

## Typical Heat Load and Annual Heating Cost Comparisons for 3200 sq-ft House

Values shown are: BTU/hr heat load on a typical heating day (not maximum requirement!)  
US\$/yr heating cost

<i>Design approach:</i>	<b>1. 2-story "Box"</b> 12.5% window area 40' x 40' footprint 8' ceilings	<b>2. High Ceilings</b> Increase ceiling height to 9.5'	<b>3. Lots of Glass</b> Increase window area to 25%	<b>4. Narrow Form</b> Stretch building to 25' x 64'	<b>5. Ranch</b> 25' x 128' single-story	<b>6. Nice Design</b> All of 2+3+4
<i>Efficiency Scenarios:</i>						
<b>A. Base Case</b> R18 walls R36 ceiling R3 Low-E/dble windows 0.35 ACH infiltration	23,254 1302  BTU/hr \$/yr	26,197 1467	27,032 1514	24,359 1364	32,270 1807	32,442 1817
<b>B. Leaky</b> 1.0 ACH infiltration	35,984 2015	41,173 2306	39,762 2227	37,089 2077	47,246 2646	47,418 2655
<b>C. Hi-Perf Windows</b> R4 windows (Triple Pane)	22,121 1239	24,864 1392	24,766 1387	23,099 1294	30,995 1736	29,475 1651
<b>D. Air Tight</b> 0.1 ACH infiltration	18,358 1028	20,437 1144	22,136 1240	19,463 1090	26,510 1485	26,682 1494
<b>E. Super Insulated</b> R30 walls R60 ceiling	20,428 1144	22,997 1288	24,508 1372	21,295 1193	28,467 1594	29,357 1644
<b>F. All of C+D+E</b>	14,398 806	15,904 891	17,345 971	15,138 848	21,432 1200	20,631 1155

"ACH" = net air changes per hour (average U.S. new construction is ~0.35)

### Assumptions:

- Slab on grade.
- 70F indoors / 30F outdoors average during heating season.
- 200 days per year heating (8000 heating degree days).
- 10.50 \$/k-cuft natural gas price (average of UT and PA).
- 90% efficient boiler.
- No solar gain.
- No radiation losses.
- No wind.
- R-values are net values, including any bridging through wood and steel.
- Window area includes doors as well.
- 3200 sq-ft of living area (no garage and no basement).
- All heat comes from natural gas (no contribution from lighting, appliances, etc.).