Temperature Scales

►**Kelvin scale**: An absolute thermodynamic temperature scale whose unit of temperature is the kelvin (K); an SI base unit for temperature.

►**Rankine scale**: An absolute thermodynamic temperature scale with absolute zero that coincides with the absolute zero of the Kelvin scale; an English base unit for temperature.

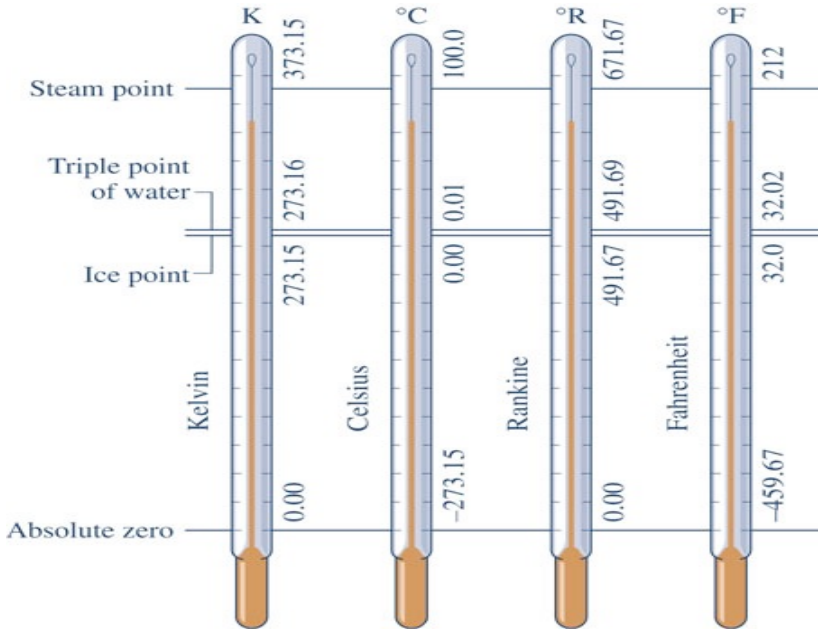
$$T(^{\circ}\mathrm{R}) = 1.8\,T(\mathrm{K}) \qquad \textbf{(Eq. 1.16)}$$

►Celsius scale (°C):

$$T(^{\circ}\mathrm{C}) = T(\mathrm{K}) - 273.15 \qquad \textbf{(Eq. 1.17)}$$

►Fahrenheit scale (°F):

$$T(^{\circ}\mathrm{F}) = T(^{\circ}\mathrm{R}) - 459.67 \qquad \textbf{(Eq. 1.18)}$$



Design

- Engineering design is a **decision-making process** that draws principles from engineering and fields
- Fundamental elements include **establishment of objectives**, **synthesis**, **analysis**, **construction**, **testing**, and **evaluation**.
- Designs are typically subject to **constraints** including **economics**, **safety**, and **environmental impact**.

Problem-Solving Methodology

►**Known**: Read the problem, think about it, and identify what is known.

►**Find**: State what is to be determined.

►**Schematic and Given Data**: Draw a sketch of system and label with all relevant information/data.

►**Engineering Model**: List all simplifying assumptions and idealizations made.

►**Analysis**: Reduce appropriate governing equations and relationships to forms that will produce the desired results.