Confirmation for heat resistance superiority.

Test conducted by KUMTT:

Testing of Thermal Performance of Polynum™ Insulation Air Bubble Sided Pure Aluminum Foil

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Important note: The results mentioned in this report are valid for the test samples

I. BSRC experimental set-up description

BSRC experimental set-up (Figure 1) is an open-ended rectangular channel that is aimed to simulate roof house. The tilt angle of the channel was fixed at 30°. The air gap space between heated plate and roof panel is 3 cm. The channel dimensions are 150×70×20 cm.

II. Experimental methodology

The BSRC experimental apparatus included various measuring sensors: Thermocouples type T connected to a data logger that sent signal to computer (Desktop-PC) to record the temperatures at different points. Heat flux sensors installed at the center of the roof panel and insulation materials (see figure 2). Data logger for measuring temperature in the range 0-200°C at ± 0.01% accuracy.

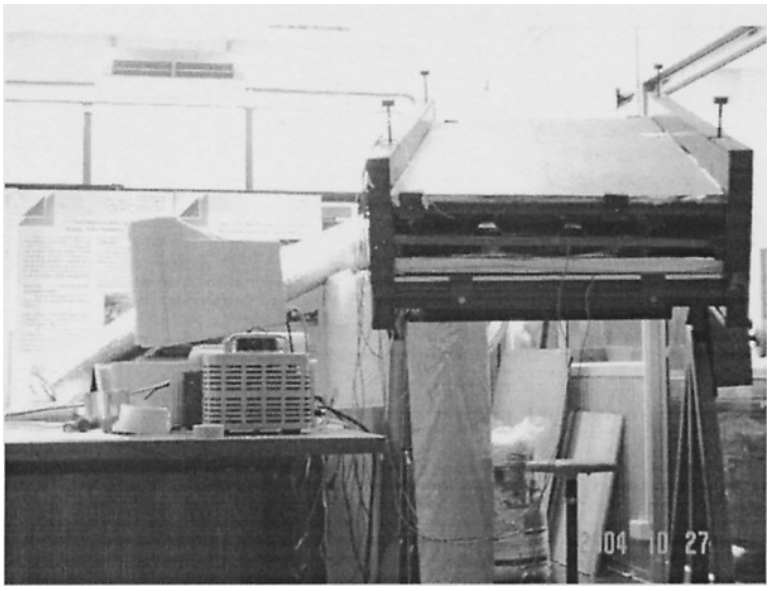


Figure 1 BSRC experimental set-up

The objective of the tests was to heat the upper plate at a constant power supply of 500We (the corresponding heat intensity is, therefore, 500 W/m^2), and to measure heat flux passing through the insulation material of Polynum™ Insulation (manufactured by Polyon Barkai Industries (1993) Ltd., and distributed by L'aquatech Group Co. Ltd), and to conduct a comparative analysis with reference to common materials in the market.

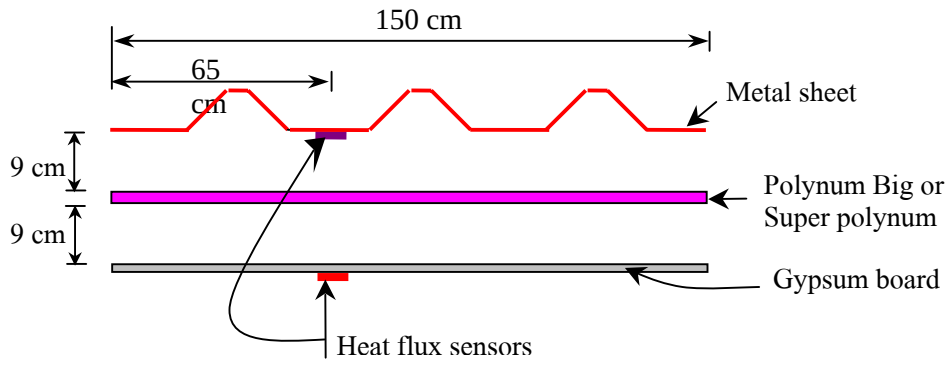


Figure 2 (a) Measuring positions of heat flux sensors (Polynum™ Big and\or Super Polynum™)

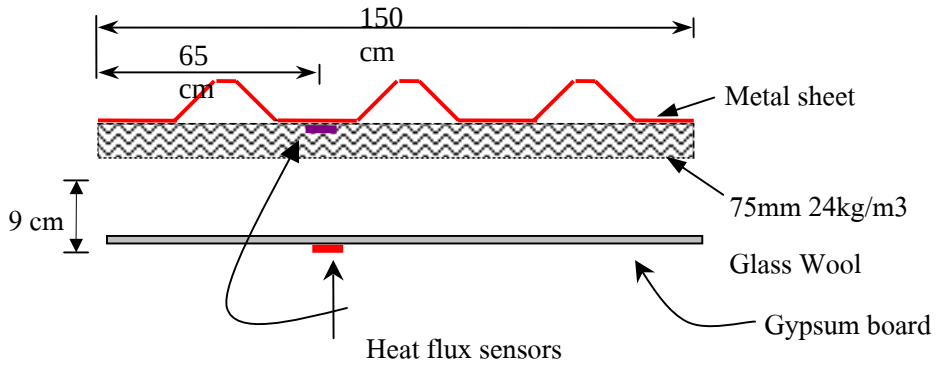


Figure 2 (b) Measuring positions of heat flux sensors (Glass Wool test)

Figure 3 Data logger and thermocouple wires

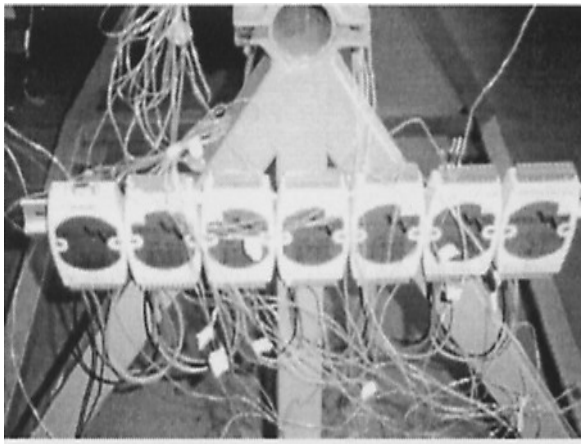
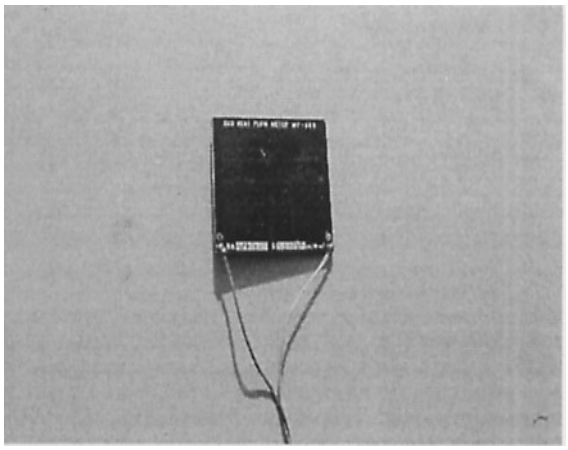


Figure 4 Heat flux sensor (model MF-140)



III. Materials tested

The materials tested are:

- Glass Wool (Fiber Glass) of thickness = 3” at 24kg/m3
- Polynum™ Big (thickness = 9 mm)
- Super Polynum™ (thickness = 4.5 mm)

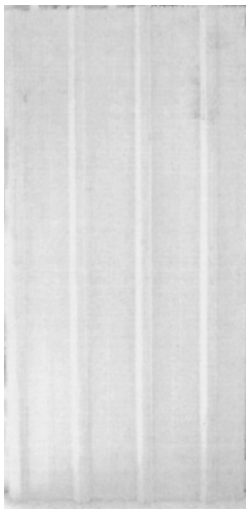


Figure 5 Metal sheet roof panels

(a) Glass Wool with foil face up and PVC sheet facing down

(b) Polynum™ Big

(c) Super Polynum™

Figure 6 Materials tested

IV. Experimental results

Presented in this report is heat flux reduction analysis through the insulations. Table 1 here shows the measured heat fluxes and calculated percentage heat flux reduction at four times, 1-hour period each from the beginning of testing.

Table 1 Data analysis at four hours (from the beginning of test)

Measured Heat Flux, HF1 W/m^2			Measured Heat flux, HF2 (Insulation material) W/m^2	% Heat Flux reduction HF2 (Lower plate)
Total average	**Local**	**Material**		**Ref. HF1**
21.23	10.10	Polynum™ Big	1.8	82.17
	10.10	Super Polynum™	2.32	77.03
	37.03	Glass Wool (Fiberglass)	8.9	75.96
36.63	29.88	Polynum™ Big	6.1	79.58
	28.5	Super Polynum™	6.7	76.5
	48.15	Glass Wool (Fiberglass)	12.6	73.83
40.88	34.51	Polynum™ Big	8	76.82
	33.4	Super Polynum™	8.5	74.55
	51.63	Glass Wool (Fiberglass)	21.8	57.77
42.35	36	Polynum™ Big	8.4	76.7
	35.35	Super Polynum™	9.2	73.97
	53.27	Glass Wool (Fiberglass)	22.2	58.32

Average % HF2 reduction	Polynum™ Big	Super Polynum™	Glass Wool (Fiberglass)
Ref. HF1	78.82	75.51	66.47

Test condition using BSRC heat gain reduction test unit

Power supply (electrical) = 500 We

V. Conclusion

This report presented the heat flux reduction of four insulation materials, namely Large-Polynum Big (9 mm), Super Polynum (4.5 mm), and Glass Wool (75mm, 24kg/m3) compared to a reference roof panel (metal sheet roof) using BSRC laboratory experimental unit (inclined rectangular channel with natural ventilation). The power supply was maintained constant at 500 We and the inclination angle was fixed at 30°.

Heat flux reduction varied with the type of the insulation used. Compared to the reference roof panel and under the tested configurations, the results are as follows:

Average:

- Average heat flux reduction with Polynum™ Big (9 mm) is about 78%.
- Average heat flux reduction with Super Polynum™ is about 75%.
- Average heat flux reduction with Glass Wool is about 66%.

High temperature conditions:

- Heat flux reduction with Polynum™ Big (9 mm) is about 76%.
- Heat flux reduction with Super Polynum™ is about 74%.
- Heat flux reduction with Glass Wool is about 57%.

Report Completed on 06/01/2005

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Important note: The results mentioned in this report are valid for the test samples