

1. Product and Company Identification

Material name	GRADE 55NS EXPANDABLE POLYSTYRENE	
MSDS number	21636	
Version #	03	
Revision date	01-21-2011	
CAS #	Mixture	
Product code(s)	5455NS; 5655NS; 6455NS; 6655NS	
Manufacturer	Flint Hills Resources Chemical Intermediates, LLC 501 Brunner Street Peru, IL 61354, US	
Telephone numbers - 24 hour emergency assistance		
	Chemtrec (US)	800-424-9300
	Carechem24 (Asia)	65 3158 1074 (Singapore)
	Carechem24 (Europe)	44 (0) 1235 239 670 (UK)
	Carechem24 (US/Canada)	866-928-0789
	Carechem24 (Mexico)	52 555 004 8763
Telephone numbers - general assistance		
	8-5 (M-F, CST) Customer Service	815-224-5257
	8-5 (M-F, CST) MSDS Assistance	316-828-7988
	Email: msdsrequest@fhr.com	
Supplier	Flint Hills Resources, LP 1330 Lake Robbins Drive Suite 400 The Woodlands, TX 77380 US	
Telephone numbers - 24 hour emergency assistance		
	Chemtrec (US)	800-424-9300
	Carechem24 (US/Canada)	866-928-0789
	Carechem24 (Mexico)	52 555 004 8763
	Flint Hills Resources, LP (after business hours)	432-296-1674
Telephone numbers - general assistance		
	7-4 (M-F, CST) Customer Service	281-363-7200
	8-5 (M-F, CST) MSDS Assistance	316-828-7988
	Email: msdsrequest@fhr.com	

2. Hazards Identification

Emergency overview

WARNING!

WHITE SOLID WITH HYDROCARBON ODOR

HEALTH HAZARDS

DUST MAY CAUSE SKIN, EYE AND RESPIRATORY TRACT IRRITATION

FUMES FROM HOT PRODUCT CAN CAUSE IRRITATION TO THE EYES, SKIN AND RESPIRATORY SYSTEM

HOT MATERIAL MAY CAUSE THERMAL BURNS

SEE "TOXICOLOGICAL INFORMATION" (SECTION 11) FOR MORE INFORMATION

FLAMMABILITY HAZARDS

DUST MAY FORM EXPLOSIVE MIXTURE IN AIR WHEN DISPERSED IN A CONFINED SPACE

SOLID WITH EXTREMELY FLAMMABLE SOLVENT AND VAPORS

FLAMMABLE GASES MAY EVOLVE FROM THIS MATERIAL

MAY CAUSE FLASH FIRE

REACTIVITY HAZARDS

STABLE

For additional safety information, consult the current editions of the National Fire Protection Association (NFPA) 654 Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, NFPA 499, Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas, NFPA 77, Recommended Practice on Static Electricity, and NFPA 68, Standard on Explosion Protection by Deflagration Venting.

Potential health effects

Routes of exposure

Inhalation, ingestion, skin and eye contact.

Eyes

Dusts may cause mechanical irritation including pain, lacrimation and redness. Effects may become more serious with repeated or prolonged contact.

Skin

Dusts may cause irritation due to abrasion. Repeated or prolonged skin contact may cause reddening, itching and inflammation.

Contains a component(s) that may cause allergic skin reactions in some individuals.

Contact with hot material may cause thermal burns.

Inhalation

Dusts may cause irritation to the nose, throat and lungs by mechanical abrasion.

Fumes or vapors from the heated material may be irritating to the respiratory tract. In confined or poorly ventilated areas, vapors can readily accumulate and can cause unconsciousness and death.

Overexposure to this material may cause systemic damage including target organ effects listed under "Toxicological Information" (Section 11).

Ingestion

Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

3. Composition / Information on Ingredients

Components	CAS #	Concentration*
POLYSTYRENE	9003-53-6	92 - 97 %
PENTANES	Mixture	2.5 - 7.5 %
MODIFIERS - ADDITIVES	Mixture	0.01 - 2 %
STYRENE	100-42-5	0 - 0.3 %

*Values do not reflect absolute minimums and maximums; these values are typical which may vary from time to time.

Composition comments

This Material Safety Data Sheet is intended to communicate potential health hazards and potential physical hazards associated with the product(s) covered by this sheet, and is not intended to communicate product specification information. For product specification information, contact your Flint Hills Resources, LP representative.

4. First Aid Measures

First aid procedures

Eye contact

If hot material comes in contact with eyes hold the eyelids apart and flush the eye with a large amount of cool water for at least 15 minutes. Get immediate medical attention.

If eyes become irritated from contact with dust, flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Get medical attention if irritation persists.

Skin contact

If hot material gets on skin, immediately flush affected area with large amounts of cool water. Do not attempt to remove the material from the skin, or to remove contaminated clothing. Get immediate medical attention.

For cold material, immediately wash skin with plenty of soap and water after removing contaminated clothing and shoes. Get medical attention if irritation persists.

Inhalation

Remove to fresh air. If not breathing, institute rescue breathing. If breathing is difficult, ensure airway is clear and give oxygen. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR).

Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

Ingestion

If spontaneous vomiting occurs, keep head below hips to prevent aspiration and monitor for breathing difficulty.

Never give anything by mouth to an unconscious person.

Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

Notes to physician

INHALATION: This material (or a component) sensitizes the myocardium to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. Administration of sympathomimetic drugs should be avoided.

5. Fire Fighting Measures

Flammable properties

This material releases a flammable blowing agent. When in its finely divided form as dust, this material presents an explosion hazard when dispersed in a confined area and ignited in air. Risk of dust-air explosion is increased if flammable vapors are present.

Extremely flammable vapors form flammable or explosive mixtures with air at room temperature. Vapor or gas may spread to distant ignition sources and flash back. Eliminate ignition sources (including static spark) and prevent vapor accumulation.

Explosion hazard if exposed to extreme heat.

This material may accumulate static charge which can cause an electrical spark (ignition source) in some cases.

To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material.

This material, as produced and not in its finely divided form as dust, is not explosive as defined by established regulatory criteria.

Hazardous melting and dripping may occur at elevated temperatures. May burn at or above flash point, and airborne dust may explode if ignited.

Extinguishing media

Suitable extinguishing media

Use water spray, dry chemical, carbon dioxide or fire-fighting foam for Class B fires to extinguish fire.

Protection of firefighters

Specific hazards arising from the chemical

A variety of decomposition products may occur including simple hydrocarbons to toxic and irritating gases such as carbon, carbon monoxide, carbon dioxide, acids, ketones, and aldehydes.

**Fire fighting
equipment/instructions**

Material is a solid containing an extremely flammable liquid and vapor. Material will burn on contact with flame or exposure to high temperature.

Evacuate area and fight fire from a safe distance.

If spilled material has not ignited, ventilate area and use water spray to disperse gas or vapor and to protect personnel. Use water spray to cool adjacent structures.

Containers can build up pressure if exposed to heat (fire). Stay away from storage container ends. Withdraw immediately in case of rising sound from venting safety device or any discoloration of storage container due to fire.

Be aware that a BLEVE (Boiling Liquid Expanding Vapor Explosion) may occur unless surfaces are kept cool with water.

Firefighters must wear NIOSH approved positive pressure breathing apparatus (SCBA) with full face mask and full protective equipment.

6. Accidental Release Measures

Environmental precautions

If material is released to the environment, take immediate steps to stop and contain release. Prevent or minimize formation of a dust cloud or layer. Eliminate all sources of ignition. Isolate hazard area and deny entry. Caution should be exercised regarding personnel safety and exposure to the released material. Notify local, provincial and/or federal authorities, if required.

Other information

Eliminate all sources of ignition (no smoking, flares, sparks or flames in immediate area). Prevent or minimize formation of a dust cloud or layer during cleanup. This material releases a flammable blowing agent. In its finely divided form, this material may present an explosion hazard when dispersed in a confined area and ignited in air.

Small spills can be cleaned up using non-sparking tools. Avoid procedures that may result in formation of a dust cloud or in water pollution. Place in an appropriate container for disposal or recycle.

For large spills and releases follow the handling and storage recommendations as detailed in NFPA 654, NFPA 499 and NFPA 77. Grounding, bonding, and intrinsic safety of equipment used should be considered.

See Exposure Controls/Personal Protection (Section 8).

Emergency action

Eliminate and/or shut off ignition sources and keep ignition sources out of the area. Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind. Isolate for 800 meters (1/2 mile) in all directions if tank, rail car or tank truck is involved in fire. Evacuate area endangered by release as required. (See Exposure Controls/Personal Protection, Section 8.)

7. Handling and Storage

Handling

Minimize vapor accumulation in confined spaces with positive ventilation. Minimize dust generation during handling and contact.

Dusts may become explosive when dispersed in a confined space such as a building or vessel and in the presence of oxygen and heat (spark). Risk of dust-air explosion is increased if flammable vapors are present.

This material may accumulate electrostatic charge which may cause an electrical spark (ignition source) in some cases.

Ground and bond lines and equipment used during transfer to reduce the possibility of static spark-initiated fire or explosion. When airborne dust or a dust cloud is present, do not cut, grind, drill, weld or reuse containers unless adequate precautions are taken against these hazards.

Facilities using this material should assess their potential for combustible dust and static spark hazards and follow applicable federal, state and local laws and regulations and accepted codes and standards.

Avoid accumulation of dust on surfaces and hidden areas where dust may collect in the interior of buildings. Clean up dust using approved methods that do not generate dust clouds if ignition sources are present.

Avoid inhaling dust and contact with skin and eyes.

Do not eat, drink or smoke in areas of use or storage.

For additional safety information, consult the current editions of the National Fire Protection Association (NFPA) 654 Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, NFPA 499, Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas, NFPA 77, Recommended Practice on Static Electricity, and NFPA 68, Standard on Explosion Protection by Deflagration Venting.

Storage

Store in tightly closed containers in a cool, dry, isolated, well-ventilated area away from heat, sources of ignition and incompatibles.

Avoid contact with strong oxidizers.

Empty containers may contain material residue. Do not reuse without adequate precautions.

Do not eat, drink or smoke in areas of use or storage.

For additional safety information, consult the current editions of the National Fire Protection Association (NFPA) 654 Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, NFPA 499, Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas, NFPA 77, Recommended Practice on Static Electricity, and NFPA 68, Standard on Explosion Protection by Deflagration Venting.

8. Exposure Controls / Personal Protection

Occupational exposure limits

ACGIH

Components

Components	Type	Value	Form
POLYSTYRENE (9003-53-6)	TWA	10.0 mg/m ³	PNOC (Particles not otherwise classified) - INHALABLE PARTICULATE (8-Hr)
		5.0 mg/m ³	PNOS (Particles not otherwise specified) - RESPIRABLE PARTICULATE (8-Hr)
STYRENE (100-42-5)	STEL	40.0 ppm	
	TWA	20.0 ppm	

**U.S. - OSHA
Components**

	Type	Value	Form
POLYSTYRENE (9003-53-6)	TWA	5.0 mg/m ³	PNOR (Particles not otherwise regulated) - RESPIRABLE FRACTION (8-Hr)
		15.0 mg/m ³	
STYRENE (100-42-5)	Ceiling	200.0 ppm	
	TWA	100.0 ppm	

**U.S. - Minnesota (MNOSHA)
Components**

	Type	Value
STYRENE (100-42-5)	STEL	425.0 mg/m ³
		100.0 ppm
	TWA	215.0 mg/m ³
		50.0 ppm

Engineering controls

General or local exhaust ventilation and other forms of engineering controls are the preferred means for controlling exposures.

It is recommended that all dust control equipment such as local exhaust ventilation and material transport systems involved in handling of this product contain explosion relief vents or an explosion suppression system or an oxygen deficient environment.

Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment).

Use only appropriately classified electrical equipment and powered industrial trucks.

Personal protective equipment**Eye / face protection**

Keep away from eyes. Eye contact can be avoided by using indirect-vent goggles and/or face shield. Have eye washing facilities readily available where eye contact can occur.

Skin protection

Avoid skin contact with this material. Use appropriate chemical protective gloves when handling. Additional protective clothing may be necessary, such as antistatic clothing and conductive footwear.

Good personal hygiene practices such as properly handling contaminated clothing, using wash facilities before entering public areas and restricting eating, drinking and smoking to designated areas are essential for preventing personal chemical contamination.

Respiratory protection

A NIOSH approved dust respirator may be appropriate under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection.

9. Physical & Chemical Properties

Color	White
Odor	Hydrocarbon
Odor threshold	Not available
Physical state	Solid
Form	Bead
pH	Not available
Melting point	Softens & expands @ 200-215 °F (93.3-101.7 °C) (EPS beads containing pentanes)
Freezing point	Not available
Boiling point	Not available
Flash point	< 73 °F (< 22.8 °C)
Evaporation rate	Not available
Flammability limits in air, upper, % by volume	8.3 % (as pentanes)
Flammability limits in air, lower, % by volume	1.4 % (as pentanes)

Vapor pressure	< 100 mmHg @77 °F (25 °C)
Vapor density	Not available
Specific gravity	Not available
Relative density	Not available
Solubility (water)	Negligible (<1%)
Partition coefficient (n-octanol/water)	Not available
Auto-ignition temperature	500 °F (260 °C) (as pentanes) (estimated)
Decomposition temperature	Not available
VOC	Not available
Viscosity	Not available
Density	1.02 g/ml @77 °F (25 °C)
Surface tension	Not available
Percent volatile	7.5 Maximum (as pentanes)
Molecular weight	Not available
Molecular formula	Not available
Chemical family	Polystyrene Thermoplastic Polymer

10. Chemical Stability & Reactivity Information

Chemical stability	Stable
Conditions to avoid	Avoid high temperatures, open flames, sparks and the use of ungrounded electrical equipment.
Incompatible materials	Incompatible with strong oxidizers. See precautions under Handling & Storage (Section 7).
Hazardous decomposition products	Not anticipated under normal conditions.
Possibility of hazardous reactions	Will not occur.

11. Toxicological Information

Carcinogenicity

ACGIH Carcinogens

STYRENE (CAS 100-42-5)

A4 Not classifiable as a human carcinogen.

IARC Monographs. Overall Evaluation of Carcinogenicity

POLYSTYRENE (CAS 9003-53-6)

3 Not classifiable as to carcinogenicity to humans.

STYRENE (CAS 100-42-5)

2B Possibly carcinogenic to humans.

Pre-existing conditions aggravated by exposure	Pre-existing medical conditions which may be aggravated by exposure include disorders of the respiratory tract.
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Toxicological data

POLYSTYRENE BASED POLYMERS: Dust may be irritating to the respiratory system. Prolonged and repeated inhalation of dust may cause impaired lung function and lung changes. Irritating vapors and fumes from the blowing agent or component additives or modifiers may be emitted from thermal processing or from storage in confined spaces. In addition, trace amounts of unreacted monomer may be present in the final polymer.

PENTANES: Studies of pentane isomers in laboratory animals indicate exposure to extremely high levels (roughly 10 vol.%) may induce cardiac arrhythmias (irregular heartbeats) which may be serious or fatal.

STYRENE: Neurological effects including learning and memory impairment, increased reaction time and altered nerve conduction have been observed in studies of workers exposed to styrene but there does not appear to be evidence of permanent effects. Some studies indicate occupational exposure to styrene may be related to hearing loss but other studies do not. Studies in laboratory rats have demonstrated evidence of hearing loss at an exposure level of 600-700 ppm for 4 weeks. Chromosomal damage has been observed in lymphocytes of peripheral blood of workers exposed to styrene. Studies in laboratory animals include positive in vivo micronuclei findings, chromosome breaks in cells from the kidney, liver, lung, testes, brain, and circulating blood cells. An increased incidence of leukemia was observed in a study of workers exposed to styrene and butadiene. Another study did not show a significant increase in leukemia in workers exposed to styrene. The International Agency for Research in Cancer (IARC) has classified styrene as 2B - 'possibly carcinogenic'; inadequate evidence in humans. Adverse effects on the testicles and sperm formation were observed in laboratory animals exposed to high levels of styrene by the oral route of exposure. Some studies suggest a slightly increased rate of spontaneous abortion in workers exposed to styrene and others do not. Increased serum liver enzyme levels and increased NAG (an early marker of renal toxicity) have been observed in workers exposed to styrene. Increased erythrocyte Heinz body formation has been observed in laboratory animals exposed to styrene.

Exposure to this material may cause adverse effects or damage to the following organs or organ systems: central nervous system, skin, eyes, respiratory tract, blood, bone marrow, blood forming organs, and heart.

12. Ecological Information

Ecotoxicity	Not classified as harmful to aquatic organisms.
Persistence and degradability	Not readily biodegradable.
Bioaccumulation / Accumulation	Not classified in terms of bioaccumulation in aquatic organisms.
Mobility in environmental media	Not classified in terms of mobility in air, soil and water.

13. Disposal Considerations

Disposal instructions Under RCRA, it is the responsibility of the user of the material to determine, at the time of disposal, whether the material meets RCRA criteria for hazardous waste.

In Canada, wastes should be disposed of according to federal, state, provincial and local regulations.

For additional handling information and protection of employees, see Section 7 (Handling and Storage) and Section 8 (Exposure Controls/Personal Protection).

14. Transport Information

General BILL OF LADING - BULK (U. S. DOT): UN2211, Polymeric Beads, Expandable, 9, PG III
BILL OF LADING - NON-BULK (U. S. DOT): UN2211, Polymeric Beads, Expandable, 9, PG III
BILL OF LADING (CTDG): UN2211, Polymeric Beads, Expandable, 9, PG III

The above description may not cover shipping in all cases, please consult 49 CFR 100-185 for specific shipping information.

15. Regulatory Information

US federal regulations

All ingredients are on the TSCA inventory, or are not required to be listed on the TSCA inventory.

This material may contain toxic chemical(s) in excess of the applicable de minimis concentration that are subject to the annual toxic chemical release reporting requirements of the Superfund Amendments and Reauthorization Act (SARA) Section 313 (40 CFR 372). This information must be included in all MSDSs that are copied and distributed for this material.

This material contains substances subject to accident prevention regulations when present above the applicable threshold quantities (Section 112(r) of the Clean Air Act).

This material contains one or more substances listed as hazardous air pollutants under Section 112 of the Clean Air Act. This material contains up to 0.3% hazardous air pollutants (HAPs) per Section 112 Clean Air Act Amendments of 1990.

Check local, regional or state/provincial regulations for any additional requirements as these may be more restrictive than federal laws and regulations. Failure to report may result in substantial civil and criminal penalties.

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

STYRENE (CAS 100-42-5)

0.1 %

CERCLA (Superfund) reportable quantity

STYRENE: 1000.0

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - Yes
Pressure Hazard - No
Reactivity Hazard - No

State regulations

Based on available information this product does not contain any components or chemicals currently known to the State of California to cause cancer, birth defects or reproductive harm at levels which would be subject to Proposition 65. Reformulation, use or processing of this material may affect its composition and require re-evaluation.

This product, as sold, meets the requirements of the Model Toxics Legislation of the Coalition of Northeastern Governors (CONEG). Any alteration of this product may affect its compliance with this law.

Canadian regulations

All ingredients are on the Canadian Domestic Substance List (DSL), or are not required to be listed on the DSL.

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

Controlled under WHMIS (Canada).

WHMIS classification

B4 - Flammable/Combustible

WHMIS labeling



16. Other Information

NFPA ratings

Health: 1
Flammability: 3
Instability: 0

HMIS® ratings

Health: 1*
Flammability: 3
Physical hazard: 0
* Indicates chronic health hazard

Disclaimer

NOTICE: The information presented herein is based on data considered to be accurate as of the date of preparation of this Material Safety Data Sheet. Adequate training and instruction should be given by you to your employees and affected personnel. Appropriate warnings and safe handling procedures should be provided by you to handlers and users. Additionally, the user should review this information, satisfy itself as to its suitability and completeness, and pass on the information to its employees or customers in accordance with the applicable federal, state, provincial or local hazard communication requirements. This MSDS may not be used as a commercial specification sheet of manufacturer or seller, and no warranty or representation, expressed or implied, is made as to the accuracy or comprehensiveness of the foregoing data and safety information, nor is any authorization given or implied to practice any patented invention without a license. In addition, vendor neither assumes nor retains any responsibility for any damage or injury resulting from abnormal use, from any failure to adhere to appropriate practices, or from any hazards inherent in the nature of the material. Moreover, unless an employee or a customer accesses or receives a MSDS directly from the company, there is no assurance that a document obtained from alternate sources is the most currently available MSDS.

Issue date

01-21-2011

This data sheet contains changes from the previous version in section(s):

This document has undergone significant changes and should be reviewed in its entirety.

Completed by

Flint Hills Resources, LP - Operations EH&S