically non-toxic (LD50: greater than 2000 mg/kg), based on testing of similar products and/or the components.

INHALATION TOXICITY (RATS): Not established.

EYE IRRITATION (RABBITS): Practically non-irritating (Draize score: greater than 6 but 15 or less), based on testing of similar products and/or the components.

SKIN IRRITATION (RABBITS): Irritant. (Primary Irritation Index: 3 or greater but less than 5), based on testing of similar products and/or the components.

SUBCHRONIC TOXICOLOGY (SUMMARY)

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Dermal application of 500 mg/kg/day or more to rats for 13 weeks resulted in increased mortality and decreased body weights. At 30 mg/kg/day or more, increased liver and kidney weights and decreased thymus weight were also observed.

REPRODUCTIVE TOXICOLOGY (SUMMARY)

Repeated dermal application of this material or its components to rats at 125 mg/kg/day or more resulted in maternal toxicity and decreased fetal body weights and survival. At 2000 mg/kg/day, malformations were also observed.

CHRONIC TOXICOLOGY (SUMMARY)

Expected to be carcinogenic in lifetime mouse skin painting bioassays. Prolonged and repeated contact with oils can produce skin lesions. IARC has determined that the carcinogenic activity of refined oils is related to the severity of processing of the base oil. IARC has determined that sufficient evidence exists to classify untreated or mildly hydrotreated oils as carcinogenic to humans. This product is untreated and has not been tested to determine carcinogenic potential. This product should be regarded as a human carcinogen (IARC Group 1) and used in engineered systems designed to prevent or minimize contact. Where direct contact is necessary, appropriate personal protective equipment should be selected based on a review of the product hazards. In all cases of use, an exposure assessment should be conducted by a qualified person to determine adequacy of engineering controls, administrative controls, and personal protective equipment.

OTHER TOXICOLOGY DATA

Evidence from skin cleansing studies suggests that toxic effects are unlikely in humans if good personal hygiene practices are followed. Skin painting studies in laboratory animals with products containing **Polycyclic Aromatic Compounds** have resulted in severe irritation and systemic toxicity, including cancers. Polycyclic aromatic compounds have been shown to cause anemia, disorders of the liver, bone marrow and lymphoid tissues in rats following dermal application.

Acute toxicity

Product/ingredient name	Result	Species	Dose
Polycyclic Aromatic Hydrocarbons	LD50 Subcutaneous	Rat	50 mg/kg
	TDL _o Intraperitoneal	Rat	100 mg/kg
	TDL _o Intraperitoneal	Rat	50 mg/kg
	TDL _o Intraperitoneal	Rat	40 mg/kg
	TDL _o Intratracheal	Rat	12 mg/kg
	TDL _o Intratracheal	Rat	10.5 mg/kg
	TDL _o Oral	Rat	12.5 mg/kg
	TDL _o Oral	Rat	25 mg/kg
	TDL _o Oral	Rat	100 mg/kg

Carcinogenicity

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Polycyclic Aromatic Hydrocarbons	A2	2A	-	-	Possible	-

Chronic effects on humans : **CARCINOGENIC EFFECTS:** Classified 2 (Suspected for humans.) by European Union [Heavy Paraffinic Distillate Solvent Extract (petroleum)]. Classified A2 (Suspected for humans.) by ACGIH, 2A (Probable for human.) by IARC, 2 (Reasonably anticipated to be human carcinogens.) by NTP, 2 (Suspected for humans.) by European Union [Polycyclic Aromatic Hydrocarbons].

MUTAGENIC EFFECTS: Classified 2 by European Union [Polycyclic Aromatic Hydrocarbons].

Contains material which may cause damage to the following organs: upper respiratory tract, skin, eye, lens or cornea.

Other toxic effects on humans : Very hazardous by the following route of exposure: of eye contact (corrosive). Hazardous by the following route of exposure: of skin contact (irritant, sensitizer), of ingestion, of inhalation (lung irritant).

Specific effects

Carcinogenic effects : Contains material which may cause cancer. Risk of cancer depends on duration and level of exposure.

Target organs : Contains material which may cause damage to the following organs: upper respiratory tract, skin, eye, lens or cornea.

Section 12. Ecological Information

Ecotoxicity data

Product/ingredient name	Result	Species	Exposure
Polycyclic Aromatic Hydrocarbons	Acute LC50 0.25 mg/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
Oil Mist, Mineral	Acute LC50 >100 ppm Fresh water	Fish - Rainbow trout, donaldson trout - Oncorhynchus mykiss	96 hours

Biodegradability

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Biodegradability

Products of degradation : Decomposition products may include the following materials: carbon oxides (CO, CO₂) and water.

Toxicity of the products of biodegradation : The products of degradation are less toxic than the product itself.

Section 13. Disposal Considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.

Consult your local or regional authorities.

Section 14. Transport Information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.		Not a DOT controlled material (United States).			Not available.
TDG Classification	Not regulated.		Not a TDG-controlled material.	Not available.		Not available.

Section 15. Regulatory Information**United States**

HCS Classification : Combustible liquid
Toxic material
Corrosive material
Carcinogen
Target organ effects

U.S. Federal regulations : TSCA 8(b) inventory: All components are listed or exempted.
SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Polycyclic Aromatic Hydrocarbons; Heavy Paraffinic Distillate Solvent Extract (petroleum)
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Polycyclic Aromatic Hydrocarbons: Immediate (acute) health hazard, Delayed (chronic) health hazard; Heavy Paraffinic Distillate Solvent Extract (petroleum): Immediate (acute) health hazard, Delayed (chronic) health hazard
Clean Water Act (CWA) 307: Polycyclic Aromatic Hydrocarbons
Clean Water Act (CWA) 311: No products were found.
Clean Air Act (CAA) 112 accidental release prevention: No products were found.
Clean Air Act (CAA) 112 regulated flammable substances: No products were found.
Clean Air Act (CAA) 112 regulated toxic substances: No products were found.

SARA 313

	Product name	CAS number	Concentration
Form R - Reporting requirements	: Polycyclic Aromatic Hydrocarbons	130498-29-2	>5
Supplier notification	: Polycyclic Aromatic Hydrocarbons	130498-29-2	>5

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SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

- State regulations** :
- Pennsylvania RTK Hazardous Substances: Polycyclic Aromatic Hydrocarbons: (special hazard, environmental hazard, generic environmental hazard)
 - Massachusetts Substances: Polycyclic Aromatic Hydrocarbons; Heavy Paraffinic Distillate Solvent Extract (petroleum)
 - New Jersey: Polycyclic Aromatic Hydrocarbons

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

<u>Ingredient name</u>	<u>Cancer</u>	<u>Reproductive</u>	<u>No significant risk level</u>	<u>Maximum acceptable dosage level</u>
Polycyclic Aromatic Hydrocarbons	Yes.	No.	Yes.	No.
Oil Mist, Mineral	Yes.	No.	No.	No.

Canada

- WHMIS (Canada)** :
- Class D-2A: Material causing other toxic effects (Very toxic).
 - Class D-2B: Material causing other toxic effects (Toxic).
 - Class E: Corrosive liquid.
 - CEPA DSL & NDSL: All materials are either listed or exempt

EU regulations

Hazard symbol or symbols



Risk phrases

- :
- R45- May cause cancer.
 - R46- May cause heritable genetic damage.
 - R60- May impair fertility.
 - R61- May cause harm to the unborn child.
 - R43- May cause sensitization by skin contact.
 - R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety phrases

- :
- S53- Avoid exposure - obtain special instructions before use.
 - S2- Keep out of the reach of children.
 - S24- Avoid contact with skin.
 - S29- Do not empty into drains.
 - S37- Wear suitable gloves.
 - S46- If swallowed, seek medical advice immediately and show this container or label.
 - S61- Avoid release to the environment. Refer to special instructions/safety data sheet.

Section 16. Other Information

- Label requirements** : COMBUSTIBLE LIQUID AND VAPOR.
VAPOR MAY CAUSE FIRE.

Hazardous Material Information System (U.S.A.)

Health	*	3
Fire hazard		1
Physical Hazard		0
Personal protection		

National Fire Protection Association (U.S.A.)

Health	3	1	0	Flammability
				Instability
				Specific hazard

Date of printing : 1/8/2010.

Date of issue : 1/8/2010.

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Version**Disclaimer**

THIS MATERIAL SAFETY DATA SHEET ("MSDS") WAS PREPARED IN ACCORDANCE WITH 29 CFR 1910.1200 BY PAULSBORO REFINING COMPANY, LLC (PRC, LLC). PRC, LLC DOES NOT ASSUME ANY LIABILITY ARISING OUT OF PRODUCT USE BY OTHERS. THE INFORMATION, RECOMMENDATIONS, AND SUGGESTIONS PRESENTED IN THIS MSDS ARE BASED UPON TEST RESULTS AND DATA BELIEVED TO BE RELIABLE. THE END USER OF THE PRODUCT HAS THE RESPONSIBILITY FOR EVALUATING THE ADEQUACY OF THE DATA UNDER THE CONDITIONS OF USE, DETERMINING THE SAFETY, TOXICITY, AND SUITABILITY OF THE PRODUCT UNDER THESE CONDITIONS, AND OBTAINING ADDITIONAL OR CLARIFYING INFORMATION WHERE UNCERTAINTY EXISTS. NO GUARANTEE EXPRESSED OR IMPLIED IS MADE AS TO THE EFFECTS OF SUCH USE, THE RESULTS TO BE OBTAINED, OR THE SAFETY AND TOXICITY OF THE PRODUCT IN ANY SPECIFIC APPLICATION. FURTHERMORE, THE INFORMATION HEREIN IS NOT REPRESENTED AS ABSOLUTELY COMPLETE, SINCE IT IS NOT PRACTICABLE TO PROVIDE ALL THE SCIENTIFIC AND STUDY INFORMATION IN THE FORMAT OF THIS DOCUMENT, PLUS ADDITIONAL INFORMATION MAY BE NECESSARY UNDER EXCEPTIONAL CONDITIONS OF USE, OR BECAUSE OF APPLICABLE LAWS OR GOVERNMENT REGULATIONS.

Definitions of Material Safety Data Sheet Terminology

GOVERNMENT AGENCIES AND PRIVATE ASSOCIATIONS

ACGIH - American Conference of Governmental Industrial Hygienists, (private association)

DOT - United States Department of Transportation

EPA - United States Environmental Protection Agency

IARC - International Agency for Research on Cancer, (private association)

NFPA - National Fire Protection Association, (private association)

MSHA - Mine Safety and Health Administration, U.S. Department of Labor

NIOSH - National Institute of Occupational Safety and Health, U.S. Department of Health and Human Services

NTP - National Toxicology Program, (private association)

OSHA - Occupational Safety and Health Administration, U.S. Department of Labor

WHMIS - Workplace Hazardous Material Information System

CSA - Canadian Standards Association

HAZARD AND EXPOSURE INFORMATION

Acute Hazard - An adverse health effect which occurs rapidly as a result of short term exposure.

CAS # - American Chemical Society's Chemical Abstract service registry number which identifies the product and/or ingredients.

Ceiling - The concentration that should not be exceeded during any part of the working exposure

Chronic Hazard - An adverse health effect which generally occurs as a result of long term exposure or short term exposure with delayed health effects and is of long duration

Fire Hazard - A material that poses a physical hazard by being flammable, combustible, pyrophoric or an oxidizer as defined by 29 CFR 1910.1200

Hazard Class - DOT hazard classification

Hazardous Ingredients - Names of ingredients which have been identified as health hazards

IDLH - Immediately Dangerous to Life and Health, the airborne concentration below which a person can escape without respiratory protection and exposure up to 30 minutes, and not suffer debilitating or irreversible health effects. Established by NIOSH.

mg/m³ - Milligrams of contaminant per cubic meter of air, a mass to volume ratio

N/A - Not available or no relevant information found

NA - Not applicable

PEL - OSHA permissible exposure limit; an action level of one half this value may be applicable

ppm - Part per million (one volume of vapor or gas in one million volumes of air)

Pressure Hazard - A material that poses a physical hazard due to the potential of a sudden release of pressure such as explosive or a compressed gas as defined by 29 CFR 1910.1200

Reactive Hazard - A material that poses a physical hazard due to the potential to become unstable reactive, water reactive or that is an organic peroxide as defined by 29 CFR 1910.1200.

STEL - The ACGIH Short-Term Exposure Limit, a 15-minute Time-Weighted Average exposure which should not be exceeded at any time during a workday, even if the 8-hour TWA is less than the TLV.

TLV - ACGIH Threshold Limit Value, represented herein as an 8-hour TWA concentration.

8-hour TWA - The time weighted average concentration for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

LD50 - Single dose of a substance that, when administered by a defined route in an animal assay, is expected to cause the death of 50% of the defined animal population.

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LC50 - The concentration of a substance in air that, when administered by means of inhalation over a specified length of time in an animal assay, is expected to cause the death of 50% of a defined animal population.