



TECHNICAL DATA SHEET

LINEAR LOW-DENSITY POLYETHYLENE — LLDPE

1. PRODUCT IDENTIFICATION

Product Name:

Linear Low-Density Polyethylene

Abbreviation:

LLDPE

Polymer Type:

Thermoplastic ethylene–alpha-olefin copolymer

Chemical Family:

Polyolefin / Polyethylene

CAS Number:

25087-34-7 or grade-dependent polymer identification

General Chemical Formula:

$(C_2H_4)_n$ with alpha-olefin comonomer units

Physical Form:

Pellets or granules

Available Grade Families:

- Blown-film grades
- Cast-film grades
- Stretch-film grades
- Injection-molding grades
- Extrusion and extrusion-coating grades
- Rotational-molding grades
- Agricultural-film grades
- Lamination grades
- General-purpose grades
- Slip and antiblock-modified grades
- UV-stabilized grades
- Natural and colored grades



2. PRODUCT DESCRIPTION

BASEKIM Linear Low-Density Polyethylene is a versatile thermoplastic resin supplied in multiple grades for flexible-film, molding, coating, and general extrusion applications.

LLDPE is produced by copolymerizing ethylene with controlled quantities of alpha-olefin comonomers. The resulting molecular structure combines flexibility with good tensile strength, impact resistance, elongation, puncture resistance, and heat-sealing performance.

Product behavior varies significantly according to:

- Resin density
- Melt-flow rate
- Molecular-weight distribution
- Comonomer type
- Comonomer content
- Additive package
- Catalyst technology
- Intended processing method

The exact grade must therefore be selected according to the customer's equipment, processing conditions, and finished-product requirements.

3. PRINCIPAL APPLICATIONS

LLDPE is commonly used in:

Flexible film

- Stretch film
- Shrink film
- General-purpose packaging film
- Food-packaging film
- Lamination film
- Liner film
- Industrial bags
- Shopping and carrier bags
- Refuse sacks



- Heavy-duty sacks
- Agricultural film
- Greenhouse film
- Mulch film
- Silage film
- Protective sheeting
- Construction film

Extrusion and coating

- Extrusion coating
- Paper and board coating
- Cable compounds
- Hose and tubing
- Profiles
- Sheet extrusion
- Multilayer-film structures
- Polymer blending

Injection molding

- Containers
- Lids and closures
- Household articles
- Flexible molded parts
- Industrial components
- Caps
- Crates
- Thin-wall molded articles

Rotational molding

- Water tanks
- Chemical tanks
- Storage containers
- Industrial bins
- Toys
- Agricultural products
- Hollow molded articles



4. PRODUCT FEATURES

Depending on grade, LLDPE may provide:

- High flexibility
- High elongation
- Good tensile strength
- Good puncture resistance
- Good dart-impact strength
- Strong tear resistance
- Good heat-seal performance
- Low-temperature toughness
- Good environmental stress-crack resistance
- Good chemical resistance
- Low moisture absorption
- Low density
- Good processability
- Good blending compatibility with LDPE and other polyethylenes
- Potential for film downgauging
- Good toughness-to-weight ratio
- Good electrical-insulation properties
- Good resistance to many acids, alkalis, and aqueous chemicals

5. GENERAL GRADE RANGES

The following ranges represent the broader BASEKIM LLDPE product family. They are not guaranteed values for every grade.

Processing Family	Typical Melt-Flow Rate
Blown- and cast-film grades	Approximately 0.3–3 g/10 min
General extrusion grades	Approximately 1–8 g/10 min
Rotational-molding grades	Approximately 3–5 g/10 min
Injection-molding grades	Approximately 5–60 g/10 min

Standard Melt-Flow Test Condition:

190°C / 2.16 kg unless otherwise specified

Property	General Family Range
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Property	General Family Range
Density	Approximately 0.912–0.940 g/cm ³
Physical form	Pellets or granules
Standard color	Natural, translucent to white
Moisture absorption	Very low
Water solubility	Insoluble
Melting range	Commonly approximately 110–128°C, grade dependent
Processing temperature	Commonly approximately 160–230°C, grade and process dependent

6. TYPICAL FILM-GRADE PROPERTIES

The following values represent a typical general-purpose LLDPE film grade. They must not be used as contractual specifications unless confirmed for the selected grade.

Property	Typical Value	Test Method
Melt-flow rate, 190°C/2.16 kg	1.0–2.0 g/10 min	ASTM D1238 / ISO 1133
Density	0.918–0.922 g/cm ³	ASTM D792 / ISO 1183
Tensile strength at break, MD	25–40 MPa	ASTM D882
Tensile strength at break, TD	20–35 MPa	ASTM D882
Elongation at break, MD	500–750%	ASTM D882
Elongation at break, TD	600–850%	ASTM D882
1% secant modulus, MD	170–280 MPa	ASTM D882
1% secant modulus, TD	190–320 MPa	ASTM D882
Vicat softening point	90–105°C	ASTM D1525
Melting temperature	Approximately 115–125°C	ASTM D3418 / ISO 11357
Haze	Grade and film-condition dependent	ASTM D1003
Gloss	Grade and film-condition dependent	ASTM D2457
Dart-impact strength	Grade and film-thickness dependent	ASTM D1709
Elmendorf tear strength	Grade and orientation dependent	ASTM D1922

Film properties depend strongly on:

- Film thickness
- Blow-up ratio
- Frost-line height



- Die gap
- Cooling rate
- Melt temperature
- Extrusion rate
- Machine direction
- Transverse direction
- Additive package
- Test conditioning

7. TYPICAL INJECTION-MOLDING GRADE PROPERTIES

Property	Typical Range	Test Method
Melt-flow rate, 190°C/2.16 kg	5–60 g/10 min	ASTM D1238 / ISO 1133
Density	0.918–0.940 g/cm ³	ASTM D792 / ISO 1183
Tensile strength at yield	Approximately 8–20 MPa	ASTM D638 / ISO 527
Elongation at break	Approximately 200–700%	ASTM D638 / ISO 527
Flexural modulus	Approximately 150–600 MPa	ASTM D790 / ISO 178
Shore D hardness	Approximately 45–65	ASTM D2240
Vicat softening point	Approximately 85–110°C	ASTM D1525
Melting temperature	Approximately 115–128°C	ASTM D3418 / ISO 11357

Values depend on resin density, flow rate, comonomer, additives, and molded-sample preparation.

8. TYPICAL ROTATIONAL-MOLDING GRADE PROPERTIES

Property	Typical Range
Melt-flow rate, 190°C/2.16 kg	Approximately 3–5 g/10 min
Density	Approximately 0.920–0.940 g/cm ³
Powder particle size	Grade dependent
Tensile strength at yield	Approximately 12–22 MPa
Elongation at break	Commonly above 300%
Flexural modulus	Approximately 250–700 MPa
Vicat softening point	Approximately 90–115°C
Environmental stress-crack resistance	Grade dependent
UV stabilization	Optional, grade dependent



Rotational-molding material may be supplied as pellets or micronized powder according to customer requirements.

9. PROVISIONAL COMMERCIAL SPECIFICATION

The following table provides a proposed general specification structure. Final limits must be issued separately for each BASEKIM grade.

Test Parameter	Provisional Requirement
Appearance	Clean, uniform pellets or granules
Color	Natural, unless otherwise specified
Contamination	No visible foreign material
Density	Grade-specific
Melt-flow rate	Grade-specific
Pellet uniformity	Commercially uniform
Moisture	Grade-specific
Volatile matter	Grade-specific
Additive package	According to grade designation
Slip content	Grade-specific
Antiblock content	Grade-specific
Antioxidant package	Grade-specific
UV stabilizer	Optional, grade-specific
Carbon-black content	Colored-grade specific
Food-contact status	Grade and market specific
Regulatory compliance	Grade and destination specific

Only the approved product specification and Certificate of Analysis determine batch conformity.

10. ADDITIVE OPTIONS

Depending on grade, the resin may contain:

- Primary antioxidants



- Secondary antioxidants
- Processing stabilizers
- Slip agents
- Antiblock agents
- UV stabilizers
- Processing aids
- Antistatic additives
- Pigments
- Carbon black
- Other application-specific additives

Additive content may affect:

- Coefficient of friction
- Film blocking
- Printability
- Surface treatment
- Optical properties
- Odor
- Food-contact suitability
- Sealing behavior
- Long-term weathering performance

The complete additive package must be confirmed for each grade.

11. PROCESSING GUIDANCE

Blown-film extrusion

Typical starting conditions:

Parameter	General Guidance
Melt temperature	Approximately 170–220°C
Die temperature	Approximately 180–220°C
Blow-up ratio	Commonly 2:1–3:1
Frost-line height	Adjust according to film balance
Die gap	Equipment and film dependent
Cooling	Sufficient to maintain bubble stability



Cast-film extrusion

Typical melt temperatures may range from approximately 190–250°C depending on equipment, line speed, resin grade, and layer structure.

Injection molding

Typical starting conditions:

Parameter	General Guidance
Barrel temperature	Approximately 170–230°C
Mold temperature	Approximately 15–50°C
Injection pressure	Part and equipment dependent
Holding pressure	Adjust to control shrinkage
Cooling time	Part-thickness dependent

Rotational molding

Cycle conditions depend on:

- Oven temperature
- Mold material
- Wall thickness
- Powder particle size
- Resin grade
- Heating rate
- Cooling method
- Desired surface finish

Processing trials are required before commercial production.

12. DRYING

LLDPE normally absorbs very little moisture and generally does not require drying when stored correctly.

Drying may be considered when:

- Packaging has been damaged.



- Pellets have been exposed to condensation.
- Material has been stored in a humid environment.
- Surface moisture affects processing.
- A multilayer process contains moisture-sensitive components.

Where drying is necessary, use mild conditions and avoid temperatures that could cause pellet sticking, oxidation, or additive loss.

13. BLENDING

LLDPE may be blended with:

- LDPE
- HDPE
- Metallocene polyethylene
- EVA
- Polyethylene masterbatch
- Reprocessed polyethylene, subject to quality requirements
- Mineral-filled polyethylene compounds
- Color masterbatch
- Additive masterbatch

Blending may modify:

- Melt strength
- Film bubble stability
- Clarity
- Stiffness
- Sealability
- Impact strength
- Tear balance
- Processing pressure
- Shrinkage
- Final-product cost

Compatibility and finished-product testing are required before commercial use.

14. FILM PERFORMANCE CONSIDERATIONS

LLDPE film performance is influenced by:



- Resin density
- Melt-flow rate
- Molecular weight
- Molecular-weight distribution
- Comonomer type
- Film thickness
- Film orientation
- Processing temperature
- Cooling conditions
- Additive content
- Blending ratio
- Corona treatment
- Storage and aging

Key tests may include:

- Tensile strength
- Elongation
- Dart impact
- Tear strength
- Puncture resistance
- Seal-initiation temperature
- Hot-tack strength
- Haze
- Gloss
- Coefficient of friction
- Blocking
- Gel count
- Film gauge variation

15. CHEMICAL RESISTANCE

LLDPE generally provides good resistance to:

- Water
- Dilute acids
- Dilute alkalis
- Salt solutions
- Many alcohols
- Many aqueous chemicals



Resistance may be limited by:

- Aromatic hydrocarbons
- Chlorinated solvents
- Strong oxidizing chemicals
- Oils and fuels at elevated temperature
- Environmental stress-cracking agents
- Prolonged exposure to ultraviolet radiation without stabilization

Suitability must be established under actual concentration, temperature, stress, and exposure-time conditions.

16. PACKAGING

Typical commercial packaging may include:

- 25 kg polyethylene or laminated bags
- 1,000–1,250 kg palletized units
- Octabins
- Big bags
- Bulk containers
- Silo-truck delivery
- Customer-specific packaging

Actual packaging, pallet weight, and net quantity must be confirmed in the sales contract.

17. STORAGE

Store:

- In a clean, dry, covered warehouse
- In sealed original packaging
- Away from direct sunlight
- Away from excessive heat
- Away from flames and ignition sources
- Away from strong oxidizing chemicals
- Away from dust and contamination
- Away from sharp objects that could damage bags



Recommended storage temperature should normally remain below approximately 50°C.

Avoid prolonged outdoor storage.

Protect packaging from:

- Rain
- Condensation
- Ultraviolet radiation
- Mechanical damage
- Dirt
- Foreign polymer contamination

18. SHELF LIFE

LLDPE is stable under recommended storage conditions.

Proposed Retest Period:

24 months from the production or packaging date.

The manufacturer's approved shelf life or retest period takes precedence.

Material should be inspected or retested where:

- Packaging is damaged.
- Pellets are contaminated.
- Color or odor changes.
- Material has been stored at excessive temperature.
- The stated retest period has expired.
- Additive performance may have changed during storage.

19. QUALITY CONTROL

Recommended quality-control testing includes:

- Appearance
- Pellet contamination
- Density
- Melt-flow rate



- Moisture
- Volatile content
- Ash content
- Additive verification
- Color
- Pellet size and uniformity
- Gel count for film grades
- Mechanical properties
- Optical properties
- Film coefficient of friction
- Antiblock performance
- Environmental stress-crack resistance for applicable grades
- UV performance for stabilized grades

A grade-specific Certificate of Analysis should accompany each batch or shipment where required.

20. REGULATORY AND FOOD-CONTACT STATUS

Regulatory status is grade and market dependent.

Before using LLDPE in food packaging, medical products, toys, potable-water applications, or other regulated products, confirm:

- Resin grade
- Additive package
- Migration limits
- Food-contact declaration
- Applicable FDA requirements
- Applicable EU food-contact requirements
- REACH status
- National chemical-inventory status
- Heavy-metal restrictions
- Phthalate restrictions
- Customer restricted-substance requirements
- Recycled-content status, where applicable

No general LLDPE grade should be represented as food-contact, medical, or potable-water approved without supporting documentation for the exact grade.



21. RECYCLING AND ENVIRONMENTAL CONSIDERATIONS

Clean LLDPE production scrap may be recyclable where appropriate collection and processing facilities exist.

Recycling suitability depends on:

- Polymer purity
- Additives
- Pigments
- Contamination
- Multilayer construction
- Local recycling infrastructure
- Finished-product requirements

Do not release pellets into drains, soil, waterways, or the marine environment.

Facilities should maintain pellet-loss prevention and housekeeping procedures.

22. SAFETY SUMMARY

At normal handling temperatures, LLDPE pellets are generally considered to present low health risk.

Important precautions include:

- Avoid contact with molten polymer.
- Molten material can cause severe thermal burns.
- Avoid inhaling fumes generated during overheating.
- Control pellet spills because pellets create a slipping hazard.
- Keep polymer dust away from ignition sources.
- Prevent accumulation of fine combustible dust.
- Use appropriate guarding around processing equipment.
- Consult the current Safety Data Sheet before use.



23. DOCUMENT CONTROL

Document Title:

Technical Data Sheet — Linear Low-Density Polyethylene

Product Abbreviation:

LLDPE

Revision Number:

1.0 Draft

Issue Date:

To be assigned

Supersedes:

New document

Prepared For:

BASEKIM

Prepared By:

Technical / Quality Department

Approved By:

To be assigned

24. GRADE-SPECIFIC INFORMATION REQUIRED

Before this TDS is officially issued, BASEKIM must identify:

1. Commercial grade code.
2. Intended processing method.
3. Resin density.
4. Melt-flow rate and test load.
5. Comonomer type.
6. Additive package.
7. Slip-agent level.
8. Antiblock-agent level.
9. Antioxidant system.
10. UV-stabilizer status.
11. Mechanical-property values.



12. Optical-property values.
13. Seal-performance data.
14. Recommended processing temperatures.
15. Pellet or powder form.
16. Packaging configuration.
17. Shelf life or retest period.
18. Food-contact and regulatory status.
19. Approved test methods.
20. Certificate of Analysis limits.