SPEED OF RESPONSE

It is the purpose of the information on this page to give you some general guidelines in estimating the speed of response you might expect from a thermocouple or an RTD.

In defining any transient condition such as a temperature change, it is important that a standard measuring point be established to provide a basis of comparison. In temperature transducers, the time constant is defined as the time required, in seconds, for the temperature sensor to respond through 63.2% of the total temperature change.

The factors affecting the response rate of a temperature probe in a fluid are

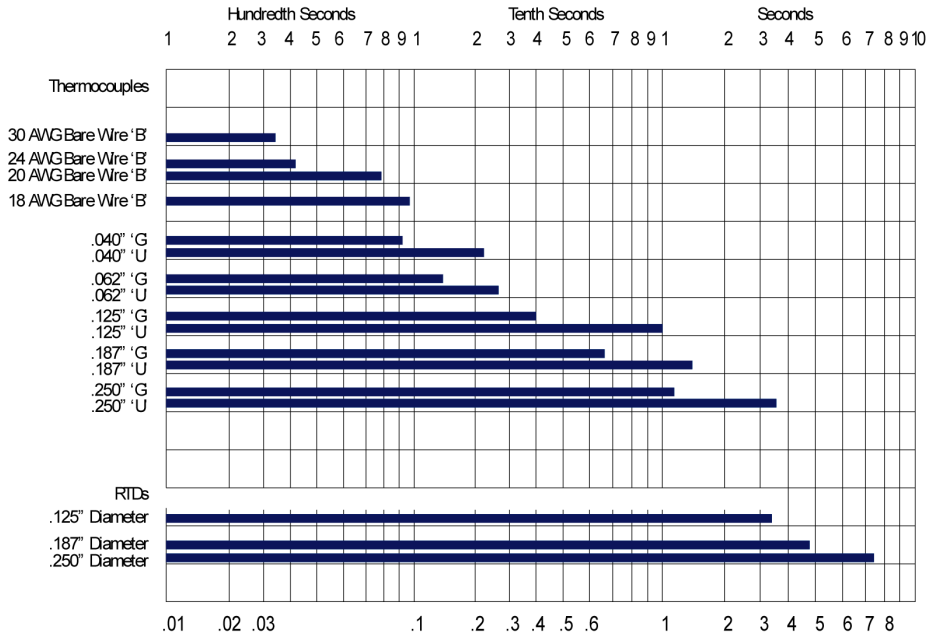
a) *The mass of the probe surrounding the active temperature sensitive point.*

b) *The thermoconductivity of materials used in manufacturing the transducer.*

c) *The mass and conductivity of the measured fluid.*

d) *Velocity of the fluid over the probe.*

From the above, it is obvious that a probe of small diameter made of highly conductive materials will respond most rapidly to temperature change. Since thermocouple materials will have shorter conductive paths, a thermocouple probe will respond more rapidly than an RTD probe of equal diameter. This is verified by the bar charts



In determining time constants for the bar charts above, tests were performed in still water going through an instantaneous step change from 32°F to 212°F.

For guidelines for determining time constant for specific probes under other conditions, multiply the time constant from the chart by the following factors:

Condition	Still Air	Air @10ft/Sec.	Water @15 ft/Sec.
Factor	20X	4X	.25X

DIAMETER indicated in decimals refers to standard Conax probe diameters. Letters G, U and B correspond with various styles of tip configurations

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