



## You and Your PPE; Part 2

### NFPA Standards for PPE;

1. **NFPA 1971 (2007 edition)** is a product standard that establishes minimum levels of protection and specifies minimum design, performance testing and certification requirements for structural firefighting protective ensembles.
2. **NFPA 1851 (2008 edition)** is a user standard that was developed to be a companion document to The 1971 standard to reduce the safety and health risks associated with poorly maintained, contaminated and damaged gear.

**Performance Testing:** Firefighters need to be familiar with the way their PPE is tested in order to better understand how it protects them.

### TPP; Thermal Protective Performance;

The TPP test measures the elapsed time for heat emitted from a radiant and convective heat source to go through all layers of our ensemble (Outer shell-Moisture barrier-Thermal liner)  
The NFPA mannequin burn test pictured on the right determines thermal insulation and thermal stability of PPE

- **Thermal Insulation:** refers to the ability of the ensemble to protect the wearer from outside sources of ambient high heat environments.
- **Thermal Stability:** refers to the break open resistance of the fibers from which the ensemble is constructed in high heat environments.
- The higher the TPP the better the thermal protection. Unfortunately a higher TPP rating will have an inverse affect on the THL rating.



**THL; Total Heat Loss;** This test measures the ability of an ensemble (Outer shell Moisture barrier-Thermal liner) in evacuating conductive (dry) and evaporative (wet) heat from the inside layer to the outside layer. A high THL value indicates greater ability to evacuate moisture. Unfortunately a higher THL value will have an inverse affect on the TPP rating.

- Increases in core body temperature of (2.7°-3.6°F) leads to fatigue, exhaustion, nausea and diminished decision making capacity.
- An increase of only 3°C can be life threatening (there is only a 5-6° range between normal activity and death)
- Core temperatures can continue to rise up to 30 minutes after exertion.

**CCHR; Conductive and Compressive Heat Resistance;** This test measures the level of thermal protection in various areas subjected to compression in the ensemble components (Outer shell-Moisture barrier-Thermal liner) This test represents the time in seconds for a temperature rise of 75.2° when a source of heat and pressure is applied to the exposed area.

- Compression of a specific ensemble component can contribute to a rapid discharge of stored thermal energy, rapidly increasing the skin temperature and shortening the time to a thermal burn.

### Why is This Information Important to Us?

1. Ignorance of the rules and standards that govern the proper use and care of PPE is not an excuse
2. Firefighters need to understand heat stress and our PPE's ability to reduce it
3. Firefighters need to understand how they can be burned and how our PPE can reduce burn injuries.
4. Having intimate knowledge about our PPE and its limitations can reduce our risk when wearing it.

By Bryan T Smith



The severely damaged gear pictured above and below did it's job and protected the firefighters wearing it. Despite the degradation to the gear neither of them received any burns.



In order for firefighters to be focused on the job at hand they must have confidence in their PPE to protect them!