

[ABS27]

## Respiratory Protection for Wildland Firefighters

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Each year, an estimated 80,000 fire fighters battle wildfires, often spending long durations at the fire front where they are exposed to high levels of smoke and heat. Sudden changes in weather or fire conditions increase the chances of being entrapped by an uncontrolled wildfire or caught in the burnover of a rapidly advancing fire front. Such situations drastically increase the danger posed to the fire fighter. Wildfire smoke contains a large number of toxic components, including pulmonary irritants (particulates) and high levels of carbon monoxide (CO). In wildfires, many fire fighters are injured or killed by heat-damaged airways or lungs, caused by breathing superheated air; this risk is greater than that from external burns. Most fire fighters employ a mask to help make the air more tolerable to breathe. Currently, there is no suitable respirator available to protect fire fighters from exposure to CO or superheated air.

With funding from the US National Institute of Occupational Safety and Health (NIOSH), TDA is developing a lightweight, low-pressure drop heat exchanger device that instantaneously cools superheated air (as hot as 350°F) to body temperature (100°F) so that the wildland firefighter can comfortably breathe in a hot environment. The device needs no expendables, and can function for long periods of time. We have incorporated our proprietary catalyst that oxidizes CO to CO<sub>2</sub> into the device. We have also successfully tested the catalyst for escape hood (CBRN) respirator and a wild land firefighter respirator (as per NFPA's proposed 1984 standards) requirements.