TERMS OF REFERENCE FOR THE R&D PROJECT

1. Title: Study of safety and performance requirements of fire hoods for firefighter.

2. Background

2.1 Firefighters play an indispensable role in our society, not only rescuing lives during fire accidents but also preventing property damage from hazardous fires. This demanding and life-threatening occupation requires intense physical exertion in perilous environments. To enhance the effectiveness of firefighting efforts and safeguard lives, the provision of appropriate Personal Protective Equipment (PPE) is paramount. Among these protective gears, the fire hood for firefighters stands out as a crucial component, offering thermal protection for the head and neck region. Specifically designed to shield firefighters from radiant heat and direct flames, these hoods play a vital role in minimizing the risk of burn injuries.

2.2 Considering the importance of fire hoods for firefighters in ensuring the safety of firefighters in life threatening situations, and with the aim to mitigate the risk of life due to fire induced accidents, it has been decided to undertake a research and development project on fire hoods for firefighters so that the requirements for the fire hoods for firefighter shall be developed on the basis of scientific evidences derived from the data collected from both primary and secondary sources.

3. Objective

3.1 To collect and analyse the relevant technical data/information for safety and performance requirements of fire hoods for firefighters from both primary and secondary sources.

4. Scope

4.1 Undertake study and analysis of the available literature including but not restricted to the following:

i) National and International standards and regulation,
ii) Journals and research papers,
iii) Guidelines of ministries/departments/regulators/users,
iv) Books and magazines,
v) Any other relevant published information.

4.2 Collection of the database for manufacturers (small, medium and large-scale), testing infrastructure and user base in the country.

4.3 Collection of import and export data, type of standards and regulation being followed by domestic/foreign manufacturers, comparative analysis of these standards and regulation.

4.4 Undertake 2 visits to each of small, medium and large-scale manufacturer and collect the information on the aspects including but not restricted to the following:

i) Data of the requirements of raw materials.
ii) Manufacturing process.
iii) In-process controls being exercised during manufacturing.
iv) Testing method being used.
v) Testing infrastructure available.
vi) Post manufacturing quality/in-house data for all the varieties being manufactured.
vii) Sampling plan being followed.
viii) Marking and labelling of the product.
ix) Packaging requirements.
x) Sustainability practices [sustainable raw material, energy efficient processes and methodologies, renewable energy sources, 3Rs (Reduce, Reuse and Recycle), waste management and disposal mechanisms].
xi) Focused group discussions with teams involved in production, testing, and R&D to address quality issues, challenges faced, and gather suggestions for improvement.

4.4.1 The feedback from other manufacturers (where visit is not carried out) shall be collected by circulating suitable questionnaire covering above information through email or any other digital means.

4.5 Undertake 2 visits to users and 2 visits to testing labs (one govt and one private NABL accredited lab) to collect information including but not restricted to the following:

User

i) Standards and regulations being followed.
ii) Compliance mechanism being followed (test certificate from supplier, third party testing etc.)
iii) Focused group discussion on quality issues, challenges being faced and suggestions, if any.

Labs

i) Standards and regulation being followed.
ii) Testing methods being followed.
iii) Testing infrastructure.
iv) Focused group discussion on testing related issues, challenges being faced and suggestion.

4.5.1 The feedback from users and labs where visit cannot be carried out shall be obtained through suitable questionnaire covering above information.

4.6 Collection of the 2 samples each from small, medium and large industry of fire hoods for firefighters and generation of test data for the requirements including but not restricted to the following after getting the samples tested from 2 NABL accredited labs:

i) Flame spread (material)
ii) Flame spread (seam)
iii) Heat transfer (flame)
iv) Heat transfer (radiation)
v) Residual burst strength of material when exposed to radiant heat
vi) Heat resistance
vii) Seam burst strength
viii) Dimensional change due to washing
ix) Hood opening size retention test
x) Thread heat resistance
xi) Dimensions

Note: Any other manufacturer or user declared parameter(s) may be identified and tested.

4.7 Preparation of a comprehensive report with detailed summary of the above information.

5. Research Methodology:

5.1 Collect and analyse the data/information as specified in the scope [4.1, 4.2 and 4.3].

5.2 Visit manufacturers, users and labs and collect data/information as specified in the scope [4.4 and 4.5].

5.3 Collect and test the samples as specified in the scope 4.6.

5.4 Analyze the data/information and prepare a comprehensive project report.

6. Expected Deliverables

6.1 Comprehensive report (both hard copy and soft copy) consisting of outcomes of the study covering all the aspects of the scope appending the survey formats and responses, questionnaire, results and result analysis of testing, reports of visits and other relevant documents/information as specified in scope.

7. Requirement for the CVs:

7.1 The person shall be at least graduate in Textile Engineering or Textile Technology or Textiles Chemistry or Fibre science and technology or post graduate in science with minimum 3 years of experience in the area of manufacturing and/or testing of protective textiles.

8. Timeline and Method of Progress Review:

8.1 The duration of the project is 120 days from the date of the award of the project. The stagewise indicative timelines are as follows:

Indicative Time line	Method of progress
0 to 20 days	Literature review, desktop study, collection of data and information Note: The plan for collection of samples and visit shall be discussed and finalized in consultation with the nodal officer after literature survey and desktop research. A review by sectional committee shall be done after the literature review.
21 to 50 days	Visit to manufacturer, user, testing lab and collection of samples
51 to 100 days	Testing of samples (Except long duration test for testing time more than 30 days, if any) Preparation and submission of first draft report.
101 to 120 days	Submission of the final project report.

9. Support BIS will Provide:

BIS will provide access to latest available editions of Indian standards and/ or international standards relevant to the project, on request.

10. Nodal Officer:

In case of queries/clarification, Shri Mayur Katiyar, Scientist B and Member Secretary of TXD 32 may be contacted on txd@bis.gov.in