# System Sizing

Ducts also should be sized according to ACCA Manual D. Often, duct systems are undersized; the tendency is to run fewer and smaller ducts to make the job as easy as possible. In turn, this leads contractors to want to oversize the equipment to compensate. But the results can be disastrous. Another reason technicians often install a bigger system than is needed is because they don’t want a customer complaining about being too cold in winter or too hot in summer.

However, there are four main penalties for oversizing equipment: short-cycling, moisture buildup, reduced equipment life, and noisy operation

**Short-cycling.** Air conditioners, in particular, are very inefficient when they first start up, butthey get more efficient the longer they run. Oversized units, however, never work at full capacity, so they start and stop constantly, even on the hottest days. The frequent starts waste energy.

**Moisture buildup.** Short-cycling also means the unit doesn’t run long enough to effectivelydehumidify the air. To remove moisture from indoor air, the coil must be colder than the dew point temperature of the air. The moisture in the air condenses on the coil. If the unit runs long enough, this moisture will begin to flow off the coil into the condensate drain. But when the unit short-cycles, there’s just not enough time for this to happen. In humid weather, the moisture begins to condense on the coil, but not enough to drain off. Instead, it beads up on the coil and then evaporates back into the indoor air when the system shuts off.

**Reduced service life.** When a system short-cycles, it wears down the equipment. The ampdraw on a compressor and blower motors is about four times greater during startup than it is during its normal run time. The increased heat generated by this higher amp draw reduces both efficiency and the longevity of the compressor and blower motors.

**Noise.** The speed of the air blowing through the supply registers and the speed of the air beingdrawn into the return grille depend on the size of the unit — larger units have greater airflow moving at higher speeds. If the air speed is too high, the system will be noisy and uncomfortable, and the return filter’s effectiveness will be reduced.