



1.0 Hour, HSW

Thermal Performance of Steel Stud Framing & Masonry Veneer

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Learning Objectives

For steel stud/foam sheathing/brick veneer,

1. Understand thermal performance terms and definitions related to steel stud insulation.
2. Understand ASHRAE 90.1 requirements for continuous insulation, "ci".
3. Understand proper technique for estimating effective R or U.
4. Understand contribution of "ci" to improved thermal performance.

Steel Stud Back-Up for Brick Veneer

- Steel stud back-up is common in commercial construction.
 - Brick, aesthetics/durability
 - Steel, economy
- Steel stud framing offers many advantages.
 - Lower cost
 - Non-combustible
 - Smaller footprint
 - Lighter weight



Steel Stud Back-Up for Brick Veneer

However.....

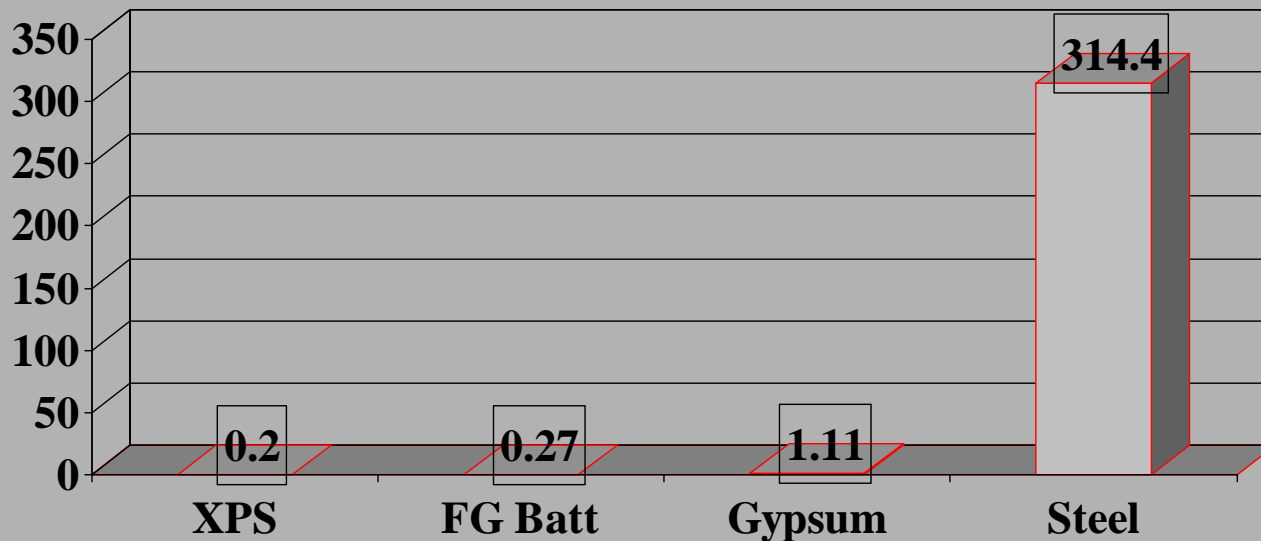
Steel stud/brick veneer wall systems must be thoughtfully detailed.



Thermal Performance

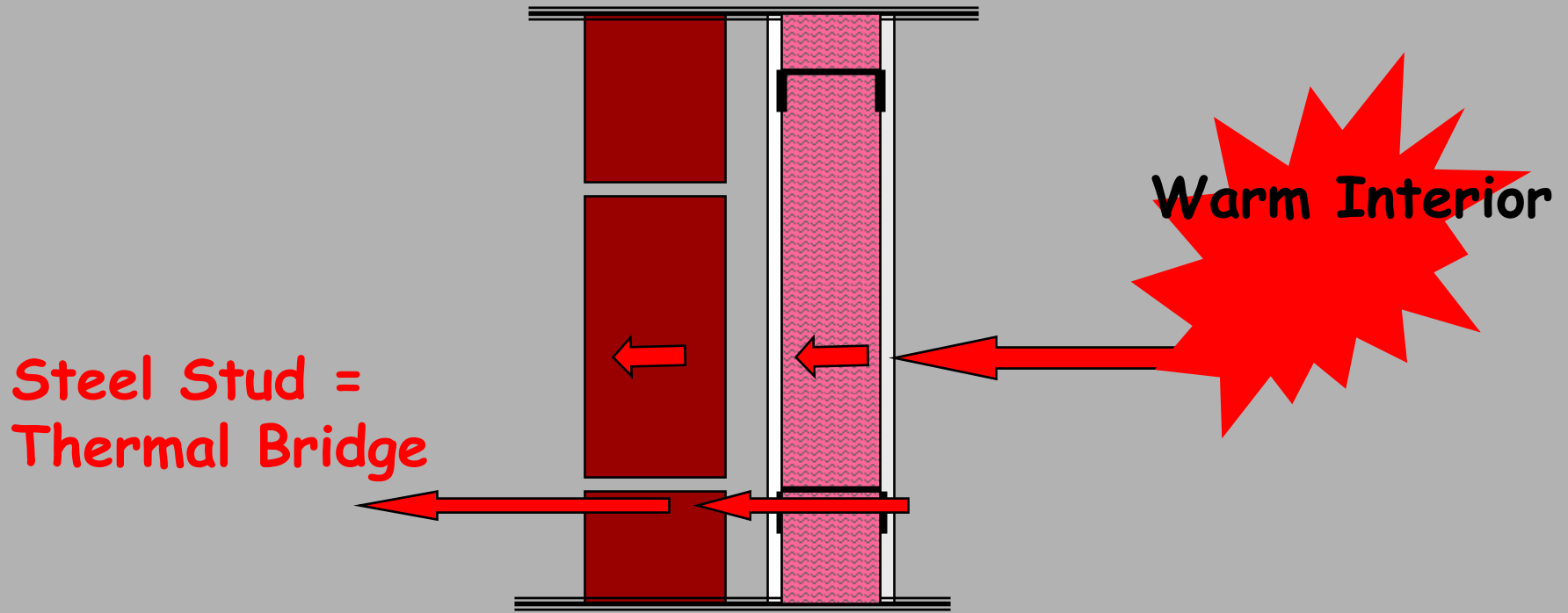
Steel stud framing is highly conductive compared to other materials, and has a dramatic effect on thermal performance of the wall assembly.

Conductivity: Btu x in. / hr x ft² x °F



Thermal Bridging

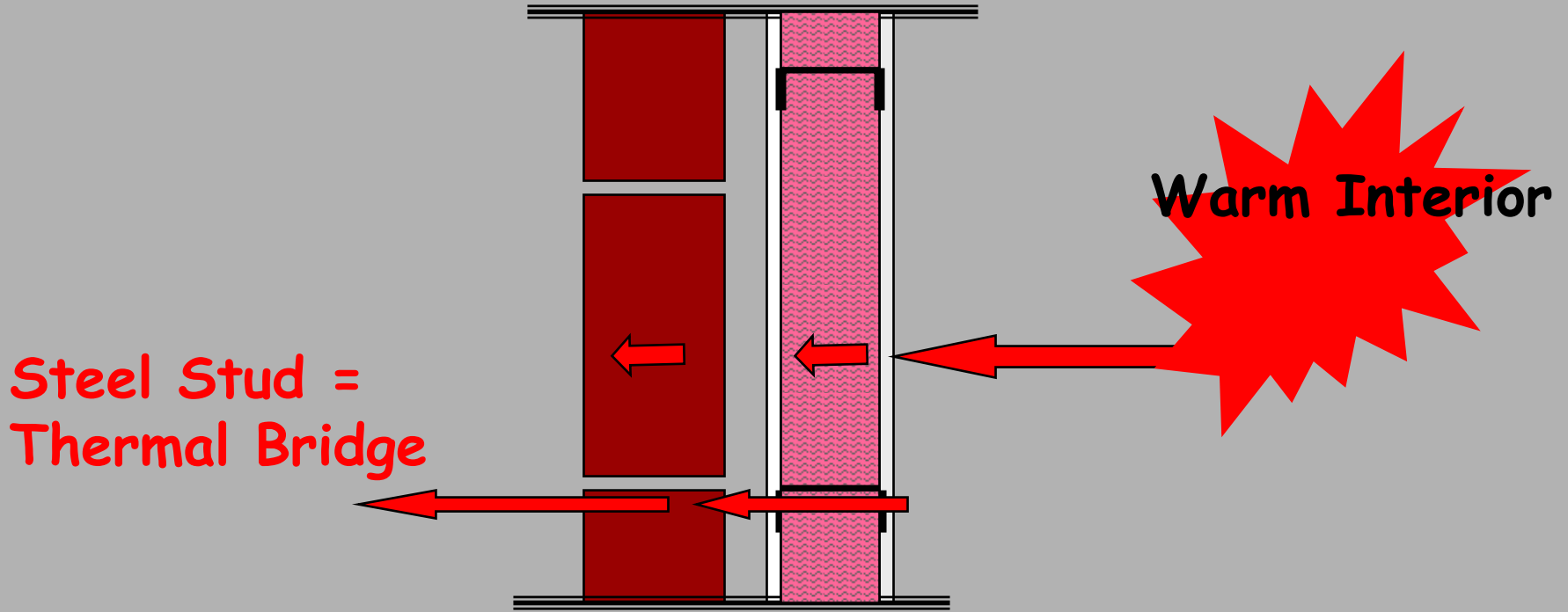
Thermal bridges create a highly conductive parallel path through the insulation layer.



Wall Plan Section

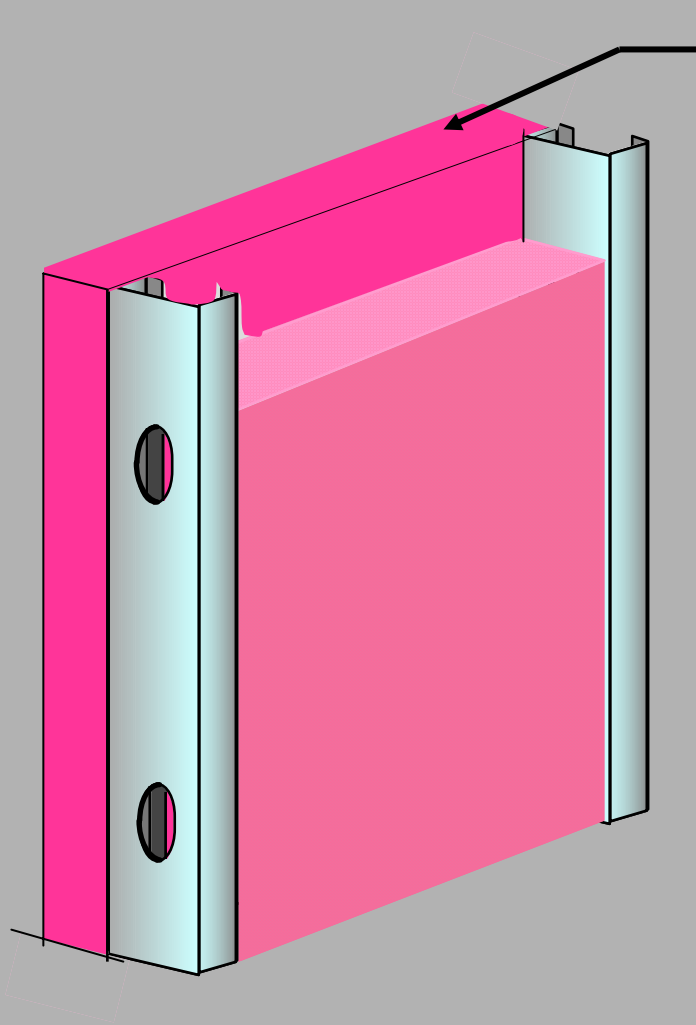
Thermal Bridging

How is it addressed?



Wall Plan Section

Continuous Insulation or “ci”

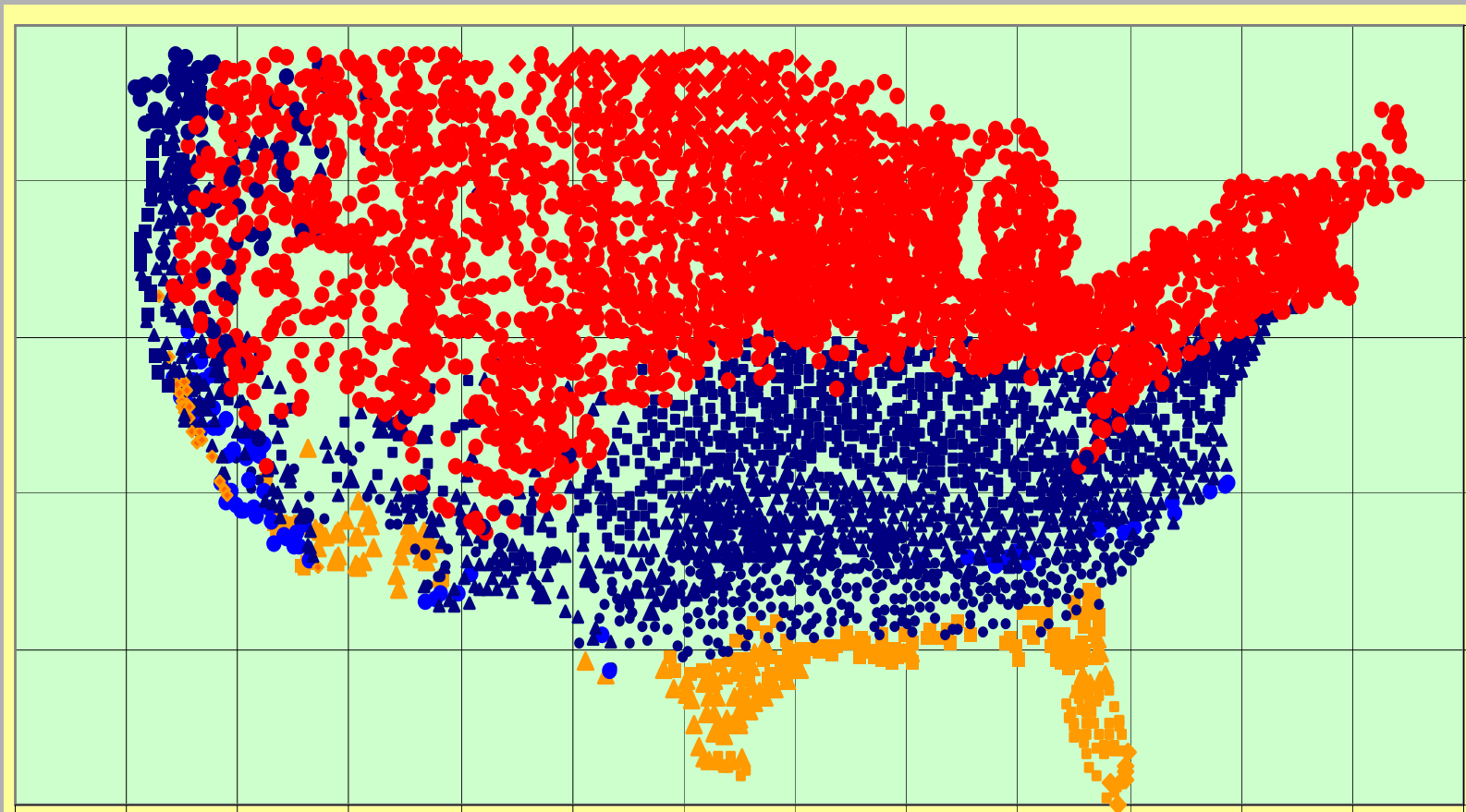


“ci”

Continuous Insulation

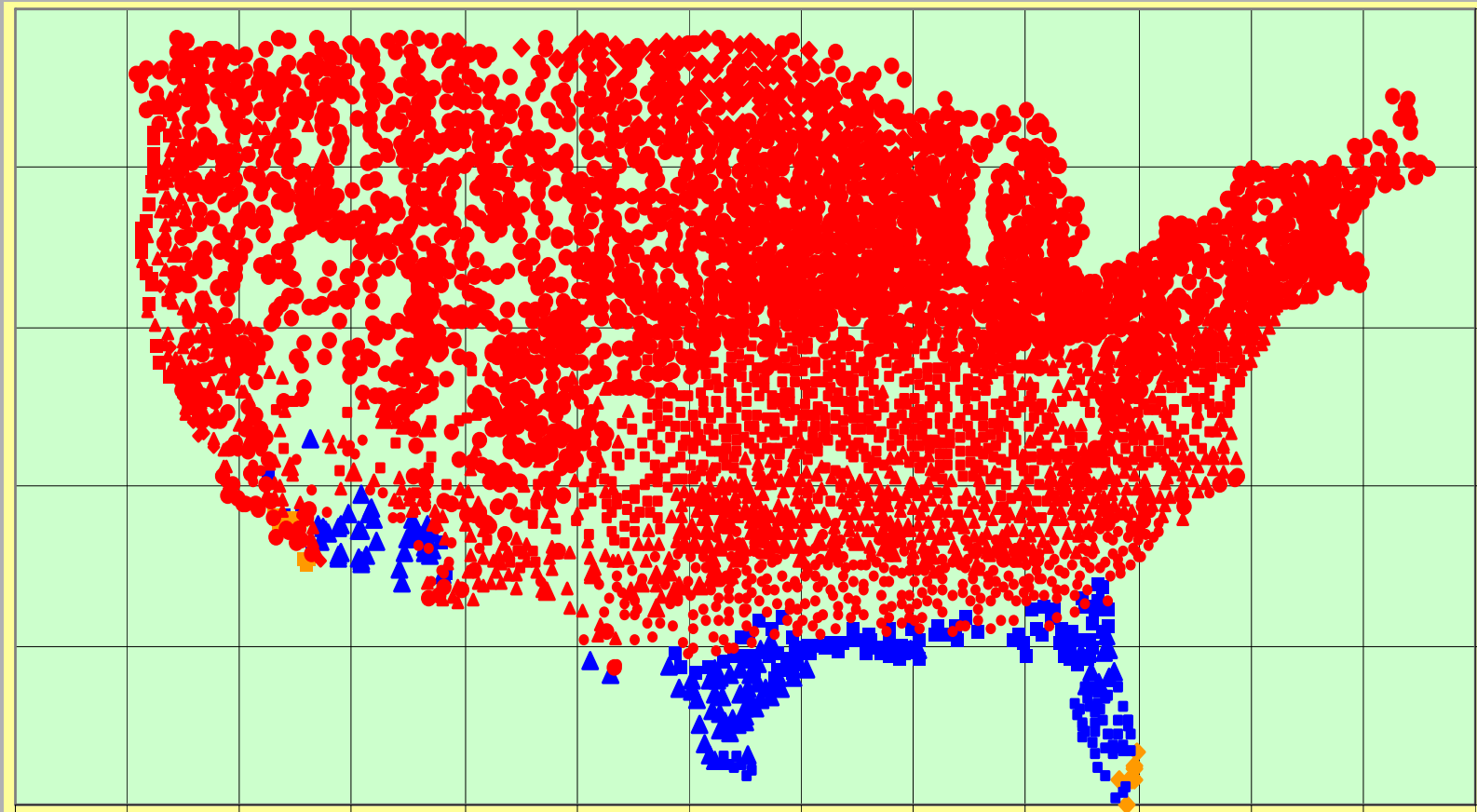
ASHRAE 90.1-2004, “ci” Prescribed in Commercial Steel Stud Construction

All Require Multi-Family >3 Stories Requires Not Required



ASHRAE 90.1-2007, “ci” Prescribed in Commercial Steel Stud Construction

All Require Multi-Family > 3 Stories Requires Not Required

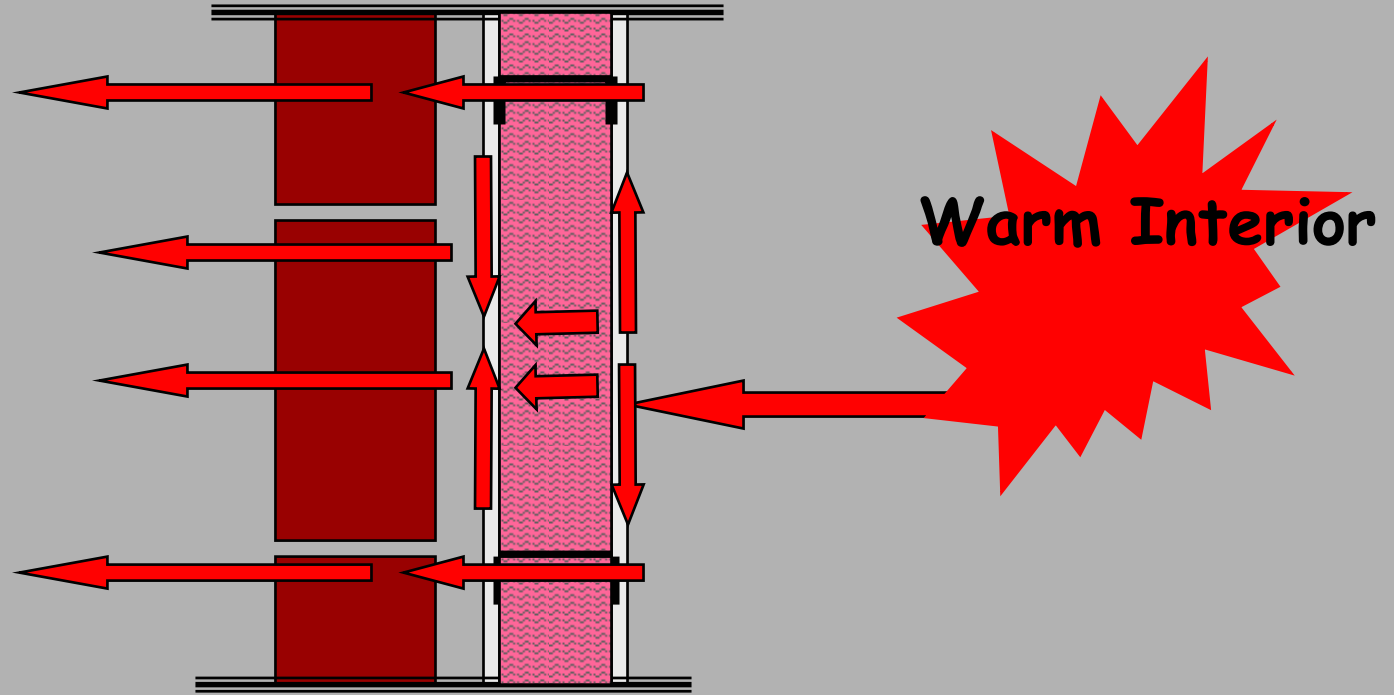


ASHRAE 90.1-2007, Insulation Prescribed by Climate Zone

Zone	Steel Framing	
	Non-Res	Res
1	13	13
2	13	13+7.5
3	13+3.8	13+7.5
4	13+7.5	13+7.5
5	13+7.5	13+7.5
6	13+7.5	13+7.5
7	13+7.5	13+15.6
8	13+7.5	13+18.8

Non-Insulating Sheathing over Steel Studs

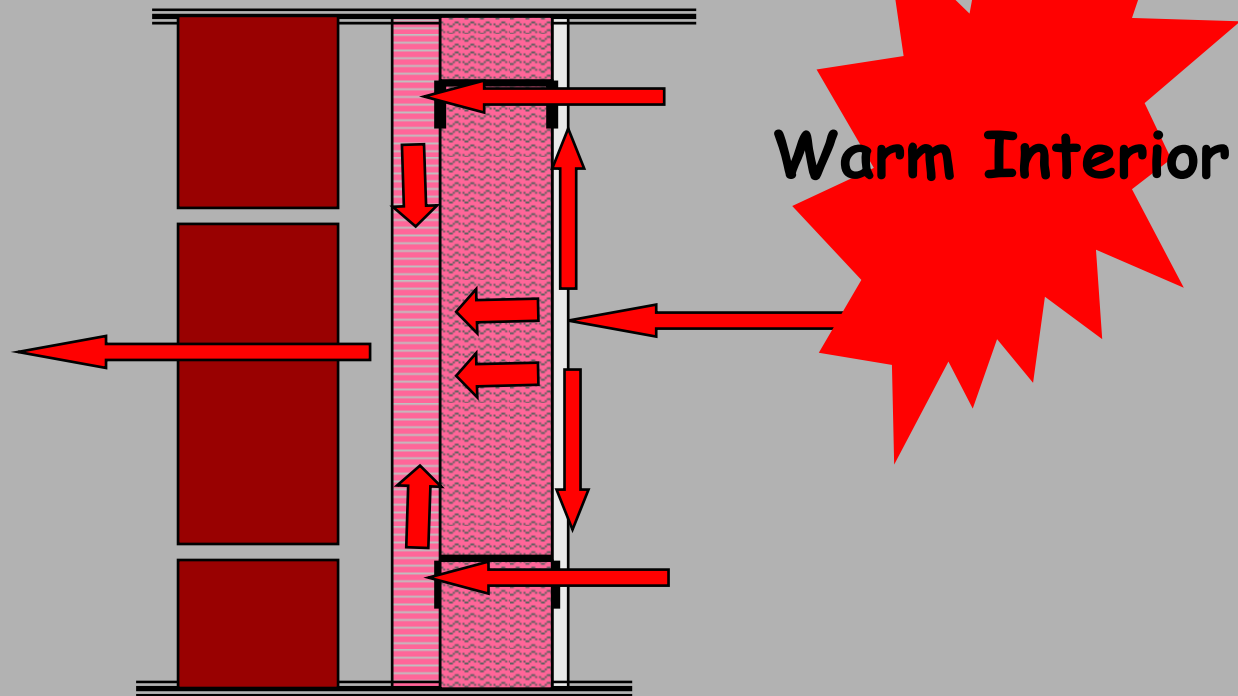
Non-insulating sheathing does little to minimize heat loss because it conducts and radiates heat energy through and along the wall.



Wall Plan Section

Insulating Sheathing over Steel Studs

An insulating sheathing reduces heat loss by minimizing lateral heat energy transfer along the large sheathing surfaces of the wall.



Wall Plan Section

ASHRAE Methods Used to Estimate “Effective U”

“Series” and “Series with Correction Factor” don’t account for transverse heat flow.

- ~~Series~~
- ~~Series with Correction Factor~~
- Modified Zone Method does