

CRUDE BUTADIENE



Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Version: 1.1 Revision Date: 05/21/2015

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY

Product Identifier

Product Form: Mixture

Product Name: Crude Butadiene

Synonyms: 1,3 Butadiene Concentrate

CAS No. 68476-52-8

Intended Use of the Product

Use of the Substance/Mixture: Industrial Use. Use as directed.

Name, Address, and Telephone of the Responsible Party

Company

Williams Olefins, L.L.C.
PO Box 470
Geismar, Louisiana 70734
T (225)-642-2100
ehs@williams.com

Emergency Telephone Number

Emergency number (888)253-4015, (225)642-2100; (800)424-9300 (CHEMTREC)

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture

Classification (GHS-US)

Simple Asphy

Flam. Gas 1 H220

Liquefied gas H280

Muta. 1B H340

Carc. 1A H350

Label Elements

GHS-US Labeling

Hazard Pictograms (GHS-US) :



GHS02



GHS04



GHS08

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Signal Word (GHS-US)	: Danger
Hazard Statements (GHS-US)	: H220 - Extremely flammable gas H280 - Contains gas under pressure; may explode if heated H340 - May cause genetic defects H350 - May cause cancer H380 - May displace oxygen and cause rapid suffocation
Precautionary Statements (GHS-US)	: P201 - Obtain special instructions before use. P202 - Do not handle until all safety precautions have been read and understood. P210 - Keep away from heat, sparks, open flames, hot surfaces. - No smoking. P280 - Wear protective gloves, protective clothing, eye protection, face protection, respiratory protection. P308+P313 - If exposed or concerned: Get medical advice/attention. P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely. P381 - Eliminate all ignition sources if safe to do so. P403 - Store in a well-ventilated place. P405 - Store locked up. P410+P403 - Protect from sunlight. Store in a well-ventilated place. P501 - Dispose of contents/container to local, regional, national, and international regulations.

Other Hazards

Other Hazards Not Contributing to the Classification: Exposure may aggravate those with pre-existing eye, skin, or respiratory conditions. Contact with liquid may cause cold burns/frostbite. May form explosive peroxides when exposed to air, may undergo violent self polymerization if inhibitor is lost or product is exposed to excessive heat. Product may oxidize rapidly if exposed to air and iron uninhibited.

Unknown Acute Toxicity (GHS-US) Not available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Substances/Mixture

NAME	PRODUCT IDENTIFIER	% (W/W)	CLASSIFICATION (GHS-US)
Hydrocarbons, C4, ethylene-manufacture-by-product	(CAS No) 68476-52-8	100	Flam. Gas 1, H220 Liquefied gas, H280 Muta. 1B, H340 Carc. 1A, H350
Contains	Product identifier	% (w/w)	Classification (GHS-US)
1,3-Butadiene	(CAS No) 106-99-0	60 - 100	Simple Asphy Flam. Gas 1, H220 Compressed gas, H280 Muta. 1B, H340 Carc. 1A, H350

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1-Butene	(CAS No) 106-98-9	5 - 10	Simple Asphy Pyr. Gas Not classified Flam. Gas 1, H220 Liquefied gas, H280
Butane	(CAS No) 106-97-8	5 - 10	Simple Asphy Flam. Gas 1, H220 Liquefied gas, H280
2-Butene, (E)-	(CAS No) 624-64-6	3 - 7	Simple Asphy Flam. Gas 1, H220 Compressed gas, H280
Isobutylene	(CAS No) 115-11-7	1 - 5	Simple Asphy Pyr. Gas Not classified Flam. Gas 1, H220 Liquefied gas, H280
cis-2-Butene	(CAS No) 590-18-1	1 - 5	Simple Asphy Flam. Gas 1, H220 Compressed gas, H280
1-Buten-3-yne	(CAS No) 689-97-4	1 - 5	Simple Asphy Flam. Gas 1, H220 Liquefied gas, H280

Full text of H-phrases: see section 16

SECTION 4: FIRST AID MEASURES

Description of First Aid Measures

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible). If exposed or concerned: Get medical advice/attention. If frostbite or freezing occurs, immediately flush with plenty of lukewarm water to GENTLY warm the affected area. Do not use hot water. Do not rub affected area. Get immediate medical attention.

Inhalation: When symptoms occur: go into open air and ventilate suspected area. If exposed or concerned: Get medical advice/attention.

Skin Contact: Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Obtain medical attention if irritation persists. If frostbite or freezing occurs, immediately flush with plenty of lukewarm water to GENTLY warm the affected area. Do not use hot water. Do not rub affected area. Get immediate medical attention.

Eye Contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if irritation persists. If frostbite or freezing occurs, immediately flush with plenty of lukewarm water to GENTLY warm the affected area. Do not use hot water. Do not rub affected area. Get immediate medical attention.

Ingestion: Not expected to be a primary route of exposure.

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Most Important Symptoms and Effects Both Acute and Delayed

General: May cause genetic defects. May cause cancer. May cause frostbite on contact with the liquid. Gas can be toxic as a simple asphyxiant by displacing oxygen from the air.

Inhalation: May cause cancer by inhalation. Gas can be toxic as a simple asphyxiant by displacing oxygen from the air.

Skin Contact: Causes skin irritation. May cause frostbite on contact with the liquefied gas.

Eye Contact: May cause slight irritation. Contact with the liquefied gas causes frostbite.

Ingestion: Not considered a potential route of exposure, contact with liquid may cause freeze burns and frostbite.

Chronic Symptoms: Not available

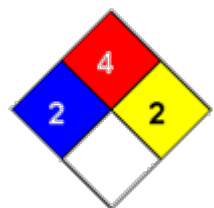
Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention.

SECTION 5: FIREFIGHTING MEASURES

NFPA 704 Hazard Class

Health: 2 Flammability: 4 Instability: 2



0 (Minimal)
1 (Slight)
2 (Moderate)
3 (Serious)
4 (Severe)

Extinguishing Media

Suitable Extinguishing Media: Do not extinguish burning gas if flow cannot be shut off immediately. Extinguish secondary FIRES with appropriate materials.

Unsuitable Extinguishing Media: Do not use a heavy water stream. Use of heavy stream of water may spread fire.

Special Hazards Arising From the Substance or Mixture

Fire Hazard: Extremely flammable gas

Explosion Hazard: May form flammable/explosive vapor-air mixture. Heating may cause an explosion. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries. May form explosive peroxides when exposed to air, may undergo violent self polymerization if inhibitor is lost or product is exposed to excessive heat. Product may oxidize rapidly if exposed to air and iron uninhibited.

Reactivity: This product is stable with an appropriate level of inhibitor, but reactive (unstable) without.

Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire

Firefighting Instructions: Leaking gas fire: Do not extinguish, unless leak can be stopped safely. In case of leaking gas fire, eliminate all ignition sources if safe to do so. Use water spray or fog for cooling exposed containers. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

Hazardous Combustion Products: Carbon oxides (CO, CO₂). Toxic fumes are released. Acrid vapors.

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Other information: Do not allow run-off from fire fighting to enter drains or water courses

Reference to Other Sections

Refer to section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Use special care to avoid static electric charges. Eliminate every possible source of ignition. Keep away from heat/sparks/open flames/hot surfaces - No smoking. Ruptured cylinders may rocket. Do NOT breathe (gas). Avoid all contact with skin, eyes, or clothing.

For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protection equipment (PPE).

Emergency Procedures: Evacuate unnecessary personnel.

For Emergency Personnel

Protective Equipment: Equip cleanup crew with proper protection.

Emergency Procedures: Ventilate area.

Environmental Precautions

Prevent entry to sewers and public waters. Avoid release to the environment.

Methods and Material for Containment and Cleaning Up

For Containment: Stop the flow of material, if this is without risk. Use only non-sparking tools. As an immediate precautionary measure, isolate spill or leak area in all directions.

Methods for Cleaning Up: Clear up spills immediately and dispose of waste safely. Use only non-sparking tools. Isolate area until gas has dispersed.

Reference to Other Sections

See heading 8, Exposure Controls and Personal Protection.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Additional Hazards When Processed: Handle empty containers with care because residual vapors are flammable. Extremely flammable gas. May form explosive peroxides when exposed to air, may undergo violent self polymerization if inhibitor is lost or product is exposed to excessive heat. Product may oxidize rapidly if exposed to air and iron uninhibited.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work. Do not eat, drink or smoke when using this product.

Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Proper grounding procedures to avoid static electricity should be followed. Comply with applicable regulations. Ground/bond container and receiving equipment.

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Storage Conditions: Store in a dry, cool and well-ventilated place. Keep container closed when not in use. Keep in fireproof place. Store locked up. Keep/Store away from extremely high or low temperatures, ignition sources, direct sunlight, incompatible materials.

Incompatible Materials: Strong acids. Strong bases. Strong oxidizers.

Specific End Use(s) Not available

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Chemical Name	ACGIH	OSHA	NIOSH
Butane (106-97-8)	STEL: 1000 ppm	--	REL (TWA): 1900 mg/m ³ REL (TWA): 800 ppm
1-Butene (106-98-9)	TWA: 250 ppm	--	--
Isobutylene (115-11-7)	TWA: 250 ppm	--	--
2-Butene, (E)- (624-64-6)	TWA: 250 ppm	--	--
cis-2-Butene (590-18-1)	TWA: 250 ppm	--	--
1,3-Butadiene (106-99-0)	TWA: 2 ppm	PEL (TWA): 2 ppm PEL (STEL): 5 ppm (see 29 CFR 1910.1051)	IDLH: 2000 ppm (10% LEL)

Note: State province, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Exposure Controls

Appropriate Engineering Controls: Gas detectors should be used when flammable gases/vapours may be released. Use explosion-proof equipment. Ensure adequate ventilation, especially in confined areas. Ground/bond container and receiving equipment. Ensure all national/local regulations are observed.

Personal Protective Equipment: Protective goggles. Protective clothing. Respiratory protection of the dependent type. Insulated gloves.



Materials for Protective Clothing: Chemically resistant materials and fabrics. Wear fire/flame resistant/retardant clothing.

Hand Protection: Wear chemically resistant protective gloves. Insulated gloves

Eye Protection: Chemical goggles or safety glasses.

Skin and Body Protection: Wear appropriate protective clothing.

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Respiratory Protection: Use a NIOSH-approved self-contained breathing apparatus whenever exposure may exceed established Occupational Exposure Limits.

Thermal Hazard Protection: Wear suitable protective clothing.

Other Information: When using, do not eat, drink or smoke.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State	: Gas
Appearance	: Colorless gas
Odor	: Not available
Odor Threshold	: Not available
pH	: Not available
Relative Evaporation Rate (butylacetate=1)	: Not available
Melting Point	: 128.4 °C (263.2°F)
Freezing Point	: Not available
Boiling Point	: -4.44 °C (24°F)
Flash Point	: -76.1 °C (-105°F)
Auto-ignition Temperature	: 450 °C (842°F)
Decomposition Temperature	: Not available
Flammability (solid, gas)	: Not available
Lower Flammable Limit	: 2.0 %
Upper Flammable Limit	: 12.5 %
Vapor Pressure	: 59.5 psia @ 37.8°C (100°F)
Relative Vapor Density at 20 °C	: 1.92 (air=1)
Relative Density	: 0.643 @-17.78°C (0°F)
Specific Gravity	: Not available
Solubility	: Insoluble in water.
Log Pow	: Not available
Log Kow	: Not available
Viscosity, Kinematic	: Not available
Viscosity, Dynamic	: Not available
Explosion Data – Sensitivity to Mechanical Impact	: Not available
Explosion Data – Sensitivity to Static Discharge	: Not available

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SECTION 10: STABILITY AND REACTIVITY

Reactivity: This product is stable with an appropriate level of inhibitor, but reactive (unstable) without.

Chemical Stability: Extremely flammable gas.

Possibility of Hazardous Reactions: May form explosive peroxides when exposed to air, may undergo violent self polymerization if inhibitor is lost or product is exposed to excessive heat. Product may oxidize rapidly if exposed to air and iron uninhibited.

Conditions to Avoid: Direct sunlight. Extremely high or low temperatures. Open flame. Overheating. Heat. Sparks. Incompatible materials.

Incompatible Materials: Strong acids. Strong bases. Strong oxidizers.

Hazardous Decomposition Products: Carbon oxides (CO, CO₂). acrid vapors. Toxic vapors.

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Toxicological Effects - Product

Acute Toxicity: Not classified

LD50 and LC50 Data: Not available

Skin Corrosion/Irritation: Not classified

Serious Eye Damage/Irritation: Not classified

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: May cause genetic defects.

Teratogenicity: Not available

Carcinogenicity: May cause cancer.

Specific Target Organ Toxicity (Repeated Exposure): Not classified

Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Single Exposure): Not classified

Aspiration Hazard: Not classified

Symptoms/Injuries after Inhalation: May cause cancer by inhalation. Gas can be toxic as a simple asphyxiant by displacing oxygen from the air.

Symptoms/Injuries after Skin Contact: Causes skin irritation. May cause frostbite on contact with the liquefied gas.

Symptoms/Injuries after Eye Contact: May cause slight irritation. Contact with the liquefied gas causes frostbite.

Symptoms/Injuries after Ingestion: Not considered a potential route of exposure, contact with liquid may cause freeze burns and frostbite.

Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data

BUTANE (106-97-8)	
LC50 Inhalation Rat (mg/l)	30957 mg/m ³ (Exposure time: 4 h)

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ISOBUTYLENE (115-11-7)	
LC50 Inhalation Rat (mg/l)	620 mg/l/4h
National Toxicology Program (NTP) Status	Evidence of Carcinogenicity.
1,3-BUTADIENE (106-99-0)	
LC50 Inhalation Rat (mg/l)	285 g/m ³ (Exposure time: 4 h)
LD50 Oral Rat	5480 mg/kg
IARC Group	1
National Toxicology Program (NTP) Status	Evidence of Carcinogenicity, Known Human Carcinogens.

SECTION 12: ECOLOGICAL INFORMATION

GHS Classification:

No classified hazards

Toxicity: Not classified

Persistence and Degradability

CRUDE BUTADIENE	
Persistence and Degradability	Not established

Bioaccumulative Potential

CRUDE BUTADIENE	
Bioaccumulative Potential	Not established

BUTANE (106-97-8)	
Log Pow	2.89

1-BUTENE (106-98-9)	
Log Pow	2.42 (at 23 °C)

ISOBUTYLENE (115-11-7)	
Log Pow	2.11 (at 23 °C)

1,3-BUTADIENE (106-99-0)	
BCF fish 1	13 - 19.1
Log Pow	1.85 (at 23 °C)

Mobility in Soil Not available

Other Adverse Effects

Other adverse effects: Can cause frost damage to vegetation.

Other Information: Avoid release to the environment.

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SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Recommendations: Dispose of waste material in accordance with all local, regional, national, provincial, territorial and international regulations.

Additional Information: Handle empty containers with care because residual vapors are flammable. Empty product containers may contain hazardous residue. Do not reuse empty containers without commercial cleaning or reconditioning.

SECTION 14: TRANSPORT INFORMATION

UN Number

UN-No.(DOT): 1010

DOT NA no.: UN1010

UN Proper Shipping Name

DOT Proper Shipping Name : UN 1010 Butadienes, stabilized containing more than 40% butadienes, 2.1

Hazard Labels (DOT) : 2.1 - Flammable gases



DOT Special Provisions (49 CFR 172.102) : T50 - When portable tank instruction T50 is referenced in Column (7) of the 172.101 Table, the applicable liquefied compressed gases are authorized to be transported in portable tanks in accordance with the requirements of 173.313 of this subchapter.

DOT Packaging Exceptions (49 CFR 173.xxx) : 306

DOT Packaging Non Bulk (49 CFR 173.xxx) : 304

DOT Packaging Bulk (49 CFR 173.xxx) : 314;315

Additional Information

Emergency Response Guide (ERG) Number : 116P

Transport by sea

DOT Vessel Stowage Location : B - (i) The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) "On deck only" on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.

DOT Vessel Stowage Other : 40 - Stow "clear of living quarters"

Air transport

DOT Quantity Limitations Passenger Aircraft/Rail (49 CFR 173.27) : Forbidden

DOT Quantity Limitations Cargo Aircraft Only (49 CFR 175.75) : 150 kg

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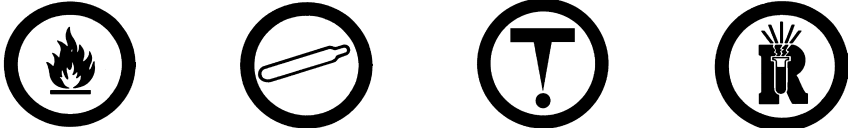
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SECTION 15: REGULATORY INFORMATION

US Federal Regulations

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SARA Section 311/312 Hazard Classes	Fire hazard Reactive hazard Delayed (chronic) health hazard Sudden release of pressure hazard
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
HYDROCARBONS, C4, ETHYLENE-MANUFACTURE-BY-PRODUCT (68476-52-8)	
1-BUTEN-3-YNE (689-97-4)	
BUTANE (106-97-8)	
1-BUTENE (106-98-9)	
ISOBUTYLENE (115-11-7)	
2-BUTENE, (E)- (624-64-6)	
CIS-2-BUTENE (590-18-1)	
1,3-BUTADIENE (106-99-0)	
1,3-BUTADIENE (106-99-0)	
SARA Section 313 - Emission Reporting	1.0 %

Canadian Regulations

CRUDE BUTADIENE	
WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas Class D Division 2 Subdivision A - Very toxic material causing other toxic effects Class F - Dangerously Reactive Material
	
HYDROCARBONS, C4, ETHYLENE-MANUFACTURE-BY-PRODUCT (68476-52-8)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Class A - Compressed Gas Class D Division 2 Subdivision A - Very toxic material causing other toxic effects

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1-BUTEN-3-YNE (689-97-4)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Class B Division 1 - Flammable Gas Class A - Compressed Gas

BUTANE (106-97-8)	
Listed on the Canadian DSL (Domestic Substances List) inventory. Listed on the Canadian Ingredient Disclosure List	
WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas

1-BUTENE (106-98-9)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Class B Division 1 - Flammable Gas Class A - Compressed Gas

ISOBUTYLENE (115-11-7)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	

2-BUTENE, (E)- (624-64-6)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas

CIS-2-BUTENE (590-18-1)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas

1,3-BUTADIENE (106-99-0)	
Listed on the Canadian DSL (Domestic Substances List) inventory. Listed on the Canadian Ingredient Disclosure List	
WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas Class D Division 2 Subdivision A - Very toxic material causing other toxic effects Class F - Dangerously Reactive Material

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

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SECTION 16: OTHER INFORMATION

Revision date : 05/21/2015

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200

GHS Full Text Phrases:

Carc. 1A	Carcinogenicity Category 1A
Compressed gas	Gases under pressure Compressed gas
Flam. Gas 1	Flammable gases Category 1
Liquefied gas	Gases under pressure Liquefied gas
Muta. 1B	Germ cell mutagenicity Category 1B
Simple Asphy	Simple Asphyxiant
H220	Extremely flammable gas
H280	Contains gas under pressure; may explode if heated
H340	May cause genetic defects
H350	May cause cancer

Guide to Abbreviations:

ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and implied Warranties:

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Party Responsible for the Preparation of This Document

Williams Olefins, L.L.C.
PO Box 470
Geismar, Louisiana 70734
(225)642-2100

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product

North America GHS US 2012 & WHMIS