

## TERMS OF REFERENCE FOR THE R&D PROJECT

*(Rubber and Rubber Products Sectional Committee, PCD 13 under PCD, BIS)*

**1. Title of the Project:** Study of material properties of Silicone for use in Silicone gadgets for kitchen.

**2. Background:** The use of silicone-based materials in kitchen gadgets has become increasingly prevalent in recent years, driven by their remarkable properties that enhance safety and functionality in kitchen environments. Silicone, a versatile and food-safe material, is well-regarded for its heat resistance, flexibility, and non-reactivity with food, making it a suitable choice for various kitchen gadgets like spatulas, baking mats, trivets, oven mitts, and more. Consumers have become more conscious of health and environmental considerations and they are moving towards safer and more durable non-stick options which has contributed to the increased use of silicone in cookware manufacturing. These kitchen gadgets are manufactured in India, however, despite the growing popularity of silicone kitchen gadgets, the absence of clear and unstandardized specifications for the material properties of silicone has led to variations in product quality, performance, and safety. There is a need to develop Indian Standard on material properties of Silicone for use in ‘Silicone gadgets for kitchen’.

**3. Objective:** To collect relevant data and information from primary and secondary sources in regard to requirements of material properties of Silicone for use in ‘Silicone gadgets for kitchen’.

#### **4. Scope:**

**4.1** Undertake study and comparative analysis of literature which includes International Standards, Research papers, SOPs/Guidelines issued by Ministries and regulatory bodies concerned, Standards/Technical Regulations in the Countries from where Silicone (used for making kitchen gadgets) is imported, and any other study on the product.

**4.2** Collect data of manufacturing base, testing facilities available and users.

**4.3** Visits to manufacturing units/labs shall be taken as per the following sample plan:

<b>Manufacturing Units/Labs</b>	<b>Number of Industries to Visit</b>
Large	2
Medium	2

Small	2
Micro	2
Labs	2 (1 Lab of Govt and 1 Lab of Private)

It is expected to carry out maximum of 10 visits, however, the final sample plan will be made after the data of manufacturing base and testing facilities available has been shared by the Proposer to the Nodal Officer of BIS.

**4.4** Collection of information during visits to manufacturing units may comprise of the following:

- i) Data of raw materials used.
- ii) Varieties of kitchen gadgets manufactured and the manufacturing process.
- iii) Quality parameters including safety and performance parameters requirements followed.
- iv) In-process quality control, test facilities and test methods used.
- v) Marking, labelling, packing practices and also post quality checks being followed, if any.
- vi) Sustainability impact of the processes involved i.e. sources of energy used (renewable/non-renewable), Energy consumption, measures taken, if any to ensure energy consumption, impact of the manufacturing processes involved on the environment, and their waste disposal protocols based on 3 R's (Reduce, Reuse, Recycle).

## **5. Research Methodology:**

- 5.1** Review the literature in respect of the scope and analyse the findings.
- 5.2** Contact the organizations, associations, industries, labs for information on silicone material for use in kitchen gadgets after collecting the data base of manufacturing base, testing facilities available and users.
- 5.3** A questionnaire to be prepared based on the literature survey done and circulate to the manufacturers and users for the feedback.
- 5.4** During the visit to manufacturing unit, followings methods shall be used:

- i) Observation and focussed discussion with the technical experts/quality control personnel.
  - ii) Collecting the sample and doing the testing.
- 5.5** During the visit to Lab unit, observation and focused discussion to be done on the testing parameters and testing methods used.
- 5.6** A focused discussion to be done with the users for their feedback.

## **6. Deliverables:**

- 6.1** Project report covering all the aspects in the scope.
- 6.2** Feedback questionnaire, discussions report and test reports of sample tested appended to the project report in digital and hard copy form.

**7. Timeline and Method of Progress Review:** The timeline for submission of the project is 3 months from the date of award of the project. Breakdown of stages are as follows:

Stage 1: Literature Survey and Collection of data of manufacturers, labs and users to be done in first 1 month.

Stage 2: Visits to units and labs to be carried out during the second month after consultation with nodal officer.

Stage 3: Draft Report to be submitted after the end of 2.5 months. The proposer may forward the draft report to BIS without waiting for test reports if the test is a long duration test.

Stage 4: Final Report to be submitted after 3 months.

## **8. Support BIS will Provide:**

**8.1** BIS will provide access to latest editions of Indian Standards, International Standards and resources of BIS labs.

**8.2** For facilitation and communication purpose, nodal officer for this project from BIS is:

Shri Rajat Gupta, Scientist-B/Assistant Director and Member Secretary of PCD 13,  
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