
Arranging Insulation for Better Thermal Resistance in Concrete and Masonry Wall Systems



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29 May 2011



Three Walls



pre-cast panels

\$\$\$



cast in place

\$\$\$



concrete block

\$



1 billion/yr

80 million m²

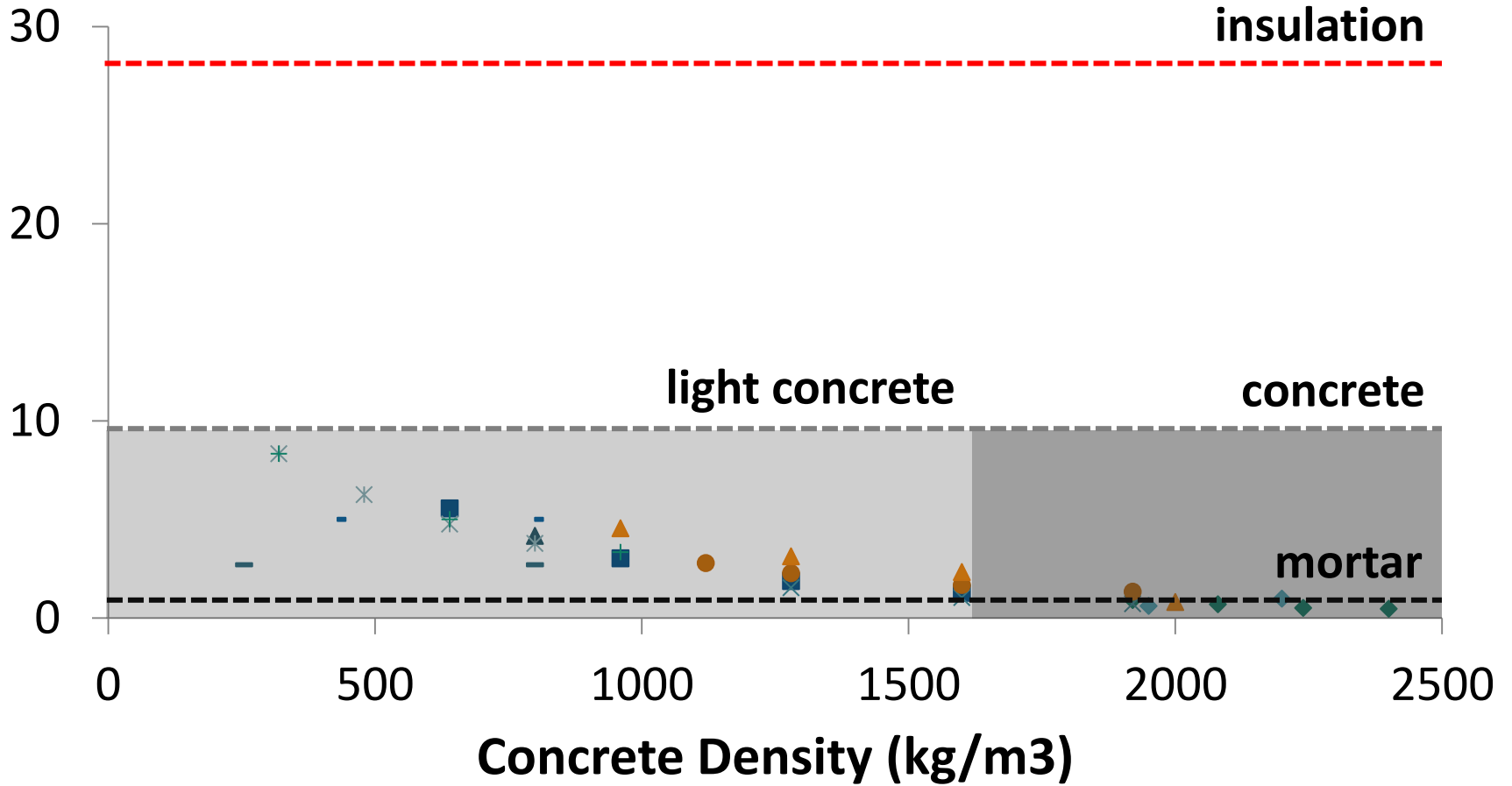
1 of these...

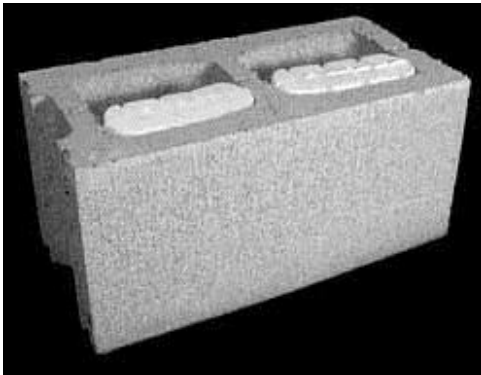


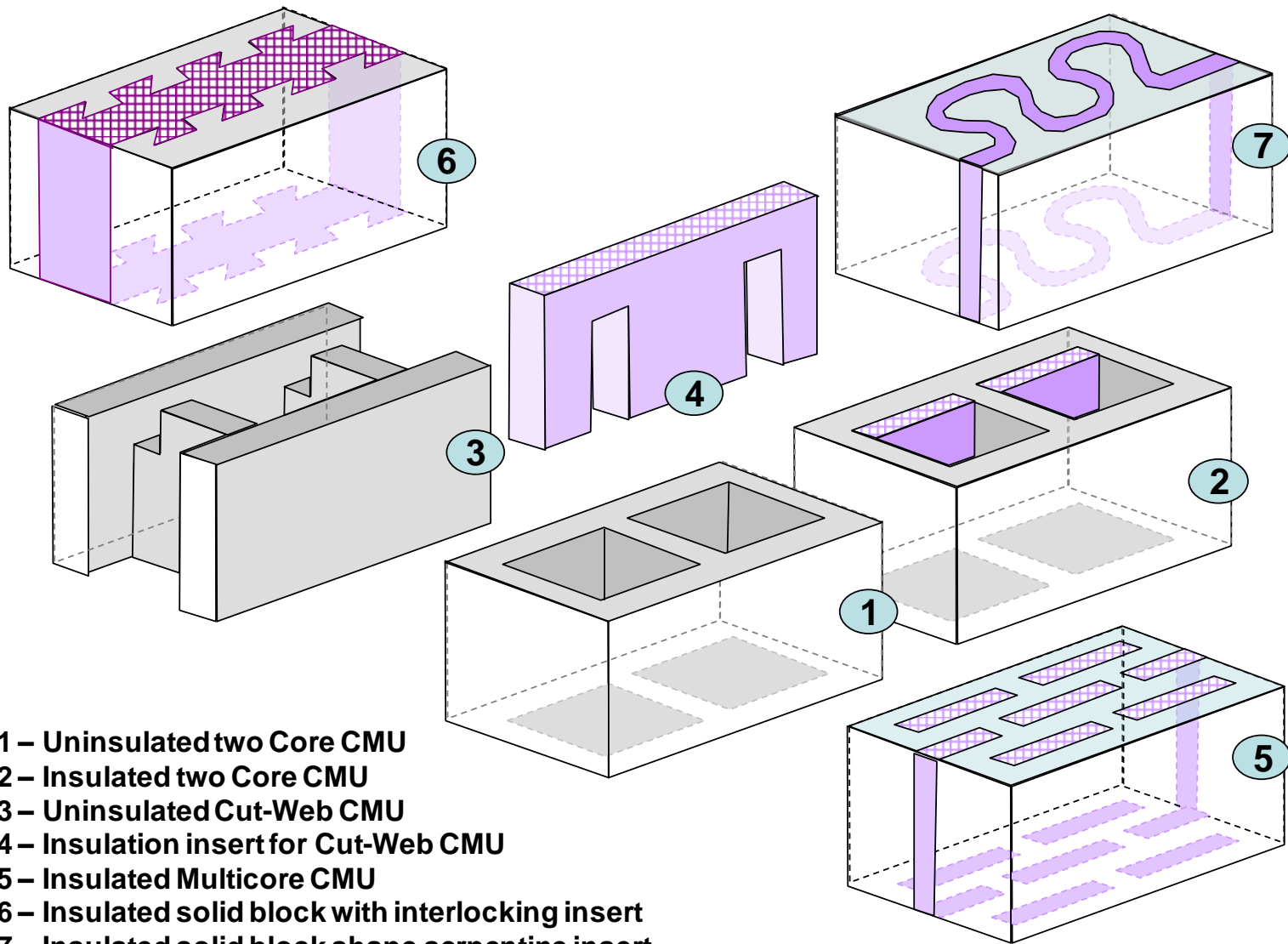
Sources of Thermal Bridging



Thermal Resistivity ($m \cdot K/W$)







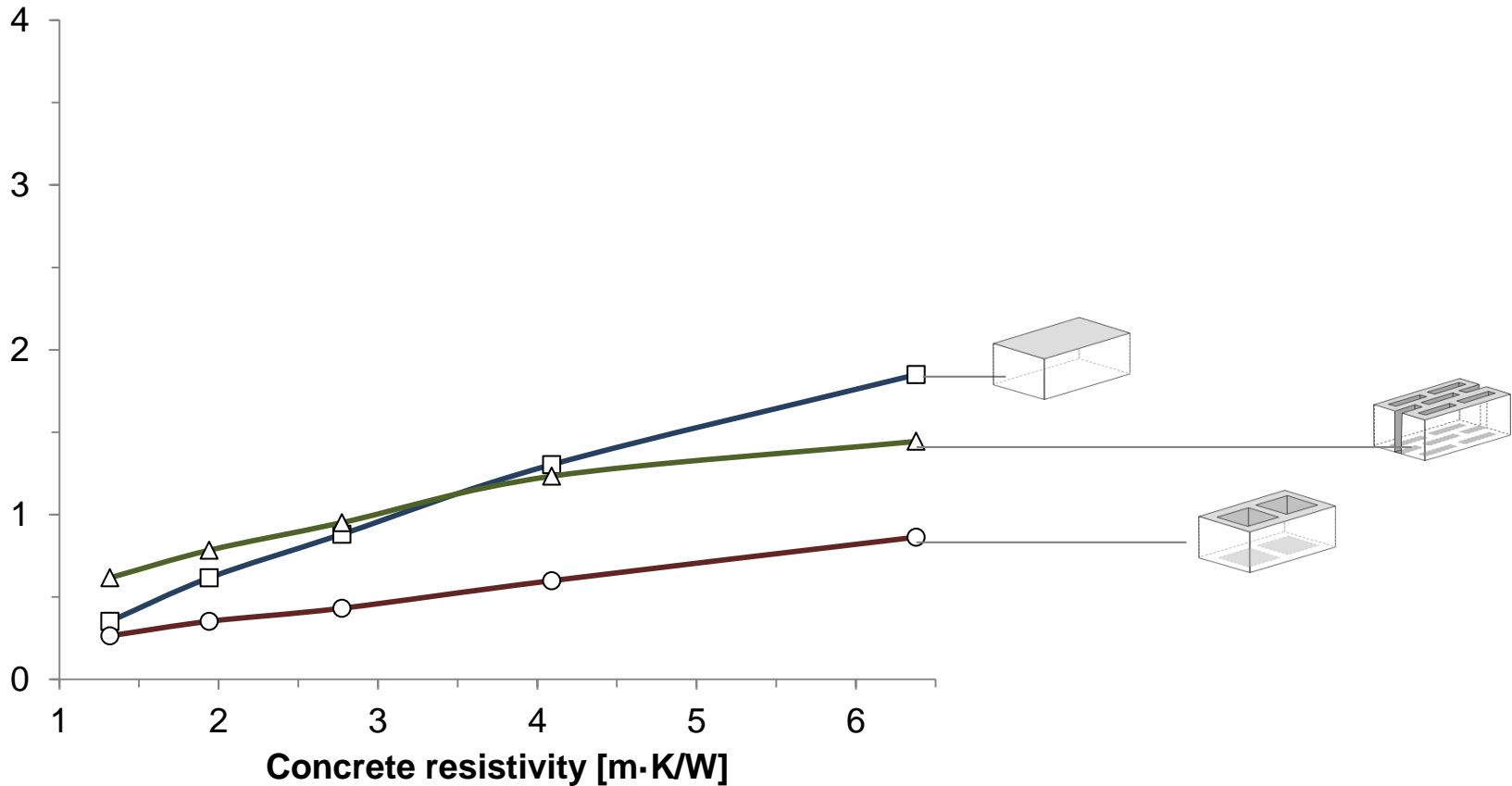
- 1 – Uninsulated two Core CMU
- 2 – Insulated two Core CMU
- 3 – Uninsulated Cut-Web CMU
- 4 – Insulation insert for Cut-Web CMU
- 5 – Insulated Multicore CMU
- 6 – Insulated solid block with interlocking insert
- 7 – Insulated solid block shape serpentine insert

Point #1:

How much does insulation improve R-Value?

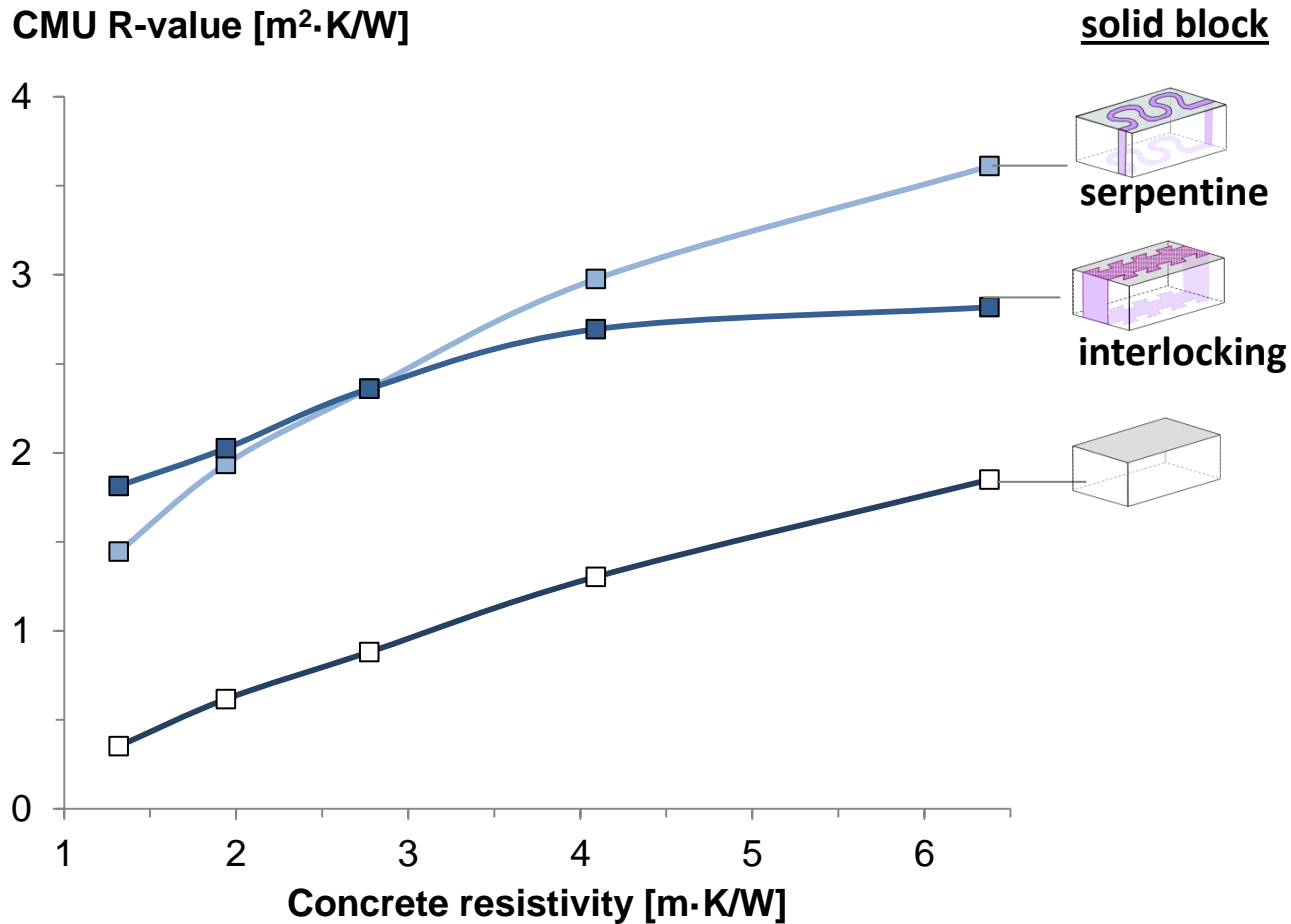
CMU R-value [$m^2 \cdot K/W$]

solid block two-core multicore



Point #1:

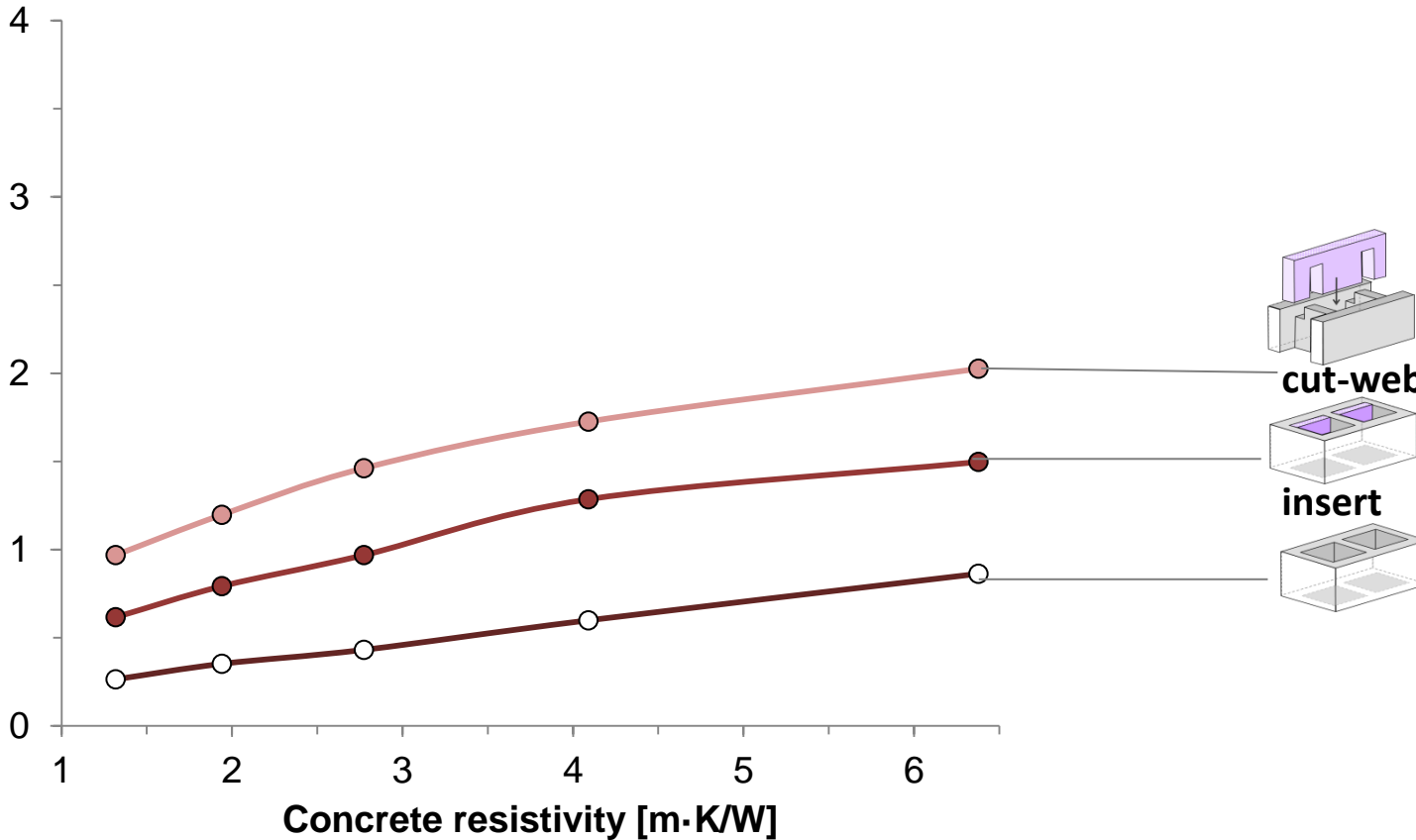
How much does insulation improve R-Value?



Point #1: How much does insulation improve R-Value?

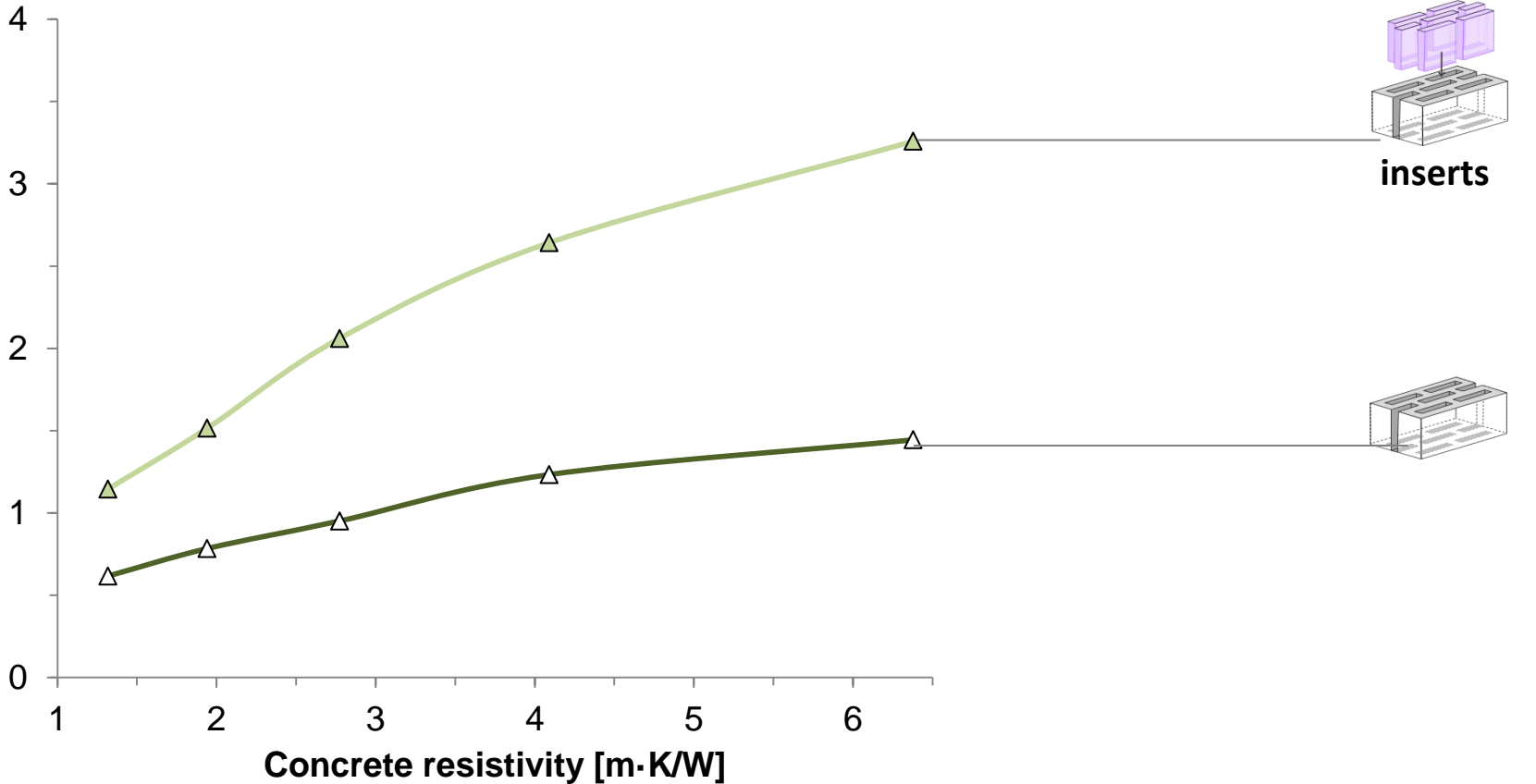
CMU R-value [$\text{m}^2\cdot\text{K}/\text{W}$]

two-core

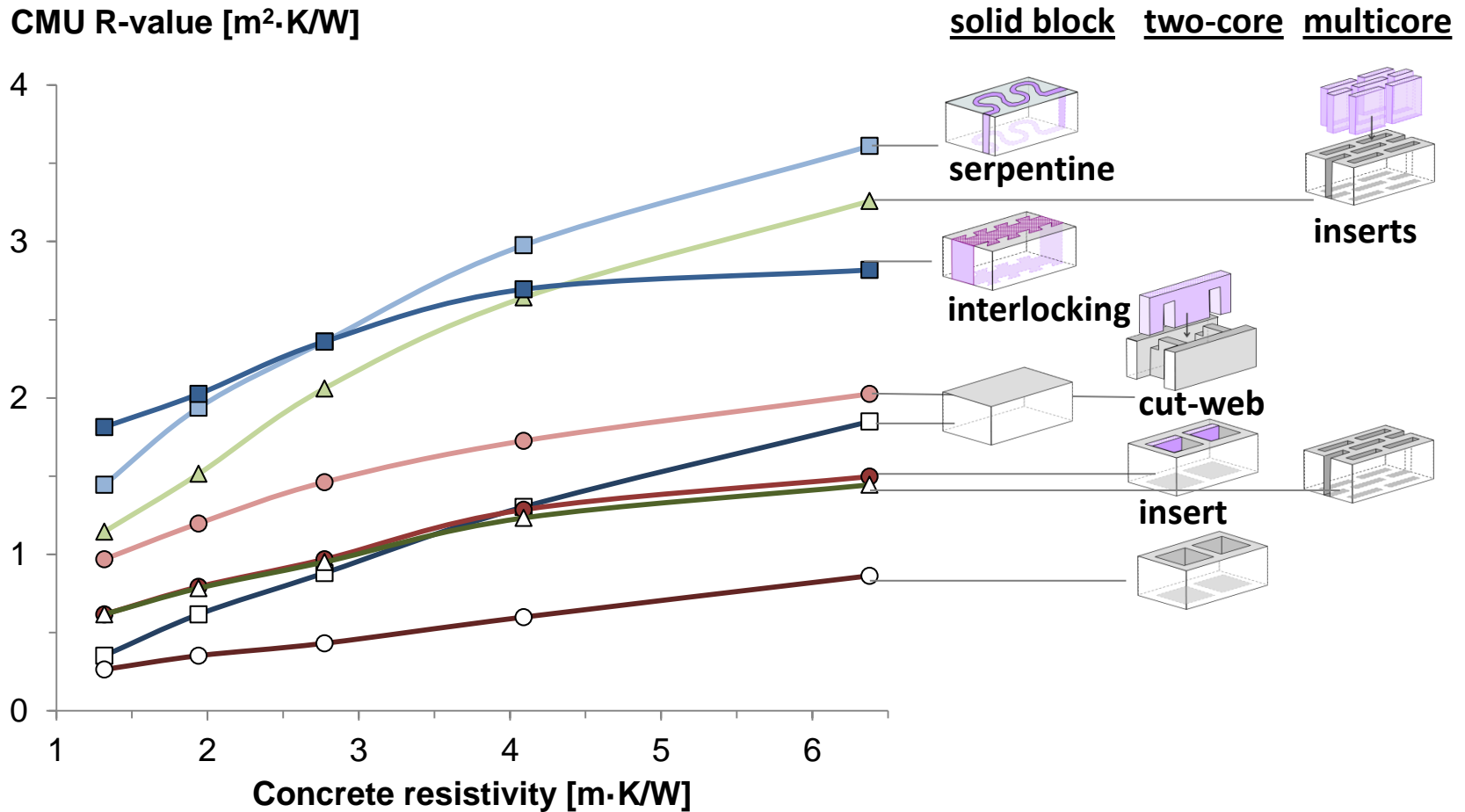


Point #1: How much does insulation improve R-Value?

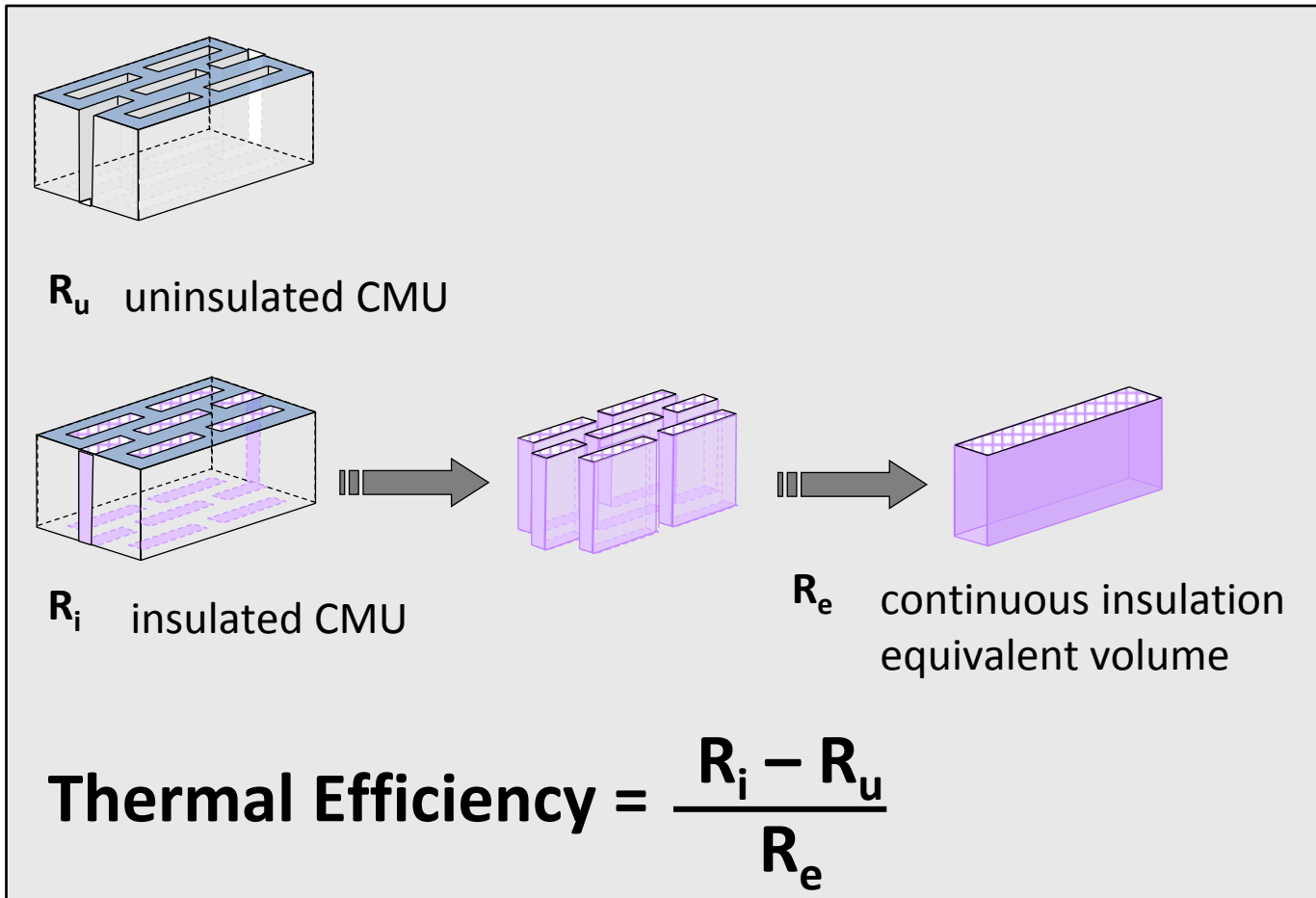
CMU R-value [$\text{m}^2\cdot\text{K}/\text{W}$]



Point #1: How much does insulation improve R-Value?

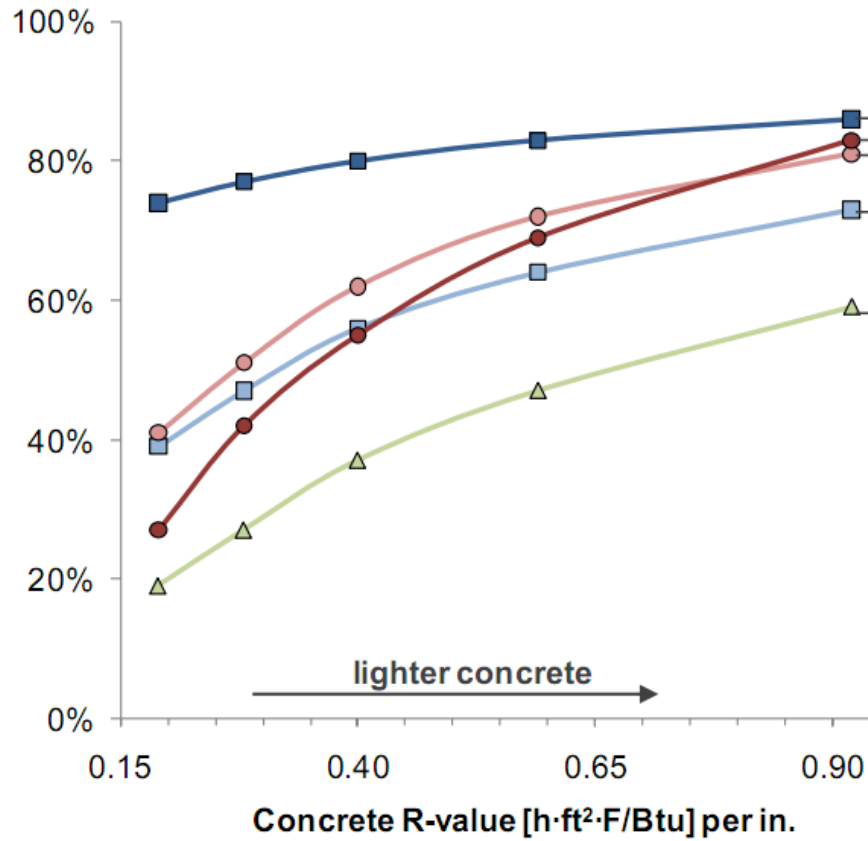


Point #2: How effective is the insulation?



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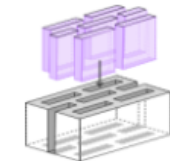
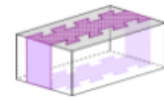
Thermal efficiency of insulation



solid block

two-core

multicore

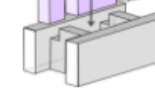
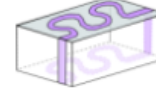


interlocking

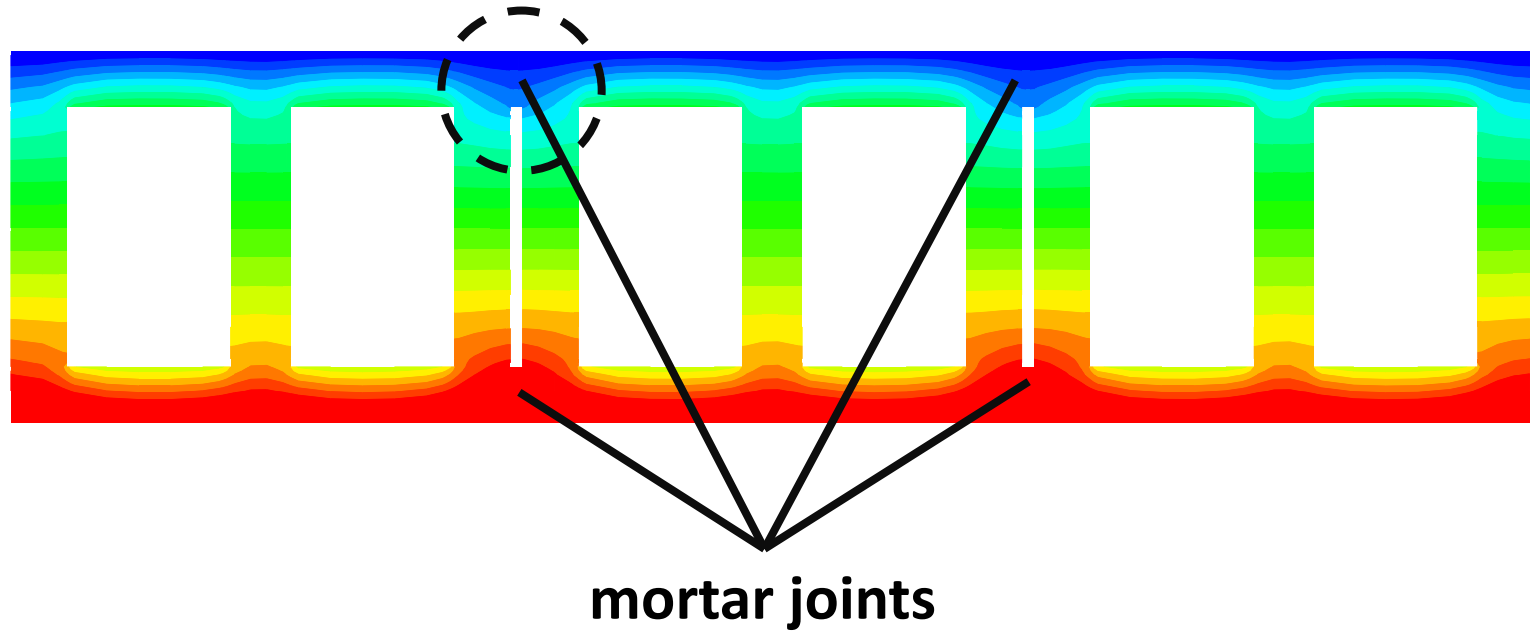
insulated cut-web

insulated

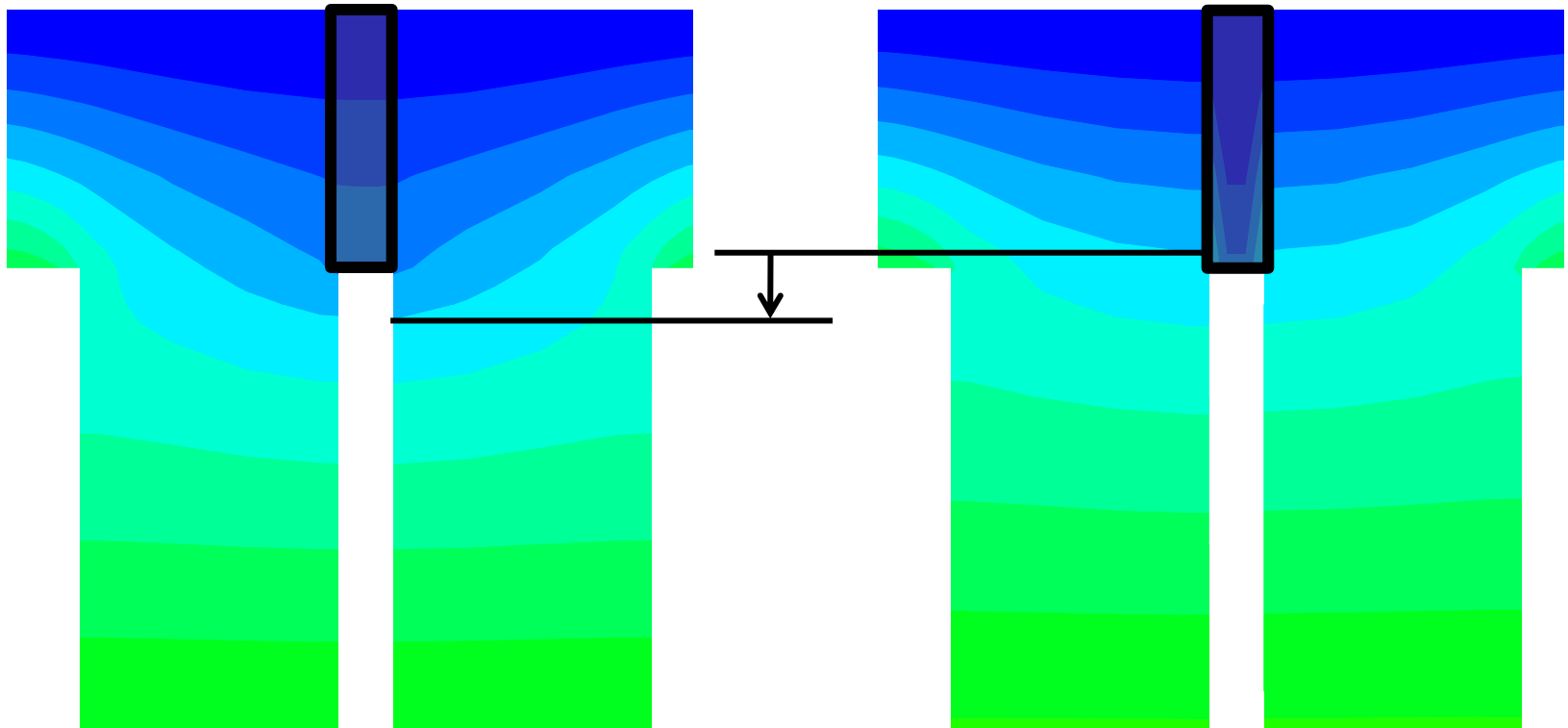
serpentine



Point #3: How does mortar affect R-value?



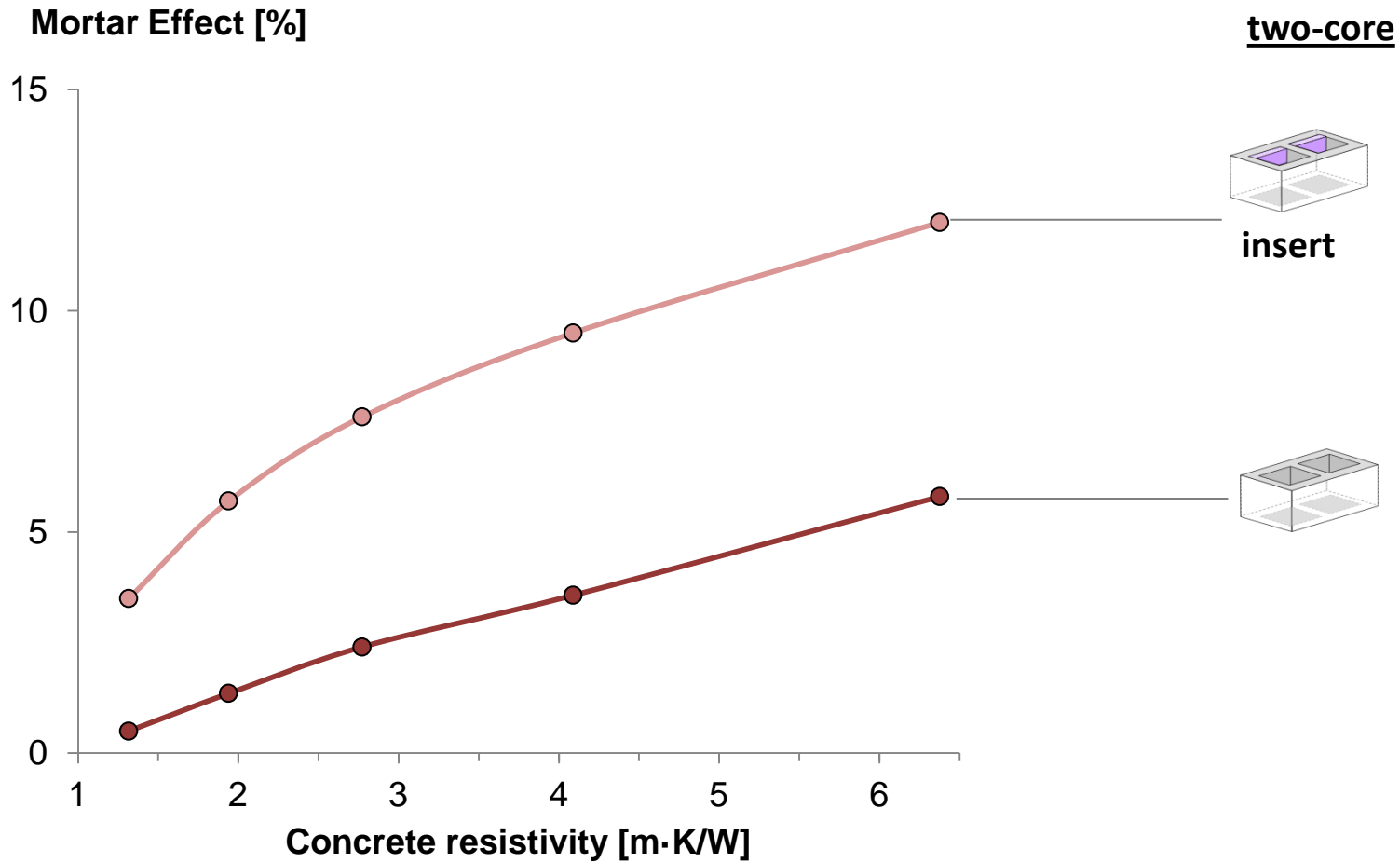
Lightweight Concrete



Mortar Joint

Insulated Joint

Point #1: How does mortar affect R-value?



Conclusions

- Insulation Potential
 - **R-3.5 is possible**
- Insulation Effectiveness
 - **80% is possible**
- Mortar Effect
 - **12% reduction possible**
- In All Cases:
 - concrete weight matters
 - configuration matters



Thank You!

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