

Protective clothing and equipment for use in violent situations and in training —

Part 2: Guidance on risk assessment and on the selection, use, cleaning and maintenance of protective clothing and equipment

ICS 13.340; 13.340.10

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee PH/3, Protective clothing, to Subcommittee PH/3/12, Protective clothing and equipment for use in violent situations, upon which the following bodies were represented:

- APSS — Association of Police and Public Security Suppliers
- Association of Chief Police Officers in Scotland
- BSIF Test and Certification Association
- British Association for Chemical Specialities
- British Association of Women Police
- British Clothing Industry Association
- British Glove Association
- British Textile Technology Group
- Defence Industries Association
- Department of Health — Medical Devices Agency
- Home Office
- Ministry of Defence — UK Defence Standardization
- National Association of Healthcare Safety and Risk Practitioners
- Personal Safety Manufacturers' Association
- Police Federation of England and Wales
- Police Purchasing Manager Association
- Police Uniform Project Group
- SATRA Technology Centre
- Co-opted members

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 11 April 2003

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The following BSI references relate to the work on this British Standard:
Committee reference PH/3/12
Draft for comment 00/565111 DC

ISBN 0 580 38499 3

Amendments issued since publication

Amd. No.	Date	Comments

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Foreword

This part of BS 7971 has been prepared by Subcommittee PH/3/12.

This part of BS 7971 has been prepared for the use of both employers and employees, and gives guidance on a sequence of procedures from conducting a risk assessment through to accurate interpretation of the results, and selection of appropriate protective clothing and equipment for use in violent situations. A series of hypothetical examples is included. The general principles involved in risk assessment and its application in the selection, care and maintenance of protective clothing and equipment are described so that procedures already established within an organization can be related to the guidance given in this part of BS 7971 and differences in approach identified.

The following parts of BS 7971 have been published or are in preparation.

- *Part 1: General requirements;*
- *Part 2: Guidance on risk assessment and on the selection, use, cleaning and maintenance of protective clothing and equipment;*
- *Part 3: Personal defence shields — Requirements and test methods;*
- *Part 4: Limb protectors — Requirements and test methods;*
- *Part 5: Footwear — Requirements and test methods;*
- *Part 6: Gloves for protection against mechanical, thermal and chemical risks — Requirements and test methods;*
- *Part 7: Slash-resistant gloves — Requirements and test methods;*
- *Part 8: Blunt trauma body, shoulder, abdomen and genital protectors — Requirements and test methods;*
- *Part 9: Training suits and equipment — Requirements and test methods;*
- *Part 10: Coveralls — Requirements and test methods.*

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

In particular, attention is drawn to the Management of Health and Safety at Work Regulations 1999 [1], and the other legislation listed in BS 7971-1, and to the Human Rights Act 1998 [2].

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 49 and a back cover.

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1 Scope

This part of BS 7971 gives guidance on carrying out risk assessments on violent situations and on the selection of protective clothing and equipment for use in such situations, and in training of operatives exposed to such situations.

Guidance is given on the identification of those with responsibility for decision making and the factors to be taken into account in decision making. Guidance is also given on establishing systems for the maintenance, storage, preparation, and issuing of protective clothing and equipment, and the segregation, decontamination, cleaning, inspection and eventual disposal of used clothing and equipment.

NOTE Additional guidance on assessment of the suitability of protective clothing and equipment, and factors to be taken into account in improving the design of items of protective clothing and equipment is given in Annex F.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 7963:2000, *Ergonomics of the thermal environment — Guide to the assessment of heat strain of workers wearing personal protective equipment*.

BS 7971-1, *Protective clothing and equipment for use in violent situations and in training — Part 1: General requirements*.

ISO/IEC Guide 51, *Safety aspects — Guidelines for their inclusion in standards*.

ISO/IEC Guide 73, *Risk management — Vocabulary — Guidelines for use in standards*.

3 Terms and definitions

For the purposes of this part of BS 7971 the definitions given in ISO/IEC Guide 51, ISO/IEC Guide 73 and the following apply.

3.1

complete accountable system

entire and all-encompassing policy determining and management structures within which risks are imposed on operatives

NOTE It includes the European Commission and its Directives, Parliament (British) and the Acts of Parliament, ministers and their decisions, government departments and their policies, and the management hierarchy of an organization and its decisions at all levels from the head of a service down to the person immediately superior to the operative exposed to the risk.

3.2

duty-holder

any person, organization, employer or employee who has a responsibility for an aspect of health, safety and welfare

NOTE In organizations and companies this is particularly those who have the authority and capacity to be active in preventing or controlling risks. All employees have a measure of duty with respect to health and safety.

3.3

hazard

potential source of injury and/or damage to the health of people, or damage to property or the environment c.f. risk (3.7)

NOTE This definition is different to that given in ISO/IEC Guide 51.

3.4

opponent

individual who by intent, or inadvertently due to a medical condition, creates a violent situation

3.5

operative

person detailed to take action to prevent, contain or terminate a violent situation

NOTE Examples are police officers or prison staff confronting a riot, and staff of medical and emergency services seeking to restrain a deranged person.

3.6**organization**

company, operation, firm, enterprise, institution, utility, public body or association, or part thereof, whether incorporated or not, public or private, that has its own functions and administration

NOTE For organizations with more than one operating unit, a single operating unit may be defined as an organization.

3.7**risk**

product of the probability of the existence or occurrence of a hazard in a particular situation, and the consequences or extent of harm to an individual, to property or to the environment to be expected from the hazard

NOTE This definition is different to those given in ISO/IEC Guide 51 and ISO/IEC Guide 73.

3.8**risk assessment**

procedure for addressing issues the outcome of which can only be presented in probabilistic terms, and for identifying the significant factors to be considered in decision taking

NOTE 1 The procedure ranks risks and highlights uncertainties and subjective assumptions that effect the quality of decision taking regarding risks and preventive and protective measures.

NOTE 2 This definition is different to those given in ISO/IEC Guide 51 and ISO/IEC Guide 73.

3.9**risk management**

systematic application of management policies, procedures and practices to the tasks of analysing, evaluating and controlling risk

NOTE This definition is different to that given in ISO/IEC Guide 73.

3.10**stakeholder**

individual, group, organization or society having a vested interest in the operation of a particular organization and the outcome of its activities

NOTE 1 Stakeholders might bear a cost, receive a benefit or be concerned about an effect on themselves or others or society as a whole, property, the environment or a cultural heritage.

NOTE 2 This definition is different to that given in ISO/IEC Guide 73.

4 Principles of risk assessment and risk management**4.1 General consideration of risk assessment within management systems**

Every organization should have a set of identified goals for its operations. Strategic planning and decisions determine broadly how these goals are to be attained taking into account external constraints and the concerns of stakeholders. Tactical planning and decision making concern choices of approach and methods within the strategic framework. Operational decisions take account of the precise conditions existing at the time.

Within the operations of an organization, risk management (see **3.9**) is a core process as it aids the attainment of goals and reduces costly surprises. It should be integrated into all levels of planning and decision taking. This part of BS 7971 concentrates on risks to health and safety of people and the management of these risks. Further discussion and details of the concept of risk management within the operations of an organization are given in BS 6079-3:2000 and BS 8444-3:1996.

The management of occupational health and safety at work is an integral element within the overall management of the operations and projects of an organization. Therefore it should be included within all planning and decision taking processes; it is not separate from them. Details of how this can be done are given in BS 8800:1996. Employers have a statutory duty to comply with the Management of Health and Safety at Work Regulations 1999 [1]. Advice on how to comply with these regulations is given in the Health and Safety Executive (HSE) Approved Code of Practice *Management of Health and Safety at Work* [3]. The advice is specific about processes but inevitably general regarding their application. This part of BS 7971 gives guidance on the application of this advice to the provision of protective clothing and equipment for use in violent situations.

Within risk management in occupational health and safety management, risk assessment (see 3.8) plays a key role. The Management of Health and Safety at Work Regulations 1999 [1], Regulation 3, states the following:

“Risk assessment

3. - (1) Every employer shall make a suitable and sufficient assessment of -

- (a) the risks to the health and safety of his employees to which they are exposed whilst they are at work; and
- (b) the risks to the health and safety of persons not in his employment arising out of or in connection with the conduct by him of his undertaking,...

Risk assessment is a major tool in managing health and safety at work and should be applied to all aspects of managing violent situations. It encompasses risk analysis and risk evaluation. Guidance on risk assessment is given in Annex A. This is directed particularly at risk assessment related to the selection and use of clothing and equipment specified in the other parts of BS 7971. However all decisions taken concerning the management of violent situations effect the decisions that have to be taken regarding the selection and use of clothing and equipment, and therefore should be examined and if necessary reviewed with a view to implementing changes where the risk assessment shows these are appropriate. A fundamental principle underpinning the Health and Safety at Work Etc. Act 1974 [4], is that those who create risks (see 3.7) from work activity are responsible for protecting workers and the public from the consequences. The broad general duties are explicitly placed on those who are in the best position to do something about preventing or controlling the risks. The nature of risk is that it always contains two elements; the frequency or probability with which a hazardous event occurs and the severity of the consequences of such a hazardous event.

A hazard (see 3.3) exists when an inherent property of a system could cause harm to an individual or property. In a violent situation the hazards are mainly created by the opponent (see 3.4) who by intent, or inadvertently due to a medical condition, creates the violent situation. In this context it is not reasonable to postulate that remote causes, such as unpopular legislation, are the “true” hazard. In risk management it is considered best to base risk assessment on the hazard to which practical control measures can be applied. The hazard in the context of violent situations encompasses the intentions of the opponents prior to the event, their responses to the particulars of the event, and all their actions likely to cause harm to the public, property, operatives (see 3.5) or to themselves. The risk of harm to operatives has to be controlled by their employers even though the hazard is inherently not under the control of the organization employing the operatives, and cannot be eliminated.

4.2 The principles of good risk management

The basic principles of good risk management are the following.

- a) *Targeting*. Focussing action on the most serious risks and the least well controlled hazards.
- b) *Consistency*. Adoption of similar approaches to similar circumstances.
- c) *Proportionality*. Implementation of measures commensurate with the risks.
- d) *Transparency*. Making known to those affected how decisions were arrived at, what uncertainties were allowed for, and what the implications of the decisions are.
- e) *Accountability*. Making clear who is responsible for decisions and their implementation, and who is held accountable for failures in the system.

It is the responsibility of every employer to take proper measures to safeguard the health and safety of employees who might be required to work in, or to train for working in, hazardous situations associated with violence such as those described in BS 7971-1. To determine what constitutes “proper measures” for a particular situation at least the following steps should be carried out:

- determination of responsibility;
- hazard identification;
- risk estimation;
- risk evaluation, in which the tolerability of a risk is determined by reference to defined risk criteria;
- risk treatment, in which measures are selected for the reduction of risk;

- residual risk estimation, to confirm both that the level of personal protection selected is fit for purpose and that the limits of hazard exposure have been realistically anticipated;
- verification of every step of every stage of the above by an independent analyst.

Annex A and Annex B give information, advice and guidance that is intended to assist those responsible to carry out risk assessments. Informative and illustrative details are provided to ensure that, as far as is possible, necessary elements for inclusion in risk assessments relevant to violent situations are not neglected. Whilst it is appreciated that risk assessments for particular situations will be specific to an organization and its staff, it is strongly recommended that a consistent approach is used in the methodology and selection of appropriate input data for the control of risks in violent situations. Annex C and Annex D give a series of formats for tables that could be used in carrying out risk assessments and the selection of protective clothing and equipment.

5 Selection of protective clothing and equipment

5.1 General

Selection of protective clothing and equipment can be divided into six stages. However, the boundaries between the stages are not clear cut and as each stage is dependent on others no stage can be completed on its own. When all six stages in the selection process have been provisionally completed, the results should be reviewed and considered in the context of the risk assessment of the organization's whole activity, and the specific types of incident predicted to be likely, and their management.

When protective clothing and equipment has been selected and is brought into use, the results of all the selection stages should be continuously reviewed. The protective clothing and equipment might turn out to have a higher or a lower performance than that assumed during the selection process, in which case the records should be updated accordingly. External changes, such as changes in the nature of the hazards, in risk levels or in other interacting factors like public opinion, should be monitored and necessary changes made to the assumptions recorded during the selection process. The results need to be entered into the risk assessment process described in Annex B.

The stages in the selection of protective clothing and equipment are as follows.

Stage 1. Determining what the protective clothing and equipment needs to do. Listing of the foreseeable hazards and risk levels identified in the risk assessment of the situations in which the protective clothing and equipment might be used. Determination of what it will be necessary for the protective clothing and equipment to do with respect to each hazard.

Stage 2. Collecting information about the protective clothing and equipment available. Investigation of the protective clothing and equipment available and its claimed performance against the hazards identified at stage 1. Consideration of the compatibility of items of protective clothing and equipment and their combined performance to protect the parts of users' bodies at risk. Consideration of the problems inherent in the use of the protective clothing and equipment.

Stage 3. User trials. Wearer trials to assess the compatibility and the ergonomic performance of protective clothing and equipment ensembles, and trials of the protective clothing and equipment by experienced operatives in specific scenarios designed to replicate aspects of operational use. Validation of the performance of the combinations of protective clothing and equipment.

Stage 4. Establishing procedures. Establishment and documentation of procedures for the storage, issue and maintenance of, and record keeping for, the protective clothing and equipment. Establishment of training needs with respect to the management of the protective clothing and equipment. Provision and monitoring of the training.

Stage 5. Introduction of the protective clothing and equipment. Prioritizing the supply of protective clothing and equipment, introducing it in stages and organizing the training of operatives to use it as it is introduced.

Stage 6. Continuous evaluation. Establishment and operation of procedures to monitor the training of operatives to use the protective clothing and equipment, to monitor the performance of the protective clothing and equipment in training and in operational use, to determine whether the protective clothing and equipment is achieving the reduction in risk required, to consider whether operational restrictions are necessary, to determine whether the decisions reached were correct and remain correct in the light of current circumstances, to consider whether new intelligence or technological developments should be taken into immediate account, and to provide information for continuing risk assessment.

5.2 Stage 1. Determining what the protective clothing and equipment needs to do

The risk assessments carried out within the overall management of health and safety in violent situations should be used to provide the basic data on the hazards and on the levels of risk. The existing or proposed operational procedures for reducing risks should be taken into account and the performance requirements for the protective clothing and equipment drawn up. This may be conveniently done for each body part, such as the head, face, torso, abdomen, limbs, feet and hands. The performance requirements should include a list of the items and/or actions the protective clothing and equipment is intended to intercept, such as thrown bricks, pick-axe handle blows and petrol bombs. For each of these the level of harm that would be unacceptable and that which would be tolerable should be stated. For example, it is normally unacceptable for operatives to be even temporarily incapacitated or unable to further defend themselves, but light bruising might be considered tolerable.

Stage 1 is completed when there is a list of what the protective clothing and equipment is intended to do.

5.3 Stage 2. Collecting information about protective clothing and equipment available

Information on the protective clothing and equipment available should be obtained from manufacturers, and from comparable organizations using such protective clothing and equipment. Where possible, protective clothing and equipment conforming to the relevant part of BS 7971 should be used. Where protective clothing or equipment not specified in BS 7971 is required, protective clothing and equipment conforming to the relevant British Standard or international standard, should be used if possible.

NOTE Some protective clothing and equipment for use by the police is covered by specifications issued by the Police Scientific Development Branch¹⁾.

The Personal Protective Equipment (PPE) Directive (89/686/EEC) [5] as implemented by the Personal Protective Equipment (EC Directive) Regulations [6], requires that clothing and equipment of types such as those specified in BS 7971 are tested by a notified body and the manufacturer states in his information for users what performance level, as specified in the relevant standard, has been reached.

The performance levels are normally based on test severity. Unfortunately there will not be authoritative statements as to what level of injury a user might sustain in particular circumstances of practical use. Annex E gives information on the hazard levels that clothing or equipment conforming to a particular standard can be expected to withstand. It is very important to record practical experience with protective clothing and equipment that has been tested for conformity to particular standards and conforms to different performance levels. This information is more valuable than predictions based on Annex E.

A manufacturer might only make a single type of protective clothing or equipment. However operatives might need to be clothed and equipped from head to foot and protected against a range of hazards. The compatibility of protective clothing and equipment worn on different parts of the body has to be examined. Gaps between items might result in unacceptable risks. The size range of the protective clothing and equipment selected and the inter-size intervals can be critical in enabling protection to be provided without gaps on operatives of a range of different statures.

Providing protection from more than one hazard might require protective clothing to be worn in layers. It is essential that compatibility between the layers is ensured. For example if a coverall which provides flame protection is to be worn it has to be large enough to go over the limb protectors chosen if these are not fire resistant.

If protective clothing is worn in layers the required performance levels of particular items might change. For example a thinner, lighter and lower performance blunt trauma torso protector might be appropriate if a ballistic vest is always worn under it. The two items are specified in different standards and might never have been tested together. An evaluation of the combination by a test laboratory might be needed. Otherwise simple addition of layers of protective clothing and equipment could lead to excessive and unnecessary ergonomic burdens on the operatives.

Stage 2 is complete when protective clothing and equipment ensembles have been identified that are fully compatible, are available in appropriate sizes and have been predicted to provide the level of protection required.

¹⁾ Home Office, Police Scientific Development Branch, Woodcock Hill, Sandridge, St. Albans, Hertfordshire, AL4 9HQ.

5.4 Stage 3. User trials

5.4.1 The selection of protective clothing and equipment at stage 2 is based on experience and laboratory data. The validity of the selection of the ensemble needs to be tested. As far as possible experienced operatives and training officers should be used to trial the protective clothing and equipment. However, laboratory simulations using manikins might be necessary to supplement human user trials, when the trials cannot be made safely with human subjects.

5.4.2 The following questions should be addressed in an initial static assessment.

- a) Ease of putting on and taking off.
- b) Ease and degree of adjustability. Are the straps the right length to obtain comfortable closure? Are touch and close fastenings positioned so that the hook component does not contact bare skin?
- c) Are there enough sizes to get a good fit on both men and women of different proportions?
- d) Are the parts of users' bodies at risk of injury covered by the clothing or equipment? Is there excessive or unnecessary coverage?
- e) Is it free of irritating edges etc.?
- f) Is it compatible with the other items of protective clothing and equipment, giving coverage without hazardous gaps and not conflicting with other protective clothing and equipment?
- g) Is the ensemble acceptable in terms of comfort, weight and mechanical restriction?

5.4.3 The following questions should then be addressed in a dynamic assessment.

- a) Is it possible to carry out all likely movements and actions with the vigour and speed required in violent situations?
- b) Does the protective clothing and equipment remain in place during vigorous activity with a comfortable tension in the straps and closures?
- c) Are the effects of wearing the ensemble for long periods acceptable? Is there unacceptable heat build up during exercise? Can procedures be adopted to limit heat build up? Is heat stress inevitable?

NOTE Guidance on the assessment of heat strain in workers wearing personal protective equipment is given in BS 7963.

- d) Is it possible to relax and open up the ensemble during stand-down periods and to become comfortable after heavy exercise?

5.4.4 The assessments detailed in **5.4.2** and **5.4.3** are complete when ensembles of individual items of protective clothing and equipment have been identified that are compatible and ergonomically practical to use. These ensembles should then be assessed in user performance trials in accordance with **5.4.5**.

5.4.5 The protective clothing and equipment ensemble selected should be assessed in user trials where hazards are present, in order to validate as far as possible the predicted performance of the ensembles in violent situations, by replicating them. A risk assessment should be carried out before commencing these trials and their progress should be monitored carefully. Everyone involved should be made fully aware of the aims of the performance assessment and the risks involved.

Scenarios should be devised in which participants are exposed to gradually escalating levels of specific, well-defined hazards. After exposure to each hazard level the performance of the protective clothing and equipment should be reviewed and a decision taken as to whether it is reasonable to proceed to the next level.

Some hazards are too serious to examine in this way and dummy (manikin) tests might be necessary. The assistance of a test laboratory might be appropriate.

Stage 3 is complete when the protective clothing and equipment ensembles have been shown in practical circumstances to provide the required protection identified in stage 1.

5.5 Stage 4. Establishing procedures and staff training

Before any protective clothing or equipment is obtained and brought into service, management procedures should be set up and staff should be trained. These management procedures and staff training should include the following:

- procedures for record keeping, covering the purchase, storage, issuing, cleaning, inspection, repair and discharge of the protective clothing and equipment;
- training of the support staff who are to handle and maintain the protective clothing and equipment;
- training of instructors who will train the operatives;
- preparation of training programmes for operatives.

Stage 4 is complete when all record keeping procedures are in place, support staff and instructors have been trained and training programmes for operatives have been prepared.

5.6 Stage 5. Introduction of protective clothing and equipment

The priorities for introducing the selected protective clothing and equipment should be determined. The selected protective clothing and equipment should be introduced into “active service” only when operatives have been trained in its use. It is necessary to determine whether new protective clothing and equipment can be used with existing protective clothing and equipment because it is compatible, or whether some operatives should be fully equipped with the new protective clothing and equipment. Care should be taken if individual items of an intended ensemble are introduced sequentially to existing stocks of protective clothing and equipment. It is essential to ensure compatibility at all times so that no unintended reduction in protection can occur.

Stage 5 is complete when all operatives are equipped with the new protective clothing and equipment.

5.7 Stage 6. Continuous evaluation

As is the case in all management of risks to health and safety, the collection and use of information is essential. The following records should be kept:

- the specifications of the protective clothing and equipment;
- the service history of batches or individual items of protective clothing and equipment;
- training records of operatives including the duration of exposure to risks and the identity of the risks;
- accident and ill-health records of operatives in training;
- service records of operatives including the duration of exposure to risks and the identity of the risks;
- accident and ill-health records of operatives on active service;
- records of the hazards to which the protective clothing and equipment has been exposed;
- records of wear and damage to the protective clothing and equipment;
- inspection and maintenance records;
- details of repairs made and items discharged.

The effectiveness of the protective clothing and equipment should be continuously assessed, and the results of these assessments recorded, together with any problems arising from the use of the protective clothing and equipment.

Effects of changes in the foreseeable hazards on the validity of the decisions made, the suitability of the protective clothing and equipment and the suitability of existing operational procedures should be regularly evaluated and an assessment made of whether there is a need for a full risk assessment to take account of such changes. In addition, the potential benefits of advances in knowledge should be considered on an ongoing basis.

The information will be of little use if not acted upon. Therefore, procedures should be put in place to ensure that there is no delay in reporting to the appropriate management level any significant conclusions such as:

- that the protective clothing and equipment is proving inadequate;
- that changes in the foreseeable hazards means they cannot be withstood by current protective clothing and equipment;
- that the current protective clothing and equipment is unsuitable for use under the new circumstances following changes made to operational procedures;
- accident or health records show there is a problem, which might or might not be related to the protective clothing and equipment.

If it is apparent there is a problem because operatives are being injured or are complaining, it is necessary to rapidly identify the causes. Annex F provides a set of recommendations that can as a whole, or in part, be used to aid investigation and to provide manufacturers and developers of protective clothing and equipment with information about what needs to be done to resolve the problem.

Stage 6 is never complete.

6 Use of protective clothing and equipment

6.1 Fitness and health of users

Protective clothing and equipment used in violent situations and in practical training for such operations places a physiological burden on the users. The clothing and equipment is heavy, it restricts movements, it causes a rise in body temperature with sweating, it creates a sense of isolation and it is fatiguing. In addition, in violent situations the user is subjected to psychological stress, to a measure of risk of physical injury and to the added physical workload of the operation. Users who do not have the appropriate physique, or who are not adequately physically fit, or who have a medical condition, will be placed at risk by these stresses.

Responsibility for the occupational health and safety of employees is covered by Regulations 6 and 7 of the Management of Health and Safety at Work Regulations, 1999 [1]. To discharge their duties most large employers appoint “competent” staff who are health care professionals with appropriate expertise in occupational health.

In the context of protective clothing and equipment for use in violent situations employers should ensure the following.

- a) Health surveillance in the organization should include consideration of the special circumstances and stresses connected with the use of this clothing and equipment.
- b) Only appropriately experienced medical staff should assess the fitness and health of prospective users of this clothing and equipment.
- c) The criteria for “fitness” should be agreed between the employer, their employees and the organizations representing the employees. An inappropriate physique or level of fitness, or a medical condition should be sufficient to bar an individual from training to use this clothing and equipment and from taking part in operations necessitating the use of this clothing and equipment. Certain categories of people should be excluded from violent situations and from training for them, including the following:
 - 1) people with diabetes, epilepsy or haemophilia;
 - 2) people with certain cardiac conditions;
 - 3) people with only one good eye;
 - 4) pregnant and nursing women.
- d) Operatives should be medically examined at least every year and after being involved in a major violent situation.
- e) Psychological aspects should not be ignored. Operatives should be psychologically trained for possible duties. Counselling should be available for those who have been involved in major violent situations.
- f) A physical fitness training programme should be provided for operatives who are not naturally fit by virtue of their normal duties.

6.2 Theoretical training of users

Prospective users should complete basic theoretical training before starting practical training. Experienced operatives should receive refresher theoretical training at intervals, and additional training when new protective clothing or equipment is introduced.

The training should include the following topics as applicable:

- a) the structure and personnel of the organization's health and safety department, including any occupational health provision;
- b) the hazards that might be encountered in violent situations and in training, and the harm that they could cause;
- c) the roles of each type of protective clothing and equipment in reducing the risk of injury;
- d) the limitations of each type of protective clothing and equipment;
- e) the personal and uniform clothing that is appropriate and that is inappropriate to wear with the protective clothing and equipment, and protocols with respect to head hair, facial hair, spectacles, hearing aids, false teeth and any other cosmetic or medical attachments, implants or prostheses;
- f) how to prepare the protective clothing and equipment for use, how to put it on, how to adjust it and how to check it is the correct size and fit;
- g) how to clean the protective clothing and equipment after training, and how to store it;
- h) the procedures to be followed if the protective clothing or equipment is soiled or contaminated in a violent situation;
- i) how to inspect the protective clothing and equipment for wear and damage, and the procedures to follow if either are suspected (see 8.2);
- j) responsibilities and correct behaviour while using the protective clothing and equipment.

For full instruction in the topics listed at least 6 h training is likely to be needed. Records should be kept of who has received the training.

6.3 Fitting and issue of protective clothing and equipment

In an organization purchasing protective clothing and equipment to issue to employees or others, one or more individuals should be assigned responsibility for overseeing the fitting of the protective clothing and equipment. These individuals should be given appropriate training so that they are familiar with the hazards to which the users of the protective clothing and equipment are likely to be exposed, and how the protective clothing and equipment acts to reduce the risk of injury. They should also be trained in its use so that they can foresee the problems that would be caused by poor fit.

The person fitting protective clothing and equipment to prospective users should ensure that:

- a) all of the relevant part of the body is covered;
- b) the gaps between various items of protective clothing and equipment are large enough to allow movement but small enough not to increase the risk of injury;
- c) for close fitting protective clothing or equipment the adjusters can be tightened to give firm and comfortable restraint of the clothing or equipment, and that further adjustment is possible to meet varying needs, and that for loose fitting protective clothing or equipment the degree of looseness is appropriate and the closures operate adequately;
- d) for safety critical protective clothing or equipment, such as respiratory protective equipment (RPE), the fit is assessed quantitatively to ensure for example that the mask fits accurately, that the helmet and face shield do not interfere with it, and that the user knows how to don all the equipment and to check its functioning. Such assessments should be repeated at least annually;
- e) if appropriate the protective clothing or equipment is altered to fit the user in a way that does not compromise its performance, or an alternative size is obtained from stock or ordered specially, or, if none of these proves to be possible, that it is recorded that the prospective user could not be fitted with adequate protective clothing and equipment;
- f) when a prospective user is fully equipped with protective clothing and equipment the whole ensemble is compatible and usable;

- g) the user has been given, and acknowledged receipt of, the user instructions pertaining to the protective clothing and equipment;
- h) records are kept of the clothing and equipment issued to ensure traceability.

6.4 Practical training of users

Practical training of users of the protective clothing and equipment should be in two parts. In the first, the use of the protective clothing and equipment should be taught; in the second, the protective clothing and equipment should be used during training in operational procedures. The second part is outside the scope of this standard. In the first part the following should be learned and practised as applicable:

- a) carrying out pre-use checks of the protective clothing and equipment;
- b) putting on the protective clothing and equipment under various conditions, adjusting it and checking it;
- c) taking progressively more vigorous exercise, observing the effects on the restraint systems and closures of the protective clothing and equipment, and learning how to adjust parts while on the move;
- d) taking a break, loosening and opening the protective clothing and equipment to cool off, readjusting the protective clothing and equipment after the break;
- e) using other equipment to perform particular tasks while wearing the protective clothing and equipment, i.e. learning to work in protective clothing and equipment;
- f) recognizing when the protective clothing and equipment is not adequate for the level of hazard;
- g) putting on additional protective clothing and equipment when the level or nature of the hazards changes;
- h) assisting colleagues in difficulty with their protective clothing and equipment, or following injury;
- i) removing a colleague's possibly contaminated protective clothing and equipment;
- j) removing his or her own contaminated protective clothing and equipment;
- k) carrying out routine cleaning, care and inspection of protective clothing and equipment not contaminated in use;
- l) preparing the protective clothing and equipment for its next use, stowing in kitbags, or storing in specific stores, as applicable. (See 8.4.)

For full coverage of the topics listed at least 12 h training is likely to be needed. Records should be kept of who has received the training.

6.5 Health and welfare under operational conditions

In addition to the many other factors that effect the health and welfare of operatives, those attributable to their protective clothing and equipment under operational conditions should be considered in relation to the risk assessments made on the anticipated violent situations and the tactical planning for handling violent situations.

The commonest stresses due to protective clothing and equipment are as follows:

- heat stress due to retained heat;
- dehydration due to increased sweating and voluntarily restricted fluid intake;
- discomfort due to problems urinating and defecating while wearing protective clothing and equipment. The different needs of men and women should be taken into account;
- localized fatigue, for example fatigue caused by the weight of a shield on the arm;
- general fatigue;
- hunger.

All the above can be anticipated and therefore should be allowed for in determining manning levels, shift durations, the stand-to/stand-down ratio, the provision of reinforcements, the provision of mobile rest and recovery vehicles etc. Heat strain in long operations is so likely to occur that it can be considered normal. However it has to be controlled. Heat strain should be assessed in accordance with the guidance given in BS 7963:2000 and measures taken to control it. It should be noted that changing the protective clothing and equipment specification might have little effect, and that the only fully effective way to control heat strain is by enforcement of a strict system of command and control, both during incidents and prior to them.

It is essential that the system incorporates ongoing fitness and operational training of operatives, with heat exposure to ensure acclimatisation, and medical surveillance to ensure all operatives are capable of dealing with extreme conditions of work. Heat strain has to be regarded as a continual and potentially serious health hazard for operatives using a full set of the protective clothing and equipment specified in BS 7971. The response of individuals to heat stress is variable from day to day. Medical supervision and aid needs to be provided at every incident where heat stress can be anticipated.

Heat acclimatisation is only achieved and maintained by regular and frequent exposures to heat of several hours duration on several days per week. All operatives at risk of heat stress during infrequent incidents cannot be heat acclimatised in this way. They could however be exposed to exercise heat stress while being monitored so that they can learn to recognize the onset of heat stress.

7 Cleaning and care of protective clothing and equipment

7.1 Routine cleaning and care

Manufacturers are required to supply cleaning instructions with protective clothing and equipment. An organization may decide that it will follow different procedures, but such a decision should be taken with care. If protective clothing and equipment is personal issue and the user takes it home or stores it in a personal locker at their place of work, the user should be instructed in routine cleaning procedures to ensure the protective clothing and equipment is in a hygienic condition and fit for use. If users are expected to launder their own protective clothing very strict procedures need to be enforced to ensure they do not take home contaminated items. It is preferable for all protective clothing and equipment to be cleaned on the employer's premises.

7.2 Cleaning after operational use

Cleaning after operational use and after some training exercises requires specific planning. After operational use the protective clothing and equipment might be contaminated with any of a wide range of materials. The hazard status of the materials will not be known. The Control of Substances Hazardous to Health Regulations 1999 [7] apply, therefore procedures need to be established in advance and notified to all relevant people to ensure the control of unidentified hazards. Procedures need to be established based on a consideration of the worst case possible.

An appointed safety officer with adequate competence should be assigned responsibility for determining what should be done in such circumstances. Sources of external expert knowledge and of practical assistance should be identified and engaged to provide their services, if and when necessary. Arrangements should take into account the speed with which assistance might be needed. The fire and rescue service might be able to offer advice on handling contaminated protective clothing and equipment.

All contaminated, or possibly contaminated, protective clothing and equipment should be removed by users in the manner that they have been trained to use, in order to minimize transfer of the contaminant to themselves or to other equipment. The protective clothing and equipment should be segregated while the nature of the contaminants is determined.

If decontamination is possible it should be carried out under controlled, safe conditions; if it is not possible the protective clothing and equipment should be disposed of as hazardous waste.

If protective clothing and equipment is normally cleaned by its users, procedures should be put in place to ensure that they do not take contaminated equipment or clothing away from the site of the incident.

8 Records, maintenance, inspection, repair and disposal

8.1 Records

Records should be kept as part of the administrative procedures. The service history, maintenance, inspection, repair and ultimate disposal of protective clothing and equipment should be logged, together with details of the person to whom it was issued, if applicable. In so far as is practical details of the hazards encountered in violent situations should be recorded. The records should be linked to the records of protective clothing and equipment issue and operative training records. The responsibility for record keeping should be assigned to staff at an adequately senior level.

8.2 Inspection

Regular inspection of protective clothing and equipment is essential to ensure it will provide the protection intended. A qualified person should be appointed to this task. They should receive training so that they are familiar with the protective clothing and equipment and the types of wear and damage to it that indicate that its performance might be reduced. Manufacturers of the protective clothing and equipment might be willing to assist in this training.

All protective clothing and equipment should be inspected annually, or more frequently if stated in the manufacturer's instructions or specified in a standard applicable to particular items of clothing or equipment, such as respiratory protective equipment or lifejackets.

NOTE Some clothing and equipment is covered by statutory regulations which specify inspection intervals.

Additional inspections should be carried out in the following situations:

- a) when an item is returned to "stores" for example in exchange for a different size;
- b) after every deployment in a violent situation;
- c) when an item is returned to "stores" by a user because they suspect it is worn or damaged, or has sustained a major impact;
- d) after any repair has been made by the manufacturer or within the organization;
- e) whenever a user is injured.

If a user has been injured, notes should be made, and possibly photographs taken, while the appearance of the protective clothing or equipment is still fresh. No attempt to clean or repair it should be made. The protective clothing or equipment should be suitably bagged and stored in case further examination or testing is required.

The whole batch, or all items of a particular type, of protective clothing or equipment should be recalled for inspection if damage to the protective clothing or equipment, or injuries to users, are unusually frequent.

The inspector should place each item of protective clothing or equipment in one of the following categories:

- fit for service;
- fit only for training;
- to be repaired;
- to be retained for further examination or testing;
- to be discharged, destroyed and disposed of.

Any helmet reported to have received a hard impact should be marked for discharge and disposal even if no damage is visible.

Any face shield contaminated by a solvent should be marked for discharge and disposal even if no damage is visible and the solvent has evaporated.

Any helmet or RPE face piece contaminated by a solvent should be marked for discharge and disposal unless it is known to be constructed of solvent resistant material.

Records of all inspections, and the results, should be maintained (see 8.1).

8.3 Repair

Repairs by users should not normally be permitted. However routine replacement of components such as filters or face shields by users would be reasonable after adequate training. Repairs to protective clothing or equipment should only be made by specialist staff and should be made according to the manufacturer's instructions with parts supplied for the purpose. It is however preferable to return the protective clothing or equipment to the manufacturer for all except trivial repairs.

After repair the protective clothing or equipment should be inspected and placed in the appropriate category in accordance with 8.2. All repairs should be recorded (see 8.1).

8.4 Storage

Protective clothing and equipment should be stored in such a way that it remains hygienic and clean until it is required for use. Personal issue protective clothing or equipment should be stored in identified containers.

Storage conditions should be as follows.

- Eye protectors should be stored in individual containers to keep them free of dirt, grit, oil and grease, and kept where they will not be exposed to excessive temperatures, strong light, moisture or chemicals.
- Helmets should be stored in bags and kept where they are unlikely to fall onto hard surfaces.
- Clothing, gloves and boots should be stored in clean dry well ventilated conditions without excessive temperature changes.
- Shields and any other items of equipment constructed of polycarbonate plastics should be stored in a clean dry atmosphere that is free of solvent fumes, oil aerosols, and gaseous hydrocarbons. The temperature should be between 5 °C and 30 °C and strong light should be excluded.

NOTE Such items can degrade very rapidly if left in a vehicle where they are exposed to fuel fumes and heat.

8.5 Discharge and disposal

Protective clothing and equipment that is classified for discharge and disposal should be disrupted so that it cannot be inadvertently re-used. The means of disposal should be selected on the basis of the constituent materials.

Protective clothing or equipment that is contaminated should be disposed of using a method that is also appropriate for the particular contaminant.

NOTE Attention is drawn to the Environmental Protection Act [8].