



Building Performance SOLUTIONS

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Systems shall be sized designed using the following criteria:

- Design Conditions for Denver, Colorado shall be used as indicated in the 2005 American Society of Heating and Refrigeration Engineers (ASHRAE) Handbook of Fundamental local design conditions.
- Outdoor design conditions shall be based on the 99.6% and .4% design temperatures for the city that the home is being constructed.
- Denver’s design conditions are between +1 to -3°F Winter, 91- 93.2°F Summer drybulb (59°F wetbulb) with a maximum outdoor humidity not to exceed, 50% RH.
- Heating Degree Days are 6,020 and cooling degree days are 679.
- Indoor Design Temperatures are to be based on a thermostat maximum set-point 70-71°F for heating and 75°F for cooling.
- Infiltration rates will be assumed as “tight” construction unless instructed otherwise.
- Fireplaces and other accessories shall be assumed as “tight” unless instructed otherwise.

Component	Description	Input value/rate, R-Value, U-Value SHGC (glass)
Below grade slabs		
Slab Edge/underslab		
Crawl space walls		
Below grade/Basement walls		
Rim joist/box sill		
Above grade walls		
Attached Party Walls		
House to garage wall		
Attic insulation-flat		
Attic insulation-vaulted		
Floors over unconditioned		
Exterior doors		
Windows-below grade		
Windows/glass doors		
Equipment location		
Duct Leakage/sealing		
Fireplaces		
Occupants	Number of bedrooms + 1	
Air Changes/hour	Heating= 0.25 Nat, Cooling =0.18 Nat	
Ventilation Rate	ASRAE 62.2 Formula, Ventilation rate= (# of beds + 1) x 7.5 + (0.01 X cond. floor area)	
Ventilation equipment		

Additional Sizing and Specification Guidelines:

- The heating and cooling equipment should be sized as accurately as possible **no larger than 110% of the calculated load, after altitude derating (not to exceed 4% 1,000 ft of elevation)** and indoor and outdoor equipment should match.
- Air conditioning equipment should be sized for the calculated sensible load and 50% of the unused latent capacity could be added to the sensible capacity.
- If the total cooling load exceeds the equipment capacity by > 10% then move to the next larger size unit.
- CFM will be matched to equipment selected
- The highest efficiency available should be selected
- Units should be ARI rated, with the certificate provided in the Manual J calculation sheet to at least 14 SEER with Non-CFC refrigerants (R-410A or Puron) and all indoor coils equipped with a Thermal Expansion Valve (TXV).

Airflow and duct sizing of the systems and to each individual room shall match designed airflow calculations from the ACCA Manual J to within +/- 10% of the average requirements for that room, based on the average of the 4 orientations of that specific home.

Duct sizing basics

Supply Air

Size all Supply trunks at 600-750 fpm and a friction rate of 0.05-0.06 iwc
Size all supply run-outs at 500-700 fpm and a friction rate of 0.07-0.08 iwc
DO NOT exceed 125 cfm from any supply register.

Return Air

Size all return ducts based on the flow rates of the areas served at 300-500 fpm and a MAX friction rate of 0.02-0.03 iwc
See note above on grille selection and noise coefficients

