# Brett Egan-Briers

Brett Egan-Briers is a retired fire officer now working as the NFCC PPE Technical Advisor and vice chair of the NFCC PPE and Clothing Committee.  Brett has 40 years fire service experience with the last 25 directly involving firefighters PPE.

Brett also represents NFCC on numerous British, European and International standards committees directly relating to fire service PPE.

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# Firefighters PPE – Complex Requirements and a Balanced Approach for protecting responders

# The Journey 1900 - 2025

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# What changed - 1987

- Home Office - A26

- EN 469:1995
- EN 469:2005
- EN 469:2020

**Now under revision**

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# PPE at Work Regulations

## Regulation 4 – Provision of PPE

*"Every employer shall ensure that suitable personal protective equipment is provided to his employees who may be exposed to a risk to their health or safety while at work except where and to the extent that such risk has been adequately controlled by other means which are equally or more effective".*

## Regulation 6 – Assessment of PPE

*"Before choosing any personal protective equipment which by virtue of regulation 4 he is required to ensure is provided, an employer or self-employed person shall ensure that an assessment is made to determine whether the personal protective equipment he intends will be provided is suitable".*

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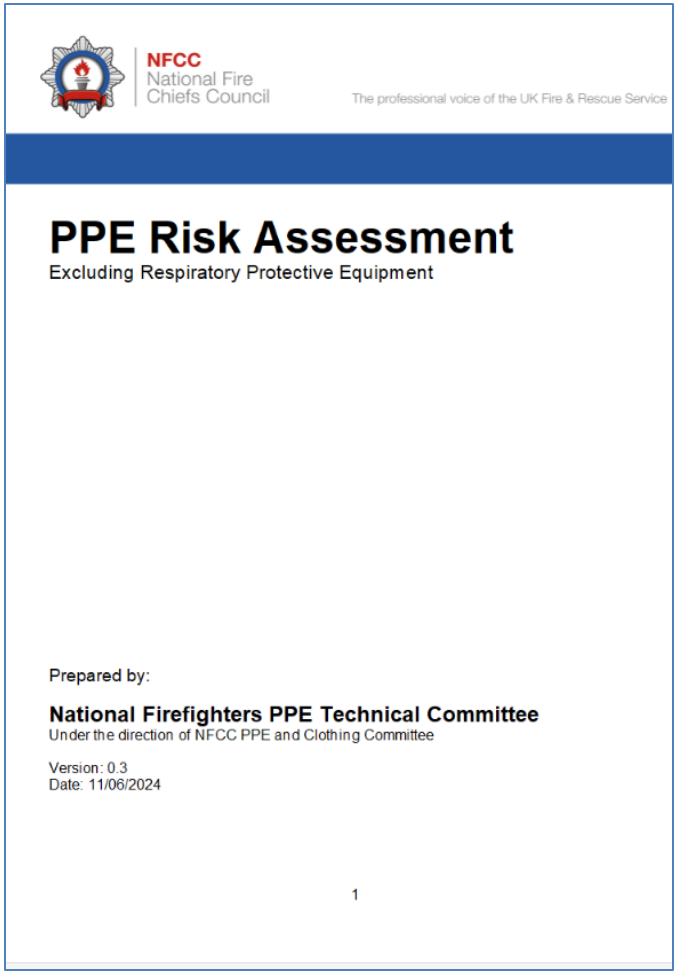
# PPE Risk Assessment

- Temperature
- Irrespirable atmosphere
- Weather conditions
- Working environment
- Collisions
- Hazardous materials
- Machinery
- Smoke and fire gases
- Electricity
- Animals
- People
- Manual handling
- Equipment
- Noise
- Vibration
- Physical
- Contamination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The professional voice of the UK Fire & Rescue Service

**PPE Risk Assessment**

Excluding Respiratory Protective Equipment

Prepared by:

**National Firefighters PPE Technical Committee**
Under the direction of NFCC PPE and Clothing Committee

Version: 0.3
Date: 11/06/2024

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# Thermal Intensity faced by firefighters

| Routine | Hazardous | Emergency |
| --- | --- | --- |
| • 20-70°C<br>• < 1.67 kW/m$^2$<br>• 10-20 mins | • 70-300°C<br>• 1.67-12.56 kW/m$^2$<br>• 1-10 mins | • 300-1200°C<br>• 12.56-209.34 kW/m$^2$<br>• < 1 min |
| External attack | Internal Attack | Flashover |


N. J. Abbot, S. Schulman, Protection from fire: non-flammable fabrics and coatings, J. Coat. Fabr. 6 (1976) 48.
R. Rossi, Fire fighting and its influence on the body, Ergonomics 46 (10) (2003) 1017.
J.A Foster, G.V Roberts, measurements of the firefighting environment – summary report, Fire Eng. J .55 (178) (1995) 30.
B.N. Horschke, Standards and specifications for firefighters' clothing, Fire saf. J. 4 (1981) 125.


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# Performance

| | |
|---|---|
| Heat and Flame Resistance | • Heat resistance<br>• Heat transfer (flame)<br>• Radiant heat transfer |
| Mechanical Properties | • Tear resistance<br>• Tensile strength<br>• Residual strength |
| Comfort | • Dimensional change<br>• Chemical resistance<br>• Breathability |

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# 1. Heat and Flame

1. Heat Resistance
2. Flame spread
3. Heat Transfer – Flame
4. Heat Transfer – Radiation
5. Contact Heat
6. Conductive and Compressive Heat Resistance

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# 2. Mechanical properties

7. Residual strength after heat exposure
8. Heat resistance – Sewing thread
9. Tensile strength
10. Tear Strength
11. Abrasion Resistance

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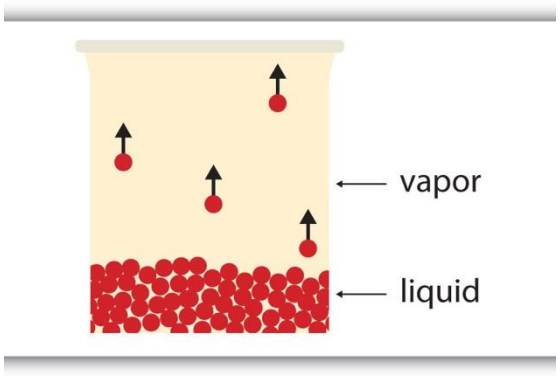
# 3. Comfort - Liquid and Vapour properties




1. Dimensional change – shrinkage
2. **Resistance to liquid chemicals**
3. Resistance to water penetration
4. Water vapour resistance – breathability
5. Surface wetting

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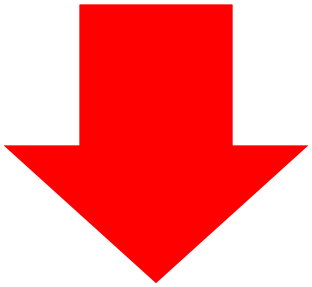

Heat transfer &

mechanical strength

Breathability, comfort

& weight

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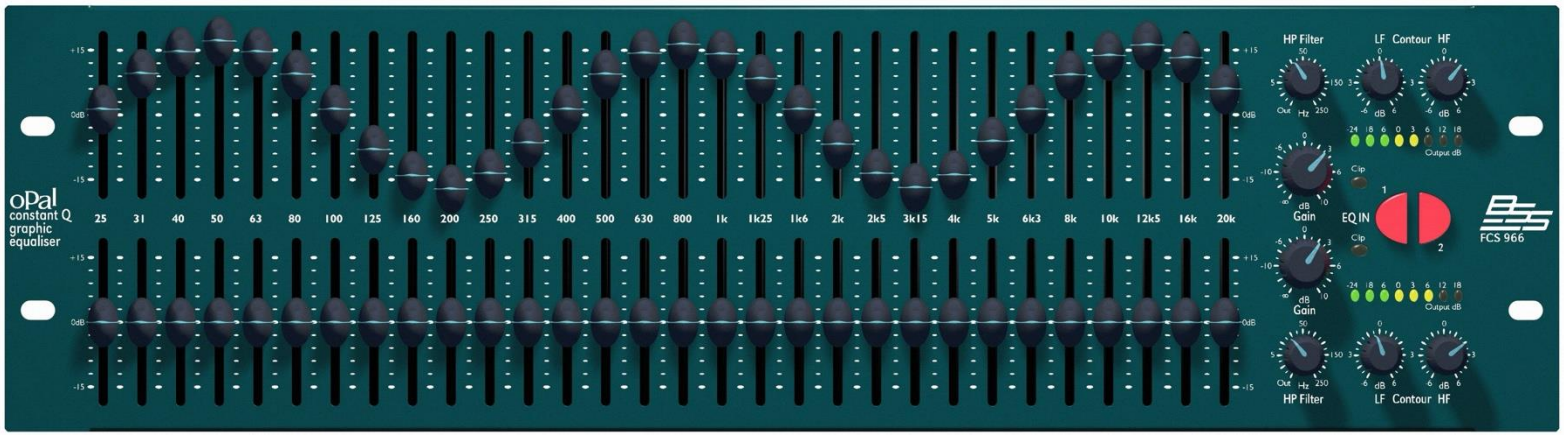
# Caution – be careful what you ask for!

## Thermal Burden




## Thermoregulation

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# The Norm

**The fire service traditionally supplies, Primary Protective Clothing (PPC), fire suits to EN 469 level 2 - protection required when fighting fires in structures**

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# England fire Statistics 2021

**“fires accounted for 27 per cent”**

This represents 147,295 incidents and can be broken down as such:

- Dwellings = 27,015
- Other buildings = 12,358
- Road Vehicles = 18,117
- Other outdoors = 4,811
- Secondary fires = 81,982
- Chimney fires = 3,012

Fire and rescue incident statistics: England, year ending December 2021 - GOV.UK (www.gov.uk)

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# England fire Statistics 2021

From the data:

- Dwellings = 27,015
- Other buildings = 12,358

These incidents as a total of the overall numbers (555,358) represent just 7% of activity.

Of that 7% it is likely that in some cases no entry was required into the structure.

**Therefore, we are using our structural PPC for the other ≥ 93% of our activities.**

NB. Previous years data has been calculated between 5-6%

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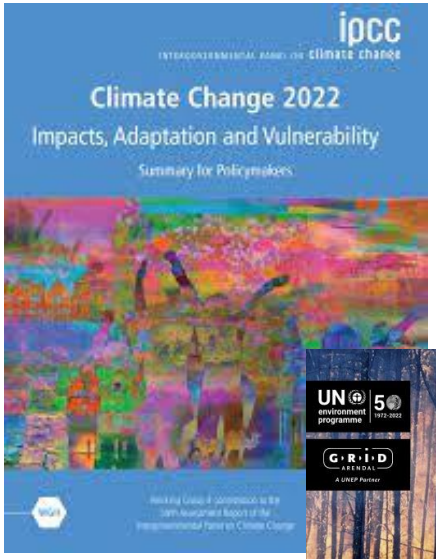
# Back to Risk - Environmental

- IPCC 6th Assessment
- UN Environment Programme - *Spreading like Wildfire*
- Summer 2022





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# New threats – New Risks

- Electric Vehicles

- Attacks on firefighters
  (terrorist threat)

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# Lightweight FF PPE

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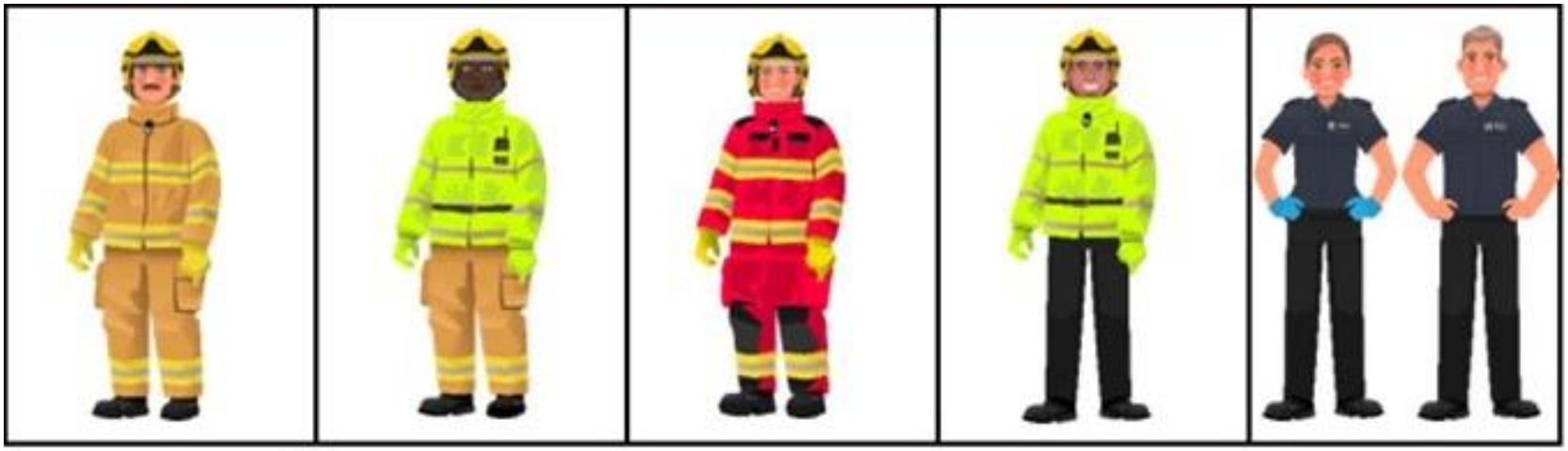
# New Options



**Hybrid PPE**

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# Contaminants

- Much research related to firefighters' health
- IARC (WHO) - Occupational Exposure as a Firefighter is Carcinogenic to humans (Group 1)

IARC Publications Website - Occupational Exposure as a Firefighter

- BS ISO 23616:2024 - Cleaning, inspection and repair of firefighters' personal protective equipment (PPE)

BS ISO 23616:2024 | 31 Aug 2024 | BSI Knowledge

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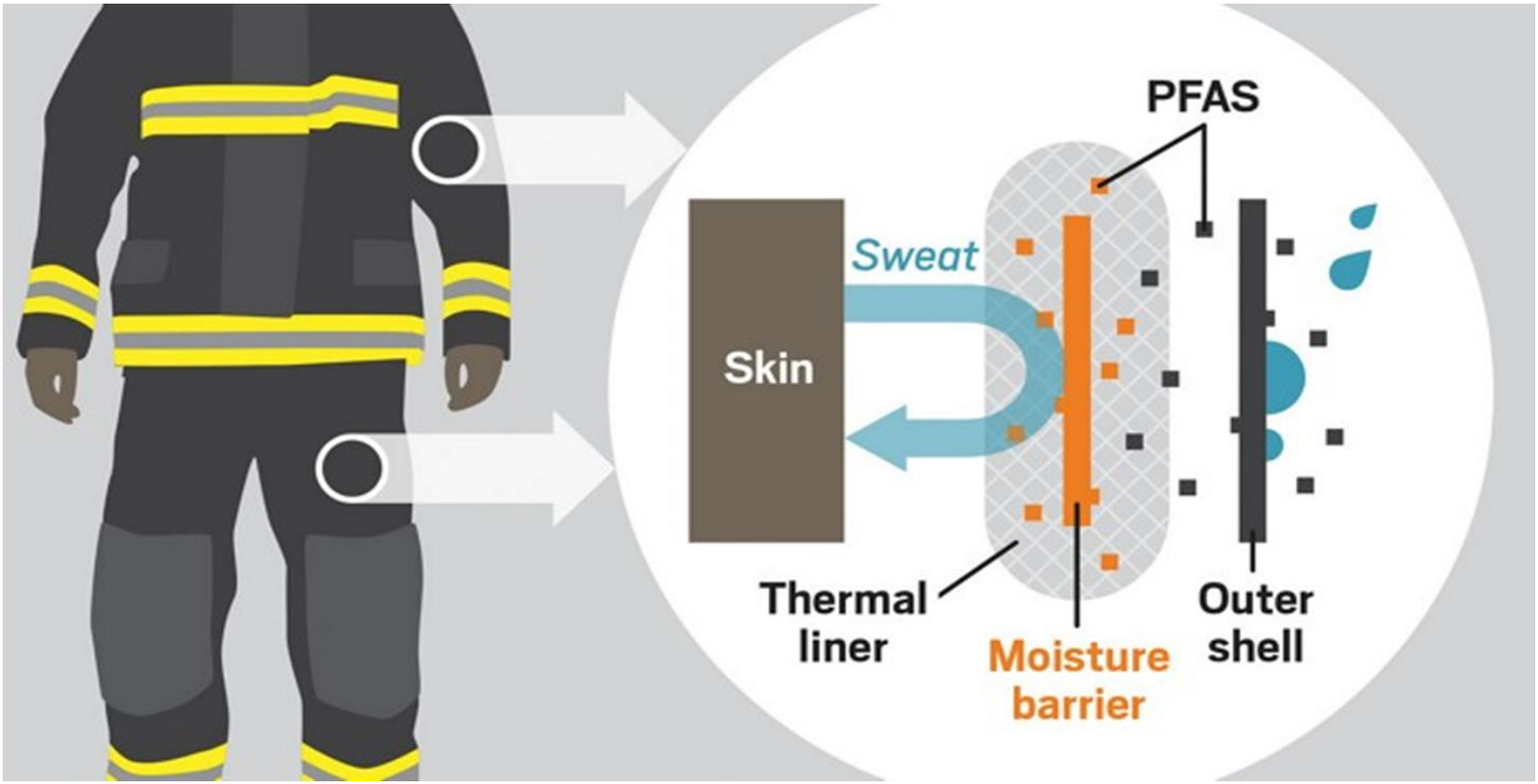
# Contaminants in PPE

**PFAS can be found in the moisture barrier and the durable water repellent on the outer shell**




[Regulator's report on "forever chemicals" published | HSE Media Centre]

[Protecting workers against cancer-causing substances at work]

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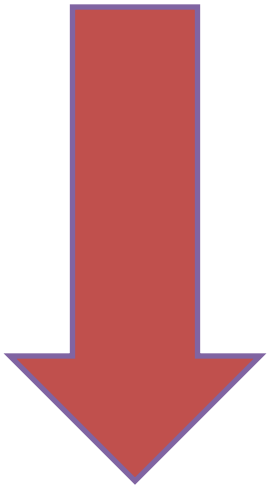
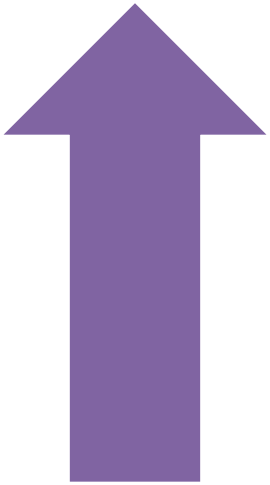
# The Trade OFF



- Chemical repellency
- Oil repellency
- Water repellency
- Breathability
- Durability
- Washability



- Uptake of hydrocarbons and other heavy metals by the raw textile
- Number of reimpregnations
- Run-off of water repellent
- Degradation

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# Equality, Diversity and Inclusion


- Fit:
  - sizing
  - protection
- Gender neutral
- Religious garments
  - Hijab – FR?
- Brand

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# Remember our hierarchy of safety

Last line of defence, but has limitations


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# Not forgetting

## Helmets

- Better fit/weight
- Ease to adjust
- Ease to Clean

## Fire hoods

- Protection level
- Particulate blocking?

## Gloves

- Dexterity
- Grip

## Boots

- Penetration resistance
- Fit/comfort/weight
- Electrical resistance

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