

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

### **1. TITLE OF THE PROJECT**

Literature review, market and industry survey, and performance assessment of different type of sliding door bolts for doors and windows (a builder's hardware) manufactured and/or available in Indian market.

### **2. BACKGROUND**

At present three Indian Standards are available for different types of sliding door bolts as below:

IS 281:2009 – “Mild steel sliding door bolts for use with padlocks — Specification (fourth revision)”,

IS 2681:1993 – “Non-ferrous metal sliding door bolts (aldrops) for use with padlocks — Specification (third revision)”

IS 15834:2020 – “Stainless steel sliding door bolts (aldrops) for use with padlocks — Specification (first revision)”

These standards were formulated in last two decades and with primary focus on materials of components, dimensional and performance aspects. However, the rapid advancement in technology over the last 20 years has introduced new designs and materials to the market and performance criteria.

BIS has received inputs from different stakeholders about availability of new materials, designs, sizes and performance parameters (followed Internationally) which are at present not covered in the above Indian Standards on sliding door bolts.

In the above context, an R&D study is required to cover new varieties (includes design, sizes and materials) and performance parameters in the revision of the above Indian Standards on sliding door bolts.

### **3. OBJECTIVE**

To collect the information about the availability of different varieties of sliding door bolts with respect to designs, sizes and materials, and further sample drawn and testing of sliding door bolts for study on their performance parameters achieved by the identified varieties of sliding door bolts.

## **4. SCOPE**

**4.1** Extensive and intensive review of the available literature related to the sliding door bolts.

**4.2** Collect details on industry (domestic and leading foreign industry), and test lab and R&D institutes working in the field of builder's hardware from government agencies, trade associations/traders, online marketplaces and other agencies including those involve in export and imports.

**4.3** Study on varieties of sliding door bolts manufactured/available in Indian market and their quality compliance with respect to standards (Indian/International) followed.

**4.4** Study on varieties of sliding door bolts exported and imported and their quality compliance with respect to standards followed by these products.

**4.5** Market survey to be done in minimum five cities of India that represent PAN India for the availability of different varieties of sliding door bolts.

**4.6** Visit minimum two large scale and four MSME sliding door bolts manufacturing units of different group and management.

**4.7** Drawal of samples of sliding door bolts from market/ factory for testing.

**4.8** Testing of samples for pull test, resistance to cutting and drilling, endurance test, salt-spray/corrosion test, and dimensions.

**4.9** Comparative analysis of test results with respect to each sample tested.

**4.10** Preparation and submission of comprehensive analytical report along-with all the evidence and data collected during the R&D project and analysis of the data.

## **5. RESEARCH METHODOLOGY**

**5.1** Extensive and intensive study of the available literature related to the sliding door bolts which includes Standards (Indian and International/other country standards), published research papers (if available), any study conducted by industries/ organizations and other available literature.

**5.2** Identify relevant government agencies, trade associations/traders, online marketplaces and other agencies including those involve in export and imports, to collect and create the data-base which includes the manufacturing industry (domestic and leading foreign industry) and testing-labs (government, autonomous, private labs with and without NABL accreditation), and R&D institutes working in the field of builder's hardware, for sliding door bolts, and varieties of sliding door bolts (designs, sizes and materials) manufactured/available in Indian market.

**5.3** Study on varieties of sliding door bolts (designs, sizes and materials) manufactured/available in Indian market and their quality compliance with respect to standards (Indian/International) followed. Collect the data from government agencies, trade associations/traders, online marketplaces and other agencies identified in 5.2.

**5.4** Study on varieties of sliding door bolts (designs, sizes and materials) exported and imported and their quality compliance with respect to standards (Indian/International) followed. Collect the export-import data from government agencies, trade associations/traders, online marketplaces and other agencies identified in 5.2.

**5.5** Market survey to be done in minimum five cities of India that represent PAN India for the availability of different varieties of sliding door bolts with respect to designs, sizes and materials.

**5.6** Visit minimum of two large scale and four MSME sliding door bolts manufacturing units (of different groups /management). These visits include discussion and report preparation on manufacturing process, varieties manufactured by the units, quality parameters tested/ got tested from outside/third party labs (in case of outside/third party lab, name of the lab to be included in the report), the testing facilities available with them and witness testing (for tests possible in one day). Also, one standard questionnaire should be prepared and got approved from BIS before factory visits. In case non-availability of large scale manufacturing units, plan of visits to manufacturing units may be modified in consultation and approval of BIS.

**5.7** Drawal of samples of sliding door bolts, minimum 3 samples of each variety with respect to design and material identified during the survey. The samples can be drawn from market or manufacturing units visited. The sampling should be a thorough representation of the industry (large scale as well as MSME) through-out the country. Before testing, on the basis of market survey and industry visits, the final sampling plan should be prepared by the organization/expert and got approved from BIS.

**5.8** Testing of samples for performance tests, that is, pull test, resistance to cutting and drilling, endurance test, salt-spray/corrosion test, and dimensions in any identified NABL accredited laboratory up to the level of performance as per declaration on the product sample or in case no declaration available, test to check maximum level of performance achieved by the product sample. If NABL accredited laboratory is not available, then testing can be done in any other laboratory in India having sufficient infrastructure for testing of sliding door bolts. Tests methodologies should be identified by the organization/expert in the literature review and got approved from BIS before testing of samples.

**5.9** If organization/expert identified tests (other than mentioned above) during literature review, survey and industry visit, same should be informed by the organization/expert before testing, and decision on the tests to be conducted or not, should be taken in consultation and approval of BIS.

## **6. EXPECTED DELIVERABLES**

Project report covering all the aspects covered in the Scope of Work.

Market survey data-base, test reports, reports of discussions held with various stakeholder groups, feedback of questionnaire/interviews, to be appended to the Project Report

Deliverables shall be provided in both digital and hard copy form.

## **7. TIMELINE AND METHOD OF PROGRESS REVIEW**

**7.1** The R&D project should be completed along-with submission of final report in a total time of maximum 5 months from date of award of the R&D project.

### **7.2 Stages of Review**

#### **1) Stage – I**

At the of end 1st month, the organization/expert should prepare and submit a progress report include the following:

- i) Details of literature review carried out and summarized report;
- ii) Details on industry (domestic and leading foreign industry), and test lab and R&D institutes working in the field of builder's hardware specific to sliding door bolts;
- iii) Details of varieties of sliding door bolts manufactured/available in Indian market and their quality compliance with respect to standards (Indian/International) followed;
- iv) Details of varieties of sliding door bolts exported and imported and their quality compliance with respect to standards followed by these products;
- v) Plan of cities to be visited and samples drawn;
- vi) Plan of manufacturing industries to be visited, samples drawn and standard questionnaire;
- vii) Proposed sampling plan as mentioned in 5.7;
- viii) Details of tests to be carried-out on samples drawn as mentioned 5.8 and 5.9.

#### **2) Stage – II**

At the end of 2<sup>nd</sup> month, the organization/expert should prepare and submit first draft report include the following:

- i) Detailed market survey report as mentioned in 5.5 including details of sample drawn from market.

- ii) Detailed industry visit report includes all the details mentioned in 5.6 including details of sample drawn from industry;

### **3) Stage – III**

At the end of 5<sup>th</sup> month, the organization/expert should prepare and submit final draft report include the following:

- i) Detailed project report covering all the aspects covered in the Scope of Work.
- ii) Market survey data-base, test reports, reports of discussions held with various stakeholder groups, feedback of questionnaire/interviews, to be appended to the Project Report.
- iii) And all other details study carried out during the R&D project.

## **8. SUPPORT FROM BIS**

BIS provide support in terms of relevant Indian/International standards, details of BIS standard mark licensees, details of BIS labs and BIS's recognized laboratories, if any.

## **9. NODAL PERSON:**

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