



# Instrumentation Temperature



## Course Objectives

1. Identify common types of instruments for measuring temperature including: fluid thermometer; dial thermometers; thermostats; infrared; filled thermal systems; temperature gauges and temperature transmitters using thermocouple, thermistor, and resistance temperature detector (RTD) sensing elements.
2. Describe the operation of common temperature measurement instruments.
3. Describe typical applications for common temperature measurement instruments.
4. Describe safety concerns for common temperature measurement instruments.
5. Describe typical malfunctions for common temperature measurement instruments.
6. Identify common temperature instrument drawings on P&IDs.
7. Measure temperature using concepts and principles of measurement for common instruments.
8. Solve common problems encountered when using temperature measurement instruments.



## Key Terms (Define the following)

Non-electronic temperature measurement instruments - \_\_\_\_\_

Thermowells - \_\_\_\_\_

Thermocouples - \_\_\_\_\_

Resistance temperature detectors - \_\_\_\_\_

Thermistors - \_\_\_\_\_

Infrared digital thermometers - \_\_\_\_\_



## Questions

1. When measuring the temperature of a process material, it is the \_\_\_\_\_ contained in the process material that is being measured.
2. List the four temperature scales that are discussed in this course.
  - 1) \_\_\_\_\_
  - 2) \_\_\_\_\_
  - 3) \_\_\_\_\_
  - 4) \_\_\_\_\_
3. The most common instruments for industrial temperature measurement are
  - electronic
  - non-electronic
4. Thermometers that use the change in physical characteristics of solids to sense a temperature change are
  - glass stemmed
  - filled thermal
  - bimetallic
  - total immersion