DHS Science and Technology Directorate

Transitioned

Improved Firefighter Structure Glove

Current firefighter structure gloves can hamper response efforts

When responding to structural fires, firefighters wear protective gloves known as "structure gloves" to shield their hands from burns and other injuries. Because structure gloves can be bulky and limit dexterity, firefighters often need to remove the gloves to complete routine tasks, such as handling operating tools or using communications equipment. Without gloves, firefighters' hands are at a higher risk of injury.

In addition to dexterity issues, existing structure gloves can be difficult to put on when wet and offer limited heat protection. In the field, these gloves can be very impractical and slow response time.

Final Prototype Design

Commercialized Product

Improved Firefighting Structure Glove

New glove with next-generation fabric and design offers better fit and form

The U.S. Department of Homeland Security Science and Technology Directorate (S&T) partnered with NanoSonic, Inc. and Shelby Specialty Gloves (Shelby Glove) to construct a new, improved structure glove that will provide the full range of protection firefighters need. This next-generation glove provides firefighters with enhanced dexterity, water repellency, and fire resistance.

NanoSonic has developed a durable material called HybridSil®—a Kevlar®-based fabric that is both heat and water resistant. HybridSil® can withstand punctures and lacerations that current structure gloves may not. S&T worked with NanoSonic to ensure the final glove design meets all identified first responder requirements, standards, and certifications.

S&T addressed first responders' needs for reduced risk and increased protection

By improving the structure glove's technology and materials, S&T helps ensure firefighters can perform their duties while fully protected. The new material and design allows firefighters to make more precise movements without having to remove their gloves. The improved form and fit and water repellant-features ensure they provide the protection firefighters need.

The project underwent multiple stages of research and testing to ensure the durability of the selected materials in operational field conditions. To make certain the gloves truly met the needs of firefighters, S&T sent the prototypes to be tested by fire departments across the nation. Testers used the gloves in a series of rigorous exercises designed to replicate real life operational scenarios. Follow-on iterations featured improvements based on firefighter comments. In the spring of 2014 the final glove prototypes were evaluated against five categories: ease of donning and doffing, proper fit, puncture resistance, dexterity, and thermal protection and heat dissipation.

Gloves are now commercially available

After gathering feedback from responders through several rounds of testing, S&T, NanoSonic and Shelby Glove captured the final design specifications before manufacturing commenced in spring 2015, including obtaining National Fire Protection Administration (NFPA) 1971 compliance approval for structural and proximity firefighting safety and heat resistance. The finished product features NanoSonics' HybridSil® material and is available for purchase from Shelby Glove under the name Flex-Tuff HS Glove (Model #s 5293 and 5294 at http://www.shelbyglove.com/flextuff/flex-tuff-hs.html).

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To learn more about Improved Firefighter Structure Glove, contact SandTFRG@dhs.gov.

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