

GVS



*Protecting you for
life's best moments.*

Firefighters Adapting to Survive



Firefighters are exposed to respiratory hazards both during and after a fire.

Changes in technology and regulations aim to help protect our local heroes.

Firefighters regularly appear in children's 'What I want to be when I grow up' job lists. These are the most popular jobs kids dream of doing when they grow up.¹ Recognized as strong, brave, and selfless, firefighters have all the ingredients needed to be a hero. With collapsed ceilings, impassable doorways, and incredibly high firefighting ladders, there are countless ways for a firefighter to perish. The most prevalent yet least known is cancer, with firefighters having a 14% higher chance of dying from the disease than non-firefighters, equating to a shorter life expectancy by ten years on average.²

“We must respect the past and mistrust the present if we wish to provide for the safety of the future”

- Joseph Joubert, French moralist, and essayist.

Fire marshals and inspectors know about hard times and face significant risks during post-fire investigations and overhauls. They often come into contact with hazardous materials and carcinogens in the debris, such as asbestos and other dangerous substances that can be inhaled or absorbed through the skin. This contact could lead to serious health consequences, therefore, proper respiratory protection, such as SCBAs (Self-Contained Breathing Apparatus), PAPRs (Powered Air Purifying Respirators), and other necessary PPE must be provided to minimize their exposure. Other procedures that can ensure their safety include:

- Use of monitoring equipment to detect hazardous substances in the air and on surfaces
- Establishment of decontamination procedures
- A designated clean area



Some substances used to protect firefighters have been causing great harm. Per- and Polyfluoroalkyl Substances (PFAS) and Polybrominated Diphenyl Ethers (PBDEs) are water, oil, and heat resistant and are used as flame retardants in turnout gear worn by firefighters. Researchers found high concentrations of the hazardous substance fluorine (associated with both PFAS and PBDEs) on the moisture barrier and outer shell of the firefighter gear, potentially coming into direct contact with the skin.³ A study conducted in San Francisco tested the blood of 12 firefighters immediately after they responded to a call and found levels of PBDEs to be three times higher than that of the general public.⁴ PFAS and PBDEs can cause neurotoxicity, reproductive toxicity, diabetes, and cancer, which means firefighters have to go through a decontamination process after every fire; additionally, they are encouraged only to wear turnout gear to actual fires and never around the public.⁵

PFAS is a Forever Chemical because it does not break down naturally and it persists in the environment and the human body.⁶ It is used in firefighting foam and has contaminated rivers, streams, and groundwater, affecting the health of entire communities.⁷ Fire services now mostly use alternatives including the Fluorine Free Fire Fighting Foam and Dry Chemical Fire Suppression System, both of which are PFAS-free.⁸



“Hard times don’t create heroes. It is during the hard times the ‘hero’ within us is revealed.”

- Bob Riley, the 52nd governor of Alabama.



Safety is not an intellectual exercise to keep us in work. It is a matter of life and death. It is the sum of our contributions to safety management that determines whether the people we work with live or die.”

-Sir Brian Appleton, Lord Cullen, Piper Alpha Disaster.

73% of the wildland firefighter workforce develops respiratory complications during their career. While exposed to many of the same respiratory hazards as structural firefighters, they often work long hours doing strenuous manual labor while carrying many tools and supplies over long distances. It is impractical for them to haul the usual cumbersome respiratory apparatus, so historically have only used bandanas and N95 masks, which are inadequate forms of respiratory protection.⁹ Wildland firefighters are now encouraged to wear APRs (Air Purifying Respirators) or PAPRs.¹⁰ Many of these respirators offer:

- Durability
- Portability
- Thermal resistance
- Active filtration
- Positive pressure
- Protection from particulate hazards, including gases and vapors



There's little doubt that firefighting will look very different in the future with intelligent fire suits and respiratory masks in development. Intelligent fire suits and masks can help firefighters effectively avoid danger in future.¹¹ Chinese researchers, working with the material polybenzoxazole (PBO), have successfully woven electrodes into the fabric of fire suits, combining fire resistance with computer technology. PBO has also been used to make respiratory masks, with a piezoelectric layer in-between to convert mechanical pressures to electricity and vice-versa. In addition to monitoring the firefighters' breathing, it also tracks Nitrogen Dioxide levels, so they can effectively avoid danger.

The registry is now open in the US for the first national campaign to monitor cancer in firefighters (nfr.cdc.gov). Hopefully, it will find more information about how the two are connected. Since James Braidwood established the world's first organized municipal fire brigade in Edinburgh in 1824, the fire service has had to adapt to new technologies, scientific discoveries, and societal changes.¹² The issue of hazards is arguably the most pressing that the firefighting industry will ever face; the big question is whether the required changes will be enough to protect firefighter and the public that they serve. Fighting fires is never going to be an easy job, but we owe it to our firefighting heroes to do everything we can to make them as safe as possible. They already sacrifice so much.

Works Cited

1. SWNS Digital. 'These are the most popular jobs kids dream of doing when they grow up.'
<https://swnsdigital.com/us/2019/12/these-are-the-most-popular-jobs-kids-dream-of-doing-when-they-grow-up/>
2. WAFF. 'Firefighter Cancer Awareness Month: Local fire department shares how it's protecting firefighters.'
<https://www.waff.com/2023/01/23/firefighter-cancer-awareness-month-local-fire-department-shares-how-its-protecting-firefighters/>
3. PBS. 'How firefighters' life-saving work puts them at a higher risk of cancer.'
<https://www.pbs.org/newshour/show/how-firefighters-life-saving-work-puts-them-at-a-higher-risk-of-cancer>
4. Notre Dame News. 'Gear treated with 'forever chemicals' poses risk to firefighters.'
<https://news.nd.edu/news/gear-treated-with-forever-chemicals-poses-risk-to-firefighters/>
5. Bangor Daily News. 'Exposure to Flame Retardant Chemicals Means Firefighters Face Higher Cancer Risk Than Previously Thought.'
<https://www.sffcpf.org/news-post-2/>
6. Fire-Dex. 'Alternatives to Firefighter Turnout Gear.'
<https://blog.firedex.com/blog/alternatives-to-firefighter-turnout-gear>
7. Vanguard. 'Firefighting Foam & PFAS: What You Need to Know.'
<https://vanguard-fire.com/firefighting-foam-pfas-what-you-need-to-know/>
8. TUV SUD. 'How To Phase Out PFAS Forever Chemicals In Fire Fighting Foams.'
<https://www.tuvsud.com/en-us/resource-centre/stories/fire-foam-phase-out>
9. Design Center Colorado. 'Protecting the Health of Wildland Firefighters'
chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.colorado.edu/mechanical/sites/default/files/attached-files/industry_team28_respirator.pdf
10. U.S. Fire Administration. 'EMR-ISAC InfoGram Dec. 15 – Market survey of respirators suitable for wildland firefighting; White House launches Non-Fatal Opioid Overdose Dashboard.'
<https://content.govdelivery.com/accounts/USDHSFACIR/bulletins/33d9d82>
11. News Medical. 'Intelligent fire suits and masks can help firefighters effectively avoid danger in future.'
<https://www.news-medical.net/news/20230117/Intelligent-fire-suits-and-masks-can-help-firefighters-effectively-avoid-danger-in-future.aspx>
12. Firefighter Foundation. 'History of Firefighting.'
<https://www.firefighterfoundation.org.uk/history/#:~:text=The%20first%20organised%20municipal%20fire,as%20the%20first%20Fire%20Chief.>

Want to know more?



EUROPE

Italy (Head Office)
Tel. +39-051-617-6311
gvs@gvs.com

Romania
Tel. +40-244-463044
gvsromania@gvs.com

Russia
Tel. +7-495-004-5077
gvsrussia@gvs.com

Turkey
Tel. +90-216-504-4767
gvsturkey@gvs.com

United Kingdom
Tel. +44-(0)-1524-847-600
gvsuk@gvs.com

AMERICAS

Argentina
Tel. +54-114-988-9041
gvsarg@gvs.com

Brazil
Tel. +55-193-879-7200
gvs@gvs.com.br

Mexico
Tel. +52-81-2282-9003
gvmex@gvs.com

U.S.A.
Tel. 1-866-494-4599
respirators@gvs.com

ASIA

China
Tel. +86-512-6661-9880
gvschina@gvs.com

India
gvsindia@gvs.com

Japan
Tel. +81-3-5937-1447
gvsjapan@gvs.com

Korea
Tel. +82-31-563-9873
gvskorea@gvs.com

Malaysia
gvsmalaysia@gvs.com

Help us spread the word about respiratory protection.

Find more information at gvs-rpb.com



linkedin.com/company/gvs-health-and-safety



youtube.com/gvsrpb

gvs.com

Copyright ©2024 GVS S.p.A.. All rights reserved.

All materials contained in this publication are protected by United States copyright law and may not be reproduced, distributed, transmitted, displayed, published or broadcast without the prior written permission of GVS S.p.A.. You may not alter or remove any trademark, copyright or other notice from copies of the content.

Trademarks and Other Intellectual Property

All trademarks, service marks, and logos used in this publication, both registered and unregistered, are the trademarks, service marks, or logos of their respective owners. The green and gray color combination is a registered trademark of GVS S.p.A.. All rights in the GVS-RPB Intellectual Property contained in this publication, including copyright, trademarks, service marks, trade secret, and patent rights are reserved. GVS-RPB Intellectual Property means any patent, patented articles, patent applications, designs, industrial designs, copyrights, software, source code, database rights, moral rights, inventions, techniques, technical data, trade secrets, know-how, brands, trademarks, trade names, slogans, logos, and any other common law and proprietary rights, whether registered or unregistered anywhere in the world, that are owned by, developed in whole or in part by, or licensed by GVS S.p.A..

DuPont™ Tychem is a registered trademark of E.I. du Pont de Nemours and Company or its affiliates.