

Delcotex

Laser technology for carrying systems and composite for thermoplastic lightweight construction

In the textile industry, the military and government market has always been known for its consistency and conservative views. Innovation cycles in all sectors are long and in some areas they often show only modest modifications to the already familiar lines.

Today's soldiers and policemen face challenges that can only be overcome with the help of large amounts of technical equipment. In order to not sacrifice user-mobility and protection in light of the extra physical burden, textile components as a central component of the personal equipment concept had to keep up with the developments.

For a long time materials from shipbuilding and other industry branches were misappropriated for the manufacture of their new generation of carrying systems, while at the same time experimenting with new processing techniques such as laser cutting.

In the process, some disadvantages of these adapted raw materials quickly became a stumbling block for their large-scale use. In addition to their usually very inadequate colorability and printability, most materials had only a limited resistance to environmental influences such as heat, UV radiation or extreme cold. Other laminated fabrics, which provided higher resistance and stability values, were on the other hand quite problematic in their processing. Regularly, during processing with laser cutters, these materials released toxic fumes, or corrosive substances remained at their cut edges.

The years of testing preliminary solutions helped to define the exact requirements for the needed raw materials: a balanced combination of structural stability, tear resistance and human ecology compatibility, as well as colorability and printability – combined with availability and a good price/performance ratio. In 2014, Palstex started to explore and to experiment with countless possible solutions for this series of requirements. In addition to various combinations of the latest high-end fibers and fabric combinations, another series comprised of different versions of proven, easily accessible materials with a deliberately chosen minimalism were developed – from which one of the most powerful all-round-talents has emerged.

The laminate based on the proven Invista Cordura complies with NATO-StanAg 4370 standards for environmental resistance and use in all climates. Consequently, fabric delamination at high temperatures or high hu-

midity is as much a thing of the past as material fractures in extreme cold.

Thanks to the composition of the Made-in-Germany high-performance laminate, no toxic fumes or other hazardous substances are released during laser processing. This guarantees a completely risk-free handling of Palstex in production and use, as certified by Oeko-Tex.

In combination with technology from Delcotex Delius Techtex GmbH, Bielefeld/Germany, Palstex can be equipped with flame-retardant capabilities, meeting DIN 53438-3 F1 and a variety of international standards. The FR treatment does not affect its other technical properties, making it interesting for specialized government forces, emergency services and PPE suppliers.

Palstex laminate allows innovative designers to create tailor-made solutions in the field of modern laser-cut load carrying systems, which offer the user a very good balance of robustness and highest wearing comfort. It supports modern laser cutting and engraving processes, as well as all other conventional cutting technologies and fabrication techniques. The perfect combination between material and laser-cut technology enables extremely fine, almost radius-free contours, as well as lint-free, clean and sealed edges. Its surface texture makes it very easy to engrave with lasers as well, which can be used during

the cutting process for applying sewing markers. Furthermore, it ensures the possibility for complete traceability and documentation of textile components and the finished product – as, for example, required in PPE – by automatically assigning and laser-engraving serial numbers into them. The laminate allows the garment maker to create more ergonomic designs, flatter constructions and includes significant cost reductions, as many products no longer need to be edge-bound. With its 2 identical material surfaces, Palstex supports interesting design approaches, color variations and technical constructions. It unites the know-how of the safety-critical automotive industry with the leading competencies of the tactical equipment sector.

The new, innovative composite DeliCom makes many products lighter, more stable and more cost-effective. Using a special infusion technology, Delcotex has invented a process in which fabrics are soaked in a thermoplastic matrix. High-strength yarns such as textile glass, aramid or basalt are used. Due to the special process, all fibers are completely permeated and coated by the matrix, giving the fabric its final mechanical properties.

Especially in the automotive industry DeliComp is used as an insert in plastic injection molded components or as a laminate. The direct molding of grid-like textile weaving structures becomes a fast and controllable process with high economic potential and individual competitive advantages.

The previously known complex and expensive processing of continuous fiber-reinforced thermoplastic composites represented a major challenge for mass production in the automotive industry. There is now a solution available of inserting textile woven structures into the entire surface as splinter protection or partially as reinforcement of component.

DeliComp can either be placed in the mold unheated or alternatively it can be heated above its melting point and then transformed within a very short time. The energy input and warm-up time are significantly lower than for other composites.

It is suitable for a large number of different hybrid components because of its availability in different structures and matrix systems. The article can be supplied in rolls or, on request, be cut to size. Processing tests have shown that DeliComp can be cut very well with a CO₂ laser system. ■



Example of laminated and unformed prepregs

