

Section 1. Identification

GHS product identifier : HiTEC® 4103 Cetane Improver
Chemical name : 2-Ethylhexyl nitrate
Product use : Petrochemical industry: Diesel Fuel Additive

In case of emergency - Chemical

+1-703-527-3887 (International)
 +1-703-741-5979 (Spanish language)
 +1-800-424-9300 (US & Canada)

Manufacturer / Supplier

Afton Chemical Corporation
 500 Spring St.
 Richmond,
 VA 23219
 USA
 Tel: +1-804-788-5800

Afton Chemical Corporation
 7201 W. 65th Street
 Bedford Park, IL 60638, USA
 Tel: (708) 458-8450 (Non-emergency)
 (800) 323-3231 (Customer Service)

Afton Chemical Canada
 P.O. Box 130
 Coranna, Canada N0N1G0

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 4
 ACUTE TOXICITY (oral) - Category 4
 ACUTE TOXICITY (dermal) - Category 4
 ACUTE TOXICITY (inhalation) - Category 4

GHS label elements

Hazard pictograms



Signal word

: Warning

Hazard statements

: Combustible liquid.
 Harmful if swallowed, in contact with skin or if inhaled.

Precautionary statements

Prevention

: Wear protective gloves. Wear eye or face protection. Wear protective clothing. Keep away from flames and hot surfaces. - No smoking. Use only outdoors or in a well-ventilated area. Avoid breathing vapor. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.

Response

: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF SWALLOWED: Call a POISON CENTER or physician if you feel unwell. Rinse mouth. IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or physician if you feel unwell. Wash contaminated clothing before reuse.

Storage

: Store in a well-ventilated place. Keep cool.

Disposal

: Dispose of contents and container in accordance with all local, regional, national and international regulations.

Supplemental label elements

:

Hazards not otherwise classified

:

When heated above 100°C/212°F may undergo a self-accelerating, exothermic reaction which causes a rapid rise in temperature and pressure. Rupture of storage vessels and fire should be anticipated in case of such temperature.

Section 3. Composition/information on ingredients

Substance/mixture	: Substance
Chemical name	: 2-Ethylhexyl nitrate
Other means of identification	: Diesel Ignition Improver 3 (DII-3).

Ingredient name	CAS number	Conc. (% w/w)	US GHS Classification
2-Ethylhexyl nitrate	27247-96-7	60 - 100	ACUTE TOXICITY (oral) - Category 4 ACUTE TOXICITY (dermal) - Category 4 ACUTE TOXICITY (inhalation) - Category 4

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact	: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.
Inhalation	: If inhaled, remove to fresh air. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours. If not breathing, give artificial respiration. If breathing is difficult, administer oxygen.
Skin contact	: Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 15 minutes. Get medical attention if adverse health effects persist or are severe. If necessary, call a poison center or physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Ingestion	: Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact	: No known significant effects or critical hazards.
Inhalation	: Harmful if inhaled.
Skin contact	: Harmful in contact with skin.
Ingestion	: Harmful if swallowed.

Over-exposure signs/symptoms

Eye contact	: No specific data.
Inhalation	: Adverse symptoms may include the following: Inhalation of vapors may cause a sharp decrease in blood pressure with resulting loss of consciousness.
Skin contact	: Overexposure to organic nitrates by inhalation of vapor or skin contact may cause headache, dizziness, nausea, and decreased blood pressure.
Ingestion	: No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Section 4. First aid measures

- Notes to physician** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

- Suitable extinguishing media** : Use dry chemical, CO₂, water spray (fog) or foam.

- Unsuitable extinguishing media** : Do not use water jet.

- Specific hazards arising from the chemical** : Combustible liquid. Material will produce a vigorous reaction under conditions of shock, pressure or temperature. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides

- Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. First move people out of line-of-sight of the scene and away from windows. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. Do not fight fire when it reaches the material. Withdraw from fire and let it burn. When heated above 100°C/212°F may undergo a self-accelerating, exothermic reaction which causes a rapid rise in temperature and pressure. Rupture of storage vessels and fire should be anticipated in case of such temperature. Spray storage vessels with water to maintain temperature below 100°C/212°F.

- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Fire-fighters' protective clothing will only provide limited protection.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

- For emergency responders** : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

Methods and materials for containment and cleaning up

- Small spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Section 6. Accidental release measures

- Large spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container. A vapor recovery system should be used when packaging this product. Wash thoroughly after handling. Do not heat the product.

Product Transfer : Do not heat the product. Prior to starting transfer pump, ensure all valves in the product discharge line are open and that the line is unobstructed. Immediately after starting the transfer pump, verify that the product is flowing. If product is not flowing, shut the pump off immediately. Operating the transfer pump in a dead-headed (blocked) condition without product flow can result in an explosion damaging equipment and causing personal injury. A pneumatic driven diaphragm pump or pumps of other designs equipped with high temperature (75 degs. C) shut-off devices are recommended when pumps are provided at fixed locations.

- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

- Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. Do not heat the product. Warehouses equipped with fire suppression systems are recommended. This product should not be stored in the same area with tanks containing flammable liquids. Fire suppression systems should be adequate to keep product cool in the event of a fire. Refer to "Safety and Handling Manual for 2-Ethylhexyl Nitrate" for further information on safety and handling concerns and procedures (available from Afton Corporation).

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
2-Ethylhexyl nitrate	Afton (United States). TWA: 1 ppm 8 hours.

- Appropriate engineering controls** : Use only with adequate ventilation. Engineering controls may be required to control the primary or secondary risks associated with this product. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Section 8. Exposure controls/personal protection

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

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

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid.

Color : Colorless to light yellow.

Odor : Fruity. Pungent. Ester. Characteristic.

Odor threshold : Not available.

pH : Not available.

Melting point : <-45°C (<-49°F)

Boiling point : Decomposition temperature: >100°C (>212°F)

Flash point : Closed cup: 65°C (149°F) [Pensky-Martens.Minimum]

Evaporation rate : Not available.

Flammability (solid, gas) : Not applicable.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : 0.027 kPa (0.2 mm Hg) [room temperature]

Vapor density : Not available.

Density : 0.96 g/cm³ @ 20°C

Relative density : Not available.

Solubility : Insoluble in the following materials: cold water

Solubility in water : 12.6 g/l

Partition coefficient: n-octanol/water : 5.24

Auto-ignition temperature : 130°C (266°F)

Decomposition temperature : >100°C (>212°F)

Viscosity : 1.8cSt at 20°C

Section 10. Stability and reactivity

- Reactivity** : No specific test data related to reactivity available for this product or its ingredients.
- Chemical stability** : The product may not be stable under certain conditions of storage or use. See "Possibility of Hazardous Reactions" for further information.
- Possibility of hazardous reactions** : Hazardous reactions or instability may occur under certain conditions of storage or use. Conditions may include the following:
shock
friction
high temperature
Reactions may include the following:
risk of explosion
- Conditions to avoid** : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Avoid shock and friction.
- Incompatible materials** : Reactive or incompatible with the following materials:
oxidizing materials
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product / ingredient name	Result	Species	Dose	Exposure
2-Ethylhexyl nitrate	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	>10000 mg/kg	-
	LD50 Oral	Rat	>10000 mg/kg	-

Conclusion/Summary : Harmful if inhaled. Harmful if swallowed. Harmful in contact with skin.

Irritation/Corrosion

Sensitization

Information on the likely routes of exposure : Skin, Eyes, Ingestion, and Inhalation

Potential acute health effects

- Eye contact** : No known significant effects or critical hazards.
- Inhalation** : Harmful if inhaled.
- Skin contact** : Harmful in contact with skin.
- Ingestion** : Harmful if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics

- Eye contact** : No specific data.
- Inhalation** : Adverse symptoms may include the following:
Inhalation of vapors may cause a sharp decrease in blood pressure with resulting loss of consciousness.
- Skin contact** : Overexposure to organic nitrates by inhalation of vapor or skin contact may cause headache, dizziness, nausea, and decreased blood pressure.
- Ingestion** : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

- Potential immediate effects** : Inhalation of vapors may cause a sharp decrease in blood pressure with resulting loss of consciousness.
- Potential delayed effects** : Not available.

Long term exposure

Section 11. Toxicological information

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

Conclusion/Summary : - Adverse symptoms may include the following: Overexposure to organic nitrates by inhalation of vapor or skin contact may cause headache, dizziness, nausea, and decreased blood pressure.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Conclusion/Summary : Toxic to aquatic life with long lasting effects.

Persistence and degradability

Not available.




Bioaccumulative potential

Product / ingredient name	LogP _{ow}	BCF	Potential
2-Ethylhexyl Nitrate	5.24	-	high

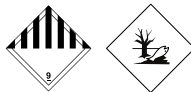

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	NA1993	Combustible liquid, n.o.s. (2-ethylhexyl nitrate)	Combustible liquid.	III		Marine pollutant
TDG Classification	UN 3082	Environmentally hazardous substance, liquid, n.o.s. (2-ethylhexyl nitrate). Marine pollutant	9	III	 	-

Section 14. Transport information

IMDG Class	UN 3082	Environmentally hazardous substance, liquid, n.o.s. (2-ethylhexyl nitrate) Marine pollutant.	9	III		Remarks Marine pollutant
IATA-DGR Class	UN 3082	Environmentally hazardous substance, liquid, n.o.s. (2-ethylhexyl nitrate)	9	III		-

Marine pollutant

Notice to reader

The above transport information is provided to assist in the proper classification of this product and may not be suitable for all shipping conditions.

Section 15. Regulatory information

US regulations

SARA 313 toxic chemical notification and release reporting (w/w%) : No SARA 313 chemicals are present above the reporting threshold.

SARA 311/312 Hazardous Categorization : **SARA 311/312 MSDS distribution - chemical inventory - hazard identification** : Fire hazard, reactive, Immediate (acute) health hazard

RQ (Reportable quantity) : CERCLA: Hazardous substances.: NITRIC ACID: 1000 lbs. (454 kg);

State - California Prop. 65 : No products were found.

Canadian regulations

HMIRA Registry Number : Not available.

International Inventory Status

United States inventory (TSCA 8b) : All components are listed or exempted.

Canada inventory : All components are listed or exempted.

Europe inventory : All components are listed or exempted.

Japan inventory (ENCS) : All components are listed or exempted.

Australia inventory (AICS) : All components are listed or exempted.

Korea inventory (KECI) : All components are listed or exempted.

China inventory (IECSC) : All components are listed or exempted.

Philippines inventory (PICCS) : All components are listed or exempted.

New Zealand Inventory of Chemicals (NZIoC) : All components are listed or exempted.

Taiwan inventory (CSNN) : All components are listed or exempted.

Section 16. Other information

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

Health	2
Flammability	2
Physical hazards	1

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

History

Section 16. Other information

Date of issue/Date of revision : 9/21/2015.

Prepared by : EHS Department (Tel: +1 804 788 5800)

Key to abbreviations :

- ATE = Acute Toxicity Estimate
- BCF = Bioconcentration Factor
- GHS = Globally Harmonized System of Classification and Labelling of Chemicals
- IATA = International Air Transport Association
- IBC = Intermediate Bulk Container
- IMDG = International Maritime Dangerous Goods
- LogPow = logarithm of the octanol/water partition coefficient
- MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
- UN = United Nations

▣ Indicates information that has changed from previously issued version.

Notice to reader

This information and these recommendations are offered in good faith and believed to be correct as of the date hereof. Information and recommendations are supplied upon the condition that the recipients will make their own decision as to safety and suitability for their purposes. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature, are made with respect to the product or the information and recommendations. Afton makes no representation as to completeness or accuracy. In no event will Afton be responsible for damages of any nature whatsoever resulting from the use or reliance upon the information and recommendations.