

## **TERMS OF REFERENCE FOR THE R&D PROJECT**

**1 TITLE : Study to develop a standard test method for determination of lint and trash content of cotton.**

### **2 BACKGROUND**

Lint refers to the actual cotton fibres that are separated from the seeds during the ginning process. Lint is the usable part of the cotton used in textile production.

Trash encompasses non-lint materials present in raw cotton, such as leaves, stems, seed coats, and dirt. It is undesirable and can impact the efficiency of processing and the quality of the final textile products.

IS 4871 : 1968 'Method for determination of lint and trash content of cotton by means of mechanical–pneumatic machines' is formulated by BIS. It prescribes a method for determination of lint and trash content of cotton fibres by mechanical-pneumatic machines. The method applies to cotton taken from bales, laps, slivers or other sources of lint cotton.

The committee observed that that the time to completion of testing is too high because of high weight of the specimen. Consequently, it has been proposed to review the existing standard to address this time-related issue.

The outcome of this research and development (R&D) will form the foundation for revision of the existing test method.

### **3 OBJECTIVE**

Collect and analyse the relevant technical data and scientific evidence to develop a standard test method for the determination of lint and trash content of cotton from both primary and secondary sources.

### **4 SCOPE**

**4.1** Extensive study and analysis of the available literature on trash and lint measurement methods, including but not restricted to the following:

- a) ISO, ASTM, DIN, EN and other International standards;
- b) Books and research papers; and
- c) Any other relevant sources.

**4.2** Collection of data through suitable questionnaires from at least 20 cotton yarn spinning industries across the country to know the testing methods along with procedures being followed by them and the problems being faced by them regarding the test method.

**4.3** Undertake visits to 2 NABL testing labs (at least 1 government lab) having testing facilities related to trash content measurement and collect the aspects including but not limited to the following:

- a) Witness the testing;

- b) Testing instruments;
- c) Testing methods being followed by them; and
- d) Problems faced by them in the testing.

**4.4** Preparation of a standard test method covering sampling, no. of specimens, procedures, calculation, preparation of test samples etc. based on **4.1, 4.2, and 4.3.**

**4.5** Undertake visits to 3 cotton ginning/spinning units [1 extra-long-staple cotton (if available), 1 long/superior-medium-staple cotton, and 1 medium/short-staple cotton]; and collect the samples.

**4.6** Collection of 10 kg sample of each variety from at least 20 bales of a lot and undertake testing at six standard labs (at least 3 NABL-accredited labs). The sampling plan for testing shall follow the tabulated details below:

<b>Table ↓ Sampling Plan</b>		
<b>Cotton Ginning/Spinning Unit (refer IS 12171:2019)</b>	<b>Specimen size</b>	<b>No. of specimens to be tested</b>
(1)	(2)	(3)
Extra-long-staple cotton with <i>max</i> 2 % trash content ( <i>see</i> Note 2)	100 gm	5 specimens to be tested at each of 6 labs
	50 gm	5 specimens to be tested at each of 6 labs
	25 gm	5 specimens to be tested at each of 6 labs
Long/superior-medium-staple cotton with a range of 2.5 % to 3.5 % trash content	100 gm	5 specimens to be tested at each of 6 labs
	50 gm	5 specimens to be tested at each of 6 labs
	25 gm	5 specimens to be tested at each of 6 labs
Medium/short-staple-cotton with a range of 3.5 % to 4.5 % trash content	100 gm	5 specimens to be tested at each of 6 labs
	50 gm	5 specimens to be tested at each of 6 labs
	25 gm	5 specimens to be tested at each of 6 labs
<b>NOTES</b>		
<p><b>1</b> HVI testing for each variety collected, to verify staple length and trash value, will be carried out by an NABL-accredited lab before forwarding samples to other labs for trash testing.</p> <p><b>2</b> Sample may be purchased if any ginning unit is unavailable in India.</p> <p><b>3</b> Total Specimens = 270 (5 * 6 * 9)</p> <p><b>4</b> Specimens tested at each lab = 45 (5 * 3 * 3)</p> <p><b>5</b> Approx. 1.5 kg cotton of each variety shall be sent to each lab.</p>		

**4.7** Validation of the test method by determining precision and bias for trash content analysis

of cotton and accuracy of the test method to be assessed as per ISO 5725-1:2023.

**4.8** Preparation of a comprehensive project report covering all the above information.

## **5 RESEARCH METHODOLOGY**

- a) Collect and analyse the data/information as specified in **4.1** and **4.2**;
- b) Visit labs and collect data/information as specified in **4.3**;
- c) Prepare a standard test method based on the data/information collected;
- d) Visit ginning/spinning units and collect the samples as specified in **4.5** and **4.6** respectively;
- e) Validate the test method through labs; and
- f) Analyse the data/information and prepare a comprehensive project report.

## **6 DELIVERABLES**

- Comprehensive report (both soft and hard copy) consisting of outcomes of the study covering all the aspects of the scope appending the survey formats and responses, questionnaires, results of testing, report of visits, and other relevant documents/information.

## **7 REQUIREMENTS FOR THE CVs**

- B.Tech in Textile Technology/Textile Engineering/Textile Chemistry/Textile Fibre.

## **8 TIMELINE AND METHOD OF PROGRESS REVIEW**

The timeline for the project shall be 120 days from the date of award of the project. The stage-wise indicative timelines for the execution of the project shall be as follows:

<b>Timeline</b>	<b>Method of progress</b>
Up to 20 days	Literature review, desktop study, collection of relevant data and information.  After conducting a literature survey and desktop research, the R&D strategy will be reviewed through a meeting with the nodal officer before any site visits.
Up to 60 days	Visit labs and ginning/spinning units. Collect the samples.
Up to 104 days	Testing of samples for validation of test method. Submit a draft report to BIS.
Up to 120 days	Submission of the final project report.

## **9 SUPPORT FROM BIS**

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

## **10 Nodal Contact Point**

Member Secretary of “Physical Methods of Test Sectional Committee TXD 01”, Email : [txd@bis.gov.in](mailto:txd@bis.gov.in).