

Solid Drilled Thermowells

- Wide Range of Materials
 - Stainless Steels
 - Exotic Materials
- Choice of Process Connections
 - Flanged
 - Screwed
 - Weld-In
- One Piece Forgings
- ASME IX Coded Welding
- Special Coatings
- Non Destructive Testing

General Description

Thermowells from Thermocouple Instruments Limited are precision components manufactured to the highest standard from bar or forgings, to serve as protective devices for primary sensing elements of all types.

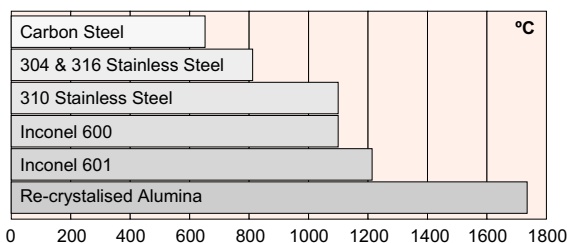
A wide range of possible products are available. Conditions of pressure, temperature and corrosion resistance govern the size, shape and selection of materials to ensure optimum dependability system response and accuracy.

Specification

Materials

Thermocouple Instruments Ltd are experienced in the manufacture of solid drilled thermowells in a wide range of materials, including 304, 316 and 321 Stainless Steels, 446 Cr-Fe, 6% Mo, Haynes Alloys 214, 230, 556 and HR-160, Carbon Steels, Chromium Steels, Duplex and Super Duplex Stainless Steels, Hastelloy B3, C22, C276 and X, Incoloy 800, 825 and MA-956, Inconel 600 and 625, Monel 400 and Titanium.

Some suggested materials for various temperatures are shown in the chart below.



For further recommendations on the use of these materials, please refer to Technical Data Sheet TD-TW/MATA.

Instrument Connection

Instrument connections may be male or female, with API, NPT, BSP, or other thread forms.

Process Connection

Connection to the pipe or vessel may be by means of thread, flange or weld.



Solid Drilled Thermowells

Threaded Connection

Using standard tapered or parallel pipe threads for simplicity and low cost is popular, generally for low pressure applications.

Standard threads are NPT, BSP(PI), BSP(Tr) and API. The thread size is dependent on the application, but 3/4" and 1" are common.

Flanged Connection

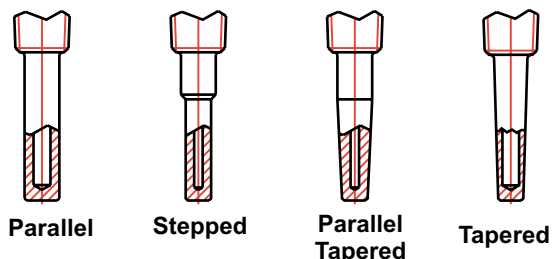
All sizes and pressure ratings are available to DIN, BS, ANSI/ASME and JIS or other standards. Flanged connections are now the petrochemical standard for all applications.

Weld-In Connection

Weld in thermowells are normally used where process pressure and velocities are too great for flanged and threaded, or where long term inexpensive connections are required.

Immersion Profile

The profile should take account of fluid flow characteristics, strength of thermowell and immersion length. Refer to Technical Data Sheets TD-TM/WFPA and TD-SW/WFCA for more information.



Tip Profile

Consideration should be given to tip profiles when designing the thermowell for a specific application. As a rough guide, flat tip should be used for lower pressure applications, where flow characteristics around thermowell are not important. Domed and spherical profiles should be used in medium and high pressure applications respectively where flow characteristics around thermowell are important.



Bore

Selected to suit primary sensing element, ensure ease of removal and minimise the amount of free air space around sensor, thus providing optimum response time. In general the outside diameter and bore of the thermowell should be such that the minimum wall thickness is 3 mm.

Thermocouple Instruments Ltd operate specialised deep bore gun-drilling machines to ensure the concentricity and finish of the thermowell bore.

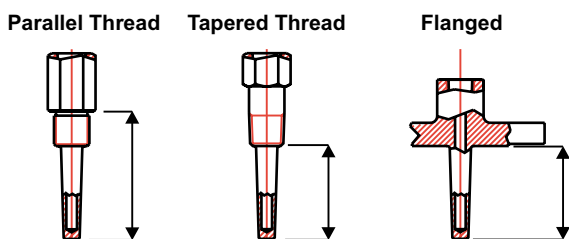
Immersion Length

The immersion length should be calculated to ensure that the sensing element has sufficient immersion into the process medium to give accurate measurement. To ensure optimum results and freedom from outside influences, thermowell tip should be located at a point which equates with the lower portion of the centre third of the pipe line.

For tanks, the depth of immersion obviously varies considerably but, as a rule of thumb, 300 mm from outer wall will give ideal results.

In high velocity applications, wake frequency effects must also be considered. Refer to Technical Data Sheet TD-TM/WFPA for more information.

Immersion length is defined as shown.



Surface Finish

Thermowells are supplied as standard with a fine machined surface finish. Other finishes may be supplied on request.

Special Coatings

Thermocouple Instruments Ltd has specialist in-house facilities for coating thermowells to increase corrosion and abrasion resistance. Options include Stellite, Tungsten Carbide, Tantalum, Zirconium and PTFE.

Weld Procedures

Thermocouple Instruments Ltd employ ASME IX coded welders, experienced in stainless steels, Carbon Steels and exotic materials. Welding

procedures, qualification records and welder approval certificates can be supplied on request.

Heat Treatment

Thermowells may be heat treated to customers' requirements. The requirements of NACE MR 01-75 can be met.

Quality Control / Inspection

Thermocouple Instruments Ltd's thermowells are manufactured under a strict ISO 9002 quality control system. A wide range of documentation and Non Destructive Testing can be provided on request, including:

- Material Certification (EN 10049 3.1b)
- Certificate of Conformity
- Hydrostatic Pressure Test
- Dye Penetrant Inspection
- Radiography
- Ultrasonic Bore Concentricity Test
- Positive Material Identification
- Intergranular Corrosion Test
- Hardness Testing

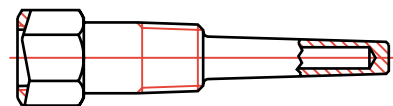
Third party inspection may be arranged, and material certification to EN 10204 3.1c and IBR can be provided.

Standard Thermowells

The following are the most common thermowell types available from Thermocouple Instruments Ltd. Other designs are available to customers' standards, as the application requires.

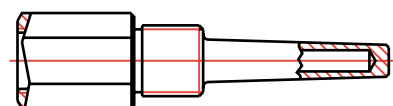
It is not to be implied that all thermowells shown below are available in all sizes, ratings and materials. Please refer to the sales department with specific enquiries.

Type 001



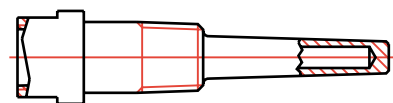
Hex Thermowell With Tapered Thread

Type 002



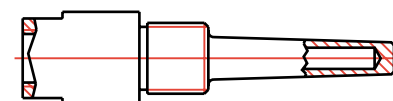
Hex Thermowell With Parallel Thread

Type 003



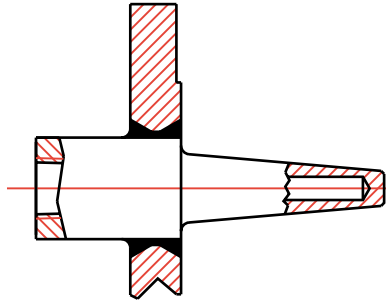
Round Thermowell With Tapered Thread

Type 004



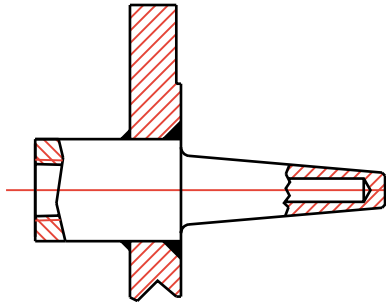
Round Thermowell With Parallel Thread

Type 005



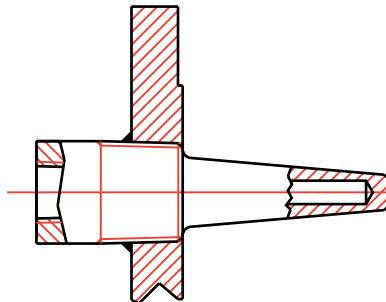
Flanged Thermowell, Full Penetration Weld

Type 006



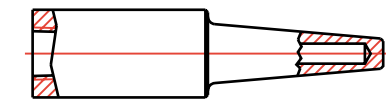
Flanged Thermowell, Fillet Weld

Type 007



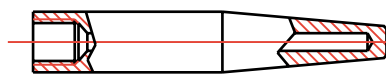
Flanged Thermowell, Thread and Weld

Type 008



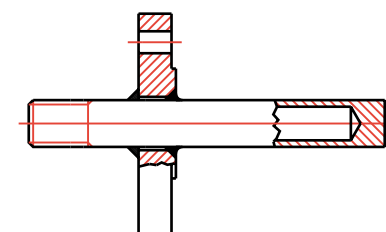
Weld-In Thermowell

Type 009



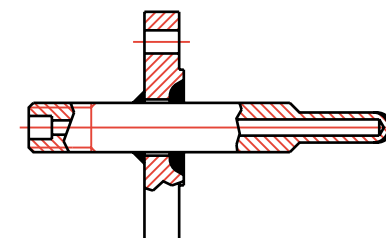
DIN Standard Weld-In Thermowell

Type 010



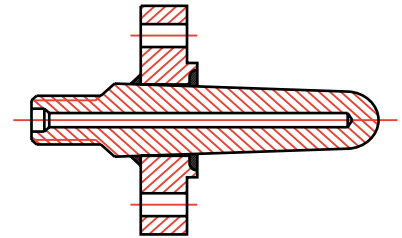
Type A Flanged Thermowell

Type 011



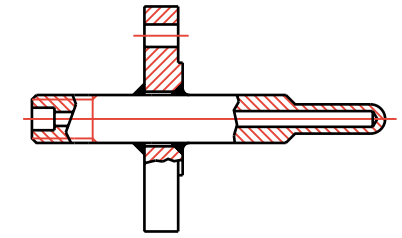
Type E Flanged Thermowell

Type 012



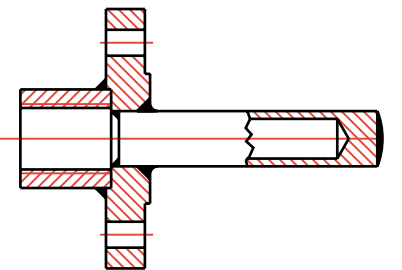
Type D Flanged Thermowell

Type 013



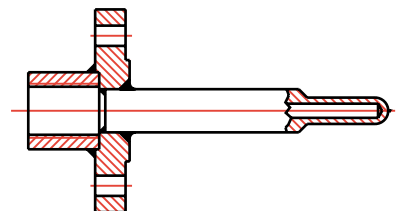
Type C Flanged Thermowell

Type 014



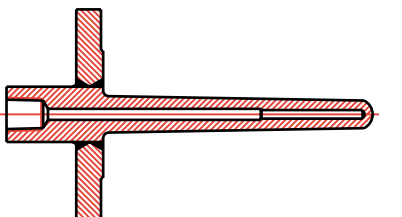
Type A2 Flanged Thermowell

Type 015



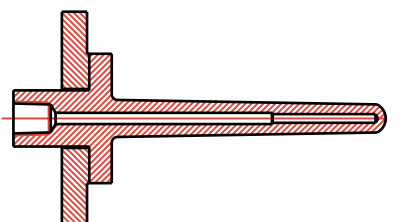
Type A2 Flanged Thermowell, Reduced Tip

Type 016



S-2006-4 Thermowell

Type 017



S-2007-4 Thermowell

Type 018



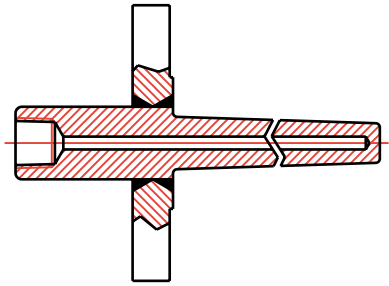
S-0984-9 Thermowell

Type 019



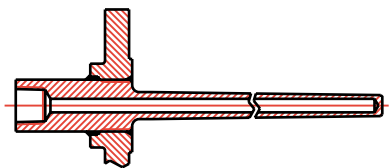
FSJ-776 Screwed Thermowell

Type 020



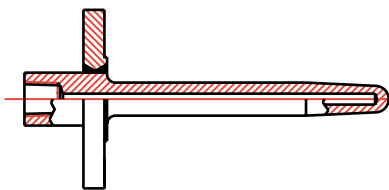
FSJ-776 Flanged Thermowell

Type 021



6-105-3 Flanged Thermowell

Type 022



SP.BL.2291-K14 Flanged Thermowell

Type 023

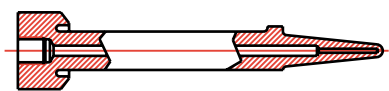


Fig 1 Weld-In Thermowell

Type 024

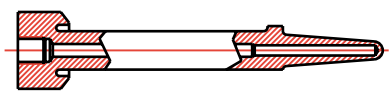


Fig 2 Weld-In Thermowell

Type 025

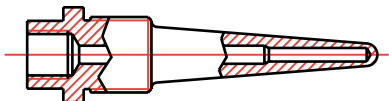


Fig 3 Screwed Thermowell

Type 026

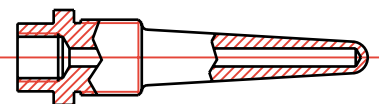
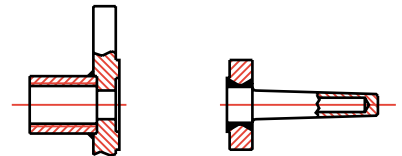


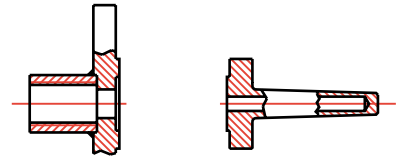
Fig 4 Screwed Thermowell

Type 027



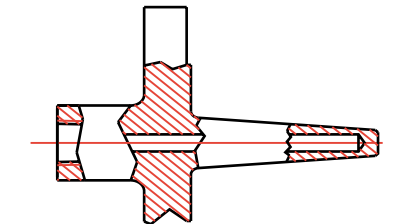
Welded Thermowell and Backing Flange

Type 028



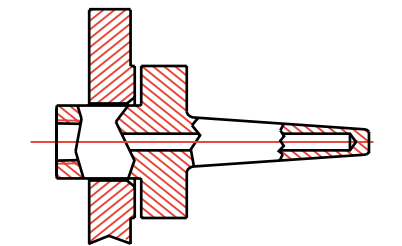
Forged Thermowell and Backing Flange

Type 029



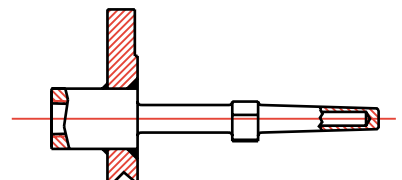
Forged Flanged Thermowell

Type 030



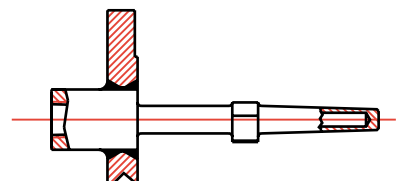
Forged Thermowell with Backing Flange

Type 031



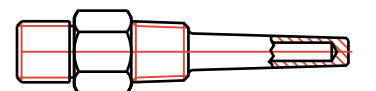
High Velocity Thermowell, Fillet Weld

Type 032



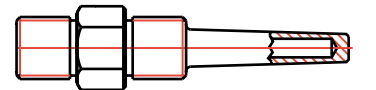
High Velocity Thermowell, Full Penetration Weld

Type 033



Hex Thermowell with Tapered Thread

Type 034



Hex Thermowell with Parallel Thread

Thermocouple Instruments Limited

Pentwyn, Cardiff, CF23 7XJ, UK
 Tel: (+44) 029 20734121 Fax: (+44) 029 20734040
 Internet: <http://www.thermocouple.co.uk>
 E-mail: thermocouple@thermocouple.co.uk