

World class protection

The Personal Protective Equipment worn by NSW RFS firefighters is the best protection in the world. Over years of rigorous testing those 'yellows' not only meet industry standards, but in many cases exceed them.

Personal Protective Equipment (PPE) and Personal Protective Clothing (PPC) are terms that are often interchanged. For the record, Personal Protective Equipment (PPE) refers to protective clothing, helmets, goggles, or other garments or equipment designed to protect the wearer's body from injury. So essentially, PPE is anything used or worn by a person to minimise a risk to the person's health or safety.

The purists of the world will tell you, quite correctly, that PPE should only be considered as a control measure when the chance to minimise or eliminate exposure to a risk cannot be lessened in any other way. So, essentially PPE does not control the hazard at the source, rather it is your last line of defence.

For the PPE to offer the protection for which it is designed, it is essential that it fits correctly and that it is used correctly. If your PPE does not fit correctly or is damaged you need to tell your Captain and /or District and seek a replacement or repair.

As a baseline, all the PPE issued by the NSW RFS meets the applicable Australian Standards. Generally, the PPE issued by the NSW RFS exceeds the Australian Standard in specific areas, for example, the RFS goggle has requirements for scratch and fog resistant lenses, describes a minimum volume inside the goggle and a minimum distance

between the lens and the eye, additionally the RFS requires the body of the goggle to resist high temperatures, have a retention strap that will not drip melted elastic when burnt and lenses that deliver an increased level of ballistic impact protection.

The NSW RFS continually works towards improving its PPE. This involves keeping current with Standards, which are generally reviewed and perhaps changed every five years, maintaining an understanding of developments and trends in PPE and undertaking testing, which we do both in Australia and worldwide. As far back as 1995, the NSW RFS conducted its initial test of its bush fire protective clothing in a simulated flash fire chamber. The NSW RFS was the first Australian bush firefighting agency to do so.

The Service continues to conduct this type of testing, generally trialing an alternate fabric or adjustments to design. The testing has been undertaken at the University of Alberta, Edmonton Canada. Why Canada? Because at the time this was the only test facility not associated with a fabric manufacturer and has significant experience in the provision of independent advice on the specialty textiles being used.

In 2007, the NSW RFS conducted multiple series of tests (each series consist of three tests) at Alberta University which

included bush fire and structural firefighting garments. One of these tests involved a complete bush fire PPE ensemble (except for the boots).

The PPE was in the flames for four seconds at temperatures in the range of 800°C – 900°C. The energy the PPE was subjected to was 84 kW/m². It is the same as having 84 one kilowatt bar room heaters crammed into a space one metre by one metre right next you.

Following the test the "yellows" (Bush Fire Ensemble) showed very little damage and were still intact, the helmet and goggles had not melted nor lost their shape, the gloves and hood were still intact. The equipment performed as was intended.

It needs to be stressed that although the equipment has been tested in these conditions, it does not mean that you can now get yourself closer to a fire or place yourself in a more hazardous position.

The selection and evaluation of PPE is an important process. The NSW RFS Equipment Research and Development Unit develop the specifications for all the PPE issued to NSW RFS members gathered over many years. In the past, groups of NSW RFS volunteers have been used to assess products during tender evaluations and whilst the tender process and evaluation of the

products was a formal process, the selection of the NSW RFS members used in the evaluations was not.

NSW RFS Equipment Research and Development Unit will be changing this in the very near future. It is proposed to select 10 members from each Region, chosen from districts across the region so as to maximize the representation and conditions equipment will be used in. These members will in effect become a reference group when new equipment is to be evaluated.

It is not intended that all the 40 members will be called upon all the time, it will depend on the nature of the equipment and the impact it will have on the NSW RFS. For example, in the coming tender for PPE, the entire group will participate. For PPE / equipment which only have a small usage in the Service, such as lifejackets, then it will be a much smaller group.

What is different about the new structural PPE?



The NSW RFS is issuing a new structural ensemble. What's different about it?

The current two piece structural ensemble worn by RFS volunteers was certified to Australian Standard (AS) 4967 - 2006 – Protective Clothing for Firefighters. As discussed earlier, Standards change and in 2009 a revised standard came into effect, AS 4967-2009 - Protective Clothing for Firefighters. There is always a reasonable amount of time to transition to new Standards, hence we commenced releasing the revised product earlier this year.

This particular Australian Standard establishes the minimum requirements for structural firefighting protective clothing designed to provide firefighting personnel with limited protection from thermal, physical and environment hazards encountered during structural firefighting operations.

The 2006 Standard allowed the use of multiple garments to achieve the necessary performance, eg use of structural trousers over the top of bush fire pants, the new standard only allows the use of a single layer ensemble for certification. It should be noted that standards

are not applied retrospectively. This does not mean that you have to modify the approach of wearing bush fire PPE under the structural if that's how it suits you, however, the new structural is certified as a standalone garment and can be worn with minimal underclothing if you wish.

The new Standard also mandated an increase in the radiant heat resistance and flame heat transfer performance. There was no change in the requirements for resistance to water and liquid chemicals or water vapor resistance ("breathability").

The jacket will now have an additional high visibility triple trim tape on the sleeves, the trousers will also feature additional material on the knees to reduce wear and minimise the impact on the users when crawling through active structural fire environments.

Q: How can I ask questions or find out more information?

A: You can email your question to Equipment@rfs.nsw.gov.au with contact details and answer will be emailed back to you.

Your PPE: what makes it world class?

Without PPE

RISKS: head injuries, radiant heat, flying debris, falling branches, embers in hair

RISKS: temporary and permanent eye damage; temporary loss of sight due to dust, embers, heat and smoke; no protection from flames, radiant heat or the impact of flying objects

RISKS: abrasions, burns, severe skin loss; not visible in low light conditions; no protection from heat, flame or flying objects

RISKS: severe skin loss and burns; abrasions and cuts; radiant heat

RISKS: no protection from heat, flames and abrasions

RISKS: significant risk of 2nd or 3rd degree burns to large areas of the body; low visibility; flammable

RISKS: foot and toe injuries from penetrating or falling objects; low protection from radiant heat from the ground, ash or chemicals on the ground; no support for ankles

With PPE

WHITE HELMET WITH HIGH VISIBILITY MARKINGS:

- provides visibility in low light or smoky conditions
- internal harness and frame protects the skull, spine and neck from impact of falling objects
- internal air barrier protects the head from over-heating
- flame resistant material protects head and hair from flames

GOGGLES:

- protects face, eyes and eyesight from the effects of heat, smoke, flames and flying objects
- all materials are flame and fire-retardant
- lens is anti-fogging, anti-scratch
- exact volume of air within the goggles is designed to protect the lens of the eye from overheating
- tested to protect against high impact

NECK FLAP:

- protects neck, hair and ear-openings from dust, embers and sun

COLLAR:

- protects neck and throat from radiant heat, flame resistant

JACKETS:

- significantly reduces the risk of burn injury by protecting from radiant heat flame
- loose-fitting allows air to circulate
- yellow colour provides high visibility during the day
- fluorescent stripes provide high visibility at night
- fabric has high standard of wicking breathability and is hypo-allergenic

FOUR OUTER POCKETS:

- provide storage for goggles, radios, hoods

GLOVES:

- protect hands from radiant heat and flames
- protection against cuts, abrasions and some impact
- inner kevlar cuff protects wrists from injury, abrasions and heat

HIGH-WAISTED PANTS:

- high waists protect kidneys and lower back when crouching
- high waist provides facility for inner utility belt if required
- as for JACKET: provides world class overall protection from burn and heat injuries and high visibility

REINFORCED KNEE PANEL:

- provides protection from abrasions while crouching and climbing
- also provides extra protection for radiant heat when the knee is bent

REFLECTIVE STRIPES:

- enhance visibility in low light conditions

PRESS STUDS AND ANTI-SCUFF HEMS:

- press studs can be clipped to protect from embers, ash
- Nomex hem stops fraying and accidents from tripping or loose fibres catching alight

CALF-HIGH BOOTS:

- leather uppers protect from heat, flame and embers
- height of boot supports ankles
- reinforced soles protect from sharp objects or spikes
- reinforced toe caps protect from falling objects
- soles resistant to acid, oil and chemicals
- dual density provides hard outer and soft sole for comfort
- inner sole is anti-fungal, anti-bacterial