PERSONAL PROTECTIVE EQUIPMENT
FOR
FIREFIGHTERS

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- **Professional Background:**
  Working in the Fire Safety Industry since 1966.
  Fellow of the Institution of Fire Engineers (IFE) and founder of Irish branch of IFE.
  Fellow of JOIFF - The International Organisation for Industrial Hazard Management.

- **Present Position:** Director of Fulcrum Training Ltd.
  Director of JOIFF Ltd.

- **Engaged in development of standards:**
  Member of National Standards Authority of Ireland Fire Advisory Committee.
  Representative of NSAI on European (CEN) and International (ISO) Committees dealing with Firefighters' Personal Protective Equipment;
  Member of NFPA (USA) Technical Committees on qualifications for Professional and Industrial Firefighters and on flame protective clothing.
  Member ASTM (USA) Committees on protective clothing and Homeland Security.

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PRESENTATION WILL INCLUDE

- The Human Factor
- Personal Protective Equipment
- Firefighters Working Environments
- Current issues with Firefighters' PPE

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THE HUMAN FACTOR

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SOME PEOPLE

- EVEN FIREFIGHTERS -

BELIEVE THAT

=

NOT TRUE

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A FIREFIGHTER IS A

Human Being wearing **PPE**

and s/he should be :

- Fit
- Well trained
- Currently competent
- Well equipped
- Part of an efficient team

but s/he is still just a Human Being

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EFFECTS OF TEMPERATURE – PPE AND THE BODY

°C	°F	Observed effect
37	98.6	Average human body core temperature
39	102	Limit of efficiency/health of human body core temperature
44	111	Human skin temperature – discomfort and pain
60	140	Human skin temperature – maximum pain
120	248	Firefighters Helmet – visor melts
350+	660+	Aramids Nomex/Kermel begin to char

CORE BODY TEMPERATURE

FACTS:

- **Average normal core body temperature is 37ºC (98.6ºF)**
- **1°C rise in core body temperature to 38ºC (100.4ºF)**
  - seeing and hearing are impaired,
- **2ºC rise in core body temperature to 39ºC (102.2ºF)**
  - human body begins to lose efficiency and medical problems commence
- **3°C rise in core body temperature to 40ºC (104ºF)**
  - risk of collapse
- **3.5°C rise in core body temperature to 40.5ºC (105ºF)**
  - 50% of people have impaired thinking and their speech makes little sense

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“HEAT STRESS” – OVERHEATING OF THE BODY

Firefighters are regularly submitted to rises in core body temperature of / or greater than 2.5°C

» **critical decisions are taken – not questioned**
» **is medical attention sought ?**

Short Term –

- **What is the actual quality / value of the work being carried out ?**

Long Term –

- **what permanent damage is being caused to the body and brain ?**

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“HEAT STRESS” – OVERHEATING OF THE BODY

FACT:

Many Firefighters suffer

- **medical complaints,**
- **disability and**
- **premature death**

after completing active service,
due to unnecessary stress
to which they have been exposed during service

“HEAT STRESS” – OVERHEATING OF THE BODY

Is it any wonder firefighters become ill ??

Why should firefighters be so exhausted and dehydrated so regularly in their Place of Work ??

Would this be allowed in any other job ??

FIREFIGHTERS' WORKING ENVIRONMENTS

A number of studies have been carried out to identify the fire environment that may be faced by Firefighters

- **In 1976, USA National Aeronautics and Space Administration (NASA) initiated Project Fires**
- **In 1994, the United Kingdom Joint Committee on Fire Research carried out a Study "Measurements of the Firefighting Environment"**

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FIREFIGHTERS' WORKING ENVIRONMENTS

In 1976, NASA Project Fires.

•As the first step of the Project, the firefighting environment for "structural" firefighting was measured and defined and four thermal classes were designated:

Environment	Air Temperatures	Thermal Radiation
Class 1:	**up to 40°C**	**up to 0.5 kW/m²**
Class II:	**up to 100°C**	**up to 1.0 kW/m²**
Class III:	**up to 250°C**	**up to 1.75 kW/m²**
Class IV:	**up to 800°C**	**up to 40 kW/m²**

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FIREFIGHTERS' WORKING ENVIRONMENTS

In 1994, UK Joint Committee on Fire Research
"Measurements of the Firefighting Environment".

•The various conditions under which Firefighters and their equipment have to operate was classified into four groups as follows:

Environment	Exposure time limit	Thermal radiation limit
Routine conditions:	**25 minutes at 100°C**	**1 kW/m²**
Hazardous conditions:	**10 minutes at 160°C**	**4 kW/m²**
Extreme conditions:	**above 160°C but not exceeding 235°C**	**above 4 kW/m² but not exceeding 10 kW/m²**
The Study states that these conditions would not be acceptable operationally		
Critical conditions:	**above 235°C**	**above 10 kW/m²**
The Study state that a Firefighter would not be expected to operate in these conditions		

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FIREFIGHTERS' WORKING ENVIRONMENTS

Probably the most widely used template

in the development of standards for

PPE for protection against Heat and Flame

is called the

Hoschke Table

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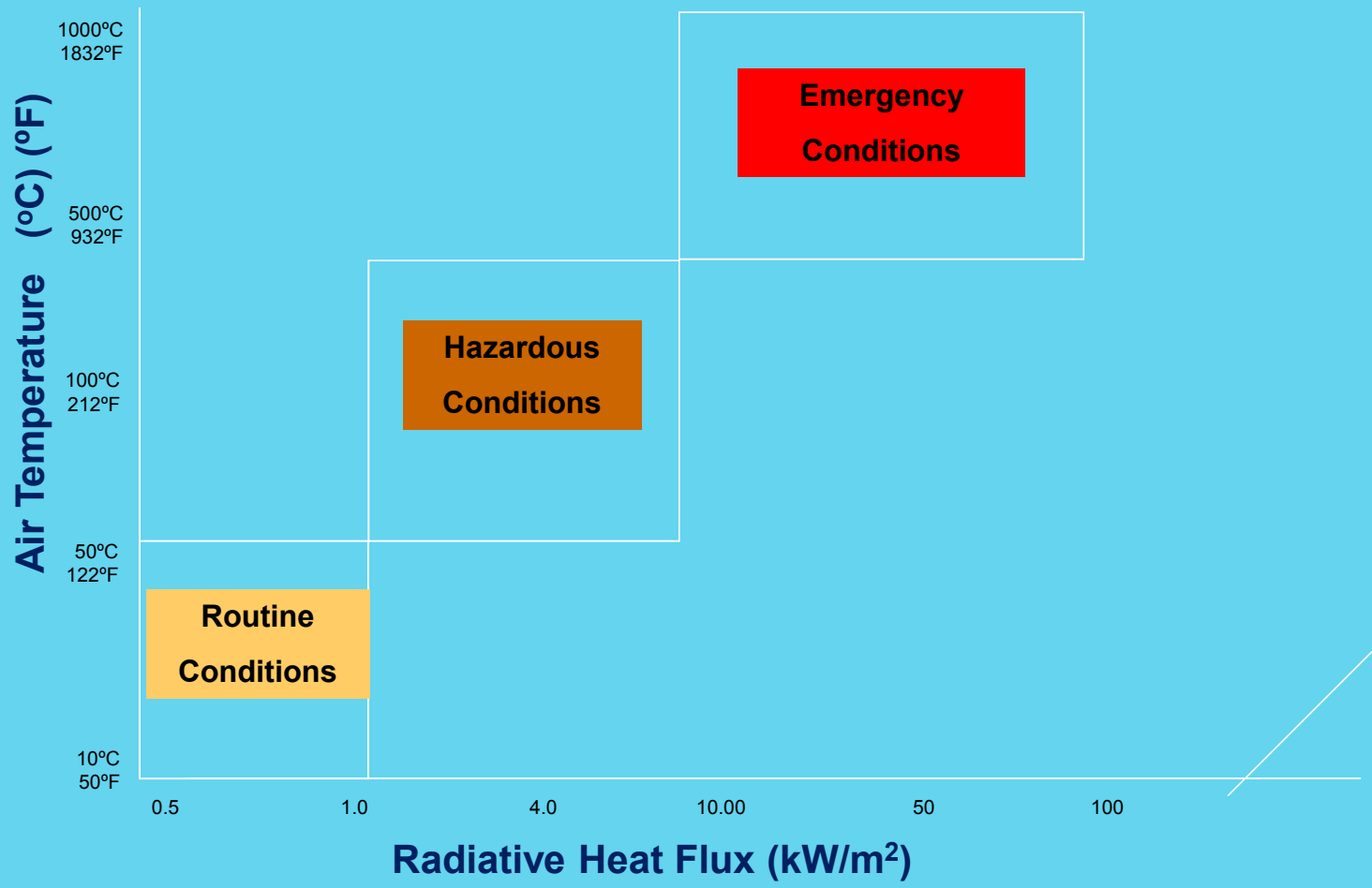
HOSCHKE TABLE (FIRE SAFETY JOURNAL 4 1981)



HEAT FLUX LEVELS – HOSCHKE TABLE

Heat Flux Level

- **Routine conditions**
  0.5 kw/m² - 1 kw/m²
  (0.024 cal./cm²)
- **Hazardous conditions**
  1 kw/m² - 10 kw/m²
  (0.24 cal./cm²)
- **Emergency conditions**
  10 kw/m² - >100 kw/m²

50 kw/m² - 84 kw/m²
(2 cal./cm²)

Occurrence

0.1 – 1.5 kw/m²

- **Sunburn in up to 30 mins.**

1.5 – 10 kw/m²

- **2nd degree burns in up to 25 secs.**

10 - 100 kw/m²

- **2nd degree burns in 1 sec.**
- **20 kw/m²** beginning of flashover
- **50 kw/m²** radiant heat flux 12m (40ft) away from fully involved building with exterior flames
- **84 kw/m²** = flashover conditions in testing PPE

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RECOMMENDED FIREFIGHTER EXPOSURE TIMES

Thermal exposure	Recommended maximum exposure times when dressed in suitable PPE
Level 1 - Routine Conditions: Air Temperature up to 100°C Radiant source ≤ 1.25 kW/m²	A number of hours at the lower end of the temperature range Approximately 20 minutes at the upper end of the temperature range.
Level 2 - Hazardous Conditions: Air Temperature up to 250°C Radiant source ≤ 8 kW/m²	A few minutes
Level 3 Emergency Conditions: Air Temperature ≤ 800°C Radiant source ≤ 80 kW/m²	A few seconds

EXPOSURE TIMES IN TESTING PPE FOR FIREFIGHTERS

Radiant heat exposure	Standards for Clothing	Standards for Gloves	Standards for Helmets
Level 1 ***- Routine Conditions:*** Air Temperature up to 100°C Radiant source ≤ 1.25 kW/m²			
Level 2 ***- Hazardous Conditions:*** Air Temperature up to 250°C Radiant source ≤ 8 kW/m²			
Level 3 ***- Emergency Conditions:*** Air Temperature ≤ 800°C Radiant source ≤ 80 kW/m²	40 kW/m²	40 kW/m²	14 kW/m²

FIREFIGHTERS WORKING ENVIRONMENTS

PPE to current Standards can withstand extreme exposures for a long time without any damage whatsoever

i.e.

Hoschke Table Emergency Conditions:

Air Temperature up to 800°C / 1470°F

– conditions that the human body cannot deal with

i.e.

Hoschke Table Routine Conditions:

Air Temperature up to 50°C / 122°F

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FIREFIGHTERS' WORKING ENVIRONMENTS

The protective performance levels of PPE

set down in CEN/ISO/NFPA Standards for

PPE for Firefighters

are aimed at protection against exposure to

***"worst possible"* fire scenarios,**

i.e. flashover conditions

FLASHOVER

Phenomenon that takes place only after failure of systems –

- ***building safety systems***
  - **fire loads are exceeded**
- ***occupants safety systems***
  - **an act or acts done or not done by people cause the fire**
- ***incident safety systems***
  - **failure to detect and extinguish a fire in its early stages.**

FACT:

Very few firefighters will experience exposure to flashover in their entire career

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FLASHOVER

So why put firefighters into this type of training exposure ??

This is not Realistic Training

FLASHOVER

Training Firefighters:

In a real life situation, would firefighters be allowed stay in such exposures ?

Training should replicate real life conditions firefighters might be exposed to under their job specification

FIREFIGHTERS' WORKING ENVIRONMENTS

It is widely accepted that

Working in fires

forms just a small percentage of the work carried out by firefighters

– a figure of 10% or less would appear to be the case

FIREFIGHTERS' WORKING ENVIRONMENTS

So why do all firefighters wear PPE that is tested to withstand *flashover conditions* for every call out ??

FIREFIGHTERS' WORKING ENVIRONMENTS

This practice means that for approximately *90% or more* of the work

of Firefighters,

they are wearing what could be considered as

inappropriate PPE

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FIREFIGHTERS' WORKING ENVIRONMENTS

At those exposures
from which the Firefighter will feel protected
inside the PPE cocoon

what is happening to the body ???

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PERSONAL PROTECTIVE EQUIPMENT

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PERSONAL PROTECTIVE EQUIPMENT

Known as PPE

is

"Any device or appliance

designed to be worn or held by an Individual

to protect against

one or more

Health and Safety Hazards."

Definition from the EU PPE "Use" Directive

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PERSONAL PROTECTIVE EQUIPMENT

The purpose of PPE is:

- ***to allow persons to work*** **in environments where without the protection afforded by the PPE, they normally could not work**
  - **without undue stress being caused by the PPE**

and

- **on unexpected exposure to hazards in emergency conditions**
  - **to safeguard personnel *by providing protection as persons escape* to safety**

JOIFF Handbook: Introduction

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FIREFIGHTERS' PPE – TO CURRENT STANDARDS

Firefighters' PPE is designed to reduce the flow of heat and moisture from the firefighting environment to the firefighter

- **It also reduces the flow of heat and moisture away for the firefighter to the environment**

Cannot easily lose body heat through the clothing

which causes

- **a rise in core body temperature which**
- **activates the sweating process in the body's attempt to restore normal temperature**

FIREFIGHTERS' PPE – TO CURRENT STANDARDS

As Firefighters' PPE is resistant to liquid flow

- **Sweat cannot easily evaporate so evaporative cooling is limited**
- **PPE will absorb/trap the evaporating sweat**
  - **reducing the insulating properties of the PPE**

FIREFIGHTERS' PPE – TO CURRENT STANDARDS

This can result in burns from moisture within the PPE

- **First degree burns occur at skin temperature 44ºC (111ºF)**
- **Second degree burns occur at skin temperature 55ºC (131ºF)**
- **Instantaneous skin destruction 72ºC (162ºF)**
- **Water turns to steam at standard air pressure 100ºC (212ºF)**

Remember……

Hoschke Table Routine Conditions:
Air Temperature up to 50°C / 122ºF

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FIREFIGHTERS' PPE

Much greater risk of such burns when e.g. bending arm, kneeling etc.

- **This compresses and might totally remove the insulating air barrier in the clothing**
- **Water transfers heat about 21 times faster than air at a temperature of 93ºC (200ºF)**
- **Wet garments/gloves result in higher heat transfer rates through garment/glove**

FIREFIGHTERS' PPE

BURN INJURY SCENARIO

- **Alarm sounds**
- **Firefighter dons turnout gear**
- **Normal heat loss from the body is slowed**
- **Arriving on the scene, SCBA and gloves are donned**
- **Physical activity takes place prior to commencing firefighting – pulling out hoses etc.**
  - **Sweat may already have soaked the clothing next to the skin**

FIREFIGHTERS' PPE

BURN INJURY SCENARIO

- **Firefighter enters the building, climbs stairs**
  carrying hose, fighting the fire etc.

- **Protective clothing is heated on its surface by**
  thermal environment of the fire

- **Heat capacity and thermal conductivity of clothing starts to change**
  - **increased quantity of absorbed sweat increases the thermal conductivity of the clothing**

- **As garments heat up, moisture evaporation rates tend to increase**

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FIREFIGHTERS' PPE

BURN INJURY SCENARIO

- **Increased evaporation rates helps keep the firefighter comfortable but hot**
- **Firefighting water splashes on the outside of the clothing**
- **Thermal conductivity of clothing approaches that of water and decreases the insulating properties of the clothing**
- **Firefighter suddenly feels pain on a hand, a shoulder next to the SCBA strap, biceps, knee**

If lucky, the firefighter withdraws
and gets back safely to the station with limited burns

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FIREFIGHTERS' WORKING ENVIRONMENTS

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SAFE SYSTEM OF WORK FOR FIREFIGHTERS

is built by a combination of many things including

- **Knowledge of the Workplace**
- **Hazard identification**
- **Risk Assessment**
- **Provision of the correct type of PPE**
- **Effective Planning**
- **Effective Command and Control**
- **Competency Based Training relevant to potential exposures**

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DO THE STANDARDS-MAKERS KNOW THIS ?

January 2001 I asked the CEN committee dealing with Firefighters' PPE

From the point of view of Safety of personnel in life threatening situations, how can "manufacture" and "use" be separated ?

A Project Group in CEN was set up to prepare a report on

Firefighters' Working Environments and their PPE

I was appointed Chairman of this Group

and

researched and wrote most of the report.

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FIREFIGHTERS' WORKING ENVIRONMENTS AND THEIR PPE

The questions reviewed in the Report were :

1. **Do the current EN Standards for Firefighters PPE adequately address the hazards to which Firefighters are exposed during the full range of their Working activities ?**

2. **Why are current EN Standards for Firefighters PPE being revised to include higher levels of performance when there is no data to support either a revision or an increase in performance levels ?**

3. **A growing number of injuries caused to Firefighters occur during Training exercises**
   - **Is PPE used by Firefighters in Training adequate ?**
   - **Should a series of new Standards for Firefighters PPE during Training be written ?**

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FIREFIGHTERS' WORKING ENVIRONMENTS AND THEIR PPE

Amongst the Report's conclusions were:

1. **Environments faced by firefighters in actual conditions of work should be known so that Standards-makers will understand what standards for PPE for firefighters should be trying to achieve.**

2. **Actual working environments that are likely to be experienced by firefighters under a proper system of Safety Management should be considered and protection against lower levels of Risk should be established in Standards for PPE for Firefighters.**

3. **All items of PPE to protect against particular exposures should be tested to the same level of performance so that Firefighters are equally protected on their whole body.**

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FIREFIGHTERS' WORKING ENVIRONMENTS AND THEIR PPE

4. **The periods of exposure by persons dressed in suitable PPE to each of the Firefighters' Environments identified in this Paper (Hoschke Table) should be limited.**

5. **Where otherwise unavoidable, the potential for heat stress caused by the required PPE should be actively controlled.**

6. **The type of Training provided for Firefighters should reflect the actual hazards in the Work Place of Firefighters.**

7. **Establish a mechanism requiring testing of PPE for Firefighters in service to be establish whether the levels of performance of PPE deteriorates with exposure/use and whether or not it is "fit for use" after such exposures/uses.**

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FIREFIGHTERS' WORKING ENVIRONMENTS AND THEIR PPE

- **Completed report was agreed unanimously by the Working Group (WG)**
- **Report was circulated to all WGs in CEN TC 162 dealing with Firefighters PPE**
- **Report was agreed unanimously by each WG and the CEN Technical Committee to which they reported**

What happened as a result of the Report's recommendations ??

ABSOLUTELY NOTHING

"BUSINESS AS USUAL" !!

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CURRENT ISSUES WITH FIREFIGHTERS' PPE

WHAT IS HAPPENING TO FIREFIGHTERS TODAY

- Firefighters all over the World are contracting and dying from cancer and other diseases each year
- Standards-makers continue to make more and more standards for PPE with little or no reference to the Users or their needs
- Manufacturers continue to develop new materials for PPE to protect against what they perceive as firefighters exposures
- Test Houses continue to develop new tests for what they perceive are relevant levels of performance for firefighters PPE
- The cost of purchase and replacement of PPE gets higher and higher

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FIREFIGHTERS CANCER AND OTHER DISEASES

- A significant number of chemicals absorb through skin and cause both acute and latent toxic effects.
- Much of the smoke in a building fire consists of visible soot particles generated by the combustion of various materials.
- Many fire ground gases penetrate the clothing and reach the firefighters skin.
  - Work done in Australia showed specific carcinogens to be present on the firefighters skin after simulated residential and industrial fires.
- The decomposition products from burning materials, particularly the large amounts of synthetic materials now found throughout all structures, contributes to a significant number of highly hazardous chemicals.

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FIREFIGHTERS CANCER AND OTHER DISEASES

- **While most of these chemicals are relatively volatile and dissipate over time, the carbon- based soot particles adsorb (condense and form a thin surface film) many of these vapors holding them in place as the particles deposit onto surfaces including firefighter clothing and skin.**

- **These chemicals initially trapped on the particles over time desorb (release) into the surrounding environment and come in contact with the firefighter.**

- **Analyses conducted on fire ground contaminated clothing often show a range of different types of chemical substances present in the clothing.**
  - **In some cases, these chemicals are *not* removed by washing the clothing.**

FIREFIGHTERS CANCER AND OTHER DISEASES

- The ability of PPE to prevent skin exposure to fireground contaminants is limited and wearing PPE is not sufficient to limit exposure to most cancer-causing agents that may be encountered on the fire ground.

- Several parts of the PPE ensemble provide penetration pathways for smoke particulates and vapors to reach firefighters skin.

  - Helmet ear covers, hoods, and coat and glove wristlets lack any form of barrier material.

  - Garment closures designed to be resistant to liquid penetration are not airtight.

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FIREFIGHTERS' PPE, CANCER AND OTHER DISEASES

- Interface areas between gloves and coat sleeves, footwear and trouser ends, the coat and trousers and the face/head/neck interface area are all relatively open to airborne fire ground contaminants.

- The contamination of exterior surfaces and inner layers of firefighters' PPE results in exposure well after the incident if not removed

- SCBA when worn provides respiratory protection; but SCBA is not always worn, particularly during post fire activities (overhaul)

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POST-FIRE – DO YOU SEE ANY SCBA ?

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DO YOU HAVE A POST-FIRE POLICY ?

POST FIRE EXPOSURES ARE THE MOST DANGEROUS

- Are on-scene commanders permitted to allow firefighters to partially remove PPE ?
- What is the procedure when crew called to a 2nd fire incident on the way back to the station after a major fire incident ?
  - Do they re-don the contaminated PPE ?
- Do crew wash down / decontaminate after every fire incident ?
- Does each firefighter have at least 2 sets of PPE ?

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FIREFIGHTERS' PPE, CANCER AND OTHER DISEASES

Getting the Chemicals Out

- Apply the proper cleaning instructions to all PPE when any exposed surface is suspected of being contaminated
- Good practice in care and maintenance of turnout PPE requires the washing of PPE by using suitable cleaning agents as a form of clothing care at least once a year but also whenever your gear is exposed to soiling at a fire.
- Frequency for cleaning is a judgment call but if the clothing is visibly soiled or contaminated, then it must be cleaned.
- In addition, if the PPE is known to have been exposed where there is any concern about continued contamination, then it also must be cleaned

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FIREFIGHTERS' PPE, CANCER AND OTHER DISEASES

Laundering is not necessarily decontamination

- **Most laundering processes specified by clothing manufacturers are designed to remove soiling, including soot particles and many chemicals**

- **Research has shown that a great deal of contamination can be removed with thorough cleaning through appropriate washing procedures or use of an independent service provider but**
  - **this does not mean that all chemicals will be removed**

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FIREFIGHTERS AND CANCER

11 Action points to help protect firefighters from cancer

1. **Use SCBA from initial attack to finish of post fire activities (overhaul).**

   Not wearing SCBA in active and post-fire environments is the MOST dangerous activity in the fire service today.

2. **Decontaminate PPE and body before leaving the fireground to remove as much soot and particulates as possible.**

3. **Use baby wipes to remove as much soot as possible from head, neck, jaw, throat, underarms and hands immediately and while still on the scene.**

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FIREFIGHTERS AND CANCER

11 Action points to help protect firefighters from cancer

4. Change clothes and wash them immediately after a fire.

5. Shower thoroughly after a fire.

6. Clean PPE including gloves, hood and helmet immediately after a fire.

7. Don’t take contaminated PPE home or store it in a personal vehicle.

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FIREFIGHTERS AND CANCER

11 Action points to help protect firefighters from cancer

8. **Decontaminate the interior of the fire apparatus immediately after a fire.**

9. **Keep PPE out of living and sleeping quarters.**

10. **Do not use tobacco products.**

11. **Use sunscreen or sun block when out of doors for long periods.**

Firefighter Cancer Support Network www.FirefighterCancerSupport.org

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FIREFIGHTERS AND CANCER

Life saving practices on the Fireground

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FIREFIGHTERS PPE

Current standards for PPE are not suitable for what happens in practice

ACTION: **Become knowledgeable about Risk Assessment**
and the safe systems of work where PPE is required

Choose PPE that is "fit for purpose" based on a PPE Risk Assessment

More information on this and other matters on PPE
to protect against Heat and Flame from…..

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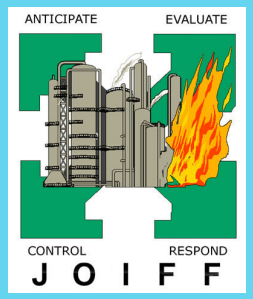

The Organisation for Emergency Services Management

THE JOIFF STANDARD

HANDBOOK
ON

PERSONAL PROTECTIVE EQUIPMENT (PPE)

to protect against

Heat and Flame

Available for free download from www.joiff.com

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FIREFIGHTERS PPE

Current standards for PPE are not suitable for what happens in practice

ACTION: **Start to know and understand what technology can do**

Forward thinking manufacturers are developing excellent new ranges of materials that can be used in PPE for Firefighters

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THE LAYERED SYSTEM – ALSO KNOWN AS ONION SKINS

Already used in the USA for Hazmat Incidents

FLAME RESISTANT

IMPERMEABLE TO CHEMICALS

FULLY ENCAPSULATED

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FIREFIGHTERS PPE - THE LAYERED SYSTEM

Add or remove based on risk

FIREFIGHTERS PPE – THE FUTURE ???

 Omni-Heat®	 Omni-Dry®	 Omni-Shade®
Thermal technology helps maintain warmth and prevent Heat loss. Regulates temperature by reflecting and retaining the warmth the body generates while dissipating moisture and excess heat Dot lining provides heat retention while maintaining a high level of breathability to reduce excess heat and moisture	Breathable waterproof technology, designed to keep wearer dry during highly aerobic activity. Extremely air permeable waterproof fabric transfers the moisture vapours at an extremely high rate. Air is circulates through the fabric helping to regulate conditions in the garment and keep excess moisture from collecting inside while still maintaining wind blocking properties	Protects from damaging UV radiation by blocking the majority of the suns harmful rays. Blocks Ultraviolet A and Ultraviolet B rays helping to prevent sun burn and long-term skin damage through tight weave construction, UV reflectors, and UV absorbing technology.

FIREFIGHTERS PPE – THE FUTURE ???

Overheating is a huge problem for Firefighters with full PPE

Why can't energy from SCBA regulators be harnessed to provide an air conditioning system

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FIREFIGHTERS PPE – THE FUTURE ???

GTX CORP With You® A GPS Tracking Company

Developed for persons with Alzheimer's Disease

- **Global Positioning System (GPS) is built into the footwear**
- **With a downloadable app, wearers can be tracked using the GPS or get an alert if the person wanders out of a pre-set safe zone**

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SUMMARY

This paper covered:

- **The Human Factor**
- **Personal Protective Equipment**
- **Firefighters Working Environments**
- **Current issues with Firefighters' PPE**

THANK YOU FOR YOUR ATTENTION

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STANDARDS

NEED FOR CHANGE

Danger in choosing PPE based on *Standards* and not *Risk*

Standards relate to *PERFORMANCE* not *PROTECTION*

- **Levels of performance in standards are based upon the results of *testing in a laboratory***
- **they do not necessarily relate to *actual conditions in the workplace***

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NEED FOR CHANGE

PPE should be selected with a full appreciation

of the conditions and tasks in the workplace

- **PPE chosen should be**
  - ***Fit for Purpose***

    decided by *Risk Assessment* of the *Job Roles*

    for which *PPE is needed*

NOT JUST BECAUSE IT COMPLIES WITH A STANDARD

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WHY IS FIREFIGHTERS' PPE MADE THIS WAY ?

- **The Standards-Making Process**
  - Europe, International and America

STANDARDS FOR FIREFIGHTERS' PPE

Standards are developed in

Europe by

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Internationally by

International Organization for Standardization

USA by

National Fire Protection Association
The authority on fire, electrical, and building safety

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STANDARDS FOR FIREFIGHTERS PPE

Europe

To protect the upper and lower torso arms and legs:

- EN 469 Protective Clothing for Firefighting
- EN 1486 Protective reflective clothing for specialised firefighting
- EN 15614 Wildland firefighting clothing
- EN ISO 11612 Protective clothing for workers exposed to heat

To protect the head :

- EN 443 Helmets for Firefighters
- EN 13911 Fire Hoods

To protect the hearing:

- No standards for Firefighters PPE yet

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STANDARDS FOR FIREFIGHTERS PPE

Europe

To protect the eyes and face

- EN 14458 Faceshields+visors for firefighters/ambulance/ emergency services

To protect the respiratory system

- EN 137 Self-contained open-circuit compressed air breathing apparatus with full face mask

To protect the hands:

- EN 659 Protective gloves for firefighters

To protect the feet

- EN 15090 Footwear for firefighters

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WHERE STANDARDS FOR FIREFIGHTERS PPE ARE STORED

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How many standards-makers have ever faced something like this ?

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Or this ?

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STANDARDS FOR FIREFIGHTERS' PPE

There is a perception
that Standards are written
for the Safety and Health of Users

WRONG !!

Safety and Health of Users
is assured
by effective
Safe Systems of Work

NEED FOR CHANGE

- **In choosing protection for Firefighters what we should be looking at is providing**

a Safe System of Work

- **The Standards-making process should be directed at assisting this process**

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SAFE SYSTEMS OF WORK

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SAFETY AND THE FIREFIGHTER

Relevant European Directives

3 key European Union Directives are critical to *safety of firefighters*

- **89/391/EEC**
  - **Health and Safety of Workers at Work**
- **89/656/EEC**
  - **Use by Workers of Personal Protective Equipment – known as PPE "Use" Directive"**
- **89/686/EEC**
  - **Personal Protective Equipment – known as**

    PPE "Product" Directive

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EUROPEAN DIRECTIVE 89/391/EEC

Health and Safety of Workers at Work

All Workers have the right to a *Safe Work Place*

through the establishment of *Safe Systems of Work*

known as

Safety Management System

This applies to all Workers including Firefighters

- ***Firefighters' work is potentially dangerous but they have the same rights to protection as other Workers***

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SAFE SYSTEM OF WORK

EUROPEAN DIRECTIVES SPECIFIC TO PPE

89/656/EEC

The "Use" Directive

- minimum Health and Safety requirements for the use by Workers of personal protective equipment in the work place

89/686/EEC

The "Product" Directive

- the laws specifying the procedures to be taken in the manufacture and certification of personal protective equipment

EUROPEAN DIRECTIVE 89/656/EEC
PPE "USE" DIRECTIVE

PPE shall be used

when the risks cannot be avoided or sufficiently limited

by

technical means of collective protection

or by

measures, methods or procedures of work organisation

EUROPEAN DIRECTIVE 89/656/EEC
PPE "USE" DIRECTIVE

There is a legal requirement for Employers to:

ACTION 1

- **Identify the hazards**
  - **eliminate, remove or reduce the risks**

ACTION 2

- **If the risks cannot be eliminated/removed/reduced**
  - **introduce controls to ensure Safety of personnel**

ACTION 3

- **If Safety of personnel still cannot be ensured**
  - **introduce Personal Protective Equipment**

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EUROPEAN DIRECTIVE 89/686/EEC
PPE "PRODUCT" DIRECTIVE

Governs the conditions under which PPE can be placed on the Market

- **the *Basic Safety Requirements* which PPE must satisfy in order to ensure the health protection and safety of Users**

- **requirement for EC Type-Examination**
  - **all PPE on the market in the EU must have a CE mark**

EUROPEAN DIRECTIVE 89/686/EEC
PPE "PRODUCT" DIRECTIVE

Establishes a legal requirement for Employers to

- **ensure PPE is "Fit for Purpose"**
- **define the characteristics which PPE must have in order to be effective against the risk(s) in question**
- **assess whether the PPE intended to be used satisfies the requirements of being effective against the risk(s) in question**

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PPE RISK ASSESSMENT

- **To ensure PPE is "Fit for Purpose" employer must**
  - **define the characteristics which PPE must have in order** ***to be effective against the risk(s) in question***
  - **assess whether the PPE intended to be used satisfies the requirements of** ***being effective against the risk(s) in question***

Therefore knowledge of the Risks is essential

Who better to provide such information than the User ?

EUROPEAN DIRECTIVES SPECIFIC TO PPE

CEN Standards for PPE

are under

the “Product” Directive

How the PPE is used is not its responsibility