The dimensions for small and large houses are given in and . The supporting calculations are in the “Size Parametric” tab of the “RP 1449 Calculations” spreadsheet.



Figure : Linear Dimensions



Figure : Building Areas

The BUI and associated files for TRNSYS are in two zip files:

https://s3.amazonaws.com/bergey/ASHRAE+RP-1449/small-buildings.zip

https://s3.amazonaws.com/bergey/ASHRAE+RP-1449/large-buildings.zip

I believe we decided to compare these runs to a slightly different baseline house. (cf, email 2012-07-06, subject: errors in BUI) These revised medium files are here:

https://s3.amazonaws.com/bergey/ASHRAE+RP-1449/revised-medium-buildings.zip

I sized the AC systems according to Manual J. I shaded the heating loads below according to likely system size; I don’t believe we discussed what heating output we will use for houses requiring more than the default 60 kBTU/hr. The heating load in Zone 4 is lower than in Zone 3. I believe that this is due to the increase in slab insulation between these scenarios. The Manual J files are online:

https://s3.amazonaws.com/bergey/ASHRAE1449/rp1449-manJ.zip



Figure : Small House Cooling Loads



Figure : Large House Cooling Loads



Figure : Small House Heating Loads



Figure : Large House Heating Loads

The sensible and latent internal gains are scaled to the number of bedrooms. This follows Armin’s email form 2012-07-10, but differs from the 62.2 assumption of occupancy as (# bedrooms)+1. Figure 7 shows parameters that depend on house volume and occupancy, as well as several invariants used in calculating other parameters.



Figure : Capacities and Gains

The following parameters depend on house size and AC system size:

* AC CFM
* recirc fraction (for const 0.5 ACH, depends on size, ACCFM)

The duct areas for all houses above HERS 70 follow the BA Benchmark. For medium houses, the duct areas were reduced (ducts were brought inside) to reach the HERS 70 and HERS 50 targets. I have not calculated HERS ratings for small and medium houses. Instead, I have maintained the same ratio:

For simplicity, duct area does not depend on heating or cooling system size. Return duct areas are 100 sf for all house sizes, except for HERS 50 houses, which have all return ductwork in conditioned space.



Figure : Supply Duct Areas