FMM - Malaysian Insulation Manufacturers Group

Our reference: FMM/IG/MIMG/31.2

Statement of Clarification

Industry Perspective on Thermal Performance U-Value Calculation Methodologies for Roofing System

The FMM Malaysian Insulation Manufacturers Group (MIMG) takes this opportunity to present its official position on the thermal performance calculation methodologies/guidelines currently being adopted by architects, specifiers, consultants, GBI Facilitators and other relevant stakeholders within the construction and sustainability industry.

As stakeholders supporting Malaysia's energy-efficiency agenda, we believe it is important that any technical guidance or industry reference related to building thermal performance is developed through a transparent and balanced process, taking into consideration Malaysian climatic conditions and construction practices.

1. Background: MS1525 and the Role of Insulation in Malaysia

Malaysia's building energy-efficiency framework is anchored in MS1525: Energy Efficiency and Use of Renewable Energy for Non-Residential Buildings – Code of Practice. The standard outlines thermal performance requirements for building envelopes and provides several pathways to achieve the required U-values.

To meet these U-value targets, the Malaysian market predominantly relies on two types of insulation systems:

(a) Bulk Insulation (fibreglass wool, mineral wool and stone wool)

These materials resist heat flow, which is influenced by the thickness and density of the material used. Their R-values are obtained through internationally accepted laboratory test methods, such as ISO 8301 and ISO 9869. These methods produce repeatable empirical data derived from controlled testing equipment, such as heat-flow meters.

(b) Reflective Insulation (aluminium foil, bubble foil and radiant barriers)

Reflective systems depend on surface reflectivity and air gaps, meaning their thermal performance is significantly influenced by installation conditions, ventilation, spacing and environmental factors. Unlike bulk insulation, there is no single global standard for calculating R-values for reflective insulation. This gap has led countries to establish their own approaches, resulting in non-uniform R-values that cannot be directly compared.

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2. Measurement Differences: A Critical Issue

Bulk insulation R-values are generally measured using internationally recognised and consistent methods. The reference standards for determining thermal resistance and thermal conductivity are in accordance with ISO 8301 "*Thermal insulation — Determination of steady-state thermal resistance and related properties — Heat flow meter apparatus*" and ISO 8302 "*Thermal insulation — Determination of steady-state thermal resistance and related properties — Guarded hot plate apparatusor*" their Malaysian equivalents, MS ISO 8302. Reflective insulation R-values, however, may vary due to several factors:

- Vary by test method
- Depend on assumed air-gap temperatures
- Are influenced by climate, wind speed, orientation and installation quality
- Are often theoretical rather than empirical

3. Industry Observations on Current Guideline Development

Under the current methodologies/guidelines, elements from several foreign standards are merged, including those from Australia, the United States and Europe. While individually valid within their respective countries, combining them creates a hybrid methodology that does not reflect Malaysian climatic conditions or construction practices.

From our technical review, this approach appears to:

- Selectively adopt parameters that increase the calculated performance of reflective insulation
- Use assumptions that are not validated by real-world installations
- Present R-values that do not align with ISO-based bulk insulation data, creating an uneven playing field

These concerns were previously highlighted by MIMG to relevant stakeholders. Additionally, an independent study conducted by the University of Wollongong (UOW), a globally recognised authority on building thermal performance, identified accuracy gaps and modelling flaws within the guideline that required further attention. **Please refer to Annex 1 for the key executive summary of the study.**

4. Concern Over the Planned "Second Version"

As discussions continue regarding future revisions or updates to thermal calculation guidance, MIMG believes it is important that the process involves broader participation from relevant stakeholders across the building industry.

MIMG understands that there may be ongoing discussions regarding potential revisions to the R-values of reflective insulation, including possible updates to the theoretical models applied. We would therefore take this opportunity to again highlight that any revision process should be transparent and involve all relevant stakeholders.

5. MIMG's Position

We strongly emphasise the following:

- Thermal performance guidelines must be developed through multi-industry collaboration
- The guideline must be aligned with the objectives of MS1525.
- All major insulation categories (bulk, reflective, rigid boards, etc.) must be included.
- Testing methodologies employed must be transparent, validated and suited to Malaysian climatic conditions.
- The applicability of ISO 6946 and other foreign standards to Malaysian construction practices must be critically evaluated and deemed suitable for use.

6. Call to Action

MIMG welcomes continued constructive engagement with all industry stakeholders to support the development of practical, transparent and technically credible guidance for the Malaysian construction sector.

We believe collaboration across the industry is essential to ensure Malaysia continues progressing toward higher-performing and more energy-efficient buildings. We urge the immediate establishment of an open and multidisciplinary technical committee involving:

- Manufacturers
- Mechanical and architectural professionals
- Academia
- Accredited laboratories
- Government bodies

Malaysia needs a guideline that is clear, transparent and scientifically credible, which will benefit the entire construction industry and contribute to the country's energy-efficiency and sustainability goals.

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