INEOS STYROLUTION

SAFETY DATA SHEET

1. Identification

Manufacturer:
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INEOS Styrolution Product Name: Lustran® LGM BK902051
INEOS Styrolution Material Number: 50021060, 50021061
INEOS ABS Product Name
(Formerly known as): LUSTRAN ABS LGM 902051 S&P
INEOS ABS Material Number 56025166, 56041420

Chemical Family: Thermoplastic Polymer
Chemical Name: Modified Acrylonitrile/Butadiene/Styrene Polymer
Synonyms: Modified ABS
Recommended Use: Manufacture of polymeric articles
Restrictions on Use: None known

SDS Date of Preparation/Revision: 01/18/2016

2. Hazards Identification

GHS Classification:

Health	Environmental	Physical
Carcinogen Category 2 Reproductive Toxicity Category 2	None	Combustible Dust

Label Elements

WARNING!
H351 Suspected of causing cancer
H361 Suspected of damaging fertility or the unborn child.
May form combustible dust concentrations in air
Prevention:
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P280 Wear protective gloves and eye protection.
Response:
P308+P313 IF exposed and concerned: Get medical advice.
Storage:
P405 Store locked up.
Disposal:
P501 Dispose of contents and container in accordance with local and national regulations.
Supplemental Labeling:

WARNING! May form combustible dust concentrations in air during processing. Melted product is flammable and produces intense heat and dense smoke during burning. Irritating gases and fumes may be given off during burning or thermal decomposition. May cause mechanical irritation (abrasion). Causes slipping hazard if spilled. Contact with hot material will cause thermal burns.

3. Composition/Information on Ingredients

Components

Weight %	Components	CAS-No.
>=1%	Modified Acrylonitrile/Butadiene/Styrene Polymer	Trade Secret
1-3%	White Mineral Oil, Petroleum	8042-47-5
0.1-1%	Carbon Black	1333-86-4
<=0.25%	Styrene	100-42-5

The exact concentrations are a trade secret.

4. First Aid Measures

Eye Contact: In case of eye contact, flush eyes with plenty of lukewarm water.

Skin Contact: In case of contact with skin, wash affected areas with soap and water. In case of thermal burns, immediately immerse affected area in cold water. Do not attempt to remove material adhering to the skin. Get medical attention for burns.

Inhalation: If exposed to gases or fumes from thermal processing, move to fresh air. Get medical attention, if irritation or other symptoms develop and persist.

Ingestion: Not a likely route of exposure. If swallowed, get medical attention.

Most Important Symptoms: Contact with heated material can cause thermal burns. Gases and fumes evolved during thermal processing or decomposition of this material may irritate the eyes, skin or respiratory tract and cause nausea, drowsiness and headache.

Indication of Immediate Medical Attention and Special Treatment, if Needed: Medical attention may be needed for treatment of burns.

5. Fire-Fighting Measures

Suitable (Unsuitable) Extinguishing Media: Water, foam, dry chemical, carbon dioxide (CO2).

Specific Hazards Arising from the Chemical: Toxic and irritating gases and fumes may be given off during burning or thermal decomposition. Avoid generating dust. Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard. Hazardous combustion products include **c**arbon dioxide, carbon monoxide, styrene, acrylonitrile, hydrogen cyanide, hydrocarbons.

Special Protective Equipment and Precautions for Fire-Fighters: Firefighters should be equipped with self-contained breathing apparatus to protect against potentially toxic and irritating fumes.

6. Accidental Release Measures

Personal Precautions, Protective Equipment And Emergency Procedures: Wear appropriate protective clothing as described in Section 8.

Methods And Materials For Containment/Cleanup: If molten, allow material to cool and place into an appropriate marked container for disposal. Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration. Avoid dispersal of dust in the air (i.e., removing dust from surfaces with compressed air). Non-sparking tools should be used.

7. Handling and Storage

Precautions for Safe Handling: Handle in accordance with good industrial hygiene and safety practices. Wash thoroughly after handling. Avoid breathing dust. Use with adequate ventilation.

Minimize dust generation and accumulation. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces.

Pellets and pellet dust can build static electricity charges when subjected to the friction of transfer and mixing operations. Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres.

Protect equipment (e.g. storage bins, conveyors, dust collectors) with explosion vents.

Conditions for Safe Storage, including any incompatibilities: Store in a dry, well-ventilated area.

Storage Temperature: 82°C (179.6°F) maximum

Storage Period: Not established

8. Exposure Controls / Personal Protection

Exposure Guidelines:

United States

Although no exposure limit has been established for this product, the OSHA PEL for Particulates not Otherwise Regulated (PNOR) of 15 mg/m3 total dust, 5 mg/m3 respirable fraction is recommended.

Chemical	OSHA PEL	ACGIH TLV
Styrene	100 ppm TWA 200 ppm Ceiling 600 ppm Maximum concentration (5 min in any 3 hrs)	20 ppm TWA 40 ppm STEL
White Mineral Oil, Petroleum	5 mg/m3 TWA	5 mg/m3 TWA (inhalable)
Carbon Black	3.5 mg/m3 TWA	3 mg/m3 TWA (inhalable)

Canada

Although no exposure limit has been established for this product, applicable provincial exposure limits for particles not otherwise classified/ specified are recommended.

Provinces	**Chemical**	**Exposure Limits**
Alberta; Manitoba; New Brunswick; Newfoundland/Labrador; Northwest Territories; Nova Scotia; Prince Edward Island	Styrene	20 ppm TWA 40 ppm STEL
British Columbia	Styrene	50 ppm TWA 75 ppm STEL
Nunavut; Québec; Saskatchewan	Styrene	50 ppm TWA 100 ppm STEL
Ontario	Styrene	35 ppm TWA 100 ppm STEL
Yukon	Styrene	100 ppm TWA 125 ppm STEL

Alberta; New Brunswick; Northwest Territories; Nunavut, Québec; Saskatchewan	White Mineral Oil	5 mg/m3 TWA 10 mg/m3 STEL
British Columbia	White Mineral Oil	1 mg/m3 TWA
Ontario	White Mineral Oil	None Established
Manitoba, Newfoundland/Labrador, Nova Scotia, Prince Edward Island	White Mineral Oil	5 mg/m3 (inhalable)
Alberta; British Columbia , Manitoba; New Brunswick; New Foundland/Labrador; Nova Scotia; Ontario, Prince Edward Island, Québec	Carbon Black	3.5 mg/m3 TWA
Northwest Territories, Nunavut, Saskatchewan, Yukon	Carbon Black	3.5 mg/m3 TWA 7 mg/m3 STEL

Appropriate Engineering Controls: General dilution and local exhaust as necessary to control airborne vapors, mists, dusts and thermal decomposition products below appropriate occupational exposure limits. It is recommended that all dust control equipment such as local exhaust ventilation and material transport systems involved in handling 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).

Personal Protective Equipment:

Respiratory Protection: If the recommended exposure limits are exceeded a NIOSH approved particulate/organic vapor respirator appropriate for the form and concentration of the contaminants should be used. Selection and use of respiratory equipment must be in accordance with OSHA 1910.134 or other applicable regulations and good industrial hygiene practice.

Hand Protection: Wear heat resistant gloves when handling molten material.

Eye Protection: Safety glasses with side shields.

Skin and Body Protection: No special protection required for normal handling and use. For operations where heated polymer is handled, thermally protective gloves and clothing should be worn along with appropriate eye protection.

Additional Protective Measures: Employees should wash their hands and face before eating, drinking, or using tobacco products. Educate and train employees in the safe use and handling of this product. Purgings should be collected as small flat, thin shapes or thin strands to allow for rapid cooling. Precautions should be taken against autoignition of hot, thick masses of the plastic. Quench with water. Fumes or vapors emitted from the hot melted plastic during converting operations may condense on cool overhead metal surfaces or exhaust ducts. The condensate, usually in the form of a soft, grease-like semi-solid may contain substances which can be irritating or toxic. Wear rubber gloves when cleaning contaminated surfaces.

Use only appropriately classified electrical equipment and powered industrial trucks where dust from product is present.

9 Physical and Chemical Properties

Form:	Solid	**Appearance:**	Pellets
Color:	Black and Natural	**Odor:**	Slight, sweet, aromatic
pH:	Not applicable	**Odor Threshold:**	0.15 to 25 ppm (styrene)
Boiling Point/Range:	Not applicable	**Vapor Density:**	3.6 (styrene)
Melting point/freezing point:	Not established	**Evaporation Rate:**	Not applicable
Flammability (solid, gas):	Dust and molten material are combustible	**Partition coefficient (n-octanol/water):**	Not applicable
Viscosity:	Not applicable	**Softening Point:**	110-118°C (230-244°F)
Flash Point:	388-400°C (730-752°F)	**Vapor Pressure:**	Not applicable
Lower Explosion Limit:	Not established	**Bulk Density:**	600-700 kg/m3
Upper Explosion Limit:	Not established	**Relative Density:**	Approx. 1.05

Autoignition Temperature:	495-510°C (923-950°F)	**Solubilities:**	Insoluble in water
Decomposition Temperature:	Approx. 260°C (500°F)		

10. Stability and Reactivity

Reactivity: Hazardous polymerization does not occur.

Chemical Stability: Stable

Possibility of Hazardous Reactions: None known.

Conditions to Avoid: None known

Incompatible Materials: None known

Hazardous Decomposition: Thermal decomposition will generate carbon dioxide, carbon monoxide, styrene, acrylonitrile, hydrogen cyanide, hydrocarbons.

11. Toxicological Information

HUMAN HEALTH EFFECTS AND SYMPTOMS OF EXPOSURE

Skin (Acute): Contact with heated material can cause thermal burns.

Eye (Acute): May cause mechanical irritation.

General Effects of Exposure

Acute Effects of Exposure: Gases and fumes evolved during thermal processing or decomposition of this material may irritate the eyes, skin or respiratory tract and cause nausea, drowsiness and headache.
Chronic (non-cancer) Effects of Exposure: Not expected to cause any adverse chronic health effects.

Carcinogenicity:
The Agency for Toxic Substances & Disease Registry concluded in their 2007 Toxicological Profile for Styrene that styrene may possibly be a weak human carcinogen. The EPA has not given a formal carcinogen classification to styrene stating "Several epidemiologic studies suggest there may be an association between styrene exposure and an increased risk of leukemia and lymphoma. However, the evidence is inconclusive due to confounding factors." In 2011 the National Toxicology Program listed styrene as reasonably anticipated to be a human carcinogen based on limited evidence from studies in humans, sufficient evidence from studies in experimental animals, and supporting data on mechanisms of carcinogenesis.

Styrene	**IARC** – Overall evaluation: 2B Possible carcinogen **IARC** – Evidence of carcinogenicity in animals: Limited data **IARC** – Evidence of carcinogenicity in humans: Limited data **NTP** - Reasonably anticipated to be a human carcinogen **ACGIH** – A4: Not classifiable as a Human Carcinogen
Carbon Black	**IARC** – Overall evaluation: 2B Possible carcinogen **IARC** – Evidence of carcinogenicity in animals: Sufficient data **IARC** – Evidence of carcinogenicity in humans: Inadequate data **ACGIH** – A4: Not classifiable as a Human Carcinogen

Product Toxicity Data

Toxicity Note: Toxicity data is based on similar ABS resins.

Skin Irritation: rabbit – non-irritating.

Eye Irritation: rabbit – Draize – slightly irritating.

Other Relevant Toxicity Information: Styrene is slightly toxic to practically non-toxic in oral feeding studies (rats) and skin application studies (rabbits). Repeated inhalation studies in rats for 3 weeks reported effects suggestive of a hearing impairment. Repeated inhalation exposures produced lung irritation in guinea pigs and organ weight changes in rats. Styrene caused lung tumors in several strains of mice by inhalation and oral exposure. The evidence in rats is insufficient for reaching a conclusion concerning the carcinogenicity of styrene. There is limited evidence for the carcinogenicity of styrene in humans based on studies of workers that showed an increased mortality from or incidence of cancer of the lymphohematopoietic system and increased levels of DNA adducts and genetic damage in lymphocytes from exposed workers. However, the types of lymphohematopoietic cancer observed in excess varied across different studies and excess risk was not found in all cohorts. In standard mutagenicity tests, both positive and negative results were reported. No birth defects occurred in rats given styrene orally. Some toxic effects on the fetus were noted in a limited inhalation study using repeated high doses.

Toxicity Data for White Mineral Oil, Petroleum

Acute Oral Toxicity: LD50 >5000 mg/kg (rat)

Acute Dermal Toxicity: LD50 >2,000 mg/kg (rabbit)

Skin Irritation: rabbit – Draize – 24 hour occlusive – non-irritating

Eye Irritation: rabbit – Slightly irritating

Sensitization: Dermal – non-sensitizer (guinea pig maximization test)

Repeated Dose Toxicity: 90 days oral rat, NOAEL 1800 mg/kg/day

Mutagenicity:
Genetic Toxicity in Vitro: Ames test salmonella typhimurium negative (with and without activation); Mouse lymphoma assay negative (with and without activation)

Carcinogenicity
Mouse, dermal, 18-24 months – did not show carcinogenic effects
Dog, inhalation, 12-26 months - did not show carcinogenic effects

Toxicity to Reproduction/Fertility
One generation study, oral, rat, NOAEL parental >4350 mg/kg; NOAEL F1 offspring >4350 mg/kg – No effects on reproductive parameters observed at doses tested.

Developmental Toxicity/Teratogenicity
Rat, gestation days 6-19, NOAEL maternal toxicity and teratogenicity >4350 mg/kg – No teratogenic or fetotoxic effects observed at doses tested.

Toxicity Data for Carbon Black

Acute Oral Toxicity: LD50 >5,000 mg/kg (rat)

Acute Dermal Toxicity: LD50 >3,000 mg/kg (rabbit)

Skin Irritation: rabbit – non-irritating

Eye Irritation: rabbit – non-irritating

Carcinogenicity

Several inhalation studies involving carbon black in female rats have shown increases in benign and malignant lung tumors. Although a large body of data on possible mechanisms of carcinogenicity in rats was considered by the IARC Working Group, it was not possible to state with confidence that the mechanisms of carcinogenicity in rats correlate to exposure in humans. Tumors have not been observed in other animal species (i.e., mouse and hamster) under similar circumstances and study conditions.

Toxicity Data for Styrene

Acute Oral Toxicity: LD50 1000 mg/kg (rat)

Acute Inhalation Toxicity: LC50 11.8 mg/L/4 hr (rat)

Acute Dermal Toxicity: LD50 >20,000 mg/kg (rabbit)

Skin Irritation: rabbit – Draize – moderately irritating

Eye Irritation: rabbit – Draize – severely irritating

Sensitization: Dermal – non-sensitizer (guinea pig maximization test (GPMT))

Repeated Dose Toxicity
6 months, inhalation NOAEL 6.3 mg/kg (monkey, male/female, daily)
28 Days, dermal NOAEL <500 mg/kg (rat, male daily)
13 weeks, inhalation NOAEL 0.565 mg/L (rat, male/female, daily)

Mutagenicity
Genetic Toxicity in Vitro:
Ames: negative (Salmonella typhimurium, metabolic activation with and without)
Sister Chromatid Exchange: positive (human lymphocytes, metabolic activation with and without)

Genetic Toxicity in Vivo:
Cytogenic assay positive (rat)
Drosophila SLRL test: positive (Drosophila melanogaster)

Carcinogenicity
Styrene was tested for carcinogenicity in rats in four gavage studies, one drinking water study and two inhalation studies. Overall, there was no reliable evidence for an increase in tumor incidence in rats in any of these studies. Inhalation exposure caused benign lung tumors (alveolar/bronchiolar adenoma) and increased the combined incidence of benign and malignant lung tumors (alveolar/bronchiolar adenoma and carcinoma) in CD-1 mice of both sexes; in females, it also increased the separate incidence of malignant lung tumors. In male B6C3F1 mice, oral exposure to styrene increased the combined incidence of benign and malignant lung tumors (alveolar/bronchiolar adenoma and carcinoma), and a positive dose-response trend was observed (NCI 1979). These findings are supported by findings of lung tumors in both sexes of O20 mice exposed to styrene (Ponomarkov and Tomatis 1978). In O20 mice, a single dose of styrene was administered to pregnant dams on gestational day 17, and pups were exposed orally once a week for 16 weeks after weaning. A significantly increased incidence and earlier onset of benign and malignant lung tumors combined (adenoma and carcinoma) occurred in mice of both sexes as early as 16 weeks after weaning. In a similar study with C57Bl mice administered a much lower dose of styrene, lung-tumor incidence was not significantly increased. A screening study by intraperitoneal administration did not find an increase in tumor incidence or multiplicity in mice. The increased risks for lymphatic and hematopoietic neoplasms observed in some human epidemiological studies are generally small, statistically unstable and are not very robust.

Toxicity to Reproduction/Fertility
Three generation study, oral, daily (rat, male/female) NOAEL (parental): 250 ppm, NOAEL (F1): 125 ppm, NOAEL (F2): 125 ppm
No effects on reproductive parameters observed at doses tested.
Other method, inhalation, daily, (rabbit female) NOAEL parental 2.6 mg/L, NOAEL (F1) 2.6 mg/L

Developmental Toxicity/Teratogenicity
Rat, female inhalation, gestation NOAEL (teratogenicity): >600 ppm, NOAEL (maternal) : <300 ppm. No teratogenic effects observed at doses tested.
Rabbit, female, inhalation, daily, gestation, NOAEL (teratogenicity): >600 ppm, NOAEL (maternal) : >600 ppm. Fetotoxicity seen only with maternal toxicity.

12. Ecological Information

Ecological Data for White Mineral Oil, Petroleum

Biodegradation: Aerobic, 0-24% after 28days, Not readily biodegradable

Biological Oxygen Demand (BOD): 344 mg/g

Chemical Oxygen Demand: 3130 mg/g

Acute and Chronic Toxicity to Fish
LC50: >10,000 mg/L/96 hr bluegill (lepomis macrochirus)
LC50: 10-100 mg/L/96 hr zebra fish (brachydanio rerio)

Ecological Data for Carbon Black

Acute and Chronic Toxicity to Fish
NOEC 1000 mg/L/96 hr zebra fish (brachydanio rerio)

Acute Toxicity to Aquatic Invertebrates
EC50 > 5600 mg/L/24 hr water flea (daphnia magna)

Toxicity to Microorganisms
EC0 >100 - 800 mg/L/3 hr activated sludge microorganisms

Ecological Data for Styrene

Biodegradation: aerobic 71% 28 d

Biological Oxygen Demand (BOD): 5 days, 2.46 mg/L

Chemical Oxygen Demand: 2800-2880 mg/g

Theoretical Biological Oxygen Demand (ThBOD): 3.07 mg/L

Bioaccumulation: Carp 13.5 BCF

Acute and Chronic Toxicity to Fish
LC50 9 mg/L/96 hr sheepshead minnow (cyprinodon variegatus)
LC50 29 – 59.3 mg/L/96 hr fathead minnow (pimephales promelas)
LC50 25 mg/L/96 hr bluegill (lepomis macrochirus)
LC50 2.4 – 4.1 mg/L/96 hr rainbow trout (salmo gairdneri)

Acute Toxicity to Aquatic Invertebrates
EC50 4.7 – 23 mg/L/48 hr water flea (daphnia magna)

Toxicity to Aquatic Plants
EC50 1.4 mg/L/72 hr green algae (selenastrum capricornutum)

Toxicity to Microorganisms
EC50 approx. 500 mg/L/30 min activated sludge microorganisms

EC50 5.5 mg/L/5 min photobacterium phosphoreum
EC50 72 mg/L/16 hr pseudomonas putida

13 Disposal Considerations

Waste Disposal Method
Waste disposal should be in accordance with existing federal, state, provincial, and/or local environmental control laws.

14. Transportation Information

Land Transport (DOT): Not Regulated

Land Transport (TDG): Not Regulated

Sea Transport (IMDG): Not Regulated

Air Transport (ICAO/IATA): Not Regulated

15. Regulatory Information

United States Federal Regulations

US OSHA Hazard Communication Classification: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard (29 CFR 1910.1200).

US Toxic Substance Control Act: All the components of this product are listed on the TSCA Inventory

US EPA CERCLA Hazardous Substances (40 CFR 302):
Components
Styrene 100-42-5 <=0.25% RQ=1000 lbs

SARA Section 311/312 Hazard Categories: Chronic Health

US EPA Emergency Planning and Community Right to Know Act (EPCRA) SARA Title III

Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A):
Components
None

Section 313 Toxic Chemicals (40 CFR 372.65) – Supplier Notification Required:
Components
Styrene 100-42-5 <=0.25%

US EPA Resource Conservation and Recovery Act (RCRA) Composite List of Hazardous Wastes and Appendix VIII Hazardous Constituents (40 CFR 261):
If discarded in purchased form, this product would not be a hazardous waste either by listing or by characteristic. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste (40 CFR 261.20-24).

State Right-to-Know Information
The following chemicals are specifically listed by individual states; other product specific data in other sections of the SDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

Massachusetts, New Jersey or Pennsylvania Right to Know Substance Lists

Weight%	Components	CAS-No.
0.1-1%	Carbon Black	1333-86-4

New Jersey Environmental Hazardous Substance List and/or New Jersey RTK Special Hazardous Substances Lists:

Weight%	Components	CAS-No.
<=0.25%	Styrene	100-42-5

Pennsylvania Right to Know Special Hazardous Substance List:

Weight%	Components	CAS-No.
<=0.01%	Acrylonitrile	107-13-1

MA Right to Know Extraordinarily Hazardous Substance List:

Weight%	Components	CAS-No.
<=0.25%	Styrene	100-42-5
<=0.01%	Acrylonitrile	107-13-1

California Proposition 65:
Warning! This product contains a chemical(s) known to the State of California to cause cancer.

Weight%	Components	CAS-No.
<=0.01%	Acrylonitrile	107-13-1

Note: Carbon black (airborne, unbound particles of respirable size) is listed as a chemical known to cause cancer, however, the carbon black in this product is bound in the polymer matrix so no warning is required.

Canadian Regulations

Canadian CEPA Status: All of the components of this product are listed on the DSL.

16. Other Information

Refer to NFPA 654, Standard for the Prevention of Fire and Dust Explosion from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, for safe handling.

NFPA 704M Rating

Health	0
Flammability	1
Instability	0
Other	

0=Insignificant 1=Slight 2=Moderate 3=Serious 4=Extreme

HMIS Rating

Health	0*
Flammability	1
Physical Hazard	0

0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe
* Chronic Health Hazard

INEOS Styrolution America LLC's method of hazard communication is comprised of Product Labels and Safety Data Sheets. HMIS and NFPA ratings are provided by INEOS Styrolution America LLC as a customer service.

Contact Person: Product Safety Department
Telephone: +1 866 - 890 - 6353
SDS Number: STN002110
Version Date: 01/18/2016
Report Version 1.0

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