

THERMOWELLS Fabricated, Solid Barstock, Flanged & Screwed



THERMOWELLS - AN INTRODUCTION

Thermowells are used extensively in the power, process, pharmaceutical and petrochemical industries. They are used to protect temperature indicators and sensors from process media and to enable servicing or replacement of sensors without the need to shut down plant.

Rototherm Thermowells are designed to meet standards established by BSI, DIN, ASME and other authorities as well as established company standards such as BP, Shell, CEGB, ICI etc.

All thermowells manufactured by British Rototherm are precision made to the highest standards of finish in our modern well equipped machine shop and are manufactured to Rototherms high quality standard that is approved to BS EN ISO 9001. Thermowells are available fabricated from tube or drilled from barstock or from forgings, and full material certification including original mill and suppliers materials certificates can be provided. If required NACE standard MR-01-75 requirements can be met.

Rototherm's experienced engineering sales department can give advice and guidance on material selection for a given application.

PROCESS CONNECTIONS

Rototherms Thermowells are available with both flanged and screwed process connections including:

- **FLANGES** - ANSI, BS AND DIN (others also available)
- **SCREWED** - NPT, API, BSP AND ISO

Other sizes available, contact Sales office for details.

All flange connections are welded front and back by ASME IX approved welders and procedures and are fully hydrostatically tested internally and externally.

Dye penetrant or radiographic inspection of welds is available if required. Flanged thermowells can also be manufactured from 'one piece' forgings removing the need for welding.

INSERTION LENGTHS

For greatest accuracy Rototherm recommend the insertion length selected should exceed the sensitive portion of the indicator or sensing device being used.

The maximum standard immersion lengths are:

- **SOLID DRILLED** - 600mm
- **FABRICATED** - 1500mm

Longer lengths available to special order, contact Sales office for details. If required, thermowell insertion lengths can be determined by means of wake frequency calculations.

MATERIALS

Rototherm Thermowells are available in a variety of materials:

- Stainless steels - 304,316,321 etc
- Carbon steel
- Brass
- Aluminium Bronze and other non ferrous alloys
- Nickel alloys - Monel, Inconel, Hastelloy etc.

Rototherm can also supply thermowells with a variety of corrosion resistant protective coatings, e.g. PTFE, PFA, Gore Fluoroshield, Tantalum Etc. Material certification to DIN 50049 3.1.C is available. Heat treatment to NACE MR-01-75 is also available.

QUALITY ASSURANCE

All Rototherm Thermowells are thoroughly tested and inspected at all stages of manufacture, and include the following:

1. Dimensional Accuracy check
2. Pressure Test - Internal Hydrostatic and External Flange Test
3. Dye Penetrant test as required
4. Radiography as required

Standard Thermowells are supplied with a finely machined surface finish and other finishes are available i.e., polished or knurled as required. All thermowells are degreased and cleaned before despatch and can be supplied cleaned for oxygen or other gas service, e.g Air Products standard A02 etc.

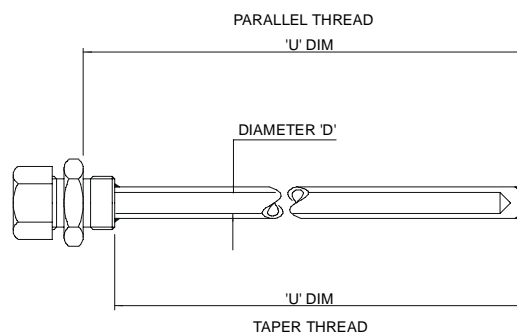
Full documentation can be supplied for all Rototherm Thermowells.

FABRICATED THERMOWELLS

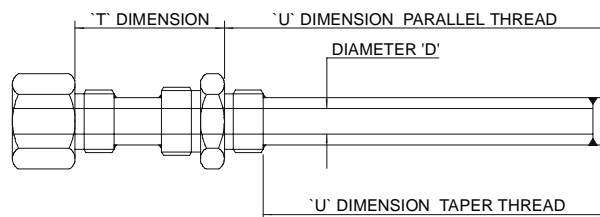
Screwed Process Connections

- Fabricated from tube with an Integral Compression Gland, no need for extra fittings.
- Available with BSP parallel, BSP taper or NPT/API connections, others are available.
- To suit 6.0, 6.3, 8.0, 12.7 and 15.9mm stem diameters as standard - other dimensions available to order, specify dimensions "d"
- Note dimension "U" datum point changes for parallel and taper threads.

TYPE FSP - FABRICATED SCREWED



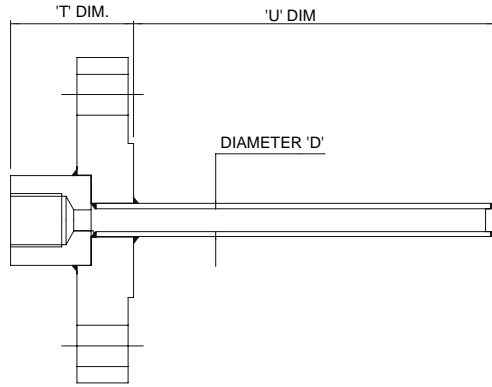
TYPE FSP-EX - FABRICATED SCREWED WITH LAGGING EXTENSION



Flanged Process Connections

- Fabricated from tube, flange and barstock
- Flanges available to ANSI, BS and DIN standards

TYPE FFP - FABRICATED FLANGED



T=50mm is standard, other lengths available

Fig 1 Flange Connections

NOMINAL SIZE	RATING
ANSI - B 16.5/ - BS 1560	
1" (25mm)	150 lb
1.5" (40mm)	300 lb
2" (50mm)	600 lb
	900 lb
Other sizes available	1500 lb
	2500 lb
BS 10	
1"	Table D
1.5"	Table E
2"	Table F
	Table H
(other sizes available)	
DIN/BS4504	
DN 25	PN 6
DN 40	PN 10
DN 50	PN 16
(other sizes available)	(other ratings available)

Note: ANSI flanges are supplied as RF (Raised Face) unless specified as FF (Flat Face) or RTJ (Ring Type Joint)

To order specify Size and Rating e.g. 1.5" 150lb

Fig 2 Immersion Lengths "U"

FABRICATED	SOLID
50 mm	50 mm
75 mm	75 mm
100 mm	100 mm
150 mm	150 mm
200 mm	200 mm
225 mm	225 mm
250 mm	250 mm
300 mm	300 mm
450 mm	450 mm
600 mm	600 mm
750 mm	
Other	Other
(State Requirement)	(State Requirement)

Fig 3 Screwed Connections

BSP PL	BSP TR	NPT	Others
1/4"	1/4"	1/2"	ISO metric
3/8"	1/2"	3/4"	e.g. M24 x 1.5
1/2"	3/4"	1"	IDF Hygienic
5/8"	1"		

FABRICATED OR SOLID?

The choice of fabricated or solid drilled thermowell is determined by a number of factors:-

PRESSURE RESISTANCE

Fabricated : Suitable for up to 70 Bar (1000 PSIG)

Solid : Suitable at all pressures

COST

Fabricated thermowells by their nature are less costly than their solid drilled equivalent, particularly where exotic materials are involved.

VELOCITIES

Solid drilled thermowells can withstand higher flow rates than is possible with a fabricated type.

MATERIALS

Some materials, e.g. Aluminium Bronze are only readily available in barstock form and are therefore unavailable as fabricated thermowells.

SPECIAL DESIGN THERMOWELLS

Rototherm also offers custom made thermowells to a wide range of established standards from a variety of industries including Chemical, Petrochem and Power Generation. These include:-

BP	SHELL
TEXACO	ICI
CEGB	BRITISH GAS
U.O.P.	EXXON/ESSO
GEC/ALSTOM	AIR PRODUCTS

Rototherm can manufacture thermowells to clients exact design or alternatively a suitable design of thermowell for special applications.

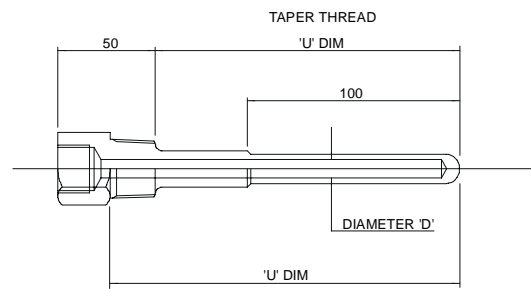
For all technical questions or information please contact the Rototherm Technical Sales Office.

SOLID DRILLED THERMOWELLS

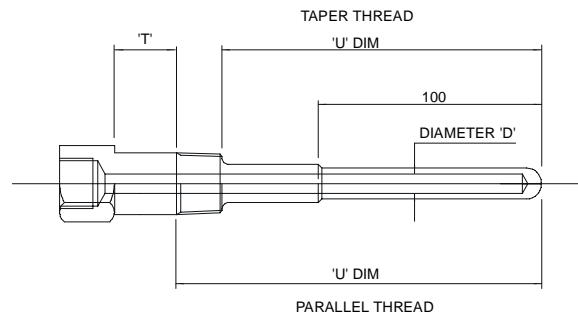
SCREWED PROCESS CONNECTIONS

- Solid drilled from Barstock available with BSP parallel, BSP taper or NPT connections, others also available
- Custom drilled to suit any stem diameter - specify dimension "d"

TYPE SSP - SOLID SCREWED



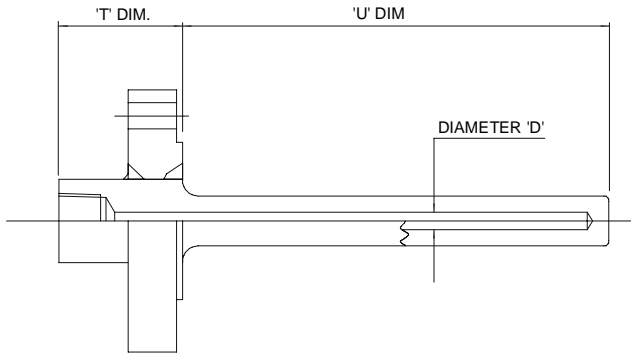
TYPE SSP - SOLID SCREWED WITH LAGGING



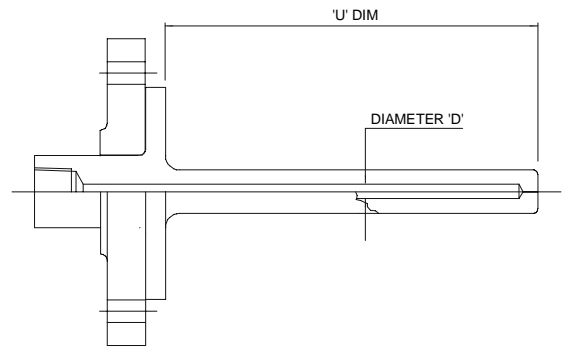
FLANGED PROCESS CONNECTIONS

- Solid drilled from Barstock
- Flanges available to ANSI, BS and DIN standards

TYPE SFP - SOLID FLANGED



TYPE SFP-VS - SOLID VAN STONE FLANGED



THERMOWELL TIP PROFILES

FLAT TIP

Used in low pressure applications or where flow characteristics around the thermowell are not important.

DOMED TIP

Used in higher pressure applications or where flow characteristics around the thermowell are important.

Rototherm thermowells with immersion lengths in excess of 200mm feature a reduced diameter section 100mm long from the tip of the thermowell.

This ensures a high degree of mechanical strength without losing the sensitivity or accuracy of the indicator. Alternatively for short to medium length thermowells the profile can be tapered over its entire length to give the same effect.

PLUG AND CHAIN

If required, Rototherm thermowells can be supplied with an optional plug or cap nut and chain to prevent foreign objects entering and obstructing the thermowell bore.

THERMOWELL ORDERING CODES

FABRICATED SCREWED THERMOWELL

FABRICATED SCREWED THERMOWELL WITH LAGGING

FABRICATED FLANGED THERMOWELL

SOLID SCREWED THERMOWELL

SOLID SCREWED THERMOWELL WITH LAGGING

SOLID FLANGED THERMOWELL (WELDED)

SOLID FLANGED THERMOWELL (VAN STONE)

MATERIAL

- Brass
- Mild steel
- Stainless steel (316 is standard) other grades available
- Other

PROCESS CONNECTION

From table figs 1 & 3

INTERNAL CONNECTION (if required)

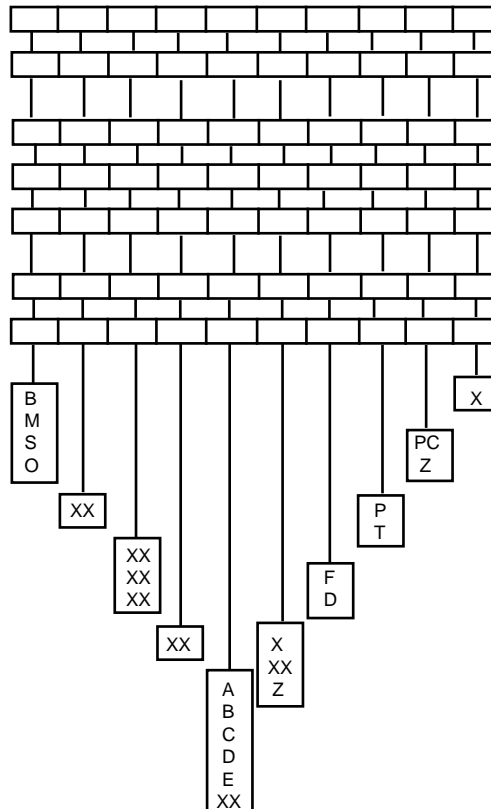
- 1/2" BSP is standard
- Other (state requirement)
- No internal connection

IMMERSION LENGTH

From table fig 2

SENSOR DIAMETER

- 6.0 mm
- 6.3 mm
- 8.0 mm
- 12.7 mm
- 15.9 mm
- Other (state requirement) in mm



- SPECIAL FEATURES**
 - State requirements
- PLUG AND CHAIN**
 - Required
 - Not required
- THERMOWELL PROFILE**
 - Parallel
 - Tapered
- THERMOWELL TIP**
 - Flat
 - Domed
- LAGGING EXTENSION "T"**
 - 50mm is standard
 - Other (state requirement)
 - None

Rototherm

instrumentation and control

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