

Effectively sealing textile fluid bags

Field of application

The inventive sealing method for multi-layer, woven containers allows the versatile use of 3D shape-optimizable and flexible structural components with fluid filling.

Wherever fluids have to be stored or transported in a space-saving manner, these 'fluid bags' are ideal. The range of applications is extremely broad. For example, lightweight solar thermal modules or adaptive facade elements in the building industry could be just as easily realized as alternatives to the usual foil bags for the medical sector. Here, they could be used as a clothing-integrated element for medication over a longer period of time, which would also have a high degree of tightness and thus safety. Ready-made vests or bandages with integrated 'fluidbags' allow for more mobility for the patient or also a plus in functionality and mobility for protective or sports clothing.

State of the art

Today, flexible containers for liquids or other fluids are made of foil. Fabrics surround these foil containers when they need to be protected from damage, for example. Complex manual production steps and production-related limitations of the container geometry are essential limitations of this well-established design.

For one-piece woven fabrics, highly automated manufacturing processes for 2D and 3D formed air reservoirs are available for the manufacture of airbags in the automotive industry. However, a long-lasting seal for these airbags has been a major challenge in the past for low-cost production.

Innovation

Scientists at the Institute for Lightweight Structures and Conceptual Design (ILEK) at the University of Stuttgart have succeeded in developing a method for reliably sealing such systems for multi-layer woven containers such as airbags. Textile bags that can be filled with fluids can thus be produced and finished in the required two- and three-dimensional design in a single manufacturing process.

The previous challenge was to seal the seam between the layers of fabric forming the container. With this invention, it is possible to close the existing micropores and at the same time create a circumferential sealing channel.

Patent portfolio

DE and EP patent applications are pending.

Your benefits at a glance

- ✓ Flexible, light-weight and 3D shaped containers
- ✓ Excellent seam sealing
- ✓ Sealed containers for fluids such as gases and liquids (of low and high viscosity)
- ✓ Integrated geometry, function and production optimization in the design process
- ✓ Production, sealing and filling in highly automated and coordinated production steps
- ✓ Further processing in existing manufacturing processes of the textile industry (sewing, gluing, finishing)

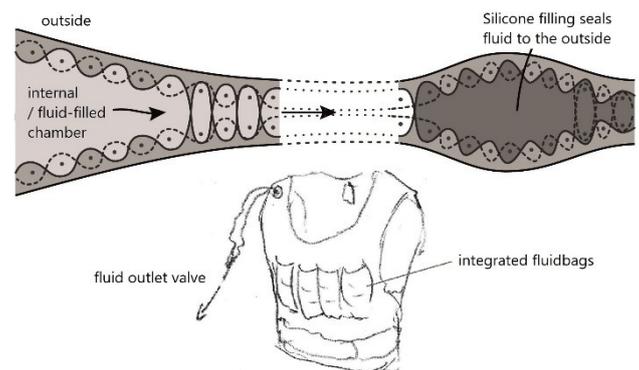


Figure: Scheme of the sealing strategy (top) and sketch of use case: vest / bandage with integrated fluid bags and outlet (bottom).

Technology transfer

TLB GmbH manages inventions until they are marketable and offers companies opportunities for license and collaboration agreements.

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