

The R-value is the measure of a material's insulating value or resistance to heat flow. The higher the R-value the better the material acts as an insulator. This paper compares R-values between a LOGIX wall versus a framed wall with batt insulation. The comparison demonstrates that, in practice, unless the insulation is constant throughout the wall section the overall R-value of the wall will be less than that provided by the insulation.

In this comparison, a 4" LOGIX wall section is compared against a 6" stud wall with R-19 batt insulation. The wall sections, shown on the following pages, use only the bare components that make up the wall assembly plus drywall and interior air film.

The calculations used to determine the overall R-value of each wall section are based on ASHRAE 1997 Handbook – Fundamentals, which considers the insulating value proportionately contributed from each material component in the wall assembly. The end result is a more realistic R-value - overall thermal resistance.

As shown, LOGIX walls maintain a constant R-value due to the continuity of the wall section. In addition, the thermal mass property of concrete, not included in the calculations, will further increase the R-value of LOGIX. On the other hand, the total R-value of the framed wall is less than that provided by the R-19 batt insulation. The R-value is reduced in the framed wall due to the lack of insulation at the stud sections. For a framed wall to maintain a constant R-value that is equivalent or higher than that provided by the batt insulation, a continuous layer of insulation would be needed. In addition, unless properly sealed, air and moisture can leak through the joints of framed walls further reducing the R-value of the wall.

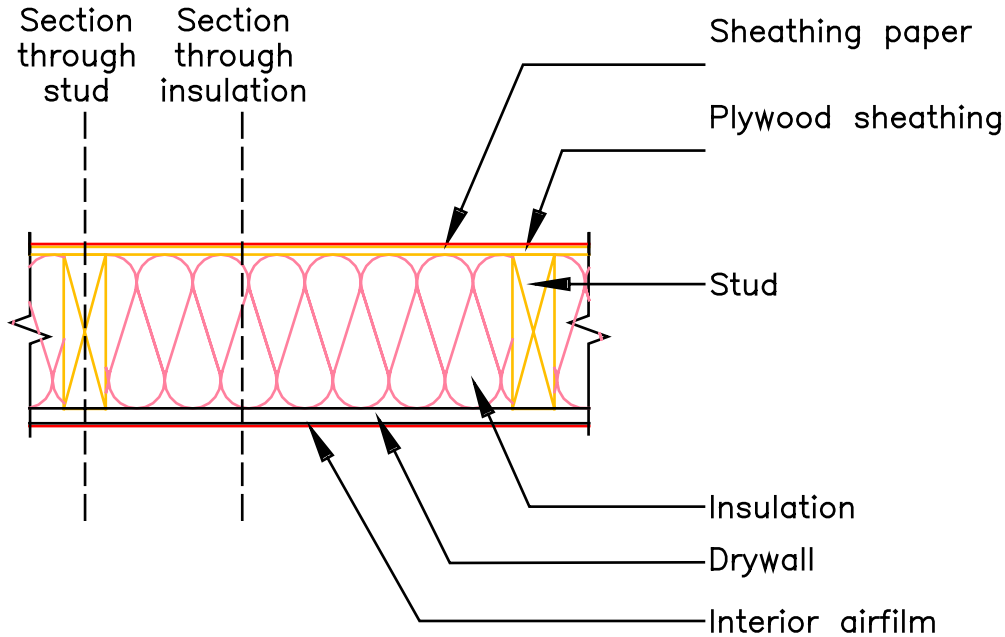
	Overall Thermal Resistance, R-value (RSI*)
4" LOGIX	24 (4.3)
6" Stud wall w/ R-19 batt insulation	16 (2.9)

* Metric units: 1RSI = R5.67.

For more information please contact info@logixicf.com.

Calculation of Thermal Resistance of Building Assemblies – Comparison of Stud Frame Wall to Logix ICF Wall System

6inch Stud Frame Wall:



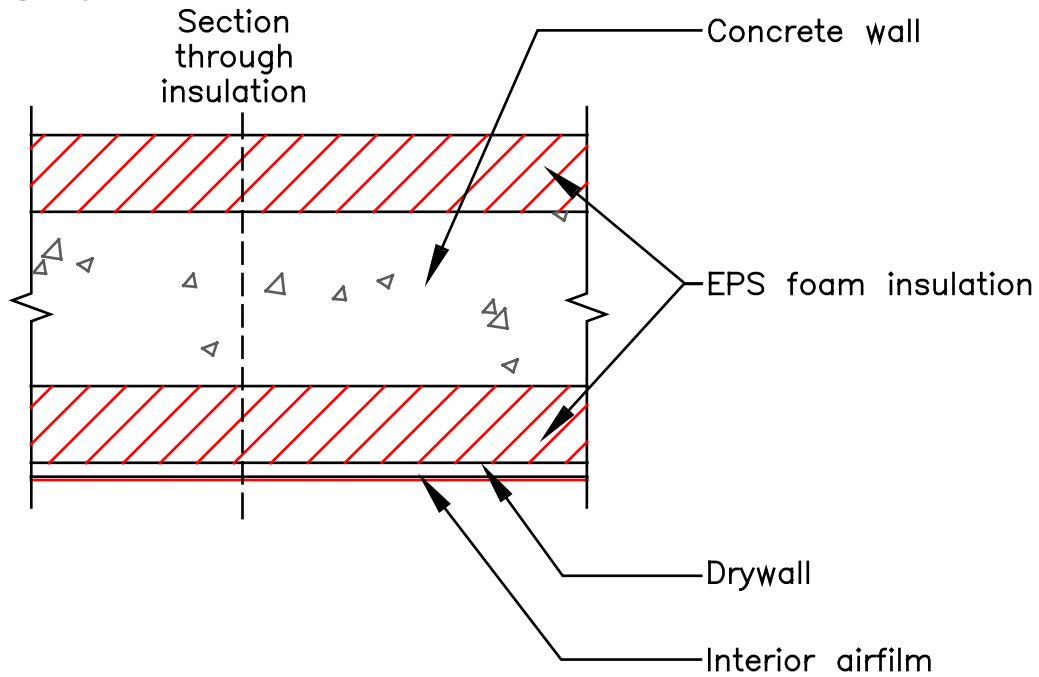
Component	R-value (RSI ²) through stud	R-value (RSI ²) through insulation
Sheathing paper ¹	0.06 (0.01)	0.06 (0.01)
5/8" Plywood sheathing ¹	0.79 (0.14)	0.79 (0.14)
Stud @ 16" o/c ¹	6.41 (1.13)	-
Insulation	-	19 (3.35)
1/2" Drywall ¹	0.45 (0.08)	0.45 (0.08)
Interior airfilm ¹	0.68 (0.12)	0.68 (0.12)
Total	8.39 (1.48)	20.98 (3.70)
Percent of Total Area	19¹	81¹
Overall thermal resistance	16 (2.9)	

1. Model National Energy Code of Canada for Houses 1997.
2. Metric units: 1RSI = R5.67.

$$\text{Overall thermal resistance} = \frac{100\%}{\frac{\% \text{ area with framing}}{R\text{value framing}} + \frac{\% \text{ area without framing}}{R\text{value without framing}}} = \frac{100\%}{\frac{19\%}{8.39} + \frac{81\%}{20.98}} = 16$$

Calculation of Thermal Resistance of Building Assemblies – Comparison of Stud Frame Wall to Logix ICF Wall System Cont'd

4inch Logix ICF Wall:



Component	R-value (RSI ²) through LOGIX ¹
2.75" EPS foam insulation	11.39 (2.01)
Concrete wall (normal weight)	0.28 (0.05)
2.75" EPS foam insulation	11.39 (2.01)
1/2" Drywall	0.45 (0.08)
Interior airfilm	0.68 (0.12)
Total	24.15 (4.26)
Percent of Total Area	100
Overall thermal resistance	24 (4.3)

1. Intertek Testing Services report, Thermal Resistance of Logix ICF Wall System.
 2. Metric units: 1RSI = R5.67.

$$Overall\ thermal\ resistance = \frac{100\%}{\frac{\% \text{ area with framing}}{R\text{value framing}} + \frac{\% \text{ area without framing}}{R\text{value without framing}}} = \frac{100\%}{0 + \frac{100\%}{24.15}} = 24$$

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