

Seam Sealing Technology Manufacturing Processes (MANTECH)

PROBLEM / OBJECTIVE



Current seaming technology fails to incorporate self-sealing capabilities whereby environmentally protective end-items (e.g. tents, tarps, chemical protective (CP) uniforms, rainsuits, Extended Cold Weather Clothing System (ECWCS) and equipment) can be simultaneously sewn and sealed over seams. As a result, a high cost is incurred to independently apply a seam-sealing tape over the seams to prevent leakage. This process is like sewing the end-item a second time and the process progresses at only half the speed of sewing. Therefore, manual labor represents a large portion of the item's cost. Furthermore, it is impractical for end-items such as tents, tarps and other covers to be separately taped due to their large size.

This project investigated several seam sealing methods including non-toxic ultraviolet (UV) adhesives, moisture cure hot-melt injection, seam taping and/or electric seaming to determine optimum manufacturing methods. The goal was to develop a process in which seam-sealing, either in the form of self-stick or extruded adhesive, is applied directly to the seam such that sewing and sealing or taping are accomplished simultaneously.

ACCOMPLISHMENTS / PAYOFF

Process Improvement: Clemson University has developed a patent pending process identified as 'Duraseam'. The process utilizes a two-layer polyurethane seam seal tape with 5-mil high temperature layer with three-mil low temperature adhesive. The tape is manually applied to a lapped seam configuration using heat and pressure. The finished seam is hermetically sealed offering CB Protection, high degree of hydrostatic resistance and superior seam efficiency. Additionally, ILC DOVER did work to perfect a novel seaming technique that involves injecting a proprietary polymer into sewn seams that resists/repels moisture.

Industry Acceptance:

Clemson is set up to serve as a demonstration site to exhibit the 'stitchless' process to interested contractors. Additionally, they are preparing licenses for several companies to utilize their technology in items such as CB protective clothing and gloves.



Implementation/Technology Transfer: Although some issues must be resolved before the seaming processes developed here can be used in the ECWCS as initially planned, there has been a great deal of support for this program from the chem/bio community. The technology is being licensed for both European Union, and US military application as it has a high potential for use in protective clothing.

Expected Benefits: All of the Services as well as commercial industry will benefit from the development of this technology. It will ultimately provide a superior seaming method, as well a considerable cost savings by eliminating the need to tape over sewn seams.

TIMELINE / MILESTONES

Start Date: October 1999

End Date: September 2001

Initial Army Fielding: TBD

FUNDING:

Army ManTech Total: \$648K

Cost Sharing: Clemson University, \$65K

PARTICIPANTS

- Clemson University, Clemson, SC
- North Carolina State University, Raleigh, NC
- Gentex Corp., Carbondale PA
- ILC Dover Corp, Frederica, DE