Sizing Air Conditioners:
Recommendations for Contractors

- Check all numbers for consistency. For example, in typical construction, total area of exterior walls facing north or east (including a wall to garage) is usually equal to the total area of the opposite south or west walls; ceiling area is usually equal to the building footprint area; window area is usually from 10% to 25% of the floor area; gross wall area is bigger than the window area.
- Use design outdoor conditions and daily temperature range exactly for your location per Manual J . Otherwise, use the data for the closest location with a similar climate.
- Use standard 75 degrees F design indoor temperature.
- Consider both location and level of insulation of ducts. When selecting cooling factors for roofs, floors, and walls consider their R-value and type; for example, frame wall or masonry wall. Partitions and knee walls that separate a conditioned space from an unconditioned space like an attic or garage should be treated separately from the exterior sunlit surfaces.
- Always account for the effect of the overhang shading. This is one of the most efficient load reduction measures. When calculating this effect, consider window height, overhang length and distance to the top of the window.
- Pay great attention to window type, material, and interior shading. An error in this area can throw off the window heat gain.
- Calculate infiltration rate based on blower door measurements.
- Calculate the latent load based on the number of people and the outdoor air humidity ratio. Do not use a "typical" multiplier of 1.3 or any other to calculate the total load from the sensible load. This implies that every building has a latent load that is exactly equal to 30% of its sensible load and that the quality of construction and location are not important. It also means that if a new source of the cooling load is added, for example another window, the moisture gains will also increase. This simply is not accurate.
- Consider ventilation load if appropriate.
- Select equipment based on the detailed manufacturer's performance data. Do not rely on the nominal tonnage since different units may have more than 10% capacity difference.
- Choose equipment based on the ACCA Manual S without using any safety factors. This method selects the unit that has the sensible capacity at least equal to but no more than 15% greater than the building sensible load, and the latent capacity equal to or greater than the latent load at standard indoor conditions of 75 degrees F dry bulb and 50% relative humidity.
- Test the duct leakage with a duct test rig and suggest that that the ducts be sealed before the new air conditioner is installed. Use the appropriate sealant and retest to ensure the quality of the job.
- When installing a complete system, design the duct work using Manual D. Test for proper installation.
- Properly evacuate the coil and refrigerant lines before releasing the refrigerant charge from the outside unit into the system.
- After installation, check the air flow across the coil and the refrigerant charge using the manufacturer's suggested methods. Correct any deficiencies.