

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

### **Mechanical Engineering Department**

#### **Photographic Equipment Sectional Committee, MED 32**

**1. Title:** To study and establish various performance and safety requirements and practical evaluation of Thermal Imaging Camera.

**2. Background:**

**2.1** Thermal imaging cameras are innovative devices that capture and display the infrared radiation emitted by objects. These cameras provide a visual representation of temperature differences, enabling users to identify hot spots, anomalies, and temperature patterns in various applications. The technology has found extensive use in fields such as various R&D, defence, , firefighting, building diagnostics, electrical inspections, and security surveillance.

**2.2** Photographic Equipment Sectional Committee MED 32 of BIS has identified the subject of 'Thermal Imaging Camera' for a Research project. In order to take a holistic view of the subject, detailed study of already developed Thermal Imaging Camera in industrial vicinities across the country is required to be conducted. The study shall cover Thermal Imaging Camera used in different areas like Aerospace and Defence, Building Diagnostics and Construction, Firefighting and Public Safety, Energy and Utilities, clinical applications, metrology, etc. The establishment of metrological traceability and metrological characterization of these items is very crucial for the precision measurements required to prove its suitability for various end applications.

**3. Objective:** Collection of data on Thermal Imaging Camera based on established facts and information including principles of working, safety requirements, methodologies, procedures, best practices, documentation and evaluation. Also, the project may furnish the following objectives.

- a) Machine Development
- b) Innovation and Technology
- c) Cost Reduction
- d) Environmental Considerations
- e) Customization and Versatility
- f) Market Research and Customer Feedback
- g) Testing and Quality Assurance
- h) Scalability

**4. Proposed Scope of the Project:** Study of Thermal Imaging Camera used in various applications ( other than medical) and to understand the principles, processes and methodology adopted in the development and maintenance of Thermal Imaging Camera, including practical challenges and gaps. The project should cover on-site visits to the manufacturing units and labs for the detailed study of Thermal Imaging Camera development process and working. A thorough literature review should also be done for existing international and national guidelines, regulatory stipulations etc. The project should include a collection of substantial facts and information for

preparing a comprehensive report documenting the research findings. A draft report based on research shall be prepared on Thermal Imaging Camera considering best practices and technological advancements.

Particular attention should be made to:

- a) Establishment of accuracy , precision, metrological traceability for calibration, testing and validation of thermal imaging cameras.
- b) “To establish the acceptance criteria towards temperature range, thermal sensitivity, spectral range, resolution, emissivity, distance effect, corrections, uncertainties and other properties like durability, construction and safety”.
- c) Classification of the above for various applications.

Project leader and team members need to define clear, measurable objectives that align with the overall purpose of the project and the needs of the target market. Additionally, regular assessment and evaluation of progress towards these objectives are crucial for project success.

## **5. Methodology:**

- a) A thorough literature review should be done for existing manufacturers specifications and catalogues, product manuals.
- b) Testing of samples collected through various sources in an accredited laboratory (IS/ISO/IEC 17025) , analysis of test data and validation of test methods to be included in the project.
- c) The project should cover on-site visits for the study of Thermal Imaging Camera development procedures and protocols, through survey-based research including standards and practices being used, infrastructure requirements etc.
- d) Report shall be prepared of research findings and data collected as per the deliverables of this project. A draft based on the research shall be prepared on Thermal Imaging Camera, considering best practices and technological advancements.

## **6. Deliverables**

Considering the scope and objectives, the research shall be taken up by the proposer and prepare a report on the following deliverables based on research for incorporation in the proposed standard:

- a) Definition and classification of Thermal Imaging Camera
- b) To stipulate acceptance parameters/criteria for performance and safety requirements for Thermal Imaging Camera duly substantiated by relevant test data and analysis : To stipulate acceptance parameters/criteria for performance and safety requirements for Thermal Imaging camera”
- c) To prescribe test methods for various parameters as per (b) above:

## **7. Time lines**

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:

<b>Sl No.</b>	<b>Stage</b>	<b>Time from date of award of project (cumulative)</b>
a)	Literature review and identification of manufacturing base, testing laboratories, user/user industry, and discussion with BIS for the finalization of sampling plan	1 Month
b)	Visit to manufacturers, testing laboratories, users and importers and exporters and data collection	2 Months
c)	Mid term Review	3 Months
d)	Preparation and submission of first draft report to BIS	5 Months
e)	Submission of final project report	6 Months

**Note** —The proposer may submit the draft report to BIS without waiting for a test report from independent laboratories if the test is of long duration test (> 1 month).

## **8 . Relevant sectional committee and Nodal officer from BIS**

Sectional committee:

- MED 32 – Photographic Equipment Sectional Committee

**Nodal officer:**

- Mr Shubham Tiwari, Scientist D/Joint Director – Member Secretary MED 32,
- Email : med@bis.gov.in