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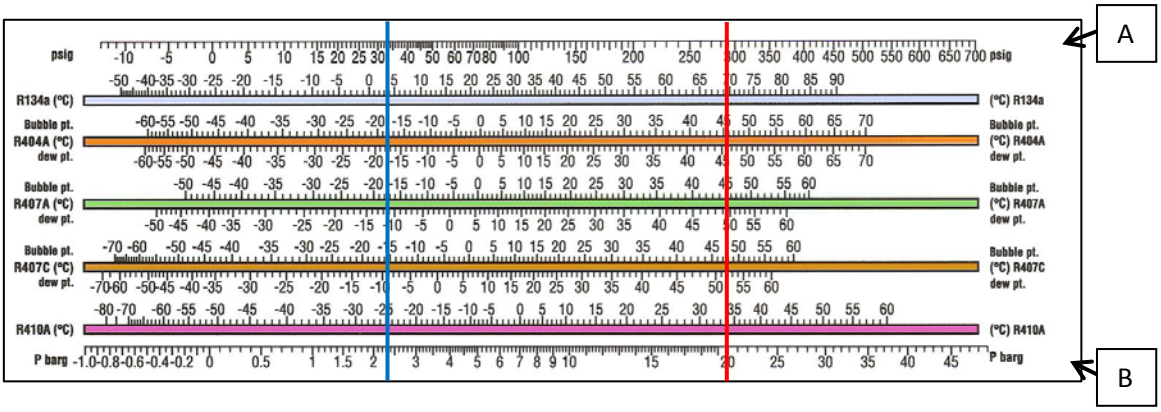
How to Use Your Comparator

A comparator gives you the pressure temperature relationship at saturation conditions for common refrigerants and is useful for setting up systems and diagnosing faults. This guide shows you how to use it.

In the example comparator below:

- The top scale (A) shows pressure in psig;
- The bottom scale (B) shows pressure in bar g;
- The coloured lines in between are the saturation temperatures equivalent to these pressures
    - A range of refrigerants is included: R134a, R404A, R407A, R407C and R410A.



- If you measure the pressure on the high side of the system (e.g. at the liquid receiver outlet), the comparator will tell you the **saturated condensing temperature** at that pressure**.** This information is vital if you are trying to assess the amount of subcooling;

- If you measure the pressure on the low side of the system, the comparator will tell you the **saturated evaporating temperature** at that pressure. You'll need to do this to set an expansion valve correctly.

For some refrigerants the pressure temperature relationship is not that simple! R400 series refrigerants such as R407C are zeotropic blends, which means they do not change state at a constant temperature – they have "temperature glide". You can see this from the comparator – for most blends there are two temperatures scales:

- The saturated liquid temperature (also known as the bubble point temperature) – the refrigerant will be this temperature when it just starts to evaporate or has just finished condensing;

- The saturated vapour temperature (dew point temperature) – this is the temperature the refrigerant will be when it has just finished evaporating or is just starting to condense.

For R404A and R410A the two temperatures are similar – they have a low glide. For R407C the temperature glide is high – up to 8°C.

Examples

In the example comparator the vertical red curser line is positioned to find the condensing temperature from the high side pressure measured on an R404A system:

- High side pressure = 20 bar g;
- Condensing temperature = 45^{O}C.

The blue curser line is positioned to find the evaporating temperature from the suction pressure on an R407C system so that the expansion valve can be set:

- Suction pressure = 2.3 bar g;
- Saturated gas (dew) temperature = -10^{O}C.

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