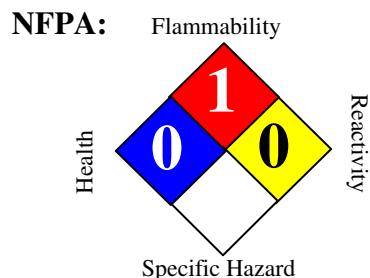


Material Safety Data Sheet

Resid



HMIS III:

HEALTH	1
FLAMMABILITY	1
PHYSICAL	0

0 = Insignificant, 1 = Slight, 2 = Moderate, 3 = High, 4 = Extreme

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	: Resid
Synonyms	: Atmospheric Tower Bottoms; Residual Oil; Thermocracked Residue, Residium, Atmospheric, Reduced Crude, Residium, Vacuum Cracked, Residium, Vacuum Straight Run, Red Crude, Fuel Oil, DCU Feed, Delayed Coker Feed, Coker Feed, 888100005236
MSDS Number	: 888100005236 Version : 2.13
Product Use Description	: Refinery intermediate Stream
Company	: For: Tesoro Refining & Marketing Co. 19100 Ridgewood Parkway, San Antonio, TX 78259
Tesoro Call Center	: (877) 783-7676 Chemtrec (Emergency Contact) : (800) 424-9300

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Regulatory status	: This material is considered hazardous by the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR 1910.1200).
Signal Word	: CAUTION
Hazard Summary	: Combustible Liquid. Slight to moderate irritant. Affects central nervous system. Harmful or fatal if swallowed. Skin cancer hazard.

Potential Health Effects

Chronic Exposure	: Similar products produced skin cancer and skin tumors in laboratory animals following repeated applications. The significance of these results to human exposures has not been determined - see Section 11, Toxicological Information. Petroleum industry experience indicates that a program providing for good personal hygiene, proper use of personal protective equipment, and minimizing the repeated and prolonged exposure to liquids and fumes, as outlined in this MSDS, is effective in reducing or eliminating the carcinogenic risk of high boiling aromatic oils (polynuclear aromatic hydrocarbons) to humans.
Eyes	: May cause eye irritation.
Skin	: May cause skin irritation with prolonged or repeated contact. Practically non-toxic if absorbed following acute (single) exposure. May cause dermal sensitization. Liquid may be absorbed through the skin in toxic amounts if large

areas of skin are repeatedly exposed.

Ingestion : This material has a low order of acute toxicity. If large quantities are ingested, nausea, vomiting and diarrhea may result. Ingestion may also cause effects similar to inhalation of the product. Aspiration hazard if liquid is inhaled into lungs, particularly from vomiting after ingestion. Aspiration may result in chemical pneumonia, severe lung damage, respiratory failure and even death. Ingestion may also lead to central nervous system (brain) effects which may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure and death.

Inhalation : Because of its low vapor pressure, this product presents a minimal inhalation hazard at ambient temperature. Upon heating, fumes may be evolved. **WARNING:** Irritating and toxic hydrogen sulfide gas may be found in confined vapor spaces. Greater than 15 - 20 ppm continuous exposure can cause mucous membrane and respiratory tract irritation. 50 - 500 ppm can cause headache, nausea, and dizziness. Continued exposure at these levels can lead to loss of reasoning and balance, difficulty in breathing, fluid in the lungs, and possible loss of consciousness. Greater than 500 ppm can cause rapid unconsciousness due to respiratory paralysis and death by suffocation unless the victim is removed from exposure and successfully resuscitated. Hydrogen sulfide (H₂S) has a characteristic rotten egg odor with an odor threshold as low as 10 parts per billion or even less. However, this odor should not be used as a warning property because H₂S can deaden the sense of smell. H₂S concentrations can be measured with an H₂S meter or colorimetric indicating tubes.

Target Organs : Respiratory system, Eyes, Skin, Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash)

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Weight %
Residues (petroleum), atm. tower; Heavy Fuel oil	64741-45-3	100%
Sulfur	7704-34-9	0 – 2%
Hydrogen Sulfide	7783-06-4	Trace

SECTION 4. FIRST AID MEASURES

Inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical attention immediately.

Skin contact : Take off contaminated clothing and shoes immediately. Immediately flush contaminated area with LARGE AMOUNTS of clean, low-pressure water for at least 15 minutes, even if pain has stopped. Wash off with soap and plenty of water. Seek medical advice if symptoms persist or develop. Contaminated leather, particularly footwear, must be discarded.

Eye contact : Immediately flush eyes thoroughly with warm water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Seek medical attention immediately.

Ingestion : Do not give liquids. Obtain medical attention. Do NOT induce vomiting. If vomiting does occur naturally, keep head below the hips to reduce the risks of aspiration.

Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

SECTION 5. FIRE-FIGHTING MEASURES

Form	: Liquid
Flash point	: >93.33 °C (199.99 °F)
Suitable extinguishing media	: SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO ₂ , water spray, fire fighting foam, or Halon. LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.
Specific hazards during fire fighting	: Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.
Special protective equipment for fire-fighters	: Firefighters should wear self-contained breathing apparatus and full protective clothing as need for protection from heat and airborne combustion products.
Further information	: Vapors may form explosive mixture with air. Flammable vapor production at ambient temperature in the open is expected to be minimal unless the oil is heated above its flash point. When heated to flash point and mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions	: ACTIVATE FACILITY'S SPILL CONTINGENCY OR EMERGENCY RESPONSE PLAN if applicable. Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to contain spill areas. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8). Ventilate the area.
Environmental precautions	: Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. Authorities should be notified if reportable quantity release occurs.
Methods for cleaning up	: Contain and collect spillage with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations. Do not discharge into lakes, ponds, streams or public waters.

SECTION 7. HANDLING AND STORAGE

Handling : Keep away from fire, sparks and heated surfaces. No smoking near areas where material is stored or handled. The product should only be stored and handled in areas with intrinsically safe electrical classification.

Advice on protection against fire and explosion Hydrocarbon liquids including this product can act as a non-conductive flammable liquid (or static accumulators), and may form ignitable vapor-air mixtures in storage tanks or other containers. Precautions to prevent static-initated fire or explosion during transfer, storage or handling, include but are not limited to these examples:

- (1) Ground and bond containers during product transfers. Grounding and bonding may not be adequate protection to prevent ignition or explosion of hydrocarbon liquids and vapors that are static accumulators.
- (2) Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil or diesel) is loaded into tanks previously containing low flash point products (such gasoline or naphtha).
- (3) Storage tank level floats must be effectively bonded.

For more information on precautions to prevent static-initated fire or explosion, see NFPA 77, Recommended Practice on Static Electricity (2007), and API Recommended Practice 2003, Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents (2008).

Requirements for storage areas and containers : Keep away from flame, sparks, excessive temperatures and open flame. Use approved containers. Keep containers closed and clearly labeled. Empty or partially full product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose containers to sources of ignition. Store in a well-ventilated area. The storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

Hydrogen sulfide may accumulate in tanks and bulk transport compartments. Consider appropriate respiratory protection (see Section 8). Stand upwind. Avoid vapors when opening hatches and dome covers. Confined spaces should be ventilated and gas tested prior to entry.

Advice on common storage Keep away from food, drink and animal feed. Incompatible with oxidizing agents. Incompatible with acids.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

List	Components	CAS-No.	Type:	Value
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OSHA	Residues (petroleum), atm. tower; Heavy Fuel oil	64741-45-3	PEL	5 mg/m3 (as mineral oil mist)
	Polycyclic aromatic compounds (or coal tar pitch volatiles – benzene soluble)		PEL	0.2 mg/m3
	Hydrogen Sulfide	7783006-4	STEL	20 ppm 15-min Ceiling
ACGIH	Residues (petroleum), atm. tower; Heavy Fuel oil	64741-45-3	TWA	0.2 mg/m3 (as mineral oil) Sum of 15 NTP-listed polynuclear aromatic hydrocarbons 0.005 mg/m3
	Polycyclic aromatic compounds (or coal tar pitch volatiles – benzene soluble)		TWA	0.2 mg/m3
	Hydrogen Sulfide	7783006-4	TWA	1 ppm 8-hour

- Engineering measures** : Use adequate ventilation to keep gas and vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.
- Eye protection** : Where there is a possibility of liquid contact, wear splash-proof safety goggles and faceshield.
- Hand protection** : Gloves constructed of nitrile, neoprene, or PVC are recommended.
- Skin and body protection** : Chemical protective clothing such as DuPont TyChem®, Barricade or equivalent, recommended based on degree of exposure. The resistance of specific material may vary from product to product as well as with degree of exposure.
- Respiratory protection** : If hydrogen sulfide concentration is below H2S permissible exposure limit a NIOSH/ MSHA-approved air-purifying respirator with acid gas cartridges may be acceptable for odor control, but continuous air monitoring for H2S is recommended. Use a NIOSH/ MSHA-approved positive-pressure supplied-air respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.
- Work / Hygiene practices** : Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

- Form** : Liquid
- Appearance** : Black
- Odor** : Petroleum asphalt-type odor
- Flash point** : >93.33 °C (199.99 °F)

pH	: Not applicable
Boiling point	: 307.22 - 704.44 °C(585.00 - 1,299.99 °F)
Density	: 0.94 g/cm ³
Water solubility	: < 0.1 g/l
Percent Volatiles	: 100 %
Conductivity (conductivity can be reduced by environmental factors such as a decrease in temperature)	Hydrocarbon liquids without static dissipater additive may have conductivity below 1 picoSiemens per meter (pS/m). The highest electro-static ignition risks are associated with "ultra-low conductivities" below 5 pS/m. See Section 7 for sources of information on defining safe loading and handling procedures for low conductivity products.

SECTION 10. STABILITY AND REACTIVITY

Conditions to avoid	: Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources.
Materials to avoid	: Strong oxidizing agents
Hazardous decomposition products	: Carbon monoxide, carbon dioxide and noncombusted hydrocarbons (smoke). Oxides of sulfur including sulfur dioxide are generated from burning hydrogen sulfide.
Hazardous reactions	: Hazardous polymerization does not occur. Note: Stable

SECTION 11. TOXICOLOGICAL INFORMATION

Carcinogenicity

NTP	: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
IARC	: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
CA Prop 65	: This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.
Further information	: Similar products produced skin cancer and skin tumors in laboratory animals following repeated applications. The significance of these results to human exposures has not been determined - see Section 11, Toxicological Information. This material contains polynuclear aromatic hydrocarbons (PNAs), some of which are animal carcinogens. Studies have shown that similar products produce skin cancer or skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation. The presence of carcinogenic PNAs indicates that precautions should be taken to minimize repeated and prolonged inhalation of fumes or mists. Materials of similar composition have been positive in mutagenicity studies.

Component:

Residues (petroleum), atm. tower; 64741-45-3
Heavy Fuel oil

Acute oral toxicity: LD50 rat
 Dose: 2,001 mg/kg

Acute dermal toxicity: LD50 rat
 Dose: 2,001 mg/kg

Carcinogenicity: Considered carcinogenic to animals in certain countries.

SECTION 12. ECOLOGICAL INFORMATION

Additional ecological information : Keep out of sewers, drainage areas, and waterways. Report spills and releases, as applicable, under Federal and State regulations.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal : Consult federal, state and local waste regulations to determine appropriate waste characterization of material and allowable disposal methods.

SECTION 14. TRANSPORT INFORMATION

CFR

Proper shipping name : Flammable liquids, N.O.S.
 UN-No : 1993.
 Class : 3
 Packing group : II
 Emergency Response : 128
 Guidebook Number :
 Hazard Inducer : (Toluene, Ethylbenzene, Benzene)

Proper shipping name : Flammable liquids, N.O.S.
 UN-No : UN1993.
 Class : 3
 Packing group : II
 Emergency Response : 128
 Guidebook Number :
 Hazard Inducer : (Toluene, Ethylbenzene, Benzene)

IATA Cargo Transport

UN UN-No. : UN1993
 Description of the goods : FLAMMALBE LIQUID, N.O.S.
 (Toluene, Ethylbenzene, Benzene)
 Class : 3
 Packing Group : II
 ICAO-Lables : 3
 Packing instructions (cargo Aircraft) : 364
 Packing Instructions (cargo Aircraft) : Y341

IATA Passanger Transport

UN UN-No. : UN1993
 Description of the goods : FLAMMALBE LIQUID, N.O.S.
 (Toluene, Ethylbenzene, Benzene)
 Class : 3
 Packing Group : II
 ICAO-Lables : 3
 Packing instructions (passenger aircraft) : 353
 Packing Instructions (passenger aircraft) : Y341

IMDG-Code

UN UN-No. : UN1993
 Description of the goods : FLAMMALBE LIQUID, N.O.S.
 (Toluene, Ethylbenzene, Benzene)
 Class : 3
 Packaging group : II
 IMDG-Labels : 3
 EmS Number : F-E-S-E
 Marine Pollutant : Yes

SECTION 15. REGULATORY INFORMATION

OSHA Hazards : Harmful by skin absorption.
 Carcinogen
 TSCA Status : On TSCA Inventor
 DSL Status : All components of this product are on the Canadian DSL list.
 SARA 311/312 Hazards : Acute Health Hazard
 Chronic Health Hazard

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIROMENT)

The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil. Fractions of crude oil, and products (both finished and intermediate) from the crude oil refining process and any indigenous components of such from the CERCLA Section 103 reporting requirements. However, other federal reporting requirements, including SARA Section 304, as well as the Clean Water Act may still apply.

SARA III US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required

Components

CAS-No.

