

Save 100's of Dollars on your Next AC

Air Conditioner Replacement Cycle Timing

Sooner or later, you will need a new air conditioner. What's the best way to size your new air conditioner? Bigger is better, right? It turns out this is not true. Just like the start-stop city miles per gallon in your car is less than highway miles per gallon, the most efficient AC is one that runs all afternoon on the hottest days of the year.

Replacing an AC requires a permit. The building code requires a computer calculation known as Manual J to properly size replacement AC systems. The building department reviews the Manual J to make sure that your AC is 'right-sized;' and you will get the "highway mpg". But, the information needed for the Manual J calculation is hard to get for an existing house: how much insulation is in the walls and roof, how well was it installed, what is the U-value and SHGC of the windows?

A good way to check the size of AC you need is to use your existing AC as a measuring tool. The procedure is called cycle timing

1. You have to wait for a nice hot afternoon. It must be 105° of hotter
2. Then time how long the AC runs and how long it is off. Do this two or three times.
3. Average the run-times and average the off-times.
4. Then use the following formula:

$$\frac{\text{Minutes on}}{\text{Minutes on} + \text{Minutes off}} = \% \text{ of current system capacity used}$$

5. Multiply the % of current system capacity used by the size of your current AC. This is how big your next AC needs to be

For Example: if average cycle is 22 minutes running and 21 minutes off, then the load is 54% of system capacity:

$$\frac{22}{22 + 21} = .536 \approx 54\%$$

Then multiple the capacity of your existing AC by the percentage of capacity used:

3.5 tons * .54 = 1.9 tons of load. A new two ton should be fine.



Old 3.5 ton



New 2.0 ton

There is more work for your AC contractor before the new size is confirmed; they will need to asses any differences in the what is called the sensible/latent split of the new unit compared to the old, if you have improved your duct work since your test, and see if your existing system was properly charged with refrigerant. And they will need to prepare a Manual J calculation. This will be a good double check of the cycle timing. Chances are you will end up with a smaller, less expensive, higher mpg AC than the one you replace!