KRATON™

Sustainable Solutions.
Endless Innovation.™

UNLOCKING DESIGN-FOR-RECYCLING-READY MEDICAL APPLICATIONS WITH KRATON'S STYRENIC BLOCK COPOLYMERS

Sustainability is Reshaping Medical Product Design

Sustainability and circularity are becoming central priorities in the medical sector as the industry seeks to reduce waste and environmental impact. The healthcare industry accounts for nearly 5% of global greenhouse gas emissions, putting pressure on medical device manufacturers to improve material efficiency without compromising safety or sterility. At the same time, the industry relies heavily on single-use plastics and multi-material constructions, which often hinders recyclability and creates complex waste streams.

RISING PRESSURES ARE REDEFINING MEDICAL DESIGN

Frameworks such as EU MDR/IVDR and ISO 14001 encourage manufacturers to consider environmental impacts across the product lifecycle, including material safety, waste reduction, and end-of-life pathways In parallel, the EU Packaging & Packaging Waste Regulation (EU PPWR) introduces new requirements for medical packaging, including proposed recyclability targets by 2035, packaging minimization, labeling, and documentation while recognizing that sterility-critical formats may face design constraints. Together, these drivers are accelerating Design for Recyclability (DfR) trends across medical devices and packaging:

- **Material simplification:** Reducing multi-material structures and incompatible polymer combinations
- **Reduction of substances of concern:** Phasing out per-and polyfluoroalkyl substances (PFAS), bisphenol A (BPA), and di(2-ethylhexyl)phthalate (DEHP) based plasticizers.
- **Recyclable secondary packaging:** Shifting from complex laminates to mono-material solutions where sterility requirements allow.

HOW KRATON UNLOCKS MEDICAL APPLICATIONS DESIGNED FOR RECYCLING

Healthcare professionals and their patients depend on safe, reliable medical equipment every day. Kraton's styrenic block copolymers (SBCs) deliver clarity, flexibility, strength, and durability with easy thermoplastic

processing, enabling high-quality medical bags, tubing, and other compound solutions. These materials are designed to support recyclability and improved environmental profiles, helping manufacturers balance performance, safety, and sustainability.

In applications such as medical tubing and intravenous (IV) systems, Kraton SBCs support the transition from polyvinyl chloride (PVC) helping address concerns related to plasticizers, extractables, and active pharmaceutical ingredients (API) interactions. Kraton solutions contain no intentionally added phthalate plasticizers and enable polyolefin-based designs, supporting patient safety objectives and simplifying end-of-life recyclability.

Kraton also supports customers seeking silicone replacement, especially in biopharma fluid-handling and single-use systems with multiple SBC technologies. These materials can provide performance comparable to silicone in certain applications with improved processability and recyclability, supporting simpler, more circular medical designs aligned with DfR principles.

Kraton's Value in Use: Environmentally Friendly IV bags

INDUSTRY / CUSTOMER CHALLENGE

Medical IV films have traditionally relied on PVC and plasticizers, raising concerns around substances of concern, limited recyclability, that hinder material efficiency and sustainability goals.

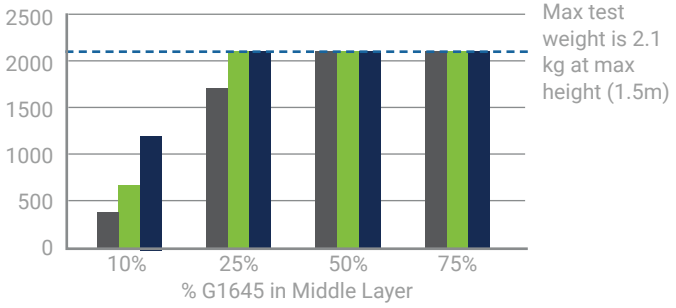
KRATON SOLUTION

Kraton partnered with medical film manufacturers to enable a polyolefin-based IV film architecture using Kraton™ G1645 combined with polypropylene (PP) in cast and blown film multi-layer IV bags.

VALUE

Kraton™ G1645 enables PVC-free, polyolefin-based IV films that combine high performance with improved sustainability profiles. The material provides durable, clear, and strong sealing films compatible with steam sterilization processes and reliable handling, without the need for added plasticizers or certain substances of concern. Its compatibility with polyolefin recycling streams combined with the ability to downgauge films versus conventional PVC designs helps manufacturers improve patient safety, support lightweighting efforts, and design for recyclability without sacrificing performance.

Dart Impact



Seal Strength

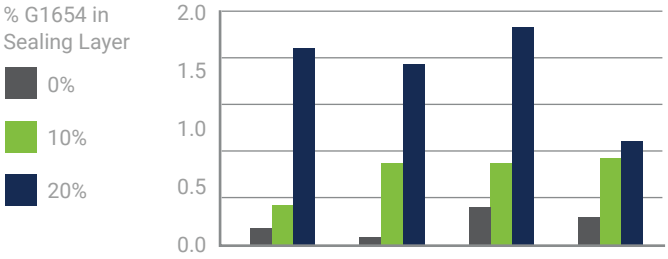


Figure shows seal strength and impact performance of multi-layer SBC/PP films containing varying amounts of Kraton SBC in the core and inner layers. SBC in sealing layer can improve seal strength with higher amounts. SBC in core layer primarily contributes to improved impact performance of the films in drop test.

KRATON CORPORATION

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