

TERMS OF REFERENCE FOR THE R&D PROJECTS

1. Title of the Project: Technological gap analysis for Steel tapes used in measurement.

2. Background:

2.1 The Weights and Measures Sectional Committee, PGD 26 under the Production and General Engineering Division Council has published IS 1269 (Part 2) : 1997 Legal metrology — Material measures of length Part 2 Steel Tape Measures.

2.2 The Indian Standard is currently under review. It specifies the Material, Nominal Length, Construction requirements, Graduation, Numbering, Accuracy Class, Maximum Permissible Error, Case, Winding Devices and Marking Requirements for Steel tape measures.

2.3 The existing standard only specifies maximum permissible error as criteria for selection of material. The tapes are divided in several varieties based on the nominal length upto 200 m and three classes based on Maximum permissible error. The design of the case and windings has also been specified. This project has been commissioned to address the need for addressing the changes in material, maximum permissible error, design and varieties of the tapes being manufactured or imported in India. The existing standard does not specify requirements for coatings, end hook, retraction mechanism and temperature requirements which are also required to be explored and added to the standard.

In this context, there is a need for in-depth study of the new varieties of steel tapes for measurement available in the market.

3. Objective:

3.1 To study the materials, varieties, accuracy classes, maximum permissible error, designs, coatings, thermostability, end hook designs for different types of Steel Tape Measures.

3.2 Identification of suitable test methods for testing of the various properties of measuring tapes as mentioned in **2.3**, **3.1** or identified during this project.

4. Scope:

4.1 Extensive literature review on the properties and tests for measuring tapes as mentioned in the background and the objective. The literature review may include International Standards such as ASTM, JIS, EN, ISO etc available on the subject, research papers, any study conducted by other organisations, companies' brochure, study of national and international best practices etc.

4.2 Identification of key suppliers, manufacturing bases specializing in various types of measuring tapes, and pinpointing testing facilities dedicated to testing of metrological equipment within India.

4.3 Checking the quantity of the products imported and exported. The list of countries with which the trade for this product is occurring. Checking if any technical regulations exist for this product in these countries. Collection of any foreign specifications as per which the product is being imported or exported.

4.4 Visit to Indian manufacturing units and test laboratories for onsite verification of data collected.

4.5 Testing of measuring tapes as per identified test methods. Comparison of performance of different types of tapes using a performance matrix.

4.6 Preparation of a comprehensive project report incorporating the points mentioned above.

5. Research Methodology:

5.1 Study the literature and analyse the findings.

5.2 With the help of a structured questionnaire, collection of feedback. Interview with the major manufacturers of measuring tapes and laboratories as applicable.

5.3 Carry out Market Analysis which may include:

- a. Identification of Indian stakeholders (manufacturing, testing, user base, regulators and academicians etc)
- b. Conduct surveys and interviews with industry experts, manufacturers, and consumers.
- c. Analyse EXIM data, sales data, market reports, and industry publications.
- d. Study of National and International regulations on the product.
- e. Evaluate online platforms, forums, and social media for consumer feedback.

5.4 Carry out Sustainability Impact Assessment, which may include:

- a. Research and analyse the environmental impact of current measuring tape manufacturing processes.
- b. Collaborate with environmental experts to understand sustainable practices in the industry.
- c. Develop metrics and assessment tools to measure the sustainability impact of the different processes.

5.5 Following the data acquisition on suppliers, manufacturing and testing bases, present a proposed Sampling Plan (SP) and a Visit Plan (VP) for approval from the Bureau of Indian Standards (BIS).

5.6 On-site visits to manufacturing units and laboratories as per the approved visit plan or as given below:

- a) Two manufacturers of measuring tapes, one large and one MSME should be visited.
- b) Two laboratories, one in government sector and one in private sector should be visited.

5.7 Implementing a systematic approach for the collection of samples according to Sampling Plan.

5.8 Testing of the products as per identified test methods, if any.

6. Requirement for the CVs:

The project will engage experts with qualifications and experience in Mechanical engineering, Industrial Metrology, Standardization or any other relevant field.

7. Expected Deliverables:

7.1 Analytical report covering all the aspects mentioned in the scope.

7.2 The following has to be appended to the report:

- i. Summary of literature review;
- ii. Summary of Environmental Impact Assessment;
- iii. Market Analysis Report: Summary of the interview; list of identified stakeholders (Manufacturing, testing, user base, regulators, academicians etc); import export data; existing regulations in India and in countries where the product is imported or exported;
- iv. Outcome of the industry visits; and
- v. Comparison matrix of the various tests.

8. Timeline and Method of Progress Review:

The duration of the project is 6 months from the date of award of the project. The proposed indicative timeline stage-wise is given below:

Timeline	Stages
Week 01 – Week 03	1) Preparation of comprehensive plan identifying the following: <ul style="list-style-type: none"> a) Details of literature review and summarized reports; b) Identified manufacturers, exporters, importers, laboratories, and users; c) Information gathered from contacting the above stakeholders and visits to be carried out; and d) Laboratory where testing is to be carried out along with the sampling plan. 2) Evaluation of the plan by Member Secretary, and provide feedback, if any.

Timeline	Stages
Week 12	1) Submission of progress report along with the report on utilization of the 75 percent of the fund received after project approval. 2) Evaluation and acceptance of the reports by the Sectional Committee.
Week 20	Submission of final report with information as mentioned in the project deliverables.
Week 21 – Week 23	Evaluation of the final report by Sectional Committee, and provide feedback/recommend changes, if any.
Week 24 – Week 26	Submission of final report incorporating recommendations/feedback of the Committee.

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.

9. Support BIS will Provide:

National /International standards relevant to the project.

10. Nodal Person

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