

Thermowells

Thermowells are used to provide an isolation between a temperature sensor and the environment, either liquid, gas or slurry. A thermowell allows the temperature sensor to be removed and replaced without compromising either the ambient region or the process.

Care must be taken in determining the material used for the thermowell as well as other factors. Thermo Sensors offers design assistance that includes pressure, temperature and or corrosion as well as vibration effects of the fluids. This vibration can cause well stem failure.

Thermo Sensors thermowell materials include:

- Carbon Steel
- 304 & 316 Stainless Steel
- Monel
- Brass

Please refer to our order guide to assist in determining your needs. We can also provide technical design assistance and application suggestions. Give us a call.

How to Select Thermowells

Introduction

Thermowells are used to shield thermocouple elements against mechanical damage and corrosion. Many variations are available in a variety of materials to meet individual job specifications.

The chemical and physical properties of all standard bar stock materials are rigidly controlled. All bar stock wells are drilled by the gun drilling process. Use of specially designed and constructed measuring equipment enables standard guaranteed bore concentricity to be within $\pm 10\%$ of wall thickness. Internal threads are within 1/2 turn of standard plug gauge. External threads are within 1/4 turn of standard ring gauge.

If required by purchase order, your thermowells undergo an internal hydrostatic test as a final precaution against pressure failure. Test pressures and duration are determined by the customer. Radiograph and other tests can be performed and results furnished upon request.

A variety of alloys suitable for every thermowell requirement is available. Thermowell material should be selected for ability to withstand the process environments, high thermal conductivity and low porosity to gases.

Choosing Bore Sizes for Maximum Flexibility

Where several types of temperature measuring instruments are used, the selection of a standard bore diameter can provide greater efficiency and flexibility of use. The same well can accommodate either thermocouple, resistance thermometer, bi-metal thermometer or test thermometer. The bore sizes of wells shown on this website accommodate the most commonly used temperature sensing elements. For example:



.260 Diameter Bore:

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A Leading Manufacturer of Quality Thermocouple and RTD Assemblies Since 1972

- Bi-Metal Thermometers (1/4" stem)
- Thermocouples (#14 Awg)
- 1/4" & 3/8" O.D. Cerampak Thermocouples & RTD's
- Liquid-in-glass Test Thermometers (unarmored)
- Other elements having .252 max. O.D.

.385 Diameter Bore:

- Bi-metal Thermometers (3/8" stem)
- Thermocouples (#14 Gauge)
- 1/4" & 3/8" O.D. Cerampak Thermocouples & 3/8" RTD's (Use .260 Bore for 1/4" RTD's)
- Liquid-in-glass Test Thermometers (armored)
- Other elements having .377 max. O.D.

When to Use Tapered or Straight Thermowells

Tapered thermowells provide greater strength without sacrificing sensitivity. Because of its higher strength-to-weight ratio, the tapered thermowell provides greater resistance to high frequency vibrations than straight thermowells. This permits reliable operation at high fluid velocities. Thus, for higher fluid velocities, the tapered well should be chosen; for lower fluid velocities, the straight well. When choosing wells, refer to the [velocity rating charts](#) and other design information.

Choosing the Material

A most important factor in selecting thermowell material is to determine the corrosive conditions to which the well will be exposed. Recommended materials for various services are given in the [Thermowell Material Guide](#). The high mirror polish given to all wells enhances its corrosion resistance capability.

Occasionally, the material consideration is one of strength rather than corrosion. For example, a stainless steel well may be required for high pressure water service, where a brass well might have been satisfactory from a corrosion viewpoint. It will be helpful to consult the [pressure-temperature ratings](#) given for each well type.

Choosing the Proper Connection

In this website you will find standardized wells of threaded, flanged (ASA and Van Stone), and socket weld types with standard bore sizes. A provision for customer specifying design parameters or "weld-in" thermowells is also provided.

Threaded wells are made in readily weldable material. Standard flanged wells (other than Van Stone) have flanges welded front and back with "V" or "J" groove design. Full penetration double welded flanges are also available.

The double-welded construction eliminates possible crevice corrosion and stress cracking. Heat treated to NACE specs is available.

Socket weld of wells are especially simple to install. They fit ASA standard socket weld couplings or flanges to produce a clean, tight installation.