

PROJECT REPORT

1 PROJECT TITLE — To study the use and impact of Indian standards on fire retardant textiles in fire safety and comparison with relevant international standards.

2 OBJECTIVES

The study was undertaken to accomplish the following objectives:

- a) Assessing the use and impact of Indian Standards on Fire Retardant Protective Clothing for industrial workers exposed to heat and flame, welder's clothing, firefighter's clothing in line with UN Sustainable Development Goals (UNSDG) for promoting safe and secure working environment for all workers.
- b) Carry out the gap analysis between user requirements and present standards on FR textiles which will result in revising the existing standards and formulation of new standards on the subject.
- c) Assessing the availability and adequacy of testing infrastructure for FR textiles.

3 BACKGROUND OF THE PROJECT

FR Textiles are used in various applications such as Protective Clothing for industrial workers exposed to heat and flame, welder's clothing, firefighter's clothing, etc. It covers a number of important sectors of economy such as steel manufacturing industries, metal mouldings, foundries, welding units, industrial units, firefighting, etc. A lot of injuries, burn injuries and casualties of industrial workers have been reported in the past, where there was negligence or no use of fire-retardant protective clothing during work. The part played by textiles in the initial burn, spread and propagation of fires has been known since time immemorial.

In the recent past there has been tremendous growth of high-rise buildings, shopping complexes/malls, PVRs, hospitals and other exhibitions/parties in public places especially in metros of India. With this growth, the fire safety in public places/buildings has assumed paramount importance which is further evidenced by enormous loss to human life and property as a result of fires. Some of the recent examples of such fire include Meerut exhibition fire, Hissar marriage pandal fire, Uphar Cinema fire, fires in high rise buildings in Connaught Circus, New Delhi, etc.

Similarly, due to above incidences, the role of firefighters has also become very extensive in our society. Firefighters not only play a pivotal role to rescue human lives during fire accident but also save properties from extensive damage by extinguishing hazardous fires. For fighting fire accident more effectively and saving their precious life, it is needed to provide them suitable firefighting clothing with apt quality. The same is the case for industrial workers who are exposed to heat, flame, spatters, short contact time with flame, radiant heat from an electric arc,

molten metal splashes of iron, aluminium etc and are required to be protected from such hazards by providing suitable protective clothing.

In order to provide adequate safety to industrial workers, and for the benefits of the user sectors (Oil companies, Fire service departments, Utility companies, Smelting units, Industrial units with welding applications etc), the use of Protective Clothing is of utmost importance. There is a strong need to study the gap analysis in the user requirements vis-à-vis the requirements incorporated in Indian Standards for their comprehensive implementation. Apart from the above, this action research project intends to assess the availability and adequacy of testing infrastructure for FR textiles along with comparison and mapping of Indian standards on FR clothing with relevant International standards. This has been accomplished through a structured questionnaire, interaction with stakeholders and desk top research.

4 RESEARCH METHODOLOGY

a) Comprehensive questionnaires were devised for manufacturers, labs and users to collect/gather information regarding uses/awareness of Indian Standards, FR products being manufactured or used, quality requirements of these FR products, any gap in standards or regulatory framework, availability of testing infrastructure etc. –: **Questionnaires sent to various stakeholders including manufacturers, labs and users are given at Annex I (P-9 to 11), Annex II (P-12 &13), Annex III (P-14 & 15) respectively.**

b) Interaction with organized manufacturers, users of FR textiles like Petrochemical processing industry and Fire department etc were made to assess their quality needs and actual feedback on the quality of product being used along with compliance mechanism being followed were obtained. Also, interactions with testing laboratories like NITRA, TUV Rheinland (India) Pvt. Ltd, SASMIRA, ATIRA and BTRA were made to assess their testing infrastructure, specific inputs/suggestions on various test method being used, any specific bottleneck etc.–: Interactions were done over phone and emails; however, it was previously intended to visit the stakeholders but due to pandemic (COVID-19) physical visits could not be made. The specific inputs and suggestions were gathered through emails and telephonically.

c) Comparison and mapping of Indian standards on with relevant International standards has been carried out and is given at **Annex IV (P-16 to 21)** for firefighter clothing and **Annex V (P-22 to 25)** for protective clothing for industrial workers exposed to heat.

5 SALIENT OUTCOMES/FINDINGS

5.1 Statistical analysis of replies received from various stakeholders on the questionnaires is detailed as follows:

- a) Whether Indian standards being followed during manufacturing of FR textile items?
Yes – 36 %
No – 64 %

b) Will following Indian Standards have an impact in ensuring quality of FR items used in public place and for worker safety in India?

Yes – 92 %

No – 8%

c) In-house testing facility available or not ?

Yes – 38.5 %

No – 38.5 %

Partial – 23 %

d) Is adequate testing facility available in India?

Yes – 31 %

No – 54 %

Partial – 15 %

e) Adequate standards/regulations exist in India?

Yes - 23 %

No - 67 %

5.1.1 Duly filled-in questionnaire as received from various stakeholders are given in **Annex VI (P-26 to 92)**.

5.2 Most of the proprietary inherent fire-retardant fibres are supplied by few International manufactures like Dupont, Teijin etc apart from Reliance Industries. Indian manufacturers then spin, weave and stitch the garment and exports the same. Some manufacture in India are imparting FR properties by FR finishes. These textiles are less expensive in comparison to inherently FR products but have limited FR durability.

5.3 Export is governed by compliance to EN, ISO or National Fire Protection Association (NFPA) standards. For certifications, samples of Indian manufacture are required to be tested in International labs like BTTG, UK; UL, USA; STIFI, Germany; Kinetrics, Canada where testing charges are very high. Apart from above, certification cost is also very high.

5.4 In India, NITRA, BTRA, ATIRA, SGS, TUV, WRA, Spectro, Athrava are having test facilities for FR products. NITRA has been approved by BIS for following FR and other similar products as specialized lab:

i) IS 16890:2018 Protective clothing for firefighters

ii) IS 15748:2007 Protective clothing for industrial workers exposed to heat

iii) IS 15809:2017 High visibility warning clothing

iv) IS 15742:2007 Requirements for clothing made of limited flame spread materials and material assemblies affording protection against heat and flame

v) IS 15741:2007 Resistance to ignition of curtains and drapes

vi) IS 16874:2018 Protective gloves for firefighters

vii) IS 15768:2008 Resistance to ignition of upholstered composite used for non-domestic furniture

5.5 Most of the test method standards to test and evaluate the physical and fire-retardant properties of FR clothing have been published and the same have been aligned with latest ISO standards. Textiles Protective Clothing Sectional Committee, TXD 32 is responsible for undertaking standardization for textile protective clothing for protection from fire and other health/life hazards and has published 23 product and 36 test method Indian Standards.

5.6 Based on the specific end uses, stakeholders have requested for incorporation of Charge dissipation as per EN 1149-3 and Full Manikin test as per ISO 13506 in the existing Indian Standards on FR clothing as optional requirements. However, test facilities for these tests are not available presently in India.

5.7 Indian standards for Aluminized suits, Electric Arc suits, and Fire entry suits are not available.

5.8 Awareness of stakeholders specifically user about the availability of Indian Standards is not adequate. Most of the buyers in India specify the procurement of FR products as per International standards only.

5.9 Presently, IS 16890:2018 ‘Protective clothing for firefighters’ and IS 16874:2018 ‘Protective gloves for firefighters’ is being currently known to stakeholders including users. As per the information available, 2 manufacturers have been given BIS certification licence for IS 16890:2018.

5.10 Based on the interaction with stakeholders and analysis of feedback on questionnaire, it has been found out that some fire safety regulation on the use of FR protective clothing exists in India like Model Factory Rules issued by Directorate General of Factory Advisory Service and Labour Institute (DGFASLI) etc. These rules mandate that occupier shall provide protective clothing to workers who are exposed to heat and flame and these protective clothing shall conform to National Standards. The occupiers shall also ensure that the workers exposed to these hazards to use such protective clothing and the same shall be maintained in proper working conditions by the occupier. These regulations are inadequate to ensure the availability of quality FR protective clothing on continuous basis.

5.11 Detailed technical comparison of IS 16890 : 2018 ‘Protective clothing for firefighters’ with ISO 11613 : 2017 ‘Protective clothing for firefighter's who are engaged in support activities associated with structural firefighting — Laboratory test methods and performance’ and BS/EN 469 : 2020 ‘Protective clothing for firefighters — Performance requirements for protective clothing for firefighting activities’ has been carried out which is given at Annex IV (P-). The salient proposed changes which will be put up to TXD 32 committee for consideration are enumerated below:

i) IS 16890 includes the requirements for firefighters clothing to be worn during both firefighting and associated activities. ISO has published separate standards for firefighters clothing to be used for support activities of firefighting (ISO 11613:2017) and for fighting fires in structures (ISO 11999-3:2015). Similarly, BS/EN 469:2020 specifies two levels; Level 1 for outdoor firefighting and their support activities and Level 2 for fighting fires and rescue from fire in structures.

Accordingly, we may also specify two levels in IS 16890 based on risk assessment.

ii) Requirements for external pockets with flap in line with ISO and BS/EN standards to prevent entry of heat, flame or hot material may be incorporated.

iii) Requirements of anti-wicking barrier at sleeve ends, trouser legs or bottom of the jacket to reduce moisture collection inside the garment and to lower the heat transfer resistance may be incorporated.

iv) To allow the moisture in the garment to escape, provision of drain mesh at appropriate location may be incorporated.

v) For intermediate layer like moisture management layer, hole formation during flame resistance (Procedure A, surface ignition) is permitted as per ISO 11613:2017 and BS/EN 469:2020. However, in Indian standard, the same is not permitted. Further, for bottom ignition, requirement of char length of 100 mm max has been specified in ISO 11613:2017 and the same has not been specified in IS 16890:2018. Bottom ignition test has not been specified in BS/EN 469:2020.

vi) Flame resistance test for hardware, label and badges (Procedure A, surface ignition) may be incorporated in line with ISO and BS/EN standards.

vii) Bursting strength requirement for knitted outer fabric may also be incorporated in line with ISO 11613:2017. Similarly, different test methods for testing tensile strength for woven and coated fabric may be incorporated in line with BS/EN 469:2020.

viii) Tear Strength requirement (in machine and cross machine directions) may be changed to minimum 30 N in line with BS/EN 469:2020 as the manufacturers have shifted to aramid/synthetics fibres in place of natural fibres.

ix) As spray rating is a subjective test, water absorption resistance of $\leq 15\%$ and its applicable test method before and after pre-conditioning may be incorporated in line with ISO 11613:2017. The water absorption resistance test method has been derived from spray test only.

x) Dimensional change requirement for woven and knitted/nonwoven may be specified separately in line with ISO 11613:2017 and BS/EN 469:2020. Specific values for the same will also be deliberated.

xi) For liquid chemical penetration resistance, 36 percent hydrochloric acid and 40 percent sodium hydroxide may be excluded in line with BS/EN 469:2020 and testing with sulfuric acid may be sufficient. As per BS/EN 469:2020, it has been found that even non-finished material will repel sufficiently HCl, NaOH and H₂SO₄ and so to represent risk from acid from car batteries, only penetration by H₂SO₄ may be considered. Other chemical used will be 100 % O-xylene to represent risk from solvent or petrol etc. Apart from the above, change in temperature of application of these chemicals from 20°C to 27°C may also be discussed.

xii) Rate of increase of water pressure of 10 cm H₂O/min ± 0.5 cm H₂O/min while testing water penetration may be specified in line with ISO 11613:2017 and BS/EN 469:2020. Further, the pressure requirement may be changed to ≥ 20 kPa (Specified in ISO 11613:2017 and BS/EN 469:2020) in place of ≥ 7 kPa (Specified in Indian Standard).

xiii) Water vapour resistance may not be tested for special purpose material like reflective tapes, reinforcement materials, etc.

xiv) Optional requirement of whole garment testing on instrumental manikin as per ISO 13506 at heat flux of 84 kW/m² may be specified. The time of exposure may be 4s (Specified in ISO 11613:2017) or 8s (Specified in BS/EN 469:2020). Allowable body burns shall be less than 50 percent.

xv) IS 15370:2005 has been revised as IS 15370:2020 and accordingly pre-treatment clause to be rewritten for type of reference detergent, wash cycle, drying procedure etc.

5.12 Detailed technical comparison of IS 15748:2007 ‘Protective clothing for industrial worker exposed to heat’ with BS/EN/ISO 11612:2015 ‘Protective clothing — Clothing to protect against heat and flame — Minimum performance requirements’ has been carried out which is given at Annex V (P-). The salient proposed changes which will be put up to TXD 32 committee for consideration are enumerated below:

i) Requirements regarding garment configuration (Single or two-piece garment), overlap requirement for two-piece configuration, compatibility with other protective equipment like boot, gloves, helmets etc and quick release fastening arrangement to enable rapid removal of garment in case of emergency may be incorporated in IS 15748:2007 in line with BS/EN/ISO 11612:2015.

ii) Requirement and compatibility of additional protective garments such as neck curtain, hoods, sleeves, apron and gaiter may be incorporated in line with BS/EN/ISO 11612:2015.

iii) Requirement for pockets and closures to prevent entry of heat, flame or hot material and hardware may be incorporated.

iv) Additional garment requirements to offer protection against molten metal (Aluminium and Iron) splash may include design of pleats to prevent entrapment of molten metal by providing diagonal stitches along with requirement for patch pockets.

v) IS 15370:2005 has been revised as IS 15370:2020 and accordingly pre-treatment clause to be rewritten for type of reference detergent, wash cycle, drying procedure etc.

vi) Flame resistance test for seams, hardware and label, badges, retro-reflective material (Procedure A, surface ignition) may be incorporated in line with BS/EN/ISO standard. Type of exposure like surface ignition or bottom ignition may be incorporated in line with ISO standard.

vii) For intermediate layer like moisture management layer, hole formation during flame resistance (Procedure A, surface ignition) is permitted as per ISO. However, in Indian standard, the same is not permitted. The same may be deliberated in the sectional committee with stakeholders.

viii) Detailed optional requirement for flame resistance by bottom ignition may also be incorporated in line with BS/EN/ISO 11612:2015.

ix) Dimensional change of maximum ± 3 % for woven fabric has been specified in IS 15748:2007, while in ISO requirement for woven/non-woven/aluminized fabrics and knitted fabric have been specified separately. The same may also be changed in Indian Standard.

x) Five performance level (B1 to B5) based on BS/EN 531:1995 for Convective heat (Code letter B) has been specified in IS 15748:2007, while in ISO three performance levels have been specified. Further, BS/EN 531:1995 has been withdrawn and has been aligned with ISO 11612:2015. So, the same may also be changed in Indian Standard.

xi) Four performance level (C1 to C4) based on BS/EN 531:1995 for Radiant heat (Code letter C) at a heat flux of 20kW/m^2 has been specified in IS 15748:2007. In ISO 11612:2015 also, four performance levels have been specified, however the specific requirements for different levels are different. Further, BS/EN 531:1995 has been withdrawn and has been aligned with ISO 11612:2015. So, this requirement may also be aligned in Indian Standard.

xii) Depending upon the expected use of protective clothing, optional requirement for Heat resistance at a temperature of $260 \pm 5^\circ\text{C}$ may also be incorporated in line with BS/EN/ISO 11612:2015. Heat shrinkage has potential to reduce the thermal protection level of garment and accordingly its control is required to ensure adequacy of protective garment for the intended purpose.

xiii) Physical performance requirements like tensile strength, tear strength, bursting strength and seam strength and fat content of leather (if used) and their applicable test methods may be incorporated in Indian Standard in line with BS/EN/ISO 11612:2015.

xiv) Optional requirement of whole garment testing on instrumental manikin as per ISO 13506 at heat flux of at least 84 kW/m^2 may be specified. Depending upon the risk assessment, the time of exposure may be kept as 4s or 8s. Allowable body burns shall be less than 50 percent.

xv) IS 14453:1997 for definition and body measurement procedure referred in IS 15748:2007 has been superseded by IS/ISO 8559-1:2017. Accordingly, Control dimensions of the protective garment (height, chest or bust girth, and waist girth) will be measured as per the latest procedure. Accordingly, clause 4.1 may be rewritten.

xvi) Practical performance tests for checking of basic ergonomic features of protective clothing may be incorporated in Indian Standard in line with BS/EN/ISO 11612:2015.

5.13 IS 16655 : 2017 ‘Textiles — Protective clothing for use in welding and allied processes’ has already been aligned with BS/EN/ISO 11611 : 2015.

6 RECOMMENDATIONS

6.1 The detailed salient changes in Indian Standards on Firefighter clothing (IS 16890:2018) and Protective clothing for industrial worker’s exposed to heat (IS 15748:2007) vis-à-vis relevant international standards will be put up to Textiles Protective Clothing Sectional Committee, TXD 32 for issuing amendment or revision of the Indian standards, so as to align them with current international practices. This will also support in achieving the USD 100 billion exports of textiles in next five years.

6.2 Based on the specific end uses, stakeholders have requested for incorporation of Charge dissipation as per EN 1149-3 and Full Manikin test as per ISO 13506 in the existing Indian Standards on FR clothing as optional requirements. However, test facilities for these tests are not available presently in India. It is proposed that LPPD may explore the possibility of developing testing infrastructure for these tests.

6.3 Indian standards for Aluminized suits, Electric Arc suits, and Fire entry suits are not available. Proposal for standardization of these products will be put up to Textiles Protective Clothing Sectional Committee, TXD 32 for consideration.

6.4 Awareness of stakeholders specifically user about the availability of Indian Standards is not adequate. Letter will be sent to all the user sectors like steel manufacturing industries, metal mouldings, foundries, welding units, industrial units, firefighting, etc requesting them to implement Indian Standards in their area of relevance and also to procure the items with BIS Standard Mark. It is also proposed to organize a seminar on the subject involving all the stakeholders to disseminate information about standardization of FR protective clothing.

6.5 Keeping in view the safety of industrial workers exposed to heat and flame and personnel engaged in firefighting activities and to make available standard quality of FR protective clothing indigenously, it is proposed that government may bring a quality control order on FR protective clothing in near future. This will also prevent the import of sub-standard and hazardous FR textile materials in India.

ANNEX – I
[Clause 4 (a)]

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Manufacturer

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the organization : _____

Location/Address : _____

Email id/contact details : _____

Q.1 Please specify the name of fire retardant textile items being manufactured in your company.

Q.2 Who are your main buyers for the items specified by you in Q.1? please provide their address city/country too.

Q.3 Please specify whether you are required to follow any standard/regulation/protocol during manufacturing and supplying of FR textile items in India? If yes, please mention the list of same.

Q.4 List down the challenges being faced by you to follow these standards/regulations/protocols.

Q.5 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

Q.6 List down the Indian standards being followed by you for manufacturing of FR products.

Q.7 What are the challenges being faced by you while implementing/following Indian standards for FR products?

Q.8 Suggestions/comments if any, on Indian standards on FR textiles.

Q.9 Pl inform whether users are referring Indian Standards while procuring FR textile items?

Q.10 If answer to Q.9 is no, Pl inform which standards/protocols users refer while procuring FR textile items?

Q.11 Pl inform whether buyer specify product specific requirements very clearly while tendering FR textile items?

Q.12 Pl inform whether FR textile items are being adequately used in public places and for worker safety in India?

Q.13 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places and for worker safety in India?

Q.14 Do you have inhouse testing facilities for FR textile products? If yes, please mention the major equipment details.

Q.15 Name the testing laboratories (India or abroad) from where you are testing FR products being manufactured by you?

Q.16 Pl inform whether adequate testing infrastructure exist in India for FR textile items?

Q.17 If you are exporting FR textiles items, Pl inform the standards and regulations which are required to be followed.

Q.18 Any other specific input/information which you wish to provide.

ANNEX – II
[Clause 4 (a)]

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Laboratory

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the laboratory : _____

Location/Address : _____

Email id/contact details : _____

Q.1 Please specify the testing facilities available in your laboratory for fire retardant textile items (Attach additional sheet, if necessary).

Q.2 Who are your main customers of your testing facilities for FR textile items? please provide their details.

Q.3 Please specify whether your customers request for testing as per available Indian Standards on FR textiles items? If yes, please provide the list of these Indian Standards.

Q.4 Suggestions/comments/inputs if any, on Indian standards on FR textiles (Test method, product standards, terminology, etc).

Q.5 Please specify whether your customers request for testing as per standards of different origin like ASTM, EN, ISO on FR textiles items? If yes, please provide the list of these standards.

Q.6 Pl provide the list of testing facilities for FR textiles which is presently not available at your lab and which in your opinion is necessary to evaluate a FR textile item?

Q.7 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

Q.8 Pl inform whether FR textile items are being adequately used in public places (Curtain, drapes and upholstery fabric) and for worker safety (Protective clothing, Fire fighter clothing and gloves) in India?

Q.9 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places (Curtain, drapes and upholstery fabric) and for worker safety (Protective clothing, Fire fighter clothing and gloves) in India?

Q.10 Any other specific input/information which you wish to provide.

ANNEX – III
[Clause 4 (a)]

Standardization in the field of Fire Retardant Textiles (Questionnaire)- User

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the organization : _____

Location/Address : _____

Email id/contact details : _____

Q.1 Please specify the name of fire retardant textile items being procured by your organization.

Q.2 Whether you are aware about the availability of Indian Standards for the FR textiles items procured by you in Q.1? If yes, Pl list few of them.

Q.3 Pl inform whether you refer Indian Standards while procuring FR textile items?

Q.4 Pl inform whether Indian Standards adequately address all your requirements as user? If no, pl provide specific inputs/comments on these Indian Standards.

Q.5 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places (Curtain, drapes and upholstery fabric) and for worker safety (Protective clothing, Fire fighter clothing and gloves) in India?

Q.6 Please inform whether adequate regulations exist in India for use of FR textile items in public places and for industrial worker safety? If no, Pl provide any suggestions/inputs for the same.

Q.7 Pl inform whether adequate testing infrastructure exist in India for FR textile items?

Q.8 Any other specific input/information which you wish to provide.

Annex – IV
[Clause 4 (c)]

Detailed technical comparison of IS 16890 : 2018 ‘Protective clothing for firefighters’ with ISO 11613 : 2017 ‘Protective clothing for firefighter's who are engaged in support activities associated with structural firefighting — Laboratory test methods and performance’ and BS/EN 469 : 2020 ‘Protective clothing for firefighters — Performance requirements for protective clothing for firefighting activities’

IS 16890 : 2018	ISO 11613 : 2017	BS EN 469 : 2020
<p>This standard specifies test methods and minimum requirements for protective clothing to be worn during firefighting and associated activities where there is a risk of heat and/or flame.</p>	<ul style="list-style-type: none"> • This standard specifies test methods and minimum performance requirements for protective clothing used by firefighters who are engaged in support activities of firefighting like water & material supplies, extinguishing fires from the outside of structures, securing traffic, first aid base activity, evacuation etc. Firefighters clothing for fighting fires in structures has been covered under ISO 11999-3:2015 	<p>This standard specifies minimum performance requirements for protective clothing designed to be worn during firefighting activities. Two levels have been specified based on risk assessment. (Level 1 and level 2)</p> <p>Level 1: specifies the minimum requirements for firefighting clothing involving work associated with outdoor firefighting and their support activities</p> <p>Level 2: specifies the minimum requirements for firefighting clothing for risks encountered in fighting fires and rescue from fire in structures</p>
<p>Design/Configuration: a) Single outer garment; or b) an outer two-piece suit consisting of a jacket and a pair of trousers with a minimum overlap of 30 cm; or c) a series of outer and undergarments designed to be worn together.</p>	<ul style="list-style-type: none"> • Design/configuration is same Specific requirement of minimum overlap in case of outer two-piece suit is not specified. However, a test procedure to ensure adequate overlap while raising hand and bending over from upright position have been specified. 	<ul style="list-style-type: none"> • Design/configuration is same. Specific requirement of minimum overlap in case of outer two-piece suit is not specified. However, a test procedure to ensure adequate overlap while raising hand and bending over from upright position have been specified.

<p>Multilayer assembly shall consist of the following three layers;</p> <p>a) Outer layer : ≤ 220 GSM b) Moisture barrier: ≤ 140 GSM c) Thermal layer : Thermal layer may be a single layer or two layers quilted together and the mass shall not be more than 350 g/m²</p>	<ul style="list-style-type: none"> • Requirement for GSM for multilayer assembly is not specified. • Requirement for ‘Extension of interlining and innermost layers’ has been specified. • External pocket requirements have been specified. 	<ul style="list-style-type: none"> • Requirement for GSM for multilayer assembly is not specified. • Requirement for anti-wicking barrier at sleeve ends, trouser legs or bottom of the jacket has been specified: The width of material shall not exceed 10 cm for jackets and 15 cm for trousers • Requirement for drain mesh is specified: Width shall not exceed 3 cm and will also become part of the component assembly. • External pocket requirements have been specified
<p>Seam breaking strength shall be minimum 250 N (To be tested on the seam on the outer layer of garment)</p>	<ul style="list-style-type: none"> • Minimum 225 N for woven fabric. • Knitted outer material with seam shall have a minimum burst strength of 100kPa, when using 50 cm² test area, or 200 kPa when using 7.3 cm² test area. 	<ul style="list-style-type: none"> • Minimum 300 N for woven fabric
<p>Hardware and closure system: Shall not melt, drip, separate, ignite and shall not shrink more than 5 % when tested as per ISO 17493 @ 180 ± 5° C.</p>	<p style="text-align: center;">Same as IS</p>	<p style="text-align: center;">Same as IS</p>
<p>Retroreflective elements/Visibility</p> <p>a) Minimum area of 0.13 m² for retroreflective material and 0.2 m² for fluorescent or combined performance material. b) Photometric requirements as per IS 15809. c) Heat resistance requirement as per ISO 17493 d) Flame spread requirements as per IS 15758 (Part 4)</p>	<p style="text-align: center;">Same as specified in Indian Standard</p>	<p style="text-align: center;">Same as specified in Indian Standard</p>

<p>Size: 6 size designations are specified in the standard (S, M, L, XL, XXL, XXXL)</p>	<p>Size designations have been specified</p>	<p>Size designations have been specified</p>						
<p>Flame Resistance: To be tested for face ignition and bottom ignition before and after pretreatment for component assembly and innermost lining etc. Seams and wristlet material shall also be tested for flame resistance by face ignition procedure.</p> <p>a) No specimen shall give flaming to top or either side edge; b) No specimen shall give hole formation in any layer; c) No specimen shall give flaming or molten debris; d) The mean value of afterflame time shall be ≤ 2 s; and e) The mean value of the afterglow time shall be ≤ 2 s.</p>	<ul style="list-style-type: none"> • Same as IS except the following: • Hole formation on burning shall not be more than 5 mm except for an interlining that is used for specific protection other than flame protection e.g. moisture management component. • For bottom ignition, requirement of char length of 100 mm Max has been specified. • Flame resistance test for hardware, label and badges have also been specified 	<ul style="list-style-type: none"> • Same as IS except the following: • Hole formation on burning shall not be more than 5 mm except for an interlining that is used for specific protection other than flame protection e.g. moisture management component. • For bottom ignition, requirement of char length of 100 mm Max has been specified. • Flame resistance test for hardware, label and badges have also been specified • Flame resistance test by bottom ignition procedure has not been specified. • Contact heat test at 250°C as per ISO 12127-1 for level 2 only = Threshold time shall be minimum 10 s. 						
<p>Heat Transfer (Flame Exposure): Mean heat transmission index (I_Q) $I_{Q,24} \geq 13$ and a mean ($I_{Q,24} - I_{Q,12}$) ≥ 4.</p>	<ul style="list-style-type: none"> • Heat Transfer (Flame Exposure): Mean heat transmission index (I_Q) $HTI_{24} \geq 9$ and a mean ($HTI_{24} - HTI_{12}$) ≥ 3 	<ul style="list-style-type: none"> • Heat Transfer (Flame Exposure): <table border="1" data-bbox="1388 1076 1906 1230"> <tr> <td style="text-align: center;">Level 1</td> <td style="text-align: center;">Level 2</td> </tr> <tr> <td style="text-align: center;">$HTI_{24} \geq 9.0$ s</td> <td style="text-align: center;">$HTI_{24} \geq 13.0$ s</td> </tr> <tr> <td style="text-align: center;">$(HTI_{24} - HTI_{12}) \geq 3.0$ s</td> <td style="text-align: center;">$(HTI_{24} - HTI_{12}) \geq 4.0$ s</td> </tr> </table>	Level 1	Level 2	$HTI_{24} \geq 9.0$ s	$HTI_{24} \geq 13.0$ s	$(HTI_{24} - HTI_{12}) \geq 3.0$ s	$(HTI_{24} - HTI_{12}) \geq 4.0$ s
Level 1	Level 2							
$HTI_{24} \geq 9.0$ s	$HTI_{24} \geq 13.0$ s							
$(HTI_{24} - HTI_{12}) \geq 3.0$ s	$(HTI_{24} - HTI_{12}) \geq 4.0$ s							

<p>Heat Transfer (Radiant Exposure): When the component assembly or multilayer clothing assembly is given a heat flux density of 40 kW/m², after the pre-treatment shall give a mean $t_2 \geq 22$ s, a mean $(t_2 - t_1) \geq 6$ s, and a mean transmission factor ≤ 60 percent.</p>	<p>• Heat Transfer (Radiant Exposure): Mean $RHTI_{24} \geq 10$ s, a mean $(RHTI_{24} - RHTI_{12}) \geq 3$ s Mean transmission factor is not specified.</p>	<p>• Heat Transfer (Radiation):</p> <table border="1" data-bbox="1388 269 1908 423"> <thead> <tr> <th>• Level 1</th> <th>• Level 2</th> </tr> </thead> <tbody> <tr> <td>$RHTI_{24} \geq 10.0$ s</td> <td>$RHTI_{24} \geq 18.0$ s</td> </tr> <tr> <td>$(RHTI_{24} - RHTI_{12}) \geq 3.0$ s</td> <td>$(RHTI_{24} - RHTI_{12}) \geq 4.0$ s</td> </tr> </tbody> </table>	• Level 1	• Level 2	$RHTI_{24} \geq 10.0$ s	$RHTI_{24} \geq 18.0$ s	$(RHTI_{24} - RHTI_{12}) \geq 3.0$ s	$(RHTI_{24} - RHTI_{12}) \geq 4.0$ s
• Level 1	• Level 2							
$RHTI_{24} \geq 10.0$ s	$RHTI_{24} \geq 18.0$ s							
$(RHTI_{24} - RHTI_{12}) \geq 3.0$ s	$(RHTI_{24} - RHTI_{12}) \geq 4.0$ s							
<p>Residual Strength of Material when exposed to Radiant Heat at a heat flux of 10 kW/m² shall be ≥ 450 N</p>	<p>Same as IS</p>	<p>Same as IS</p>						
<p>Heat resistance- All materials used shall be heat resistant at $180 \pm 5^\circ$ C): Shall not melt, drip, separate, ignite and shall not shrink more than 5 %</p>	<p>Same as IS</p>	<p>Same as IS</p>						
<p>Tensile strength (in machine and cross machine directions): ≥ 450 N</p>	<p>• Same as IS • Bursting strength of knitted fabric has also been specified.</p>	<p>• Same as IS • Different test methods for woven and coated fabric have been specified.</p>						
<p>Tear Strength (in machine and cross machine directions): ≥ 25 N</p>	<p>Same as IS</p>	<p>≥ 30 N as the fabric are now made from aramid in place of natural fibres.</p>						
<p>The outer material shall give a spray rating of ≥ 4</p>	<p>Water absorption resistance of $\leq 15\%$ has been specified (This method is derived from the spray test)</p>	<p>Not specified</p>						
<p>Dimensional change after cleansing pre-treatment, in both directions, shall be ≤ 3 %</p>	<p>• ≤ 5 % for woven • ≤ 5 % for knitted/nonwoven material</p>	<p>• $\leq \pm 3$ % (woven) • $\leq \pm 5$ % (knitted & non-woven)</p>						

<p>Liquid-chemical penetration resistance: Clothing shall give more than 80 percent runoff and no penetration to the innermost surface using the following liquids: a) 40 percent sodium hydroxide (NaOH) at 20°C; b) 36 percent hydrochloric acid (HCl) at 20°C; c) 30 percent sulfuric acid (H₂SO₄) at 20°C; and d) O-xylene 100% (Incorporated through amendment No. 1).</p>	<p>Same as IS except concentration of sulfuric acid is 37%</p>	<p>Same as IS except only H₂SO₄ 30 % and O-xylene 100 % are used for liquid chemical penetration resistance.</p>				
<p>Minimum area for visibility of retroreflective = 0.13 m²</p>	<p>Same as IS</p>	<p>Minimum area for visibility of retroreflective = 0.13 m²</p>				
<p>Minimum area for visibility of fluorescent material = 0.2 m²</p>	<p>Same as IS</p>	<p>Minimum area for visibility of fluorescent material = 0.2 m²</p>				
<p>Water penetration resistant including seams @ 7 kPa for a period of 5 min</p>	<p>≥ 20 kPa (using rate of increase in pressure 0.98 ± 0.05 kPa/min)</p>	<ul style="list-style-type: none"> • < 20 kPa for garments without a moisture barrier • ≥ 20 kPa for garments with a moisture barrier 				
<p>Maximum water vapour resistance of 30 m² Pa/W after pre-treatment.</p>	<ul style="list-style-type: none"> • Maximum water vapour resistance of 20 m² Pa/W • Pretreatment not specified • Reinforcement material for shoulder pad, knee pads, reflective tapes, etc are excluded for this test 	<ul style="list-style-type: none"> • Water vapour resistance (Grade) after pre-treatment <table border="1" data-bbox="1388 1084 1906 1198"> <tr> <td data-bbox="1388 1084 1646 1122"> <ul style="list-style-type: none"> • Level 1 </td> <td data-bbox="1646 1084 1906 1122"> <ul style="list-style-type: none"> • Level 2 </td> </tr> <tr> <td data-bbox="1388 1122 1646 1198"> <p>>30 to ≤ 45 m²Pa/W</p> </td> <td data-bbox="1646 1122 1906 1198"> <p>≤ 30 m² Pa/W</p> </td> </tr> </table> <p>Anti-wicking barrier, reflective tapes, etc are excluded for this test.</p>	<ul style="list-style-type: none"> • Level 1 	<ul style="list-style-type: none"> • Level 2 	<p>>30 to ≤ 45 m²Pa/W</p>	<p>≤ 30 m² Pa/W</p>
<ul style="list-style-type: none"> • Level 1 	<ul style="list-style-type: none"> • Level 2 					
<p>>30 to ≤ 45 m²Pa/W</p>	<p>≤ 30 m² Pa/W</p>					
<p>Labelling and care label requirements have been specified in the standard.</p>	<p>Same as IS</p>	<p>Same as IS</p>				

Practical performance tests for checking of basic ergonomic features of protective clothing have been specified.	Same as IS	Same as IS
Whole garment testing not specified	Whole garment testing (optional): Exposure to heat flux of 84 kW/m ² for a duration of 4 s	Whole garment testing (optional): Exposure to heat flux of 84 kW/m ² for a duration of 8 s
Not Specified	Not Specified	Heat resistance of sewing thread used in structural seam by hot plate test at 260 ± 5°C has been specified and the thread shall not melt.

Annex – V
[Clause 4 (c)]

Detailed technical comparison of IS 15748:2007 ‘Protective clothing for industrial worker exposed to heat’ with BS/EN/ISO 11612:2015 ‘Protective clothing — Clothing to protect against heat and flame — Minimum performance requirements’

IS 15748 : 2007 + A1 : 2007	BS/EN/ISO 11612 :2015
Size designations and body measurement has been specified as per IS 14453. Control dimensions of the protective garment shall be height, chest or bust girth, and waist girth	Same as IS
Not specified	<ul style="list-style-type: none"> • Requirements regarding garment configuration (Single- or two-piece garment), overlap requirement for two-piece configuration, compatibility with other protective equipment like boot, gloves, helmets etc and quick release fastening arrangement to enable rapid removal of garment in case of emergency have been specified. • Requirement and compatibility of additional protective garments such as neck curtain, hoods, sleeves, apron and gaiter have been specified. • Requirement for pockets and closures, Hardware have been specified.
Additional garment requirements to offer protection against molten metal (Aluminium and Iron) splash has been specified.	<ul style="list-style-type: none"> • Additional design requirements to offer protection against molten metal (Aluminium and Iron) splash has been specified. • Requirement for pleats to prevent entrapment of molten metal by providing diagonal stitches and patch pockets have also been specified.
Pre-treatment (washing) shall be done as per manufacturer’s instruction in front loading machine or as per Method 6A of IS 15370:2005.	Same as IS

<p>Dimensional change in warp and weft direction: Maximum 3 percent</p>	<ul style="list-style-type: none"> • $\leq \pm 3\%$ (woven, non-woven and aluminized fabrics) • $\leq \pm 5\%$ (knitted) 																														
<p>Performance requirements: Shall meet limited flame spread (code letter A), heat resistance at $180 \pm 5^\circ\text{C}$ and one or more of other heat transmission performance requirement (code letters B to F) at level 1 or above</p>	<p>Same as IS</p>																														
<p>Not specified</p>	<p>Optional requirement for Heat resistance at a temperature of $260 \pm 5^\circ\text{C}$ has also been specified</p>																														
<p>Durability of fire-retardant properties after 50 laundering cycles by standard or reduced washing procedure has been specified.</p>	<p>Not specified</p>																														
<p>Limited flame spread: All outer materials or clothing assemblies shall meet the following requirements: a) No specimen shall give flaming to top or either side edge; b) No specimen shall give hole formation; c) No specimen shall give flaming or molten debris; d) The mean value of afterflame time shall be ≤ 2 s; and e) The mean value of the afterglow time shall be ≤ 2 s.</p> <p>Type of exposure like surface ignition or bottom ignition or both have not been specified.</p>	<ul style="list-style-type: none"> • Same as IS except the following: • Hole formation on burning shall not be more than 5 mm except for an interlining that is used for specific protection other than heat and flame protection e.g. moisture management component. • Flame spread shall be checked for surface ignition or optionally for bottom ignition. • Flame spread by surface ignition for seams, hardware and label, badges, retro-reflective material etc have been specified. • Detailed required for optional flame spread by bottom ignition has been specified. 																														
<ul style="list-style-type: none"> • Connective heat (code letter B) : Following 5 performance levels, B1 to B5 has been specified; <table border="1" data-bbox="193 1133 1033 1360"> <thead> <tr> <th>Performance level</th> <th>Minimum (HTI)</th> <th>Maximum (HTI)</th> </tr> </thead> <tbody> <tr> <td>B1</td> <td>3</td> <td>6</td> </tr> <tr> <td>B2</td> <td>7</td> <td>12</td> </tr> <tr> <td>B3</td> <td>13</td> <td>20</td> </tr> <tr> <td>B4</td> <td>21</td> <td>30</td> </tr> <tr> <td>B5</td> <td>31 and above</td> <td></td> </tr> </tbody> </table>	Performance level	Minimum (HTI)	Maximum (HTI)	B1	3	6	B2	7	12	B3	13	20	B4	21	30	B5	31 and above		<ul style="list-style-type: none"> • Connective heat (code letter B) : Following 3 performance levels, B1 to B3 has been specified; <table border="1" data-bbox="1066 1166 1906 1344"> <thead> <tr> <th>Performance level</th> <th>Minimum (HTI)</th> <th>Maximum (HTI)</th> </tr> </thead> <tbody> <tr> <td>B1</td> <td>4.0</td> <td><10.0</td> </tr> <tr> <td>B2</td> <td>10.0</td> <td><20.0</td> </tr> <tr> <td>B3</td> <td>20.0</td> <td></td> </tr> </tbody> </table>	Performance level	Minimum (HTI)	Maximum (HTI)	B1	4.0	<10.0	B2	10.0	<20.0	B3	20.0	
Performance level	Minimum (HTI)	Maximum (HTI)																													
B1	3	6																													
B2	7	12																													
B3	13	20																													
B4	21	30																													
B5	31 and above																														
Performance level	Minimum (HTI)	Maximum (HTI)																													
B1	4.0	<10.0																													
B2	10.0	<20.0																													
B3	20.0																														

- **Radiant heat (code letter C)** : at a heat flux of 20kW/m²

Following 4 performance levels, C1 to C4 has been specified;

Performance level	Minimum (Mean time)	Maximum (Mean time)
C1	8	30
C2	31	90
C3	91	150
C4	151 and above	

Test on metallized material shall be carried out after mechanical pre-treatment.

Molten Aluminium splash (code letter D):

Following 3 performance levels, D1 to D3 has been specified;

Performance level	Minimum (Molten aluminium splash index, g)	Maximum (Molten aluminium splash index, g)
D1	100	200
D2	201	350
D3	351 and above	

- **Radiant heat (code letter C)** : at a heat flux of 20kW/m²

Following 4 performance levels, C1 to C4 has been specified;

Performance level	Minimum (Mean time)	Maximum (Mean time)
C1	7.0	<20.0
C2	20.0	<50.0
C3	50.0	<95.0
C4	95	

Test on metallized material shall be carried out after mechanical pre-treatment.

Same as IS

Performance level	Minimum (Molten aluminium splash index, g)	Maximum (Molten aluminium splash index, g)
D1	100	<200
D2	201	<350
D3	350	

<p>Molten iron splash (code letter E): Following 3 performance levels, E1 to E3 has been specified;</p> <table border="1" data-bbox="193 305 1033 532"> <thead> <tr> <th>Performance level</th> <th>Minimum (Molten iron splash index, g)</th> <th>Maximum (Molten iron splash index, g)</th> </tr> </thead> <tbody> <tr> <td>E1</td> <td>60</td> <td>120</td> </tr> <tr> <td>E2</td> <td>121</td> <td>200</td> </tr> <tr> <td>E3</td> <td>201 and above</td> <td></td> </tr> </tbody> </table>	Performance level	Minimum (Molten iron splash index, g)	Maximum (Molten iron splash index, g)	E1	60	120	E2	121	200	E3	201 and above		<p>Same as IS</p> <table border="1" data-bbox="1066 266 1906 493"> <thead> <tr> <th>Performance level</th> <th>Minimum (Molten iron splash index, g)</th> <th>Maximum (Molten iron splash index, g)</th> </tr> </thead> <tbody> <tr> <td>E1</td> <td>60</td> <td><120</td> </tr> <tr> <td>E2</td> <td>120</td> <td><200</td> </tr> <tr> <td>E3</td> <td>200</td> <td></td> </tr> </tbody> </table>	Performance level	Minimum (Molten iron splash index, g)	Maximum (Molten iron splash index, g)	E1	60	<120	E2	120	<200	E3	200	
Performance level	Minimum (Molten iron splash index, g)	Maximum (Molten iron splash index, g)																							
E1	60	120																							
E2	121	200																							
E3	201 and above																								
Performance level	Minimum (Molten iron splash index, g)	Maximum (Molten iron splash index, g)																							
E1	60	<120																							
E2	120	<200																							
E3	200																								
<p>Contact heat (code letter F): Following 3 performance levels, F1 to F3 has been specified;</p> <table border="1" data-bbox="193 678 1033 873"> <thead> <tr> <th>Performance level</th> <th>Threshold time (s), Minimum</th> <th>Threshold time (s), Maximum</th> </tr> </thead> <tbody> <tr> <td>F1</td> <td>5.0</td> <td><10.0</td> </tr> <tr> <td>F2</td> <td>10.0</td> <td><15.0</td> </tr> <tr> <td>F3</td> <td>15</td> <td></td> </tr> </tbody> </table>	Performance level	Threshold time (s), Minimum	Threshold time (s), Maximum	F1	5.0	<10.0	F2	10.0	<15.0	F3	15		<p>Same as IS</p> <table border="1" data-bbox="1066 639 1906 834"> <thead> <tr> <th>Performance level</th> <th>Threshold time (s)</th> <th>Threshold time (s)</th> </tr> </thead> <tbody> <tr> <td>F1</td> <td>5.0</td> <td><10.0</td> </tr> <tr> <td>F2</td> <td>10.0</td> <td><15.0</td> </tr> <tr> <td>F3</td> <td>≥15.0</td> <td></td> </tr> </tbody> </table>	Performance level	Threshold time (s)	Threshold time (s)	F1	5.0	<10.0	F2	10.0	<15.0	F3	≥15.0	
Performance level	Threshold time (s), Minimum	Threshold time (s), Maximum																							
F1	5.0	<10.0																							
F2	10.0	<15.0																							
F3	15																								
Performance level	Threshold time (s)	Threshold time (s)																							
F1	5.0	<10.0																							
F2	10.0	<15.0																							
F3	≥15.0																								
<p>Design and Constructional requirements have been specified.</p>	<p>Same as IS. However, checking the ergonomic features of protective clothing has been specified as informative annex.</p>																								
<p>Not Specified</p>	<p>Optional requirement for whole garment testing has been specified in the standard.</p>																								
<p>Not specified</p>	<p>Physical requirements have been specified in ISO such as: Tensile strength, tear strength, bursting strength and seam strength and fat content of leather.</p>																								

ANNEX – VI
(Clause 5.1.1)

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Manufacturer

Instructions before filling the information below:

1. Please fill in the following questionnaire on the basis of the facts of your organization.
2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.
3. Please make sure that the data filled should be authentic.

Name of the organization : DuPont

Location/Address : Gurgaon & Mumbai

Email id/contact details : Manoj.Jhaver@dupont.com / 9987078813

Q.1 Please specify the name of fire retardant textile items being manufactured in your company.

- DuPont is supplier of Nomex® and Kevlar® fibers and/or fabric made up of these fibers.
- Our partners make finished product and sell to users in India.

Q.2 Who are your main buyers for the items specified by you in Q.1? please provide their address city/country too.

Following are the users in India, using FR products:

FR Clothing	Fire Fighter Gear	Electric Arc	Molten Metal
1. Reliance	8. Fire Service department across India	12. All the utility companies	14. All the smelters like JSW; Tata Steel; SAIL etc
2. HPCL	9. Industrial Fire Fighters	13. All the industries with sub-station	15. All industries with welding applications
3. ONGC	10. Airport Authority of India		
4. BPCL	11. Indian Navy		
5. Indian Air Force			
6. Indian Navy			
7. Indian Army			

Q.3 Please specify whether you are required to follow any standard/regulation/protocol during manufacturing and supplying of FR textile items in India? If yes, please mention the list of same.

- Compliance to NFPA 2112 and/or ISO 11612 for fire protection

- Compliance to IEC 61482-2 and/or ASTM F1959 for arc protection
- Compliance to EN 1149-5 for electrostatic dissipation
- Compliance to ISO 11611 for welding applications
- Compliance to EN 469 for Fire Fighter clothing / Some customer ask NFPA 1971

Q.4 List down the challenges being faced by you to follow these standards/regulations/protocols.

- Limited testing capability at 3rd party lab for the criteria mentioned in response to Q3.
- No testing capability in India for some tests like:
 - Arc testing as per IEC 61482 (IS 15405)
 - Charge dissipation as per EN 1149-3 (no Indian test method)
 - Flame Manikin Testing as per ISO 13506 (no Indian test method)

Q.5 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

- Garment level testing not part of any of the Indian FR standard.
- No Indian test method to quantify electrostatic dissipation performance.

Q.6 List down the Indian standards being followed by you for manufacturing of FR products.

- Couple of our partners are working to certify their products as per IS 16890. Other standards are not in much use.
- All the Indian standards are adopted from ISO standards, FR products made in India will comply with Indian standards as well. However, there is very limited awareness in the users on Indian standards. As the buying specification for users is with international standards, no vendor takes effort to certify their product as per Indian standards.

Q.7 What are the challenges being faced by you while implementing/following Indian standards for FR products?

- No awareness of Indian Standards in the users of FR products. Users demand testing of products as per International standards as they also have a garment level testing.
- No regulation in place to make Indian standards mandatory for FR Products.

Q.8 Suggestions/comments if any, on Indian standards on FR textiles.

Following are my comments, which are very critical in building confidence of the buyer/ user of FR products:

- a) Indian FR standard are adopted from international standards, hence there is no concern for the adopted test methods. However, the Indian standards are not in sync with the subsequent changes in corresponding international standards. Need to periodically review/amend/upgrade the standards.

- b) Also, Indian Standards in FR space have adopted test methods for fabric, whereas a User is going to buy a FR garment or a gear and there is no garment testing in any of the Indian standard for FR Products and neither there is any garment level testing capability in India.

Q.9 Pl inform whether users are referring Indian Standards while procuring FR textile items?

Not a single buying specs of any of the buyer in India has reference to Indian standards for FR Products. In the specs of Indian Air Force, one criterion is to test the flammability of the fabric as per IS 11871

Q.10 If answer to Q.9 is no, Pl inform which standards/protocols users refer while procuring FR textile items?

Already answered in Q9

Q.11 Pl inform whether buyer specify product specific requirements very clearly while tendering FR textile items?

- Yes

Q.12 Pl inform whether FR textile items are being adequately used in public places and for worker safety in India?

- India has started to recognize fire hazards in Industrial work-place and have started to show interest in knowing more about FR products to protect workforce. But is it adequate – answer is no.
- In public place, at least my perception is that we have still not learn our lesson. This is an area which need holistic approach to make public aware about the hazard and consequence of fire mishap in public place. Once awareness is there the consumption of FR products in this space will initiate. Also there has to be some strong regulation to penalize non-compliance of not using FR products in public places.

Q.13 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places and for worker safety in India?

- Industrial worker safety: as international standard has a garment test (instrumented Flame manikin testing) which is being asked by almost all the buyers. Without the garment level testing it is difficult to win confidence of the buyers.
- Public Place – no comments

Q.14 Do you have inhouse testing facilities for FR textile products? If yes, please mention the major equipment details.

- In our labs across the globe we have all the tools & capability needed to characterize FR products:
 - *Mechanical performance* – Tensile, Tear, Burst, Pilling, Abrasion etc
 - *Fastness Properties* – Light, Wash, Solvent, Perspiration etc
 - *FR Performance of fabric* – Flame spread; Radiant, Convective, Contact heat etc
 - *FR performance of garment* – Manikin Flame testing; Electric Arc Testing;

Q.15 Name the testing laboratories (India or abroad) from where you are testing FR products being manufactured by you?

- BTTG, UK
- Kinetrics, Canada
- STIFI, Germany
- ATIRA, India
- WRA, India
- UL, USA

Q.16 Pl inform whether adequate testing infrastructure exist in India for FR textile items?

- Most of the testing and certification are happening in labs outside India. Once the Indian standards become mandatory, the existing lab capability would not be enough. It is also a question of demand and supply. Once there is increase in testing needs, more infrastructure can be added.
- No testing infrastructure for garments

Q.17 If you are exporting FR textiles items, Pl inform the standards and regulations which are required to be followed.

- Same as mentioned in Q3

Q.18 Any other specific input/information which you wish to provide.

- Same as captured in Q12,

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Manufacturer

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the organization : FRAI

Location/Address : New Delhi

Email id/contact details : muralimohandel@gmail.com

Q.1 Please specify the name of fire retardant textile items being manufactured in your company.

Not Applicable

Q.2 Who are your main buyers for the items specified by you in Q.1? please provide their address city/country too.

Not Applicable

Q.3 Please specify whether you are required to follow any standard/regulation/protocol during manufacturing and supplying of FR textile items in India? If yes, please mention the list of same.

Not Applicable

Q.4 List down the challenges being faced by you to follow these standards/regulations/protocols.

Awareness is lacking. Even if there is a regulation on economic considerations they avoid regulations. Implementation is a big challenge and questioned.

Q.5 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

Flame Retardancy per se has not been a serious subject in India. Whatever is happening in Automotive or other segments is because of overseas manufacturers' influence. FR Textiles should be mandated in Public space areas like Theatres, Auditoriums, Halls where sizable number of people gather for an occasion.

Q.6 List down the Indian standards being followed by you for manufacturing of FR products.

Not Applicable

Q.7 What are the challenges being faced by you while implementing/following Indian standards for FR products?

The Standards have to be made Mandatory for the prescribed application. It cannot be Voluntary.

Q.8 Suggestions/comments if any, on Indian standards on FR textiles.

A few standards have been drafted on FR Textiles, but are not Mandatory.

Q.9 Pl inform whether users are referring Indian Standards while procuring FR textile items?

Not Known.

Q.10 If answer to Q.9 is no, Pl inform which standards/protocols users refer while procuring FR textile items?

Generally it is the accepted Standard between the Buyer and the Seller whether local or imported.

Q.11 Pl inform whether buyer specify product specific requirements very clearly while tendering FR textile items?

Sometimes Yes

Q.12 Pl inform whether FR textile items are being adequately used in public places and for worker safety in India?

No. Not used in public places and workers safety.

Q.13 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places and for worker safety in India?

Yes.

Q.14 Do you have inhouse testing facilities for FR textile products? If yes, please mention the major equipment details.

No

Q.15 Name the testing laboratories (India or abroad) from where you are testing FR products being manufactured by you?

NITRA, SPECTRO LABS, Atharva Lab

Q.16 Pl inform whether adequate testing infrastructure exist in India for FR textile items?

Probably Not. Very Limited.

Q.17 If you are exporting FR textiles items, Pl inform the standards and regulations which are required to be followed.

Not applicable

Q.18 Any other specific input/information which you wish to provide.

- a) Awareness and Implementation**
- b) Ensure large manufacturing sites follow the principal of using FR textiles in their uniforms especially working in fire prone sensitive areas.**
- c) All Fire Fighters' clothing and Miners' clothing in work area should be made FR.**
- d) Mass Transports should be made to accept FR Textiles**
- e) Unless they are made Mandatory the usage and acceptance will be low.**

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Manufacturer

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the organization: **Arvind Limited | Human Protection Division**

Location/Address : **PO. Khatraj, Tal. Kalol,
Dist. Gandhinagar 382 721, Gujarat,
India.**

Email id/contact details:-

Mr. Narinder Thapa - VP – Human Protection Division (Arvind Limited)
(narinder.thapa@arvind.in)

Q.1 Please specify the name of fire retardant textile items being manufactured in your company.

A. Fire retardant Fabrics

B. Garments (Single layer, multi-layer, coveralls, shirts, trousers, Bib)

Q.2 Who are your main buyers for the items specified by you in Q.1? please provide their address city/country too.

A: Oil & Gas / Steel/ Aluminium / Power / Auto / Pharma / Aviation / Manufacturing / Chemical Etc.

Q.3 Please specify whether you are required to follow any standard/regulation/protocol during manufacturing and supplying of FR textile items in India? If yes, please mention the list of same.

A: We follow ISO 9001.

Q.4 List down the challenges being faced by you to follow these standards/regulations/protocols.

A: No challenges faced in following ISO 9001 standard, as of yet.

Q.5 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

A: Yes, BIS IS 15758 exists in India for FR textile item.

Q.6 List down the Indian standards being followed by you for manufacturing of FR products.

A: No.

Q.7 What are the challenges being faced by you while implementing/following Indian standards for FR products?

A: No challenges faced.

Q.8 Suggestions/comments if any, on Indian standards on FR textiles.

A: Lack of safety norms and standard operational process are not mandated in the relevant industries, there has limited requirement for following an Indian Standard/regulation to manufacture FR textile. The gap can be covered once the Industry is made aware of the need of accurate safety regulations as per segment.

Q.9 Pl inform whether users are referring Indian Standards while procuring FR textile items?

A: No.

Q.10 If answer to Q.9 is no, Pl inform which standards/protocols users refer while procuring FR textile items?

A: The standards that buyers usually refer to are listed as follows:

ISO 11612/ ISO 11611/ EN 1149/ EN 61482

NFPA 2112/ ASTM F 1506/ ASTM F 1959

Q.11 Pl inform whether buyer specify product specific requirements very clearly while tendering FR textile items?

A: No.

Q.12 Pl inform whether FR textile items are being adequately used in public places and for worker safety in India?

A: No.

Q.13 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places and for worker safety in India?

A: Yes, for sure.

Q.14 Do you have inhouse testing facilities for FR textile products? If yes, please mention the major equipment details.

A: Yes, we do have inhouse testing facility. We have Flame Spread Tester (as per ISO 11612/ ISO 11611, NFPA 2112) for FR textile items.

Q.15 Name the testing laboratories (India or abroad) from where you are testing FR products being manufactured by you?

A: India – NITRA, WRA, ATIRA

Overseas – UL (USA), AITEX (Spain), BTTG (UK)

Q.16 Pl inform whether adequate testing infrastructure exist in India for FR textile items?

A: No, it lacks infrastructure for Arc rating.

Q.17 If you are exporting FR textiles items, Pl inform the standards and regulations which are required to be followed.

A: ISO 11612/ ISO 11611/ EN 1149/ EN 61482

NFPA 2112/ ASTM F 1506/ ASTM F 1959

Q.18 Any other specific input/information which you wish to provide.

A: Absence of regulatory measures in sectors like oil & gas, chemical, petrochemical, etc for usage of FR textile items.

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Manufacturer

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the organization : Teijinaramid Pune (Teijin India Pvt Ltd)

Location/Address : Gurgaon & Pune

Email id/contact details : ravi@teijin.co.in/ +91 9971003930

Q.1 Please specify the name of fire retardant textile items being manufactured in your company.

Meta aramid fibre (Teijinconex) and Para aramid fibre (Twaron) and Spun yarn and Fabric with blends of Aramid, FR Viscose, Nylon, Anti static fibre.

Q.2 Who are your main buyers for the items specified by you in Q.1? please provide their address city/country too.

Shri Deepak Exports, Mumbai NEX G, Mumbai, Arnaf Futuristic, Delhi

Q.3 Please specify whether you are required to follow any standard/regulation/protocol during manufacturing and supplying of FR textile items in India? If yes, please mention the list of same.

End User FR specs, ISO 11612, NFPA 2112, ISO 15025 A and B, EN 469

Q.4 List down the challenges being faced by you to follow these standards/regulations/protocols.

We did not have any Challenges for meeting specs.

Q.5 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

IS 11871 & IS 15748 & IS 16890 are existing standard in India for FR Textiles Items.

Q.6 List down the Indian standards being followed by you for manufacturing of FR products.

IS 11871

Q.7 What are the challenges being faced by you while implementing/following Indian standards for FR products?

Many End users are not aware about Indian standard and they follow International FR Standard only.

Q.8 Suggestions/comments if any, on Indian standards on FR textiles.

This Indian FR standard should be mandatory requirement for all end user. BIS & FICCI should conduct seminar and increase awareness of FR Textiles.

Q.9 Pl inform whether users are referring Indian Standards while procuring FR textile items?

End user have no awareness about Indian FR Standard

Q.10 If answer to Q.9 is no, Pl inform which standards/protocols users refer while procuring FR textile items?

End user can refer BIS FR Standards ie IS 11871 & IS 15748 & IS 16890 .

Q.11 Pl inform whether buyer specify product specific requirements very clearly while tendering FR textile items?

YES

Q.12 Pl inform whether FR textile items are being adequately used in public places and for worker safety in India?

Use of FR Fabrics in Public places & worker safety in India are still very less.

Q.13 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places and for worker safety in India?

YES

Q.14 Do you have inhouse testing facilities for FR textile products? If yes, please mention the major equipment details.

Not Available

Q.15 Name the testing laboratories (India or abroad) from where you are testing FR products being manufactured by you?

NITRA, ATIRA, WRA ,BTRA, BTTG, UL, AITEX

Q.16 Pl inform whether adequate testing infrastructure exist in India for FR textile items?

YES

Q.17 If you are exporting FR textiles items, Pl inform the standards and regulations which are required to be followed.

ISO 11612, NFPA 2112

Q.18 Any other specific input/information which you wish to provide.

NA

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Manufacturer

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the organization : Tarasafe International Pvt Ltd

Location/Address : Plot # 6,7,8,9, GIDC Apparel Park, SEZ Khokhra, Ahmedabad,
Gujarat.

Email id/contact details : basant@tarasafe.in; naveen@tarasafe.in

Q.1 Please specify the name of fire retardant textile items being manufactured in your company.

(Tarasafe) Flame resistant Garments for Industrial applications

Q.2 Who are your main buyers for the items specified by you in Q.1? please provide their address city/country too.

(Tarasafe) We have global presence with major customer base in Europe, Middle East Asia, South East Asia and Indian domestic market as well

Q.3 Please specify whether you are required to follow any standard/regulation/protocol during manufacturing and supplying of FR textile items in India? If yes, please mention the list of same.

(Tarasafe) EN ISO 11612, EN ISO 11611, EN 1149-5, EN 61482, NFPA 2112, NFPA 70e – ASTM F1959

Q.4 List down the challenges being faced by you to follow these standards/regulations/protocols.

(Tarasafe) Non availability of complete testing facilities in India as per the above norms.

Q.5 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

(Tarasafe) The above EN norms are almost covered by the IS standards with exception to EN 61482. NFPA and ASTM norms as above are missing in the IS standards

Q.6 List down the Indian standards being followed by you for manufacturing of FR products.

(Tarasafe)

Q.7 What are the challenges being faced by you while implementing/following Indian standards for FR products?

(Tarasafe) No domestic company demands the IS standards in India for their products. Requirements are majorly as per EN & NFPA/ASTM norms

Q.8 Suggestions/comments if any, on Indian standards on FR textiles.

(Tarasafe) Indian standards should be used by domestic companies instead of international standards for acceptability of their products. Indian labs should be fully equipped to test the requirements of the Indian standards to facilitate their use.

Q.9 Pl inform whether users are referring Indian Standards while procuring FR textile items?

(Tarasafe) No

Q.10 If answer to Q.9 is no, Pl inform which standards/protocols users refer while procuring FR textile items?

(Tarasafe) EN or NFPA/ASTM norms

Q.11 Pl inform whether buyer specify product specific requirements very clearly while tendering FR textile items?

(Tarasafe) Yes

Q.12 Pl inform whether FR textile items are being adequately used in public places and for worker safety in India?

(Tarasafe) No

Q.13 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places and for worker safety in India?

(Tarasafe) Yes

Q.14 Do you have inhouse testing facilities for FR textile products? If yes, please mention the major equipment details.

(Tarasafe) Yes. We can do the basic testings like Flammability, color fastness to washing, dimensional stability on fabrics. Equipments used: Flammability tester as per ISO 15025 & ASTM D6413; Washing machine and dryer as per ISO 6330. For all other major testings we are outsourcing from 3rd party labs

Q.15 Name the testing laboratories (India or abroad) from where you are testing FR products being manufactured by you?

(Tarasafe) India Labs – Wool Research Association, NITRA, ATIRA

Abroad – Underwriters Lab, USA; Arcwear, USA; Kinectrics, Canada, Aitex, Spain, BTTG, UK

Q.16 Pl inform whether adequate testing infrastructure exist in India for FR textile items?

(Tarasafe) Partial only.

Q.17 If you are exporting FR textiles items, Pl inform the standards and regulations which are required to be followed.

(Tarasafe) EN ISO 11612, EN ISO 11611, EN 1149-5, EN 61482, NFPA 2112, NFPA 70e – ASTM F1959

Q.18 Any other specific input/information which you wish to provide.

(Tarasafe) For BIS certification on our garments for sale in Indian market, we were informed that the manufacturer should have a complete lab to test the major FR standards inhouse, which is a huge investment on equipments. We therefore, suggest that 3rd party labs should be allowed to do all testings for a Indian manufacturer to qualify for the BIS certification.

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Manufacturer

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the organization : Shree Deepak Export

Location/Address : Gala No.108, First Floor
Nidhi Industrial Estate, Plot No. 41 & 43
Hissa No. 2, Village Valiv
Taluka Vasai, Dist. Thane-401208

Email id/contact details : deepak_jh1977@yahoo.com

Q.1 Please specify the name of fire retardant textile items being manufactured in your company.

- Fire fighter's clothing
- Protective clothing for Industrial worker
- Aluminized suits

Q.2 Who are your main buyers for the items specified by you in Q.1? please provide their address city/country too.

- a) Oil and natural gas commission (ONGC)
- b) Airports authority of India (AAI)
- c) HPCL
- d) Fire service departments

Q.3 Please specify whether you are required to follow any standard/regulation/protocol during manufacturing and supplying of FR textile items in India? If yes, please mention the list of same.

- a) EN 469 (Protective clothing for fire fighters)
- b) IS 16890

Q.4 List down the challenges being faced by you to follow these standards/regulations/protocols.

- a) Complete testing facility is not available in India.
- b) Availability of specialized Fire retardant fibres is not there in India. Mostly these fibres are imported from other countries like Taiwan, China etc.

Q.5 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

- a) No such regulation exists in India.
- b) Complete garment testing should also be part of Indian standards on FR textiles.

Q.6 List down the Indian standards being followed by you for manufacturing of FR products.

- a) We are following IS 16890 for protective clothing for fire fighter suits
- b) IS 16874 for fire fighter's gloves

Q.7 What are the challenges being faced by you while implementing/following Indian standards for FR products?

- a) Awareness about Indian standards on Fire retardant items is very less in Indian market.
- b) Buyers demand the product as per international standards.
- c) Some buyers require complete garment testing which is not available in India and also this testing is also not the part of Indian Standards on FR textile items.

Q.8 Suggestions/comments if any, on Indian standards on FR textiles.

- a) Requirement for anti-wicking barrier shall be specified in IS 16890 (as per EN 469 latest)
- b) For liquid penetration test O-xylene shall be specified in IS 16890 instead of white spirit.
- c) Whole garment testing (optional) at exposure to heat flux of 84 kW/m² for a duration of 8 s can be given in IS.

Q.9 Pl inform whether users are referring Indian Standards while procuring FR textile items?

No. Due to very less awareness about the standard on FR even the government departments are not referring the Indian standards during procurement. They are referring international standards only

Q.10 If answer to Q.9 is no, Pl inform which standards/protocols users refer while procuring FR textile items?

EN and ISO standards and overseas regulations notified time to time by respective countries on FR.

Q.11 Pl inform whether buyer specify product specific requirements very clearly while tendering FR textile items?

Yes

Q.12 Pl inform whether FR textile items are being adequately used in public places and for worker safety in India?

In public places it is in very minimal use. But for worker's safety it is there. DGFASLI has notified under the Model Factories ACT, that for the workers working in extreme environment and heat/flame conditions shall be provided with adequate PPE as per the National standards on the specified products. But still the adequate quality material is not being supplied on continue basis.

So India being itself a big user of FR, must come with regulation on FR textiles being used in public places and worker safety in India.

Q.13 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places and for worker safety in India?

Yes for sure. (see reply on Q. 12)

Q.14 Do you have inhouse testing facilities for FR textile products? If yes, please mention the major equipment details.

Partial testing is available for fire fighting suits.

Q.15 Name the testing laboratories (India or abroad) from where you are testing FR products being manufactured by you?

NITRA, Ghaziabad and ATIRA. But still testing for full garment is not available in India.

Q.16 Pl inform whether adequate testing infrastructure exist in India for FR textile items?

- Testing infrastructure and facilities for Fire fighter clothing and welder's clothing and other similar products is available in India.
- Testing for full garment is not still available in India. For this the products are tested and certified outside India.

Q.17 If you are exporting FR textiles items, Pl inform the standards and regulations which are required to be followed.

- EN 469.
- NFPA 1971

Q.18 Any other specific input/information which you wish to provide.

No

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Manufacturer

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the organization : SRF Limited
Location/Address : Gummidipoondi, Tamil Nadu
Email id/contact details : Sheelam.Seth@srf.com

Q.1 Please specify the name of fire retardant textile items being manufactured in your company.
Flame retardant PVC Coated Fabrics

Q.2 Who are your main buyers for the items specified by you in Q.1? please provide their address city/country too.

Across India
Institutional Buyers – Eg. State Transport Corporations/ASRTU
Ducting material manufacturers
Tents/Pandal manufacturers
Distributors of coated fabric products for tents, tarpaulins,awnings etc across India
Overseas customers
Distributors of coated fabric products for tents, tarpaulins,etc in UK,USA,UAE

Q.3 Please specify whether you are required to follow any standard/regulation/protocol during manufacturing and supplying of FR textile items in India? If yes, please mention the list of same.

Yes
IS 15061
IS 3768
IS 11871
FMVSS302
BS 3119
DIN 75200
BS 7837
NFPA 701-2

Q.4 List down the challenges being faced by you to follow these standards/regulations/protocols.

Test facilities for few of the international standards are not available in India. Eg. NFPA 701-2, DIN 4102

Q.5 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

Statutory regulations, which mandates the usage of FR products in places of public gatherings, can be enforced.

Additionally, the other standard of importance in workwear clothing is EN 11612, which is not followed in India. The defense procurement follows MIL specs

Q.6 List down the Indian standards being followed by you for manufacturing of FR products.

IS 15061

IS 3768

IS 11871

Q.7 What are the challenges being faced by you while implementing/following Indian standards for FR products?

NA

Q.8 Suggestions/comments if any, on Indian standards on FR textiles.

Different standards may be prescribed for single side coated/double side coated and low GSM FR products.

Q.9 Pl inform whether users are referring Indian Standards while procuring FR textile items?

Yes, occasionally some customers specify the standards

Q.10 If answer to Q.9 is no, Pl inform which standards/protocols users refer while procuring FR textile items?

IS 15061

IS 11871

IS 3768

Q.11 Pl inform whether buyer specify product specific requirements very clearly while tendering FR textile items?

Mostly buyers specify only FR, but not the standard or method of tests.

Q.12 Pl inform whether FR textile items are being adequately used in public places and for worker safety in India?

No. they are not used. Also the ones used are very heavy and not comfortable to wear for longer work periods.

Q.13 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places and for worker safety in India?

Yes

Q.14 Do you have inhouse testing facilities for FR textile products? If yes, please mention the major equipment details.

Vertical FR tester – which can test as per IS 11871, BS 7837, BS 3119

Horizontal FR tester – which can test as per IS 15061, DIN 75200

Q.15 Name the testing laboratories (India or abroad) from where you are testing FR products being manufactured by you?

- Northern India Textile Research Association (NITRA)
- Bombay Textile Research Association (BTRA)
- PSG Indutech, Coimbatore
- SGS, India/SGS,Hongkong/SGS,USA
- TEXTTEST,USA

Q.16 Pl inform whether adequate testing infrastructure exist in India for FR textile items?

Test facility to test as per some popular international standards – Eg NFPA, DIN etc are not available in India

Q.17 If you are exporting FR textiles items, Pl inform the standards and regulations which are required to be followed.

NFPA 701-2,

DIN 75200

DIN 4102

Q.18 Any other specific input/information which you wish to provide.

NIL

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Manufacturer

Instructions before filling the information below:

1. Please fill in the following questionnaire on the basis of the facts of your organization.
2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.
3. Please make sure that the data filled should be authentic.

Name of the organization : SYSTEM 5S Private Limited

Location/Address : B4 SIDCO Industrial Estate ,
Villiwakkam , Chennai ^00049

Email id/contact details : Sudhir Takker
sudhir@system5s.com

Q.1 Please specify the name of fire retardant textile items being manufactured in your company

- Ans) 1) Protective clothing for protection against heat and flame ISO 11612
2) Protective clothing against welding and allied process ISO 11611
3) Arc flash Protective clothing as per EN / IEC 61482
4) Fire Fighter's Protective clothing as per EN 469:2005
5) Fire Fighter's Protective Gloves as per EN 659:2003+ A1 : 2008
6) Fire Fighter's Hood as per EN 13911 :2017

Q.2 Who are your main buyers for the items specified by you in Q.1? please provide their address city/country too.

Ans) Oil Sector companies , State Fire Brigades , Companies dealing in flammable liquids and gases . Our customers are based in India, Asia and EU

Q.3 Please specify whether you are required to follow any standard/regulation/protocol during manufacturing and supplying of FR textile items in India? If yes, please mention the list of same.

Ans) The standards mentioned as Answers to Q1) are all being followed in India .

In addition two BIS standards have been published and we have made arrangements to acquire the BIS license as per these standards

IS 16890 – Protective clothing for Fire Fighters

IS 16874 Protective Gloves for Fire Fighters

Q.4 List down the challenges being faced by you to follow these standards/regulations/protocols.

Ans) The challenges are

- 1) Lack of education on the prevailing standards – their applicability , use and limitations

Many End User departments are not well informed . Hence, unscrupulous manufacturer's misrepresent products (or) supply sub standard products . Hence, educating the End Users and the entire Supply chain of Manufacturers and resellers is vital for the standards to be widely used .

- 2) Strong mechanism of enforcement on END Users and Manufacturers & Resellers. Once the Education on the standards is widely done then the enforcement of the standards will become essential . To achieve this -- Directive from BIS and KEY Governmental Nodal Agencies to END USERS to buy and use products as per relevant BIS standard would help .

Q.5 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

Ans) There has been a significant effort by BIS to implement standards for Protective segment in the last few years . We are happy to be involved in this process of implementing the BIS standards.

We eagerly look forward to publishing of newer relevant standards in the days to come

Q.6 List down the Indian standards being followed by you for manufacturing of FR products.

Ans) We are in the process of acquiring the BIS license for the below mentioned
IS 16890 – Protective clothing for Fire Fighters
IS 16874 Protective Gloves for Fire Fighters

Q.7 What are the challenges being faced by you while implementing/following Indian standards for FR products?

Ans) The BIS officers have been most supportive and thorough in their approach .

Q.8 Suggestions/comments if any, on Indian standards on FR textiles.

Ans) As mentioned in Answers to Q4)

a) Once a standard is published – education to the End users on their applicability , use and limitations will surely be welcome

b) A strong enforcement mechanism to foster the implementation of the BIS standard

c) A strong corrective action mechanism to take action against errant Manufacturers, Suppliers, Users .

Q.9 Pl inform whether users are referring Indian Standards while procuring FR textile items?

Ans) These are early days and End Users are currently using ISO and EN standards which have been in vogue for several years .

Q.10 If answer to Q.9 is no, Pl inform which standards/protocols users refer while procuring FR textile items?

Ans) ISO 11612 ; ISO 11611 ; EN/ IEC 61482 ; EN 469 ; EN 659 ; EN 13911

Q.11 Pl inform whether buyer specify product specific requirements very clearly while tendering FR textile items?

Ans) Yes, in Tenders the buyer specify product specific requirement .

Q.12 Pl inform whether FR textile items are being adequately used in public places and for worker safety in India?

Ans) A lot of interest has been generated by End Users . Owing to the GeM (Government E Market place) a few Government Departments have commenced procurement . However, a lot remains to be done to ensure wide usage of FR Products

Q.13 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places and for worker safety in India?

Ans) Following BIS standards will surely have a HUGE IMPACT provided the three elements have been addressed – EDUCATION , ENFORCEMENT , CORRECTIVE ACTION against non compliant END USERS, Manufacturers and Resellers.

Q.14 Do you have inhouse testing facilities for FR textile products? If yes, please mention the major equipment details.

Ans) Yes, we have a full fledged Lab of testing equipment for Protective clothing

Q.15 Name the testing laboratories (India or abroad) from where you are testing FR products being manufactured by you?

1) NITRA , SGS , ATIRA , Wool research Institute

Q.16 Pl inform whether adequate testing infrastructure exist in India for FR textile items?

Ans) The NABL Accredited Labs mentioned above have infrastructure for testing

Q.17 If you are exporting FR textiles items, Pl inform the standards and regulations which are required to be followed.

Ans) the Standards mentioned in Answers to Q10) are being followed by us .

Q.18 Any other specific input/information which you wish to provide.

Ans) All our inputs have been provided in the previous queries .
Thankyou for the opportunity

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Manufacturer

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the organization : **Kay Tent Industries**

Location/Address : B-109 Mayapuri Industrial Area, Phase 1. New Delhi 110064. India

Email id/contact details : nk@priyankaindia.com

Q.1 Please specify the name of fire retardant textile items being manufactured in your company.

All types of Relief / Family Tent

Q.2 Who are your main buyers for the items specified by you in Q.1? Please provide their address city/country too.

- International Federation of Red Cross and Red Crescent Societies – Address: Kuala Lumpur, Malaysia
- UNHCR – Geneva
- National Disaster Response Forum – New Delhi, India

Q.3 Please specify whether you are required to follow any standard/regulation/protocol during manufacturing and supplying of FR textile items in India? If yes, please mention the list of same.

Flame retardant under CPA I84 section 5 / 6

Q.4 List down the challenges being faced by you to follow these standards/regulations/protocols.

We face challenges in Price and testing facilities are not available in India. We have to get the fabric tested from International laboratories which increase our costing.

Q.5 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

No.

Suggestion: there should be equivalent standards india even for export

Q.6 List down the Indian standards being followed by you for manufacturing of FR products.
Not doing currently

Q.7 What are the challenges being faced by you while implementing/following Indian standards for FR products?

NA

Q.8 Suggestions/comments if any, on Indian standards on FR textiles.

NA

Q.9 Pl inform whether users are referring Indian Standards while procuring FR textile items?

No

Q.10 If answer to Q.9 is no, Pl inform which standards/protocols users refer while procuring FR textile items?

Flame retardant under CPA I84 section 5 / 6

Q.11 Pl inform whether buyer specify product specific requirements very clearly while tendering FR textile items?

Yes

Q.12 Pl inform whether FR textile items are being adequately used in public places and for worker safety in India?

No

Q.13 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places and for worker safety in India?

Yes

Q.14 Do you have inhouse testing facilities for FR textile products? If yes, please mention the major equipment details.

Yes , a very basic testing equipment . A box for flame testing

Q.15 Name the testing laboratories (India or abroad) from where you are testing FR products being manufactured by you?

Centexbel Laboratories in Belgium

Q.16 Pl inform whether adequate testing infrastructure exist in India for FR textile items?

No

Q.17 If you are exporting FR textiles items, Pl inform the standards and regulations which are required to be followed.

Flame retardant under CPA I84 section 5 / 6

Q.18 Any other specific input/information which you wish to provide.

For Indian Army and paramilitary forces, this should be the standard to follow in India to procure FR items only considering the safety features.

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Manufacturer

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the organization : Access Textiles

Location/Address : Building NO.7, 1st Floor, Mittal Industrial Estate,
Sakinaka, Andheri Kurla Road,
Andheri (E), Mumbai- 400059

Email id/contact details : accesstextiles@yahoo.com

Q.1 Please specify the name of fire retardant textile items being manufactured in your company.

Fire fighter's clothing, welder's clothing and Industrial worker's clothing for protection against heat and flame.

Q.2 Who are your main buyers for the items specified by you in Q.1? please provide their address city/country too.

Indian Air Force, Army, Utility companies, HPCL etc. and steel manufacturing companies.

Q.3 Please specify whether you are required to follow any standard/regulation/protocol during manufacturing and supplying of FR textile items in India? If yes, please mention the list of same.

EN 469 for fire fighter clothing , NFPA 1971 and ISO 11613:2017.

Q.4 List down the challenges being faced by you to follow these standards/regulations/protocols.

Raw material is being imported due to which raw material cost is too high. Complete testing facilities are also not available in India for which material needs to be supplied outside India.

Q.5 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

No regulation is in force for FR items in India.

Authorities must come up with some regulation on FR textiles used in public places and workers safety as the same is happening in many countries. Indian standards shall be made mandatory to comply with.

Q.6 List down the Indian standards being followed by you for manufacturing of FR products.

IS 16890 and IS 16874

Q.7 What are the challenges being faced by you while implementing/following Indian standards for FR products?

Awareness is very less in India. Most of the buyers demand the product as per international standards.

Q.8 Suggestions/comments if any, on Indian standards on FR textiles.

Requirement for anti-wicking barrier and full garment testing shall be part of standard IS 16890. Rate of increase of water pressure during hydrostatic test to be specified.

Q.9 Pl inform whether users are referring Indian Standards while procuring FR textile items?

No. Users have very less awareness about Indian standards.

Q.10 If answer to Q.9 is no, Pl inform which standards/protocols users refer while procuring FR textile items?

EN and ISO/ASTM standards on respective FR items.

Q.11 Pl inform whether buyer specify product specific requirements very clearly while tendering FR textile items?

Yes

Q.12 Pl inform whether FR textile items are being adequately used in public places and for worker safety in India?

FR protective textiles are not being used for public safety in public places. Still for workers safety it is being used, but not of adequate quality.

Q.13 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places and for worker safety in India?

Yes

Q.14 Do you have inhouse testing facilities for FR textile products? If yes, please mention the major equipment details.

No

Q.15 Name the testing laboratories (India or abroad) from where you are testing FR products being manufactured by you?

NITRA, ATIRA and BTRA. For whole garment testing we are sending samples to other countries.

Q.16 Pl inform whether adequate testing infrastructure exist in India for FR textile items?

For fire fighter clothing and welder's clothing and other similar products testing is available in India. Testing for full garment is not still available in India. For this the products are tested and certified outside India.

Q.17 If you are exporting FR textiles items, Pl inform the standards and regulations which are required to be followed.

EN 469, ISO 11613, NFPA 1971

Q.18 Any other specific input/information which you wish to provide.

No

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Manufacturer

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the organization : High Performance Textiles Pvt. Ltd

Location/Address : Plot 145, Phase 1, HSIIDC, Barhi, Sonapat, Haryana

Email id/contact details : nandan@hpt-india.com, Nandan.leeds@gmail.com,

Mobile - 9996625050

Q.1 Please specify the name of fire retardant textile items being manufactured in your company.

Aramid Ring Spun Yarns, Modacrylic Ring Spun Yarns, Inherent Flame retardant blended yarns

Q.2 Who are your main buyers for the items specified by you in Q.1? please provide their address city/country too.

We export Aramid yarns to UK, China, Sri Lanka, Mexico.

Q.3 Please specify whether you are required to follow any standard/regulation/protocol during manufacturing and supplying of FR textile items in India? If yes, please mention the list of same.

NA (we don't produce finished FR textiles)

Q.4 List down the challenges being faced by you to follow these standards/regulations/protocols.
NA

Q.5 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

We mainly supply yarns to be used in gloves, protective clothing where finished product is mainly tested as per EN 407 and EN 388. ATIRA, SGS can perform test as per EN 407, however they can't perform protection against molten metals as well as EN 388-2016 (TDM tester for cut performance). We also test our products for protection against Electric Arc Flash as per ASTM F1959/F1959M-14, however no lab in India can perform these tests as of now.

Q.6 List down the Indian standards being followed by you for manufacturing of FR products.
NA

Q.7 What are the challenges being faced by you while implementing/following Indian standards for FR products?

I am not sure if there is any Indian standard available for safety gloves, i.e. protection against cut, slash, heat similar to EN 388-2016.

Q.8 Suggestions/comments if any, on Indian standards on FR textiles.

NA

Q.9 Pl inform whether users are referring Indian Standards while procuring FR textile items?

Vertical flammability test as per IS 11871 is used, however there is lot of confusion especially when FR polyester or blended fibres is being tested as per this standard, need to revise this test for FR polyester which passes this test due to shrinkage and 'move away' from fire source which is fixed.

Q.10 If answer to Q.9 is no, Pl inform which standards/protocols users refer while procuring FR textile items?

NA

Q.11 Pl inform whether buyer specify product specific requirements very clearly while tendering FR textile items?

Yes, in case of export clients.

Q.12 Pl inform whether FR textile items are being adequately used in public places and for worker safety in India?

No

Q.13 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places and for worker safety in India?

Need to update Indian standards as per EN 388, EN 407.

Q.14 Do you have inhouse testing facilities for FR textile products? If yes, please mention the major equipment details.

Vertical flammability, Oven

Q.15 Name the testing laboratories (India or abroad) from where you are testing FR products being manufactured by you?

SGS Chennai, West Yorkshire UK, Kinectrics, Canada.

Q.16 Pl inform whether adequate testing infrastructure exist in India for FR textile items?

No

Q.17 If you are exporting FR textiles items, Pl inform the standards and regulations which are required to be followed.

For our products, EN 407 and ASTM F1959/F1959M-14

Q.18 Any other specific input/information which you wish to provide.

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Manufacturer

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the organization : BARNET INDIA
Location/Address : MUMBAI
Email id/contact details : SIDDHARTH GUPTA
BUSINESS MANAGER
MOBILE : +91-9920812303
Email : sgupta@barnet-india.com

Q.1 Please specify the name of fire retardant textile items being manufactured in your company.

Q.2 Who are your main buyers for the items specified by you in Q.1? please provide their address city/country too.

Q.3 Please specify whether you are required to follow any standard/regulation/protocol during manufacturing and supplying of FR textile items in India? If yes, please mention the list of same.

Q.4 List down the challenges being faced by you to follow these standards/regulations/protocols.

Q.5 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

Q.6 List down the Indian standards being followed by you for manufacturing of FR products.

Q.7 What are the challenges being faced by you while implementing/following Indian standards for FR products?

Q.8 Suggestions/comments if any, on Indian standards on FR textiles.

We would recommend to incorporate EN 1149/5 norm while testing for FR textiles.

The reason for same is that sometimes accumulated charge could lead to explosion risk.

Hence the person may be prevented from the Flame,, but he is still at risk from static charge which has accumulated on his uniform.

Q.9 Pl inform whether users are referring Indian Standards while procuring FR textile items?

Q.10 If answer to Q.9 is no, Pl inform which standards/protocols users refer while procuring FR textile items?

Q.11 Pl inform whether buyer specify product specific requirements very clearly while tendering FR textile items?

Q.12 Pl inform whether FR textile items are being adequately used in public places and for worker safety in India?

Q.13 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places and for worker safety in India?

Q.14 Do you have inhouse testing facilities for FR textile products? If yes, please mention the major equipment details.

Q.15 Name the testing laboratories (India or abroad) from where you are testing FR products being manufactured by you?

Q.16 Pl inform whether adequate testing infrastructure exist in India for FR textile items?

Q.17 If you are exporting FR textiles items, Pl inform the standards and regulations which are required to be followed.

Q.18 Any other specific input/information which you wish to provide.

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Manufacturer

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the organization : URJA PRODUCTS PVT LTD

Location/Address : Inside Pirana Gate, Before Ode Village,
On Outer Ring Road, Piplaj – Pirana,
AHMEDABAD – 382 427

Email id/contact details : nmej@urjafabrics.com; tcgc@urjafabrics.com;

Q.1 Please specify the name of fire retardant textile items being manufactured in your company.

Ans: 1) Carbon Fabrics, 2) Fiberglass, 3) Aramid Fabrics, 4) PTFE Coated Fabrics

Q.2 Who are your main buyers for the items specified by you in Q.1? please provide their address city/country too.

Ans: Sorry, we cannot provide.

Q.3 Please specify whether you are required to follow any standard/regulation/protocol during manufacturing and supplying of FR textile items in India? If yes, please mention the list of same.

Ans: NA.

Q.4 List down the challenges being faced by you to follow these standards/regulations/protocols.

Ans: There are no standards available for the type of Fabrics that we manufacture.

Q.5 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

Ans: TX 30 should take up this matter.

Q.6 List down the Indian standards being followed by you for manufacturing of FR products.

Ans: There is no Indian standard.

Q.7 What are the challenges being faced by you while implementing/following Indian standards for FR products?

Ans: Absence of Indian standard is itself a big challenge.

Q.8 Suggestions/comments if any, on Indian standards on FR textiles.

Ans: You should have an Indian standard.

Q.9 Pl inform whether users are referring Indian Standards while procuring FR textile items?

Ans: May be.

Q.10 If answer to Q.9 is no, Pl inform which standards/protocols users refer while procuring FR textile items?

Ans: Users are in dilemma.

Q.11 Pl inform whether buyer specify product specific requirements very clearly while tendering FR textile items?

Ans: Sometimes they do, sometimes they don't.

Q.12 Pl inform whether FR textile items are being adequately used in public places and for worker safety in India?

Ans: No.

Q.13 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places and for worker safety in India?

Ans: Yes, certainly.

Q.14 Do you have inhouse testing facilities for FR textile products? If yes, please mention the major equipment details.

Ans: No.

Q.15 Name the testing laboratories (India or abroad) from where you are testing FR products being manufactured by you?

Ans: NABL approved Laboratories.

Q.16 Pl inform whether adequate testing infrastructure exist in India for FR textile items?

Ans: Why not?

Q.17 If you are exporting FR textiles items, Pl inform the standards and regulations which are required to be followed.

Ans: NA.

Q.18 Any other specific input/information which you wish to provide.

Ans: First let TX 30 sit down to formulate standards for new generation items for FR.

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Manufacturer

Name of the organization : Surya Processors Pvt. Ltd.
Location/Address : 619, Bisrakh Road,
Vill-Chhapraula,
Gautam Budh Nagar – 201009
Email id/contact details : info@suryatextiles.com

Q.1 Please specify the name of fire-retardant textile items being manufactured in your company.

Ans. Developed fire retardant and water repellent cotton fabric for Fire & Explosive dept. of DRDO and fabric passed their all the required test.

Q.2 Who are your main buyers for the items specified by you in Q.1? please provide their address city/country too.

Ans. We are the first to develop this fabric for DRDO and now they are going to issue open tender as per the Std. procedure. Mr. Meena (Mobile. 8800512782) is handling this project.

Q.3 Please specify whether you are required to follow any standard/regulation/protocol during manufacturing and supplying of FR textile items in India? If yes, please mention the list of same.

Ans. DRDO specified tests to pass as per NFPA-1971.

Q.4 List down the challenges being faced by you to follow these standards/regulations/protocols.

Ans. As far as fire retardant was concerned there was no issue as first sample itself passed flame test. The challenge was to achieve water repellency of 1780mbar. With water repellent chemicals and PU coating, we could not achieve more than 300mbar. After lot of R&D, we finally along with PU Coating laminated PTFE sheet on the fabric which resulted in, along with perfect fire-retardant test, water repellency came to 2000 plus instead of 1780mbar.

Q.5 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

Ans. As far as standards are concerned, labs in India are doing tests as per ISO various specifications as per test requirement. Regarding regulations, there is no regulation in India. All fuel station employees, boiler workers in Industries, Steel mill workers and allied industries should wear fire retardant garments, but no rules have been framed for that.

Q.6 List down the Indian standards being followed by you for manufacturing of FR products.

Ans. ISO 1502

Q.7 What are the challenges being faced by you while implementing/following Indian standards for FR products?

Ans. No Challenge.

Q.8 Suggestions/comments if any, on Indian standards on FR textiles.

Ans. Standard are OK as far as FR Textiles are Concerned.

Q.9 Pl inform whether users are referring Indian Standards while procuring FR textile items?

Ans. For Export, Requirement is for test to be conducted by BTTG lab Germany and tests to be conducted under 11611 & 11612 EN. Indian customers do not specify any specification.

Q.10 If answer to Q.9 is no, Pl inform which standards/protocols users refer while procuring FR textile items?

Ans. N.A.

Q.11 Pl inform whether buyer specify product specific requirements very clearly while tendering FR textile items?

Ans. Foreign buyers do specify, but Indian buyer does not specify any requirement.

Q.12 Pl inform whether FR textile items are being adequately used in public places and for worker safety in India?

Ans. Almost NIL.

Q.13 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places and for worker safety in India?

Ans. It depends on Govt. to first enforce proper regulations for use of fire-retardant garments for particular segments where it is must to use.

Q.14 Do you have inhouse testing facilities for FR textile products? If yes, please mention the major equipment details.

Ans. NO

Q.15 Name the testing laboratories (India or abroad) from where you are testing FR products being manufactured by you?

Ans. NITRA

Q.16 Pl inform whether adequate testing infrastructure exist in India for FR textile items?

Ans. YES

Q.17 If you are exporting FR textiles items, Pl inform the standards and regulations which are required to be followed.

Ans. Not Yet, but in due course may start experts.

Q.18 Any other specific input/information which you wish to provide.

Ans. Already provided above.

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Manufacturer

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the organization : _INDO GERMAN YARN AND FIBRES LLP

Location/Address : Kh No 521, G T Road, Near OCM Back Gate, Amritsar

143001 Email id/contact details : rajiv.sajdeh@gmail.com

Q.1 Please specify the name of fire retardant textile items being manufactured in your company. Para Aramid Yarns and Fabrics
Meta Aramid Yarns and Fabrics

Para Aramid/Pre Ox Yarns and Fabrics

Q.2 Who are your main buyers for the items specified by you in Q.1? please provide their address city/country too.
India, Germany, UK, Turkey, China, Netherlands, USA

Q.3 Please specify whether you are required to follow any standard/regulation/protocol during manufacturing and supplying of FR textile items in India? If yes, please mention the list of same.
NO

Q.4 List down the challenges being faced by you to follow these standards/regulations/protocols.

Q.5 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, please provide any suggestions/inputs for the same.
No. Following EU or US standards and regulations

Q.6 List down the Indian standards being followed by you for manufacturing of FR products. Not Applicable

Q.7 What are the challenges being faced by you while implementing/following Indian standards for FR products?
Not Known

Q.8 Suggestions/comments if any, on Indian standards on FR textiles.

These need to be aligned with the International standards to make them relevant

Q.9 Pl inform whether users are referring Indian Standards while procuring FR textile items?NO

Q.10 If answer to Q.9 is no, Pl inform which standards/protocols users refer while procuring FR textile items?
European or US standards

Q.11 Pl inform whether buyer specify product specific requirements very clearly while tendering FR textile items?

No. Some companies do specify, but follow up and implementation is poor

Q.12 Pl inform whether FR textile items are being adequately used in public places and for worker safety in India?

Very small quantity

Q.13 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places and for worker safety in India?
Yes, provided these are easy to follow and adhere to. They should not be cumbersome and confusing

Q.14 Do you have inhouse testing facilities for FR textile products? If yes, please mention the major equipment details.

NO

Q.15 Name the testing laboratories (India or abroad) from where you are testing FR products being manufactured by you?

SGS, BITRA , ATIRA

Q.16 Pl inform whether adequate testing infrastructure exist in India for FR textile items?NO

Q.17 If you are exporting FR textiles items, Pl inform the standards and regulations which are required to be followed.

EUROPEAN STANDARDS

Q.18 Any other specific input/information which you wish to provide.

For local supplies, sampling is done of certified products and certificates provided. At the time of supply , non standard products are used. There has to be compulsory registration of Raw Material supplier of the Vendor at the time of submission of samples to ensure quality .

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Manufacturer

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the organization : SURE SAFETY (INDIA) LTD

Location/Address : 42, A/B, YOGINAGAR TOWNSHIP, CHHANI ROAD,
BARODA-391740

Email id/contact details : sushil@suresafety.com

Q.1 Please specify the name of fire retardant textile items being manufactured in your company.

- FIRE RETARDANT COVERALLS / TWO / THREE PIECE GARMENTS
- FIRE RETARDANT COVERALLS / TWO / THREE PIECE GARMENTS WITH D3, E3 CERTIFICATIONS.
- FIRE PROXIMITY AND FIGHTER SUITS (UNDER DEVELOPMENT BUT IN FINAL STAGES)
- ALUMINISED TWO / THREE PIECE SUITS
- ELECTRIC ARC SUITS (FR BEING BASE FABRIC)

Q.2. Who are your main buyers for the items specified by you in Q.1? please provide their address city/country too.

IOCL-BARODA, VEDANTA GROUP etc. to name a few. Also Exported to Middle East countries. [Name and addresses cannot be shared...sorry for the same)

Q.3 Please specify whether you are required to follow any standard/regulation/protocol during manufacturing and supplying of FR textile items in India? If yes, please mention the list of same.

Normally Customers look for ISO certified Manufacturers and all Fabrics need to be certified either to any EN or NFPA or relevant standards like (EN 469) IS 16890, EN 11611, EN 11612, NFPA 2112, and UL etc. Foreign Buyers also look for GMP certifications.

Q.4 List down the challenges being faced by you to follow these standards/regulations/protocols.

- GMP certification
- UL being too costly hence another challenge

Q.5 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

Though the regulations exist but preference is to all Global standards, hence unless it is made statutory the Industries will continue following same standards. Secondly, Equivalent BIS standard to EN 11612 A, B, C, D, E & F needs to be defined and test facilities to be created for ease of certification.

Q.6 List down the Indian standards being followed by you for manufacturing of FR products.

IS 16890 & IS 16874

Q.7. What are the challenges being faced by you while implementing/following Indian standards for FR products?

AS stated above

Q.8 Suggestions/comments if any, on Indian standards on FR textiles.

As stated in answer of Q5

Q.9 Pl inform whether users are referring Indian Standards while procuring FR textile items?

Not to our knowledge

Q.10 If answer to Q.9 is no, Pl inform which standards/protocols users refer while procuring FR textile items?

(EN 469) IS 16890-IS 16874, EN 11611, EN 11612, NFPA 2112, and UL etc.

Q.11 Pl inform whether buyer specify product specific requirements very clearly while tendering FR textile items?

Yes they normally do so.

Q.12 Pl inform whether FR textile items are being adequately used in public places and for worker safety in India?

We believe all good Industries have started following the Safety Requirements.

Q.13 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places and for worker safety in India?

No as Now Indian Standards are slowly becoming at par with International Standards.

Q.14 Do you have inhouse testing facilities for FR textile products? If yes, please mention the major equipment details.

UTM, Perspirometer, Crockometer, Grey Scale, Stability Chamber, Conditioning Chamber, Cold Chamber for Low temperature, High Temperature Cum Humidity Chamber, Aeging Oven, Muffle Furnace etc. FR test Rig for EN 11612 D and E.

Q.15 Name the testing laboratories (India or abroad) from where you are testing FR products being manufactured by you?

ATIRA, SASMIRA, WRA etc.

Q.16 Pl inform whether adequate testing infrastructure exist in India for FR textile items?

NO

Q.17 If you are exporting FR textiles items, Pl inform the standards and regulations which are required to be followed.

EN 11611, EN 11612, NFPA 2112, UL etc.

Q.18 Any other specific input/information which you wish to provide.

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Manufacturer

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the organization : M/a AERONAV INDUSTRIAL SAFETY APPLIANCES

Location/Address : E-24/25, Sector VII, NOIDA-201301, U.P.

Email id/contact details : anisaman@aeronav.org

Q.1 Please specify the name of fire retardant textile items being manufactured in your company.

All Flame Retardant Protective Clothing head to toe solutions.

Q.2 Who are your main buyers for the items specified by you in Q.1? please provide their address city/country too.

Ministry of Defence, DRDO, Oil Refinery, Ministry of Home Affairs , Royal Malaysian Army , Singapore Armed Forces, Turkish armed forces, UAE (in progress).

Q.3 Please specify whether you are required to follow any standard/regulation/protocol during manufacturing and supplying of FR textile items in India? If yes, please mention the list of same.

Specific elaborate standards specified by each buyer.

Q.4 List down the challenges being faced by you to follow these standards/regulations/protocols.

NO CHALLENGE FACED for manufacturing . Challenge faced for Thermoman full mannequin test

Q.5 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

We need laboratory with equipment to test dope dyed aramid and exact blend composition .

No FULL BODY MANNEQUIN TESTING FACILITY AVAILABLE LIKE THERMOMAN TEST.

Q.6 List down the Indian standards being followed by you for manufacturing of FR products.

IS 11871 , other standards are protocol testing standards for physical, chemical and other tests as per existing STAndards.

Q.7 What are the challenges being faced by you while implementing/following Indian standards for FR products?

NO LAB to TEST FULL BODY MANNEQUIN TESTE LIKE THERMOMAN TEST.

This is a qualifying next to life simulation of the actual scenario.

Q.8 Suggestions/comments if any, on Indian standards on FR textiles.

Need to be more precise not generic.

Q.9 Pl inform whether users are referring Indian Standards while procuring FR textile items?

YES , IS Test Protocols followed.

Q.10 If answer to Q.9 is no, Pl inform which standards/protocols users refer while procuring FR textile items?

IS 11871 primarily.

Q.11 Pl inform whether buyer specify product specific requirements very clearly while tendering FR textile items?

Yes very clear and discernable.

Q.12 Pl inform whether FR textile items are being adequately used in public places and for worker safety in India?

Limited as of now , no one is ready to pay the price for inherent FR.

Q.13 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places and for worker safety in India?

Which standard in particular ?? Standard not specified.

Q.14 Do you have inhouse testing facilities for FR textile products? If yes, please mention the major equipment details.

We are associate member with NITRA for 10 years , Also on the council of NITRA , all testing carried out with them regularly.

Q.15 Name the testing laboratories (India or abroad) from where you are testing FR products being manufactured by you?

NITRA, SASMIRA, FDDI, ATHARVA, TESTTEX, SRIRAM INSTITUTE, DEBEL BANGALORE, TESTILE COMMITTEE, DUPONT SINGAPORE, SGS, INTERTEK.

Q.16 Pl inform whether adequate testing infrastructure exist in India for FR textile items?

For Coated FR Textiles yes , for inherent FR limited.

Q.17 If you are exporting FR textiles items, Pl inform the standards and regulations which are required to be followed.

NOT DISCLOSEABLE

Q.18 Any other specific input/information which you wish to provide.

Need to Build up capability for extensive inherent FR testing with comfort testing capabilities.

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Laboratory

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the laboratory : **Northern India Textile Research Association**
Location/Address : **Sector-23, Rajnagar, Ghaziabad-201002, U.P, India**
Email id/contact details : **mail@nitratextile.org**

Q.1 Please specify the testing facilities available in your laboratory for fire retardant textile items (Attach additional sheet, if necessary).

Please see the list attached as Annex 1

Q.2 Who are your main customers of your testing facilities for FR textile items? please provide their details.

Military & Paramilitary forces, State and Union territory police forces, DRDO, BIS, Centre for Fire, Explosive and Environment Safety (CFEES), Technical Institute like IIT, Research Institutes, Multinational Laboratories (like SGS, TUV, Intertech, GeoChem), Indian Railways, Air lines, RDSO, RITES, Ordnance Factories, Indian industries, Exporters, Aramid fibre manufacturers like Teijin India etc

Q.3 Please specify whether your customers request for testing as per available Indian Standards on FR textiles items? If yes, please provide the list of these Indian Standards.

Yes. Please see the list attached as Annex 1

Q.4 Suggestions/comments/inputs if any, on Indian standards on FR textiles (Test method, product standards, terminology, etc).

There is a need to frame specification for tents and other similar products having FR property.

Q.5 Please specify whether your customers request for testing as per standards of different origin like ASTM, EN, ISO on FR textiles items? If yes, please provide the list of these standards.

Yes. Please see the list attached as Annex 1

Q.6 Pl provide the list of testing facilities for FR textiles which is presently not available at your lab and which in your opinion is necessary to evaluate a FR textile item?

Please see the list attached as Annex 2

Q.7 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

Most of the standards are framed related to FR protective textiles. However there is need to implement/frame regulations.

Q.8 Pl inform whether FR textile items are being adequately used in public places (Curtain, drapes and upholstery fabric) and for worker safety (Protective clothing, Fire fighter clothing and gloves) in India?

At present FR textiles are not being used adequately in public places, work places in India.

Q.9 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places (Curtain, drapes and upholstery fabric) and for worker safety (Protective clothing, Fire fighter clothing and gloves) in India?

If these are implemented certainly there will be a positive impact.

Q.10 Any other specific input/information which you wish to provide.

In our opinion, without regulation, the use of FR textiles cannot be propagated adequately.

Annex-1

List of test methods

S.No	Test parameter	Test method
1	Pre-treatment after 05 washes before FR test	IS 15370-2A/ISO 6330-2A
2	Heat resistance	ISO 17493 (180°C)
3	Flame spread – Face ignition	IS 15758 (Part 4)/ISO 15025: 2000 (A) /BS 5867/BS 5438-1A, BS 5438-2A, BS 5438-3A
4	Flame spread – Edge ignition	IS 15758 (Part 4)/ISO 15025: 2000 (B)/BS 5867/BS 5438-1B, BS 5438-2B, BS 5438-3B
5	Impact of spatter (up to class-2)	ISO 9150
6	Electrical resistance	EN 1149-1, EN 1149-2
7	Convective heat	IS 15758/(Part 1)/ISO 9151

8	Radiant heat	IS 15758 (Part 2)/ISO 6942
9	Molten metal Splash	IS 15758-5/ISO 9185
10	Contact Heat –Heating cylinder	ISO 12127-1, ISO 12127-2
11	Sweating guard hot plate test	ISO 11092
12	Limiting Oxygen Index	IS 13501/ASTM D 2863/ NCD 14510/ISO 4589-2
13	Vertical Flammability test	IS 15061/IS 11871 /BS 5438/ASTM D 6413
14	Inclined Flammability Test	IS : 11871 (Method-B)/ASTM D1230/ AATCC-33
15	Horizontal Flammability Test	IS 15061/FMVSS 701
16	Methenamine Tablet test	BS 6307/ASTM D 2859/NFPA 101
17	Ignitability of covers and fillings used in upholstered seating (Source 0 to 7)	IS 15727/BS 5852/EN ISO12952
18	Fire test	NFPA 701
19	Thermal Protective Performance Test (TPP /HTP)	NFPA-2112, ISO 17492, NFPA 1971, NFPA 1981, ASTM F 2700, ASTM 2703 (For contact & Space both)
20	Lateral flame spread (Surface Flammability Test)	ISO 5658-2/ IMO A 653
21	Deterioration of visibility due to smoke	Appendix – 15 of UIC-564-2
22	Toxicity Index (for 14 gases)	NCD – 1409
23	Resistance to Spread to Flame	Appendix – 8 of UIC-564-2OR
24	Fire fighter suit	EN 469, NFPA 1971(Not complete facility), IS 16890
25	Fire fighter gloves	IS 16874
26	Welder cloth	IS 16655/ISO 11611
27	Work Wear	IS 15748/ISO 11612
28	Test Methods for testing and evaluation of Flame Retardancy/Flammability/Ignition Resistance of upholstery, curtains etc	IS 12467, IS 15741, IS 15768, IS 15612,
29	Flame spread properties of vertically oriented specimen	IS 15590/ISO 6941

30	Determination of ease of ignition of vertically oriented specimen	IS 15589/ISO 6940
31	Flammability of mattresses and mattresses	16 CFR 1632

Annex-2

List of Instrument not available

S.No	Test parameter	Test method
1	Heat release, smoke production and mass loss rate (Cone calorimeter method)	ISO 5660-1
2	Radiant panel test for horizontal flame spread of flooring	EN ISO 9239-1
3	Ignition when subjected to direct impingement of flame	EN ISO 11925-2
4	Reaction to fire tests. Full scale room tests for surface products Technical background and guidance	ISO: 9705-2
5	Smoke generation and analysis of gas using FTIR: Determination of optical density by a single chamber test	EN ISO 5659-2 and EN 45545-2
6	Thermal Manikin	Annex E of EN 469
7	Helmet test	Fire resistance test as per NFPA 1971 Section 8.3

Standardization in the field of Fire Retardant Textiles (Questionnaire) - Laboratory

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the laboratory : **TÜV Rheinland (India) Pvt. Ltd**

Location/Address : **Plot no. 330-331 Phase IV Udyog Vihar, Gurgaon 122015 , Haryana, India**

Email id/contact details : **Charan.sh@ind.tuv.com**

Q.1 Please specify the testing facilities available in your laboratory for fire retardant textile items (Attach additional sheet, if necessary).

Answer:

- 1.16 CFR 1610
2. ASTM D 1230
3. CAN/CGSB-4.2 No. 27.5-2011
4. 16 CFR 1630
5. 16CFR 1631
6. CAN/CGSB-4.2 No. 27.6
7. 16CFR 1615/ 1616
8. GB/T 14644
9. EN 12952 -1/2
10. BS 5722
11. EN 14878

Q.2 Who are your main customers of your testing facilities for FR textile items? Please provide their details.

Answer: We are working with Leading Retail companies from Europe and US for Garments, Home Textiles products.

Q.3 Please specify whether your customers request for testing as per available Indian Standards on FR textiles items? If yes, please provide the list of these Indian Standards.

Answer: No

Q.4 Suggestions/comments/inputs if any, on Indian standards on FR textiles (Test method, product standards, terminology, etc.).

Answer: No comments

Q.5 Please specify whether your customers request for testing as per standards of different origin like ASTM, EN, ISO on FR textiles items? If yes, please provide the list of these standards.

Answer:

1.16 CFR 1610

2. ASTM D 1230

3. CAN/CGSB-4.2 No. 27.5-2011

4. 16 CFR 1630

5. 16CFR 1631

6. CAN/CGSB-4.2 No. 27.6

7. 16CFR 1615/ 1616

8. GB/T 14644

9. EN 12952 -1/2

10. BS 5722

11. EN 14878

Q.6 Pl provide the list of testing facilities for FR textiles which is presently not available at your lab and which in your opinion is necessary to evaluate a FR textile item?

Answer: No all test as per our client requirement we have capability.

Q.7 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

Answer: Yes Standards are available

Q.8 Pl inform whether FR textile items are being adequately used in public places (Curtain, drapes and upholstery fabric) and for worker safety (Protective clothing, Fire fighter clothing and gloves) in India?

Answer:

Q.9 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places (Curtain, drapes and upholstery fabric) and for worker safety (Protective clothing, Fire fighter clothing and gloves) in India?

Answer: Yes

Q.10 Any other specific input/information which you wish to provide.

Answer: No Comments

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Laboratory

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the laboratory : **Wool Research Laboratory (WRA)**

Location/Address : **P.O. Sandoz Baug, Kolshet Road, Thane-400607**

Email id/contact details : **testing@wraindia.com, wra@wraindia.com**

Seema Patel, 9913710545 / 7984405863 (M)

Q.1 Please specify the testing facilities available in your laboratory for fire retardant textile items (Attach additional sheet, if necessary).

Fire fighter proximity Suit, Fire fighter Aluminised Entry suit, FR Hood, Industrial work wear, Flame retardant Gloves, FR Curtains, FR Textile Automotive, FR Medical PPE, Fire Blanket

Q.2 Who are your main customers of your testing facilities for FR textile items? please provide their details.

FR Textile Manufacturers, Government Users, Exporters, Inspection Agencies

Q.3 Please specify whether your customers request for testing as per available Indian Standards on FR textiles items? If yes, please provide the list of these Indian Standards.

Very rarely customers ask for testing as per Indian standards

Q.4 Suggestions/comments/inputs if any, on Indian standards on FR textiles (Test method, product standards, terminology, etc).

All Indian standards related to PPE should be harmonized with EN ISO standards as majority standards are based on ISO standards.

Q.5 Please specify whether your customers request for testing as per standards of different origin like ASTM, EN, ISO on FR textiles items? If yes, please provide the list of these standards.

Majority customers ask for testing as per ISO, DIN, EN, ASTM, ANSI standards

List of some of standards are ISO 11611, ISO 11612, EN 469, EN 659, NFPA 2112, NFPA 197, EN 407, EN 420, EN 388, EN 13911:2004, EN 1486 and manu more

Q.6 Pl provide the list of testing facilities for FR textiles which is presently not available at your lab and which in your opinion is necessary to evaluate a FR textile item?

Cone calorimeter with FTIR, TPP tester, Flame Manikin, Radiant, convective and Heat resistance testers and many more

Q.7 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

No,

All Industrial workwear where there is risk of fire, FR uniform should be compulsory. Hotel curtains, Theater curtains and seat covers should made from FR fabric. Fire Blanket and FR apron should be compulsory in Restaurants. All fire stations should have enough no. of Fire proximity suits.

Q.8Pl inform whether FR textile items are being adequately used in public places (Curtain, drapes and upholstery fabric) and for worker safety (Protective clothing, Fire fighter clothing and gloves) in India?

No

Q.9 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places (Curtain, drapes and upholstery fabric)and for worker safety (Protective clothing, Fire fighter clothing and gloves) in India?

Strict Implementation of Industrial laws related to Fire protection would definitely have impact on worker safety.

In India many laws are available but no implementation

No enough infrastructure available for research, development, analysis of FR garments as per International standards.

Q.10 Any other specific input/information which you wish to provide.

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Laboratory

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the laboratory : The Synthetic and Art Silk Mills' Research Association
(SASMIRA)

Location/Address : SASMIRA, SASMIRA Marg, Worli, Mumbai – 400 030

Email id/contact details : ed@sasmira.org, testing@sasmira.org

Q.1 Please specify the testing facilities available in your laboratory for fire retardant textile items (Attach additional sheet, if necessary).

1. Vertical flammability as per IS 11871 Method A & ASTM D 6413,
2. Inclined flammability as per ASTM D 1230 & IS 11871 Method B,
3. Textile fabrics burning behaviour as per ISO 6940, ISO 6941, IS 15589, IS 15590,
4. Automotive flammability requirements as per FMVSS 302, IS15061,
5. Protective clothing test as per ISO 15025, IS 15758 Part 4
6. Flammability of coated fabrics as per specification IS 1259 Appendix H , LOI as per IS 13501

Q.2 Who are your main customers of your testing facilities for FR textile items? please provide their details.

Textile Manufactures, Export Houses, Defence laboratories, Academia, Institutes, etc.

Q.3 Please specify whether your customers request for testing as per available Indian Standards on FR textiles items? If yes, please provide the list of these Indian Standards.

Yes. As per IS 11871 method A & B, IS 15061, IS 1259 Appendix H & IS 13501

Q.4 Suggestions/comments/inputs if any, on Indian standards on FR textiles (Test method, product standards, terminology, etc).

The Indian Standards are well defined and are these tests are required by many customers.

Q.5 Please specify whether your customers request for testing as per standards of different origin like ASTM, EN, ISO on FR textiles items? If yes, please provide the list of these standards.

Yes.

We get request to test as per other internationally available Test Standards like ISO 6940, ISO 6941, ISO 15025, ASTM D 1230 & also NFPA & CFR standards.

Q.6 PI provide the list of testing facilities for FR textiles which is presently not available at your lab and which in your opinion is necessary to evaluate a FR textile item?

SASMIRA does not have the test facility as per NFPA 701 which is one of the most important International specification for FR testing.

Q.7 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, PI provide any suggestions/inputs for the same.

Presently there are no regulations for FR Textiles used in Public places though QR Codes have been prepared for implementation by BIS.

Q.8 PI inform whether FR textile items are being adequately used in public places (Curtain, drapes and upholstery fabric) and for worker safety (Protective clothing, Fire fighter clothing and gloves) in India?

FR textiles are being used by not adequately.

Q.9 PI inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places (Curtain, drapes and upholstery fabric) and for worker safety (Protective clothing, Fire fighter clothing and gloves) in India?

Yes. There are a number of Standards which have been developed in the recent past viz., IS 15748 Protective Clothing for Industrial Workers, IS 15742 Protective Clothing with Limited Flame Spread Properties, IS 16655 Protective clothing for use in welding and allied processes, IS 15809 High Visibility Warning Clothing, IS 14744 Flame retardant protective hoods, IS 15321 Molten metal splash protective hoods, IS 15071 Chemical protective clothing. The mandating and use of these Standards will have an impact on the safety of users.

Q.10 Any other specific input/information which you wish to provide.

The use of FR fabrics in public places is mandatory. However, non-standard materials are being widely used at present.

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Laboratory

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the laboratory : ___ATIRA Textile Testing Laboratory

Location/Address : ___Ahmedabad_____

Email id/contact details : ttl@atira.in / Deepali_dydirector@atira.in

Q.1 Please specify the testing facilities available in your laboratory for fire retardant textile items (Attach additional sheet, if necessary).

Limited Flame Spread

Radiant Heat

Convective Heat

Contact Heat

Vertical and Horizontal Flammability

Heat Resistance

Large Splash of Molten Metal

Q.2 Who are your main customers of your testing facilities for FR textile items? please provide their details.

Teijin, Madura Coats, BDL, SGS, Intertek, System 5S, Deepak Exports, Arvind, ITM Safety etc.

Q.3 Please specify whether your customers request for testing as per available Indian Standards on FR textiles items? If yes, please provide the list of these Indian Standards.

IS : 11871 Method A and Method B

IS : 15061

Q.4 Suggestions/comments/inputs if any, on Indian standards on FR textiles (Test method, product standards, terminology, etc).

In IS: 11871 Method A, which gas to be used is not mentioned clearly

Q.5 Please specify whether your customers request for testing as per standards of different origin like ASTM, EN, ISO on FR textiles items? If yes, please provide the list of these standards.

ASTM D 6413, ASTM D1230, EN ISO 11612, EN ISO 11611, EN 388, EN 407, ISO 15025, ISO 6941, ISO 6942, ISO 9151, ISO 17493, ISO 3795,

Q.6 Pl provide the list of testing facilities for FR textiles which is presently not available at your lab and which in your opinion is necessary to evaluate a FR textile item?

Manikin Flame test

Q.7 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

Q.8 Pl inform whether FR textile items are being adequately used in public places (Curtain, drapes and upholstery fabric) and for worker safety (Protective clothing, Fire fighter clothing and gloves) in India?

Yes.

Q.9 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places (Curtain, drapes and upholstery fabric) and for worker safety (Protective clothing, Fire fighter clothing and gloves) in India?

Yes...it will help to ensure measuring of quality standard of FR textile items used in public place and at work place for safety.

Q.10 Any other specific input/information which you wish to provide.

Standardization in the field of Fire Retardant Textiles (Questionnaire)- Laboratory

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the laboratory : Dept. of Jute and Fibre Technology ,
Institute of Jute Technology, University of Calcutta
Location/Address : 35, Ballygunge Circular Road, Kolkata-700 019
Email id/contact details : Office Ph No -033-2461-5477, Fax -033-2461 5632
E mail (office) : ijt@ca2.vsnl.net.in ;

1.Name and contact of the Present HOD : Prof Debasish Das, e mail : drdebasishdas@yahoo.co.in

Ph No : 09831331481

2. Name and Contact no of member of TXD-32: Prof Ashis Kumar Samanta , Professor&
Former HOD , e mail : ijtaksamanta@hotmail.com, Ph No : 09831161529

Q.1 Please specify the testing facilities available in your laboratory for fire retardant textile items (Attach additional sheet, if necessary).

Vide -- Testing service manual of IJT -2015-16, is enclosed as Annexure -1 . Vide page -19-20 in Testing service manual to note as follows :

Test Code No.	Type of Testing	Instrument/Methods	Minimum Sample Size to be supplied	Testing Fee (in Rs.) per sample
CC26	Determination of Limited oxygen index (LOI values)	Standard LOI Tester	1 meter	Rs. 3000.00 Per sample
CC27	Determination of flammability of textiles (flame spread time and char length)	Standard Inclined (45°) / Vertical Flammability Tester	1 meter	Rs. 1000.00 Per sample

Q.2 Who are your main customers of your testing facilities for FR textile items? please provide their details.

Few Jute Mills and few PhD students of Other Universities doing research on F R textiles

Q.3 Please specify whether your customers request for testing as per available Indian Standards on FR textiles items? If yes, please provide the list of these Indian Standards.

Most of them desires to Follow for LOI value or char length and afterglow time determination as per relevant ASTM or BIS standards for relevant type of textile fabrics. For Jute fabrics , there was no standard available before. Now one standard is made.

Q.4 Suggestions/comments/inputs if any, on Indian standards on FR textiles (Test method, product standards, terminology, etc).

Almost all FR Standrads are revised/created recently to cover different applications separately . For Jute fabrics , there was no standard available before. Now one standard is made.

Q.5 Please specify whether your customers request for testing as per standards of different origin like ASTM, EN, ISO on FR textiles items? If yes, please provide the list of these standards.

Yes, sometimes request for testing as per ASTM comes.

Q.6 Pl provide the list of testing facilities for FR textiles which is presently not available at your lab and which in your opinion is necessary to evaluate a FR textile item?

We have only LOI determining set and one inclined plane flammability tester for char length. Nothing else. Different standards need different instrument as per their National standards like EN and ISO . We do not have those facilities. We generally take help of NITRA for these tests. No test facility for Smoke Density is available with us.

Q.7 Please inform whether adequate standards/regulations exist in India for FR textile items? If no, Pl provide any suggestions/inputs for the same.

Yes, NITRA has such facility as per need. But, in all four Zones of India , in my opinion, there should be one full fledged Fire Retardant testing facility centre be created by Central Govt. to facilitate its testing at reduced rate for industry and researchers.

Q.8 Pl inform whether FR textile items are being adequately used in public places (Curtain, drapes and upholstery fabric) and for worker safety (Protective clothing, Fire fighter clothing and gloves) in India?

Definitely yes, particularly in military and defence sector, fire fighter sector but not adequately in public places it is followed so strictly. It should be made mandatory by regulation only.

Q.9 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places (Curtain, drapes and upholstery fabric) and for worker safety (Protective clothing, Fire fighter clothing and gloves) in India?

Recently published BIS standards on Different applications of FR textiles will definitely have an impact in ensuring the quality of FR textile items used in public places (Curtain, drapes and upholstery fabric) and for worker safety (Protective clothing, Fire fighter clothing and gloves) in India, if Govt of India make it mandatory by regulations.

Q.10 Any other specific input/information which you wish to provide.

No, Thanks. However, in eastern region , there is no good fire retardant testing lab available.



18-10-20

Prof Ashis Kumar samanta

Professor , DJFT, IJT, CU

And member TXD-32, BIS

Standardization in the field of Fire Retardant Textiles (Questionnaire)- User

Instructions before filling the information below:

- 1. Please fill in the following questionnaire on the basis of the facts of your organization.*
- 2. Please answer all questions. In case any question is not applicable to your organization, please write NA/Not applicable.*
- 3. Please make sure that the data filled should be authentic.*

Name of the organization : Indian Oil Corporation Limited.

Location/Address : ___CORPORATE HSE , NEW DELHI_____

Email id/contact details : _____sawasti@indianoil.in_____

Q.1 Please specify the name of fire retardant textile items being procured by your organization.

- Fire retardant clothing is being procured at IOCL as per performance /Quality assurance stipulated as per BS EN ISO 11612:2015 or ISO 11612:2015(E) (Latest Edition) standards which certified Inherent Fire Retardant Suit (IFR).
- Further, IOCL doesn't certify /specify the fabric item for fire retardant.
- The Fabric based on GSM used for fabrication of the protective coverall to be inherently flame retardant having permanent heat and flame protection so that it cannot be removed or washed out throughout the life of the garment
- The physical requirement of different components of coverall shall be as per clause no 6.5 of BS EN ISO 11612:2015 or ISO 11612:2015(E).
- EU / EC Type examination certification along with the IFR coverall.
- Garment to be supplied to IOCL shall be tested as per clause no 9 of BS EN ISO 11612:2015 or ISO 11612:2015(E)

SN	Parameters	Test method	Unit	Requirement
1	Manikin Testing as per clause 9	ISO 13506 for 4 sec exposure	%	Since ISO 13506 does not define allowable body burn injury, the requirement of < 50% is to be adhere as per NFPA 2112.

Q.2 Whether you are aware about the availability of Indian Standards for the FR textiles items procured by you in Q.1? If yes, Pl list few of them.

IOCL is aware about IS 15748: 2007 TEXTILES — PROTECTIVE CLOTHING FOR INDUSTRIAL WORKERS EXPOSED TO HEAT (EXCLUDING FIREFIGHTERS' AND WELDERS' CLOTHING) and further amendment on Sep 2014.

Q.3 Pl inform whether you refer Indian Standards while procuring FR textile items?

- No procurement has been done as of now as per IS 15748 due to non-availability of license manufacturer.
- The above said EN standard was last revised on 2015 whereas the IS 15748 was last amended in 2014.

Q.4 Pl inform whether Indian Standards adequately address all your requirements as user? If no, pl provide specific inputs/comments on these Indian Standards.

- The EN standard covers our requirement to protect the body and head in totality however the IS standard covers the specification of fabric.
- Manikin Testing is one of important criteria for selection of fire retardant garment which is not stipulated in IS standard.

Q.5 Pl inform whether following Indian Standards by stakeholders will have an impact in ensuring the quality of FR textile items used in public places (Curtain, drapes and upholstery fabric) and for worker safety (Protective clothing, Fire fighter clothing and gloves) in India?

- Ref reply of question no 4.

Q.6 Please inform whether adequate regulations exist in India for use of FR textile items in public places and for industrial worker safety? If no, Pl provide any suggestions/inputs for the same.

- No aforesaid regulation exist/endorsed by OISD.
- Further stipulation by OISD exist for use of 3 L fire proximity suit.

Q.7 Pl inform whether adequate testing infrastructure exist in India for FR textile items?

- No such information.

Q.8 Any other specific input/information which you wish to provide.

- IS15748 standard to be revised in line with EN ISO 11612:2015 or ISO 11612:2015(E) (Latest Edition) standards and cover the overall garment.
- Testing facilities such as Manikin testing to be developed.