MATERIAL SAFETY DATA SHEET

Linear Low Density Polyethylene (LLDPE)

1. SUBSTANCE/PREPARATION & COMPANY/UNDERTAKING IDENTIFICATION

Chemical Name & Synonyms	: Linear Low Density Poly Ethylene (LLDPE)
Trade Name	: OPALENE-LL
Chemical Family	: Polyolefin
C.A.S. No.	: **25087-34-7**
Manufacturer's Name	: **ONGC Petro additions Limited**
Address	: Polymer Marketing Group: 35, Nutan Bharat Co-operative Housing
	Society Limited, R.C. Dutt Road, Alkapuri, Vadodara-390007, Gujarat
	India
Telephone No.	: +91 265 6192600
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Corporate Site	: **www.opalindia.in**

2. COMPOSITION & INFORMATION ON INGREDIENTS

CHEMICAL NAME	CONTENT (Normal)*	CAS NUMBER	EXPOSURE LIMITS IN AIR		
			ACGIH TLV-TWA	ACGIH TLV-STEL	IDLH
Linear Low Density Polyethylene	>=99 wt%	25087-34-7	10 mg/m^3 (inhalable fraction)	NA	NA
Proprietary additives	<=1 wt%	Mixture	NA	NA	NA
Hazardous Components	None	NA	NA	NA	NA
* For different grades of LLDPE, minor changes may be there.					

3. HAZARDS IDENTIFICATION

- Physio-chemical properties : No hazards resulting from material as supplied.
- Properties affecting health : No hazards resulting from material as supplied.
- Environmental properties : No hazards resulting from material as supplied.

Classification System

- This material is not hazardous by OHSA hazard communication definition.
- Dust may form explosive mixtures with air.
- At process Temperature irritating fumes may be produced.
- The preparation does not meet the criteria for classification in accordance with Directive 1999/45/EC and Directive 1272/2008/EC

4. FIRST AID MEASURES

GENERAL INFORMATION
At room temperature the product is neither an irritant nor gives off hazardous vapours. The measures listed below apply to critical situations (Fire, incorrect process conditions).

- **Skin Contact**
  If molten material contacts the skin it may cause thermal burns, immediately flush with large amounts of cold water to cool the affected skin and polymer. Do not attempt to peel the polymer from skin. Obtain immediately emergency medical attention if burn is deep or extensive.
- **Eye Contact**
  Dust, fines and process vapours may irritate the eyes. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Seek medical attention if discomfort persists.
- **Inhalation**
  Dust and process vapours may irritate the nose, throat and respiratory tract. If symptoms are experienced, move victim to fresh air. Obtain medical attention if breathing difficulty persists.
- **Ingestion**
  Adverse health effects due to ingestion are not anticipated. Do not induce vomiting. If symptoms develop, obtain medical attention.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media	As appropriate for surrounding fire. Extinguish preferably with foam, carbon Dioxide, water/water mist or dry chemical.
Unsuitable Extinguishing Media	Do not use high volume water jet or waterspray.
Fire Fighting Protective Equipment	A self-contained breathing apparatus and suitable protective clothing, eye protection etc should be used in fire conditions.
Hazardous Decomposition Product	Combustion or thermal decomposition will evolve toxic and irritant vapours.
Unusual Fire & Explosion hazards	Polymer dust particles in the atmosphere are combustible and may be explosive. CO, olefinic and paraffinic compound, trace amount of organic acids, ketones, aldehydes and alcohols may be formed during combustion.
Other	Can melt and burn in a fire. Molten material tends to flow or drip and will propagate fire.

6. ACCIDENTAL RELEASE MEASURES

- **Personal Precautions :**
  - Avoid generating dust. Potential dust explosion hazard. Use only non-sparking tools.
  - Material creates dangerous slipping hazard on hard surfaces.
  - Ensure adequate ventilation, especially in confined areas. In case of insufficient ventilation wear suitable respiratory equipment.
- **Environmental Precautions :**
  - Avoid release to environment. Do not allow to enter drains, sewers or watercourses.
- **Methods of cleaning up**
  - Take up mechanically and collect in suitable container for disposal.
  - Good housekeeping must be maintained to avoid potential slipping problem.
  - Keep walking surface free of spilled material to avoid slipping hazard.

7. HANDLING AND STORAGE

- **Handling :**
  - No special requirements necessary, if handled at room temperature.
  - Avoid spilling the product, as this might cause falls.
  - Will accumulate static charges that may cause an electric spark (ignition source).
  - Take precautionary measures against static discharges.
  - Do not eat, drink or smoke at the work place.
  - After handling, wash face and hands before eating, drinking or smoking.

- **Storage :**

Requirements to be met by storerooms and containers:

- This product may react with strong oxidising agents & should not be stored near such materials.
- Store the bags in areas protected with automatic sprinklers.
- Storage temperature should be ambient. (preferably below 50 ^{o}C)
- Open flames prohibited.
- Store the product in bags, car silos, container, or large cartons to avoid contamination.

Further information about storage conditions:

- Protect from heat and direct sunlight.
- Store container in a well ventilated position.
- Store under dry conditions.
- **Specific applications:** For industrial use only**,** for safe stacking follow the storage recommendations specific for this product.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS:

Use in a well-ventilated area. If handling results in dust generation, special ventilation may be needed to minimize dust exposure. If heated material generates vapour or fumes, use process enclosures, local exhaust ventilation, or other engineering controls to control exposure.

Occupational Exposure Limits:

Substance	CAS No.	LTEL (8 hr TWA ppm)	LTEL (8 hr TWA mg/m^3)	STEL (ppm)	STEL (mg/m^3)	Remark
Linear Low Density Polyethylene	25087-34-7	No Occupational Exposure limit assigned				
Inert or Nuisance Dust	-		15			Total dust
			5			Respirable dust

* The USA-OSHA PEL for respirable dust is 5.0 mg/m^3 and 15.0 mg/m^3 for total dust.
* The ACGIH Guideline for respirable dust is 3.0 mg/m^3 and 10.0 mg/m^3 for total dust.

PERSONAL PROTECTIVE EQUIPMENT:

- **Respiratory system**

Product processing, heat sealing of film or operations involving the use of wires or blades heated above 300°C may produce dust, vapour or fumes. To minimize risk of over exposure to dust, vapour or fumes it is

recommended that a local exhaust system is placed above the equipment, and that the working area is properly ventilated. If ventilation is inadequate, use certified respirator that will protect against dust/mist.

- **Skin and body**

Hot material: Wear heat-resistant protective gloves, clothing and face shield able to withstand the temperature of the molten product. Cold material: None required; however, use of gloves is good industrial practice.

- **Hand**

Hot material: Wear heat-resistant protective gloves able to withstand the temperature of the molten product. Cold material: None required; however, use of gloves is good industrial practice.
The correct choice of protective gloves depends upon the chemicals being handled, the conditions of work and use, and the condition of the gloves (even the best chemically resistant glove will break down after repeated chemical exposures). Most gloves provide only short time of protection before they must be discarded and replaced. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Gloves should therefore be chosen in consultation with the supplier/manufacturer and with a full assessment of the working conditions.

- **Eyes**

Safety glasses with side shields. Use dust goggles if high dust concentration is generated.

- **Environmental Protection**

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.

9. PHYSICAL AND CHEMICAL PROPERTIES

General Information	
Form	Solid Granules
Colour	Translucent to White
Odour	Odourless
Melting point/Melting range	115-135°C
Boiling Point (^{o}C)	Not Applicable
Flash point	> 300^{o}C
Auto Ignition temperature	> 300°C
Decomposition temperature	> 300°C
Danger of explosion	Product is not explosive.
Density	0.910-0.950 g/cm^{3}
pH (Value)	Not Applicable
Vapour Pressure (Pascal)	Not Applicable
Percent Volatile by volume (%)	<0.1
Solubility in / Miscibility with Water	Insoluble

10. STABILITY AND REACTIVITY

- **Chemical stability**

This product is stable under normal use conditions for shock, vibration, pressure or Temperature. Decomposes at prolonged heating above 300^{0}C.

- **Chemical stability - Condition to Avoid**

Avoid strong oxidizing agents. Avoid Processing Material over 300°C. Avoid Heat & direct sunlight.

- **Hazardous Polymerisation**

Not likely to occur

- **Corrosivity**

Product is not corrosive

- **Materials to avoid**

Direct contact with open flames, self-igniting and explosive materials.

- **Dangerous products of decomposition:**

No hazardous decomposition products known at room temperature. At elevated temperature the material will begin to decompose producing fumes that can contain CO_2, CO, Ketones & Aldehydes.

11. TOXICOLOGICAL INFORMATION

Low toxicity under normal conditions of handling and use.

ACUTE TOXICITY:

Primary irritant effect:

- **On the skin** : No irritant effects from normal handling and use. Dust may have irritant effect on skin.
- **On the eye** : No irritant effect. Dust may have irritant effect on eyes. Permanent damage is unlikely.
- **Sensitization** : No sensitizing effect known.
- **Ingestion** : Low oral toxicity. Linear Low Density Polyethylene:LD50, oral (rat) : >5000 mg/kg
- **Inhalation** : Low acute toxicity. Dusts and vapours or fumes evolved during thermal processing may cause irritation to the respiratory system.

CHRONIC TOXICITY:

On long term exposure: Chronic effects unlikely

- Carcinogenic effects : No information available
- Mutagenic effects : No information available
- Reproductive toxicity: No information available

ADDITIONAL TOXICOLOGICAL INFORMATION:
When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us.

12. ECOLOGICAL INFORMATION

- **Information about elimination (persistence and degradability):** The product is not biodegradable.
- **Effect of material on Plants or Animals :** Eco-toxicity is expected to be minimal based on the low water solubility of polymers.
- **Toxicity:** This material is not volatile and it is insoluble in water. Low toxicity to aquatic organisms.
- **Effect on Effluent Treatment:** Unlikely to affect biological treatment processes.

General notes:
The product is not toxic, small particles can have physical effects on water and soil organisms.

13. DISPOSAL CONSIDERATIONS

Product:
Recommendation:

- Recycle (Reprocess)
- Do not allow to enter drains, sewers or watercourses.
- Disposal through landfilled or controlled incineration or authorised waste dump in accordance with Local, State or National Regulations.
- Waste generators must determine whether a discarded chemical is classified as a hazardous waste.

Uncleaned Packaging:
Recommendation:

- Disposal must be done according to local/official regulations. Refer to manufacturer/supplier for information on recovery/recycling.

14. TRANSPORT INFORMATION

- Land transport
  ADR/RID Class: Not classified as dangerous in the meaning of transport regulations.
- Sea transport
  IMDG Class: Not classified as dangerous in the meaning of transport regulations.
- Air transport
  ICAO/IATA Class: Not classified as dangerous in the meaning of transport regulations.

15. REGULATORY INFORMATION

National regulations, other regulations, limitations and prohibitive regulations

- EC Classification : Not classified as dangerous for supply/use.
- Hazard Symbol : Not applicable.
- Risk Phrases : Not applicable.
- Safety Phrases : Not applicable.

LLDPE manufactured by OPaL shall meet the requirement stipulated in IS: 10146 on “Specification for Polyethylene and its copolymer for safe use in contact with foodstuff, Pharmaceuticals & Drinking Water”. Additives incorporated in this product shall conform to the positive list of constituents as prescribed in IS: 10141. The product & additives incorporated in it shall also comply with FDA: CFR Title 21,177.1520 Olefin Polymers.

For specific regulatory compliance related information please contact OPaL.

16. OTHER INFORMATION

The information provided in this Material Safety Data Sheet has been based upon the current level of information available, for the purpose of specifying the requirements regarding environment, health and safety in conjunction with the product. They are not to be interpreted as a warranty for specific product characteristics. OPaL takes no responsibility for inappropriate use, processing and handling by purchasers and users of the product. The data provided here is applicable only to the Product sold by OPaL and not to products sold by others. It relates only to the Product and does not relate to its use in combination with any other product or material or in any process. Local laws and regulations and conditions of use and suitability of the product for particular uses are beyond the control of OPaL; all risks of use, storage, handling, transportation and disposal of the Product are therefore assumed by the user and OPaL expressly disclaims all warranties of every kind and nature, including warranties of merchantability and fitness for a particular purpose in respect to the use or suitability of the Product. OPaL shall not be responsible for any damage or injury resulting from abnormal use of the Product, from any failure to adhere to recommendations, or from any hazards inherent in the nature of the Product. Appropriate warnings and safe handling procedures should be provided to all handlers and users.