



ABOUT VTAE

November 9, 2015

NORA¹, an Association of Responsible Recyclers (NORA) is a national trade association with nearly 400 members. Several of these members, including re-refiners, produce what traditionally has been called “asphalt flux.”² It is a thick, tarry hydrocarbon product that is derived from used oil. A more modern term for this valuable product is Vacuum Tower Asphalt Extender (VTAE). VTAE produced from used oil is typically blended with other asphalt materials, where it enhances the quality of finished products (mainly due to superior physical characteristics). It has two main applications: road paving and roofing materials. VTAE has been produced and marketed since 1983.

Recently, the Asphalt Institute presented NORA with several questions about VTAE, its functions and properties. Experts on VTAE provided the following answers to these questions.

1. What are the ASTM standards/specifications that address the quality of the VTAE?
Response: Draft specifications for VTAE use in both roofing and paving have been developed and are being submitted to the appropriate ASTM committees.
2. What are the tests and criteria for such a spec?
Response: The tests include flash point, weight loss, solubility and viscosity. The proposed criteria are being submitted to ASTM for consideration
3. Are other processes in use today (single distillation tower, centrifuge, filtering systems, etc.) that also produce additive products being used in asphalt?
Response: There are other ways to process used oils that only use filtration, centrifugation, or distillation not under vacuum. These simple processes are intended to produce products for fuel or vacuum gas oil uses and are not intended for asphalt use. These products, when blended into asphalt, would likely not meet at least one of the criteria such as flash point, weight loss, or solubility under standard asphalt specifications and are therefore not recommended for asphalt use.
4. Are there used oil (not re-refined) additive products that are being used to modify asphalt?
Response: Unrefined used oil is not recommended for blending with asphalt products to modify rheological or other parameters because of quality, safety or performance concerns of heated asphalt binders. Many of these oils can contain free water causing foaming, flash point issues or solubility issues. When these products are used in hot mix asphalts they can cause blue smoke (opacity)

¹ NORA was formerly the National Oil Recyclers Association.

² In addition to asphalt flux, VTAB is also known as asphalt extender, asphalt blowdown, VTB (Vacuum Tower Bottoms), re-refined engine oil bottoms and WEOR (Waste Engine Oil Residue).

emission issues. Even in applications such as asphalt emulsions, there are concerns about additives affecting emulsion stability, and therefore these are not recommended.

5. Are there asphalt tests that can differentiate re-refined products from those that are not re-refined?

Response: Yes, there are tests that can differentiate between re-refined products (VTAE) and unprocessed used oil in asphalt blends. Flash point, moisture, solubility and weight loss are all strong indicators.

6. Is there chemical leaching from material? If so, how much is attributed to runoff?

Response: Toxic Characteristic Leaching Procedure (TCLP) testing has been performed on VTAE blends with asphalt, and the results show no difference when compared to asphalt without VTAE for a broad range of metals and semi-volatile organics including PACs.

7. Describe confounding factors of the detection methods

Response: There are a number of ways to modify asphalts including crumb rubber and polyphosphoric acid. These contain either zinc (rubber) or phosphorus (PPA) which can be detected in the blended asphalt. VTAE contains both phosphorous and zinc as an additive.

8. Are there "Green" benefits of using these products?

Response: There are environmental benefits to using VTAE in appropriate amounts. These materials eliminate the disposal of one billion gallons of used oil in the US each year. This reduces the amount of new lubricants which must be produced each year in the US. The resulting asphalt pavements can be recycled without concern to the environment.

9. Are there any known interactions between the common binder additives such as amine antistrips, PPA, others? Are the materials hygroscopic?

Response: There maybe interactions between VTAE and additives such as PPA, Styrene Butadiene Styrene Block Copolymers (SBS), Styrene Butadiene Rubber (SBR), crumb rubber, antistrips or emulsifiers. When used in combination the final rheological properties must be assessed to determine what impacts may occur. VTAE in limited studies appears to improve adhesion, reducing the need for antistrips. There is strong evidence that the VTAE blended asphalt can cause stability problems with emulsifiers and therefore it is not recommended for these applications.

10. Are there guidelines for the use of VTAE Residue, such as a max limit either by weight of binder or by the drop of Performance Grade (PG)? If there are not such limits should they be developed? How is that accomplished?

Response: This Information Series is intended to recommend appropriate use guidelines. Some states are considering weight limits. VTAE can also be limited by considering a $\Delta T_{\text{critical}}$ which is defined as the temperature difference between Bending Beam Rheometer (BBR) failure temperature for Stiffness (S) and m (relaxation factor) value on the appropriate final PG asphalt. Guidelines are recommended; individual companies should determine product guidelines, and other guidelines will be state specific.

11. Include base asphalt effect (interaction between VTAE and base asphalt on performance)

Response: There are several studies underway that are looking at cracking and aging characteristics of VTAE asphalt blends. The studies are focused on non-load bearing cracking in pavements. A number of researchers have looked at extended aging studies in the pressure aging vessel (PAV) to see the impact of VTAE on performance characteristics.

12. Is there data available on testing VTAE in accordance to IP 346? Can NORA provide this data?

Response: IP-346 is a test designed for aromatic content of lubricating oils. As such the test is not applicable to vacuum bottoms such as (VTAE). IP-346 is also not applicable to asphalt for the same reason. Mutagenicity testing and PAC testing are more relevant measures of these endpoints.

13. What are the classifications of VTAE when listed on the GHS data sheet?

Response: The VTAE classification on a SDS under Global Harmonization Standards (GHS) is decided by the manufacturer.

14. Compare regulatory status of VTAE vs used crank case oil. In US? In Canada? Other countries such as Europe.

Response: The regulatory status of used oil in the US depends on the process. If the oil is simply to be filtered or centrifuged and sold as #4 fuel oil, then EPA has established a specification for such use. All used oil must be screened for polychlorinated biphenyls (PCBs) and solvents to be exempt from hazardous waste classification, and it must also be destined for recycling (not disposal). The EU classifies re-refined base oil as carcinogenic, unless it has been treated (solvent extraction or hydrotreated), or has an IP 346 <3%.

15. Is there data on wear metal content as compared to source?

Response: Used oil is routinely tested by NORA members for four heavy metals: lead, cadmium, chromium and arsenic. When the source of the used oil is automotive engines, the concentration of these metal is quite low. Typically no processing is required to meet EPA's stringent requirements for these metals, set forth in 40 CFR 279.11, for on-specification fuel. When the source of the used oil is industrial operations, it is difficult to make a broad generalization about metal content. However, industrial used oil destined for recycling as fuel would still have to meet EPA's on-spec standards for metal. Because the sources of used oil destined for VTAE products are the same as for used oil fuels, it is highly likely that the used oil in VTAE products have the same very low metal content as on-spec used oil fuels.

16. Please provide an SDS or MSDS from each members VTAE product.

Response: These will be provided as a separate attachment.

17. Is REOB a single substance, or are there different re-refining processes that might lead to materials being physical, or chemically different? Is there an intention to develop a specification for these substances?

Response: Like asphalt, VTAE is not a single substance but a mixture of thousands of hydrocarbons. The hydrocarbons are a more narrow range of paraffinic molecules than asphalt. The additives (which contain zinc dialkyl dithiophosphate and molybdenum sulphide) are not typically found in asphalt.

18. Used oil in EU is classified as carcinogenic, moreover the re-refined base oil is also classified as carcinogenic, unless it has been treated, or has an IP 346 <3%.

We have no information about the REOB material, as this seems to be allocated with one (or two) of the CAS numbers for bitumen.

Response: The regulations in the US and EU are different. Extensive work was done by the re-refining industry to show that proper pretesting and processing of the oil to insure no PCB's, hazardous solvents and any underlying hazardous chemicals are present before these materials are processed and after processing require no labelling. In the US when these conditions are followed there is no reason to label these materials as hazardous or carcinogenic.

19. Oil change intervals in EU seem to be much longer than in the US, with 20 000 miles being quite routine. Does the used oil source affect the REOB PAH/PNAH and metal content?

Response: Oil changes intervals could affect the level of PAC's present in the oil. However processing steps which include vacuum distillation should remove these components from the VTAE. Hydrotreating or solvent extraction would remove these from the base oil if employed.

20. How is the VTAE/REOB product changed with respect to used oil coming from diesel engine versus gasoline engine vs non internal combustion engine sources?

Response: Again, the chemistry is likely influenced for the used oils, but effects on VTAE have not been studied. Isolation of these processes would be required and re-refining of each type would need to be performed under the same conditions.

21. What are the toxicity concerns of wear metal etc.?

Response: The toxicity of wear metals is related to chromium, zinc, lead and copper. Although these are present in low concentrations in VTAE, they are not available through leaching or bioavailable because they are bound within the asphalt. The levels are also not significantly different than other materials found in construction such as cement and concrete.

22. Is VTAE (also known as REOB in the Asphalt Institute and the paving industry) listed as a carcinogen by IARC or NTP or ACGIH or other agency?

Response: No agencies have listed VTAE as a carcinogen. VTAE has been tested for the presence of compounds which are known to be carcinogenic. Testing on a number of VTAEs shows only trace levels of Polycyclic Aromatic Compounds (PACs); concentrations are similar to asphalt binders produced throughout the US without VTAE. The levels are low because the vacuum distillation process is similar to that used in petroleum refining, which removes them from the residuum as it does for straight run bitumen. Limited testing on two different sources found VTAE to be non-mutagenic based on the Modified Ames Assay.

23. It has been noted that there is a carcinogen warning label on consumer motor oil containers that used motor oil is carcinogenic. How is VTAE modified to change the carcinogenic activity?

Response: The decision to be labeled as a carcinogen is made by individual companies and varies across the industry. Any PACs present in used oil tend to be concentrated in the resulting distillate from the vacuum tower, not the VTAE. Typically, in re-refining, these distillates are further processed with steps

including hydrotreating which remove (destroy) PACs, in a process analogous to production of lube oil from virgin crude in traditional refineries.

24. In one SDS for this material it was noted that much of the section on toxicological information and ecological information states that it is “related to asphalt”. What is the compositional and/or chemical basis for suggesting that VTAE is an asphaltic material?

Response: Lube oils are generally produced from petroleum and contain primarily paraffinic high boiling hydrocarbons in the same molecular weight range as found in asphalt. Asphalts typically are a blend of paraffinic and aromatic molecules so VTAE molecules represent a narrower range of molecules typically present in all asphalts. VTAE also contains additives not normally found in asphalt, added to enhance performance of the lubricant.

25. Is it accurate to state that US EPA does not classify used oil as hazardous. Is there a reference for this?

Response: Yes; see 40 CFR 279.10. Used oil destined for recycling and not mixed with any hazardous wastes is not classified as a RCRA hazardous waste. In addition, US EPA has specifically excluded “used oil re-refining distillation bottoms that are used as feedstock to manufacture asphalt products” from classification as a hazardous waste.” See 40 CFR 261.4(b)(14).

26. What CAS numbers are used for these materials?

Response: 129893-17-0

1 **NORA Specification for Vacuum Tower Asphalt Extender**
2 **(VTAE) for Use in Pavement Construction¹**

3
4
5 **1. Scope**

6 1.1 This specification covers Vacuum Tower Asphalt Extender that is used in the production
7 of asphalt cement for Pavement Construction.

8 1.2 *Units* - The values stated in either SI units or inch-pound units are to be regarded
9 separately as standard. The values stated in each system may not be exact equivalents; therefore,
10 each system shall be used independently of the other. Combining values from the two systems
11 may result in non-conformance with the standard.

12 1.3 *This standard does not purport to address all of the safety concerns, if any, associated*
13 *with its use. It is the responsibility of the user of this standard to establish appropriate safety and*
14 *health practices and determine the applicability of regulatory limitations prior to use.*

15
16 **2. Referenced Documents**

17 2.1 ASTM Standards:²

18 ASTM D92 Test Method for Flash and Fire Points by Cleveland Open Cup Tester

19 ASTM D2042 Test Method for Solubility of Asphalt Materials in Trichloroethylene

¹ This specification is under the jurisdiction of NORA, An Association of Responsible Recyclers.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM customer service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

20 ASTM D2872 Standard Test Method for Effect of Heat and Air on a Moving Film of Asphalt
21 (Rolling Thin-Film Oven Test)

22 ASTM D4402 Standard Test Method for Viscosity Determination of Asphalt at Elevated
23 Temperatures Using a Rotational Viscometer

24 ASTM D140 Standard Practice for Sampling Bituminous Materials

25 **3. Manufacture**

26 3.1 VTAE is the product of processing used oil using atmospheric distillation followed by
27 vacuum distillation to produce a vacuum residuum meeting the specifications outlined in table 1.

28 **4. Physical Requirements**

29 4.1 The VTAE shall be homogenous, free from water, and not foam when heated to 177°C
30 [350° F].

31 4.2 The VTAE shall conform to the requirements given in Table 1.

32

33 **5. Methods of Sampling and Testing**

34 5.1 Sample and test the VTAE in accordance with the following methods:

35 5.1.1 *Sampling* – Practice D140

36 5.1.2 *Water* – Test Method D95

37 5.1.3 *Flash Point, Cleveland Open Cup* – Test Method D92

38 5.1.4 *Rolling Thin Film Oven Test* – Test Method D2872

39 5.1.5 *Solubility in Trichloroethylene* – Test Method D2042

40 5.1.6 *Viscosity at 60°C [140°F]* – Test Method D440

41

42 **6. Keywords**

43 6.1 asphalt cement, pavement, vacuum tower, asphalt extender

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Table 1 Requirement for VTAE

46

Test	
Flash Point, Cleveland Open Cup, min, °C [°F]	>232° [450]
Mass Change, RTFOT, %w/w max	1.0
Solubility in Trichloroethylene, min, %	98.0 ^A
Viscosity, 60°C [140°F], max, cP	5000

47

48

^A Solubility of less than 98.0% is acceptable provided the final asphalt blended product meets the solubility requirements in the specifications

49

1 **NORA Specification for Vacuum Tower Asphalt Extender**
2 **(VTAE) Used in Roofing¹**

3
4
5 **1. Scope**

6 1.1 This specification covers Vacuum Tower Asphalt Extender that is used in the production
7 of asphalt cement for roofing.

8 1.2 *Units* - The values stated in either SI units or inch-pound units are to be regarded
9 separately as standard. The values stated in each system may not be exact equivalents; therefore,
10 each system shall be used independently of the other. Combining values from the two systems
11 may result in non-conformance with the standard.

12 1.3 *This standard does not purport to address all of the safety concerns, if any, associated*
13 *with its use. It is the responsibility of the user of this standard to establish appropriate safety and*
14 *health practices and determine the applicability of regulatory limitations prior to use.*

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16 **2. Referenced Documents**

17 2.1 ASTM Standards: ²

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41

42 **6. Keywords**

43 6.1 asphalt cement, roofing, vacuum tower, asphalt extender

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Table 1 Requirement for VTAE

Test	
Flash Point, Cleveland Open Cup, min, °C [°F]	>260° [500]
Mass Change, RTFOT, %w/w max	1.0
Solubility in Trichloroethylene, min, %	98.0 ^A
Viscosity, 60°C [140°F], max, cP	5000

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^A Solubility of less than 98.0% is acceptable provided the final asphalt blended product meets the solubility requirements in the specifications



Safety Data Sheet

Material Name: Vacuum Tower Asphalt Extender

SDS Revision 3

Section 1 - Identification

Product Identifier

Vacuum Tower Asphalt Extender

Product Code

520

Synonyms

Asphalt Extender; Asphalt Flux; Vacuum Tower Bottoms; REOB

Recommended Use

Asphalt additive to be used in combination with other products, refer to Safety Data Sheets for other products

Restrictions on Use

None known.

Manufacturer Information

Heritage-Crystal Clean, LLC

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Suite 375-EHS

Elgin, Illinois 60123

www.crystal-clean.com

Phone: 1-877-938-7948

Emergency # 1-800-468-1760

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September 7, 2011

Original Issue Date

September 26, 2010

Section 2 - Hazard(s) Identification

EMERGENCY OVERVIEW**WARNING FOR HOT PRODUCT****Classification in Accordance with 29 CFR 1910.1200**

Flammable liquid, Category 3

Acute Toxicity (Inhalation), Category 2

GHS LABEL ELEMENTS**Symbols****Signal Word**

DANGER!

Hazard Statement(s)

Flammable liquid and vapor

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Fatal if inhaled

Precautionary Statement(s)

Prevention

Keep away from heat, sparks, open flame, and 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. Wear protective gloves and eye/face protection. Do not breathe vapor or mist. Use only outdoors or in a well-ventilated area. Wear respiratory protection.

Response

In case of fire, use carbon dioxide, dry chemical, or water fog. . IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/physician. Specific treatment is urgent, see first aid section of Safety Data Sheet. IF ON SKIN (or hair): For burns from contact with HOT MATERIAL, do NOT remove solidified material as this might cause skin tearing. Cover area with sterile, dry dressing. If contact is with COOLED MATERIAL take off immediately all contaminated clothing. Rinse skin with water/shower. IF IN EYES: If hot product contacts eye, flush with water for at least 15 minutes and seek medical attention immediately. Do not attempt to remove cooled product from eye as it can cause tissue damage. If irritation or redness from exposure to vapor develops, move away from exposure to fresh air.

Storage

Store in a well-ventilated place. Keep container tightly closed. Keep cool.

Disposal

Dispose in accordance with all applicable regulations.

Hazard(s) Not Otherwise Classified

May cause thermal burns from heated material.

Section 3 - Composition / Information on Ingredients

CAS	Component	Percent
129893-17-0	Lubricating oils, used, residues	<100
7783-06-4	Dihydrogen monosulfide (Hydrogen Sulfide)	<0.1

Section 4 - First Aid Measures

General Advice

Call 911 or emergency medical service. Remove and isolate contaminated clothing, except as provided under SKIN below.

Inhalation

Remove person to fresh air and keep comfortable for breathing. Immediately call a poison control center or doctor/physician.

Skin

For burns from contact with hot material, do NOT remove solidified material as this might cause skin tearing. Cover area with sterile, dry dressing. Immediately get medical attention.

If contact is with cooled material, immediately remove all contaminated clothing. Rinse skin with cool water.

Eyes

If hot product contacts eye, flush with water for at least 15 minutes and seek medical attention immediately. Do not attempt to remove cooled product from eye as it can cause tissue damage.

If irritation or redness from exposure to vapor develops, move away from exposure into fresh air.

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Ingestion

Do NOT induce vomiting. Immediately get medical attention. If spontaneous vomiting occurs, keep head below hips to avoid breathing the product into the lungs. Never give anything by mouth to an unconscious person.

Notes to Physician

Treat symptomatically

Most Important Symptoms/Effects

Acute

For hot product: Fatal if inhaled, thermal burns.

Cooled product may irritate the respiratory tract (nose, throat, and lungs), eyes, and skin.

Delayed

No information on significant adverse effects.

Indication of Immediate Medical Attention and Special Treatment Needed

For inhalation, consider oxygen. Treat symptomatically and supportively. Treatment may vary with condition of victim and specifics of incident.

Section 5 - Fire-Fighting Measures

Specific Hazards Arising from the Chemical

Hot product is a vapor explosion hazard indoors, outdoors, or in sewers. Vapors or gases may ignite at distant ignition sources and flash back. Most vapors are heavier than air and will spread along ground and collect in low or confined areas (drains, basements, tanks). Runoff may create fire or explosion hazard. Containers may rupture or explode if exposed to heat. Empty containers may retain product residue including flammable/explosive vapors. Product is not sensitive to mechanical impact or static discharge. For cooled product: Product may burn, but does not ignite readily.

Suitable Extinguishing Media

Carbon dioxide, dry chemical, or water fog. Water spray or foam may cause frothing.

Unsuitable Extinguishing Media

Do not use high-pressure water streams.

Hazardous Combustion Products

Decomposition and combustion materials may be toxic. Burning may produce hydrogen sulfide, sulfur oxides, carbon monoxide, and unidentified organic compounds.

Special Protective Equipment and Precautions for Firefighters

A positive-pressure, self-contained breathing apparatus (SCBA) and full-body protective equipment are required for fire emergencies.

Fire Fighting Measures

Move containers from fire area if it can be done without risk. Keep storage containers cool with water spray.

NFPA Ratings: Health: 1 Fire: 1 Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

HMIS : Health: 1 Fire: 1 Physical Hazard: 0 Personal Protection X

Section 6 - Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures

Wear personal protective clothing and equipment, see Section 8.

Eliminate ignition sources.

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Methods and Materials for Containment and Clean Up

Do not touch or walk through spilled product. Stop leak if you can do it without risk. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Ventilate area and avoid breathing vapor or mist. Contain spill away from surface water and sewers. Hot product: contain spill as a liquid for possible recovery, or sorb with compatible sorbent material and shovel with a clean, sparkproof tool into a sealable container for disposal. Cooled product: collect and dispose in proper container.

Additionally, for large spills: Dike far ahead of liquid spill for collection and later disposal.

Section 7 - Handling and Storage

Precautions for Safe Handling

This product is normally handled at high temperatures. Vapors from hot material may be explosive: keep away from sparks or flame. Where flammable mixtures may be present, equipment safe for such locations should be used. Use clean, sparkproof tools and explosion-proof equipment. When transferring product, metal containers, including trucks and tank cars, should be grounded and bonded. Keep container tightly closed. Use explosion-proof electrical/ventilating/lighting equipment. Take precautionary measures against static discharge. Do not breathe vapor or mist. Use only outdoors or in a well-ventilated area. Wear respiratory protection. Sense of smell becomes rapidly fatigued and cannot be relied upon to warn of the continuous presence of hydrogen sulfide. Avoid contact with eyes, skin, clothing, and shoes. Do not smoke when using this product. Do not put in mouth. Wear protective gloves and eye/face protection.

Conditions for Safe Storage, Including Any Incompatibilities

Keep away from water when loading and unloading. Use dry container to avoid violent eruptions and splattering of hot product. Keep container tightly closed when not in use and during transport. Store containers in a cool, dry place. Do not pressurize, cut, weld, braze, solder, drill, or grind containers. Keep containers away from heat, flame, sparks, static electricity, or other sources of ignition. Empty product containers may retain product residue and can be dangerous. Store locked up.

Incompatibilities

Avoid acids, alkalis, oxidizing materials, halogens, and reactive metals.

Section 8 - Exposure Controls / Personal Protection

Component Exposure Limits

Dihydrogen monosulfide (7783-06-4)

ACGIH: 1 ppm TWA

5 ppm STEL

OSHA Final: 20 ppm Ceiling

OSHA Vacated: 10 ppm TWA; 14 mg/m³ TWA

15 ppm STEL; 21 mg/m³ STEL

NIOSH: 10 ppm Ceiling (10 min); 15 mg/m³ Ceiling (10 min)

Appropriate Engineering Controls

Provide general ventilation needed to maintain concentration of vapor or mist below applicable exposure limits. Where adequate general ventilation is unavailable, use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below applicable exposure limits.

Individual Protective Measures, such as Personal Protective Equipment

Personal protective equipment should be selected based upon the conditions under which this material is used. A hazard assessment of the work area for PPE requirements should be conducted by a qualified professional pursuant to regulatory requirements. The following PPE should be considered the minimum required: safety glasses, gloves, lab coat or apron.

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Eyes/Face Protection

Eye protection: Safety goggles should be worn at a minimum. Additional protection such as face shields or respirators may be needed depending upon anticipated use and concentrations of mists or vapors. Provide an emergency eye wash fountain and quick drench shower in the immediate work area. Contact lens use is not recommended.

Skin Protection

Where contact with hot product is likely, wear combination temperature and chemical protective gloves. Where contact with cooled product is likely, wear appropriate product resistant gloves.

When products are heated and skin contact is likely, wear heat-resistant gloves, boots, and other protective clothing.

To avoid prolonged or repeated contact where spills and splashes are likely, wear appropriate chemical-resistant faceshield, boots, apron, coveralls, long sleeve shirts, or other protective clothing.

Respiratory Protection

Sense of smell becomes rapidly fatigued and cannot be relied upon to warn of the continuous presence of hydrogen sulfide. Use NIOSH air-certified, air-supplied respirators (self-contained breathing apparatus or air-line) respiratory protective equipment when concentration of hydrogen sulfide may exceed applicable exposure limits. Otherwise, use NIOSH-certified P- or R- series particulate filter and organic vapor cartridges when concentration of vapor or mist exceeds applicable exposure limits. Protection provided by air purifying respirators is limited. Do not use N-rated respirators. Selection and use of respiratory protective equipment should be in accordance in the USA with OSHA General Industry Standard 29 CFR 1910.134; or in Canada with CSA Standard Z94.4.

Section 9 – Physical and Chemical Properties

Appearance/Odor : For hot products: Viscous, semi-solid, black, rotten-egg odor.
For cooled products: Solid, black, rotten-egg odor.

Odor: Rotten-egg

Boiling Point: 800°F (426°C)

Solubility (H₂O): Insoluble.

Density: 8 LB/US gal (960 g/l) (approximately)

Evaporation Rate: Not available.

Auto Ignition Temperature: 905°F (485°C) (based on similar material)

Flash Point: 500°F (260°C) (minimum) Cleveland Open Cup

Viscosity: No data available

Vapor Density: No data available.

pH: Not applicable.

Odor Threshold: 0.1 ppm (based on hydrogen sulfide)

Melting Point Range: No data available

Specific Gravity: 0.96 (water = 1) (approximately)

Octanol/H₂O Coeff.: No data available

Molecular Weight: No data available.

LFL: No data available

UFL: No data available

Vapor Pressure: 0.2 mmHg @ 175°F (79°C)

Other Property Information

No additional information is available.

Section 10 - Stability and Reactivity

Chemical Stability

Stable under normal temperatures and pressures.

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Reactivity

No reactivity hazard is expected.

Conditions To Avoid

Avoid heat, flames, sparks and other sources of ignition. Avoid contact with incompatible materials.

Incompatible Materials

Avoid acids, alkalis, oxidizing agents, reactive halogens, or reactive metals. Avoid volatile solvents because contact may cause vapors from hot products to ignite. Avoid water because allowing hot product to contact water can cause violent eruptions, splatter hot material, or ignite flammable materials.

Hazardous Decomposition Products

Decomposition and combustion materials may be toxic. Burning may produce hydrogen sulfide, oxides of sulfur, oxides of carbon, and unidentified organic compounds.

Hazardous Polymerization

Hazardous polymerization does not occur.

Section 11 - Toxicological Information

Toxicity Data and Information

Component Analysis - LD50/LC50

Dihydrogen monosulfide (7783-06-4)

Inhalation LC50 Rat 0.99 mg/L 1 h

Information on Likely Routes of Exposure

Inhalation

For hot product: High concentrations of vapor or mist may irritate the respiratory tract (nose, throat, and lungs). Inhaling hydrogen sulfide released from hot products in enclosed areas may cause unconsciousness, convulsions, suffocation, coma, and death. For cooled product: Mechanical irritation may occur.

Ingestion

May be harmful if swallowed. May cause throat irritation, nausea, vomiting, and diarrhea. Aspiration hazard: breathing product into the lungs during ingestion or vomiting may cause lung injury and possible death.

Skin Contact

May cause thermal burns from heated material. For cooled product: May cause irritation.

Eye Contact

May cause thermal burns from heated material. For cooled product: May cause irritation.

Immediate Effects

For hot product: Fatal if inhaled, thermal burns

Cooled product may irritate the respiratory tract (nose, throat, and lungs), eyes, and skin.

Delayed Effects

No information on significant adverse effects.

Irritation/Corrosivity

For hot product: thermal burns

Cooled product may irritate the respiratory tract (nose, throat, and lungs), eyes, and skin.

Respiratory Sensitization

Based on best current information, there is no known human sensitization associated with this product.

Skin Sensitization

Based on best current information, there is no known human sensitization associated with this product.

Safety Data Sheet

Material Name: Vacuum Tower Asphalt Extender

SDS Revision 3

Carcinogenicity

Component Carcinogenicity

None of this product's components are listed by ACGIH, IARC, OSHA, NIOSH, or NTP.

Germ Cell Mutagenicity

Based on best current information, there is no known mutagenicity associated with this product.

Teratogenicity

Based on best current information, there is no known teratogenicity associated with these products.

Reproductive Effects

Based on best current information, there is no known reproductive toxicity associated with this product.

Specific Target Organ Effects - Single Exposure

No target organs identified.

Specific Target Organ Effects - Repeated Exposure

No target organs identified.

Medical Conditions Aggravated by Exposure

Individuals with pre-existing respiratory tract (nose, throat, and lungs), eye, and/or skin disorders may have increased susceptibility to the effects of exposure.

Section 12 - Ecological Information

Ecotoxicity

Component Analysis - Ecotoxicity - Aquatic Toxicity

Dihydrogen monosulfide (7783-06-4) (Hydrogen Sulfide)

Duration/Test/Species	Concentration/Conditions	Notes
96 Hr LC50 Lepomis macrochirus	0.0448 mg/L [flow-through]	
96 Hr LC50 Pimephales promelas	0.016 mg/L [flow-through]	

Persistence and Degradability

No information available for the product.

Bioaccumulation Potential

No information available for the product.

Mobility in Soil

No information available for the product.

Other Adverse Effects

No additional information is available.

Section 13 - Disposal Considerations

Disposal Methods

Note: Dispose of in accordance with all applicable federal, state and local regulations. Regulations may also apply to used containers. The responsibility for proper waste disposal lies with the generator of the waste.

EPA Waste Code

Product, if discarded, is not expected to be a characteristic hazardous waste. This product, if discarded, is not a listed hazardous waste. Processing, use, or contamination by the user may change the waste code(s) applicable to the disposal of these products.

Safety Data Sheet

Material Name: Vacuum Tower Asphalt Extender

SDS Revision 3

Section 14 - Transport Information

Transportation Regulations

NOTE: Product is not regulated for shipping when product temperature is less than 212 °F (100 °C), Not regulated

For Heated Product:

DOT Shipping Name: Elevated temperature liquid, n.o.s. (Vacuum Tower Asphalt Extender)
UN/NA #: UN3257 **Hazard Class:** 9 **Packing Group:** III
Required Label(s): CLASS 9

TDG Shipping Name: Elevated temperature liquid, n.o.s. (Vacuum Tower Asphalt Extender)
UN/NA #: UN3257 **Hazard Class:** 9 **Packing Group:** III
Required Label(s): 9

Section 15 - Regulatory Information

VOC (As Regulated)

100 WT%; 8 LB/US gal; 960 g/l (approximately)

Federal Regulations

SARA 302/304

Component Analysis

Based on the ingredient(s) listed in SECTION 3, this product does contain "extremely hazardous substances" listed pursuant to Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) Section 302 or Section 304 as identified in 40 CFR Part 355, Appendix A and B:

Dihydrogen monosulfide (7783-06-4) 500 lb TPQ

SARA 311/312 Hazardous Categories

These products pose the following health hazard(s) as defined in 40 CFR Part 370 and are subject to the requirements of sections 311 and 312 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA):

Hot Product: Fire Hazard

Immediate (Acute) Health Hazard

Acute Health: Yes **Chronic Health:** No **Fire:** Yes **Pressure:** No **Reactive:** No

SARA Section 313

Component Analysis

This product contains a "toxic" chemical subject to the requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) and 40 CFR Part 372.

Dihydrogen monosulfide (7783-06-4) 1.0 % de minimis concentration

CERCLA

Component Analysis

Based on the ingredient(s) listed in SECTION 3, this product contains the following "hazardous substance" listed under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) in 40 CFR Part 302, Table 302.4 with the following reportable quantities (RQ):

Dihydrogen monosulfide (7783-06-4) 100 lb final RQ; 45.4 kg final RQ

TSCA Inventory

All the components of these products are listed on, or are automatically included as "naturally occurring chemical substances" on, or are exempted from the requirement to be listed on, the TSCA Inventory.

Safety Data Sheet

Material Name: Vacuum Tower Asphalt Extender

SDS Revision 3

Component Analysis

Component	CAS #	TSCA
Lubricating oils, used, residues	129893-17-0	Yes
Dihydrogen monosulfide	7783-06-4	Yes

U.S. State Regulations

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	MA	MN	NJ	PA	CA
Dihydrogen monosulfide	7783-06-4	Yes	Yes	Yes	Yes	Yes

These products may contain detectable amounts of lead CAS 7439-92-1, nickel CAS 7440-02-0, benzo(a)anthracene CAS 56-55-3, benzo(k)fluoranthene CAS 207-08-9, benzo(a)pyrene CAS 50-32-8, benzo(b)fluoranthene CAS 205-99-2, chrysene CAS 218-01-9, dibenz(a,h)anthracene CAS 53-70-3, and indeno(1,2,3-cd)pyrene CAS 193-39-5. WARNING: These chemicals are known to the State of California to cause cancer.

These products may contain detectable amounts of lead CAS 7439-92-1. WARNING: This chemical is known to the State of California to cause birth defects or other reproductive harm.

Canadian Regulations

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all information required by the CPR.

Component Analysis

Component	CAS #	CAN
Lubricating oils, used, residues	129893-17-0	DSL
Dihydrogen monosulfide	7783-06-4	DSL

Canadian WHMIS Information

Hot Product: Class B2 - Flammable Liquid

D2B Toxic



Section 16 - Other Information

Revision Information

Revised SDS.

Disclaimer

User assumes all risks incident to the use of this product. To the best of our knowledge, the information contained herein is accurate. However, Heritage-Crystal Clean, LLC assumes no liability whatsoever for the accuracy or completeness of the information contained herein. The information related only to the specific material designated and may not be valid for such material in combination with other material or processes.

End of Safety Data Sheet



SAFETY DATA SHEET

1. IDENTIFICATION

1.1 Product identifier

Product Name: RRF Vacuum Tower Asphalt Extender (VTAE)

Synonyms: RRF Asphalt Flux

CAS #: Mixture

1.2 Recommended use of the chemical and restrictions on use

Uses: No data available.

Restrictions: No data available.

1.3 Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Intergulf Corporation

428 Hwy 146 S

La Porte, TX 77571

281-474-4210

Fax: 281-474-4226

1.4 Emergency telephone number

800-424-9300

24 HR CHEMTREC

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to 29 CFR §1910.1200 (d)

This product is not a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

2.2 Label elements

Labeling according to 29 CFR §1910.1200 (f)

Symbol(s): None

Signal word: None

2.3 Other hazards

None

**3. COMPOSITION/INFORMATION ON INGREDIENTS****3.1 Substances**

Chemical Name	CAS #	EINECS	Amount
ALKANES, C14 - C40	74664-93-0, 544-85-4, 14167-59-0, 630-06-8, 7194-85-6, etc.	Varies	100%

4. FIRST AID MEASURES**4.1 Description of first aid measures****General advice**

IF exposed or concerned: Get medical advice/attention.
Show this this safety data sheet to the doctor in attendance.

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
If breathing is difficult, give oxygen. Refer for medical attention.

Skin Contact

IF ON SKIN: Remove immediately all contaminated clothing. Wash skin with plenty of soap and water.
Get medical advice/attention if irritation occurs.

Eye Contact

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
Continue rinsing.
Get medical advice/attention if irritation occurs.

Ingestion

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. DO NOT induce vomiting.
Rest. Seek immediate medical attention.

4.2 Most important symptoms and effects, both acute and delayed**Acute**

Symptoms of exposure to this product may include minor gastrointestinal effects upon ingestion.

Delayed

No information available.

4.3 Indication of any immediate medical attention and special treatment needed

No information available.



5. FIRE FIGHTING MEASURES

5.1 Extinguishing Media

In case of fire: Use dry chemical, foam, or carbon dioxide for extinction.

Use water spray to cool fire exposed containers.

Unsuitable Extinguishing Media

Jet water spray may cause frothing and may spread the fire to a larger area.

5.2 Special hazards arising from the substance or mixture

Produces oxides of carbon upon combustion.

5.3 Advice for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand (OSHA/NIOSH approved or equivalent) and full protective gear.

5.4 Further information

NFPA Rating:

Health:	1
Flammability:	1
Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Protective Measures

Evacuate danger area. Isolate hazard area and deny entry to unnecessary or unprotected personnel. Remove all possible sources of ignition in the surrounding area.

Personal protection as described in Section 8.

6.2 Environmental precautions

Do NOT wash away into sewer. Do NOT let this chemical enter the environment

Use appropriate containment of product and fire fighting water to avoid environmental contamination. Prevent from spreading or entering drains, ditches, or rivers by using sand, earth, or other appropriate barriers.

Notify authorities if any exposure to the general public or environment occurs or is likely to occur. Local authorities should be advised if significant spillages cannot be contained.



6.3 Methods and material for containment and cleaning up

Absorb spilled product with inert material such as dry sand, clay, vermiculite, or other commercial absorbent. Place in a sealable, properly labeled container. Store in safe location until disposal. After removal, flush contaminated area thoroughly with water. Avoid runoff into storm sewers and ditches which lead to waterways. Contain all liquids for treatment or disposal.

6.4 Reference to other sections

Refer to Section 8 for personal protection advice and Section 13 for disposal information.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

Avoid breathing vapors or mists. Avoid contact with eyes or skin.

Wear protective gloves/protective clothing/eye protection/face protection.

Do no eat, drink or smoke when using this product.

Wash thoroughly after handling.

7.2 Conditions for safe storage, including any incompatibilities

Store in a well-ventilated place. Keep container tightly closed.

Store separated from strong oxidants

Ensure that all local regulations regarding handling and storage facilities are followed.

7.3 Specific end use(s)

No data available.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Permissible Exposure Limits

No relevant exposure limits exist for this product.

8.2 Exposure Controls

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures may include the following:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

8.3 Personal Protective Equipment

Use personal protective equipment as required.

All personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers for more information.

**Respiratory Protection**

Use only with adequate ventilation. If engineering controls do not maintain airborne concentrations at a level which is adequate to protect worker health, an approved respirator should be used.

When there is potential for airborne exposures in excess of applicable limits, wear NIOSH/MSHA approved respiratory protection. Contact respirator supplier for specific recommendations.

For situations where high concentrations of vapors may be present, use an approved supplied air respirator operated in positive pressure mode.

Hand Protection

Where hand contact with this material may occur, use gloves that meet applicable standards.

Specific glove information is provided based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending upon the specific use conditions.

Contact glove manufacturer for advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves.

Eye Protection

Chemical splash goggles which meet the national standards should be used when handling this material.

Skin Protection

Chemical resistant suit including boots and gloves should be used when handling this material.

Specific Hygiene Measures

Do not eat, drink, or smoke when handling this material. Wash hands thoroughly after handling.

Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned.

Monitoring Methods

Monitoring of the vapor concentrations of chemicals in the workplace may be required to confirm compliance with OEL and adequacy of exposure controls.

Sources for recommended air monitoring methods include:

USA: National Institute of Occupational Safety and Health (NIOSH): Manual of Analytical Methods, <http://www.cdc.gov/niosh/nmam/nmammenu.html>.

USA: Occupational Safety and Health Administration (OSHA): Sampling and Analytical Methods, <http://osha.gov/dts/sltc/methods/toc.html>.

Environmental Exposure Controls

Local guidelines for emissions limits for volatile substances must be observed for the discharge of exhaust air containing vapors.

See Sections 6, 7, 12, and 13 for more information on environmental exposure controls.



9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

(a) Appearance	Form:	Liquid			
	Color:	Black			
(b) Odor		Mild petroleum			
(c) Odor threshold		>1500 ppm			
(d) pH		5 - 9			
(e) Melting/freezing point		65 - 200	°F	18 - 93	°C
(f) Initial boiling point and boiling range		310 - 1036	°F	154 - 556	°C
(g) Flash point		>400	°F	>204	°C
(h) Evaporation rate		Very slow. Varies with condition.			
(i) Flammability (solid, gas)		No data available.			
(j) Upper/lower flammability or explosive limits		No data available.			
(k) True vapor pressure		<0.5 psia at 100°F		ASTM D323	
(l) Vapor density		0.9 - 1.1	(Air = 1)		
(m) Relative density		0.98	(Water = 1)		
(n) Solubility (ies)		Negligible in water			
(o) Partition coefficient: n-octanol/water		100.00			
(p) Auto-ignition temperature		>800	°F	>426	°C
(q) Decomposition temperature		>850	°F	>454	°C
(r) Viscosity		4634	CSt at 122° F		

9.2 Other information

No data available.

10. STABILITY AND REACTIVITY

10.1 Reactivity

No information available.

10.2 Chemical Stability

The chemical is expected to be stable in normal operating conditions.

Hazardous polymerization will not occur.

10.3 Possibility of hazardous reactions

No information available.

10.4 Conditions to Avoid

Avoid heat, sparks, open flames, and other sources of ignition.

10.5 Incompatible materials

Strong oxidizing agents.

10.6 Hazardous Decomposition Products

On combustion, this material forms oxides of carbon.



11. TOXICOLOGICAL INFORMATION

11.1 Likely routes of exposure

This material can be absorbed into the body by ingestion.

11.2 Signs and symptoms of exposure

This substance is not expected to cause significant health effects.

11.3 Delayed and immediate effects/Chronic effects from short- and long-term exposure

Eye

This material is not expected to cause serious/permanent eye damage but minor irritation may occur.

Skin

This material is not expected to cause serious/permanent skin damage, but minor irritation may occur.

Inhalation

This material is not expected to cause any significant respiratory tract effects.

Ingestion

This material is not expected to be toxic through ingestion, but may cause mild gastrointestinal effects including nausea, vomiting, and diarrhea.

Chronic effects

No information available.

Subchronic effects

No information available.

Respiratory or skin sensitization

No information available.

Germ cell mutagenicity

No information available.

Reproductive toxicity

No information available.

Specific target organ toxicity - single exposure

No information available.

**Specific target organ toxicity - repeat exposure**

No information available.

Aspiration hazard

No information available.

Potential health effects

This material is not expected to cause significant health effects.

11.4 Acute Toxicity Estimates

Compound Name	CAS #	TEST - SPECIES - RESULT
ALKANES, C14 - C40	74664-93-0, 544-85-4, 14167-59-0, 630-06-8, 7194-85-6, etc.	N.D.

N.D. - No data available

11.5 Carcinogenicity**IARC (International Agency for Research on Cancer):**

No component of this product present in concentrations of 0.1% or greater is identified by IARC to be a probable, possible, or confirmed carcinogen.

NTP (National Toxicology Program):

No component of this product present in concentrations of 0.1% or greater is identified by NTP to be a known or reasonably anticipated carcinogen.

OSHA (U.S. Occupational Health and Safety Administration):

No component of this product present in concentrations of 0.1% or greater is identified by OSHA to be a carcinogen or potential carcinogen.

12. ECOLOGICAL INFORMATION

12.1 Ecotoxicity

Compound Name	CAS #	TEST-SPECIES-RESULTS
ALKANES, C14 - C40	74664-93-0, 544-85-4, 14167-59-0, 630-06-8, 7194-85-6, etc.	N.D.

N.D. - No data available

**12.2 Persistence and Degradability**

No information available.

12.3 Bioaccumulative potential

No information available.

12.4 Mobility in soil

No information available.

12.5 Other adverse effects

No data available.

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Product disposal**

Recover or recycle if possible. It is the responsibility of the waste generator to determine the physical characteristics and toxicity of the material generated in order to properly designate the waste classification and disposal methods in compliance with applicable regulations.

Do not dispose into the environment, in drains, or allow to enter waterways. Waste product should not be allowed to contaminate soil or water.

Container disposal

Follow all SDS/label precautions even after container is emptied because they may retain product residues.

Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed.

Empty containers should be taken for recycling, recovery, or disposal through a suitable qualified or licensed contractor and in accordance with governmental regulations.

Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition as this may cause them to explode.

14. TRANSPORT INFORMATION**U.S. DOT**

This material is not regulated as a hazardous material for transport by the U.S. Department of Transportation in accordance with 49 CFR 172.101.

Sea (IMDG)

This material is not regulated as dangerous goods in accordance with the IMDG Code.

Air (IATA)

This material is not regulated as dangerous goods in accordance with the IATA Code.



15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This safety datasheet complies with the requirements of 29 CFR §1910.1200

As defined under SARA 311 and 312, this product contains materials that are designated as having the following hazards: None

FEDERAL REGULATORY LISTS:

Compound Name	CAS #	SARA 313	CERCLA	RCRA	CAA
ALKANES, C14 - C40	74664-93-0, 544-85-4, 14167-59-0, 630-06-8, 7194-85-6, etc.	N.L	N.L	N.L	N.L

N.L. - Not listed on regulatory list

CALIFORNIA REGULATIONS:

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

PENNSYLVANIA REGULATIONS:

To the best of our knowledge, this product does not contain any components cited on the Pennsylvania Special Hazardous Substances List, the Pennsylvania Hazardous Substances List, and/or the Pennsylvania Environmental Hazardous Substances List, at levels which require reporting.

ADDITIONAL STATE REGULATIONS:

Components of this product are not found on the following state lists: DE, FL, NJ, NY, MA, ME, MI, RI, WI.

15.2 Chemical safety assessment

No data available.

16. OTHER INFORMATION

Reason for Issue: New SDS
Approval date: May 22, 2015
Supersedes date: New

 This information is furnished without warranty, expressed or implied except that it is accurate to the best knowledge of Intergulf Corporation. The data on this sheet are related only to the specific material herein. Intergulf Corporation assumes no responsibility for the use or reliance upon these data.

END OF SDS



Safety Data Sheet

Material Name: EcoAddz

SDS ID: 82409

*** Section 1 - Identification ***

Product Identifier

EcoAddz

Restrictions on Use

Not Available.

Product Code: Prefix 06

Product Use: For blending with asphalt. If this product is used in combination with other products, refer to the Material Safety Data Sheet for those products.

Synonyms: Not applicable.

Manufacturer Information

Safety-Kleen Systems, Inc.
2600 North Central Expressway
Suite 400
Richardson, TX 75080
www.safety-kleen.com

Phone: 1-800-669-5740
www.safety-kleen.com

Emergency # 1-800-468-1760

Issue Date

March 24, 2015

Supersedes Issue Date

March 19, 2014

Original Issue Date

October 31, 1988

*** Section 2 - Hazard(s) Identification ***

Classification in Accordance with 29 CFR 1910.1200.

COOLED PRODUCT

Not classified.

HOT PRODUCT

Flammable liquid, Category 3

Acute Toxicity (Inhalation), Category 2

GHS LABEL ELEMENTS

COOLED PRODUCT

No Symbol, Signal Word, Hazard Statement, or Prevention or Response Measures needed according to classification criteria.

HOT PRODUCT

Symbol(s)



Signal Word

DANGER!

Hazard Statement(s)

Flammable liquid and vapor

Fatal if inhaled

Causes severe skin burns and eye damage.

Safety Data Sheet

Material Name: EcoAddz

SDS ID: 82409

Precautionary Statement(s)

Prevention

Keep away from heat, sparks, open flame, and 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. Wear protective gloves and eye/face protection. Do not breathe vapor or mist. Use only outdoors or in a well-ventilated area. Wear respiratory protection.

Response

In case of fire, use media appropriate for extinction. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/physician. Specific treatment is urgent, see first aid section of Safety Data Sheet. IF IN EYES: Flush with water for at least 15 minutes and seek medical attention immediately. DO NOT attempt to remove cooled product from eye as it can cause tissue damage. IF ON SKIN (or hair): For burns from contact with hot material, do NOT remove solidified material as this might cause skin tearing. Cover area with sterile, dry dressing. Immediately get medical attention.

Storage

Store in a well-ventilated place. Keep container tightly closed. Keep cool. Store locked up.

Disposal

Dispose in accordance with all applicable regulations.

Hazard(s) Not Otherwise Classified

May cause thermal burns from heated material. Inhaling hydrogen sulfide released from hot products in enclosed areas may cause unconsciousness, convulsions, suffocation, coma, and death.

*** Section 3 - Composition / Information on Ingredients ***

CAS	Component	Percent
129893-17-0	Lubricating oils, used, residues	99.9-100
7783-06-4	Dihydrogen monosulfide	<0.1

*** Section 4 - First Aid Measures ***

Description of Necessary Measures

Inhalation

Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/physician. If breathing is difficult, oxygen should be administered by qualified personnel.

Skin

For burns from contact with hot material, do NOT remove solidified material as this might cause skin tearing. Cover area with sterile, dry dressing. Immediately get medical attention.

If contact is with cooled material, remove affected clothing and shoes. Wash skin thoroughly with soap and water. Get medical attention if irritation or pain develops or persists.

Eyes

If irritation or redness from exposure to vapor develops, move away from exposure into fresh air. If hot product contacts eye, flush with water for at least 15 minutes and seek medical attention immediately. Do not attempt to removed cooled product from eye as it can cause tissue damage.

Ingestion

Do NOT induce vomiting. Immediately get medical attention. Call 1-800-468-1760 for additional information. If spontaneous vomiting occurs, keep head below hips to avoid breathing the product into the lungs. Never give anything by mouth to an unconscious person.

Safety Data Sheet

Material Name: EcoAddz

SDS ID: 82409

Most Important Symptoms/Effects

Acute

For hot product: Fatal if inhaled, thermal burns.

Cooled product may irritate the respiratory tract (nose, throat, and lungs), eyes, and skin.

Delayed

No information on significant adverse effects.

Indication of Immediate Medical Attention and Special Treatment Needed, If Needed

For inhalation, consider oxygen. Treat symptomatically and supportively. Treatment may vary with condition of victim and specifics of incident. Call 1-800-468-1760 for additional information.

* * * Section 5 - Fire-Fighting Measures * * *

Suitable Extinguishing Media

Carbon dioxide, dry chemical, or water fog. Water spray or foam may cause frothing.

Unsuitable Extinguishing Media

Do not use high-pressure water streams.

Specific Hazards Arising from the Chemical

Hot product is a vapor explosion hazard indoors, outdoors, or in sewers. Vapors or gases may ignite at distant ignition sources and flash back. Most vapors are heavier than air and will spread along ground and collect in low or confined areas (drains, basements, tanks). Runoff may create fire or explosion hazard. Containers may rupture or explode if exposed to heat. Empty containers may retain product residue including flammable/explosive vapors. Product is not sensitive to mechanical impact or static discharge. For cooled product: Product may burn, but does not ignite readily.

Hazardous Combustion Products

Decomposition and combustion materials may be toxic., Burning may produce hydrogen sulfide, sulfur oxides, carbon monoxide, and unidentified organic compounds.

Special Protective Equipment and Precautions for Firefighters

A positive-pressure, self-contained breathing apparatus (SCBA) and full-body protective equipment are required for fire emergencies.

Fire Fighting Measures

Move container from fire area if it can be done without risk. Keep storage containers cool with water spray.

NFPA Ratings: Health: 1 Fire: 1 Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

* * * Section 6 - Accidental Release Measures * * *

Personal Precautions, Protective Equipment and Emergency Procedures

Wear personal protective clothing and equipment, see Section 8.

Methods and Materials for Containment and Clean Up

Remove all ignition sources. Do not touch or walk through spilled product. Stop leak if you can do it without risk. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Ventilate area and avoid breathing vapor or mist. Contain spill away from surface water and sewers. Hot product: contain spill as a liquid for possible recovery, or sorb with compatible sorbent material and shovel with a clean, sparkproof tool into a sealable container for disposal. Cooled product: collect and dispose in proper container.

Additionally, for large spills: Dike far ahead of liquid spill for collection and later disposal.

Safety Data Sheet

Material Name: EcoAddz

SDS ID: 82409

*** Section 7 - Handling and Storage ***

Precautions for Safe Handling

This product is normally handled at high temperatures. Vapors from hot material may be explosive: keep away from sparks or flame. Where flammable mixtures may be present, equipment safe for such locations should be used. Use clean, sparkproof tools and explosion-proof equipment. When transferring product, metal containers, including trucks and tank cars, should be grounded and bonded. Keep container tightly closed. Use explosion-proof electrical/ventilating/lighting equipment. Take precautionary measures against static discharge. Do not breathe vapor or mist. Use only outdoors or in a well-ventilated area. Wear respiratory protection. Sense of smell becomes rapidly fatigued and cannot be relied upon to warn of the continuous presence of hydrogen sulfide. Avoid contact with eyes, skin, clothing, and shoes. Do not smoke when using this product. Do not put in mouth. Wear protective gloves and eye/face protection.

Conditions for Safe Storage, Including Any Incompatibilities

Keep away from water when loading and unloading. Use dry container to avoid violent eruptions and splattering of hot product. Keep container tightly closed when not in use and during transport. Store containers in a cool, dry place. Do not pressurize, cut, weld, braze, solder, drill, or grind containers. Keep containers away from heat, flame, sparks, static electricity, or other sources of ignition. Empty product containers may retain product residue and can be dangerous. Store locked up.

Incompatibilities

Avoid acids, alkalis, oxidizing materials, halogens, and reactive metals.

*** Section 8 - Exposure Controls / Personal Protection ***

Component Exposure Limits

Dihydrogen monosulfide (7783-06-4)

ACGIH: 1 ppm TWA

5 ppm STEL

OSHA Final: 20 ppm Ceiling

OSHA Vacated: 10 ppm TWA; 14 mg/m³ TWA

15 ppm STEL; 21 mg/m³ STEL

NIOSH: 10 ppm Ceiling (10 min); 15 mg/m³ Ceiling (10 min)

Appropriate Engineering Controls

Provide general ventilation needed to maintain concentration of vapor or mist below applicable exposure limits. Where adequate general ventilation is unavailable, use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below applicable exposure limits.

Individual Protective Measures, such as Personal Protective Equipment

Personal protective equipment should be selected based upon the conditions under which this material is used. A hazard assessment of the work area for PPE requirements should be conducted by a qualified professional pursuant to regulatory requirements. The following PPE should be considered the minimum required: safety glasses, gloves, lab coat or apron.

Eyes/Face Protection

Eye protection: Safety goggles should be worn at a minimum. Additional protection such as face shields or respirators may be needed depending upon anticipated use and concentrations of mists or vapors. Provide an emergency eye wash fountain and quick drench shower in the immediate work area. Contact lens use is not recommended.

Skin Protection

Where contact with hot product is likely, wear combination temperature and chemical protective gloves. For contact with cooled product, wear appropriate product resistant gloves.

When products are heated and skin contact is likely, wear heat-resistant gloves, boots, and other protective clothing.

To avoid prolonged or repeated contact where spills and splashes are likely, wear appropriate chemical-resistant faceshield, boots, apron, coveralls, long sleeve shirts, or other protective clothing.

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Respiratory Protection

Sense of smell becomes rapidly fatigued and cannot be relied upon to warn of the continuous presence of hydrogen sulfide. Use NIOSH air-certified, air-supplied respirators (self-contained breathing apparatus or air-line) respiratory protective equipment when concentration of hydrogen sulfide may exceed applicable exposure limits. Otherwise, use NIOSH-certified P- or R- series particulate filter and organic vapor cartridges when concentration of vapor or mist exceeds applicable exposure limits. Protection provided by air purifying respirators is limited. Do not use N-rated respirators. Selection and use of respiratory protective equipment should be in accordance in the USA with OSHA General Industry Standard 29 CFR 1910.134; or in Canada with CSA Standard Z94.4.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance/Odor :	For hot products: Viscous, semi-solid, black, asphalt odor. For cooled products: Solid, black, asphalt odor.	Odor Threshold:	0.1 ppm (based on hydrogen sulfide)
Boiling Point:	800°F (426°C) (minimum)	Melting Point:	Not available
Solubility (H2O):	Insoluble.	Specific Gravity:	0.96 (water = 1) (approximately)
Density:	8 LB/US gal (960 g/l) (approximately)	Octanol/H2O Coeff.:	Not available
Evaporation Rate:	Not available.	Molecular Weight:	Not available.
Auto Ignition Temperature:	905°F (485°C) (based on similar material)	LFL:	Not available
Flash Point:	500°F (260°C) (minimum) Cleveland Open Cup	UFL:	Not available
Viscosity:	Not available	Vapor Pressure:	0.2 mmHg @ 175°F (79°C)
Vapor Density:	Not available.		

Other Property Information

No additional information is available.

* * * Section 10 - Stability & Reactivity * * *

Reactivity

No reactivity hazard is expected.

Chemical Stability

Stable under normal temperatures and pressures.

Possibility of Hazardous Reactions

Polymerization is not known to occur under normal temperature and pressures. Not reactive with water.

Conditions To Avoid

Avoid heat, flames, sparks and other sources of ignition. Avoid contact with incompatible materials.

Incompatible Materials

Avoid acids, alkalis, oxidizing agents, reactive halogens, or reactive metals., Avoid volatile solvents because contact may cause vapors from hot products to ignite., Avoid water because allowing hot product to contact water can cause violent eruptions, splatter hot material, or ignite flammable materials.

Hazardous Decomposition Products

Decomposition and combustion materials may be toxic., Burning may produce hydrogen sulfide, oxides of sulfur, oxides of carbon, and unidentified organic compounds.

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*** Section 11 - Toxicological Information ***

Toxicity Data and Information

Component Analysis - LD50/LC50

Dihydrogen monosulfide (7783-06-4)

Inhalation LC50 Rat 0.99 mg/L 1 h

Information on Likely Routes of Exposure

Inhalation

For hot product: High concentrations of vapor or mist may irritate the respiratory tract (nose, throat, and lungs). Inhaling hydrogen sulfide released from hot products in enclosed areas may cause unconsciousness, convulsions, suffocation, coma, and death. For cooled product: Mechanical irritation may occur.

Ingestion

May be harmful if swallowed. May cause throat irritation, nausea, vomiting, and diarrhea. Aspiration hazard: breathing product into the lungs during ingestion or vomiting may cause lung injury and possible death.

Skin Contact

May cause thermal burns from heated material., For cooled product:, May cause irritation.

Eye Contact

May cause thermal burns from heated material., For cooled product:, May cause irritation.

Immediate Effects

For hot product:, Fatal if inhaled, thermal burns

Cooled product may irritate the respiratory tract (nose, throat, and lungs), eyes, and skin.

Delayed Effects

No information on significant adverse effects.

Irritation/Corrosivity

For hot product:, thermal burns

Cooled product may irritate the respiratory tract (nose, throat, and lungs), eyes, and skin.

Respiratory Sensitization

Based on best current information, there is no known human sensitization associated with this product.

Skin Sensitization

Based on best current information, there is no known human sensitization associated with this product.

Carcinogenicity

Component Carcinogenicity

None of this product's components are listed by ACGIH, IARC, OSHA, NIOSH, or NTP.

Germ Cell Mutagenicity

Based on best current information, there is no known mutagenicity associated with this product.

Teratogenicity

Based on best current information, there is no known teratogenicity associated with this product.

Reproductive Effects

Based on best current information, there is no known reproductive toxicity associated with this product.

Specific Target Organ Effects - Single Exposure

No target organs identified.

Specific Target Organ Effects - Repeated Exposure

No target organs identified.

Medical Conditions Aggravated by Exposure

Individuals with pre-existing respiratory tract (nose, throat, and lungs), eye, and/or skin disorders may have increased susceptibility to the effects of exposure.

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*** Section 12 - Ecological Information ***

Ecotoxicity

Component Analysis - Ecotoxicity - Aquatic Toxicity

Dihydrogen monosulfide (7783-06-4)

Duration/Test/Species	Concentration/Conditions	Notes
96 Hr LC50 Lepomis macrochirus	0.0448 mg/L [flow-through]	
96 Hr LC50 Pimephales promelas	0.016 mg/L [flow-through]	

Persistence and Degradability

No information available for the product.

Bioaccumulation Potential

No information available for the product.

Mobility in Soil

No information available for the product.

Other Adverse Effects

No additional information is available.

*** Section 13 - Disposal Considerations ***

Disposal Methods

Dispose of in accordance with all applicable federal, state, provincial, and local regulations. Regulations may also apply to empty containers. The responsibility for proper waste disposal lies with the owner of the waste. Contact Safety-Kleen regarding proper recycling or disposal.

Product, if discarded, is not expected to be a characteristic or listed hazardous waste. Processing, use, or contamination by the user may change the waste code(s) applicable to the disposal of this product.

*** Section 14 - Transport Information ***

Transportation Regulations

DOT Shipping Name: Elevated temperature liquid, n.o.s. (Asphalt flux)

UN/NA #: UN3257 **Hazard Class:** 9 **Packing Group:** III

Required Label(s): CLASS 9

Additional Information: When product temperature is less than 212 °F (100 °C)

Not regulated.

TDG Shipping Name: Elevated temperature liquid, n.o.s. (Asphalt flux)

UN/NA #: UN3257 **Hazard Class:** 9 **Packing Group:** III

Required Label(s): 9

Additional Info.: When product temperature is less than 212 °F (100 °C)

Not regulated.

*** Section 15 - Regulatory Information ***

VOC (As Regulated)

100 WT%; 8 LB/US gal; 960 g/l (approximately)

Federal Regulations

SARA 302/304

Component Analysis

Based on the ingredient(s) listed in SECTION 3, this product does contain "extremely hazardous substances" listed pursuant to Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) Section 302 or Section 304 as identified in 40 CFR Part 355, Appendix A and B:

Dihydrogen monosulfide (7783-06-4) 500 lb TPQ

SARA 311/312 Hazardous Categories

Safety Data Sheet

Material Name: EcoAddz

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This product poses the following health hazard(s) as defined in 40 CFR Part 370 and are subject to the requirements of sections 311 and 312 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA):

Acute Health: Yes **Chronic Health:** No **Fire:** Yes **Pressure:** No **Reactive:** No

SARA Section 313

Component Analysis

This product contains a "toxic" chemical subject to the requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) and 40 CFR Part 372.

Dihydrogen monosulfide (7783-06-4) 1.0 % de minimis concentration

CERCLA

Component Analysis

Based on the ingredient(s) listed in SECTION 3, this product contains the following "hazardous substance" listed under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) in 40 CFR Part 302, Table 302.4 with the following reportable quantities (RQ):

Dihydrogen monosulfide (7783-06-4) 100 lb final RQ; 45.4 kg final RQ

TSCA Inventory

All the components of this product are listed on, or are automatically included as "naturally occurring chemical substances" on, or are exempted from the requirement to be listed on, the TSCA Inventory.

Component Analysis

Component	CAS #	TSCA
Lubricating oils, used, residues	129893-17-0	Yes
Dihydrogen monosulfide	7783-06-4	Yes

U.S. State Regulations

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	MA	MN	NJ	PA	CA
Dihydrogen monosulfide	7783-06-4	Yes	Yes	Yes	Yes	Yes

This product may contain detectable amounts of lead CAS 7439-92-1, nickel CAS 7440-02-0, benzo(a)anthracene CAS 56-55-3, benzo(k)fluoranthene CAS 207-08-9, benzo(a)pyrene CAS 50-32-8, benzo(b)fluoranthene CAS 205-99-2, chrysene CAS 218-01-9, dibenz(a,h)anthracene CAS 53-70-3, and indeno(1,2,3-cd)pyrene CAS 193-39-5. WARNING: These chemicals are known to the State of California to cause cancer.

This product may contain detectable amounts of lead CAS 7439-92-1. WARNING: This chemical is known to the State of California to cause birth defects or other reproductive harm.

Canadian Regulations

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all information required by the CPR.

Component Analysis

Component	CAS #	CAN
Lubricating oils, used, residues	129893-17-0	DSL
Dihydrogen monosulfide	7783-06-4	DSL

Canadian WHMIS Information

Hot Product: Class B2 - Flammable Liquid; D2B – Irritating to eyes and skin.

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*** Section 16 - Other Information ***
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Revision Information

Key/Legend

ACGIH - American Conference of Governmental Industrial Hygienists; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States

Disclaimer

User assumes all risks incident to the use of this product. To the best of our knowledge, the information contained herein is accurate. However, Safety-Kleen assumes no liability whatsoever for the accuracy or completeness of the information contained herein. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose or of any other nature are made hereunder with respect to the information or the product to which the information refers. The data contained on this sheet apply to the product as supplier to the user.

End of Sheet 82409