

Effectively sealing textile fluid bags

This efficient sealing method for multi-layer, woven, three-dimensional fluid containers enables a wide range of applications in a wide variety of industries. The sealing process can also be integrated into existing manufacturing processes and is suitable for gases and liquids.

- Flexible, light-weight and 3D shaped containers
- Excellent seam sealing for woven containers
- Sealed containers for gases and liquids
- Optimization of geometry, function and production is part of the design process
- Production, sealing and filling executed in highly automated and coordinated production steps
- Further processing as part of existing production processes in the textile industry (sewing, gluing & finishing)

Fields of application

The inventive sealing method for containers made of multi-layer, woven fabrics makes it possible to use these 3D shape-optimizable and flexible components in many different fields – from the construction and clothing industry to the medical technology sector.

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Service

Technologie-Lizenz-Büro GmbH
has been entrusted with exploiting
this technology and assisting
companies in obtaining licenses.

Background

These so-called 'fluid bags' are ideal wherever liquids have to be stored or transported in a space-saving manner. For example, light-weight solar collectors, fluid flow wall heaters or sound reflectors could be used in the building industry. In the medical technology sector, one could think of special bags as an alternative solution to the common foil sachets. These bags could be designed as clothes-integrated elements – in cases of long-term medication, for instance. Ready-made vests or bandages with integrated fluid bags offer patients greater mobility. For the clothing industry, vests are conceivable that ensure functionality and mobility for sports or safety wear.

Problem

Today, flexible containers for liquids are made of foil materials. Fabrics protect these foil bags, if they need to be protected from excessive strain, for example. Present techniques are limited by complex manual manufacturing steps and production-related restrictions in terms of bag geometry. For one-piece woven (OPW) fabrics there are highly automated manufacturing processes for 2D and 3D shaped air reservoirs available, from the production of side airbags for the automotive industry. Long-lasting sealing of these reservoirs used to be a major challenge, in particular when it comes to low-cost production.

Solution

Scientists at the Institute for Lightweight Structures and Conceptual Design, Stuttgart University, have succeeded in developing a process for sealing multi-layer, woven containers such as airbags. Liquid-fillable textile bag fabrics in the required two- and three-dimensional shape can thus be produced and finished in a single manufacturing process.

Seam sealing of the fabric layers that form the container used to be particularly challenging. This invention allows users to close the existing micropores and at the same time create a circumferential sealing channel.

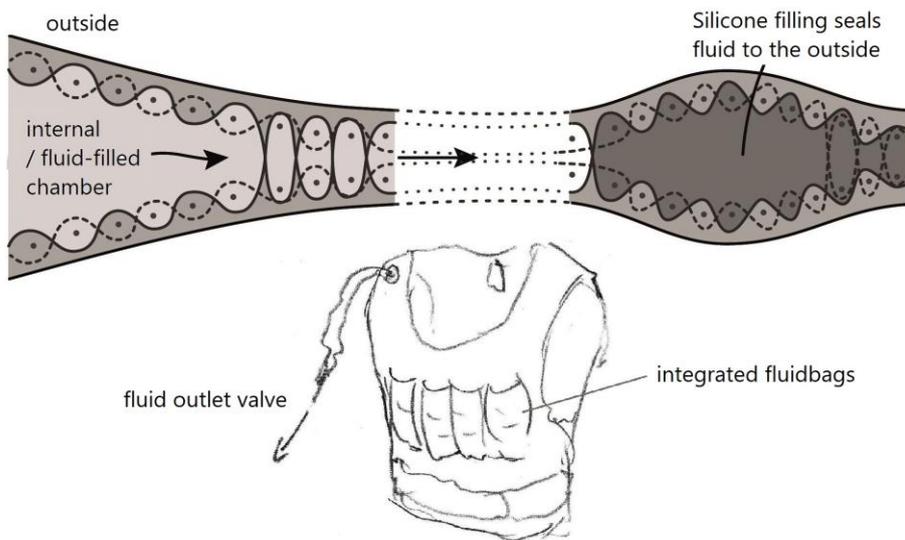


Diagram of the sealing strategy (top) and sketch of a sample application of a vest/bandage with integrated fluid bags and an outlet (bottom). [Figure: F. Schmid, Institute for Lightweight Structures and Conceptual Design, University of Stuttgart].