Refrigeration Superheat and Sub-Cooling from Readings

Evaporator superheat and condenser sub-cooling from measured suction and liquid line temperatures and the saturation temperatures read off the gauges.

Method: Definitions: superheat = suction temperature − saturation temperature; sub-cooling = condensing temperature − liquid temperature

Input parameters

Unit system: SI

Parameter	Value	Unit
Suction line temperature (at the bulb)	8.0000	°C
Evaporating (saturation) temperature from the suction gauge From the refrigerant's pressure–temperature chart; for a zeotropic blend (R407C, R404A …) use the dew-point temperature.	2.0000	°C
Liquid line temperature	36.000	°C
Condensing (saturation) temperature from the discharge gauge For a zeotropic blend use the bubble-point temperature.	42.000	°C
Air or water temperature entering the condenser	30.000	°C

Calculated results

Parameter	Value	Unit
Superheat T_suc − T_evap	6.0000	K
Sub-cooling T_cond − T_liq	6.0000	K
Condenser approach T_cond − T_a	12.000	K

Formula and method

$$SH = T_{suc} - T_{evap}, \quad SC = T_{cond} - T_{liq}$$

Variables

T_{suc}	Suction line temperature (at the bulb)	K
T_{evap}	Evaporating (saturation) temperature from the suction gauge	K
T_{liq}	Liquid line temperature	K
T_{cond}	Condensing (saturation) temperature from the discharge gauge	K
T_a	Air or water temperature entering the condenser	K
SH	Superheat T_suc − T_evap	K
SC	Sub-cooling T_cond − T_liq	K
ΔT_c	Condenser approach T_cond − T_a	K

Method and standards

Definitions.

Assumptions and limits

- Steady running.
- Zeotropic blends (R407C, R404A and other 400-series mixtures) have a temperature glide: superheat is measured from the dew-point temperature at suction pressure and sub-cooling from the bubble-point temperature at liquid pressure. Pure refrigerants and azeotropes have one saturation temperature.

References

• Definitions: superheat = suction temperature − saturation temperature; sub-cooling = condensing temperature − liquid temperature

Report details

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Release checks	2 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/hvac/refrigeration/superheat-subcooling

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.