Biesterfeld

Discover our solutions

for IV sets

Advanced Material Solutions for IV Sets

Biesterfeld – Your Partner for IV Sets

As critical medical devices, they require precision, safety, and regulatory compliance. At Biesterfeld, we offer a tailored portfolio of materials for the variety of Drug Delivery Devices including injectable devices like auto-injectors, pulmonary devices like inhalers, pre-filled syringes and infusion sets.

Why Biesterfeld?

Its cross portfolio offering – spanning from medical thermoplastics, elastomers to thermosets, from polymers to bonding solutions- supports cutting edge applications in drug delivery, wearables, and surgical and interventional components, enabling customers to unlock synergies and increase design efficiency.

Biesterfeld dedicated healthcare cross functional team with technology, market, and regulatory specialists builds long term trust across suppliers, OEMs, CDMOs, CMOs, and design houses. By engaging early at specification stages and operating within the MedTech ecosystem, Biesterfeld helps customers accelerate innovation with confidence.

As the link between material suppliers and the device industry, Biesterfeld places a strong focus on understanding key market needs. These insights enable us to create comprehensive solution portfolios and provide customers with reliable, expert material guidance.

The IV Set Market

IV sets are Class II medical devices in most jurisdictions, facilitating the safe and precise administration of fluids, medications, blood products, and nutritional solutions directly into a patient's bloodstream, and requiring compliance with strict regulatory frameworks.

Growth drivers:
The IV sets market is driven by the rising prevalence of chronic diseases such as cancer, diabetes, cardiovascular and kidney conditions, alongside a steadily aging global population. Increasing volumes of surgical procedures further boost demand, while the expansion of home healthcare and outpatient infusion services is accelerating the need for flexible and accessible IV delivery solutions.

The market is experiencing a significant shift towards disposable, single-use infusion sets due to infection control concerns. The incorporation of safety features such as needle free connectors, air-eliminating filters, anti-reflux valves, and improved fluid pathways is another significant trend, including geriatric-optimized designs with softer tubing materials, lower priming volumes for fluid-sensitive patients. Finally, the development of advanced infusion sets for specialized applications, such as targeted drug delivery, is gaining traction.

Key Material Requirements for IV Sets

Patient Safety

- Biocompatibility and Patient Safety: non-toxic, non-pyrogenic, non-hemolytic, chemically inert with drugs and fluids
- No/Low Extractables and Leachables and Particulate Control especially for oncology or neonatal applications
- Transition to DEHP-free, PVC-free, and latex-free IV set materials

Mechanical requirements

- Tensile Strength (no breakage under tension)
- Kink Resistance (maintain flow even when bent)
- Burst Pressure Resistance (no rupture)
- Connector Integrity (no disconnection leaks)
- Flexibility for patient comfort and ease of handling

Flow performance to enable consistent and predictable fluid delivery

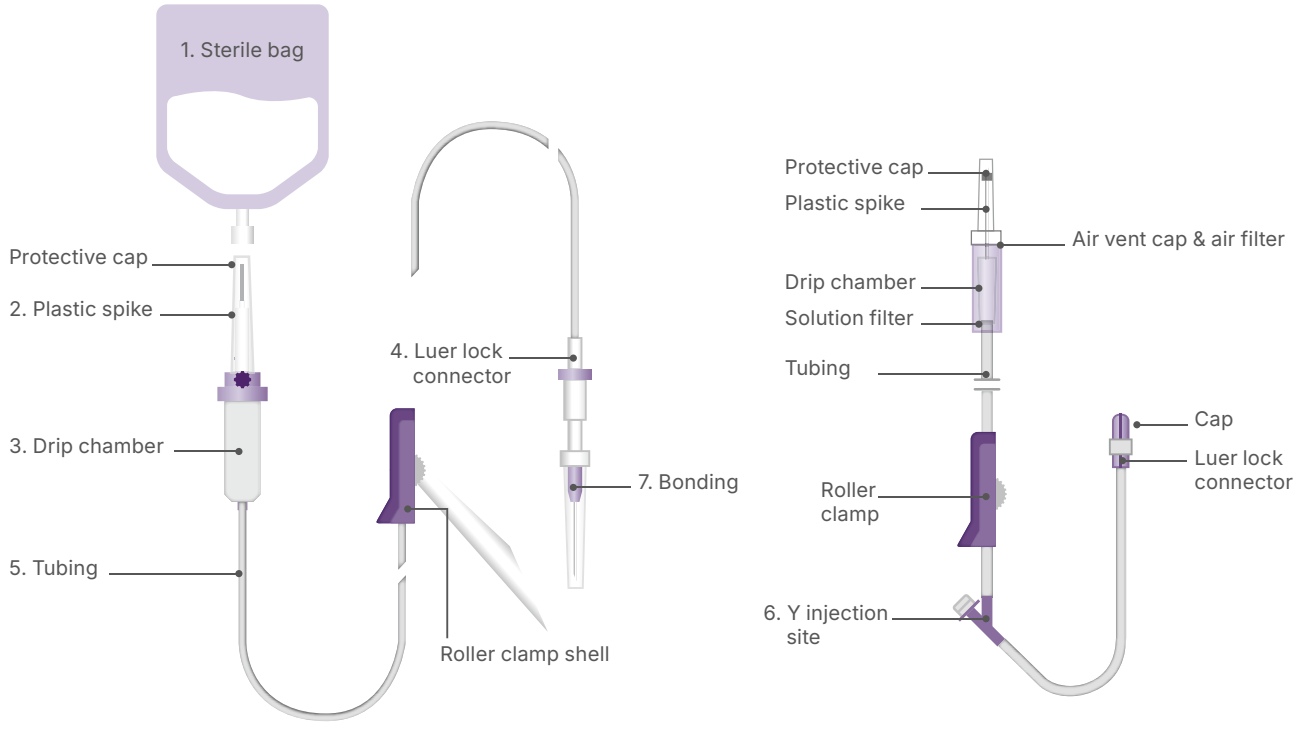
- Stable Inner Diameter
- Smooth Inner Surfaces
- Compatibility with sensitive drugs and aggressive formulations

Visual properties to enable clear visibility of the fluid flow

- Transparency
- No discoloration over time
- No bubbles

Compatibility

- Material stability and no discoloration after most common sterilization methods
- With IV fluids and drugs: no degradation when exposed to saline, lipids, chemotherapy agents, no adsorption, no absorption



Biesterfeld Material Recommendations for IV Sets – Medical Polymers

	Components	Technical requirements	Materials	Properties
1	**Bags**	Compatibility with standard and sensitive API solutions, ISO biocompatibility and USP Class VI standard Compliance	EVA, PP	› **Ateva® G Medical Grade (Celanese):** biocompatible, stable and display excellent resistance to tissue growth, optically transparent, good adhesion, puncture, impact and water resistance and breathability. Resistant to sterilization methods and processable up to a temperature of 210°C. › **BOPP (Biaxially Oriented Polypropylene) (INEOS)** widely used in medical packaging for its superior clarity, high-barrier protection against moisture/contaminants, and sterilization resistance. Specifically, **ELTEX® P KS357 HP** offers a very low heat sealing temperature and contains no technical additives and is designed for both sealing layer and treated layer of metallisable BOPP films.
2	**Spike (Piercing Pin)**	Medical grade Biocompatibility Rigidity, offering dimensional precision (fit with port septum) Good sterilization resistance (EtO, gamma, steam)	Typically ABS, PP, or PE	› **M-ABS (LG Chem):** rigidity, durability, impact and chemical resistance, compatible with EtO and Gamma sterilization, good dimensional stability **Spike protective cap:** › **Polypropylene Ineos® Eltex®**: cost -effective, resistant to microorganisms, chemicals and abrasion
3	**Drip Chamber**	High optical clarity Crack resistance No leachables/extractables , Compatible with ETO/gamma sterilization	Material alternatives to PVC: PP, PC, PETG	› **Polypropylene Ineos® Eltex®:** High transparency, Low extractables and leachables, critical for drug contact infusion fluids, Excellent chemical resistance, Compatible with EtO sterilization, good impact resistance and toughness › **Polycarbonate (PC) (LG Chem):** exceptional transparency, high strength with excellent heat and impact resistance, excellent biocompatibility, dimensional stability, resistance to EtO and gamma sterilization
4	**Flow regulator, clamps, (luer) connectors**	Stiffness, wear resistance High dimensional stability under stress or pressure Tight tolerances Transparency (for visual control, if needed) Good chemical resistance	Material alternatives to PVC: ABS, PP, PE or POM	› **Acetal Homopolymer POM (Delrin®):** resistance to breakage, chemical resistance, dimensional stability (no creep) › **Polycarbonate (PC) (LG Chem):** exceptional transparency, high strength with excellent heat and impact resistance, excellent biocompatibility, dimensional stability, resistance to EtO and gamma sterilization
5	**Tubing**	Flexible Kink resistance High clarity Smooth inner surface Tight dimensional tolerance ETO/gamma compatible Low extractables/leachables	Material alternatives to PVC: TPE (TPU, TPV), Silicone High Consistency Rubber	› **TPU Elastollan® (BASF):** Highly transparent, flexible, tear- and kink-resistant, safe for contact with tissue and fluids, resistant to chemicals, easy to sterilize with EtO and gamma rays, drains with excellent flexibility, adapted to complex and micro-thin shapes › **TPC Hytrel® (Celanese):** Dimensional stability ensures predictable flow rates, low extractables help protect drug integrity, survives EtO or gamma sterilization for disposable sets

Biesterfeld Medical Polymer Brands for IV Sets

BASF We create chemistry · Celanese The chemistry inside innovation™ · Delrin® · INEOS · Manufactured by LG Chem

Biesterfeld Material Recommendations for IV Sets – Medical Specialties

	Components	Technical requirements	Materials	Properties
5	Tubing	Flexible Kink resistance High clarity Smooth inner surface Tight dimensional tolerance ETO/gamma compatible Low extractables/leachables	Ready to use medical tubing	› **Liveo™ RX-50, -65 Tubing** is a transluscent silicone tubing made with Liveo™ BioMedical Grade elastomer, excellent flexibility, low extractables, kink resistance, stable over a wide temperature range › **Liveo™ RX Pump Tubing** for pumping applications that require long-term delivery of fluids › **Liveo™ Pharma TPE Tubing:** High-purity, thermoweldable, single-use TPE tubing for fluid transport and bioprocessing. Low extractables, good chemical resistance, minimal spallation after 24 hours of pumping, good clarity. Compatible for drug delivery including monoclonal antibodies, gene therapies and insulin
6	Injection Port	Flexibility Biocompatibility Chemical resistance Can include needle free valves	Housing: PP, ABS Septum: Silicone High Consistency Rubber, Liquid Silicone Rubber	› **DuPont Liveo™ Elastomers:** Both high-consistency (HCR) and liquid-silicone rubber (LSR) offer inertness, biocompatibility, improved processability for Class II-III medical devices
7	Bonding	Bonding of manifolds and tubing to the spike, luer connectors or valves with heterogenous characteristics: durometer, shadowed areas, low-surface tension	UV/LED-curing adhesives, 1K & 2K Cyanoacrylates, HMPUR, 2K Epoxy	› **Dymax MD® 1000-series** multipurpose UV/LED-curing adhesive › **Bostik Born2Bond 1K & 2K Cyanoacrylates, HMPUR, 2K Epoxy:** for non-transparent plastics and shadowed areas, for silicone bonding
	Customized Assemblies	Design suppport capabilities, customization Material flexibility ISO certification and clean-room manufacturing Fast turnaround time from concept to serial production	A wide range of medical polymers adapted to specific applications requirements aligned to Biesterfeld medical portfolio	› **DuPont Spectrum Plastics Group** can offer C(D)MO services and provide finished complex assemblies & packaging in ISO 13485 certified US & EU- based manufacturing facilities

Biesterfeld Medical Specialty Brands for IV sets

Bostik · DUPONT LIVEO™ · DYMAX · DUPONT Spectrum™

Interested to learn more about our medical solutions service portfolio?

Feel free to contact us at medical@biesterfeld.com

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