FACTS | Foam Plastic Applications for Better Building

Content originally produced for continuousinsulation.org with support from ACC's Foam Sheathing Committee.

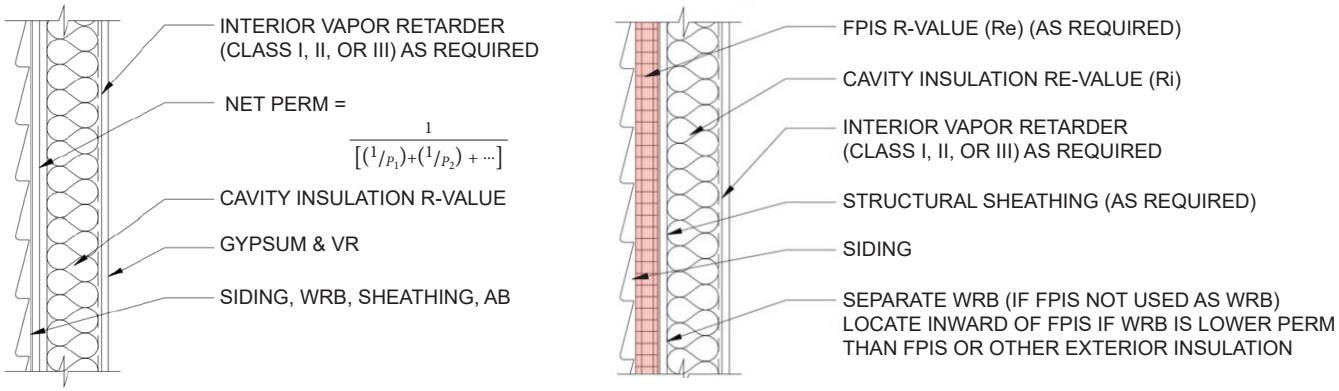
2x4 vs. 2x6 Walls:

Getting the Most Bang for Your Buck with Foam Plastic Insulating Sheathing (FPIS) Continuous Insulation

02.26.21

Is it time to consider returning to a modern version of 2x4 walls?

Uncertainty and lumber price volatility in 2020 triggered a renewed interest in reducing wood framing costs for building walls. One viable solution is 2x4 framing with cavity + continuous insulation instead of 2x6 framing with cavity-only insulation (see Figure 1 and Table 1). When compared to 2x6 framing, traditional 2x4 framing reduces framing wood fiber usage by as much as one-third with potential for similar framing cost savings. While both walls comply with minimum building and energy code requirements, the 2x4 wall constructed with foam plastic insulating sheathing (FPIS) continuous insulation (ci) provides better energy savings and moisture control performance (see Table 2 and Figure 2).



(A) 2x6 R20 Cavity Insulation Wall

(B) 2x4 R13+5ci Cavity + FPIS ci

Figure 1. Wall Construction Options 2x6 vs. 2x4

Table 1. Comparison of 2x6 and 2x4 Wall Construction[1]

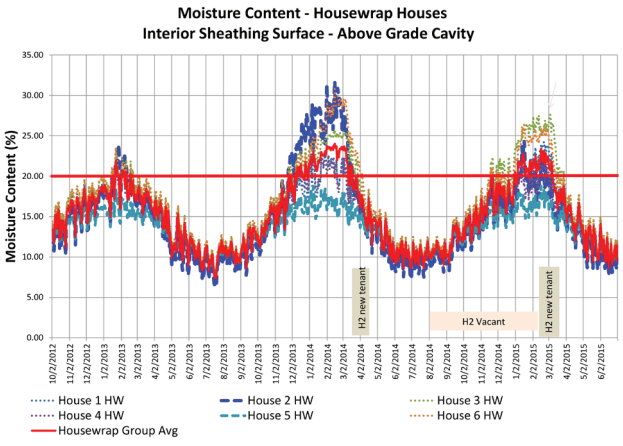
Item for Comparison	2x6	2x4	Result
Framing Cost	$$$	$$	2x4 less costly/less wood (verify local lumber pricing)
Framing Code Compliance			
1 story (16"oc or 24"oc)	YES	YES	Both comply, 2x4 uses less wood
2 story (16"oc)	YES	YES	Both comply, 2x4 uses less wood
Wall Bracing	YES	YES	Both comply, no difference
Wall Headers	YES	YES	Both comply, no difference
Energy Code Compliance[2]			
Climate Zone Applicability	1-5	1-5	Both comply in same climates
R-value	R20	R13+5ci	Both comply
U-factor (max. 0.060)	0.060	0.057	Both comply, but R13+5ci is more efficient (lower U-factor)
Air barrier	Wrap w/tape	FPIS w/tape	Both comply
Water & Vapor Control Code Compliance[2]			
Water-resistive barrier (WRB)	Felt/Wrap/Other	FPIS w/tape	Both comply, FPIS w/tape higher performing (see Table 2)
Vapor Retarder	Varies by climate	Varies by climate	FPIS has better water vapor performance (see Figure 2)

[1] Comparison based on 2012-2018 International Residential Code; local codes will vary.
[2] Use these wall calculators to coordinate and optimize compliance with energy code insulation requirements and building code water and vapor control requirements.

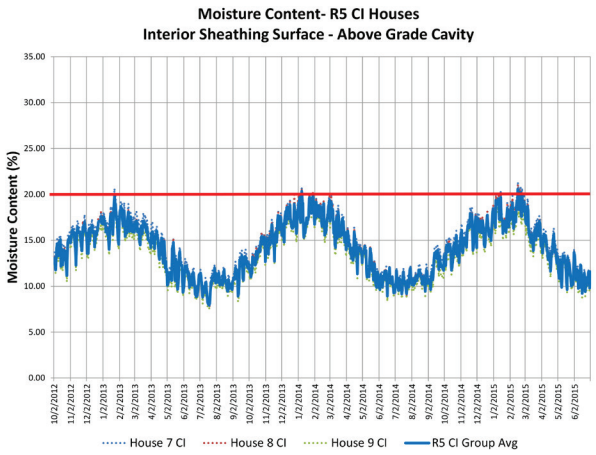
Table 2. Comparison of Water Resistance of FPIS WRB System to Other WRB Materials as Installed

WRB Type	Assembly Water-Resistance Performance (ASTM E331 wind-driven rain test)		Comparison
	Test Pressure	Test Duration	
FPIS WRB systems	6.24 psf	2 hours	FPIS WRB systems meet a higher performance standard than other code-minimum WRB types
Other WRB types (felt, wraps, coatings, etc.)	3.0 psf (if required)	15 minutes (if required)	

Source: ABTG Research Report 1504-03



(A) Walls with R20 cavity insulation only consistently experiencing wet OSB.



(B) Walls with R5 FPIS ci keeping OSB sheathing dry

Figure 2. Comparison of 12 actual walls with and without R5 FPIS ci

For supporting data and technical information, refer to CI's Water Vapor Control web page and ABTG Research Report 1410-03.

1. Both walls comply with minimum energy code and building code requirements, but the wall with R5 FPIS ci provides better moisture control.
2. Adding more FPIS ci relative to cavity insulation improves moisture-control performance in any climate zone and is a move toward the "perfect wall."
3. Refer to these wall calculators to support the good performance and code-compliance of wood frame and steel frame walls.

For more information, visit continuousinsulation.org