

FIRE FIGHTING ENVIRONMENTS AND THE LIMITS OF FIRE FIGHTERS' PROTECTIVE CLOTHING AND EQUIPMENT

James R. Lawson

Fire Fighting Technology Group
Building and Fire Research Laboratory
National Institute of Standards and Technology
Gaithersburg, MD USA 20899
James.lawson@nist.gov

Thousands of fire fighters are seriously burned every year, and the cause of many fire fighter fatalities can be directly linked to thermal exposures. The National Institute of Standards and Technology (NIST), has been working with the U.S. Fire Administration (USFA), the National Institute of Occupational Safety and Health (NIOSH), and numerous fire departments to develop a better understanding of the causes for these deaths and injuries. The work is being done in an attempt to reduce the number of fire fighter injuries and fatalities. This presentation will focus current findings from these studies. Fire fighters' protective clothing is designed to perform several functions. Of these, protection from heat and flame is one of the most important. Today's fire fighter protective clothing designs are based on years of field experience and research studies that address structural fires. Much of the work has concentrated on the fire environment where a fire fighter suddenly becomes enveloped in flames. This exposure generally results in serious life threatening injuries and sometimes death. However, many fire fighters receive serious burn injuries from thermal environments much less severe than those that completely envelop the person. Studies conducted with numerous fire departments have better defined the range of thermal environments produced by fires where serious burn injuries and fatalities occur. In addition, these studies have begun to provide insight into the functional protective limits of fire fighters' protective clothing and equipment. Performance limits are better defined by new test methods and computer models that predict the response of protective clothing and equipment to fire fighting environments. Results from field investigations and laboratory studies will be presented that address these safe use limits of fire fighters' protective clothing. In addition, the presentation will highlight health and safety issues related to fire fighting environments. Issues concerning victim rescue and self-rescue will be discussed. Current research on fire fighter safety and its impact on the future of the fire service will be addressed.