

Industrial Thermometers

DESIGN & OPERATION



Light-Powered Digital



Liquid-in-Glass

Description

A thermometer is an instrument designed to measure and indicate the temperature of a specific application or condition. An Industrial Thermometer, commonly known as a “Liquid-In-Glass” or Light-Powered Digital Thermometer, is installed at the point of measurement and is usually read from that location.

Principles of Operation

Liquid-in-Glass

This thermometer is comprised of a liquid-filled sealed glass tube and bulb, which is affixed to the front of a metal temperature scale, and extends into a metal bulb chamber (stem). Flaked graphite is used within the bulb chamber to transfer the measured temperature to the glass bulb. Temperature changes cause the thermo-active fill to expand or contract within the tube. This activity is instantly visible in the tube against the calibrated markings of the temperature scale. For purposes of readability, the tube is formed with a lens front to create a magnified indicating column.

Light-Powered Digital

This thermometer is comprised of a thermistor wire that extends into the stem. Flaked graphite is used to transfer the measured temperature to the thermistor. Temperature change causes a change in the output of the thermistor; this output is translated through a pre-programmed algorithm in the microprocessor resulting in a digital display of the temperature.

All Trerice Industrial Thermometers should be carefully selected to meet the demands of the particular application. The information contained in this catalog is offered only as a guide to assist in making the proper selection. Improper applications may cause failure of the instrument, resulting in possible personal injury or property damage. For applications where the process media may be corrosive or contained under pressure, the use of a thermowell is required to prevent damage to the thermometer and facilitate its removal from the process.

Selecting an Industrial Thermometer (Liquid in-glass only)

Case

The case is durable, die cast aluminum with dark blue epoxy powder coating (Hydro-Therm is furnished with Valox Case), and is available in scale sizes from 5½" through 12". Cases are available in adjustable angle, rigid straight, and rigid 90° and 45° angle configurations. The adjustable angle case can be moved to any viewing position for enhanced readability.

Stem

The stem is the sensitive portion of the instrument that is inserted into the process. Stems can be provided in aluminum, brass, or stainless steel. Aluminum and brass stems include a brass coupling nut, while the stainless steel stem includes a stainless steel coupling nut.

Aluminum stems must always be installed in a thermowell. Brass and stainless steel stems may be installed using a union connection bushing in place of a thermowell. Terice however, recommends the use of a thermowell to facilitate the removal of the thermometer.

Window

Windows are supplied in clear acrylic (ranges through 300°F), or double-strength glass (standard on ranges above 300°F). For direct sunlight applications, an ultraviolet protective plastic window is available. This window helps prevent sunlight induced deterioration of thermoactive fills.

Accuracy

The accuracy of an industrial thermometer is expressed as a variance (plus or minus) in scale divisions. All Terice Industrial Thermometers are accurate to within one scale division of the temperature range.

Extreme ambient conditions above 120° F or below 30° F) may more than double the allowable accuracy tolerance of spirit filled thermometers. This effect increases on thermometers operating at the high end of their scale, and decreases on thermometers operating at the low end of their scale. Please consult factory for further information.

Range and Scale

A wide variety of ranges are available in Fahrenheit, Celsius, or dual scale; in temperatures from -40°F (-40°C) through 500°F (260°C). Ranges are indelibly presented in black figures and markings upon an aluminum scale in lengths from 5½" to 12". Space constraints, as well as measurement readability, should be considered when selecting a scale size.

Thermoactive Fills

Terice Industrial Thermometers are available with either of the following fill types:

- **Spirit** – A blue-colored, organic, spirit fill is standard. This proprietary fill is available for use with temperatures of 500°F and below and can be supplied in alternate colors (consult factory).
- **Mercury** – Blue appearing mercury fill is only available for retort type thermometers as mercury fill is specifically required.

Thermowells

For applications where the process media may be corrosive or contained under pressure, the use of a thermowell is required to prevent damage to the thermometer and facilitate its removal from the process. Thermowells are available in various lengths, connections, sizes, and materials. Please consult the Thermowell Section of this catalog.

To ensure minimum response time, Terice Heat Transfer Paste should be applied to the sensing portion of the stem before installation into a thermowell. 1 oz. tube: Item No. 107-0001