Mixed air formulas…

Setting Outdoor Air percentage

"Hey Rick, I need to set a fresh air vent to 10% outdoor air. How do I measure that? More importantly, how do I set that?"

"Calculating the percentage of fresh air requires that you know just a few things." Said Rick

With the unit running in the Fan On position only, measure three different temperatures.

1. **RAT** Return air temperature.
This can be measured at the R/A grille in the building or somewhere in the Return air trunk

2. **OAT** Outside Air Temperature
This is measured at the fresh air opening where outdoor air is being brought into the building.

3. **MAT** Mixed Air Temperature
This is measured at the opening to the blower where the RAT and the OAT are mixed and being delivered into the building.

"Let's work with some numbers you would expect to see on a day like today", said Rick.

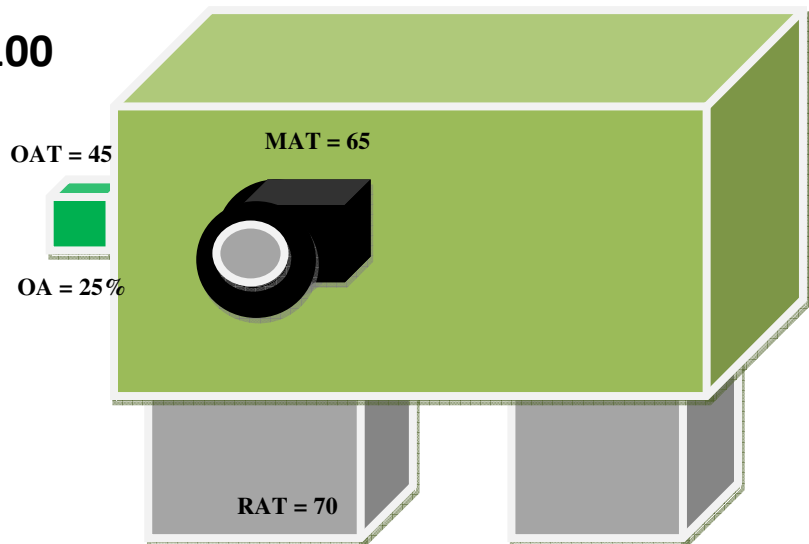The temperature outside is 45 degrees. That will be our OAT

The temperature here in the room is 70 degrees. That will be our RAT

The temperature measurement with just the Fan On, <u>at the blower,</u> is 65 degrees. That will be our MAT.

Using the formula below, let's plug in the numbers.

$$\%OA = \frac{RAT - MAT}{MAT - OAT} \times 100$$

$$25\% = \frac{70 - 65}{65 - 45} \times 100$$

OAT = 45

MAT = 65

OA = 25%

RAT = 70

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"OK Rick, that's great! This tells me what percentage of OA that ___I have___, but do I have to keep measuring and adjusting to get it to the proportion that ___I need___?"

"Well… it's not as complicated as that. Using our same temperature readings and our trusty calculator, let's see how we can do it with a minimal amount of effort."

"You said that you want .10 outdoor air and .90 return air is that right?" Asked Rick

"Yes, that would be minimum position for most of my customers. " Replied the young technician

OK let's use the formula below to see what we come up with, said Rick

MAT = (Proportion of OA x OAT) + (Proportion of RA x RAT)

MAT = (.10 x 45) + (.90 x 70)

MAT = (4.5) + (63)

MAT = 67.5

"So there it is", said Rick, "Close the fresh air damper slowly until the MAT (Mixed Air Temperature) measures 67.5 degrees and you now are set at 10% Outdoor Air."

As you might have guessed, the greater the difference between the OAT and the RAT, the more accurate these formulas will be for you to use. Take several readings before adjusting anything. Remember garbage in = garbage out.

"Wow, said the young tech, that's pretty easy. Thanks Rick"

"No problem, all you have to do is ask."