



THERMOWELLS



Introduction



Welcome to **Goa Instruments Industries Pvt. Ltd.**, established by Mr. M. T Kulkarni, it is a family owned company. He is a Mechanical Engineer with over 42 years of experience of manufacturing process control instruments for measurement of Temperature, Pressure, Flow, Level & Instrumentation Valves.

We are the leaders in manufacturing various types of Thermowells for all types of Temperature Sensors and Gauges for Industrial applications like Sugar, Power, Oil, Gas, Petrochemical, Fertilizer and other process Industries.

The company has many sets of excellent mechanical processing equipments and modern inspection and testing equipments for our products.

A-State-of-the-Art manufacturing facility, continuous Research & Development, innovative technology & stringent quality control at every stage have been some of the key factors in the manufacturing of our products.

We are not only the manufacturer but the solution providers.

We have built world class reputation of total understanding of customers requirements and needs, thus delivering excellent products and services at competitive prices.

For us, commitment and integrity are valued the most, which reflects in the philosophy of achieving total customer satisfaction. With our presence in major cities in India and a growing international network across all continents, we are in a position to reach clients all over the world.

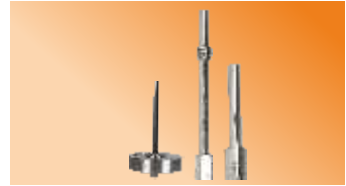
Our Products have been supplied to the following Industries

- Bhabha Atomic And Research Center
- Oil & Gas Refineries & Petrochemical Industries
- Chemical, Process, Sugar Industries
- Thermal Power & Atomic Power Plants
- Fertilizers & Agro Chemicals
- Pharmaceuticals & Laboratories
- Steel & Metallurgical Plants
- Original Equipment Manufacturers
- EPC Contractors
- Water & Effluent Treatment Plants
- Pulp, Paper & Fibre Industries
- Defence
- And Many More

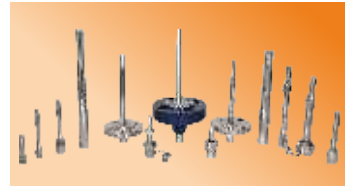


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Thermowells 03



Bar stock Thermowell 04



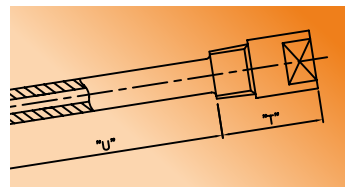
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Thermowells

A Thermowell is a protective enclosure for Temperature Gauges and Temperature Sensors (Inserts), which enhance the life of the Inserts from the corrosive and abrasive (harsh) service conditions at the installation point without affecting the performance of the the Temperature Sensors or Gauges. A Thermowell allows the temperature sensor to be removed and replaced without compromising either the ambient region or the process.

We at **Goa Instruments**, strive to provide Thermowells, which suit the Process Parameters like Pressure, Temperature, Density, Viscosity and Velocity in accordance with international PTC standards.

There are basically three major types of Thermowells.

Using Bar Stock

- Bar Stock Flanged
- Bar Stock Threaded
- Bar Stock Weld In

Using Pipe & Bar Stock

- Fabricated Flanged
- Fabricated Threaded
- Fabricated Weld In

Bar Stock Thermowells are offered for Insertion Lengths up to 600mm as a Standard. Insertion Lengths can also be provided up to 900mm in Bar Stock if required. Fabricated Thermowells are generally preferred for Insertion Lengths above 600mm.

We have a IN HOUSE Wake Frequency Calculator, in accordance with ASME PTC 19.3 TW-2010 for determining the insertion length and the type of construction best suited for the Process Parameters as required by the Client.

Our extensive internal database, on material selection, for the Thermowells, assist us in recommending and suggesting a suitable MOC for the product which will bring out the Optimum performance of the Thermowells under the process parameters and



different types of Process Fluids.

We also offer Thermowells with sleeves, coatings and linings customized to suit Client's requirements.

Thermowells with more than one material as MOC can also be offered for minimizing cost and improving the efficiency, response and longevity of the Thermowell under harsh and corrosive conditions.



Technical Specifications for Bar stock Thermowell

TYPE	: Bar Stock Flanged (BF), Bar Stock Threaded (BT), Bar Stock Weld In (BW)
STD ROD DIAMETER in mm	: 28,32,34,36,45,50,55 (any other on request). Hex Head can also be provided
MATERIAL OF CONSTRUCTION(M.O.C) FOR BAR AND FLANGE	: SS304, SS316, SS310, SS321, SS446, SS316L, SS317, CS, A105, : INCOLOY-825, INCONEL-600, INCOLOY-800, HASTELLOY C-276, MONEL-400, TITANIUM-II, NICKEL-200, KANTHAL (any other on request)
CONSTRUCTION	: Straight, Tapered, Stepped
INSTRUMENT CONNECTION	: 1/2"NPT(F), 1/2"BSP(F), 1/2"BSPT(F), PF(F), NPSM(F) (any other on request) in all thread sizes
PROCESS CONNECTION	: For Flanged Type (As per ANSI, BS, JIS, DIN or any other) Size - 1/2", 1", 1 1/2", 2", 3" (any other on request) Rating - 150#, 300#, 600#, 900#, 1500#, 2500# Facing - RF, FF, RTJ, LT, LG, WNRF, SORF (any other on request) For Threaded Type Size - 1/4", 3/8", 1/2", 3/4", 1", 1.1/4", 1.1/2" (any other on request) Threads - M18X1.5, M20X1.5, M24X1.5, M27X2, M33X2 (any other on request) NPT, BSP, BSPT, PF, NPSM (any other on request) For Weld In Type Socket Weld, Direct Weld
BORE in mm	: 6.5, 7, 8.5, 9, 10.5, 11, 12, 13 (any other on request, suitable for the Insert OD)
COLD END DIAMETER in mm	: Provided as per requirement
HOT END OD in mm	: Provided as per requirement
INSERTION LENGTH "U" in mm	: Provided as per requirement
EXTENSION LENGTH "T" in mm	: Provided as per requirement
TIP THICKNESS in mm	: Provided as per requirement (Standard-6mm)
WALL THICKNESS in mm	: 2.5mm as a standard (any other as per Bore / Hot End OD size)
SURFACE FINISH	: 16-32 Ra as standard, 4 to 12 Ra on request
WELDING FOR FLANGED TYPE TW	: By TIG (Argon) : "V" Groove welding on both sides of Flange
ADDITIONAL REQUIREMENTS	: a. Ultrasonic Test for Weld Joints b. Radiography Test for Bore Concentricity c. Radiography Test for Weld joints d. Full Penetration Welding e. IBR (Steam, Feed Water Service) f. For H2 Service (Hardness Check, Post Weld Heat Treatment, Ferrite No Test) g. NACE (MR-0175, MR-0103) h. Ti, Ni, HaC, Ta Sleeve (only on Straight Construction), Sleeve thickness and construction of Thermowell as per requirement i. PTFE, PFA, PVDF, Stellite, Tungsten Carbide Coating, coating thickness as per requirement j. Special Cleaning for Oxygen Service K. Stubs / Nozzles / Expanders / Reducers / End Fittings (Weldolet, Sockolet, Half Coupling, Coupling, Latrolet) also can be provided l. Customized special design Thermowells also can be manufactured.

Technical Specifications for Fabricated Thermowell

TYPE	: Fabricated Flanged (FF), Fabricated Threaded (FT), Fabricated Weld In (FW)
STD BAR DIAMETER in mm	: 28, 34, 45, 50 (any other on request).
PIPE SIZE & SCHEDULE	: ½"Sch 40, ½" Sch 80, ½"Sch 160, ¾"Sch 40, ¾"Sch 80 (any other on request)
CONSTRUCTION	: FABRICATION TYPES 1. Pipe to Pipe 2. Pipe to Bar 3. Bar to Bar 4. Tail Sensing Portion in Bar Stock for all of the above for faster response time
MOC FOR PIPE, ROD AND FLANGE	: SS304, SS316, SS310, SS321, SS446, SS316L, SS317, CS : INCOLOY-825, INCONEL-600, INCOLOY-800, HASTELLOY C-276, MONEL-400, TITANIUM-II, NICKEL-200, KANTHAL (any other on request)
INSTRUMENT CONNECTION	: ½"NPT(F), ½"BSP(F), BSPT(F), PF(F), NPSM(F) (any other on request) in all thread sizes
PROCESS CONNECTION	: For Flanged Type (As per ANSI, BS, JIS, DIN or any other) Size - ½", 1", 1½", 2", 3" (any other on request) Rating - 150#, 300#, 600# Facing - RF, FF, LT, LG, SORF (any other on request) : For Threaded Type Size - ¼", 3/8", ½", ¾", 1", 1¼", 1½" (any other on request) Threads - M18X1.5, M20X1.5, M24X1.5, M27X2, M33X2 (any other on request) NPT, BSP, BSPT, PF, NPSM (any other on request) : For Weld In Type Socket Weld, Direct Weld
WELDING FOR FLANGED TYPE TW	: By TIG (Argon) : "V" Groove welding on both sides of Flange : Full penetration Welding for Pipe to Pipe, or Pipe to Bar or Bar to Bar
SURFACE FINISH	: 16-32 Ra as standard
COLD END OD in mm	: Provided as per requirement
HOT END OD in mm	: Provided as per requirement
INSERTION LENGTH "U" in mm	: Provided as per requirement
EXTENSION LENGTH "T" in mm	: Provided as per requirement
TIP THICKNESS in mm	: 6mm or 8mm as Standard
WALL THICKNESS in mm	: As per the Pipe Schedule
ADDITIONAL REQUIREMENTS	: a. Ultrasonic Test for Weld Joints b. Radiography Test for Weld Joints c. NACE (MR-0175, MR-0103) d. PTFE, PFA, PVDF, coating thickness as per requirement e. Stubs / Nozzles / Expanders / Reducers / End Fittings also can be provided f. Customized special design Thermowells also can be manufactured

Special Thermowells

Van Stone Type

Such type of thermowells are used in high pressure applications, where the presence of any weld joints is highly undesirable. Due to its sturdy and rugged design, these thermowells are highly suited to resist the effects of high pressure present in the process medium. These types are machined from a Single Bar Stock, provided with a Collar of suitable thickness, the OD of which corresponds to the RF OD of the Cover or Companion Flange.



These thermowells are sandwiched between a Cover Flange and the Nozzle Flange. Various types of Instrument Connection and Collar OD can be provided as per the requirement.

Solid Sintered Tungsten Carbide Type



Such type of thermowells are used in highly abrasive environments such as Coal Based Power Plants and Air Preheaters etc. Solid Sintered Tungsten Carbide has got high resistivity to abrasions due to coal particles, due to which such type of thermowells are highly preferred mostly in coal based applications.

Generally the entire Insertion length comprises of Tungsten Carbide. But in cases where insertion length is very long only Bottom Tail Portion is provided with Tungsten Carbide, which would normally come in contact with the abrasive media.

Lined Type

Such type of thermowells are used in chemically active environments. In these type, a lining or coating, of a suitable lining material is done, so as to cover the entire Insertion length.

The lining material protects the base material of the thermowell against the corrosive, chemically inert elements present inside the process medium. Commonly used lining materials include PTFE, PFA & PVDF. The thickness of the lining can be provided as per the requirement.



Sleeved Type

Such type of thermowells are also used in chemically active environments. In these type, a sleeve of the suitable material is made, so as to cover the wetted portion. The sleeve protects the base material of the thermowell against the corrosive, chemically inert elements present inside the process medium. Commonly used Sleeve materials include Hastelloy-C, Nickel, Titanium, Tantalum. The thickness of the sleeve can be provided as per the requirement. Sleeves can only be provided for straight construction.



Sanitary Type Thermowell

These type of Thermowells are generally used to adapt a thermometer or temperature instrument to a Sanitary pipe or tank with a Tri Clover Clamp connection.



These type of thermowells allows the instruments to be removed for repair, rework or replacement without opening the process connection. These types are specially designed specifically for Food, Dairy and Pharmaceutical Industry.

Tests on Thermowells

Routine Tests (In House)

- Dimensions Check
- Thread Check
- Hydrotest Internal And External For Weld Joints
- Bore Concentricity Check Using Ultrasonic Meter
- Dye Penetration Check For Weld Joints
- Chemical Analysis Traceability

Optional Tests (In House)

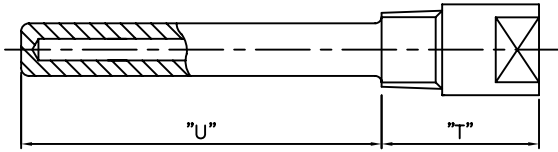
- Helium Leak Test For Weld Joints
- Full Vacuum Test
- Positive Material Identification Test
- Hardness Test
- Instrument Assembly Compatibility For Test Thermowells

Optional Tests (Lab Certified)

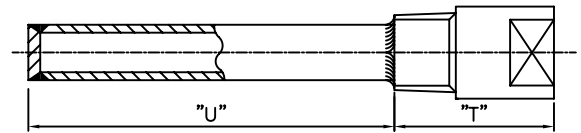
- Physical, Micro Structure
- Radiography For Bore Concentricity
- Radiography For Weld Joints
- Post Weld Heat Treatment
- Ferrite No Test
- Test For Cryogenic Service
- Ultrasonic Test For Weld Joints
- Intra Granular Corrosion Test (Type: A, B, C, E, F)
- Hydrogen Induced Cracking Test
- Sulfide Stress Corrosion Cracking Test
- Magnetic Particle Test
- Spark Test For PTFE Lining
- Impact Test

Some typical models of Thermowells

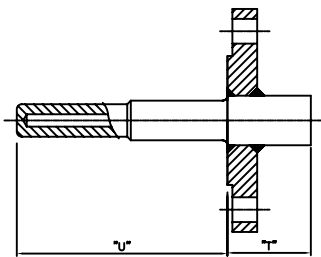
Bar Stock Threaded



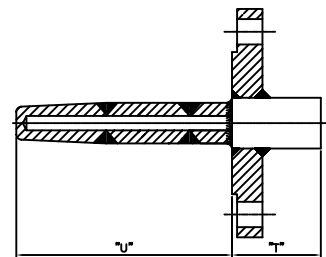
Fabricated Threaded



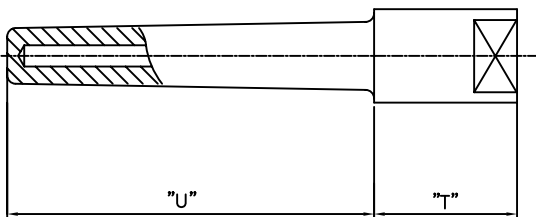
Bar Stock Flanged



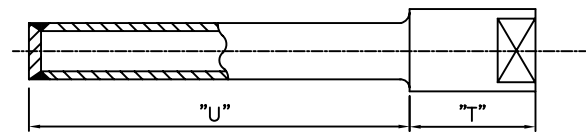
Multiple Bar Stock Flanged



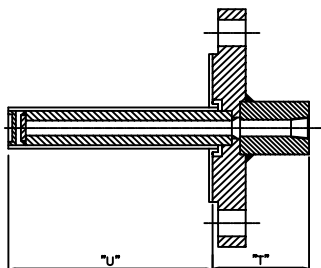
Bar Stock Weld In



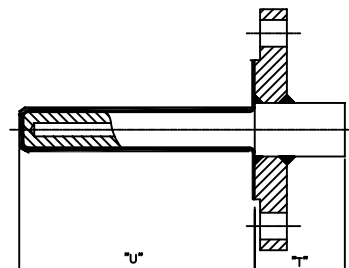
Fabricated Weld In



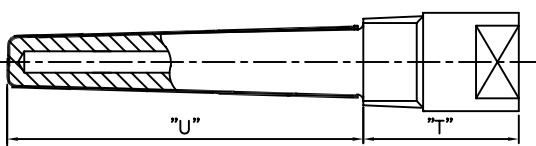
With Sleeve



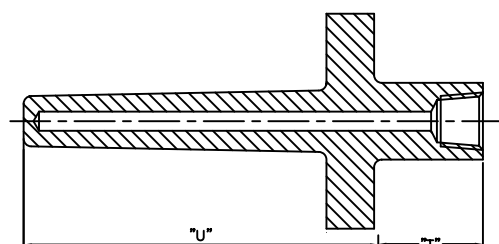
Non-Metallic Coating



Metallic Coated



Vanstone Type



Some of our Valued Customers

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|---|--|
| <input type="checkbox"/> Bharat Petroleum Corporation Ltd | <input type="checkbox"/> Garden Silk Mills |
| <input type="checkbox"/> Essar Oil Ltd | <input type="checkbox"/> Rashtriya Chemicals & Fertilizers Ltd |
| <input type="checkbox"/> Hindustan Petroleum Corporation Ltd | <input type="checkbox"/> United Phosphrous Ltd |
| <input type="checkbox"/> Kochi Refineries Ltd | <input type="checkbox"/> Syngenta India Ltd |
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| <input type="checkbox"/> Indian Oil Corporation Ltd | <input type="checkbox"/> Shalina Laboratories Pvt Ltd |
| <input type="checkbox"/> The Andhra Petrochemicals Ltd | <input type="checkbox"/> Hindalco Industries Ltd |
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| <input type="checkbox"/> Gujarat Alkalies & Chemicals Ltd | <input type="checkbox"/> Cethar Vessels Ltd |
| <input type="checkbox"/> Hindustan Unilever Ltd | <input type="checkbox"/> CICB-Chemicon Pvt Ltd |
| <input type="checkbox"/> India Glycols Ltd | <input type="checkbox"/> Emerson Process Management Pvt Ltd |
| <input type="checkbox"/> Shree Renuka Sugars Ltd | <input type="checkbox"/> Enpro Industries Ltd |
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| <input type="checkbox"/> Solaris Chemtech Ltd | <input type="checkbox"/> Kirloskar Pneumatic Co Ltd |
| <input type="checkbox"/> Thirumalai Chemicals Ltd | <input type="checkbox"/> Southern Lubrication Pvt Ltd |
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| <input type="checkbox"/> BGR Energy Systems Ltd | <input type="checkbox"/> Mecon Ltd |
| <input type="checkbox"/> Nuclear Power Corporation of India Ltd | <input type="checkbox"/> Punj Llyods Ltd |
| <input type="checkbox"/> National Thermal Power Corporation Ltd | <input type="checkbox"/> Toyo Engineering India Ltd |
| <input type="checkbox"/> Coromandal Fertilizers Ltd | <input type="checkbox"/> Uhde India Ltd |
| <input type="checkbox"/> Kribhco Shyam Fertilizers Ltd | <input type="checkbox"/> ABB Ltd |
| <input type="checkbox"/> Chambal Fertilizers & Chemicals Ltd | <input type="checkbox"/> Bharat Heavy Electricals Ltd |
| <input type="checkbox"/> Gujarat Narmada Valley Fertilizers & Chemicals Ltd | <input type="checkbox"/> ISGEC John Thomson |
| <input type="checkbox"/> Indial Farmers & Fertilizers Co-operative Ltd | <input type="checkbox"/> Larsen & Toubro Ltd |
| <input type="checkbox"/> Paradeep Phosphates Ltd | <input type="checkbox"/> Samsung Engineering Co Ltd |
| | <input type="checkbox"/> Siemens Ltd |
| | <input type="checkbox"/> Finolex Industries Ltd |





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