

TERMS OF REFERENCES FOR RESEARCH PROJECT

1. TITLE : **Study on the Performance and Construction Requirements of Small, Single-Use, Fire Extinguishers of Disposable Type**

Sectional Committee : Fire Fighting Sectional Committee, CED 22

2. BACKGROUND

The Small, Single-Use Fire Extinguishers play a critical role in addressing incipient fires, serving as the first line of defence in various settings. These compact and portable safety devices are designed for single-use scenarios, commonly found in residential spaces, vehicles, and small commercial areas where fires of limited proportions are anticipated. Being a safety product, there is a need for comprehensive study to establish essential construction and performance requirements for these extinguishers including their selection and application.

BIS has already published IS 15683: 2018 'Portable Fire Extinguishers — Performance and Construction — Specification (First Revision)', IS 16018: 2012 'Wheeled fire extinguishers — Performance and construction — Specification', and IS 2190: 2010 'Selection, installation and maintenance of first-aid fire extinguishers — Code of practice (Fourth Revision)'. This study focuses on the Small, Single-Use, Fire Extinguishers with the capacity of less than 1000 ml.

3. OBJECTIVE

The objective of this research project is to collect data, information, and evidence from primary and secondary sources on performance and construction requirements related to Small, Single-Use Fire Extinguishers. The objective is also to establish the requirements for selection and application of such extinguishers.

4. SCOPE OF THE PROJECT

The scope of this multifaceted project aims for a comprehensive understanding through the following key components:

4.1. Literature Review:

- Undertake an extensive and intensive examination of the available literature on the subject.
- Include a review of relevant national and international standards.
- Analyse research papers published on the subject, studies conducted by industry or organizations, and any other relevant literature.

4.2. Import/Export Analysis:

- Scrutinize the import/export dynamics of Small, Single-Use Fire Extinguisher.
- Investigate the technical regulations governing the product in countries with significant export/import activity.

4.3. Manufacturing Base:

- Study and compile data on the manufacturing base of small, single-use fire extinguishers in India, covering production processes, facilities, and distribution networks.
- Gather insights into production capacities, technological capabilities, regulatory compliance, and market dynamics within the Indian context.

4.4. Feedback:

- Develop a structured questionnaire to get feedback with major importers, exporters, manufacturers, users, and laboratories.
- Conduct interviews to collect first-hand information on the practical aspects, and challenges.

4.5. Visits to Manufacturers:

- Undertake visits to manufacturing facilities in India to gain in-depth knowledge of the production processes involved.
- Identify and document the diverse manufacturing processes employed for the product.

4.6. Labs Visit:

- Visit laboratories equipped for fire extinguisher testing to observe and understand the testing methodologies employed.
- Document the technological advancements and best practices observed during lab visits.

4.7. Sample Collection and Testing:

- Collect samples representative of Small, Single-Use Fire Extinguisher for laboratory analysis.
- Testing of the samples in NABL accredited labs to get the performance and construction requirements.
- Include testing for toxicity of extinguishing media.

4.8. Data Analysis:

- Undertake a comprehensive analysis of all collected data, incorporating findings

from the literature review, manufacturing visits, sample testing, and import/export analysis.

- Identify patterns, trends, and critical insights relevant to the effectiveness and implementation of Small, Single-Use Fire Extinguishers.

5. METHODOLOGY

In respect of the areas covered under the scope, the methodology encompasses the following:

5.1. Review the literature as specified under the Scope.

5.2. Preparation of the questionnaire and share the same with major importers, exporters, manufacturers, users, and laboratories to get feedback.

5.3. Visit at least three manufacturers (including large and MSMEs) of Small, Single-Use, Fire Extinguishers to collect the data. During the visit to manufacturers, data shall be collected for the following:

- Raw materials used in the manufacturing.
- In house quality control requirements of the raw materials.
- Varieties of the small, single-used fire extinguishers manufactured.
- Manufacturing methodologies.
- In process quality control and its data during manufacturing.
- Packaging, marking, and labelling.
- Data on the testing for quality control of final product.
- Sustainability efforts being used by the manufacturer with respect to Reduce, Reuse, and Recycle.
- Draw samples as per the sampling plan and get them tested in BIS approved or NABL approved laboratories for construction and performance requirements.

5.4. Visit the two Govt or NABL approved laboratories to witness the testing of the product. During the visit data shall be collected for materials, equipment, and methodologies used in the testing.

5.5. Analyse the data as specified in the Scope. The data analysis shall encompass the following:

- Rating of the fire extinguishers for various classes of fire.
- Fire testing procedure of the fire extinguishers for various classes of fire.
- Construction and performance requirements of the fire extinguisher.

- Selection and application of Small, Single-Use Fire Extinguishers.

6. **SAMPLING PLAN**

- The manufacturer from each large, small and micro scale shall be visited.
- Three samples shall be collected for each class of fire, including testing for toxicity of extinguishing media.
- Test the samples in BIS approved or NABL approved laboratories for construction and performance requirements.

7. **DELIVERABLES**

Considering the scope and objectives, the following are the deliverables:

- Project report covering all the aspects of the Scope.
- Questionnaire, feedback, and test reports shall be appended to the project report.

8. **TIMELINE AND DELIVERY MILESTONES**

The timeline of the project shall start from the date of issue of sanction letter by BIS. The details are as follows:

Stage	Timeline
Report on the literature review, manufacturing base, import/export analysis, questionnaire and feedback.	3 weeks
Report on the visit to manufacturers and laboratories and sample collection and their testing. Submission of interim report to Sectional Committee at the end of the tenth week.	10 weeks
Review of the interim report by the Sectional Committee and feedback by the Sectional Committee.	12 weeks
Draft final report submission.	16 weeks
Review of the draft final report by the Sectional Committee and feedback by the Sectional Committee.	18 weeks
Final comprehensive report submission including the feedback from the Sectional Committee.	21 weeks
NOTE — In case of delay in submission of final report, the justification shall be given by the awardee for consideration by the Sectional Committee.	

9. **SUPPORT FROM BIS**

- a) To provide any National/ International standards.
- b) Licensee details of manufacturers of similar products.

For BIS Use Only

- c) List of BIS approved laboratories for testing similar products.

10. NODAL PERSON

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