

CHAPTER 25

PERSONAL PROTECTION

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CHAPTER 25

PERSONAL PROTECTION

2501. General

This chapter covers personal protective clothing for action, damage control and firefighting. Breathing apparatus is covered in [Chapter 26](#) and individual protective equipment (IPE) for CBRN hazards is covered in BRd 2170(2).

2502. Action Dress

a. At Action and Defence Stations all personnel are to wear Action Clothing Tier Level 2 or 3 dependant on the level of threat (see [Table 25-1](#)). The basic Action Dress is as follows:

- (1) **Cotton Underwear.** Personnel are advised to avoid wearing undergarments made from nylon, thermoplastics and polyester, even in peacetime. The most practical material for undergarments is plain cotton although wool and materials derived from cellulose (eg rayon) are also melt hazard free.
- (2) Thick wool rich black socks.
- (3) DMS boots.
- (4) Flame retardant (FR) No 4 Personal Clothing System (PCS) lightweight jacket and trousers or FR overalls (blue or white) must be worn under the FR action coverall. This measure provides an additional insulating layer for personnel. It must however be balanced against that it can increase the risk of heat illness in warmer climates, or if personnel undertake heavy or prolonged physical work.
- (5) Flame retardant action coverall.
- (6) Flame retardant anti-flash gloves and hood (gloves are to be worn over the coverall sleeve). The hood bib is to be tucked into the neck of the coverall. At Defence Stations the hood may be worn around the neck (See [Para 2512](#)).

b. Selected items from the following list may be worn/carried in addition to Action Dress, when appropriate:

- (1) Rank/rate shoulder badges.
- (2) Lifejacket.
- (3) Survival suit.
- (4) General Service respirator in haversack with contents in accordance with BRd 2170(2) (only required if a chemical, biological or nuclear threat exists).

- (5) Brassard, for identification.
- (6) EEBD (only if ordered for a specific function, eg patrols).
- (7) Identity discs (stainless steel). Only when ordered.
- (8) CBRN protective suit, gloves and overboots (IPE).
- (9) CBRN decontamination suit.
- (10) Foul weather clothing.
- (11) Flight deck clothing.
- (12) Immersion coverall.
- (13) Protective helmet.

2503. Substitute Clothing

When dressed in full firefighting rig the following clothing substitution is authorised:

- a. Firefighters boots for DMS boots.
- b. Firefighters gloves for anti-flash gloves.



Note. Firefighters standing by at Action Stations should wear the anti-flash hood, as it gives better facial protection than the firefighters hood, when BA is not being worn.

- c. Firefighting suit for action coverall if No 4 (PCS) or overalls are being worn in accordance with [Para 2502](#).

2504. Keyboard Operator (KO) Anti-Flash Gloves

a. KO Anti-Flash Gloves are provided for all members of the Ship's Company in the numbers laid down in BRd 2170(3). These gloves are **NOT** provided for stowing in EDBA lockers where one size gloves are more appropriate, or for issue to EMF. At no instance should KO gloves be used for firefighting. The flame retardant (FR) treatment will last for the serviceable life of the gloves. Gloves must not, however, become badly soiled or permanently stained since such deposits/defects reduce the FR properties and decrease the protection afforded.

b. **Cleaning Instructions.** The gloves may be cleaned by careful hand washing as follows:

- (1) Synthetic detergents of known suitability are to be used. This can be determined from the instructions on the labels of proprietary products. Either they say clearly that the product is suitable for FR garments or suitability is indicated by saying how to wash FR garments or garments with FR finishes.

- (2) Do not use soap or washing products containing soap. The use of soap is to be avoided because it can cause an accumulation of flammable deposits on garments.
- (3) Do not boil.
- (4) Do not bleach.
- (5) Do not use fabric conditioner.
- (6) Do not leave gloves to soak.
- (7) Use warm water (maximum temperature 50°C).
- (8) Don the gloves and wet them thoroughly.
- (9) Carefully lather the leather portion of the gloves as if washing the hands; cotton sections may be rubbed together or with a separate piece of wet cloth.
- (10) Remove the gloves and thoroughly rinse in several changes of clean lukewarm water. It is important to continue rinsing until the water is clear.
- (11) Remove excess water by squeezing it out; **NEVER** wring it out.
- (12) Pull the gloves into shape carefully; blow into them to separate the surfaces.
- (13) Hang the gloves away from direct heat, or sunlight, to dry. KO gloves are **NOT** to be placed into a tumble dryer.
- (14) When nearly dry restore their softness, shape and size, by working them on the hands, then re-hang until completely dry.

2505. Chemical Threat - Wearing of Anti-Flash

When the Chemical Safety Rule is in force, upper deck guns crews are to wear IPE at a dress state appropriate to the threat. In Dress States Zero, One, Two and Three anti-flash is to be worn. CBRN Dress States are defined in BRd 2170(2) Para 1117. Personnel within the Citadel, whether wearing IPE or not are to wear anti-flash. For those in the Citadel and dressed in IPE the anti-flash hood is to be worn instead of the IPE hood and anti-flash gloves are to be donned instead of the IPE outer gloves. In the event of a citadel breach and a chemical hazard the anti-flash hood is to be removed, the General Service respirator donned and the IPE hood pulled up. When personnel wearing IPE with anti-flash are about to leave the citadel, they are to remove the anti-flash and don the remaining IPE protection (gloves and respirator with hood up).

2506. Action Coverall

a. The action coverall is a double-layered flame retardant garment that is to be worn during hostilities and firefighting only. The coverall may be marked in felt tip, for the identification of personnel, on the left breast pocket flap only. Air maintenance rating action coveralls, which do not have breast pockets, are not to be marked. For exercise purposes blue or white FR overalls over No 4 (PCS) trousers and lightweight jacket are to be worn to simulate the action coverall.

b. Personnel employed on duties in support of 4/5 man firefighting teams may be dressed in an action coverall ensemble (see below) at the discretion of the Firefighting Supervising Officer, although any person required to transit the ship protector waterwall to gain access to a compartment/scene of the fire must be in full firefighting rig. The action coverall firefighting ensemble includes the following additional items:

- (1) Cotton underwear and cotton T-shirt.
- (2) Woollen socks.
- (3) Firefighters hood.
- (4) Firefighting gloves.
- (5) Firefighters helmet.
- (6) Leather firefighting boots.
- (7) Breathing apparatus.
- (8) No 4 (PCS) or FR overalls.

c. Due to the limited space available in FRPP lockers and the requirement that only clean oil free action coveralls are used for firefighting, they are to be drawn from Naval stores at the discretion of the Firefighting Supervising Officer. To facilitate this it is recommended that a selection of action coveralls in various sizes be dispersed within the ships storerooms for immediate use. Action coveralls are also to be stored in the Upper Deck Re-Entry Locker.

2507. Brassards

Brassards are to be worn on the right upper arm, over action coveralls, to denote the following functions:

- a. **Red.** Damage control personnel (except heavy 'L').
- b. **Green.** Heavy 'L' personnel.
- c. **Orange.** BA Controllers (Yellow brassards are not codified).
- d. **Pink.** Weapon Repair Teams.

- e. **Red Cross on White.** First Aid Teams.
- f. **White.** Marked to indicate key personnel.

2508. 'Proban' Treated Flame Retardant Garments

- a. The following garments have 'Proban' flame retardant (FR) treatment:
 - (1) No 4 (PCS) shirt and trousers.
 - (2) Anti-flash hood and gloves.
 - (3) Ratings blue overalls.
 - (4) Officers white overalls.
 - (5) Action coveralls.
- b. The effectiveness of this FR treatment depends on garment cleanliness; so correct laundering in accordance with the garment care label is therefore essential. BR 1277 - Laundry Manual provides guidance for laundry processes. Heavy duty detergent powder is to be used in the laundering process (maximum wash temperature 60°C). General purpose detergent powder contains a bleaching agent, so should be avoided if possible. Soap or washing products containing soap are not to be used. It is especially important to avoid soiling by oils and greases, which impair the flame-retardant qualities of the fabric. Severely soiled garments are to be returned to stores.

Fig 25-1. Action Coverall in Action Dress





Note. No 4 (PCS) lightweight jacket and trousers or overalls are worn under the Action Coverall.

2509. Action Dress for Embarked Military Forces

Combat Soldier 95 (CS95) and Personnel Clothing System (PCS) worn by Embarked Military Forces (EMF) is not Flame Retardant (FR) and may increase the risk of burn injury if exposed to flame. To provide protection appropriate to risks when in the Action State, and to correspond with the protection provided afforded to RN personnel, all EMF personnel are to be issued with one Action Coverall, one anti-flash hood and one pair of anti-flash gloves as soon as practicable to cover any contingencies which may arise. These are to be worn when prescribed by the Command in accordance with the guideline below. The action coveralls are environmentally sealed and the packages should not be breached until required in accordance with the guidelines:

- a. Action Dress and anti-flash is to be worn during the following ship states:

RISK	SHIP STATE	DRESS
Low	State 3 (Cruising Watches)	CS 95/PCS
Medium 1	State 2 (Defence Watches)	CS 95/PCS (Anti-flash hood and gloves carried)
Medium 2	State 2 (Defence Watches) and a credible risk to the ship exists	CS 95/PCS Action coverall, anti-flash worn (Hood down)
High	State 1 (Action Stations) and a credible risk to the ship exists	CS 95/PCS Action coverall, anti-flash worn (Hood up)

- b. Underwear and other garments worn under coveralls should, ideally, be made from natural fibres (eg cotton).

c. It is recognised that EMF personnel will have to change back into CS 95/PCS perhaps many hours before disembarkation (when the ship might be at greatest risk). However, personnel should try to delay changing until as late as possible and wear anti-flash hood and gloves, if possible, with CS 95/PCS until disembarked. Ships will need to exercise the wearing of different levels of protection at Assault Stations and develop SOPs to minimise the impact any changes in dress states will have upon operations.

d. The wearing of CS 95/PCS when there is no risk to the ship is considered safe. However, irrespective of the readiness state of the ship, other items of FR clothing such as No 4 (PCS) or Blue overalls should be worn by EMF if working for significant periods in machinery spaces or fuelled aircraft. In these areas the risk from fire is greater than in other areas of the ship and EMF personnel should be dressed appropriately to minimise burn injury.

2510. Immersion Coverall

a. Orange immersion coveralls are provided for damage repair personnel working in partially flooded compartments. The three sizes are generously cut, to be worn over action dress, including DMS boots. Extended wearing of the coveralls should be avoided due to the risk of heat stress. The wearing of action coveralls is not necessary when immersion coveralls are worn, although the double layer could provide additional insulation in exceptionally cold conditions.

b. Brief instructions for care in use and for repair of immersion coveralls are printed on each garment. More comprehensive information is given below:

(1) As necessary after each occasion of wear, the coveralls should be sponged or washed in water at a temperature not exceeding 50°C and placed on hangers to dry. Soap or detergent may be used and, if necessary, the whole garment may be hand or machine washed, the zip being closed prior to washing. Bleach must not be applied and garments should not be ironed or dry cleaned.

(2) To avoid damage from creasing, coveralls should if possible be stowed on hangers when not in use. Alternatively they may be stowed lightly folded provided they are clean and have been thoroughly dried.

(3) Zips should be kept lubricated with paraffin wax. If a zip becomes defective the coverall should be returned to Naval Stores.

(4) Damaged coveralls can be repaired with orange fabric (see BRd 2170(3)) and impact adhesive.

2511. Ship Firefighting Clothing

Firefighting protective clothing is designed to give the wearer protection against radiant heat and flame, but only for limited periods. It will not protect from the effects of exposure to great heat for long periods. The protective clothing also reduces heat loss from the body and, as a consequence, heat stress increases, possibly leading to heat exhaustion and collapse. The safety of personnel working in heat depends on the correct approach to the problem, good training, discipline and careful supervision. Personnel who are to wear protective clothing must be regularly practised in its use. Protective clothing must be examined regularly and maintained in good order. There are 3 levels of ship firefighting rig which use, as a base, the Action Clothing Tier:

Table 25-1. Action Clothing Tiers

	TIER 1	TIER 1 (Enhanced)	TIER 2	TIER 3
Current BRd 2170 Definition	-	Basic Firefighting Rig and the basis of Intermediate Firefighting Rig	-	Action Dress

Table 25-1. Action Clothing Tiers (Cont'd)

	TIER 1	TIER 1 (Enhanced)	TIER 2	TIER 3
Clothing	No 4 (PCS) Uniform (See Note 1)	No 4 (PCS) Uniform with sleeves rolled down & cotton underwear (inc cotton T-shirt) worn. (see Note 2).	No 4 (PCS) Uniform + Coverall GS (see Note 2 and Note 3).	No 4 Uniform (PCS) + Coverall GS (see Note 2 , Note 3 and Note 4).
CBRNDC State	3	3/2	1	2/1
Example When Worn	At Sea	SSEP/HFEP and Defence Watches.	Benign operations at State 1. To be worn for OST training serials iaw BRd 9275.	Operations where a direct threat to platform is deemed realistically possible.
Physiological Burden	Low	Low	Awareness required.	High

Notes:

1. In Tier 1 protection No 4 (PCS) may be substituted for Coveralls GS.
2. Man made fibre undergarments, particularly ones with sweat wicking properties, are increasingly popular. These garments may be worn providing that the risk associated is understood. These materials have a low melting point and are less insulating than comparable cotton garments. During trials these garments have melted, compromising the effectiveness of the insulation barrier between the FR outer garment and the skin. They should not be worn at State 1, or when close contact with fire is anticipated, eg SSEP or HFEP; personnel in these roles should adopt a cotton base layer and woollen socks as a matter of course. Tier 1 Enhanced (Basic Firefighting Rig) will require sleeves to be rolled down and fastened and collar done up when engaged in firefighting duties.





3. *When new, Coveralls GS will provide some additional protection as the top FR layer in the tiered Action Clothing system however it will not prevent burns in the event of a direct flame exposure lasting 4 seconds or greater. Prolonged wear, damage to the fabric and contamination with oils and greases may compromise the limited protection afforded by the garment. Action Coveralls are held in Naval Stores and are issued only in times of tension or war. Their 2 layer design mitigates the fact that the outer layer may perish when exposed to long duration flames and in all cases they will provide enhanced protection over the Coverall GS worn with the Tier 2 Action Dress.*

4. **Action Coveralls.** *Despite instructions authorising the use of Action Coveralls alone with cotton underwear (BRd 2170 Vol 1 [Para 2502](#), [Para 2506](#) and [Para 2511](#)) recent trials suggest that the garment does not provide sufficient protection to meet the 4 second challenge when worn without a undergarment. Therefore, if the threat dictates that Action Coveralls are be used then they should be worn as an over garment to No 4 (PCS) uniform or Coveralls GS. Despite that they provide 2 layers of material, Action Coveralls (by themselves) provide little benefit over other FR uniforms as the outer layer can be breached following prolonged flame exposure and additional insulating layers between the Action Coverall and the skin become essential in order to avoid deep burns.*

a. **Basic Firefighting Rig.** This consists of Action Clothing Tier 1 Enhanced: Proban treated cotton No 4 (PCS) or cotton overalls, DMS boots, cotton underwear, cotton T-shirt, and cotton/woollen socks (see [Fig 25-2](#)). When engaged in firefighting operations, collars should be buttoned up and the sleeves rolled down with cuffs buttoned. Man-made materials should not be worn by firefighters, (eg Nylon, Polyester or Lycra). During hostilities, the action coverall is worn over No 4 (PCS) or FR overalls in the Basic Firefighting Rig.

b. **Intermediate Firefighting Rig.** The intermediate firefighting rig consists of the basic firefighting rig (Action Clothing Tier 1 Enhanced), plus BA, firefighters hood and anti-flash gloves (see [Fig 25-3](#)). The Attack Party BA wearers use it. A set of firefighters hood and anti-flash gloves is to be stowed in each BA locker to facilitate the change from basic firefighting rig.

c. **Full Firefighting Rig.** This consists of basic firefighting rig, plus firefighters hood, Firefighting Suit, firefighters gloves, woollen socks, firefighting boots, EDDB, bulb horn and firefighters helmet with built in communications (FFHBC). The Team Leader also carries a TIC (see [Fig 25-4](#)).

Fig 25-2. Basic Firefighting Rig



Fig 25-3. Intermediate Firefighting Rig



Fig 25-4. Full Firefighting Rig**2512. Personal Protection**

a. **Full Firefighting Rig.** The standard firefighting rig worn in vessels consists of:

- (1) Firefighting Suit.
- (2) FR Coveralls or No 4 (PCS) or Action Coveralls.
- (3) Undergarments (T-shirt and underwear).

b. **Underwear.** Personnel may choose to wear man made fibres under action working dress or Firefighting Suit. Indeed, modern sweat wicking under garments may provide increased comfort for individuals wearing Firefighting Suit for extended periods in hot climates. However, wool mix remains the recommended material for socks (in any dress state) and cotton for underwear when worn under non-fire retardant clothing (eg night clothing).

c. **Additional Layers vs. Climatic Conditions**

(1) The guidance at [sub para a](#) is the standard firefighting rig worn by all crews. However, it is recognised that the FR overall or No 4 (PCS) layers may cause discomfort in hot climates or strenuous working conditions. In these circumstances it is acceptable to wear the Firefighting Suit directly over underwear if time and decency permits. Unit Command should take note when considering the decision to permit this relaxation that the flexibility for role changing is diminished. Particular care should be taken if there is a potential external threat.

(2) The balance between clothing protection and work rates should be carefully considered. Detailed instructions for heat stress monitoring are contained in BRd 2170(2) Chapter 11 Section 2.

(3) Further guidance on the alleviation of heat stress is provided at [Para 2521](#) and a simple endurance guide for medium and heavy workloads in warm and hot climates is at [Table 25-2](#).

2513. Firefighting Boots

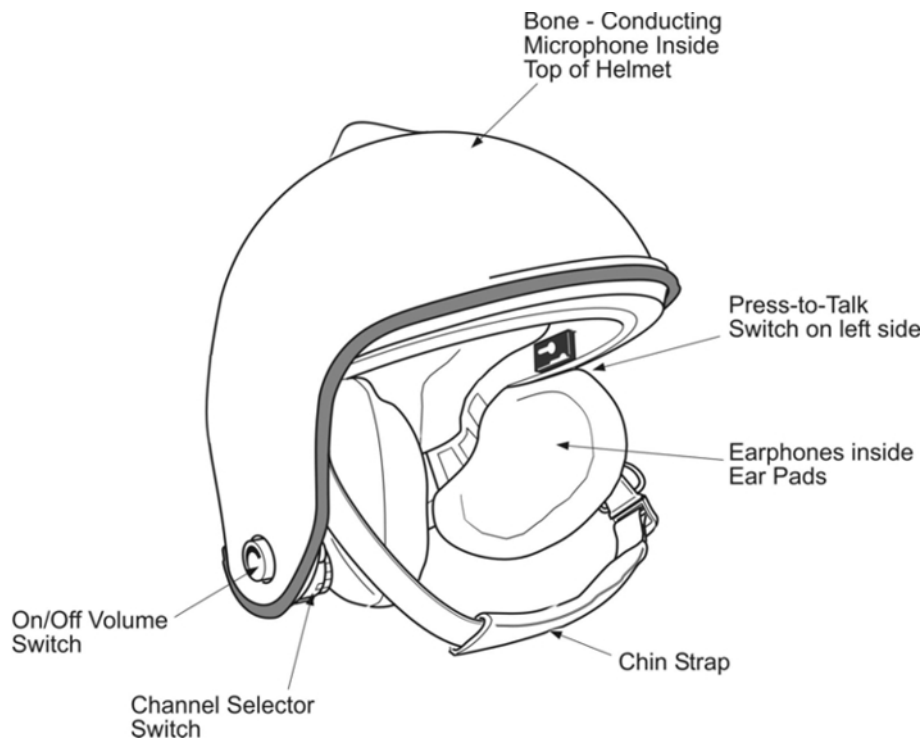
Leather firefighting boots are provided in a range of sizes for ship firefighting teams. The boots should be carefully dried after contact with water, and cleaned with 'G Wax' (see BRd 2170(3)). Insoles should be removed from boots occasionally so that they, and the boots, can be aired separately. The insoles should be cleaned by washing in warm soapy water (boiling water must not be used). They should be shaken, not wrung out, and then allowed to dry. When worn out they must not be destroyed by burning, as this will produce toxic fumes.

2514. Ship Firefighters Hood

The firefighters hood is compatible with EDDBA and FFHBC, and also with the GSR. It has a yoke that is tucked inside the lightweight jacket/overalls/firefighting suit. The hood is made from an inherently flame-retardant (FR) material and may be washed, as for synthetics, on a medium wash cycle; it is not to be bleached.

2515. Firefighters Helmet with Build-in Communications (FFHBC)

Head protection for firefighters is provided by the FFHBC, which is worn over the firefighters hood and EDDBA head harness. Guidance on the use of the helmet-mounted radio and associated hand-held radio is contained in [Para 0908](#) and [Para 0909](#) and use of the FFHBC by the Support Party is covered in [Chapter 20](#). Full details of the helmet and associated radios are contained in BR 9215. Helmets are to be stowed in the top left hand corner of nominated BA lockers, facing towards the locker hinges. Care must be taken when stowing helmets, to minimise compression of fittings. Radios in stowed helmets are to be set to the FF mode, switched off and set to Channel 1. Lockers containing FFHBC are to be identified by a 50 mm wide horizontal yellow band around all visible external surfaces, 50 mm from the top. In ships where it is not convenient to stow FFHBCs in BA lockers, they may be stowed in a suitable alternative location (eg adjacent to FRPPs).

Fig 25-5. Firefighters Helmet with Build-in Communications (FFHBC)**2516. Firefighting Protection in a CBRN Environment**

a. Protection for firefighters in a CBRN environment varies according to the hazard:

(1) **Firefighting Between Decks in a CBRN Environment.** Firefighters should wear normal action working dress with/without a firesuit. IPE clothing (ie suit and rubber gloves) need not be worn under the firesuit and firefighters gloves. All firesuitmen personnel must, however, have access to BA and General Service respirator, and be well practised in the procedures for changing over from one to the other, as detailed in [Annex 21K](#).

(2) **Firefighting on the Upper Deck in a CBRN Environment (Vapour Hazard).** If the CBRN hazard is from vapour alone, then firefighters dressed as in Para 2516a [sub para \(1\)](#) above and wearing BA will have adequate short term protection for the duration of their firefighting task. As for between decks, the respirator must be readily available (with the BA Controller) and firefighters must be practised in the procedures for changing to and from BA, as detailed in [Annex 21J](#).

(3) **Firefighting on the Upper Deck in a CBRN Environment (Liquid Hazard).** In the unlikely event of having to fight a serious fire on the upper deck, in a CBRN liquid environment, then all firefighting is to be conducted from behind a waterwall using the following personal protection:

(a) No 4 (PCS)/Overalls.

(b) Action Coverall.

(c) BA.

(d) IPE with the hood pulled up around the BA mask (flammable, but protects against liquid hazards).

(4) **Firefighting in a Nuclear Particulate Hazard Environment.** The clothing regimes used for firefighting in CBRN vapour hazard apply equally well when firefighting in the presence of nuclear fallout hazard. The same clothing regimes used with respirators or BA will provide personal protection against particles that may emit Alpha and Beta radiation. The CBRN Protection Officer will however need to consider stay times for personnel exposed to Gamma radiation.

b. The procedures for undressing and cleansing after firefighting in a CBRN environment are detailed in the BRd 2170(2) Chapter 14 Annexes A-G.

2517. Aircraft Firefighting Clothing

Naval aircraft firefighters are provided with different protective clothing from ship firefighters, due to the different conditions encountered at the scene of an aircraft fire. Crash firefighting ensemble (CFFE) can protect the wearer from radiant heat and flame licks, but is not designed to allow deliberate entry into a flame mass. The clothing is not gas tight, and the wearer inhales the surrounding air, so he must remain in a position where he is clear of superheated gases and toxic fumes. The clothing is designed as a composite outfit, and the complete outfit must be worn correctly to gain the maximum protection. There is, however, no objection to the wearing of additional cotton based T-shirt or No 4 (PCS) over the underwear. Man made fibres should not be worn. The protection from heat given by this clothing is subject to a time limit in severe conditions because the heat is conducted (although slowly) through the layers of fabric.

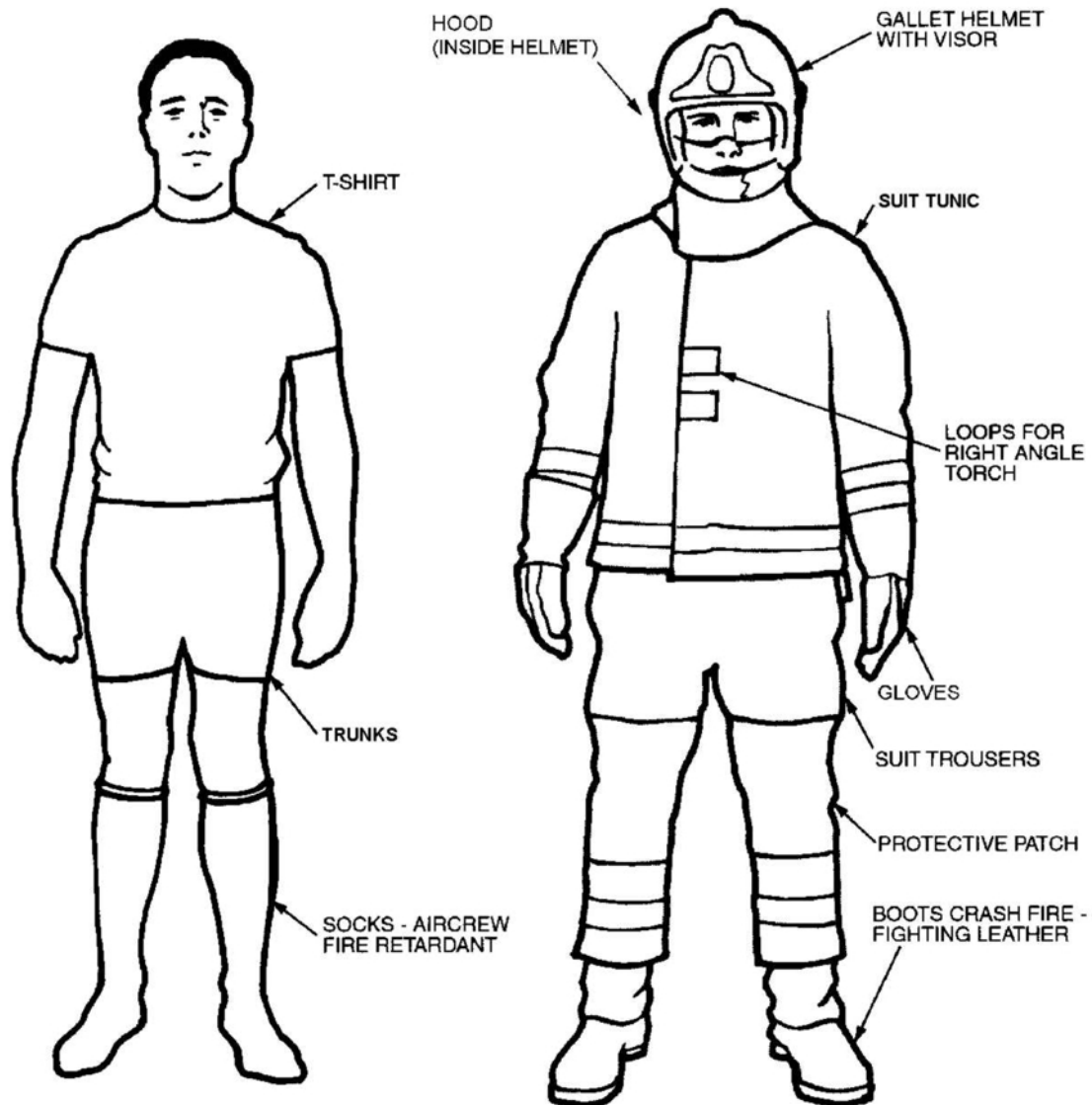
2518. Crash Firefighting Ensemble (CFFE)

a. The stock numbers and allowances for CFFE items are listed in BRd 2170(3). The full ensemble is shown at [Fig 25-6](#). It comprises the following items:

- (1) Tunic.
- (2) Trousers.
- (3) Boots.
- (4) Hood.
- (5) Helmet.
- (6) T Shirt.
- (7) Trunks.
- (8) Gloves.

(9) Aircrew fire-retardant socks.

- b. The suit incorporates a waterproof lining to provide protection from water spray and rain.
- c. The correct fitting of the suit is of great importance in order to provide the maximum protection. The suit should be a loose fit to ensure adequate airflow around the inside of the suit during movement of the body. If the suit is tight in areas, such as the shoulders, across the chest or back, at the waist and the top of the legs, the circulation of air is restricted which may allow the still air to heat up at a faster rate thereby reducing the time of limit of protection. The length of the tunic should be such that when the arms are raised above the head, no exposed areas should be created between the bottom of the tunic and the top of the trousers. The length of the trousers should be that the bottom of the leg is at the level of the ankle in order to ensure adequate overlap between the boots and the trousers to prevent the creation of exposed areas when lifting the legs during climbing.
- d. The underwear, which consists of a T-shirt and trunks for male firefighters and T-shirt, trunks and 'crop top' for female firefighters, is made from 100% cotton. The underwear is to be worn next to the skin and has a primary function of providing support and maintaining hygiene and modesty. It also provides another layer of thermal insulation.
- e. A Gallet helmet gives full protection with two visors that slide into the top of the helmet. The inner visor is for eye protection while the outer visor gives full face protection against radiated heat.
- f. Firesuitmen on single spot ships are to wear earplugs when wearing the Gallet helmet. The fire-hood is worn between the head and the helmet, thereby giving added protection and ensuring that the earplugs are not dislodged when the helmet is removed, causing a FOD hazard.
- g. The gloves are made from leather with an aluminised surface on the back of the hands and fingers to reflect radiant heat. The gloves allow, without their removal, manipulation of reasonably small articles. There is a spring band within the fabric around the wrist to secure the glove to the hand, and a long cuff to provide an adequate overlap over the sleeve of the jacket even when the arm is stretched.
- h. The boots are of a short, calf-length, step-in shape. The uppers are made from reversed chrome leather with a chrome lining. A steel toecap and sole bar are inserted and the sole and heel is a one-piece moulding of neoprene that is resistant to high temperatures and the solvent effects of hydrocarbon fuels. The moulding patterns of the sole and heel are designed to achieve a good grip on smooth surfaces and prevent the picking up of items in the tread that may constitute foreign object damage (FOD) hazards.

Fig 25-6. Crash Firefighting Ensemble**2519. Cleaning CFFE**

The ensemble is to be cleaned as follows:

- a. **Helmet.** Wash with soapy water and polish helmet and visors with a lint cloth.
- b. **Fire Hood.** Wash as per manufacturers instructions and change after 10 washes.
- c. **Suit.** The suit is not to be dry cleaned but washed as per manufacturers instructions.
- d. **Boots.** Wash with hot soapy water and allow drying naturally.
- e. **Gloves.** Wipe clean using a wet cloth and allow drying naturally.

2520. Reports of Defective Protective Clothing

On receipt of a failed item at the unit clothing store a judgement is to be made concerning the nature of the failure. Where a failure is judged to have occurred through misuse, negligence or fair wear and tear, appropriate actions is to be taken within the unit. If it is considered that the item has failed for other reasons, the item together with a MOD Form 1197 - Defective Clothing Report, is to be sent to DE&S DC Team, TIM CSO, Spur 4 Beckford, MOD Ensleigh, Bath BA1 5AB. Multiple failures in the same range may be reported on a single Clothing Failure Report Form but all failed items are to be sent together with the form.

2521. Heat Stress

Detailed instructions for heat stress monitoring are in BRd 2170(2) Chapter 11. A simple endurance guide for medium and heavy workloads in warm and hot climates is at [Table 25-2](#). The balance between clothing protection and work rates should be carefully considered. The following notes are relevant when using the table:

- a. Personnel should be fit and acclimatised to local conditions.
- b. Medical officers should be consulted and involved in monitoring personnel.
- c. Fluid intake is vital and should be encouraged especially during rest periods even if personnel do not feel thirsty. As a rough guide at least 1 ltr per hour per person is required.
- d. If an action coverall is being worn, do not remove it (removal will assist heat loss but the risk from flash, etc is too great).
- e. Remove firesuits whenever possible, or at least unzip/undo it during rest periods.
- f. Rest in a cooler shaded area.
- g. The upper deck should be kept wet.
- h. Maintain airflow over the deck and use of awnings should be considered.

2522. Alleviation of Heat Stress

When suffering from heat stress and at risk of heat illness, personnel should immerse their hands and wrists (forearms if possible) in water between 10 and 20°C whilst resting for 20 mins. This will reduce heat stress, lower the risk of heat injury, and increase safe total work times that personnel can undertake. If rest periods are shorter or repeated work/rest cycles are anticipated then 10°C water should be used in preference. If the reduction in heat stress is critical and rest times less than 20 mins then immersion of both hands and feet in 10°C water could be attempted, although it should be noted that the increased benefit is small and only equivalent to increasing rest time by 2-5 mins over using hand immersion. The risk of accidental injury to the feet, increased re-dressing time and a greater requirement for chilled water associated with immersing the feet make this option unlikely to be preferable.

Table 25-2. Heat Stress - A Guide to Avoidance in Various Clothing Regimes

RIG	CLIMATE	WORK/REST RATIO- MINUTES	REMARKS
No 4 (PCS) or overalls	Hot Warm	105/30 120/15	Rest in a cool shady area.
No 4 (PCS) + Action coverall	Hot Warm	45/30 (30/30 after 2 cycles) 45/15	Remove firesuits where possible. Enforce drinking at rest.
Action coverall only	Hot Warm	45/30 (30/30 after 2 cycles) 75/15	When action coverall is top layer, do not remove.
No 4 (PCS) + CBRN IPE	Hot Warm	45/30 (30/30 after 2 cycles) 45/15, 45/30 (alternating cycles)	
Action coverall + CBRN IPE	Hot Warm	30/30 (30/45 after 1st cycle) 45/30	
No 4 (PCS) + Firesuit	Hot Warm	30/90 30/90	3 team system 3 entries only. Rest includes dressing time



Note. 'Warm' climate approximates to conditions likely to be found in air conditioned spaces (26°C). The 'hot' climate approximates to conditions (30°C+) on the upper deck and in the poorly ventilated areas such as machinery spaces, hangar or galley of a ship in tropical waters.

2523. Protecting the Body from Injury

When an explosion occurs in, or near, a ship there is a danger to personnel from blast, flying debris and the whipping action of the hull. This may also occur during a collision. In order to minimise injuries to personnel caused by these effects the following precautions are to be taken:

- a. For prolonged periods under threat at DC State 1, personnel not directly involved with fighting the ship are to be dispersed in pairs, or small groups, throughout the ship, avoiding potential blast routes and covering all decks and all sections if possible. This will provide the facility to conduct an immediate, and more effective, blanket search after action damage, and minimise casualties in any one place.
- b. When an attack is imminent the order **"BRACE, BRACE, BRACE"** (see [Para 2524](#)) is to be broadcast by the Command.

2524. Brace Drill

On hearing the command “**BRACE, BRACE, BRACE**”:

- a. All personnel not directly involved in fighting the ship or in the most protected positions, ie a bunk or a fixed chair, are to stand, face away from any loose material, bend knees, lift heels off the deck and, with bent arms, take a firm grip from beneath a fixed object at waist height. The head, neck and back should remain in a straight vertical line to absorb the effect of shock from the deck. For accelerations athwartships, personnel should face forward or aft. For longitudinal accelerations, personnel should face athwartships.
- b. Operations Rooms personnel who are seated during periods of attack and those similarly seated and who are not directly involved in repulsing an attack are to carry out the following procedures:
 - (1) Personnel sitting in front of a VDU, unless directly repulsing an attack, should swivel their chair so that lower limbs are not trapped between the chair and the console.
 - (2) Seated personnel whose chairs cannot swivel should not twist their necks to avert the face from the VDUs. In these circumstances stand as in [sub para a](#).
 - (3) Close the eyes and extend anti-flash hoods to cover the face. Firmly grip the sides of the chair seat with both hands (all seats that are required for action are to be securely fitted to the deck).
 - (4) Seated personnel should sit in an erect position, with a slight concavity in small of the back, feet tucked beneath the seat, heels off the deck. Head, neck and back to be in a vertical line.

Fig 25-7. Brace Position (Seated)

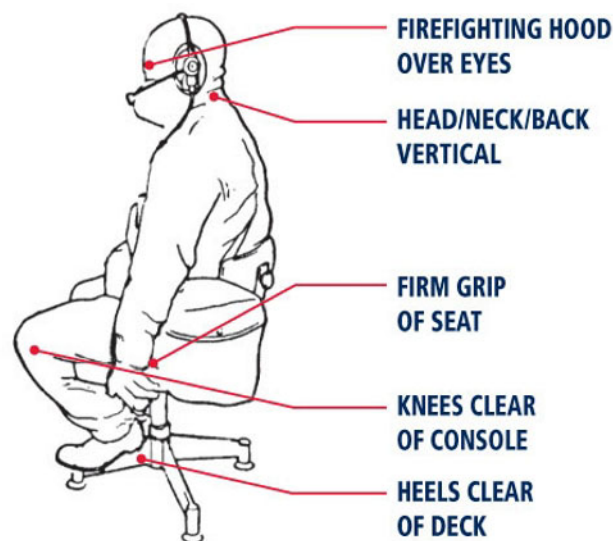
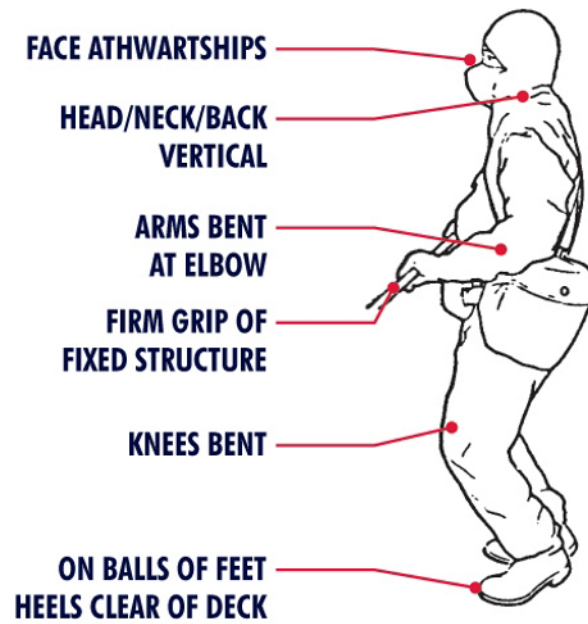


Fig 25-8. Brace Position (Standing)



Note. In the case of a nuclear airburst, personnel on the upper deck are to carry out the Take Cover Drill detailed in BRd 2170(2).