

MATERIAL AND EQUIPMENT STANDARD**FOR****FIRE BLANKET-FIRE FIGHTERS SUITS****(FIRE-PROOF TYPES) - FIRE-RESISTING****CURTAIN AND SHIELDS****FIRST EDITION****NOVEMBER 2015**

FOREWORD

The Iranian Petroleum Standards (IPS) reflect the views of the Iranian Ministry of Petroleum and are intended for use in the oil and gas production facilities, oil refineries, chemical and petrochemical plants, gas handling and processing installations and other such facilities.

IPS are based on internationally acceptable standards and include selections from the items stipulated in the referenced standards. They are also supplemented by additional requirements and/or modifications based on the experience acquired by the Iranian Petroleum Industry and the local market availability. The options which are not specified in the text of the standards are itemized in data sheet/s, so that, the user can select his appropriate preferences therein.

The IPS standards are therefore expected to be sufficiently flexible so that the users can adapt these standards to their requirements. However, they may not cover every requirement of each project. For such cases, an addendum to IPS Standard shall be prepared by the user which elaborates the particular requirements of the user. This addendum together with the relevant IPS shall form the job specification for the specific project or work.

The IPS is reviewed and up-dated approximately every five years. Each standards are subject to amendment or withdrawal, if required, thus the latest edition of IPS shall be applicable

The users of IPS are therefore requested to send their views and comments, including any addendum prepared for particular cases to the following address. These comments and recommendations will be reviewed by the relevant technical committee and in case of approval will be incorporated in the next revision of the standard.

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GENERAL DEFINITIONS

Throughout this Standard the following definitions shall apply.

COMPANY :

Refers to one of the related and/or affiliated companies of the Iranian Ministry of Petroleum such as National Iranian Oil Company, National Iranian Gas Company, National Petrochemical Company and National Iranian Oil Refinery And Distribution Company.

PURCHASER :

Means the "Company" where this standard is a part of direct purchaser order by the "Company", and the "Contractor" where this Standard is a part of contract document.

VENDOR AND SUPPLIER:

Refers to firm or person who will supply and/or fabricate the equipment or material.

CONTRACTOR:

Refers to the persons, firm or company whose tender has been accepted by the company.

EXECUTOR :

Executor is the party which carries out all or part of construction and/or commissioning for the project.

INSPECTOR :

The Inspector referred to in this Standard is a person/persons or a body appointed in writing by the company for the inspection of fabrication and installation work.

SHALL:

Is used where a provision is mandatory.

SHOULD:

Is used where a provision is advisory only.

WILL:

Is normally used in connection with the action by the "Company" rather than by a contractor, supplier or vendor.

MAY:

Is used where a provision is completely discretionary.

CONTENTS:	PAGE No.
0. INTRODUCTION	2
1. SCOPE	3
2. REFERENCES	3
3. DEFINITIONS AND TERMINOLOGY	4
4. UNITS	5
 PART I	
5. SPECIFICATION FOR FIREFIGHTING ORDINARY SUITS.....	6
6. SPECIFICATION FOR FIRE RESISTANCE SUITS	6
6.1 Aluminized Clothing	6
6.2 Materials.....	11
6.3 Design and Make-Up.....	11
6.4 Head Wear.....	12
6.5 The Visor/Face Piece	12
6.6 Hand Wear	12
6.7 Foot Wear/Heat Resistant Boots	12
6.8 Instructions and Marking	12
6.9 Testing.....	13
7. FIRE RESISTANCE BLANKET	13
7.1 Materials.....	13
7.2 Containers	13
7.3 Performance Requirements	13
7.4 Sizes	13
7.5 The Use	14
8. FIRE BLANKET	14
8.1 General.....	14
8.2 Construction.....	14
8.3 Performance Tests.....	15
8.4 Marking Blankets	16
 PART II	
9. PROSCENIUM FIRE RESISTING CURTAIN	17
10. PORTABLE FIRE RESISTING SHIELDS	17
 APPENDICES:	
APPENDIX A RECOMMENDED NOTES ON DESIGN, MAINTENANCE AND OPERATING INSTRUCTIONS FOR FIRE FIGHTING SUITS.....	19
APPENDIX B GENERAL RECOMMENDATION FOR FIRE FIGHER	21
APPENDIX C GLASS FIBER FIRE BLANKETS	24

0. INTRODUCTION

Fire resisting suit should have a high thermal insulating value, but practically it may not be possible to have a sufficiently high insulating protection against high rate of heating.

Different types of clothing may be required for protection against heating by radiation and against heating caused by hot air and flame lick. Metalized reflecting fabrics provide effective protection against radiant heat. In this Standard the use of fire blanket, fire resisting blanket, curtains and shields will be discussed.

In this standard, some of the subjects are adapted from the following specifications and handbooks:

- BS Handbook NO 11 "Method of Tests for Textile"
- National Safety Council Accident Manual for Industrial Operations Chapter 38 (6 th Edition)

1. SCOPE

This material Standard is divided into two parts and specifies the minimum requirements for the following equipment:

Part I

a) Fire fighting suits (ordinary suits)

b) Fire resistance suit (Fire entry suits)

Against radiant heat and flame lick.

c) Fire resisting blanket

Glass fiber for extinction of fire.

d) Fire blankets

For personal protection.

Part II

e) Fire resisting curtain

To provide fire and heat guard for separation of hot gas, flame and smoke in movies (cinemas), theaters etc.

f) Fire resisting shield

For protection of fire fighters against heat and fire.

Note 1:

This standard specification is reviewed and updated by the relevant technical committee on Oct. 2002. The approved modifications by T.C. were sent to IPS users as amendment No. 1 by circular No. 186 on Oct. 2002. These modifications are included in the present issue of IPS.

Note 2:

This is a revised version of this standard, which is issued as revision (1)-2015. Revision (0)-1996 of the said standard specification is withdrawn.

2. REFERENCES

Throughout this Standard the following dated and undated standards/codes are referred to. These referenced documents shall, to the extent specified herein, form a part of this standard. For dated references, the edition cited applies. The applicability of changes in dated references that occur after the cited date shall be mutually agreed upon by the Company and the Vendor. For undated references, the latest edition of the referenced documents (including any supplements and amendments) applies.

BSI (BRITISH STANDARD INSTITUTION)

BS 3120	“Performance Requirement of Materials for Flame Proofing”
BS EN 367	“Protective Clothing -Protection against Heat and Flames - Test Method: Determination of the Heat Transmission on Exposure to Flame”

BS EN 180 6942	“Protective Clothing - Protection against Heat and Fire - Method of Test: Evaluation of Materials and Material Assemblies when Exposed to a Source of Radiant Heat”
BS EN 531 (1995)	“Protective clothing for industrial workers exposed to heat”
BS 3119	“Method of Test Flameproof Materials”
BS 3791 EN 367 (92)	“Protective clothing – protection against heat and fire”
BS 7944	“Heavy Duty Fire Blanket”
BS EN 1869	“Fire blankets”
UL 96	“Standard for safety lightning Protection Components”

NFPA (National Fire Protection Association)

NFPA 101	“Life Safety Code”
NFPA 701	“Standard Methods of Fire Tests for Flame Propagation of Textiles and Films”
NFPA 80	“Standard for Fire Doors and Other Opening Protective’s”
NFPA 1971	“Standard for Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting”
NFPA 2112	“Standard for Protection Against Flash Fires”
NFPA 2113	“Standard for Protection Against Flash Fires”
NFPA 1500	“Standard on Fire Department Occupational Safety and Health Program”
NFPA 1851	“Standard on Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles”

3. DEFINITIONS AND TERMINOLOGY

3.1 Aluminized Clothing

Aluminized Clothing with range of Ceramic Fiber (1450° C) clothing made of aluminized coated flameproof fabric which reflects and insulates heat and fire for short period of time and are of two types:

- i) Fire proximity or reflective suit used in proximity of high temperature where flame is not entered or is designed to provide protection against conductive, convective and radiant heat.
- ii) Entry protective clothing that is designed to provide protection from conductive, convective and radiant heat and permit entry into flame.

3.2 Conex Meta-Aramid Fibers

Are best known for their combination of heat resistance and strength and does not ignite, melt or drip.

3.3 Fire Resisting Curtain

A fixed wall type curtain fixed above the proscenium opening which in case of stage fire automatically closes without the use of applied power.

3.4 Fire Resisting Shield

A local made shield to be used by fire fighters to combat intense flame and heat such as oil well fire.

3.5 Pbi (Polybenzimidazole)

Synthetic fiber with a very high melting point. It has exceptional thermal and chemical stability and does not readily ignite.

4. UNITS

This Standard is based on International System of Units (SI), as per [IPS-E-GN-100](#) except where otherwise specified.

PART I**5. SPECIFICATION FOR FIREFIGHTING ORDINARY SUITS**

5.1 Protective garment elements composite consisting of outer shell, moisture barrier, and thermal barrier shall be tested for thermal insulation, thermal Protective Performance (TPP) test, and shall have an average TPP of not less than 35.0.

5.1.1 PPE (Personal Protective Equipment) of fire fighters shall be includes:

- a) Protective coat and trousers
- b) Helmet
- c) Protective hood
- d) Safety boots
- e) Eye protection
- f) Hearing protection
- g) Gloves
- h) SCBA (Short-Circuit Breathing Apparatus)
- i) PASS device (Personal Alarm Safety System)
- j) SCBA and PASS shall be used in IDLH atmospheres (immediately dangerous for life and health)

5.1.2 Structure

Each fire coat and trousers shall have minimum three protective layers:

- a) Outer shell
- b) Moisture barrier
- c) Thermal barrier

More recommended for **NOTES ON DESIGN, MAINTENANCE AND OPERATING INSTRUCTIONS** is mentioned in appendix-A, and general recommendation for fire fighter is given in Appendix B.

6. SPECIFICATION FOR FIRE RESISTANCE SUITS**6.1 Aluminized Clothing**

Aluminized Clothing with range of Ceramic Fiber (1450° C) this type of clothing falls into two classes:

- a) **Fire proximity suits (Fig. 1)**
Not to enter the flame area.
- b) **Emergency suits (Figs. 2)**
For temperature exceeding 550°C.

Notes:

- 1) **Never use fire proximity clothing where fire entry suits are required.**
- 2) **Clothing for protection of close approach and other emergencies is given in Table 1.**
- 3) **Protection shall be limited to the protection against ALFA - RAY (Particle) or BETAB-RAY (Particle) radiation.**

6.1.1 Structural (fire fighter, suit)

Where men are working in extremely high temperatures up to 1000 to 1100°C, such as furnace and oven repair, cooking, slagging, fire fighting and rescue work, the use of aluminized fabrics are essential. For use by the structural fire fighters encountering dangerous radio- activity pollution hazards and radioactive contamination during the fire fighting operation and related life saving operations at the "Hot Job" places.

Combination of "CELANECE pbi" Fiber (25%) and "CONEX" META ARAMID Fiber (75%). The flame resistant outer shell shall not break nor lose the inherent flexibility after the exposure to 1200°C flame for period of more than 65 seconds.

These suits consist of the following item that shall be integrated from head to foot along with air-fed to reduce heat and increase comfort:

- a) Trousers
- b) Coats
- c) Gloves
- d) Boots
- e) Hoods

TABLE 1 - CLOTHING FOR PROTECTION AGAINST INTENSE HEAT

TYPE OF HAZARD	EXAMPLE OF HAZARDS	FLAME RESISTANCE	SUGGESTED METHOD OF PROTECTION	FITTING OF SUIT	HEAD PROTECTION	
					TYPE	DEGREE OF VENTILATION
Radiant heat	Close approach fire	Outer material shall be "Flame Proof" and interlining shall be of low flam inability	High reflective surfaces for high rate of heating thermal resistance.	Free ventilation desirable to allow evaporation and prevent local heating	Face shield of wire gage or transparent material which may be reflective coated	Naturally ventilated
Radiant heat and occasional flame lick	Rescue work and fire fighting operation in proximity of flame	Outer materials and inter lining shall be flame proof	Reflecting surfaces against radiant heat and thermal resistant as high as practicable*	As little entry of air and as much free circulation of air inside the suite	Helmet with visor to drape to enclose the mead and nock visor reflectively coated	Ventilation may be under control of weather but shall be closable
Radiant heat and pockets of flame	//	//	//	Negligible entry of air and much precirculation of air inside the suit	//	//
Radiant heat and complete static immersion	Oil fires fire entry work	Outer material shall be non combustible. Properties, inter lining to be flame proof*	//	//	//	Shall be as air tight as practicable

* With material characteristic
 Aramid fiber/Conex (PBI Blended, AEX FIRE)
 Pre-carbon fiber / PYRO MEX/ Glass Fiber / ceramic fiber

This table has reference to Note 2 of Clause 6.1

6.1.2 Ordinary clothing can be protected against flame or small sparks by flameproofing. Flameproofing will make material:

- a) Highly flame-resistant.
- b) An effective water soluble for flameproofing is 226.8 grams of borax and 113.4 grams of boric acid in 3.8L of hot water.
- c) Flame proofed clothing should be marked for distinction.





FIRE PROXIMITY SUITS

Not to enter the flame area.

Fig. 1



EMERGENCY SUITS

For temperature exceeding 550°C.

Fig. 2

6.2 Materials

6.2.1 The material of any articles of clothing used against heat and fire proximity shall be of flameproof.

6.2.2 Any lining material, which because of the design of the clothing, could come in contact with flame shall be of flameproof material.

6.3 Design and Make-Up

6.3.1 There shall be no pockets external to the assembly.

6.3.2 The trousers and the sleeves of the jacket shall not have turn-ups.

6.3.3 Wherever possible seams and sewing threads shall be protected. The threads shall be compatible with the body fabric and shall not impair the effectiveness of the protection afforded by the garment.

6.4 Head Wear

6.4.1 Helmets intended for use against fire proximity shall be tested complete with visors, there shall be no discoloration. The visor shall show no sign of cracking or breakdown, and all seams shall be substantially undamaged.

6.4.2 Helmets required to provide protection against impact and shall pass the test for shock absorption.

6.4.3 The amount of respirable air within the headwear and suit shall be made clear to the purchaser by the manufacturer and should be consistent with the use to which the equipment is to be put and for the time for which it is to be used.

6.4.4 Fasteners shall be so designed or protected that they cannot be damaged by heat or cause head injury to the wearer.

6.4.5 The field of vision shall meet the requirements of the operations to be conducted by the wearer and shall be agreed between the purchaser and the manufacturer.

6.4.6 The headwear shall be designed so that the visor or faceshield does not mist up in use to an extent that reduces the visibility.

6.5 The Visor/Face Piece

6.5.1 The visor or face shield shall be constructed of at least two independent layer of material, and their edges shall be effectively protected by suitable frames or by the design of the helmet itself.

6.5.2 The degree of transparency to light passing through a visor shall be specified.

6.5.3 When the visor or face shield is sprayed with water, it shall not have no fragment and neither the field of vision of the wearer nor the transparency of the visor or face shield shall be reduced by more than 50%.

6.5.4 The visor of face shield shall not crack, fracture or become detached from its frame when tested.

6.5.5 Acrylic face piece containing lead in equivalent of 0.3 mm Coating thickness, with heat protective film supported outside as giving a wide vision.

6.6 Hand Wear

The gloves shall be graded as light duty or heavy duty and shall be designed so that it will not slip off in use but shall be easy to take off.

6.7 Foot Wear/Heat Resistant Boots

The trousers leg of the protective suit should fit snugly into or around the boot to prevent the ingress of flame. Outer shell of Heat Resistant boot is of Aluminized Agamid Fabric Lined with felt or leather. The sole is of heat resistant rubber, which meets UL 96.VO Class Requirements. The toe is protected with steel protector for impact and compression.

6.8 Instructions and Marking**6.8.1 Instructions**

Manufacturer's instructions shall be provided with each suit of protective fire entry and proximity. These shall give information on how the best results may be obtained in use and on the limitations of the clothing, in particular, full information shall be provided concerning the undergarments used in assessing its performance, and it shall be stressed that the protective clothing for proximity and fire

entry should be used only by trained personnel.

The instructions shall also give information on the amount of respirable air contained in the suit in terms of "the time for which it can be safely worn".

6.8.2 Marking

Each separate article of protective clothing and each garment, except visor and faceshield shall be permanently marked with the following:

- a) The number of accepted standard;
- b) The warning must be adhered according to manufacturer's instructions;
- c) The type of heat against which clothing is designed to give protection, "Flame" "Radiation" or both;
- d) Each protective garment shall bear a permanent label bearing the manufacturer's identification mark and drawing attention to the necessity of consulting the manufacturer's instructions regarding the use of undergarments.

Visors and face shields shall be marked with the number of accepted standard and manufacturer's identification mark.

6.9 Testing

Flameproof clothing shall be tested in accordance with BS EN 367, BS EN ISO 6942 and certified to be flameproof for class and types of hazards.

7. FIRE RESISTANCE BLANKET

Defined as "Glass Fiber for Extinction of Fire".

7.1 Materials

The fire blanket shall be made of woven glass fiber fabric with silicon rubber coating on both sides.

7.2 Containers

7.2.1 Fire Blanket shall be packed and stored in a carry bag with handling loops and can be ready for use by its unique quick release system

7.2.2 The Container shall bear the using instruction marked on carrying bag with specified Language.

7.3 Performance Requirements

All the test requirements laid down on BS 7944, BS EN 1869 shall be carried-out and certified by manufacturers.

7.4 Sizes

The following sizes should be used:

- a) **1200 mm × 1200 mm**
- b) **1800 mm × 1200 mm**
- c) **1800 mm × 1800 mm**

7.5 The Use

Fire blankets can be used for fire extinction in:

- a) Catering establishment
- b) Training center
- c) Hospitals and nursing
- d) Laboratories
- e) Garage and work shops
- f) Boats and caravans
- g) Ships and galleys
- h) Numerous industrial outlets
- i) Extinction of fire on a persons clothing
- j) Restaurants
- k) Flammable liquid cans
- l) Cinema projection rooms
- m) Administration buildings/control rooms
- n) Living quarter

8. FIRE BLANKET

Defined as "Blanket for Personal Protection".

8.1 General

Fire blanket is a flexible sheet of material intended to be used for small fires by smothering or as a protection against radiant heat or small hot objects. Fire blankets are classified as:

- a) Light duty; for extinguishing small fires in containers of cooking fat or oil and fires in clothing worn by persons.
- b) Heavy duty; for industrial applications with ability to resist penetration by molten metals ejected from cutting and similar processes and any conducted or radiant heat transfer when used for insulation purposes, in addition to the uses mentioned for the light duty blankets.

8.2 Construction

A fire blanket shall be formed of one sheet of material, or two or more sheets of material each of a size equal to the overall size of the fire blanket, which are stitched together. The two sides shall be similar in performance.

There shall be no seams in the fire blanket except as follows if required:

- a) Where the hand-holding devices are fixed; and
- b) At any edge

8.2.1 Size and shape

Fire blanket shall be rectangular or square with no edge longer than 1800 mm. Light duty fire blankets shall have no edge less than 900 mm. Heavy duty fire blankets shall have no edge less than 1200 mm.

8.2.2 Mass

Fire blanket shall have a maximum mass of 10 kg for Heavy Duty Fire Blanket. (BS 7944) and 4.5 Kg for light Duty Fire Blanket. (BS EN 1869)

8.2.3 Hand holding devices

Hand holding devices if provided shall not comprise loops or pockets and shall not become detached from the blanket during testing.

8.2.4 Appearance and line lateral use

The two sides of fire blanket shall be of similar appearance finish or color and shall give the same result when tested.

8.2.5 Flexibility

Fire blankets shall be capable of being rolled completely around a (50+2) mm diameter bar, and along any axes parallel to adjacent sides, without permanent deformation.

8.2.6 Ease of removal and unpacking

Fire blankets shall be stowed or packed in such a way that they can be taken from the storage position unfolded and held ready for use in not more than 4 second. The force required to remove the fire blanket from its carrying bag shall not exceed 80 N.

8.2.7 Resistance to Fraying

The edge of fire blankets shall not fray or tear during testing.

8.3 Performance Tests

Fire blankets shall be certified by vendor for the following tests in accordance with Appendix A to F of BS 7944, BS EN 1869:

- a) Thermal insulation (heavy-duty fire blanket only)
- b) Resistance to the effects of hot cutting (Heavy-duty fire blanket only)
- c) Electrical insulation (resistance 1 Mega ohm)
- d) Reusability
- e) Fire performance test.

8.4 Marking Blankets

8.4.1 Each fire blanket/fire resisting blanket shall be marked with the following:

- a) The word "Fire blanket/fire resisting blanket";
- b) The word "Heavy duty" or "Light duty" and "reusable" as appropriate;
- c) The manufacturer's name and address.

8.4.2 Container

Each container shall be marked with word "Fire blanket" in white letters not less than 20 mm high on a rectangular background.

8.4.3 Container or instruction sheet

Each container or instruction sheet for fixing near to the storage position of the fire blanket shall be marked with following:

- a) The word "Fire Blanket/ Fire Resisting Blanket" on the front;
- b) The word "Heavy Duty" or "Light Duty" as appropriate;
- c) Instruction for use;
- d) The manufacturer's name and address;
- e) The model or other identification of the fire blanket;
- f) The size in meters;
- g) Reusable or should be discarded after use;
- h) Washing or cleaning instruction (reusable only);
- i) Checking and maintenance instruction including when to discard if damaged or contaminated.

The size of proper container for different size (light and heavy) of blanket is given in Appendix C.

PART II**9. PROSCENIUM FIRE RESISTING CURTAIN**

9.1 The proscenium opening of every approved stage shall be provided with a curtain made of approved materials constructed and mounted so as to intercept hot gases, flames and smoke to prevent a glow from a severe fire on the stage from showing on the auditorium side for a period of 5 minutes. The closing of the curtain from the full open position shall be effected in less than 30 seconds, but the last 2440 mm of travel shall require not less than 5 seconds.

9.2 The proscenium curtain shall be constructed in accordance with standards listed in NFPA 101.

9.3 The curtain shall be automatic closing without the use of applied power. In addition to these protections, the following items should also be considered:

- a) A noncombustible opaque fabric curtain so arranged that it will be closed automatically, and;
- b) An automatic fixed water spray deluge system shall be located on the auditorium side of proscenium opening and be so arranged that the entire face of curtain will be wetted. The system shall be activated by combination of rate-of-rise and fixed-temperature detectors located on the ceiling of the stage. Detectors shall be spaced in accordance with their listing. The water supply shall be controlled by a deluge valve and shall be sufficient to keep the curtain completely wet for 30 minutes or until the valve is closed;
- c) The curtain shall be automatically operated in case of fire by a combination of rate-of-rise and fixed temperature detectors that also activates the deluge spray system. Stage sprinklers and vents shall be automatically operated in case of fire by fusible elements;
- d) operation of the stage sprinkler system or spray deluge valve shall automatically activate the emergency ventilating system and close the curtain, and;
- e) The curtain vents and spray deluge system valve shall also be capable of manual operation.

9.4 Every stage provided with fire resisting curtain and larger than 45 m² in area shall have a system of sprinkler at the ceiling and in usable spaces under stage.

9.5 Flame Retardant Requirement

The material used for fire resisting curtain shall meet the requirement of NFPA 701, standard methods of fire tests for flame-resistant of textile. Foamed plastics may be used only by specific approval of Iranian Oil, Gas and Petrochemical Industries.

Scenery and stage properties on thrust stages shall be either non-combustible or limited-combustible materials.

9.6 Standpipes

Regular stages over 93 m² in area and stages approved by Government authority shall be equipped with Standpipe located at each side of stage.

10. PORTABLE FIRE RESISTING SHIELDS

10.1 Fire resisting shields covered by ceramic fiber or aluminized asbestos materials shall be fabricated of metal (steel) frame with ceramic fiber cover and wherever considered essential to be provided with water spray protection. The shield may be of dolly type for ease of its movement. The shield shall be fixed with two fire resisting glass windows and opening for fire fighting nozzles.

10.2 Portable fire resisting shield shall not be less than 1200 mm wide and 2000 mm in height.

The fire-resisting shield shall be made locally provided that material used is of flame and heat resistance of not less than ½ hour.

APPENDICES**APPENDIX A****RECOMMENDED NOTES ON DESIGN, MAINTENANCE AND OPERATING INSTRUCTIONS
FOR FIRE FIGHTING SUITS****A.1 Design**

Clothing for protection against intense heat should be primarily designed to prevent heat reaching the wearer, and the entry of hot air and fumes.

This can be done by allowing ambient air circulate freely under the protective clothing.

In the design of helmet and suit, care should be taken to ensure that when in use there should be sufficient air trapped in the helmet and suit to meet the respiration requirements of the wearer for the exposure period.

The suit should be as airtight as possible and the helmet or its visor or face shield has to be provided with ventilation opening, which should be easily closed to ensure a reserve of fresh air when it is in close position.

When protective clothing is used for short periods weight will not be an important factor, but where clothing is worn for long periods, the weight should be as low as possible. Care should be taken to ensure that body and limb movements are not hampered and the protective clothing should be proportioned. Either it should be made of flexible fabric or the clothing should be designed to give flexibility.

Other important aspects of design are:

- 1) Correct fitting;
- 2) Ease and speed of donning and removal;
- 3) Comfort in wear.

The gripping power of the soles depend on the nature of the surface that wearer is walking, on namely the material, angle of slope and condition (e.g. wet, dry, oily). To resist slipping performances of the different designs using several different wearers on sloping surfaces should be achieved. Non-skid qualities should last throughout the life of the footwear.

A.2 Maintenance

Garments should be examined thoroughly at regular intervals as well as after each time of use, and all tears, broken or defective fasteners, etc., should be repaired before re-use. The materials used in the repaired portion should meet the requirements of this Standard.

If a garment is soiled, it should be cleaned as soon as possible since contamination by flammable substances such as oil or grease may impair the flameproof properties of materials.

Any cleaning process on garments should be of such a nature that the cleaning agents and treatment have no deleterious effect. If clothing is dry-cleaned, no residual solvents giving rise to toxic effects should be used. The Manufacturer should recommend methods of cleaning.

The uppers of leather boots, except those made of suede leather, should be dressed periodically to maintain suppleness and waterproof ness. Flammable oils and fats should not be used.

Metalized material garments can be used only if reflective surfaces are untarnished. These garments should be washed with soapy water and wiped with a very soft rag. Normal room temperature is suitable for storage of these garments, which should be hung so that unnecessary folding is avoided. Once the reflective surfaces are no longer bright the garment should be discarded.

(to be continued)

APPENDIX A (continued)**A.3 Operating Conditions**

It is essential that wearer should know the limitations of the clothing and that he retreats from the danger zone before failure is likely. These garments should only be used by trained wearers who have frequent practice in wearing them.

Wearers should be prepared for the moment when the protective clothing and the air within it becomes rapidly warmer than the skin. Training should be planned so that each user can recognize the approach of the point of danger and the time to leave the danger zone.

Prevention of mist on the inside of a visor or face shield is important. Various proprietary anti-mist compounds and devices, which will alleviate this trouble to a large extent, should be used.

The wetting of hot dry assemblies should be avoided as this may cause scalds.

APPENDIX B
GENERAL RECOMMENDATION FOR FIRE FIGHTER

B.1 Scope and Field of Application

Rules and instructions that is essential to know and observe the use of clothing for protection against heat and fire should be in hand as a "Check- List" of safety requirements for those responsible for checking.

When new rulings specify regulations other than those given in this standard, the stricter specifications should be applied.

B.2 Important Preliminary Remarks

It is essential to release that no clothing for protection against heat and fire can offer unlimited protection.

Variable and interdependent factors affect the time that such clothing can offer protection in an area of heat and fire. For one and the same garment, this period may vary enormously from one operator to another.

It is important to realize that, if the operator has an accident or feels unwell; the absence of movement on his part reduces the circulation of air inside the garment and may increase the effects of the external heat.

B.3 Operators**B.3.1 State of health**

Any person using the garment giving protection against heat and fire must be free from any physical or mental defects, especially if he is to wear a breathing apparatus.

B.3.2 Training

Protective clothing against intense heat with or without fire shall only be used by persons who undergo systematic training in its use.

Regular training has several objectives, the most important of which are:

- To acquire a routine to permit the reduction to a minimum of the time required to put on the clothing and special equipment;
- to keep the operator informed of the properties and limiting factors of the material he has to wear;
- to accustom the operator to move about in such clothing;
- to allow the operator to accustom his body to prolonged effort, while learning to recognize his physiological limit of endurance, and also to assess the approach of the moment when he is still able to retreat from the danger zone in total safety.

Training of operators should be carried out with garments corresponding to those used in practical operations. The old clothing of the same type and style should be used and kept exclusively for training.

(to be continued)

APPENDIX B (continued)**B.4 Materials****B.4.1 Fusible materials**

Persons likely to find themselves in an area where there is a risk of heat or fire shall not wear clothing or underclothing made of fusible material next to the skin even if they are protected by special garments.

B.4.2 Permeable and absorbent materials

Persons clothed in permeable garments or in garments of which the material of the outer layer absorb water or flammable products (liquids, dusts, gases or vapors) shall be aware of the danger of entering an area of intense heat or fire when those garments have been in, or in contact with such products. Specific safety measures shall be taken to prevent permeable or absorbent garments from coming into contact with liquid oxygen.

B.5 Electricity**B.5.1 Static electricity**

Certain garments may become charged with and discharge of static electricity. The use of such garments is dangerous in areas contaminated by explosive or flammable gases.

B.5.2 Electric shock-electrocution

Before entering an area where there is an electrical hazard, the person in charge of rescue operations or fire fighting shall ensure that electricity supply systems have been separated from the supply source.

B.6 Safety Provisions**B.6.1 Operational groups**

Any operation requiring special protective clothing or equipment shall be carried out by a group of at least two men who are in constant physical contact with each other and with a safety station situated outside the danger area.

At this safety station, for each group taking part in the operation, a stand-by group of at least the same number of men, protected at least as effectively as the first group should be ready to take immediate action at the slightest alert.

B.6.2 Cooling by wetting

Unless the garment has been specially designed for it, it shall never be cooled by wetting.

B.6.3 Illumination

The operational area should be illuminated.

(to be continued)

APPENDIX B (continued)**B.7 Inspection, Storage, Maintenance, etc.****B.7.1 Inspection**

Garments for protection against heat and fire shall be checked at regular intervals and maintained in perfect condition. Particular attention shall be paid to the fastening devices to make sure they are operating properly.

Any defects that are discovered or suspected shall be pointed out to the Manufacturer or his certified representative who is responsible for declaring that the garment is capable of offering protection corresponding to its classification in accordance with the standards laid down.

Note:

The inspection of the state of the garments is especially responsible work. It requires special technical knowledge and often-special equipment.

B.7.2 Storage

The manufacturer's recommendations regarding the conditioning and storage of clothing shall be strictly observed. Each type of garment shall be arranged in a group for rapid identification of its classification. A check shall be made at regular intervals to see that all these recommendations are observed.

Protective clothing, particularly if provided with a special surface to reflect heat, shall be stored in such a way as to avoid folding the material and to protect it against dust and other dirt which may decrease its efficiency.

Protective clothing made of woven, porous or absorbent materials shall be stored in such a way as to avoid its contamination by products likely to make its use dangerous.

B.7.3 Maintenance

The manufacturer's instructions regarding the maintenance, use and cleaning of the garments shall be strictly observed.

B.8 Used and Reconditioned Garments**B.8.1 Used, converted or reconditioned garments**

The classification of a garment which has been used, whether reconditioned or not, shall be re-examined according to the standards drawn up for new garments without relying on its former classification.

Any re-examination shall ensure that the garment in question is then supplied with the symbol of its appropriate classification. Any reconditioning of a protective garment is likely to change its protective and other characteristics.

This task should be entrusted to a highly qualified person who then has to re-examine the classification of the garment.

Note:

By "reconditioning" is meant any work carried out on the original garment, with a view to restoring it to a suitable condition for use.

Even the replacing of a defective fastening device of a new garment is an act of reconditioning in sense of this Clause (7-1).

APPENDIX C

GLASS FIBER FIRE BLANKETS

Fire Blankets are made of texturised woven glass fiber, which gives them a rough surface providing stability. Designed to enable simple storage of the blanket, the container is non-corrosive, rigid self-extinguishing white PVC.

Blankets should be available in the following sizes:

BLANKET SIZE cm	CONTAINER SIZE cm
90 x 90	27 x 8 x 8
122 x 122	31 x 8 x 8
180 x 122	36 x 8 x 8

Based on BS 7944, BS EN 1869:

Light Duty (re-usable) Fire Blankets Which comply with the above packed in white rigid uPVC containers	
Blanket Size	Container Size
120 cm x 120 cm	8 cm x 8 cm x 30.5 cm
180 cm x 120 cm	8 cm x 8 cm x 35.5 cm