

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

**Title: Study of chemical composition of various Aluminium Utensils available in Indian Market**

### **1. Background :**

Aluminium due its light weight, good forming properties and food compatibility is widely used in manufacture of utensils. Indian Standard: IS 1660 :2009 (Wrought Aluminium Utensils) gives the dimensional and Physical properties of various types of utensils such as Parat, Cooking Pot, Frying Pan, Kadai or tiffin etc. For Chemical composition of grades IS 1660 gives reference to IS 21 (Wrought Aluminium for utensils). In the current standard IS 21, there are 10 standardized grades mentioned for manufacture of utensils. However as per information available from diverse sources, the aluminium utensils are manufactured in various grades which are not mentioned in the standard. Also, large number of utensils in India are manufactured by many secondary manufacturers by using scrap

A need was felt to undertake research to study and gather data of various chemical composition of aluminium utensils manufactured and used in India. This study in turn will help to identify the elements present in the aluminium scrap and be useful in specifying the limits of these elements in IS 21

The standard can be accessed from <https://standardsbis.bsbedge.com>

### **2. Objective:**

To collect relevant data and information, from primary and secondary sources, for chemical composition of various types of aluminium utensils in India.

### **3. Scope:**

- 3.1 Study the available literature like national and international standard such as ASTM, JIS, EN, ISO etc. available on the subject, research papers, any study conducted by other organisations, companies' brochure. Identify the grades, their chemical and mechanical properties and any other requirements which can be included in the standard.
- 3.2 Collect data of the manufacturing base of the product.
- 3.3 Visit the manufacturers of the product and get the information on the following:
  - a) Types of Raw material used
  - b) Varieties/grades manufactured
  - c) Quality parameters (chemical , physical and mechanical properties) of different grades
  - d) Manufacturing process,
  - e) Safety requirements
  - f) In process quality checks
  - g) Test facilities and test methods used
  - h) Marking and labelling being done
  - i) Packaging requirement
  - j) Tests being undertaken

- k) Testing facilities in the plant
  - l) Steps taken for addressing sustainability and address 3 R – Reduce, reuse, recycle, Waste recycling
- 3.4 Identify the laboratories testing the product and visit these laboratories.
- 3.5 Check the quantity of the Aluminium utensils imported and exported and countries with which the trade for this product is occurring. Also check if any technical regulations exist for this product in these countries. Take data of the foreign specification as per which the product is being imported or exported.
- 3.6 Identify the major users of Aluminium Utensils and take their feedback understand from the user the main properties required by them in Aluminium Utensils.
- 3.7 Prepare a comprehensive project report incorporating the points mentioned above.

#### **4. Methodology:**

- 4.1 Study the literature and analyse the findings.
- 4.2 Visit the manufacturing unit and
- a. observe the manufacturing process,
  - b. examine in-process control measures,
  - c. conduct focused group discussion with quality personnel
  - d. collect the data as mentioned in the scope through a questionnaire.
  - e. draw samples of the various utensils and get it tested in NABL accredited laboratories (following elements need to be tested : Silver, Aluminium, Boron, Beryllium, Bismuth, Calcium, Cadmium, Cerium, Cobalt, Chromium, Copper, Iron, Gallium, Lithium, Magnesium, Manganese, Molybdenum, Sodium, Niobium, Nickel, Phosphorus, Lead, Antimony, Silicon, Tin, Strontium, Titanium, Vanadium, Zinc, Zirconium and any other elements which the researcher feels is carcinogenic and may leach into food if present )
- 4.3 Visit laboratories and make report on
- a. test equipment required
  - b. test method being used
  - c. testing charges
  - d. testing time required.
- 4.4 Test the sample drawn in NABL accredited laboratory for chemical composition for
- 4.5 Visit the major users of the Aluminium Utensils as mentioned in the scope through a questionnaire.
- 4.6 Analyse the data and test reports from diverse sources and include the same in the project report.

#### **5. Sampling plan:**

- 5.1 Four manufacturers of Aluminium utensils each from Large, Medium, Small and Micro scale to be visited.
- 5.2 Three samples for preferably each type of utensils mentioned in IS 1660 ( namely Parat, Cooking Pot, Frying Pan, Kettle with Lid, Tiffin Carrier, Sauce Pan with Lid, Handi with Lid, Basin, Milk Can, Milk Bucket, Bucket with Stand, Mug, Cookery Colander, Pans,

Kadai, Tava , Tub, Milk Pan, Stock Pots, Casserole, Compartmental tray, Lunch box and Wok) shall be drawn from open market from each region of India viz north, West, south and east. The sample to be drawn of both branded and non-branded utensils. In all 60 samples from each region

5.3 Samples for testing may also be drawn from manufacturer, user, importer.

5.4 Eight major users namely Hotels/restaurants, Food caterers of the Aluminium utensils (2 in each region) shall be visited for feedback.

5.5 Two laboratories, preferably one in government sector and one in private sector shall be visited.

## **6. Deliverables:**

6.1 Final project report, in hard copy format as well as in soft copy, covering all aspects mentioned in the scope.

6.2 Questionnaire, discussion, visit reports, test reports to be appended with the final project report

## **7. Timeline:**

The duration of the project is 3 months from the date of award of the project. The proposed indicative timeline stage-wise is given below:

<b>Sr No.</b>	<b>Stage</b>	<b>Time from date of award project (cumulative)</b>
1.	Literature review and identification of manufacturing base, testing laboratories	1 month
2.	Visit to manufacturers, testing laboratories, market survey users and importers and exporters and data collection	2 months
3.	Preparation and submission of first draft report to BIS	2.5 months
4.	Submission of final project report	3 months

## **8. 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.

**9. Relevant sectional committee and Nodal officer from BIS Sectional Committee:**

MTD 7- Ores and Feed Stock for Aluminium Industry, its Metals/ Alloys and Products  
Sectional Committee Sectional Committee

**Nodal officer :** Mr Ashish Wakle, Scientist C/ Deputy Director – Member Secretary MTD 07 ,  
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