TERMS OF REFERENCE FOR THE R&D PROJECT

CIVIL ENGINEERING DEPARTMENT

Building Lime and Gypsum Products Sectional Committee, CED 04,

1. TITLE

Study of the technological advancements in the manufacture and market trends in the utilization of calcium silicate bricks used as building material.

2. BACKGROUND

a) BIS has published IS 4139:1989, "Calcium Silicate Bricks – Specification (*second revision*)", which prescribes the requirements regarding classification, general quality, dimensions, compressive strength and drying shrinkage of calcium silicate bricks used in buildings.

b) Calcium silicate bricks are crucial building materials in the construction industry in view of their fire resistance characteristics, durability, and insulation properties.

c) IS 4139 mentions four classes depending on the average compressive strength of the bricks used by the construction industry. This project aims to upgrade this classification based on the performance and availability of raw materials.

3. OBJECTIVES

To study the latest advancement in the field of Calcium silicate bricks, in view of the trade, technology and performance; for effecting changes in the standard as per the latest practices.

4. SCOPE

The Scope of this R&D is as follows:

a) Study and analyze the national/international literature through standards, research papers, and other peer-reviewed documents to identify the performance permeants, type, and manufacturing practices for further study.
b) Collect and analyze the production and consumption data from manufacturers, construction companies, builders, and industry reports.
c) To study the Central/State government's relevant rules associated with calcium silicate bricks, their raw materials, production process; and the characteristics of the product (calcium silicate bricks).
d) Collect and analyze the laboratories engaged in testing and research related to calcium silicate bricks, including their infrastructure, equipment, and areas of specialization.
e) Collect and analyze the import/export statistics from relevant government agencies, trade associations, and other databases.

f) On the basis of the above (a to e) field visit & testing of sample plan will be finalize with the approval of BIS.
g) Carry out survey and interviews with calcium silicate bricks manufacturers, including assessment of production capacities, technological capabilities, storage and transportation conditions and testing as per the finalized plan.
h) Generation of data after testing the product for performance parameters for different types of calcium silicate bricks,
i) Critical analysis of test results, obtained by the testing of collected sample as per finalized plan.
j) Preparation and submission of an analytical report covering the entire scope of the Project.

5. RESEARCH METHODOLOGY

The project will involve the following research methodologies:

a) Study the literature and analyse it in respect to the scope
b) Survey the market through structured questionnaires for collecting information in respect to the scope
c) Contact the relevant organizations and associations (Industry/ user associations) for gathering the data
d) Visits to the manufacturing units to observe, manufacturing processes and in-process controls,
e) Discussion with focused groups (Quality control personnel and person responsible for manufacturing) through structured questionnaires
f) Collection of samples – samples to be collected during the visits to industries as per finalized plan
g) Testing of samples – test the samples and submit the analyzed results (Samples shall be tested in BIS recognized laboratories/ laboratories of national repute).
h) Comprehensive reporting on all aspects.

6. SAMPLING PLAN

a) Two manufacturers from large and MSME companies shall be visited (unless the manufacturing database indicates otherwise) to understand and collect data from the manufacturers and organizations involved in manufacturing.
b) Two samples for each type shall be tested, preferably from different manufacturers/brands, for all the performance/properties.
c) At least two users of the product need to be visited for their feedback.
d) At least two laboratories must be visited, preferably one in the government sector and one in the private sector (NABL Certified).

7. DELIVERABLES

The list of expected outputs or deliverables is as follows:

a) Comprehensive report presenting import/export analysis, manufacturing capacity assessment, laboratory availability, and production and consumption data analysis.
b) Summary of presentations highlighting key findings, market trends, and strategic recommendations for stakeholders.
c) Detailed database or repository of gathered information for future reference or expansion of research.

8. TIMELINE AND METHOD OF PROGRESS REVIEW

The duration of the project shall be **Six months**.

An interim progress report indicating the review of the literature, desktop research and sampling & visit plan shall be submitted **within One month** from date of award of the project.

First progress report shall be submitted by the end of **Three months** from date of award of the project. This report may not wait for receipt of final test reports of samples.

Final Project Report (FPR) shall be submitted within **Six months**.

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. PAYMENT

Dr Manoj Kumar Rajak, Sc-'D', & Member Secretary, CED 04 may be contacted for more clarification on the R&D project (email- manoj@bis.gov.in).

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