



**MATERIAL SAFETY DATA SHEET (MSDS)
PENTANE PLUS**

IDENTITY (As Used on Label and List) Pentane Plus, Pentane +, C5 Plus, C5+ (DOT ID No: UN 1108)	(Hazard Rating: Health-1/Fire-4/Reactivity-2) DOT Hazard Classification: Flammable Liquid, 3.1
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Section I – Chemical Product and Company Identification

Manufacturer's Name MARKWEST	Emergency Phone Number Markwest (800) 730-8388 / CHEMTREC (800) 424-9300
Address (Number, Street, City, State and ZIP code) 1515 Arapahoe Street	Telephone Number for Information: (800) 730-8388
Tower 1, Suite 1600	Date Prepared June 21, 2011
Denver, Colorado 80202-2126	Signature of Preparer (optional) N/A

Section II – Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name (s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
Propane (74-98-6)	1000 ppm	2500 ppm	1000 ppm	0.04
Isobutane (75-28-5)	800 ppm	N/A		4.82
n-Butane (109-97-8)	800 ppm	800 ppm		5.69
i-Butane (106-98-9)	N/A	N/A		0.06
Isobutene (115-11-7)	N/A	N/A		0.06
Trans-2-butene (624-64-6)	N/A	N/A		0.34
Cis-2-butene (590-18-1)	N/A	N/A		0.36
Isopentane (78-78-4)	N/A	N/A		17.32
n-Pentane (109-66-0)	1000 ppm	600 ppm	750 ppm	10.85
Pentenes-C6+ (N/A)	N/A	N/A		60.46
Benzene	1 ppm	0.5 ppm	2.5/5.0 ppm	0.6 %

Section III – Physical/Chemical Characteristics

Boiling Point ~ -36.07°C	Specific Gravity (H ₂ O = 1): ~ 0.694
Vapor Pressure (mm Hg): 30 psi @ 100 °F	Melting Point: -129.7 °C
Vapor Density (AIR = 1): 1.0 to 3.9	Evaporation Rate (Butyl Acetate = 1): N/A
Solubility in Water: Slight	
Appearance and Odor: Clear colorless liquid, distinct hydrocarbon/gasoline odor	

Section IV – Fire and Explosion Hazard Data

Flash Point (Method Used): -40° C	Flammable Limits	LEL ~1.4%	UEL ~8.0%
Extinguishing Media: Dry chemical, foam, carbon dioxide			
Special Fire Fighting Procedures: Shut off source of product as soon as possible. Use water to cool product storage vessels and personnel while shutting off source. Avoid extinguishing unless necessary to accomplish source shut off. Firemen must use proper protective equipment, including respiratory apparatus, to protect against hazardous combustion products/oxygen deficiencies.			
Unusual Fire and Explosion Hazards: Flames impinging on product storage vessels above the liquid level will cause sudden vessel failure in approximately 9 or more minutes, resulting in BLEVE (Boiling Liquid Expanding Vapor Explosion), unless vessel surfaces are kept cooled with water. If this cannot be done, evacuate the area. Liquid product will change to vapor rapidly at well below ambient temperatures and readily forms flammable mixtures with air. If exposed to an ignition source, it will burn in the open or be explosive in confined spaces. Its vapors are heavier than air and may travel long distances to a point of ignition and then flash back. Vapors will seek low lying areas.			

Section V – Reactivity Data

Stability:	Unstable		Conditions to Avoid: High heat, sparks, open flame
	Stable	X	
Incompatibility (Materials to Avoid): Avoid contact with strong oxidizing agents. Should avoid strong oxidizing agents, chlorine, bromine, pentafluoride, nitrogen trifluoride, heat, sparks, flame and build-up of static electricity.			
Hazardous Decomposition or Byproducts: Carbon monoxide, carbon dioxide and volatile hydrocarbon vapors.			
Hazardous Polymerization	May Occur		Conditions to Avoid: None
	Will Not Occur	X	

Section VI – Health Hazard Data

Route(s) of Entry:	Inhalation?	Skin?	Ingestion?
Inhalation: Exposure may cause burning of the throat or nose and respiratory system, CNS depression (drowsiness, dizziness, coma), or even death, depending on the concentration and duration of exposure. May also act as a simple asphyxiant.			
Skin: Dermal contact may result in drying of the skin and chronic dermatitis. Can cause blistering. Frostbite may occur in some cases. May be absorbed through the skin and cause CNS depression.			
Swallowing: May cause severe burning of the mouth, throat and gastric region. Symptoms may include inebriation, vomiting, vertigo, drowsiness, confusion, fever and even death in severe cases.			
Eyes: Eye irritation may result from contact with liquid or vapors.			
Health Hazards (Acute or Chronic): Occupational exposure limits of benzene in air are set at 1 ppm for 8 hours (OSHA). Exposures to cyclohexane can result in hematologic, hepatologic and neurological effects. Toluene and Xylene are CNS depressants and cause respiratory irritation. Isobutane and n-butane have been shown to cause mild cardiac sensitization in laboratory test animals.			

Carcinogenicity Mixture:	N/A	NTP?	N/A	IARC Monographs?	N/A	OSHA Registered	N/A
Carcinogenicity Benzene:		NTP?	Yes	IARC Monographs?	Yes	OSHA Registered	Yes
Although gasoline is not itself a known carcinogen, it most likely will contain a small amount of benzene, which is classified as a known human carcinogen by NTP, OSHA and IARC.							
Signs and Symptoms of Exposure: N/A							
Medical Conditions Generally Aggravated by Exposure: Personnel with pre-existing skin disorders, impaired liver function or CNS and respiratory diseases should avoid exposure to this material.							
Emergency and First Aid Procedures: Eyes: Rinse immediately with water. Remove contact lenses. Flush with water for 10-15 minutes. Consult a physician. Skin: Wash affected areas with soap and water. If evidence of frostbite, warm frostbitten areas gradually and get medical help if there is evidence of tissue damage. Swallowed: Rinse mouth with water. Drink 1-2 glasses of milk or water. Do not induce vomiting unless directed by a physician. Seek immediate medical attention. Inhaled: Remove to fresh air. If breathing has stopped, restore breathing at once. Administer oxygen and get medical help.							
Section VII – Precautions for Safe Handling and Use							
Steps to be taken in Case Material is Released or Spilled: Eliminate and prevent source of ignition. Supply maximum ventilation. Use water fog to evaporate or ventilate. Protect against body contact with liquid. If confined space, wear self-contained breathing apparatus. For small containers, remove leaking container to remote area and allow to bleed off. Consult with local fire jurisdiction as necessary.							
Waste Disposal Method: Conduct waste gas (not liquid) to a furnace by means of piping and incinerate with caution in accordance with state and local applicable government regulations, if any.							
Precautions to Be Taken in Handling and Storing: Store small containers in well ventilated area, away from heat, direct sunlight and sources of ignition. Prohibit smoking in areas of storage or use. Keep isolated from cylinders of oxygen, chlorine and other oxidizers. Protect against damaging valves on containers. Be sure personnel are trained in proper procedures for handling compressed gas containers.							
Other Precautions: A minimum of a 20% vapor space (or outage) should be maintained on all containers of liquefied petroleum gas.							
Section VIII – Control Measures							
Respiratory Protection (Specify Type): NIOSH approved self-contained breathing apparatus accompanied by sufficient water spray to reduce the risk of fire or explosion, is required when concentration in the air exceeds TLV.							
Ventilation:	Local Exhaust			Special			
	Mechanical (General)			Other Explosion proof ventilation as needed to keep concentration in the air below TLV.			
Protective Gloves Insulated impervious industrial quality gloves recommended.				Eye Protection Safety glasses (minimum); face shield or goggles recommended.			

Other Protective Clothing or Equipment:

Appropriate, impervious clothing for prolonged or repeated contact. NOMEX or equivalent type clothing when applicable.

Work/Hygienic Practices

N/A

N/A – Not Applicable

N/D – Not Determined

~ -- Approximately

* -- Based on LP (Gas)