

TECHNICAL SPECIFICATIONS FOR FIRE PROXIMITY SUIT & ALUMINISED PROXIMITY SUIT.

I. NOMEX FIRE PROXIMITY SUIT

A. COAT/JACKET

1. General Description: Coat with a high central zip closure, covered with suitable storm flap. The coat should have full-length sleeves and a stand up collar with adjustable throat tab.

2. Standard : The coat must meet the NFPA 1971; 2007 or EN 469 : 2005 Level 2 standards or their latest applicable version .

The Suit should bear UL marking (for NFPA certified suit) with supporting certification or should bear CE marking (for EN certified suit) with supporting EC Type certification

3. Construction

a. The coat should have a three-layer construction:

b. Outer Cloth: The outer shell fabric should be made from inherently flame resistant Nomex/meta aramid fibre with requisite blend of antistatic fibres. The colour of the outer shell fabric shall be **Dark Navy shade**.

c. Moisture Barrier: Moisture Barrier shall be Fire resistant and breathable in nature. The construction should be micro porous in nature like non woven substrate/ felt / PU / spun lace aramid - suitably laminated with PTFE / PU like membrane or treated with compound to ensure that no water ingress from outside besides allowing perspiration and heat to escape from inside.

d. Thermal Barrier: The Thermal Barrier should consist of two integrated or quilted layers. The innermost layer facing the Moisture Barrier should be made from inherently flame resistant fibres in non woven felt / corded lane construction.

e. The Coat should be detachable i.e., it should be able to be used as a single layered Coat or multiple layered Garment and should be detachable by buttons from inside.

f. Seams: All sewing to be done using para-aramid or equivalent strong inherently FR thread. The seams on the outer layer should be stitched with strong thread overlock,

g. Pockets: Coat should be provided with 3 pockets as standard. 2 waist pockets on the lower fronts with flap closure and 1 patch pocket inside the coat.

h. Collar: The collar of the Coat should be designed so that the neck portion is doubly secured and covered by means of a throat tab, fitted with fire retardant Velcro for secure fastening across the neck. A hanger loop, centrally placed on outer collar or inside section to be provided to facilitate hanging

i. Front Closure

The coat should have a heavy-duty moulded zip beneath a full length catch flap, closing with fire retardant Velcro.

j. Sleeves & Cuffs: The sleeve should be designed to have an additional gusset (all 3 layers) in the underarm or any other design innovation to allow the arms to move freely without raising the hem of the coat. An aramid rib-knitted internal cuff to be provided for suitable wrist protection.

k. Reflective Tape: The Coat should have a high quality reflective tape provided at the following places

- Single row 50 mm width, around hem/ waist (including across front flap)
- Single row 50 mm width, around lower sleeves

The tape should be premium quality and the quality should comply with the length and test parameters stipulated in the corresponding NFPA/ EN standards

l. Sizing: Size chart should be provided along-with the offer. The size should be suitable for fitting on person of 5' 8'' & 5' 5'' height. Length of the jacket should be 32 inch & 28 inch.

m. Labels: A large clear label should be permanently attached (sealed) or stitched inside the lining of the fire suits. This label should give full details of compliance to international standards, manufacturer's contact details, sizing, wash/care information, style and date of manufacture and traceability coding.

B. TROUSER

1. General Description: Trouser should have **standard 36 inch & 32 inch waist size and adjustable crossover braces**, with the knees suitably padded and reinforced with an extra layer of outer cloth. The waist of the Trouser should be elasticized at both sides to provide a comfortable flexible fit.

2. Standard : The fire Trouser must meet the NFPA 1971; 2007 or EN 469 : 2005 Level 2 standards or their latest applicable version .

The Suit should bear UL marking (for NFPA certified suit) with supporting certification or should bear CE marking (for EN certified suit) with supporting EC Type certification.

3. Shape – Construction: The trousers should fit on the natural waistline (36 inch) , ankle length and constructed with following 3 layers:-

(i). Outer Cloth: The outer shell fabric should be made from inherently flame resistant para aramid fibre material with requisite blend of antistatic fibre. The colour of the outer shell fabric shall be Dark Navy shade.

(ii). Moisture Barrier: Moisture Barrier shall be Fire resistant and breathable in Nature. The Construction should be micro porous in nature like non woven substrate/ felt / PU/ spun lace aramid - suitably laminated with PTFE / PU like membrane or treated with compound to ensure no water ingress from outside besides allowing perspiration and heat to escape from inside.

(iii). Thermal Barrier: The Thermal Barrier should consist of two integrated or quilted layers. The innermost layer facing the Moisture Barrier should be made from inherently flame resistant fibres in non woven felt / corded lane construction.

g. The Trouser should be detachable i.e., it should be able to be used as a single layered Coat or multiple layered Garment and should be detachable by buttons from inside.

4. Seams All sewing to be done using para-aramid or equivalent strong inherently FR thread. The seams on the outer layer should be stitched with strong thread overlock,
5. Knee Construction The knee should have an extra layer of outer cloth as reinforcement or alternately an aramid enforcement. The knee region should be shaped or designed suitably for comfort and flexibility
6. Pockets The Trouser should have 1 internal patch pocket inside the right or left hip
7. Reflective Tape: The Trouser should have single row of 50 mm wide reflective tape around lower leg. The tape should be premium quality and should comply with test parameters stipulated in the corresponding NFPA/ EN standards.
8. Sizing Size chart should be provided alongwith the offer. The size should be suitable for fitting on person of 5'-8'' height & 36 inch waist.
- m. Labels A large clear label should be permanently attached (sealed) or stitched to the inside pocket/ section of the Trouser. This label should give full details of compliance to international standards, manufacturer's contact details, sizing, wash/care information, style and date of manufacture and traceability coding.

C. ACCESSORIES

Boots: STANDARDS: Certified to EN 15090:2012 Type 3 or NFPA 1971: 2007.

CONSTRUCTION: Light Weight Premium quality Leather or treated Rubber having flame retardant upper and waterproof characteristics

FEATURE: Rubber Boot should have the following features and Test certificate/ reports confirming the following operational requirements are required to be furnished:

- a. Outer sole of the Boot should be Heat and Oil resistant & Upper of the Boot should be Heat, Flame and Oil Resistant.
- b. Outer sole should also have high electrical resistance.
- c. Sole should be slip resistant even on ceramic tiles & Steel Tiles.
- d. Sole should have penetration resistance against sharp objects and should have Composite Anti perforation mid sole.
- e. Toe should be protected with Polymer Toe Cap and no Steel Toe Cap should be used.
- f. Size should be equivalent to size 8 (Europe) and the weight should be maximum 2.2 Kgs for size 8(Europe size).
- g. The entire Boot should be made of Compression Moulding Procedure i.e. should be One piece for sole and upper and no stick on process should be used.
- h. The Boots should be certified to EN 374-3 against resistant to dangerous chemicals i.e. n-Heptane, Sodium Hydroxide, Sulfuric Acid and EN 943-2 against chlorine, Hydrogen Chloride, Ammonia or equivalent NFPA Standards.
- i. The Boots should have excellent resistance to Fuels, Oils & Greases, Solvents, Weak and Diluted acids.

D. HELMET

STANDARD: Certified to EN 443: 2008 or NFPA 1971: 2007 standards

COLOUR : Fluorescent Yellow

CONSTRUCTION: Helmet should be constructed of composite fibre glass capable of providing full protection even against shorter flash over flames temperature exposures of upto 1000 deg C.

FEATURES: Helmet should have the following features and Test certificate/ reports confirming the following operational requirements are required to be furnished:

- Helmet with visor should have a modular design whereby the face and neck is also protected against flames
- Visor should be provided capable of withstanding extreme heat and impact
- Visor should be capable of being closed - housed within the inner shelf of the Helmet, when not in use and should have double Visor with a goggle visor inside for better protection.
- Outer Visor should be Golden Plated
- Weight of the Helmet complete with visor should not exceed 1.5 Kgs
- Interior shock absorption layer to be provided for head protection.
- Head size adjustable feature should be available for fitting various head size circumference 51-65 cm of fireman.
- Waterproof Torch – EN certified should be provided alongwith the Hemet too.
- The Helmet should have the attachment to fix torches on both the sides.

E. GLOVES

STANDARDS: Certified to EN 659: 2008 or NFPA 1971: 2007 standards. The Gloves should bear CE mark or UL certification to NFPA -1971.

FEATURES: Five fingered, Chrome Leather, soft, supple 2-3 layered Glove for hand and wrist protection. The Glove should incorporate knitted wrists made of FR Heat resistant material. All threads used for stitching the gloves should be inherently Flame retardant.

F. ANTI FIRE HOODS

STANDARDS: Certified to EN 13911:2004 in connection with EN 340:2003 or NFPA1971 and 70E Standards.

FEATURES : The Hood should be off white colour.

The Face opening should be Fit and Flat

The Neck Protector should be fit and properly covering the shoulders.

The Hood should be double layered having each layer of the Fabric of about 230 GSM, inset collar and face opening with elastic.

II. ALUMINIZED CLOSE PROXIMITY SUIT

1. GENERAL

Proximity suit designed to provide the fire- fighter with protection from radiated heat and from injuries arising from impact or abrasion during operational activities. A proximity suit should consist of hood with visor, a sit in jacket and trouser combination boot and gloves. The suit is interwoven with minimum three layers of fabric (inner, middle and outer) highly fire and heat resistant and coated lined externally with layer of aluminized reflector.

2. SUIT:

The suits shall be provided into piece, jacket and trouser combination in **large** and extra large sizes. Material of the suits should provide thermal insulation, must resist radiant heat occasional direct flame contact and be water resistant. The garments should be light weight, provide freedom of movements, be comfortable in extended period of wearing and easy to don without assistance. The fabric used should not be bulky and should be resistant to tearing & abrasion. The reflective medium may be coated or lined to minimize the effects of heat on the wearer.

- a) Fastenings should be easily secured by the wearer, adequate to maintain their security under stress and resistant to damage by heat or flame
- b) Contact seams should be waterproof.
- c) Composite outer reflecting layers, moisture barrier, hear barrier and inner most of fire retardant cloth.
- d) Thermal and moisture barriers shall overlap to outer shell.
- e) Metallic hooks, zippers, shall be protected by flaps made of same fabric used for garments.
- f) Pockets shall have provision of draining out.
- g) The entire suit should be capable of being cleaned without reducing its protective qualities.
- h) Garments should be labelled with following details.

*Manufacturer's name and address

*Identification No.

*Date of Manufacture

*Size

*Precaution

OTHER REQUIREMENTS :

- a) It should be capable of giving full thermal protection to wearer at various ambient temperature and humidity conditions as faced in various degree of fire including flashover condition.
- b) The outer layer should be capable of reflecting 85% of incident heat waves with very nominal reflective index.
- c) Thermal shrinkage should be near zero
- d) Water absorption less than 2%.
- e) Each component and fabric should be flame, heat and char resistant.

- f) The fabric shall be of high strength and shall be certified for safety against chemical and biological hazard to Fireman.
- g) Asbestos shall not be used in any components.
- h) The suits shall also be electrically non- conducting.
- i) The weights of suit including shoes, helmet & gloves should not exceed 10kg.

HOOD:

- a) Should have adequate protection from impact, be resistant to penetration and electrical conductivity should not be susceptible to deformation due to heat absorption & should have wide range of vision. The hood should not give the wearer a sense of isolation and must permit both speech and the reception of audible signals or words of command. The hood should be capable of used in conjunction with respiratory protection equipment and of incorporating radiotelephone receiver installation.
- b) Hood shall consist of helmet, face shield with complete shoulder flaps.
- c) Chin-strap with a quick release buckle should be provided to the helmet.
- d) Face shield may be coloured or non-coloured, non-splinterable glass. Visible transmittance for non- coloured glass shall not be less than 85% and for coloured glass 45%.
- e) Face shield should be capable of giving full heat protection and should be single piece, preferable gold tinted transparent poly-carbonate type visor.

BOOTS:

Uppers should be tough, flexible, heat-resistant material and extend to the mid-calf or knee level. Soles should be of a non-slip material, which may include synthetic materials, resistant to heat, oil, aircraft fuels or acids, Toe caps and soles may be reinforced with steel. The use of rubber boots in this application is not recommended.

The boots sizes should be 8 & 9

GLOVES:

These should be of the gauntlet type to provide wrist protection and their construction should permit the wearer to operate switches, fastenings and hand tools. The nature of Fire Fighting operations indicates that the back of the gloves should have a reflective surface to minimize radiated heat effects and that the palm and fingers should be provided in a material resistant to abrasion and penetration by sharp objects. All seams should be resistant to penetration by liquids.

TEST OF ACCEPTANCE: As per NFPA 1976

- a) Heat, Flame, Char resistance test
- b) Tear test
- c) Water absorption test
- d) Non- conductivity test
- e) Impact test for helmet and face shield.
- f) Reflective index / refractive index
- g) Weight
- h) Thermal protection test

COMPOSITE SUIT FIRE TEST:

The suit should be capable of protecting wearer for 2 minutes against 3W/CM₂ heat & 1 minute for 8 W / CM₂.