

Technical Bulletin

Facts About Spectra® Fiber/Spectra Shield® Materials and Heat

At Honeywell's Spectra business, the well being of law enforcement officers and military personnel who depend on our Spectra® fiber and Spectra Shield® materials is our primary concern. Our testing has consistently shown that Spectra® fiber and Spectra Shield® materials are excellent for use in the most advanced body armor. Below are facts about Spectra® fiber and Spectra Shield® materials and heat:

Q: Does Spectra® fiber-based fabric and Spectra Shield® material lose its ballistic properties after exposure to high temperatures?

A: Spectra® fiber-based fabric and Spectra Shield® materials show NO LOSS of ballistic properties when exposed to high temperatures under the following test protocol:

- Spectra Shield® material: 72 hours of continuous exposure at 212 F and then an additional 24 hours of continuous exposure at 266 F. Samples were tested to modified version MIL-STD-662E protocol.
- Spectra Shield® material: 72 hours of continuous exposure at 230 F plus an additional 24 hours of continuous exposure at 248 F. Samples were tested to modified version MIL-STD-662E protocol.
- Spectra Shield® material: 90 days of continuous exposure at 192 F. Samples were tested to modified version MIL-STD-662E protocol.
- New River, AZ environmental testing: Spectra Shield® material was exposed for 15, 30 and 60 days, during which temperatures reached 185 F in direct sunlight. Samples were tested to modified version MIL-STD-662E protocol.
- Spectra Shield® material-based shoot pack: .77 psf areal density (NIJ level IIA+) was exposed for 72 hours at 230 F and tested with a .22 caliber long rifle, LRN 40 grain, at approximately 1200 fps and sustained zero penetrations.
- Spectra® fiber-based fabric: 60 days of continuous exposure at 160 F. Samples were tested to modified version MIL-STD-662E protocol.

Q: Is it true that Spectra® fiber is made from the same polyethylene material as plastic milk jugs and coffee can lids?

A: No. Fundamentally Spectra® fiber is a polyethylene, but there are profound differences between the many types of polyethylene. Spectra® fiber is made from an extremely high performance grade of polyethylene. A complex and patented production process is required to orient the very long molecular chain that gives Spectra® fiber its unique performance properties. Spectra® fiber in the form of Spectra Shield® material, even heated to temperatures up to 266 F, does not revert to a simple polyethylene (that of coffee lids and milk jugs), and in fact, will retain its ballistic properties after exposure at that high temperature.

Q: What happens to Spectra® fiber and Spectra Shield® materials in the event of a coffee spill?

A: In a test, 96 oz of coffee at a temperature of 178.8 F was poured directly on Spectra Shield® ballistic material. This material was tested immediately after contact. There was NO LOSS of ballistic performance. In a real-life situation involving a vest, coffee would first come in contact with air, then the outer carrier of the vest garment and then the ballistic carrier that protects the multi-layer ballistic package – cooling to a temperature far below any that would compromise the panel's ballistic integrity. Also, Spectra® fiber is resistant to water and has a significantly higher resistance to many chemicals than most other high performance fibers currently used in soft body armor.

Q: What happens to Spectra® fiber and Spectra Shield® materials inside a ballistic resistant vest in the event of fire exposure?

A: Multiple tests have been conducted at different accredited laboratories specializing in the testing of flame resistant clothing. The tests were designed to simulate fire conditions that would not require specialized heat protective clothing. In all cases the Spectra Shield® materials were virtually unaffected by heat and flame. The conclusion was that vests designed for the anticipated fire conditions and containing Spectra® fiber-based materials did not increase the wearer's risk from fire.

These are examples of the kind of comprehensive testing that has been done around Spectra Shield® materials and Spectra® fiber-based fabrics. Our mission is to help protect law enforcement and military personnel through the development of advanced materials. We take that commitment very seriously.

For more information about Honeywell's ballistic materials, please visit our Web site: www.spectrafiber.com, where you can also find information about our partnership with the National Tactical Officers Association (NTOA) and the Safe Today, Alive Tomorrow safety awareness program.

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