

**DOUBLE  
ISSUE**

# SECURITY & BORDER PROTECTION CST & CBRNE SOURCE BOOK

**SOUTH BORDER  
EMERGENCY  
PREPAREDNESS**

**1ST MA WMD-CST  
RESPONSE  
INTEGRATION**

## Leadership Perspective



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# EXTENDING MISSION TIME

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**O**ne of the core values of W. L. Gore & Associates (Gore) is a concept referred to as fitness for use, in which a product is developed to meet or exceed the requirements of a specific application. Before developing a new protective barrier, Gore's scientists and engineers collaborate with end users to understand their environment, their challenges, and the hazards they face. Two primary areas identified as most challenging for first responders are achieving longer time on scene and improving their ability to function effectively in their protective suits. By combining this understanding with its extensive knowledge of membrane technologies, Gore has developed a family of durable fabrics that provide certified protection against exposure to a range of toxic industrial chemicals (TICs) and chemical warfare agents (CWAs) in hot and warm zones.

Suits made with durable GORE® CHEMPAK® fabrics enable you to operate more effectively in demanding environments. These fabrics help manage heat stress better, which enables you to remain on scene longer. At the same time, they are engineered with increased durability to resist cuts, tears, and abrasion,

while providing the necessary level of protection required for the mission. GORE® CHEMPAK® ultra barrier fabric is used in suits certified to NFPA 1994, Class 2 for hot zone missions, while GORE® CHEMPAK® selectively permeable fabric is used in suits certified to NFPA 1994, Class 3 for warm zone missions.

## The Challenge of Heat Stress

Heat stress is one of the main reasons your time on scene is limited. Your body's primary way to prevent getting overheated is through sweat evaporation, and a highly trained first responder can produce as much as two liters of sweat per hour during highly active periods. However, if perspiration cannot escape and pass through clothing, your body cannot regulate its core temperature. If this is not possible, your body core temperature will rise, which can have an adverse impact on your safety and performance. Several military studies have shown that seemingly small increases in body core temperature can affect hearing, heat exhaustion, motor control, and even your ability to solve simple problems. In fact, the National Institute for Occupational Safety and Health (NIOSH) recommends that body core temperature should be

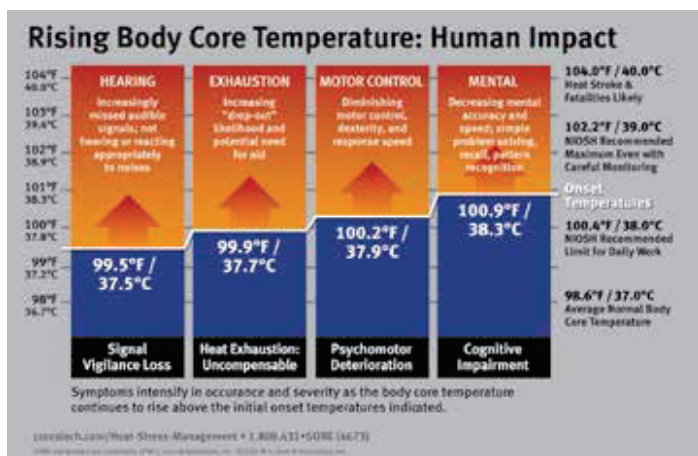


Figure 1: Impact of Rising Body Core Temperature (W.L. Gore)

carefully monitored during heavy work, with a maximum increase of only 1.8°F for daily work (Figure 1).

Several of today's Chemical Biological protective ensembles are made of impermeable materials that are not breathable (i.e., sweat vapor cannot escape through the clothing). Wearing non-breathable materials reduces your ability to manage your body core temperature through sweat evaporation. Therefore, your time on scene is limited, resulting in shorter work cycles and longer rest cycles to reduce the consequences of heat stress.

Multi-Threat Suits made with GORE® CHEMPAK® ultra barrier fabric provide an effective way to extend your time on scene because the garment's patented outer surface promotes evaporative cooling when it is wet down (Figure 2). As the water evaporates off the outer textile, it helps to dissipate body heat.

In a controlled garment study, both Multi-Threat and conventional level A suit materials lost approximately the same amount of heat when they were dry. However, when wetted down, the Multi-Threat suit lost a significantly greater amount of heat when compared to the conventional level A garment.

Clothing that is moisture-vapor permeable (breathable) allows sweat vapor to evaporate from your skin and move freely through the fabric, which helps reduce your body core temperature. For warm zone incidents, Extended Response Team (XRT) suits made with GORE® CHEMPAK® selectively permeable fabric are breathable, so sweat vapor can pass through the fabric. During a documented wear trial in which users wore XRT suits, they were able to perform eight hours of rigorous activities such as a brisk two-mile walk, drills at a firearms range, evidence investigation, and maneuvering through an obstacle course. Because the users experienced the physiological benefits of sweat evaporation, they maintained lower body core and skin temperatures.

### Certified Protection with Enhanced Functionality

When responding to a CBRN incident, you need to be protected but also must be able to complete your mission. Suits made with GORE® CHEMPAK® fabrics provide NFPA 1994-certified protection against TICs and CWAs in both hot and warm zones and help mitigate the effects of heat stress. The added durability of these fabrics enable you to be more confident that you will remain protected in the physically demanding activities required in these incidents.



Figure 2: Wetting down the Multi-Threat Suit (W.L. Gore)

Available in front- and rear-entry designs, the form-fitting Multi-Threat suits with GORE® CHEMPAK® ultra barrier fabric give you unencumbered movement, increased range of motion, improved peripheral vision, and excellent dexterity.

As the only breathable fabric available in Class 3 certified suits, GORE® CHEMPAK® selectively permeable fabric helps increase mobility because of its lightweight, low-bulk construction. Like the Multi-Threat suits, XRT suits are quick to put on because the interfaces and closures do not require additional taping. The added durability of this fabric, combined with its breathability, enables you to focus on the task at hand and not the environmental conditions around you.

### The Future Direction for Gore's ChemBio Fabrics

As new challenges are identified for responders, Gore continues to develop new technologies that combine protection, functionality, and comfort. Recently certified to NFPA 1994, Class 3, the Chemical/Biological Protective Clothing System (CPCS) is a versatile undergarment that can be worn in a variety of scenarios — VIP and public event security, consequence management, technical search and rescue, EOD, and technical decontamination. The undergarment's stretch fabric and unique design integrates easily with a variety of equipment, enabling increased mobility and operational effectiveness in tactical and catastrophic situations.

Gore's latest development is in response to the international outbreak of the Ebola Virus. The Biological Protective Suit (BPS) provides full-body protection against exposure to Ebola and other highly infectious diseases for responders involved in such operations as patient transport, non-combat casualty evaluation, waste disposal, and mortuary operations. Recently certified to NFPA 1994, Class 4 and pending certification to the multiple-use requirement in the NFPA 1999 Standard, this highly breathable suit can be laundered and re-used if not previously exposed to contaminants. ■

Lead Art: Breathable XRT Suit Provides Certified Warm-Zone Protection (W.L. Gore)





IAB SEL  
recommended  
for "high-risk"  
EBOLA threats  
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# WHEN MINUTES MATTER MOST

**Respond faster and remain focused on the mission**

Certified to NFPA 1994, Class 2, durable multi-threat suits made with GORE® CHEMPAK® ultra barrier fabric help you respond quicker with enhanced operational capabilities and reduced heat stress in **HOT ZONE** environments.

Learn more about products featuring Gore's innovative ChemBio fabrics at [www.GoreChempak.com](http://www.GoreChempak.com) in applications for Technical Rescue, HazMat, Reconnaissance, and Rapid Intervention Teams.



[www.GoreChempak.com/multithreat](http://www.GoreChempak.com/multithreat)

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Technical Fabrics

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