



## TECHNOLOGY SOLUTION

### Materials and Coatings



# Multilayered Fire Protection System

New heat retardant materials based on vehicle reentry thermal protection systems

NASA Langley has developed a flexible, light weight and portable thermal protection system. The flexible thermal protection systems are multilayer thermal blankets that are designed to handle external temperatures of up to 2000 degrees Fahrenheit. Flight tests clearly demonstrate how these new heat retardant materials can protect from the extreme conditions. This system creates an environment for protecting equipment, facilities, and people from a high intensity incident heat source, such as a fire. The system can be formed as a sleeping bag, a tent, a blanket, a vertical barrier, a curtain, a flexible rollup doorway, or a wrap.

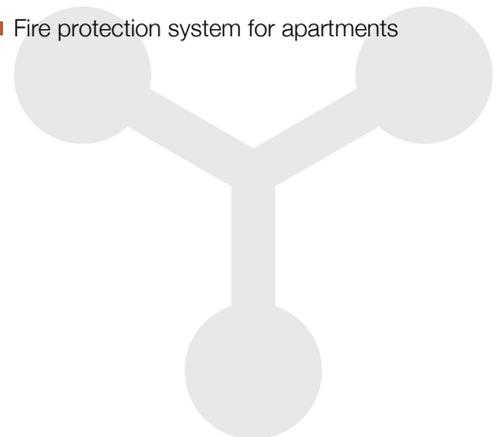
#### BENEFITS

- Light weight
- Withstanding temperatures up to 2,000 degrees Fahrenheit
- Portable
- Prevents the transfer of heat
- Flexible
- Safe

#### APPLICATIONS

The technology has several potential applications:

- Insulation for walls
- Fire containment
- Insulation for flammable trailers cargo
- Vertical barrier
- Personal emergency fire shelter
- Blanket
- Protecting property
- Fire protection system for apartments



## THE TECHNOLOGY

The Multilayered Fire Protection system uses technology from the space craft flexible heat shield for future planetary missions. By optimizing this material for the fire environment, utilizing heat shield test methods, and experimenting with different materials, the NASA team developed a multilayered fire protection system. This system includes an outer textile layer which reflects over 90 percent of the radiant heat, an insulated layer which protects against convective heat and hot gases, and a non-porous film layer which is a gas barrier layer.



Credits: USFS / Ian Grob

Fire shelter under test conditions.

## PUBLICATIONS

Patent No: 10,391,737; 10,300,675

Convective Heating Improvement for Emergency Fire Shelters - Composition and Performance of Fire Shelter Concepts at Close-Out. Joshua M. Fody, Kamran Daryabeigi, Walter E. Bruce III, John M. Wells, Mary E. Wusk, and Anthony M. Calomino, and Steve D. Miller. NASA/TM-2018-219813.

<https://ntrs.nasa.gov/api/citations/20180002094/downloads/20180002094%20updated.pdf>

The Development of a Thermally Enhanced Emergency Fire Shelter. Joshua M. Fody, Anthony M. Calomino, Kamran Daryabeigi, Walter E. Bruce III, John M. Wells, Mary E. Wusk, and, Stephen D. Miller. 47th International Conference on Environmental Systems ICES-2017-77, 16-20 July 2017, Charleston, South Carolina.

<https://ntrs.nasa.gov/api/citations/20170007490/downloads/20170007490.pdf>.

NASA's Wildfire Monitoring and Protection Technology Webinar You Tube.

<https://www.youtube.com/watch?v=ww8Fmclp6jo>.

[technology.nasa.gov](http://technology.nasa.gov)

More Information

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**Agency Licensing Concierge**

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