

Finding labels to withstand the rigorous lifecycle of a blood bag



Thanks to increased donation opportunities and better transfusion methods, giving blood has become a simple, straightforward process from the donor's perspective. For the average adult, donating a pint of blood typically takes less than 12 minutes, according to the American Red Cross. However, transporting blood and its components from donor to end user is a much more complex process for the rest of the supply chain. Blood processing and transportation require the use of specialized label materials that can both withstand the rigorous lifecycle of a blood bag and communicate critical information about its origin and contents.

The life of a blood bag

A single unit of blood contains four types of transfusable products — red cells, platelets, plasma and cryoprecipitates — that can be separated and used to meet the needs of multiple patients. As a result, just one blood donation can help save the lives of as many as three people.

However, to ensure that these blood products are correctly identified and reach their destination safely and securely, two types of labels must be applied to the blood bag at different stages of the supply chain. These labels are:

- **Primary labels:** The primary label, or base label, is applied to the blood bag by the manufacturer during production. Primary labels provide identifying information such as the manufacturer's name and address, reference and batch numbers and codes for traceability. After label application, the bags are filled with anticoagulant and sterilized with steam heat at high temperatures before they are shipped to hospitals and blood centers.
- **Secondary labels:** Once blood is collected from donors, the processing facility will typically centrifuge the blood to separate the plasma, platelets and red blood cells. The plasma and red blood cells are placed in separate bags

or containers, and a secondary label is applied to each. Secondary labels provide donor information such as donor identification number, blood type, product code, expiration information and the matrix tracking bar code.

Once the labels are applied, filled blood bags will be temporarily stored in a refrigerator and filled plasma bags are stored in a freezer while lab tests are conducted to determine their suitability for transfusion. Additional secondary labels may need to be applied to the filled blood bags, including the donor's lab results.

Considerations in label selection

Blood bags are high-volume, high-value products with a fast-paced supply chain. To minimize the risk of mistransfusion or inventory loss, label developers must consider a number of factors when developing labels for blood bag applications.

First, many regions have regulations specifically governing blood bag packaging. Manufacturers may need to ensure that their labels are DIN ISO 3826 compliant, which specifies requirements for plastic collapsible containers for human blood and blood components. The Food and Drug Administration and the ISEGA also have criteria to ensure label materials such as adhesives don't migrate through the plastic blood bags and bottles and contaminate blood components.

From a security standpoint, labels are also the source of traceability and include tracking components. With printed bar codes, companies and healthcare personnel use the label to monitor the blood bag as it travels from one site to another, ensuring that it finally reaches the right facility and patient.

Additionally, blood bag labels must be able to survive extreme storage environments and the demanding protocols used in blood processing. From collection to processing to storage, primary and secondary labels may endure a wide range of conditions, demanding performance properties such as:

- Hot and cold temperature resistance
- High adhesion to multiple types of plastics
- Low adhesive migration
- Conformability (blood bags tend to not be rigid)

Meanwhile, the print on the label must remain intact throughout the blood bag's lifecycle so that crucial information can be easily interpreted by end users.

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Innovation in blood bag labels

Pharmaceutical label developers recognize that there are unique challenges for blood bag applications. With unique combinations of face stock, adhesives and other materials they continue to introduce new solutions to better meet today's performance requirements for safety and efficiency.

Many solutions are also targeted at eliminating unreliable labeling techniques, which compromise patient safety and/or security of the label. For example, in the case of frozen plasma bags and bottles labels with donor testing information must be applied to an icy surface. Therefore, a common practice at hospitals and blood centers is to rub the bag to warm the surface and then wipe the bag to attach the label.

Fortunately, a new label construction is available that can prevent the need to hand warm frozen plasma bags. The label itself has a liner-protected adhesive coating and is applied prior to freezing. When the plasma bag is removed from the freezer, the user simply peels away the liner layer to expose a fresh adhesive surface that an additional label can be bound to with up to 100 percent adhesion. Other benefits of this plasma bag solution include time savings, reduced inventory loss and improved security.

Safe, secure label solutions

Pharma manufacturers, hospitals and blood centers must make the right choices to ensure that blood bags are labeled properly and safely. This means selecting the right label materials, as well as the right converters, to ensure that inks and coatings provide good printability, performance and compliance. As label technologies improve, healthcare providers will experience decreases in the number of mistransfusions and improvements in operational downtime while successfully getting more blood bags to the patients who need them. >

