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Attention: George Blore

**RE: Cupolex Floor System Thermal Analysis**

Dear George,

We have carried out a thermal review of the 260mm height Cupolex system with 60mm thick concrete topping.

The resulting R-Values have been computed using the normative guidance of NZS 4218:2006 and ISO 6946:2007.

The following tables illustrate a summary of those calculations, with notes as follow:

1. Wall thickness used in calculations, 100mm
2. Width of floor for foundation beam % computations 10m
3. Internal concrete ribs 320mm deep 300mm wide at 3660mm maximum centres used for Cupolex floors.
4. 320mm deep 300mm wide perimeter beam for both Cupolex and standard 100mm slab floor
5. Conductivity of concrete 1.6W/m.K from NZS4218:2006
6. Emissivity of surfaces in standard Cupolex system  $E = 0.9$  each
7. Radiant heat transfer coefficient  $H_{ro}$  at mean temperature of 15°C with 5°C temperature difference

320 Cupolex system, 100mm wall

Floor Area Ratio Perimeter	NZS4218:2006 Table E6 Ground under slab R-Value	Perimeter Ribs % of floor	Internal Ribs % of floor	Ribs R-Value	Cupolex % of Floor	Domes c/w 60mm topping R-Value	Room air R-Value	System R Value
3.0	1.54	9.76%	11.04%	0.2	79.20%	0.26	0.09	1.88
3.5	1.74	8.42%	12.63%	0.2	78.96%	0.26	0.09	2.08
4.0	1.94	7.41%	12.51%	0.2	80.08%	0.26	0.09	2.28

The extra thermal mass present in the Cupolex system, coupled with the increased resistance to heat flow in comparison to a 100mm thick slab on grade, could be used to good thermal advantage with passive solar building designs.

The following tables illustrate summary calculations, as above with a wall thickness of 200mm simulating a brick veneered framed wall detail.

320 Cupolex system, 200mm wall

Floor Area Ratio Perimeter	NZS4218:2006 Table E6 Ground under slab R-Value	Perimeter Ribs % of floor	Internal Ribs % of floor	Ribs R-Value	Cupolex % of Floor	Domes c/w 60mm topping R-Value	Room air R-Value	System R Value
3.0	1.78	9.76%	11.04%	0.2	79.20%	0.26	0.09	2.12
3.5	2.01	8.42%	12.63%	0.2	78.96%	0.26	0.09	2.35
4.0	2.23	7.41%	12.51%	0.2	80.08%	0.26	0.09	2.57

Yours faithfully,



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