# Application Note

UV-0034

## Evaluation of solar reflective paint material based on JIS K 5602/JIS K 5675

In recent years, solar reflective material has attracted interest as a technique to reduce solar heating and as a sustainable household building material. As shown in Figure 1, solar reflective materials have a specific capability to reflect more solar light with higher efficiency. This capability reduces thermal energy on surfaces which can penetrate into buildings.
In the JIS K 5602 and K 5675 standards, testing methods for analysis of the solar reflectance of reflective paint materials against solar light are outlined.

In this application note, some examples of evaluation of solar reflective paint material based on JIS K 5602 and K 5675 using [Solar Transmittance/Reflectance Calculation] Program is explained.

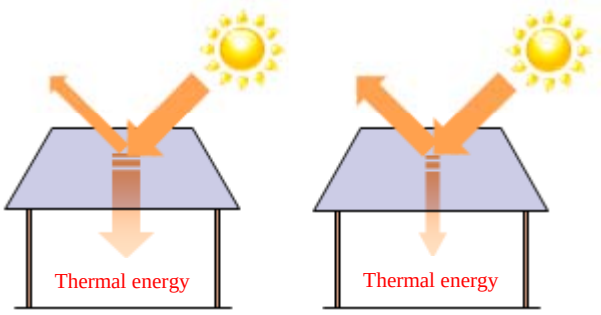


Fig. 1 Conduction of solar thermal energy
Left: general paint
Right: solar reflective paint

**Keywords**: JIS K 5602, JIS K 5675, Solar reflective paint, Solar reflectance

**Sample**
Gray paint material: Solar reflective paint / General water paint
Red paint material: Solar reflective paint / General water paint

Solar reflective paint | General water paint | Solar reflective paint | General water paint

Fig. 2 Sample surface (Left: Gray / Right: Red)

※)Two aluminum plates were painted by both general water paint and solar reflective material paint in two different colors such as Gray and Red and dried completely for 7 days.



**JASCO INTERNATIONAL CO., LTD**
11-10, Myojin-cho 1-chome, Hachioji, Tokyo 192-0046, Japan
Tel: +81-42-649-3247, Fax: +81-42-649-3518

**Spectral measurement result**

By comparing the results shown in Figures 3 and 4, it is demonstrated that the solar reflective paint has remarkably higher reflectance in the NIR region as compared to general water paint material.

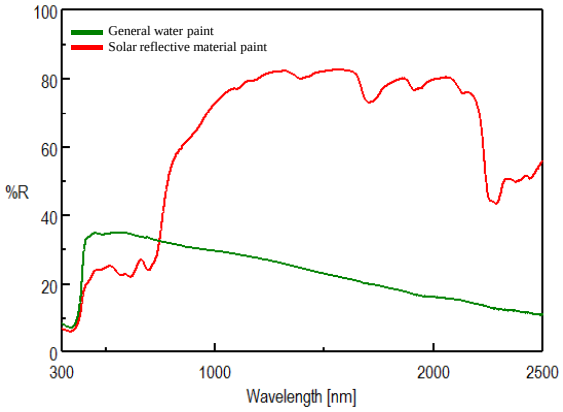


Fig. 3: Diffuse reflectance spectra of gray paint material

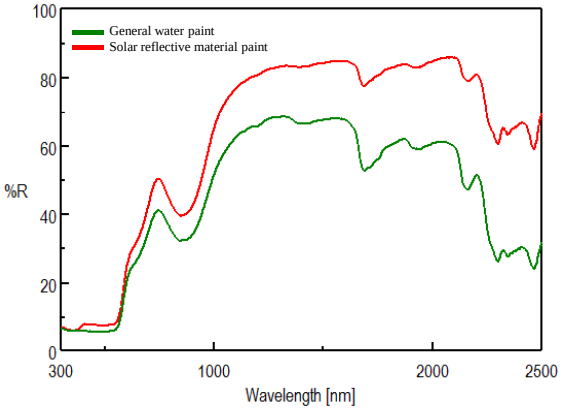


Fig. 4: Diffuse reflectance spectra of red paint material

**Measurement condition**

UV/Vis bandwidth: 5.0 nm
NIR bandwidth: 20.0 nm
Scan speed: 1000 nm/min
Response: 0.24 sec
Data interval: 1 nm



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**Color Analysis result**

The analysis program and results are illustrated in Figure 5 and as Table 1. As in Figure 5, the [Solar Transmittance/Reflectance Calculation] Program is suitable to evaluate a solar reflective paint material and provide a quality control functionality for solar reflective paints.

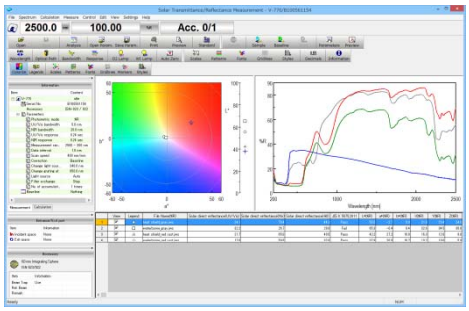

Fig. 5 [Solar Transmittance/Reflectance Calculation] Program

Table 1 Analysis result based on JIS K 5602 and JIS K 5675

| Sample | Solar reflectance (UV/Vis) | Solar reflectance (NIR) | Solar reflectance (UV/Vis/NIR) | L* | JIS K 5675 Matching |
|---|---|---|---|---|---|
| Gray: solar reflective | 24.1 | 70.4 | 44.3 | 55.5 | Pass |
| Gray: water paint | 32.2 | 26.7 | 29.8 | 65.3 | Fail |
| Red: solar reflective | 21.7 | 65.0 | 40.5 | 42.2 | Pass |
| Red: water paint | 17.6 | 50.6 | 32.0 | 37.9 | Pass |

**Color calculation condition**

Color system: L*a*b*
Light source: D65 (CIE 15:2004 / JIS Z 8781-1:2012 / ISO 11664-2:2007)
Color matching function: CIE 15:2004 / JIS Z 8701:1982
View Angle: 10º
Data interval: 5 nm



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