

# An Experimental Study on the Thermal Conductivity Change of Building Insulation Materials with Long-Time Elapse

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The quality of building insulation materials has a direct relation to the heating and air-conditioning energy consumption of the building. Various countries in the world, including Korea, are strengthening the required performance and the standards of a thermal insulation of a building as a basic measure of economizing the energy consumption of a building. In this research, the test room that is affected in accordance with the real external environmental factors (weather, solar radiation, temperature, humidity, etc.) has been designed while an architectural thermal insulation is applied to an actual structure and the changing characteristics of the long-term thermal conductivity from time elapse of over 1,000 days have been measure. The object of the test included architectural thermal insulators generally used in Korea, such as expanded polystyrene (EPS) and extruded expanded polystyrene (XPS), which are close-cell plastics, hardened urethane foam, glass wool, and rock wool.

The result of the research showed, the change in the thermal conductivity is within 1% for the type of expanded polystyrene, glass wool, rock wool and polyester, thus showed the same function maintained as the initial stage. As for the extruded expanded polystyrene, the thermal conductivity in the beginning of the production seemed to decrease as low as 20~35% in accordance with the characteristics of expanded CFC substance. And, the hardened urethane showed a decrease of about 20% in the thermal conductivity. The result showed that changes occurred continuously in the thermal conductivity in accordance with the types of the thermal insulation even at the time when 1,000 days have passed.

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