



You and Your PPE; Part 3

In this issue we will discuss the 3 main protective layers and their purpose in detail to help us better understand why and how our gear is designed. Turnouts (PPE) use special fabrics and barriers to provide the protection needed for firefighting activities.

How our PPE Works; Beyond a vacuum the best insulation is provided by trapped air whether hot or cold. In between each of the protective layers of our PPE is air to help insulate us from heat. PPE is designed to absorb energy to keep it from getting to the firefighter wearing it. After your PPE has already absorbed what it can it becomes saturated and the additional energy can pass through to the firefighter in the ensemble. But insulation from heat is not the only purpose for our PPE, we also need our PPE to breathe to reduce heat stress.

The Protective Layers and Their Purpose;

1. The 1st layer is the Outer Shell.

The outer shell provides,

- Thermal protection
- Tensile strength
- Tear strength.

The outer shell is constructed of woven textiles and filament fibers with a rip-stop design and a water repellent coating. They are primarily made of Kevlar, Nomex, PBI and PBO or a 60-40% mixed blend.



2. The 2nd layer is the Moisture Barrier.

The moisture barrier provides,

- Resistance to liquids penetrating into the garment from the outside.
- Wick ability allowing the firefighters own sweat in vapor form to escape.
- Thermal stability constructed of a polymer layer attached to a textile substrate

Heat is absorbed from the environment and produced by the work out-put of the user. The moisture barrier determines heat loss which affects the amount of heat stored increasing the bodies core temperature leading to heat stress.



3. The 3rd layer is the Thermal Liner.

The thermal liner provides,

- Thermal protection by trapping air.
- Wick ability because it lays against the firefighter and allows sweat to escape.
- Tear strength constructed of non-woven material and attached to a face cloth.

The thermal liner is usually thicker than the other two layers. It provides insulation from heat by trapping air in it's batting material.



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The 3 protective layers of your PPE



In each set of turnout gear manufactured there is a tag ensuring that the garment complies with the NFPA standard. It also lists the material that each protective layer is constructed of.

What is your outer shell, moisture barrier and thermal liner made of? if you don't know go get your PPE and find out its important information you need to know!