

## TERMS OF REFERENCE FOR THE R&D PROJECT

1. **Title of the Project:** Study of Methodology of Endurance Testing of Electric Food – Mixers (Liquidizers And Grinders) & Centrifugal Juicers” and its various components.
2. **Background:**
  - a. BIS has published IS 4250 standard on the subject “Specification for Electric Food – Mixers (Liquidizers And Grinders) & Centrifugal Juicers”. This standard incorporates method of testing of endurance of food mixers among other important tests and the standard is also under mandatory BIS certification.
  - b. In the existing standard, Endurance was kept in abeyance by the committee due to the presence of several issues in endurance test using paper pulp prescribed in IS 4250:1980, such as inconsistent loading, frequent manual intervention, and messy operation.
  - c. In the revised draft standard (Doc. No ETD 32 ( 23559 ), a new methodology for endurance test is included at Clause 9 & Annex C of the draft. The panel constituted for revision of IS 4250 recommended that the new test methodology mentioned in the draft standard, would be validated in labs to ensure the consistency and adequacy of the proposed method.
  - d. In view of the above, it is proposed that the new methodology of endurance test mentioned in the draft standard is to be validated in the labs to ensure the consistency and adequacy of the proposed method.
  - e. Also, in the newly prescribed method for endurance testing currently only focuses on testing the endurance of motors. However, important components of food mixers such as blades, couplers, etc. are not being adequately tested for their endurance. Therefore, the researcher also propose a methodology for endurance testing of components such as blades, couplers, etc.
3. **Objective :**

The objective of the project is :

- a. Validation of endurance test as per following methodology mentioned in, Clause 9 & Annex C of the draft Doc.No ETD 32 (23559) and report the outcome in the format given in Annex- A.
- b. Suggest the methodology where in endurance test of food mixers (motor, couplers, jars and blades, blade-shaft) to be test together, in case it is not feasible they will suggest an alternate methodology to check the endurance test of blades and couplers separately.

4. **Scope:** Scope of this research project includes –
- a. **Literature Survey** - Conduct an extensive study and comparative analysis of existing literature, research papers, international standards, and any other published information related to electric food mixers.
  - b. **Manufacturing Facility** - Evaluate the level of manufacturing bases in the country to understand the capabilities and quality of production facilities.
  - c. **Study of Import – Export data-** Analyse import and export data of electric food mixers in India to gather insights into market trends, demand, and potential for growth.
  - d. **Testing Infrastructure** - Assess the testing infrastructure in the country to determine the availability and adequacy of facilities for conducting product testing and quality assurance.
  - e. **Visits to Manufacturing facilities:** Visit atleast two manufacturing facilities for each category (small, medium, and large) of electric food mixers available in the country to observe the production processes, technology used, and overall manufacturing capabilities.

The study will focus on understanding important parameters:

- i. Types of Raw materials/components used.
  - ii. Varieties/grades manufactured
  - iii. Quality parameters (Performance requirements )
  - iv. Manufacturing process,
  - v. Endurance testing
  - vi. In process quality checks
  - vii. Test facilities and test methods used
  - viii. Marking and labelling being done
  - ix. Packaging requirement
  - x. Tests being undertaken
  - xi. Testing facilities in the plant
- f. **Visits to Laboratory facilities :** Visit two laboratory facilities available in the country to examine their testing equipment, capabilities, and expertise in relation to electric food mixers.( Preference shall be given to BIS labs wherever applicable )
  - g. **Collection of Samples and Independent testing:** Collections of 3 random samples each from different 3 different manufacturers from the market and its testing for generation of test data for important performance requirements (endurance tests) .
  - h. **Collection of User feedback-** Visit the users of the product and collect data as mentioned in the scope through a questionnaire.

- i. **Study of Sustainability Aspects:** The focus of this study is to collect feedback regarding energy efficiency aspects, use of renewable energy sources, recycling of materials, waste disposal process, and management.
- j. Prepare a comprehensive project report incorporating the points mentioned above.

**5. Expected Deliverables:**

- a) A detailed analytical report covering all the aspects referred in the scope.
- b) Questionnaire, discussion, visit reports, test reports to be appended with the final project report.

**6. Research Methodology:**

- a) To arrive at useful conclusions, a minimum of three samples each from three different brands, of food mixers, with the same specifications, may be tested for validation of endurance test as per methodology mentioned in Clause 9 & Annex C of the draft Doc. No ETD 32 (23559).
- b) Study of the role and relevance of the proposed method vis-a-vis current scenario.
- c) Exploring the manufacturing base of the product in the country with focus on the methodology for endurance testing of blades, couplers etc used in food mixers etc.

**7. Timeline and Method of Progress Review:**

The duration of the project is 6 months from the date of award of the project. The proposed indicative timeline stage-wise is given below:

Sr No.	Stage	Time from date of award of project (cumulative)
1	Literature review and identification of manufacturing base, testing laboratories, user/user industry, and discussion with BIS for the finalization of sampling plan	1 month
2	Visit to manufacturers, testing laboratories, users and importers and exporters and data collection	3 months
3	Preparation and submission of first draft report to BIS	5 months
4	Submission of final project report	6 months

**8. Support BIS will Provide:**

- BIS will provide access to latest editions of standards, required for the project.
- Access to testing facility available at BIS laboratories, if available.

## 9. Nodal Officer :

Shri Ritwik Anand, Scientist.D/Joint Director, ETD 32, BIS, may be contacted at eetd@bis.gov.in for any queries on the research project.

### Annex-A

#### **Template for submitting feedback on new methodology of Endurance Testing in IS 4250 “Specification For Electric Food – Mixers (Liquidizers And Grinders) & Centrifugal Juicers”.**

1. Laboratory Information:

- a. Name of Laboratory:
- b. Contact Person:
- c. Email:
- d. Phone:

2. Have you performed the endurance tests according to the newly prescribed test method?

3. Were there any challenges or difficulties encountered during the test execution? If yes , please provide the details.

4. Do you believe the test method provides clear guidelines for conducting the endurance tests?

5. Were you able to obtain consistent and reliable results using the new test method?

6. Based on your experience, do you have any suggestions to improve the clarity or effectiveness of the newly prescribed test method?

7. Is there anything else you would like to share or any additional feedback you would like to provide regarding the newly prescribed endurance test method for food mixers or any other clause of draft of IS 4250?