



CLEARWELD®



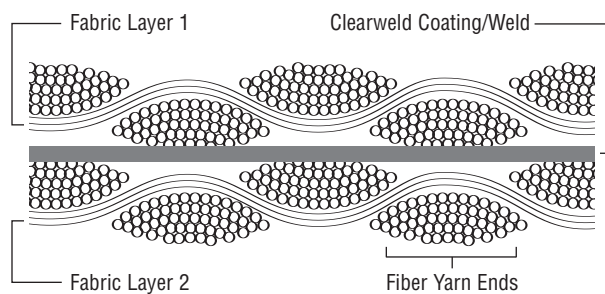
ADAPTING LASER WELDING TO YOUR IDEAS

Laser Welding of Thermoplastic Textiles

The use of lasers in materials processing is growing rapidly. Speed, accuracy and flexibility are just a few of the benefits of this advanced manufacturing technique.

To use lasers successfully for joining polymers, the energy must be harnessed and converted into heat. Laser light must be absorbed at the joint interface to generate enough heat to produce a weld.

Gentex Corporation and TWI Ltd. have developed a patented process that enables laser welding of thermoplastic textiles as a method of replacing traditional sewing.



Welding Textiles

The process utilizes Gentex' proprietary light absorptive material technology which, when applied at the joint interface, enables the conversion of laser energy into heat. The result is a highly controllable method of welding textile products.

Gentex is currently developing this technology for commercial use through new material systems and partnerships with laser and equipment companies.

Advantages

- Ability to weld all thermoplastic textiles including nylon, PP and polyester
- Weld strength capable of reaching strength of the parent material
- Clean, aesthetically pleasing seam appearance
- Enables the sewing and seam sealing process to be combined into one
- Can be easily automated

General Results

- Strong welds can be achieved over a wide range of process conditions
- Welding speeds up to 20m/min
- Up to 100% of the parent material strength in lap shear test for synthetic fabrics and laminates
- A 1kW laser can produce seams equivalent to those produced using a 150W laser, but at higher speed
- Clamping options include — slider, roller, acrylic cover sheet, tensioned film and vacuum bag

Conclusions

- Sealed seams of adequate strength can be made for inflatable products and protective garments
- Allows great flexibility in manufacturing method and structure design
- Allows automation, such as flat bed processing
- Further equipment development will allow 3D seam shapes to be made with manual and ultimately automatic fabric manipulation

GENTEX®

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