Ellison Turpin
Assignment 09 - Building Enclosure

ARCH 631
Environmental Systems I

## Typical Insulation Materials

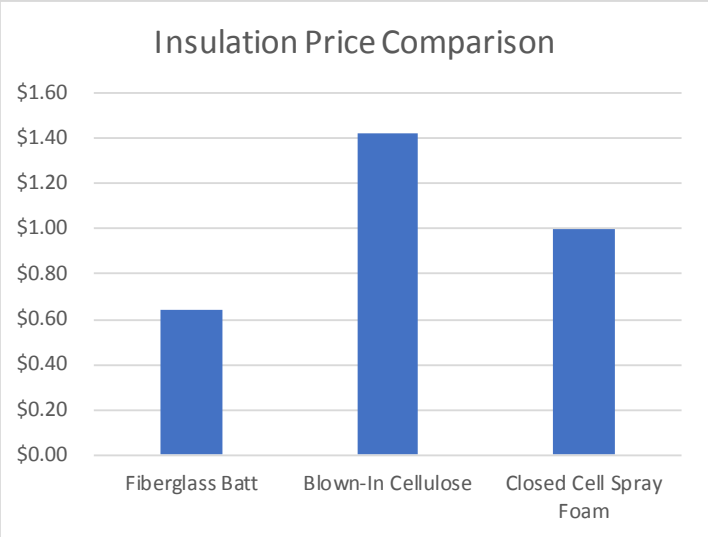
**Fiberglass (Batt)**
R-Value/in 3.1 - 3.4
3 1/2" -> 10.8-11.9
5 1/4" -> 16.3-17.8
10" -> 31.0 - 34.0
Cost: $0.64-$1.19 per sqft

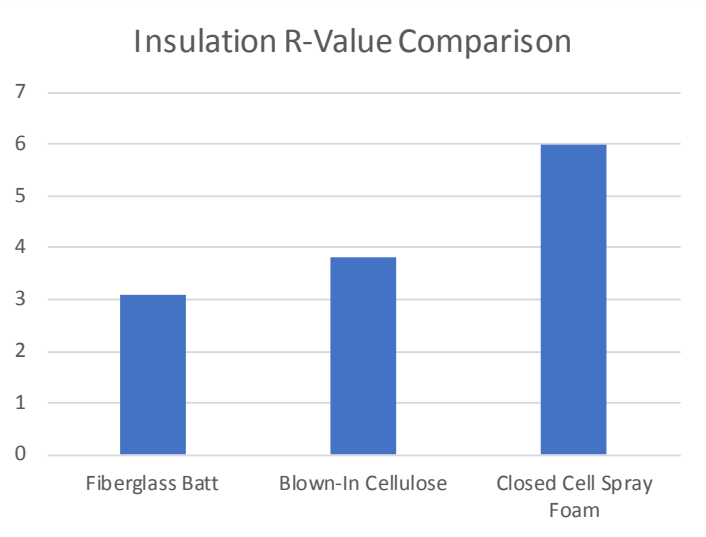
**Blown-In Cellulose**
R-Value/in 3.8-3.9
3 1/2" -> 13.3-13.6
5 1/4" -> 19.9-20.8
10" -> 38.0-39.0
Cost: $1.42 per sqft

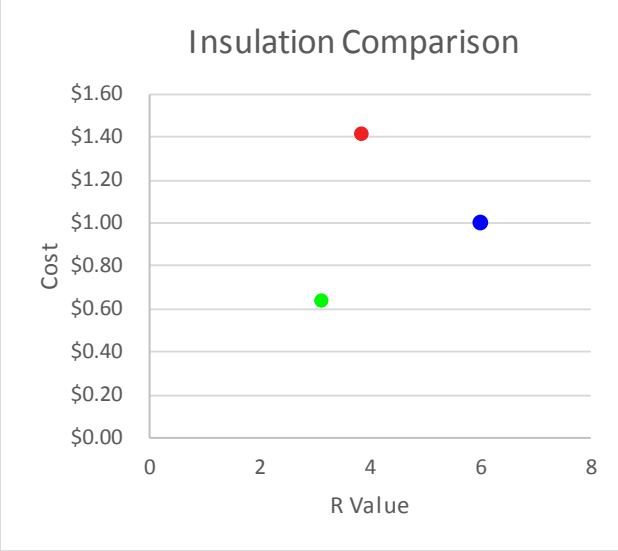
($28-30 per bag -> 40sqft
at minimum requred R value)

**Closed Cell Spray Foam**
R-Value/in 6.0-6.5
3 1/2" -> 21.0-22.7
5 1/4" -> 31.5-34.1
10" -> 60.0-65.0
Cost: $1-2 per sqft

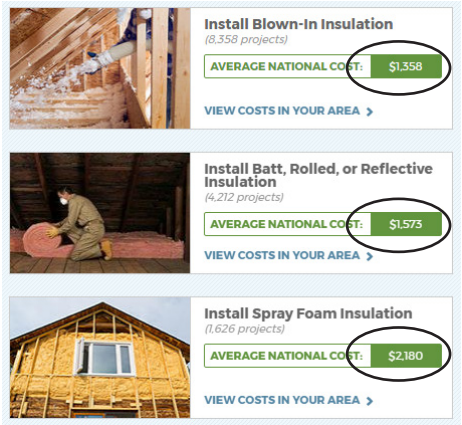
($1-2 per board foot
board foot = sqft x depth)
12"x12"x1")




Based on material costs, it would seem that the Closed Cell Spray Foam is the better deal for the R-Value. However, further research on the internet shows that it may be a more costly solution based on the professional labor costs.




Information from:
http://www.greatdayimprovements.com/insulation-r-value-chart.aspx
https://www.homeadvisor.com/cost/insulation/

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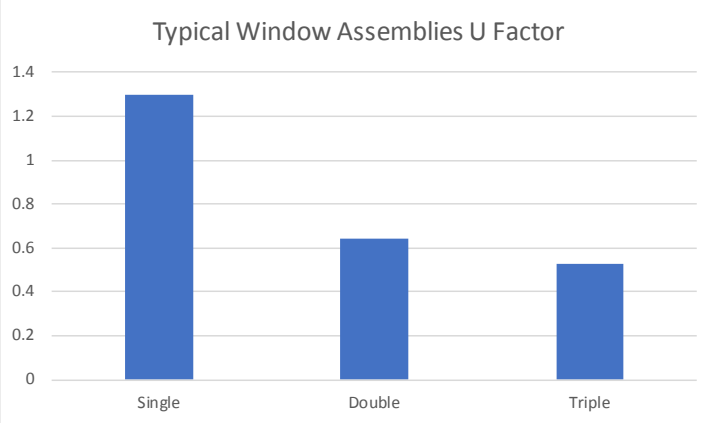
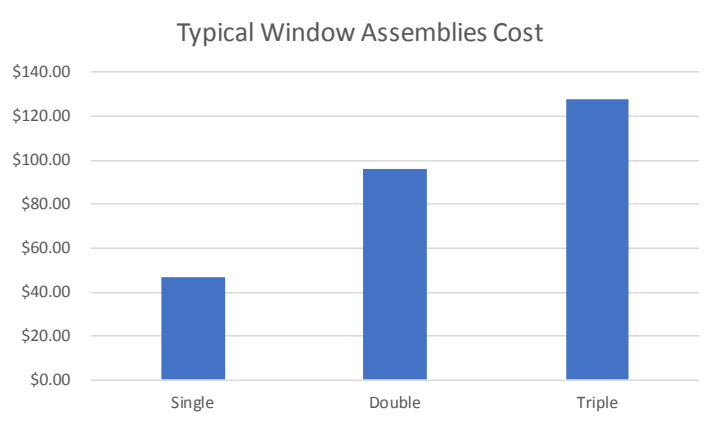
## Typical Window Assemblies

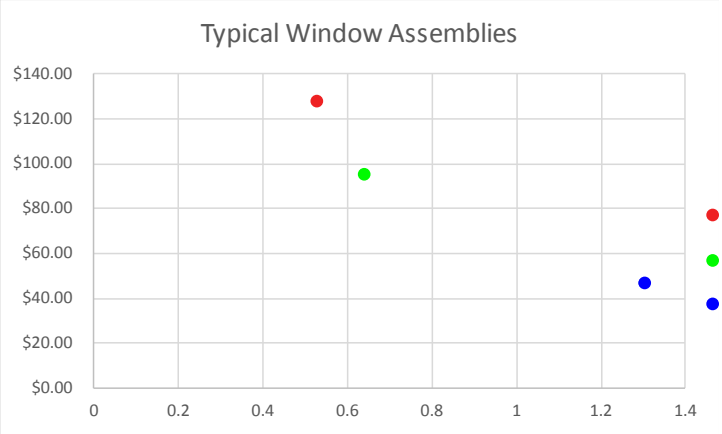
Single Pane
U Factor: 1.3
Cost: $47

Double Pane, 1/2" Argon
U Factor: .64
Cost: $96

Triple Pane, 1/2" Argon
U Factor: .53
Cost: $128




Though having more layers does reduce the U Value, the current market costs of triple panes windows makes the benefits less worth it. A few articles claimed the that expense of triple pane installation and replacement was more than the potential energy savings.

Information from:
https://www.energyguide.com/info/window2.asp
https://www.fixr.com/costs/window-replacement#types-of-windows