

# Tech Tip

## Measuring Superheat and Subcool

Our Technical department has asked that certain information be documented prior to calling them for help on refrigeration problems.

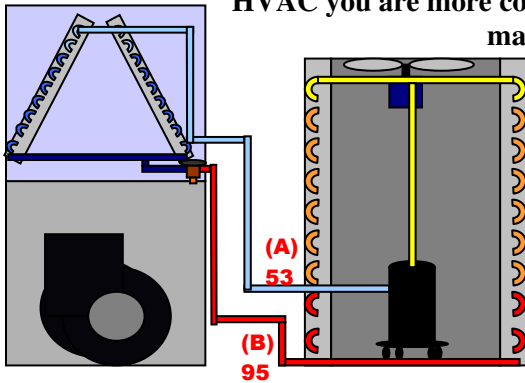
Superheat and Subcooling are vital signs of the system in the same way the doctor uses blood pressure to assess someone's health.

The request may come in a format something like this:

Formula For Super Heat	Formula For Sub Cooling
_____ Vapor Line Temp.	_____ Sat Temp.
- _____ Minus Sat Temp.	- _____ Minus Liquid Line Temp.
_____ Equals Super Heat	_____ Equals Sub Cooling

### SUPERHEAT

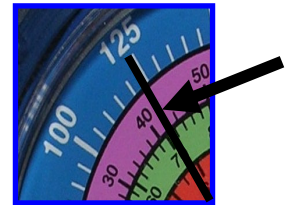
The Vapor Line Temperature is measured on the large suction line near the condensing unit (A). Many refrigeration personnel will measure at the outlet of the evaporator but in HVAC you are more concerned with protecting the compressor than maintaining full capacity of the evaporator coil.



Connecting a clamp thermometer in the shade, on the vapor line, will achieve this reading. Allow 5-10 minutes of run time to allow system to balance. For our example the Vapor Line Temp is 53 degrees.

Next step is to "Minus Sat Temp". The Saturation Temperature is located on the gauge on this R410A unit by lining up the

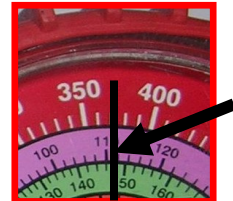
pressure with the appropriate refrigerant scale. In this example the Sat temp is 43 degrees. Subtract the two and you have 10 degrees of Superheat.



### SUBCOOL

The Saturation temperature for Subcooling is acquired from the high side gauge. In this example the Sat Temp is about 110 degrees.

Next is to "Minus Liquid Line Temp". The Liquid Line Temperature is also measured at the outlet of the condensing unit but now is measured on the small liquid line (B). For this example the Liquid line Temp is 95 degrees. Subtract the Liquid line Temperature from the Liquid Saturation Temperature and you get a Subcooling of 15.



Formula For Super Heat	Formula For Sub Cooling
<b>53</b> Vapor Line Temp.	<b>110</b> Sat Temp.
- <b>43</b> Minus Sat Temp.	- <b>95</b> Minus Liquid Line Temp.
<b>10</b> Equals Super Heat	<b>15</b> Equals Sub Cooling

"Typically" on TXV systems the Superheat will range between 8 to 28 degrees with a target of about 10 to 15 degrees. The Subcool range on TXV systems will range from about 8 to 20. Although this is not enough information to charge a system, it does give a technician a better understanding of the systems operation.

Again, follow manufacturers' recommendations for charging!