# PLASTIC ICE BAGS

## Metallocene PE / LLDPE Freezer Packaging - Technical Reference Specification

| Document | Value |
|---|---|
| Product family | Plastic Ice Bags |
| Manufacturer / supplier | Elay Plastic - Izmir, Turkiye |
| Revision | Rev. 1 - 23 September 2026 |
| Document basis | Typical / recommended design and qualification values |
| Intended use | Product selection, customer qualification and technical reference |

**Technical note:** The numerical targets below are engineering reference values compiled from commercial ice-bag benchmarks and published metallocene polyethylene film data. They are suitable as starting specifications, but they are not a certificate of measured Elay production performance. Customer-specific contractual guarantees should be based on qualification tests of the selected Elay film gauge and bag construction.

## 1. Product Description

Elay Plastic ice bags are freezer-safe flexible polyethylene packages intended for packaged ice, retail and commercial freezer storage, bars, restaurants, events, food-service operations and smaller cold-therapy applications. The recommended construction uses virgin metallocene polyethylene / LLDPE technology to combine low-temperature flexibility, impact resistance, clarity and heat-sealability. Bags may be supplied plain or printed, flat or gusseted, with dimensions and gauge selected according to fill weight and handling conditions.

## 2. Material and Construction

| Parameter | Recommended technical specification |
|---|---|
| Primary polymer | 100% virgin metallocene polyethylene (mLLDPE) / LLDPE blend for food-contact ice packaging |
| Nominal polymer density | 0.910-0.925 g/cm³, formulation dependent |
| Film structure | Mono-layer or coextruded polyethylene film, selected to required gauge and performance |
| Bag construction | Flat / tubular or gusseted bag; durable bottom heat seal or equivalent construction |
| Appearance | Natural clear; low haze and high gloss target; colored film optional |
| Printing | Plain or custom printed; print layout, inks and color count defined by approved artwork |
| Closure at user | Heat seal, tie, tape or staple where appropriate to customer filling process |
| Recycled content - food-contact grade | 0% recommended; virgin resin specification |
| Customization | Width, length, gusset, gauge, printing and nominal ice capacity can be customer-specific |

## 3. Capacity, Reference Dimensions and Film Gauge

The following are practical industry reference configurations. Final dimensions can be adjusted to ice geometry, filling equipment, headspace and customer presentation requirements.

| Nominal ice capacity | Reference bag size | Metric reference | Recommended film gauge |
|---|---|---|---|
| 5 lb / 2.3 kg | 9 x 17 in + 4 in gusset | 229 x 432 mm + 102 mm gusset | 38-50 µm (1.5-2.0 mil) |
| 8 lb / 3.6 kg | 11-12 x 20 in | 279-305 x 508 mm | 32-38 µm (1.25-1.5 mil) |
| 10 lb / 4.5 kg | 12 x 21 in | 305 x 533 mm | 38-50 µm (1.5-2.0 mil) |
| 20 lb / 9.1 kg | 14 x 26-28 in; gusset optional | 356 x 660-711 mm | 45-50 µm (1.75-2.0 mil) |
| 25 lb / 11.3 kg | 15 x 30 in | 381 x 762 mm | 50-57 µm (2.0-2.25 mil) |
| 50 lb / 22.7 kg | 16-18 x 35-36 in | 406-457 x 889-914 mm | 75-80 µm (3.0-3.15 mil) |
| Custom | According to required fill weight and application | Customer-specific | Typically 30-100 µm after validation |

## 4. Performance Targets and Test Methods

Targets below are recommended qualification values for a robust metallocene-PE ice-bag program. Mechanical results are strongly affected by gauge, blend, orientation and film-processing conditions; each commercial gauge should therefore be qualified on finished film/bags.

| Property | Recommended target / reference value | Test method / note |
|---|---|---|
| Film density | 0.910-0.925 g/cm³ | ASTM D792; formulation dependent |
| Tensile strength at break | ≥ 40 MPa MD / ≥ 40 MPa TD | ASTM D882; qualification target |
| Elongation at break | ≥ 400% MD / ≥ 500% TD | ASTM D882; qualification target |
| Dart impact | ≥ 700 g for standard light/medium qualification gauges | ASTM D1709 Method A; establish separately by gauge |
| Elmendorf tear | ≥ 150 g MD / ≥ 250 g TD for standard qualification gauge | ASTM D1922; gauge/process dependent |
| Puncture force | ≥ 40 N recommended target | ASTM F1306 or equivalent qualification method |
| Haze | ≤ 12% | ASTM D1003; clear film target |
| Gloss | ≥ 50 at 45° | ASTM D2457; clear film target |
| Seal strength | ≥ 10 N/15 mm recommended process target after seal-window validation | ASTM F88/F88M; sealing conditions must be recorded |
| Coefficient of friction | 0.20-0.35 target when automatic filling requires controlled slip | ASTM D1894; optional/customer-specific |
| Low-temperature handling | No brittle cracking or seal opening during intended frozen-storage handling | Qualification at customer-defined freezer temperature; -20°C is a practical reference condition |

**Published material benchmark:** A published metallocene PE grade identified for ice-bag film reports, at 25.4 µm test film, tensile strength at break about 60 MPa (MD/TD), elongation about 460% MD / 580% TD, dart impact about 1100 g, Elmendorf tear about 200 g MD / 300 g TD, puncture force about 58 N, haze about 9.5% and 45° gloss about 57. The lower targets above intentionally provide manufacturing margin and must still be validated on Elay finished film.

## 5. Manufacturing Tolerances and Quality Control

| Control item | Recommended acceptance / frequency |
|---|---|
| Raw material | Approved food-contact grade resin; supplier CoA / lot identification for each resin batch |
| Film thickness | Nominal gauge ±10% recommended production tolerance; monitor across web and roll |
| Bag width / length | Target ±1% or ±5 mm, whichever is greater, unless customer drawing specifies tighter tolerance |
| Gusset depth | Target ±5 mm unless otherwise agreed |
| Seal integrity | No open seal, channel or visible weak seal; periodic peel/seal-strength verification |
| Filled-bag handling test | Recommended internal qualification: 1.0 m drop, 3 drops, no rupture or seal failure |
| Visual quality | No holes, gels or contamination affecting use; print legibility and registration to approved artwork |
| Lot traceability | Finished bag lot linked to production date / machine / resin lots and inspection records |

## 6. Food-Contact and Regulatory Basis

For ice intended for human consumption, the supplied film should use food-contact suitable raw materials and inks appropriate to the destination market. For U.S. applications, polyethylene/olefin polymers are addressed within FDA 21 CFR 177.1520 subject to the applicable formulation and conditions of use. For EU food-contact applications, the selected plastic formulation should be supported against Commission Regulation (EU) No 10/2011 and any applicable migration / declaration-of-compliance requirements. Regulatory declarations must correspond to the actual resin, additives, inks and final construction supplied.

## 7. Printing and Custom Manufacturing

| Feature | Specification approach |
|---|---|
| Bag format | Flat, tubular or gusseted according to capacity and filling system |
| Printing | Plain or custom printed; flexographic printing is suitable for common ice-bag graphics |
| Artwork | Customer-approved artwork required before production |
| Weight marking | Nominal ice weight / legal markings can be incorporated in print where required |
| Custom dimensions | Available; gauge should be revalidated if dimensions or fill weight change materially |
| Sampling | Pre-production sample or approved reference sample recommended for new custom constructions |

## 8. Storage and Handling

| Item | Recommended condition |
|---|---|
| Storage temperature | 5-30°C |
| Relative humidity | Preferably below 65% RH |
| Light / heat | Protect from direct sunlight, UV exposure and local heat sources |
| Packaging | Keep in original closed protective packaging until use |
| Recommended shelf life | 12 months from production under stated storage conditions |
| Conditioning before use | Allow film/bags to equilibrate to normal packing-room conditions if stored very cold |

## 9. Application Selection Guidance

Ice is a demanding product because sharp cube edges, low temperature, repeated handling and high filled-bag weight can combine to initiate puncture or seal failure. Gauge should therefore be selected by filled weight and distribution severity rather than by dimensions alone. Heavier 20-50 lb formats generally require higher gauge and stronger seal construction than small retail or cold-therapy bags. Automatic filling lines may also require a customer-specific coefficient of friction and bag-opening behavior.

## 10. Technical Status and Contractual Use

This sheet provides a technically defensible reference specification for product development and customer discussion. The values stated as recommended targets are not automatically contractual guarantees. For a binding customer specification, the selected bag size, nominal gauge, tolerances, test methods, sampling plan and acceptance criteria should be fixed in the approved order specification and, where required, verified on qualification samples or third-party tests.

## 11. Reference Basis


- ExxonMobil Exceed / Exxtra Seal m 1012.RA metallocene polyethylene data: ice-bag application; published 25.4 µm film mechanical and optical properties.
- Ameripac Industries commercial ice-bag catalogue: common 5, 8, 10, 20, 25 and 50 lb bag dimensions and gauges.
- Mingyi / TopPack commercial ice-bag references: common capacities, dimensions and film gauges used for custom ice bags.
- ASTM D882 - Tensile Properties of Thin Plastic Sheeting; ASTM D1709 - Free-Falling Dart Impact; ASTM D1922 - Elmendorf Tear; ASTM D1003 - Haze; ASTM D2457 - Gloss; ASTM D1894 - Coefficient of Friction; ASTM F88/F88M - Seal Strength; ASTM F1306 - Slow Rate Penetration Resistance.
- FDA 21 CFR 177.1520 - Olefin polymers for food-contact applications, subject to formulation and conditions of use.
- Commission Regulation (EU) No 10/2011 - plastic materials and articles intended to come into contact with food.


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