

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

**Title: Determine the technical requirements of industrial oil-fired burners**

### **1. Background:**

**1.1** Industrial oil-fired burners are vital for generating heat in various industrial settings, combusting liquid fuels like diesel or heavy oils. Consisting of fuel delivery systems, combustion chambers, ignition mechanisms, controls, and exhaust systems, these burners efficiently produce high temperatures. They offer flexibility in fuel choice, high reliability, but require maintenance and can impact the environment, prompting knowledge of ongoing advancements focused on efficiency, emissions reduction, and exploring alternative fuel options for sustainable industrial heating.

**1.2** There is an Indian standard IS 12273: 1987 “Specification for industrial oil-fired burners” which mentions the technical requirement of size, material, fabrication, performance, burner capacity test, furnace test and Bacharach method of smoke test.

### **2. Objective:**

This technical study aims to comprehensively assess the functionality, efficiency, and operational aspects of industrial oil-fired burners. The focus includes analyzing combustion processes, evaluating designs and components, examining performance metrics such as heat output and emissions, studying maintenance needs, and exploring optimization possibilities. Through research and practical experiments, this study seeks to provide actionable insights to enhance the reliability, efficiency, and environmental sustainability of these burner systems.

### **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, electrical and physical properties and any other requirements which should be proposed for use by the industry.

**3.2** Collect data of the manufacturing base of the product.

**3.3** Visit to the manufacturers of the product and gather the following information:

- i) Types of Raw material used
- ii) Varieties/grades manufactured
- iii) Quality parameters (chemical, electrical and mechanical properties) of different grades
- iv) Manufacturing process,
- v) Safety requirements
- 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 & test results
- xi) Testing facilities in the plant
- xii) Addressing sustainability in processes such as using energy efficient process, using renewable energy sources, recycling and reuse.
- xiii) Waste recycling

### **3.4 Identification and visit to the laboratories**

**3.5** Check the quantity of the product 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 users of the product and take data of the quantity being used by them, specification used, check for the test certificates received by them and study the chemical and physical properties mentioned in the TC. Also understand from the user the main properties required by them in the product.

**3.7** Prepare a comprehensive project report incorporating the points mentioned above.

## **4. Research Methodology:**

**4.1** Study the literature and analyse the findings.

**4.2** Visit the manufacturing unit and

- i) observe the manufacturing process,
- ii) examine in-process control measures,
- iii) conduct focussed group discussion with quality personnel
- iv) collect the data as mentioned in the scope through a questionnaire.
- v) draw samples of the grades and get it tested in BIS approved laboratories

**4.3** Visit laboratories and make report on

- i) test equipment required
- ii) test method being used
- iii) testing charges
- iv) testing time required.

**4.4** Visit the identified importers and exporters and collect data as mentioned in the scope through a questionnaire

**4.5** Visit the users of the product and collect data as mentioned in the scope through a questionnaire

**4.6** Analyse the data and test reports from diverse sources (stakeholders and available literature) and include the same in the project report.

## 5. Sampling plan:

5.1 Two manufacturers from each large scale and MSME unit shall be visited.

5.2 Three samples for each grade shall be tested.

5.3 Two users of the product shall be visited.

5.4 Two BIS recognized or NABL accredited 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:

Sr No.	Stage	Time from date of award of project (cumulative)
i)	Literature review and identification of manufacturing base, testing laboratories, user/user industry, and discussion with BIS for the finalization of sampling plan	1 month
ii)	Mid-term review	1 or 2 month
iii)	Visit to manufacturers, testing laboratories, users and importers and exporters and data collection	2 month
iv)	Preparation and submission of first draft report to BIS	2.5 month
v)	Submission of final project report	3 month

Note: The proposer may submit the draft report to BIS without waiting for test report from independent laboratories if the test is of long duration test.

## 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:**

MED26 — Oil Burning Appliances

Nodal officer:

Mr Aman Dhanawat, Scientist B/ Assistant Director – Member Secretary MED 26,

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