

Rosemount™ 114C Thermowells



- Wide variety of industry standard process connections including flanged, threaded, welded, and Van Stone
- Large selection of thermowell materials to ensure proper process compatibility from stainless steel to exotic materials such as duplex and alloy C-276
- Additional thermowell options and certificates available

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Wide range of thermowell options and certificates for any application

- Options for special testing requirements, such as External Hydrostatic Pressure Test (Q5) and Dye Penetration Test (Q73)
- Options to ensure material traceability or compatibility, including Positive Material Identification or PMI (Q76), Material Certification (Q8), Thermowell X-ray/Radiograph (Q81), and NACE® Approval (Q35)
- Options for special processing requirements such as Electropolishing (R20)

Experience global consistency and local support from numerous worldwide Emerson manufacturing sites

- World-class manufacturing provides globally consistent product from every factory and the capacity to fulfill the needs of any project, large or small.
- Experienced Instrumentation Consultants help select the right product for any temperature application and offer advice on best installation practices.
- An extensive global network of Emerson service and support personnel can be on-site when and where they are needed.



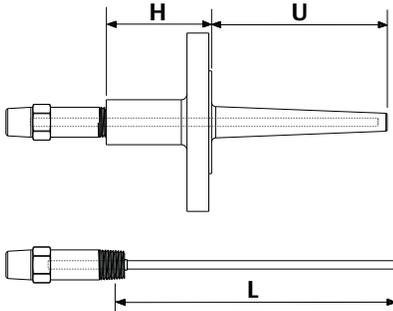
Explore the benefits of Complete Point Solutions™ from Emerson Process Management

- An “Assemble Sensor to Specific Transmitter” and “Assemble Sensor to Specific Thermowell” option enables Emerson to provide a Complete Point Solution for measuring temperature, delivering an installation-ready transmitter, sensor, and thermowell assembly.
- Emerson has a complete portfolio of Single Point and Multi-Input Temperature Measurement solutions, allowing effective measurement and process control with reliable Rosemount products.

Selection guide

Ensure sensor fits thermowell

Rosemount 114C head length (H) + immersion length (U) = Rosemount 214C Sensor insertion length (L). The Rosemount 214C spring loaded sensors are built to have approximately 1/2-in. of spring load.



Basic selection guide

Selecting the proper thermowell for an application is an important activity as it impacts plant safety and measurement efficiency. Thermowells are considered a wetted part; they physically become part of the pressure retaining system.

The four major factors to consider when selecting a thermowell for an application are described below:

1. Thermowell length

There is no standard formula to determine thermowell immersion length. However, there are a few common practices that the process industry follows along with good engineering judgment. Ideally the thermowell tip should be located near the centerline in turbulent flow conditions because this represents the most accurate process temperature.

To ensure optimal performance, a general guideline for immersion length into a pipe is as follows:

- 10x the thermowell root diameter for air or gas
- 5x the thermowell root diameter for liquids

Another guideline is at least one-third the way into the pipe for any measurement. The American Petroleum Institute (API) has a specific recommendation of using an immersion length of the sensing element plus 50 mm (2 inches).

2. Mounting configuration

Consider how the thermowell is mounted on the pipe or tank. The process designer typically specifies what mating connection will be used and the thermowell selected should match that connection. Temperature, pressure, and material are usually taken into consideration to ensure the process connection will be adequate for the application. Welded, threaded, flanged, and Van Stone are standard mounting configuration options.

3. Thermowell stem profile

Factors to be considered when selecting a stem style include the process pressure, required response speed of the measurement, drag force of the fluid flow on the well, and the wake frequency. The stem or shank is the part of a thermowell inserted into the process piping or vessel. Straight, stepped and tapered stem styles are available. Each profile has its advantages depending on the need and situation.

4. Thermowell material

Rosemount Thermowells are supplied in most materials required for industrial applications. Standard materials are 316/316L Stainless Steel, 304/304L Stainless Steel, and A105 Carbon Steel. For corrosive environments, special materials such as Alloy C-276 and Alloy 600 are also available. See the ordering table for a complete listing of standard materials. Contact your local Emerson representative for additional material availability.

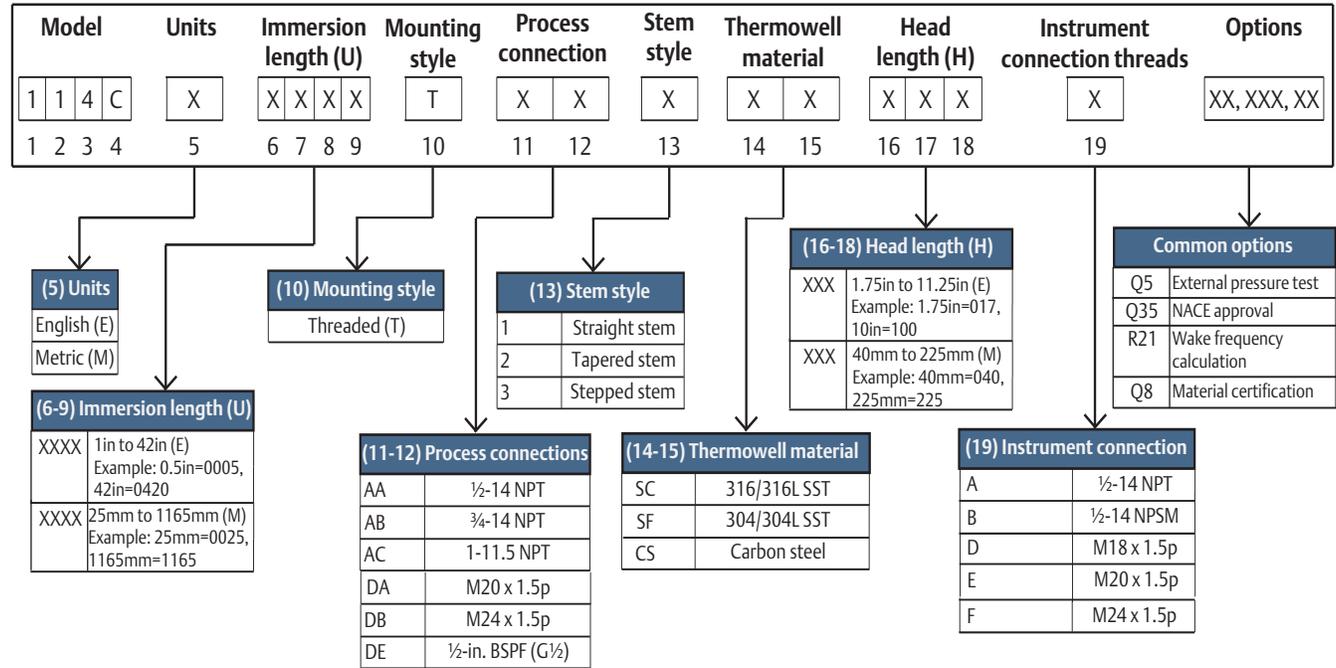
Rosemount 114C Threaded Thermowells



Threaded thermowell overview

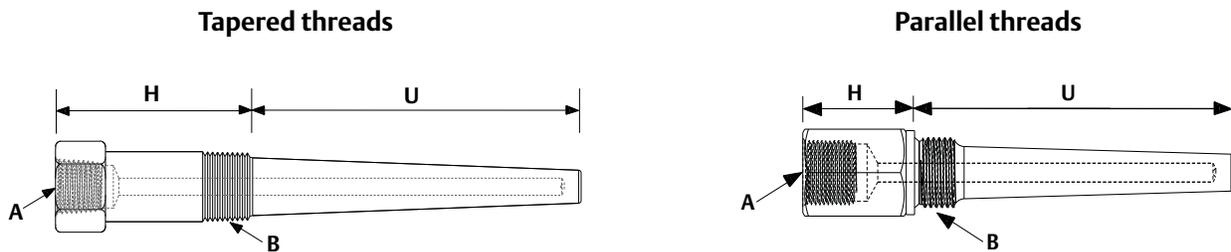
Threaded thermowells are threaded into a process pipe or tank, allowing for easy installation and removal when necessary. While this is the most common mounting method, it has the lowest pressure rating of the mounting configuration options.

Figure 1. Standard Offering–Threaded



The common options shown in Figure 1 represent a partial offering; reference the Ordering Table for a full list of available options.

Figure 2. Threaded Thermowell Components



A. Instrument connection
B. Process connection

H. Head length
U. Immersion length

Note

Wetted surface includes engaged threads and immersion length (U).

Use the form below to record your model code.

Model				Units	Immersion length (U)				Mounting style	Process connection		Stem style	Thermowell material		Head length (H)			Instrument connection	Options
1	1	4	C						T										XXXXX
1	2	3	4	5	6 through 9				10	11 and 12		13	14 and 15		16 through 18			19	

Threaded ordering information

Figure 3. Model Number Ordering Example

Model				Units	Immersion length (U)				Mounting style	Process connection		Stem style	Thermowell material		Head length (H)			Instrument connection	Options
1	1	4	C	E	0	0	6	0	T	A	A	1	S	C	0	5	0	A	WR5, Q76...
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	XXXXX

The numbers below the model number ordering example correlate to the character place numbers in the second column of the ordering table.

Table 1. Rosemount 114C Threaded Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

Place #s 1-4	Model	Details		
★ 114C	Barstock temperature thermowell	Made with a standard bore diameter of 0.26-in. (6.5mm) and tip wall thickness of 0.25-in. (6.4 mm)		
Place # 5	Dimension units	Details		Ref. page
★ E	English units (inches)	Specifies whether length units will be in inches (in) or millimeters (mm)		53
★ M	Metric units (mm)			53
Place # 6-9	Immersion length (U)	Tapered threads	Parallel threads	Ref. page
★ xxxx	xxx.x inches, 1.25 to 60 inches in 1/4-in. increments (when ordered with dimension units code E) Example of a 6.25-in. length where the second decimal is dropped off: 0062			53
★ xxxx	xxxx mm, 30 to 1300 mm in 5-mm increments (when ordered with dimension units code M) Example of a 50 mm length: 0050			53
Place # 10	Mounting style			Ref. page
★ T	Threaded			N/A
Place #s 11-12	Process connection	Details		Ref. page
★ AA	1/2-14 NPT	Tapered threads		N/A
★ AB	3/4-14 NPT	Tapered threads		N/A
★ AC	1-11.5 NPT	Tapered threads		N/A
★ AD	1 1/2-11.5 NPT	Tapered threads		N/A
★ AE	1/2-in. BSPT	Tapered threads		N/A

Table 1. Rosemount 114C Threaded Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

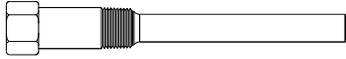
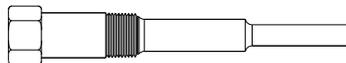
★	AF	3/4-in. BSPT	Tapered threads	N/A	
★	AG	1-in. BSPT	Tapered threads	N/A	
★	DA	M20 x 1.5p	Parallel threads	N/A	
★	DB	M24 x 1.5p	Parallel threads	N/A	
★	DC	M27 x 2p	Parallel threads	N/A	
	DD	M33 x 2p	Parallel threads	N/A	
★	DE	1/2-in. BSPF (G1/2)	Parallel threads	N/A	
★	DF	3/4-in. BSPF (G3/4)	Parallel threads	N/A	
★	DG	1-in. BSPF (G1)	Parallel threads	N/A	
Place # 13		Stem style	Details	Image	Ref. page
★	1	Straight	Minimum immersion length = 1 in (25mm)		54
★	2	Tapered	Minimum immersion length = 1 in (25mm)		54
★	3	Stepped	Minimum immersion length = 3 in (75mm)		54
Place #s 14-15		Thermowell material			Ref. page
★	SC	316/316L dual rated			54
	SD	316/316L dual rated (NORSOK)			54
★	SF	304/304L dual rated			54
★	CS	Carbon steel (A-105)			54
	SG	316Ti SST			54
	SL	310 SST			54
	SM	321 SST			54
	AB	Alloy B3			54
	AC	Alloy C-276			54
	AD	Alloy C-4 (w/ 304/304L SST flange)			54
	AE	Alloy C-22 (w/ 304/304L SST flange)			54
	AF	Alloy C-22 (w/ 316/316L SST flange)			54
	AG	Alloy 20			54
	AH	Alloy 400			54
	AJ	Alloy 400 (w/ 304/304L SST flange)			54

Table 1. Rosemount 114C Threaded Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

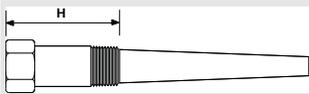
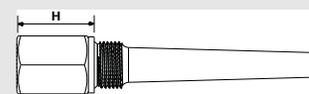
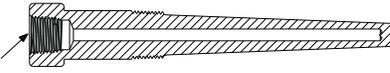
	AK	Alloy 600			54
	AL	Alloy 600 (w/ 304/304L SST flange)			54
	MO	Molybdenum			54
	CA	Chrome-Moly Grade B-11/F-11 Class II			54
	CB	Chrome-Moly Grade B-22/ F-22 Class III			54
	CC	Chrome-Moly Grade F-91			54
	NK	Nickel 200			54
	TT	Titanium Grade 2			54
	DS	Super duplex SST Grade F-53			54
	DT	Super duplex SST Grade F-53 – NORSOK			54
	DU	Duplex 2205 Grade F51			54
	DV	Duplex 2205 Grade F51 – NORSOK			54
Place #s 16-18	Head length (H)	Tapered threads	Parallel threads	Ref. page	
					
★ xxx	xxx.x inches, 1.75 to 11.25 inches in 1/4-in. increments (when ordered with Dimension Units Code E) Example of a 6.25-in. length where the second decimal is dropped off: 062 (Default head length = 1.75 inch)			56	
★ xxx	xxxx mm, 40 to 225 mm in 5-mm increments (when ordered with Dimension Units Code M) Example of a 50 mm length: 050 (Default head length = 45 mm)			56	
Place # 19	Instrument connection	Details	Image	Ref. page	
★ A	1/2–14 NPT	Female threads		57	
★ B	1/2–14 NPSM			57	
C	3/4–14 NPT			57	
D	M18 x 1.5p			57	
E	M20 x 1.5p			57	
F	M24 x 1.5p			57	
G	G 1/2-in. (BSPF)			57	
H	G 3/4-in. (BSPF)			57	
J	M27 x 2p			57	
K	M14 x 1.5p			57	

Table 1. Rosemount 114C Threaded Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

Options (include with selected model number)

Sensor/thermowell assemble to options			Details	Ref. page
★	XT	Hand tight assembly of sensor and thermowell	Ensures sensor is threaded into thermowell but only hand tightened	57
★	XW	Process-ready assembly of sensor and thermowell	Ensures sensor is threaded into thermowell and torqued for process-ready installation	57
Extended product warranty			Details	Ref. page
★	WR3	3-year limited warranty	This warranty option extends manufacturer's warranty to three or five years for manufacturer related defects	58
★	WR5	5-year limited warranty		58
Wake frequency calculation			Details	Ref. page
★	R21	Wake frequency calculation	Set of calculations to ensure thermowells are safe in certain process conditions	58
NACE approval			Details	Ref. page
★	Q35	NACE approval	Meets MR0175/ISO 15156 and MR0103 requirements	59
PMI testing			Details	Ref. page
	Q76	PMI testing	Verifies chemical composition of material	59
Material certification			Details	Ref. page
★	Q8	Material certification	Certificate for material conformance and traceability in accordance with EN 10204 type 3.1	59
Material tests			Details	Ref. page
	M01	Low temperature Charpy Test	Measures the low temperature ductility of the material	60
	M02	Ultrasonic material test	Examination of steel forgings for flaws and inclusions	60
Surface finish			Details	Ref. page
	Q16	Certification	Certificate showing measured surface finish values	60
	R14	Finish < Ra 0.3µm (12µin)	Improves surface roughness of thermowell	61
Electropolish			Details	Ref. page
	R20	Electropolish	Improve smoothness and surface quality	61
Hydrostatic pressure test			Details	Ref. page
★	Q5	External pressure test	Verifies structural quality and checks for leaks at thermowell process connection and stem	61
★	Q85	Internal pressure test	Verifies internal structural integrity of thermowell	62

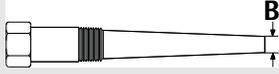
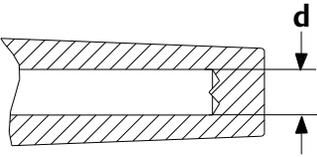
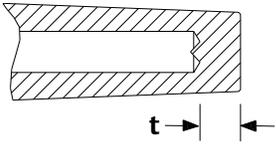
Table 1. Rosemount 114C Threaded Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

Canadian Registration No.		Details	Ref. page
Q17	Canadian Registration No.	Canadian approvals for all provinces	62
Dye penetration test		Details	Ref. page
★ Q73	Dye penetration test	Checks quality of material	62
Bore concentricity		Details	Ref. page
Q83	Ultrasonic test	Checks the bore concentricity of the thermowell	62
Special cleaning		Details	Ref. page
Q6	Special cleaning	Oxygen enriched environment cleaning per ASTM G93	63
Thermowell markings		Details	Ref. page
R40	Test markings on thermowell	External marking of the thermowell for specific tests (see reference page for list of tests)	63
Spherical tip		Details	Ref. page
R60	Spherical tip	Changes the flat tip to spherical	63
Plug and chain		Details	Ref. page
R06	Stainless steel	Protects thermowell threads when sensor is not installed	64
R23	Brass		64
Vent hole		Details	Ref. page
R11	Vent hole	Allows for the venting of a thermowell and for indication that thermowell structural integrity has been compromised	64
Thermowells with wrench flats		Details	Ref. page
R37	Thermowells with wrench flats	Converts the two wrench flats to hex wrench flats; only applies to exotic materials	70
Root diameter (A)			Ref. page
Axxx	x.xx inches, 0.4 to 3.15 inches in 0.01-in. increments (when ordered with Dimension Units Code E) Examples: Code A040 = 0.4-in, Code A315 = 3.15-in.		71
Axxx	x.xx mm, 10 to 80 mm in 0.5-mm increments (when ordered with Dimension Units Code M) Examples: Code A100 = 10.0 mm, Code A755 = 75.5 mm		71

Table 1. Rosemount 114C Threaded Ordering Information

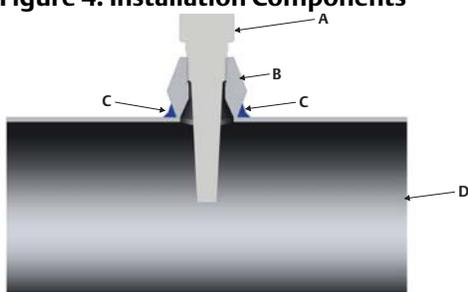
★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

Tip diameter (B)				Ref. page	
					
Bxxx	x.xx inches, 0.4 to 1.80 inches in 0.01-in. increments (when ordered with Dimension Units Code E)			72	
	Examples: Code B040 = 0.4-in, Code B180 = 1.80-in.				
Bxxx	x.xx mm, 10 to 46 mm in 0.5-mm. increments (when ordered with Dimension Units Code M)			72	
	Examples: Code B100 = 10.0 mm, Code B455 = 45.5 mm				
Non-standard bore diameter (d)		Details	Image	Ref. page	
D01	0.276-in./7.0 mm	Default = 0.26-in. (6.5 mm)		73	
D03	0.138-in./3.5 mm			73	
D04	0.38-in./9.8 mm			73	
D05	0.354-in./9.0 mm			73	
D06	0.433-in./11.0 mm			73	
Non-standard tip thickness (t)		Details	Image	Ref. page	
T01	0.197-in./5.0 mm	Default = 0.25-in. (6.4 mm)		73	
T02	0.236-in./6.0 mm			73	

Threaded installation

Threaded thermowells are screwed into the process using a threaded fitting or directly into a tapped pipe if there is sufficient wall thickness. Tapered threads will deform to each other to create a seal. Thread sealant and appropriate torque should be applied to reduce risk of leaks.

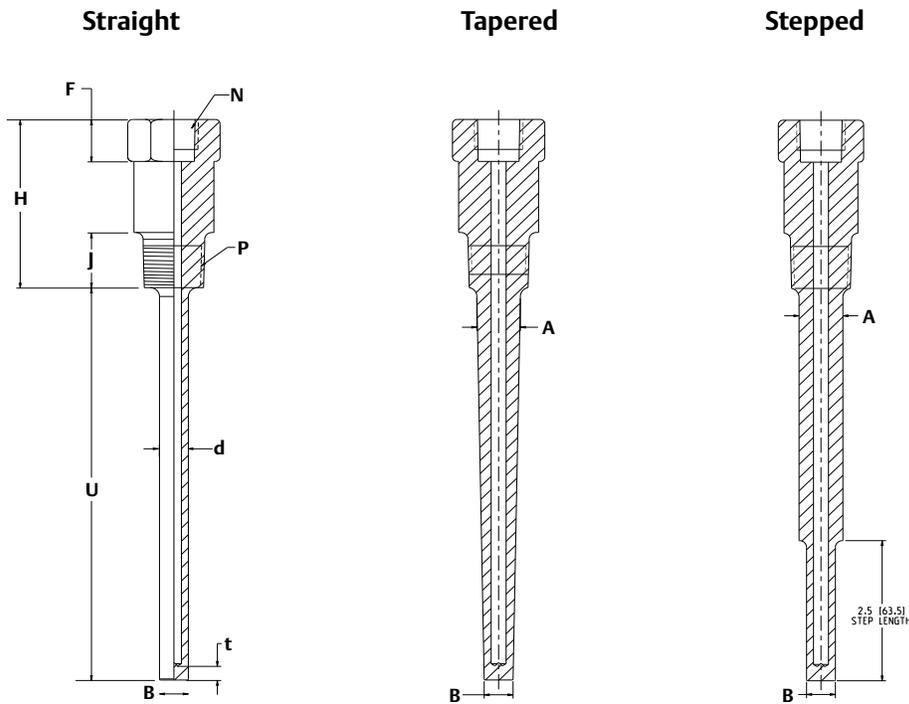
Figure 4. Installation Components



- A. Thermowell
- B. Threaded fitting
- C. Weld
- D. Process

Threaded thermowell drawings

Figure 5. Thread Mount Thermowell Drawings (Tapered Thread)⁽¹⁾



H. Head length
 F. Hex size
 U. Immersion length
 J. Thread allowance
 N. Instrument connection (1/2-in. NPT)

P. Process connection (3/4-in. NPT)
 d. Bore diameter
 t. Tip thickness
 B. Tip diameter
 A. Root diameter

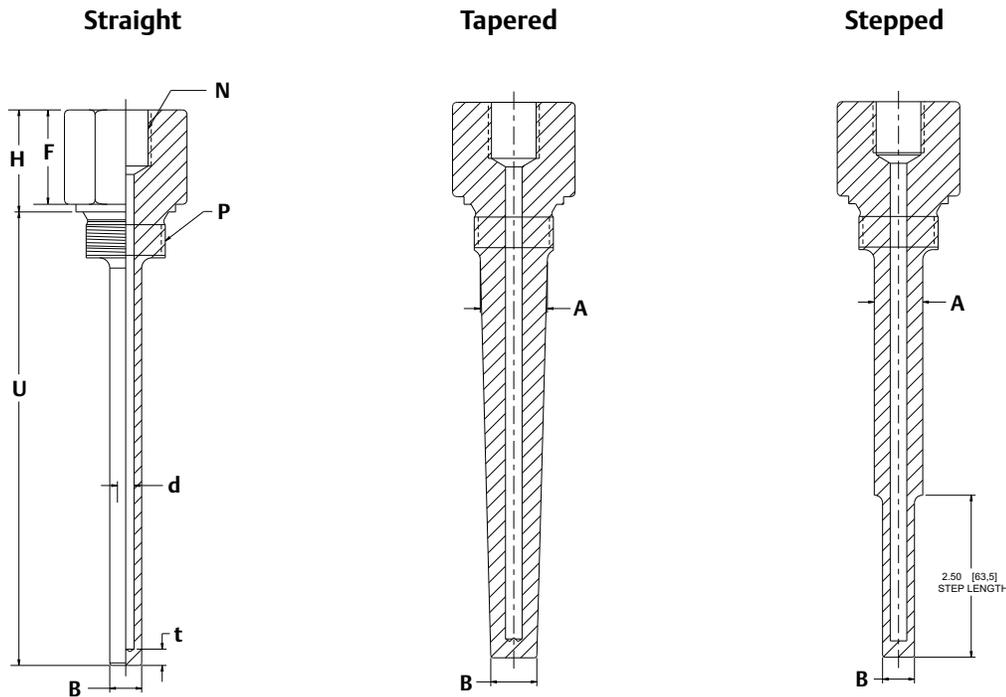
Table 2. Thread Mount Thermowells (Tapered Thread)⁽¹⁾

Code	Code T, threaded mounting style Process connection "P"	Hex size "F"		Root diameter stepped stem "Ø A _s "	Root diameter tapered stem "Ø A _t "	Tip diameter "Ø B _t "	Tip diameter straight stem "Ø B _s "	Thread specification
		Metric units in mm (code M)	English units in inches (code E)					
AA	1/2-14 NPT	30	1 1/8	0.67 (17)	0.67 (17)	0.50 (12.7)	0.67 (17)	NPT per SAE -AS 71051 (reference PS-71)
AB	3/4-14 NPT	30	1 1/8	0.75 (19)	0.89 (22.5)	0.63 (16)	0.71 (18)	
AC	1-11.5 NPT	34	1 1/4	0.85 (21.5)	1.04 (26.5)	0.71 (18)	0.71 (18)	
AD	1 1/2-11.5 NPT	48	1 3/4	0.85 (21.5)	1.04 (26.5)	0.71 (18)	0.71 (18)	
AE	1/2-in. BSPT	30	1 1/8	0.67 (17)	0.67 (17)	0.50 (12.7)	0.67 (17)	THD per ISO 7/1 (BS 21)
AF	3/4-in. BSPT	30	1 1/8	0.75 (19)	0.89 (22.5)	0.63 (16)	0.71 (18)	
AG	1-in. BSPT	34	1 1/4	0.85 (21.5)	1.04 (26.5)	0.71 (18)	0.71 (18)	

1. Dimensions are in inches (millimeters).

1. Total length = U+H.

Figure 6. Thread Mount Thermowell Drawings (Parallel Thread)⁽¹⁾



H. Head length
 U. Immersion length
 F. Hex size
 N. Instrument connection
 P. Process connection

d. Bore diameter
 t. Tip thickness
 B. Tip diameter
 A. Root diameter

Table 3. Thread Mount Thermowells (Parallel Thread)⁽¹⁾

Code	Code T, threaded mounting style	Hex size "F"		Root diameter stepped stem "∅ As"	Root diameter tapered stem "∅ At"	Tip diameter tapered stem "∅ B"	Thread specification
		English units in inches (code E)	Metric units in mm (code M)				
DA	M20 x 1.5	1.18	30	0.67 (17)	0.67 (17)	0.5 (12.7)	Thread per BS3643
DB	M24 x 1.5	1.18	30	0.75 (19)	0.75 (19)	0.5 (12.7)	
DC	M27 x 2	1.26 or 1.42	32 or 36	0.75 (19)	0.75 (19)	0.5 (12.7)	
DD	M33 x 2	1.61	41	0.85 (21.5)	1.04 (26.5)	0.71 (18)	
DE	1/2-in. BSPF (G ¹ /2)	1.06	27	0.67 (17)	0.67 (17)	0.5 (12.7)	Thread per ISO 228/1 (BS 2779)
DF	3/4-in. BSPF (G ³ /4)	1.26	32	0.75 (19)	0.75 (19)	0.5 (12.7)	
DG	1-in. BSPF (G1)	1.61	41	0.85 (21.5)	1.04 (26.5)	0.71 (18)	

1. Dimensions are in inches (millimeters).

Note

Hex size will be different depending on units selected (English and Metric).
 Wrench flats are used on exotic materials instead of hex flats. For hex flats on exotic materials, select option R37.
 Additional root and tip diameters available.

1. Total length = U+H.

Rosemount 114C Flanged Thermowells

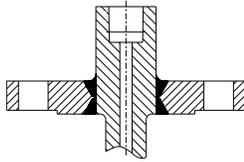


Flanged thermowell overview

All Rosemount flanged thermowells are manufactured in accordance with ANSI B16.5. The flange to stem weld is in accordance to ASME Section IX. There is also full traceability with material certifications available on request. Rosemount flanged thermowells are available in two manufacturing configurations: full and partial penetration welds.

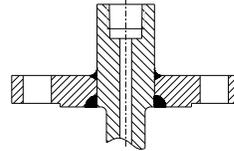
Full penetration weld (F)

- Stronger weld joint per ASME PTC 19.3 TW-2016
- Used for heavy duty applications
- Emerson recommended option



Partial penetration weld (P)

- Adequate for most process applications
- Weld withstands same pressure and temperature rating as flange
- Lower cost than full penetration weld



Forged, no welds (G)

- Highest fatigue resistance per ASME PTC 19.3 TW 2016
- Eliminates weld qualifications and failures
- Used in extreme process applications

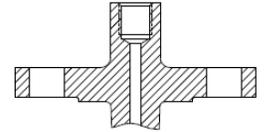
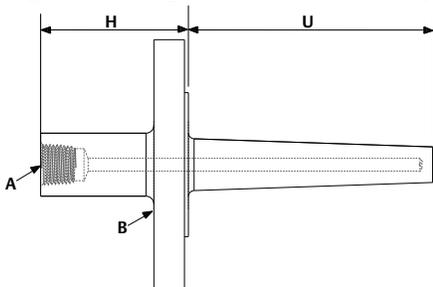


Figure 7. Standard Offering–Flanged

Model	Units	Immersion length (U)	Mounting style	Process connection	Stem style	Thermowell material	Head length (H)	Instrument connection threads	Options
1 1 4 C	X	X X X X	X	X X	X	X X	X X X	X	XX, XXX, XX
1 2 3 4	5	6 7 8 9	10	11 12	13	14 15	16 17 18	19	
(5) Units		(10) Mounting style		(13) Stem style		(16-18) Head length (H)		Common options	
English (E) Metric (M)		F Full penetration weld P Partial penetration weld G Forged, no welds		1 Straight stem 2 Tapered stem 3 Stepped stem		XXX 2.25in to 11.25in (E) Example: 2.25in=022, 10in=100 XXX 40mm to 225mm (M) Example: 40mm=040, 225mm=225		Q5 External pressure test Q35 NACE approval R21 Wake frequency calculation Q8 Material certification Q73 Dye penetration test	
(6-9) Immersion length (U)		(11-12) Process connections		(14-15) Thermowell material		(19) Instrument connection			
XXXX 0.5in to 42in (E) Example: 0.5in=0005, 42in=0420 XXXX 25mm to 1165mm (M) Example: 25mm=0025, 1165mm=1165		AA 1-in. Class 150 AB 1½-in. Class 150 AC 2-in. Class 150 AH 1-in. Class 300 AJ 1½-in. Class 300 AK 2-in. Class 300		SC 316/316L SST SF 304/304L SST CS Carbon steel		A ½-14 NPT B ½-14 NPSM D M18 x 1.5p E M20 x 1.5p F M24 x 1.5p			

The common options shown in Figure 7 represent a partial offering; reference the Ordering Table for a full list of available options.

Figure 8. Flanged Thermowell Components



A. Instrument connection
B. Process connection

H. Head length
U. Immersion length

Note

Wetted surface includes flange face and immersion length (U).

Use the form below to record your model code.

Model				Units	Immersion length (U)	Mounting style	Process connection	Stem style	Thermowell material	Head length (H)	Instrument connection	Options
1	1	4	C									
1	2	3	4	5	6 through 9	10	11 and 12	13	14 and 15	16 through 18	19	XXXXX

Flanged ordering information

Figure 9. Model Number Ordering Example

Model				Units	Immersion length (U)				Mounting style	Process connection		Stem style	Thermowell material		Head length (H)			Instrument connection	Options
1	1	4	C	E	0	1	5	0	F	A	C	1	S	C	0	5	0	A	WR5, Q76...
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	XXXXX

The numbers below the model number ordering example correlate to the character place numbers in the second column of the ordering table.

Table 4. Rosemount 114C Flanged Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

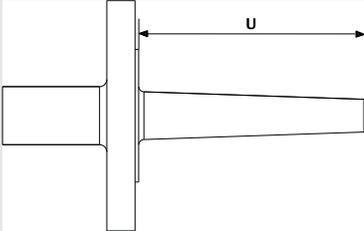
Place #s 1-4	Model	Details		Ref. page
★ 114C	Barstock temperature thermowell	Made with a standard bore diameter of 0.26-in. (6.5mm) and tip wall thickness of 0.25-in. (6.4 mm). Default ASME flange facing is raised face with spiral serrations. Default EN 1092-1 flange facing is raised face Type B1		
Place # 5	Dimension units	Details		Ref. page
★ E	English units (inches)	Specifies whether length units will be in inches (in) or millimeters (mm)		53
★ M	Metric units (mm)			53
Place # 6-9	Immersion length (U)			Ref. page
★ xxxx	xxx.x inches, 2 to 60 inches in 1/4-in. increments (when ordered with dimension units code E) Example of a 6.25-in. length where the second decimal is dropped off: 0062			53
★ xxxx	xxxx mm, 25 to 1300 mm in 5-mm increments (when ordered with dimension units code M) Example of a 25 mm length: 0025			53
Place # 10	Mounting style	Details		Ref. page
★ P	Flange, partial penetration weld	Weld refers to welding of the flange to thermowell stem		N/A
★ F	Flange, full penetration weld			N/A
G	Flange, forged	Single piece forging, no welds		N/A

Table 4. Rosemount 114C Flanged Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time.

The Expanded offering is subject to additional delivery lead time.

Place #s 11-12	Process connection			Ref. page
	Partial weld (P)	Full penetration weld (F)	Forged, no welds (G)	
				N/A
★ AA	1-in. Class 150	1-in. Class 150	1-in. Class 150	N/A
★ AB	1½-in. Class 150	1½-in. Class 150	1½-in. Class 150	N/A
★ AC	2-in. Class 150	2-in. Class 150	2-in. Class 150	N/A
★ AD	3-in. Class 150	3-in. Class 150	3-in. Class 150	N/A
★ AE	4-in. Class 150	4-in. Class 150	4-in. Class 150	N/A
★ AF	6-in. Class 150	6-in. Class 150	6-in. Class 150	N/A
★ AG	¾-in. Class 300	¾-in. Class 300	¾-in. Class 300	N/A
★ AH	1-in. Class 300	1-in. Class 300	1-in. Class 300	N/A
★ AJ	1½-in. Class 300	1½-in. Class 300	1½-in. Class 300	N/A
★ AK	2-in. Class 300	2-in. Class 300	2-in. Class 300	N/A
AL	1-in. Class 400/600	1-in. Class 400/600	1-in. Class 400/600	N/A
AM	1½-in. Class 400/600	1½-in. Class 400/600	1½-in. Class 400/600	N/A
AN	2-in. Class 400/600	2-in. Class 400/600	N/A	N/A
AP	N/A	1-in. Class 900/1500	N/A	N/A
AQ	N/A	1½-in. Class 900/1500	N/A	N/A
AR	N/A	2-in. Class 900/1500	N/A	N/A
AT	N/A	1½-in. Class 2500	N/A	N/A
AU	N/A	2-in. Class 2500	N/A	N/A
FA	DN 20 / PN 2.5/6	DN 20 / PN 2.5/6	N/A	N/A
FE	DN 20 / PN 10/16/25/40	DN 20 / PN 10/16/25/40	N/A	N/A
FG	DN 20 / PN 63/100	DN 20 / PN 63/100	N/A	N/A
GA	DN 25 / PN 2.5/6	DN 25 / PN 2.5/6	N/A	N/A
GE	DN 25 / PN 10/16/25/40	DN 25 / PN 10/16/25/40	N/A	N/A
GG	DN 25 / PN 63/100	DN 25 / PN 63/100	N/A	N/A
JA	DN 40 / PN 2.5/6	DN 40 / PN 2.5/6	N/A	N/A
JE	DN 40 / PN 10/16/25/40	DN 40 / PN 10/16/25/40	N/A	N/A
JG	DN 40 / PN 63/100	DN 40 / PN 63/100	N/A	N/A
KA	DN 50 / PN 2.5/6	DN 50 / PN 2.5/6	N/A	N/A
KC	DN 50 / PN 10/16	DN 50 / PN 10/16	N/A	N/A
KE	DN 50 / PN 25/40	DN 50 / PN 25/40	N/A	N/A
KF	DN 50 / PN 63	DN 50 / PN 63	N/A	N/A
KG	DN 50 / PN 100	DN 50 / PN 100	N/A	N/A

Table 4. Rosemount 114C Flanged Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time.
 The Expanded offering is subject to additional delivery lead time.

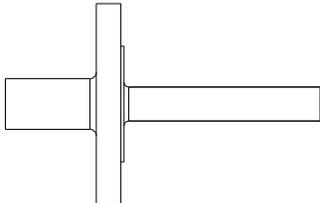
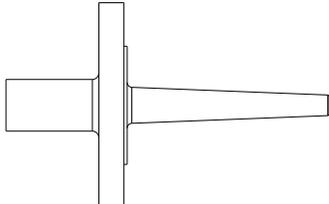
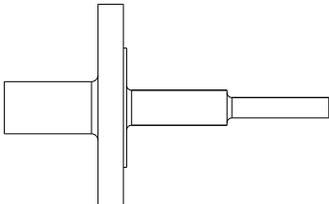
Place # 13	Stem style	Details	Image	Ref. page
★ 1	Straight	Minimum immersion length = 1 in (25mm)		54
★ 2	Tapered	Minimum immersion length = 1 in (25mm)		54
★ 3	Stepped	Minimum immersion length = 3 in (75mm)		54
Place #s 14-15	Thermowell material			Ref. page
★ SC	316/316L dual rated			54
SD	316/316L dual rated (NORSOK)			54
★ SF	304/304L dual rated			54
★ CS	Carbon steel (A-105)			54
SG	316Ti SST			54
SH	316/316L SST w/ tantalum sheath			54
SJ	316/316L SST w/ PFA coating			54
SK	304/304L SST w/ PTFE coating			54
SL	310 SST			54
SM	321 SST			54
AB	Alloy B3			54
AC	Alloy C-276			54
AD	Alloy C-4 (w/ 304/304L SST flange)			54
AE	Alloy C-22 (w/ 304/304L SST flange)			54
AF	Alloy C-22 (w/ 316/316L SST flange)			54

Table 4. Rosemount 114C Flanged Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time.
 The Expanded offering is subject to additional delivery lead time.

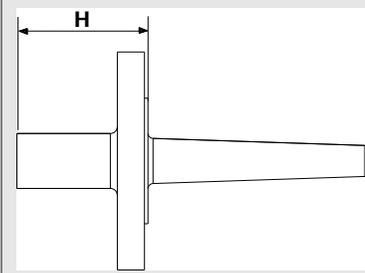
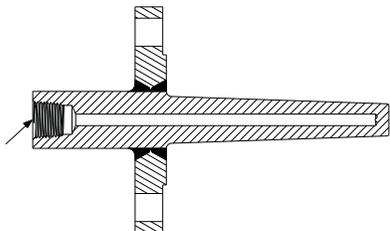
	AG	Alloy 20	54
	AH	Alloy 400	54
	AJ	Alloy 400 (w/ 304/304L SST flange)	54
	AK	Alloy 600	54
	AL	Alloy 600 (w/ 304/304L SST flange)	54
	MO	Molybdenum	54
	CA	Chrome-Moly Grade B-11/F-11 Class II	54
	CB	Chrome-Moly Grade B-22/ F-22 Class III	54
	CC	Chrome-Moly Grade F-91	54
	NK	Nickel 200	54
	TT	Titanium Grade 2	54
	DS	Super duplex SST Grade F-53	54
	DT	Super duplex – NORSOK	54
	DU	Duplex 2205 Grade F51	54
	DV	Duplex 2205 – NORSOK	54
	Place #s 16-18	Head length (H)	Ref. page
			
★	xxx	xxx.x inches, 2.25 to 11.25 inches in 1/4-in. increments (when ordered with Dimension units code E) Example of a 6.25-in. length where the second decimal is dropped off: 062 (default head length = 2.25 inches for flanges under Class 900)	56
★	xxx	xxxx mm, 45 to 225 mm in 5-mm increments (when ordered with Dimension units code M) Example of a 50 mm length: 050 (default head length = 60 mm for flanges under Class 900)	56

Table 4. Rosemount 114C Flanged Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time.
 The Expanded offering is subject to additional delivery lead time.

Place # 19	Instrument connection	Details	Image	Ref. page
★ A	1/2-14 NPT	Female threads		57
★ B	1/2-14 NPSM			57
C	3/4-14 NPT			57
D	M18 x 1.5p			57
E	M20 x 1.5p			57
F	M24 x 1.5p			57
G	G 1/2-in. (BSPF)			57
H	G 3/4-in. (BSPF)			57
J	M27 x 2p			57
K	M14 x 1.5p			57

Options (include with selected model number)

Sensor/thermowell assemble to options		Details	Ref. page
★ XT	Hand tight assembly of sensor and thermowell	Ensures sensor is threaded into thermowell but only hand tightened	57
★ XW	Process-ready assembly of sensor and thermowell	Ensures sensor is threaded into thermowell and torqued for process-ready installation	57
Extended product warranty		Details	Ref. page
★ WR3	3-year limited warranty	This warranty option extends manufacturer’s warranty to three or five years for manufacturer related defects	58
★ WR5	5-year limited warranty		58
Wake frequency calculation		Details	Ref. page
★ R21	Wake frequency calculation	Set of calculations to ensure thermowells are safe in certain process conditions	58
NACE approval		Details	Ref. page
★ Q35	NACE approval	Meets MR0175/ISO 15156 and MR0103 requirements	59
PMI testing		Details	Ref. page
Q76	PMI testing	Verifies chemical composition of material	59
Material certification		Details	Ref. page
★ Q8	Material certification	Certificate for material conformance and traceability in accordance with EN 10204 type 3.1	59

Table 4. Rosemount 114C Flanged Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time.
The Expanded offering is subject to additional delivery lead time.

Material tests			Details	Ref. page
	M01	Low temperature Charpy Test	Measures the low temperature ductility of the material	60
	M02	Ultrasonic material test	Examination of steel forgings for flaws and inclusions	60
Surface finish			Details	Ref. page
	Q16	Certification	Certificate showing measured surface finish values	60
	R14	Finish < Ra 0.3µm (12µin)	Improves surface roughness of thermowell	61
Electropolish			Details	Ref. page
	R20	Electropolish	Improve smoothness and surface quality	61
Hydrostatic pressure test			Details	Ref. page
★	Q5	External pressure test	Verifies structural quality and checks for leaks at thermowell process connection and stem	61
★	Q85	Internal pressure test	Verifies internal structural integrity of thermowell	62
Canadian Registration No.			Details	Ref. page
	Q17	Canadian Registration No.	Canadian approvals for all provinces	62
Dye penetration test			Details	Ref. page
★	Q73	Dye penetration test	Checks quality of welds and material	62
Bore concentricity			Details	Ref. page
	Q83	Ultrasonic test	Checks the bore concentricity of the thermowell	62
Special cleaning			Details	Ref. page
	Q6	Special cleaning	Oxygen enriched environment cleaning per ASTM G93	63
Thermowell markings			Details	Ref. page
	R40	Test markings on thermowell	External marking of the thermowell for specific tests (see reference page for list of tests)	63
X-ray/radiograph test			Details	Ref. page
	Q81	X-ray/radiograph	Verifies quality of full penetration flange welds	63
Spherical tip			Details	Ref. page
	R60	Spherical tip	Changes the flat tip to spherical	63

Table 4. Rosemount 114C Flanged Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time.
 The Expanded offering is subject to additional delivery lead time.

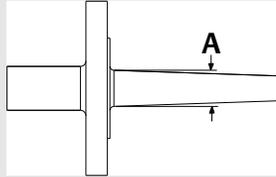
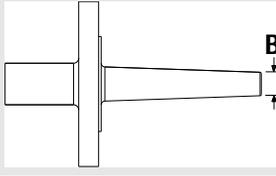
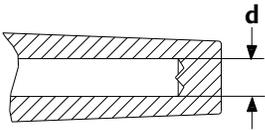
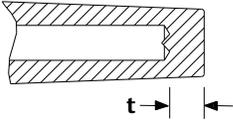
Plug and chain		Details	Ref. page
R06	Stainless steel	Protects thermowell threads when sensor is not installed	64
R23	Brass		64
Vent hole		Details	Ref. page
R11	Vent hole	Allows for the venting of a thermowell	64
Flange face		Details	Ref. page
R09	Concentric serrations	Concentric serrations on flange face per ASME B16.5	65
R10	Flat	Flat flange face per ASME B16.5 or EN 1092-1 facing Type A	65
R15	Raised face, Type B2	Raise face per EN 1092-1 facing Type B2	66
R16	RTJ	Ring type joint flange face per ASME B16.5	67
R18	Groove, Type D	Groove, Type D per EN 1092-1	67
R19	Tongue, Type C	Tongue, Type C per EN 1092-1	68
R24	Spigot, Type E	Spigot Type E per EN 1092-1	69
R25	Recess, Type F	Recess Type F per EN 1092-1	69
Root diameter (A)			Ref. page
Axxx	x.xx inches, 0.4 to 3.15 inches in 0.01-in. increments (when ordered with Dimension Units Code E) Examples: Code A040 = 0.4-in, Code A315 = 3.15-in.		71
Axxx	x.xx mm, 10 to 80 mm in 0.5-mm increments (when ordered with Dimension Units Code M) Examples: Code A100 = 10.0 mm, Code A755 = 75.5 mm		71
Tip diameter (B)			Ref. page
Bxxx	x.xx inches, 0.4 to 1.80 inches in 0.01-in. increments (when ordered with Dimension Units Code E) Examples: Code B040 = 0.4-in, Code B180 = 1.80-in.		72
Bxxx	x.xx mm, 10 to 46 mm in 0.5-mm. increments (when ordered with Dimension Units Code M) Examples: Code B100 = 10.0 mm, Code B455 = 45.5 mm		72

Table 4. Rosemount 114C Flanged Ordering Information

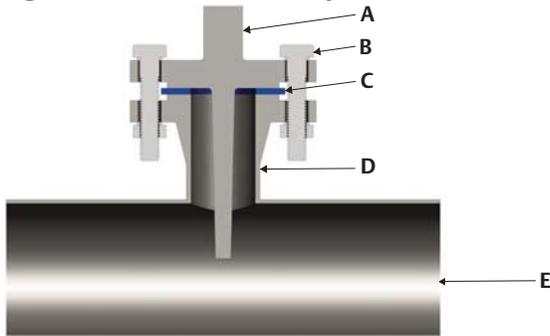
★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

Non-standard bore diameter (d)		Details	Image	Ref. page
D01	0.276-in./7.0 mm	Standard = 0.26-in. (6.5mm)		73
D03	0.138-in./3.5 mm			73
D04	0.385-in./9.8 mm			73
D05	0.354-in./9.0 mm			73
D06	0.433-in./11.0 mm			73
Non-standard tip thickness (t)		Details	Image	Ref. page
T01	0.197-in./5.0 mm	Standard = 0.25-in. (6.4mm)		73
T02	0.236-in./6.0 mm			73

Flanged installation

Flanged thermowells are bolted to a mating flange which protrudes from the process. It is important to select appropriate gasket for the process conditions, to provide a seal between the flange faces. The Rosemount 114C Thermowells come standard with a raised face and spiral serrations designed per the ASME B16.5 standard. These should be installed with an inside bolt circle (IBC) gasket/ring gasket, which extends to and is centered by the bolts. Other flange face options are available.

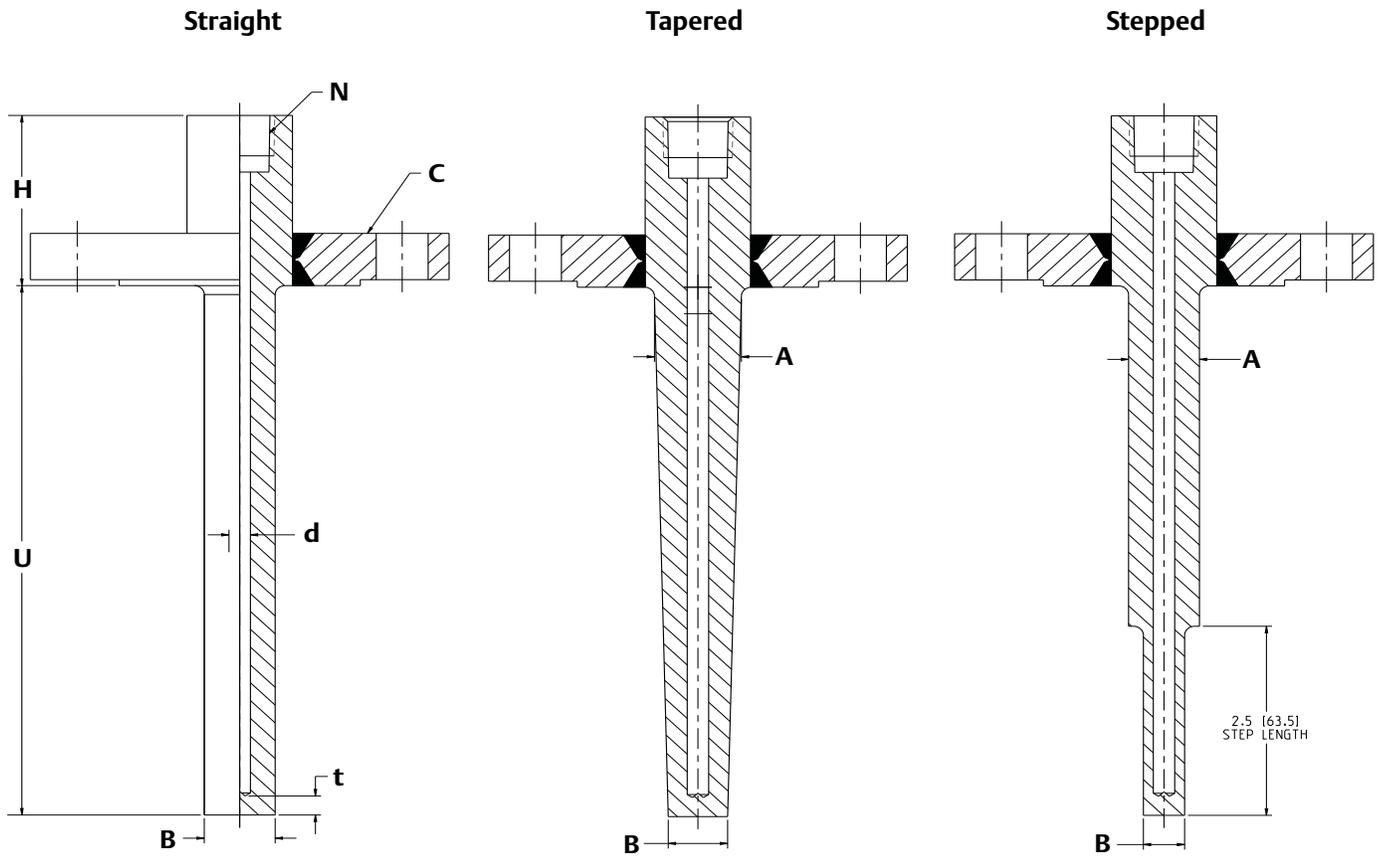
Figure 10. Installation Components



- A. Thermowell
- B. Bolt/washers
- C. Ring gasket
- D. Nozzle and mating flange
- E. Process

Flanged thermowell drawings

Figure 11. Flange Mounted Thermowell Drawings⁽¹⁾



H. Head length
 U. Immersion length
 N. Instrument connection (1/2-in. NPT)
 C. ASME B16.5 lap flange

d. Bore diameter
 t. Tip thickness
 B. Tip diameter
 A. Root diameter

1. Total length = U+H.

Table 5. Flange Mounted Thermowells⁽¹⁾

Code	Process connection			Root diameter stepped stem “Ø A _s ”	Root diameter tapered stem “Ø At”	Tip diameter tapered stem “Ø Bt”	Tip diameter straight stem “Ø Bs”	Flanges per specification
	Code P, flanged, partial penetration weld	Code F, flanged, full penetration weld	Code G, flanged, forged/no welds					
AA	1-in. Class 150	1-in. Class 150	1-in. Class 150	0.75 (19)	0.89 (22.5)	0.63 (16)	0.75 (19)	ASME B16.5
AB	1 1/2-in. Class 150	1 1/2-in. Class 150	1 1/2-in. Class 150	0.85 (21.5)	1.04 (26.5)	0.71 (18)	0.85 (21.5)	
AC	2-in. Class 150	2-in. Class 150	2-in. Class 150	0.85 (21.5)	1.04 (26.5)	0.71 (18)	0.85 (21.5)	
AD	3-in. Class 150	3-in. Class 150	3-in. Class 150	0.85 (21.5)	1.04 (26.5)	0.71 (18)	0.85 (21.5)	
AE	4-in. Class 150	4-in. Class 150	4-in. Class 150	0.85 (21.5)	1.04 (26.5)	0.71 (18)	0.85 (21.5)	
AF	6-in. Class 150	6-in. Class 150	6-in. Class 150	0.85 (21.5)	1.04 (26.5)	0.71 (18)	0.85 (21.5)	
AG	3/4-in. Class 300	3/4-in. Class 300	3/4-in. Class 300	0.67 (17)	0.67 (17)	0.50 (12.7)	0.67 (17)	
AH	1-in. Class 300	1-in. Class 300	1-in. Class 300	0.75 (19)	0.89 (22.5)	0.63 (16)	0.75 (19)	
AJ	1 1/2-in. Class 300	1 1/2-in. Class 300	1 1/2-in. Class 300	0.85 (21.5)	1.04 (26.5)	0.71 (18)	0.85 (21.5)	
AK	2-in. Class 300	2-in. Class 300	2-in. Class 300	0.85 (21.5)	1.04 (26.5)	0.71 (18)	0.85 (21.5)	
AL	1-in. Class 400/600	1-in. Class 400/600	1-in. Class 400/600	0.75 (19)	0.89 (22.5)	0.63 (16)	0.75 (19)	
AM	1 1/2-in. Class 400/600	1 1/2-in. Class 400/600	1 1/2-in. Class 400/600	0.85 (21.5)	1.04 (26.5)	0.71 (18)	0.85 (21.5)	
AN	2-in. Class 400/600	2-in. Class 400/600	N/A	0.85 (21.5)	1.04 (26.5)	0.71 (18)	0.85 (21.5)	
AP	N/A	1-in. Class 900/1500	N/A	0.75 (19)	0.89 (22.5)	0.63 (16)	0.75 (19)	
AQ	N/A	1 1/2-in. Class 900/1500	N/A	0.85 (21.5)	1.04 (26.5)	0.71 (18)	0.85 (21.5)	
AR	N/A	2-in. Class 900/1500	N/A	0.85 (21.5)	1.04 (26.5)	0.71 (18)	0.85 (21.5)	
AT	N/A	1 1/2-in. Class 2500	N/A	0.85 (21.5)	1.04 (26.5)	0.71 (18)	0.85 (21.5)	
AU	N/A	2-in. Class 2500	N/A	0.85 (21.5)	1.04 (26.5)	0.71 (18)	0.85 (21.5)	
FA	DN 20/PN 2.5/6	DN 20/PN 2.5/6	N/A	0.669 (17)	0.669 (17)	0.50 (12.7)	0.669 (17)	
FE	DN 20/PN 10/16/25/40	DN 20/PN 10/16/25/40	N/A	0.669 (17)	0.669 (17)	0.50 (12.7)	0.669 (17)	
FG	DN 20/PN 63/100	DN 20/PN 63/100	N/A	0.669 (17)	0.669 (17)	0.50 (12.7)	0.669 (17)	
GA	DN 25/PN 2.5/6	DN 25/PN 2.5/6	N/A	0.748 (19)	0.748 (19)	0.50 (12.7)	0.748 (19)	
GE	DN 25/PN 10/16/25/40	DN 25/PN 10/16/25/40	N/A	0.748 (19)	0.748 (19)	0.50 (12.7)	0.748 (19)	
GG	DN 25/PN 63/100	DN 25/PN 63/100	N/A	0.748 (19)	0.748 (19)	0.50 (12.7)	0.748 (19)	
JA	DN 40/PN 2.5/6	DN 40/PN 2.5/6	N/A	0.846 (21.5)	1.043 (26.5)	0.709 (18)	0.846 (21.5)	
JE	DN 40/PN 10/16/25/40	DN 40/PN 10/16/25/40	N/A	0.846 (21.5)	1.043 (26.5)	0.709 (18)	0.846 (21.5)	
JG	DN 40/PN 63/100	DN 40/PN 63/100	N/A	0.846 (21.5)	1.043 (26.5)	0.709 (18)	0.846 (21.5)	
KA	DN 50/PN 2.5/6	DN 50/PN 2.5/6	N/A	0.846 (21.5)	1.043 (26.5)	0.709 (18)	0.846 (21.5)	
KC	DN 50/PN 10/16	DN 50/PN 10/16	N/A	0.846 (21.5)	1.043 (26.5)	0.709 (18)	0.846 (21.5)	
KE	DN 50/PN 25/40	DN 50/PN 25/40	N/A	0.846 (21.5)	1.043 (26.5)	0.709 (18)	0.846 (21.5)	
KF	DN 50/PN 63	DN 50/PN 63	N/A	0.846 (21.5)	1.043 (26.5)	0.709 (18)	0.846 (21.5)	
KG	DN 50/PN 100	DN 50/PN 100	N/A	0.846 (21.5)	1.043 (26.5)	0.709 (18)	0.846 (21.5)	

1. Dimensions are in inches (millimeters).

Table 6. External Pressure Test–EN 1092-1

EN 1092-1 flanged thermowells	
Nominal pressure (bar)	Test pressure (bar)
16	40
40	100
100	250
Test to 2.5x nominal pressure rating	

Rosemount 114C Van Stone Thermowells



Van Stone thermowell overview

Van Stone/lap joint thermowells are mounted between the mating flange and lap joint flange. This unique design enables thermowell designers to specify thermowell flange materials different than the thermowell stem material; flanges are easily replaceable. These thermowells allow use of different thermowell materials for the flange contacting the process and overlaying flange which can save material and manufacturing costs. They are a good choice for corrosive applications, because there are no welds so weld-joint corrosion is eliminated. The Emerson standard for the Van Stone thermowell is a raised face style made of carbon steel. Other styles and flange materials are also available.

The standard offering figure below shows the thermowell configurations that can typically be shipped in two weeks or less.

Figure 12. Standard Offering–Van Stone

Model	Units	Immersion length (U)	Mounting style	Process connection	Stem style	Thermowell material	Head length (H)	Instrument connection threads	Options
1 1 4 C	X	X X X X	V	X X	X	X X	X X X	X	XX, XXX, XX
1 2 3 4	5	6 7 8 9	10	11 12	13	14 15	16 17 18	19	

(5) Units	
English (E)	
Metric (M)	

(6-9) Immersion length (U)	
XXXX	0.5in to 42in (E) Example: 0.5in=0005, 42in=0420
XXXX	25mm to 1165mm (M) Example: 25mm=0025, 1165mm=1165

(10) Mounting style	
Van Stone (V)	

(11-12) Process connections	
AA	1-in. Class 150
AB	1½-in. Class 150
AC	2-in. Class 150

(13) Stem style	
1	Straight stem
2	Tapered stem
3	Stepped stem

(14-15) Thermowell material	
SC	316/316L SST
SF	304/304L SST
CS	Carbon steel

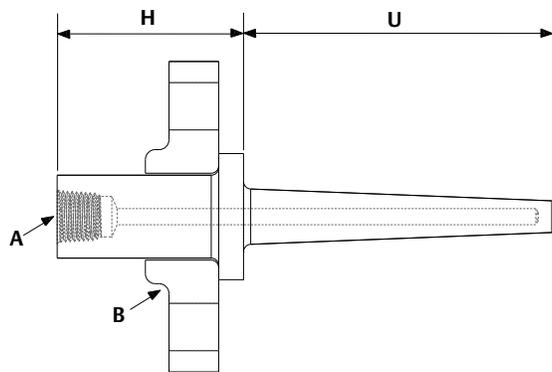
(16-18) Head length (H)	
XXX	2.25in to 11.25in (E) Example: 2.25in=022, 10in=100
XXX	40mm to 225mm (M) Example: 40mm=040, 225mm=225

(19) Instrument connection	
A	½-14 NPT
B	½-14 NPSM
D	M18 x 1.5p
E	M20 x 1.5p
F	M24 x 1.5p

Common options	
Q5	External pressure test
Q35	NACE approval
R21	Wake frequency calculation
Q8	Material certification
C01	Van Stone w/no cover flange
C02	Van Stone w/SST cover flange

The common options shown in Figure 12 represent a partial offering; reference the Ordering Table for a full list of available options.

Figure 13. Van Stone Thermowell Components



A. Instrument connection
B. Process connection

U. Immersion length
H. Head length

Note

Wetted surface includes flange face and immersion length (U).

Use the form below to record your model code.

Model	Units	Immersion length (U)	Mounting style	Process connection	Stem style	Thermowell material	Head length (H)	Instrument connection	Options
1 1 4 C			V						
1 2 3 4	5	6 through 9	10	11 and 12	13	14 and 15	16 through 18	19	XXXXX

Van Stone ordering information

Figure 14. Model Number Ordering Example

Model				Units	Immersion length (U)				Mounting style	Process connection		Stem style	Thermowell material		Head length (H)			Instrument connection	Options
1	1	4	C	M	0	1	5	0	V	A	B	1	S	C	0	5	0	A	WR5, Q76...
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	XXXXX

The numbers below the model number ordering example correlate to the character place numbers in the second column of the ordering table.

Table 7. Rosemount 114C Van Stone Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

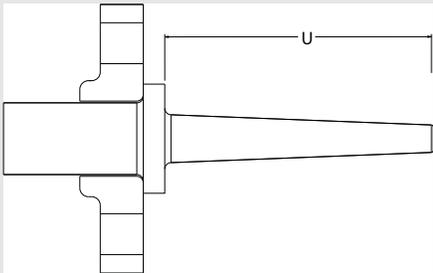
Place #s 1-4	Model	Details		
★ 114C	Barstock temperature thermowell	Made with a standard bore diameter of 0.26-in. (6.5mm) and tip wall thickness of 0.25-in. (6.4 mm)		
Place # 5	Dimension units	Details	Ref. page	
★ E	English units (inches)	Specifies whether length units will be in inches (in) or millimeters (mm)	53	
★ M	Metric units (mm)		53	
Place # 6-9	Immersion length (U)			Ref. page
★ xxxx	xxx.x inches, 0.5 to 60 inches in 1/4-in. increments (when ordered with dimension units code E) Example of a 6.25-in. length where the second decimal is dropped off: 0062	53		
★ xxxx	xxxx mm, 25 to 1300 mm in 5-mm increments (when ordered with dimension units code M) Example of a 25 mm length: 0025	53		
Place # 10	Mounting style	Details	Ref. page	
★ V	Van Stone, lap flange	Default cover flange material is carbon steel	N/A	
Place #s 11-12	Process connection	Ref. page		
★ AA	1-in. Class 150	N/A		
★ AB	1 1/2-in. Class 150	N/A		

Table 7. Rosemount 114C Van Stone Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

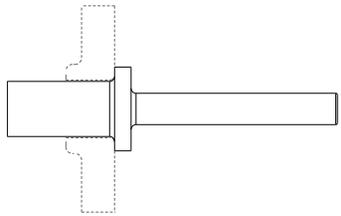
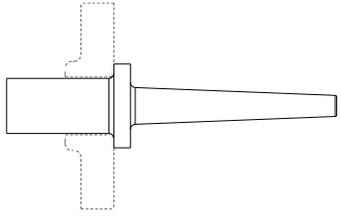
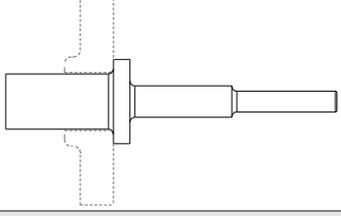
★	AC	2-in. Class 150			N/A
★	AH	1-in. Class 300			N/A
★	AJ	1½-in. Class 300			N/A
★	AK	2-in. Class 300			N/A
★	AL	1-in. Class 400/600			N/A
★	AM	1½-in. Class 400/600			N/A
★	AN	2-in. Class 400/600			N/A
	AP	1-in. Class 900/1500			N/A
	AQ	1½-in. Class 900/1500			N/A
	AR	2-in. Class 900/1500			N/A
	AS	1-in. Class 2500			N/A
	AT	1½-in. Class 2500			N/A
	AU	2-in. Class 2500			N/A
Place #	Stem style	Details	Image	Ref. page	
★ 13					
★	1	Straight	Minimum immersion length = 1 in (25mm)		54
★	2	Tapered	Minimum immersion length = 1 in (25mm)		54
★	3	Stepped	Minimum immersion length = 3 in (75mm)		54
Place #s	Thermowell material			Ref. page	
★ 14-15					
★	SC	316/316L dual rated			54
	SD	316/316L dual rated (NORSOK)			54

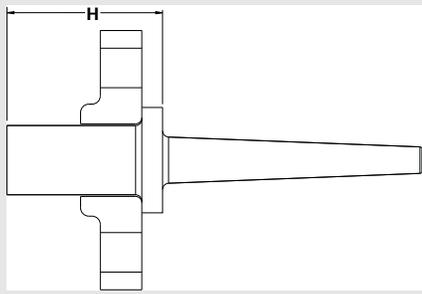
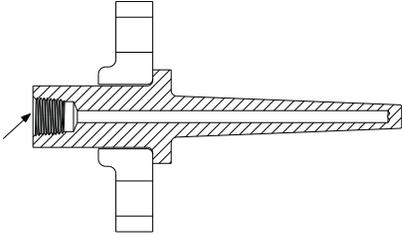
Table 7. Rosemount 114C Van Stone Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

★	SF	304/304L dual rated	54
★	CS	Carbon steel (A-105)	54
	SG	316Ti SST	54
	SH	316/316L SST w/ tantalum sheath	54
	SJ	316/316L SST w/ PFA coating	54
	SK	304/304L SST w/ PTFE coating	54
	SL	310 SST	54
	SM	321 SST	54
	AB	Alloy B3	54
	AC	Alloy C-276	54
	AD	Alloy C-4 (w/ 304/304L SST flange)	54
	AE	Alloy C-22 (w/ 304/304L SST flange)	54
	AF	Alloy C-22 (w/ 316/316L SST flange)	54
	AG	Alloy 20	54
	AH	Alloy 400	54
	AJ	Alloy 400 (w/ 304/304L SST flange)	54
	AK	Alloy 600	54
	AL	Alloy 600 (w/ 304/304L SST flange)	54
	MO	Molybdenum	54
	CA	Chrome-Moly Grade B-11/F-11 Class II	54
	CB	Chrome-Moly Grade B-22/ F-22 Class III	54
	CC	Chrome-Moly Grade F-91	54
	NK	Nickel 200	54
	TT	Titanium Grade 2	54
	DS	Super duplex SST Grade F-53	54
	DT	Super duplex – NORSOK	54
	DU	Duplex 2205 Grade F51	54
	DV	Duplex 2205 – NORSOK	54

Table 7. Rosemount 114C Van Stone Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

Place #s 16-18	Head length (H)				Ref. page
★	xxx inches, 2.25 to 11.25 inches in 1/4-in. increments (when ordered with Dimension units code E) Example of a 6.25-in. length where the second decimal is dropped off: 062 (default head length = 2.25 inches for flanges under Class 900)				56
★	xxx mm, 45 to 225 mm in 5-mm increments (when ordered with Dimension units code M) Example of a 50 mm length: 050 (default head length = 60 mm for flanges under Class 900)				56
Place # 19	Instrument connection	Details	Image	Ref. page	
★	A 1/2-14 NPT	Female threads		57	
★	B 1/2-14 NPSM			57	
	C 3/4-14 NPT			57	
	D M18 x 1.5p			57	
	E M20 x 1.5p			57	
	F M24 x 1.5p			57	
	G 1/2-in. (BSPF)			57	
	H 3/4-in. (BSPF)			57	
	J M27 x 2p			57	
	K M14 x 1.5p			57	

Options (include with selected model number)

Sensor/thermowell assemble to options		Details	Ref. page
★	XT Hand tight assembly of sensor and thermowell	Ensures sensor is threaded into thermowell but only hand tightened	57
★	XW Process-ready assembly of sensor and thermowell	Ensures sensor is threaded into thermowell and torqued for process-ready installation	57
Extended product warranty		Details	Ref. page
★	WR3 3-year limited warranty	This warranty option extends manufacturer’s warranty to three or five years for manufacturer related defects	58
★	WR5 5-year limited warranty		58

Table 7. Rosemount 114C Van Stone Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

Wake frequency calculation			Details	Ref. page
★	R21	Wake frequency calculation	Set of calculations to ensure thermowells are safe in certain process conditions	58
NACE approval			Details	Ref. page
★	Q35	NACE approval	Meets MR0175/ISO 15156 and MR0103 requirements	59
PMI testing			Details	Ref. page
	Q76	PMI testing	Verifies chemical composition of material	59
Material certification			Details	Ref. page
★	Q8	Material certification	Certificate for material conformance and traceability in accordance with EN 10204 type 3.1	59
Material tests			Details	Ref. page
	M01	Low temperature Charpy Test	Measures the low temperature ductility of the material	60
	M02	Ultrasonic material test	Examination of steel forgings for flaws and inclusions	60
Surface finish			Details	Ref. page
	Q16	Certification	Certificate showing measured surface finish values	60
	R14	Finish < Ra 0.3µm (12µin)	Improves surface roughness of thermowell	61
Electropolish			Details	Ref. page
	R20	Electropolish	Improve smoothness and surface quality	61
Hydrostatic pressure test			Details	Ref. page
★	Q5	External pressure test	Verifies structural quality and checks for leaks at thermowell process connection and stem	61
★	Q85	Internal pressure test	Verifies internal structural integrity of thermowell	62
Canadian Registration No.			Details	Ref. page
	Q17	Canadian Registration No.	Canadian approvals for all provinces	62
Dye penetration test			Details	Ref. page
★	Q73	Dye penetration test	Checks quality of welds and material	62
Bore concentricity			Details	Ref. page
	Q83	Ultrasonic test	Checks the bore concentricity of the thermowell	62

Table 7. Rosemount 114C Van Stone Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

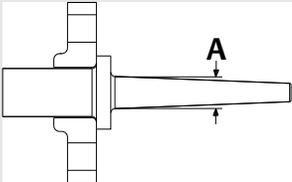
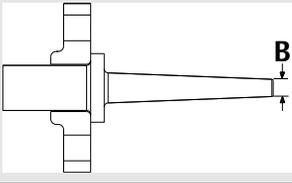
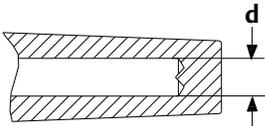
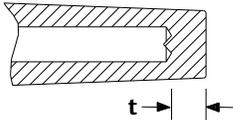
Special cleaning		Details	Ref. page
Q6	Special cleaning	Oxygen enriched environment cleaning per ASTM G93	63
Thermowell markings		Details	Ref. page
R40	Test markings on thermowell	External marking of the thermowell for specific tests (see reference page for list of tests)	63
Spherical tip		Details	Ref. page
R60	Spherical tip	Changes the flat tip to spherical	63
Plug and chain		Details	Ref. page
R06	Stainless steel	Protects thermowell threads when sensor is not installed	64
R23	Brass		64
Vent hole		Details	Ref. page
R11	Vent hole	Allows for the venting of a thermowell	64
Flange face		Details	Ref. page
R09	Concentric serrations	Concentric serrations on flange face per ASME B16.5	65
R16	RTJ	Ring type joint flange face per ASME B16.5	66
Root diameter (A)			Ref. page
Axxx	x.xx inches, 0.4 to 3.15 inches in 0.01-in. increments (when ordered with Dimension Units Code E) Examples: Code A040 = 0.4-in, Code A315 = 3.15-in.		71
Axxx	x.xx mm, 10 to 80 mm in 0.5-mm increments (when ordered with Dimension Units Code M) Examples: Code A100 = 10.0 mm, Code A755 = 75.5 mm		71
Tip diameter (B)			Ref. page
Bxxx	x.xx inches, 0.4 to 1.80 inches in 0.01-in. increments (when ordered with Dimension Units Code E) Examples: Code B040 = 0.4-in, Code B180 = 1.80-in.		72

Table 7. Rosemount 114C Van Stone Ordering Information

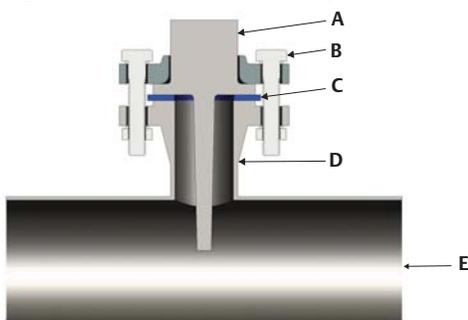
★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

	Bxxx	x.xx mm, 10 to 46 mm in 0.5-mm. increments (when ordered with Dimension Units Code M) Examples: Code B100 = 10.0 mm, Code B455 = 45.5 mm		72	
Non-standard bore diameter (d)		Details	Image	Ref. page	
	D01	0.276-in./7.0 mm		73	
	D03	0.138-in./3.5 mm		73	
	D04	0.385-in./9.8 mm		Standard = 0.26-in. (6.5mm)	73
	D05	0.354-in./9.0 mm		73	
	D06	0.433-in./11.0 mm		73	
Non-standard tip thickness (t)		Details		Image	Ref. page
	T01	0.197-in./5.0 mm		73	
	T02	0.236-in./6.0 mm		Standard = 0.25-in. (6.4mm)	73
Lap flange material for Van Stone design		Details		Ref. page	
	C01	No flange	Provides a Van Stone stem without a lap flange	74	
	C02	316/316LSST flange	Provides a Van Stone stem with a 316/316LSST lap flange	74	
	C03	Flange per stem material	Provides a Van Stone stem with a matching lap flange per stem material	74	

Van Stone installation

Van Stone thermowells are installed using a lap joint flange which slips over the stub end of the thermowell. The lap joint flange has no flange face. Instead the flange is bolted over the stub end which acts as the flange face and compresses the gasket. The Rosemount 114C Thermowells come standard with spiral serrations on the stub end designed per the ASME B16.5 standard. These should be installed with an inside bolt circle (IBC) gasket/ring gasket, which extends to and is centered by the bolts. Other flange face options are available.

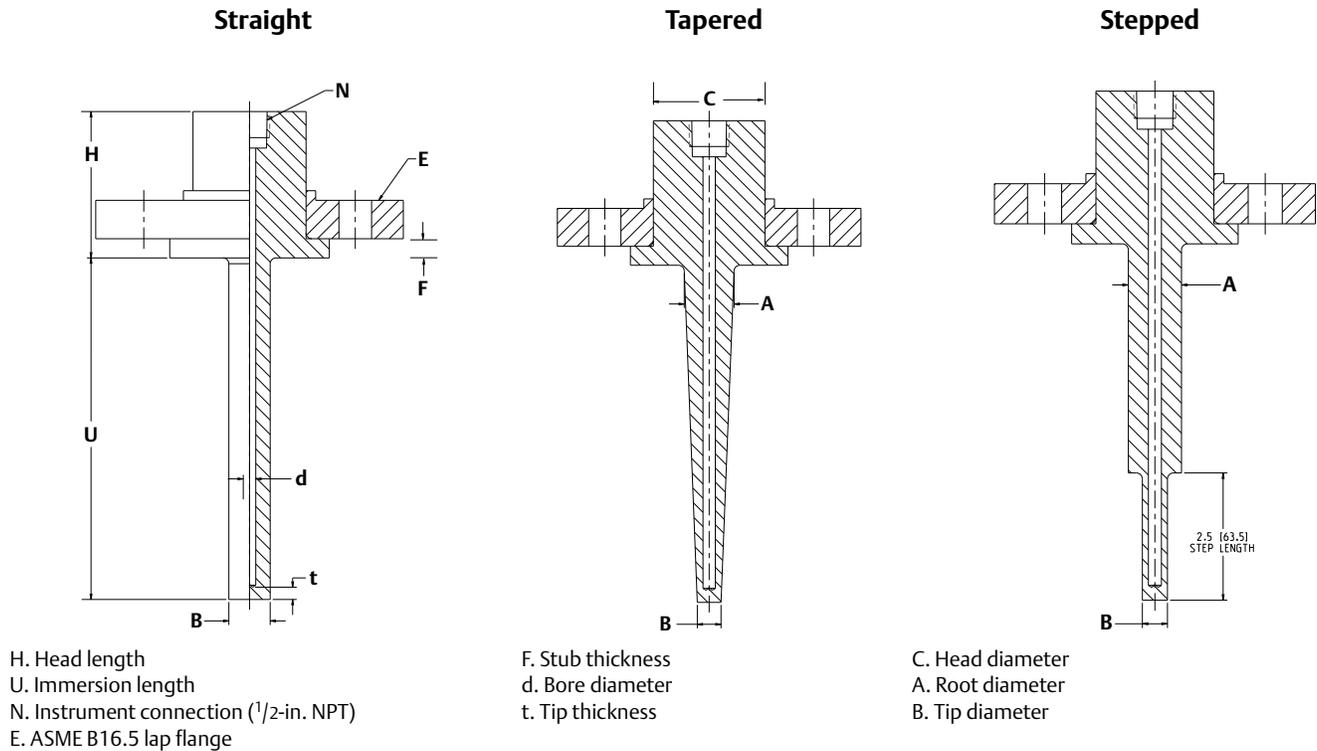
Figure 15. Installation Components



- A. Thermowell
- B. Bolt/washers
- C. Ring gasket
- D. Nozzle and mating flange
- E. Process

Van Stone thermowell drawings

Figure 16. Van Stone/Lap Flanged Mounted Thermowell Drawings⁽¹⁾



1. Total length = U+H.

Table 8. Van Stone/Lap Flanged Mounted Thermowells⁽¹⁾

Code	Code V, Van Stone lap flange mounting style	Stub thickness "F" standard raised face	Stub thickness "F" ring type joint option R16	Root diameter stepped stem "Ø As"	Root diameter tapered stem "Ø At"	Tip diameter tapered stem "Ø Bt"	Head diameter "Ø C"
	Process connection						
AA	1-in. Class 150	10 (.394)	0.644 (16.35)	0.75 (19)	0.89 (22.5)	0.63 (16)	1.315 (33.4)
AB	1½-in. Class 150		0.644 (16.35)	0.85 (21.5)	1.04 (26.5)	0.71 (18)	1.902 (48.3)
AC	2-in. Class 150		0.644 (16.35)	0.85 (21.5)	1.04 (26.5)	0.71 (18)	2.374 (60.3)
AH	1-in. Class 300		0.644 (16.35)	0.75 (19)	0.89 (22.5)	0.63 (16)	1.315 (33.4)
AJ	1½-in. Class 300		0.644 (16.35)	0.85 (21.5)	1.04 (26.5)	0.71 (18)	1.902 (48.3)
AK	2-in. Class 300		0.707 (17.92)	0.85 (21.5)	1.04 (26.5)	0.71 (18)	2.374 (60.3)
AL	1-in. Class 400/600		0.644 (16.35)	0.75 (19)	0.89 (22.5)	0.63 (16)	1.315 (33.4)
AM	1½-in. Class 400/600		0.644 (16.35)	0.85 (21.5)	1.04 (26.5)	0.71 (18)	1.902 (48.3)
AN	2-in. Class 400/600		0.707 (17.92)	0.85 (21.5)	1.04 (26.5)	0.71 (18)	2.374 (60.3)
AP	1-in. Class 900/1500		0.644 (16.35)	0.75 (19)	0.89 (22.5)	0.63 (16)	1.315 (33.4)
AQ	1½-in. Class 900/1500		0.644 (16.35)	0.85 (21.5)	1.04 (26.5)	0.71 (18)	1.902 (48.3)
AR	2-in. Class 900/1500		0.707 (17.92)	0.85 (21.5)	1.04 (26.5)	0.71 (18)	2.374 (60.3)
AS	1-in. Class 2500		0.644 (16.35)	0.75 (19)	0.89 (22.5)	0.63 (16)	1.315 (33.4)
AT	1½-in. Class 2500		0.707 (17.92)	0.85 (21.5)	1.04 (26.5)	0.71 (18)	1.902 (48.3)
AU	2-in. Class 2500		0.707 (17.92)	0.85 (21.5)	1.04 (26.5)	0.71 (18)	2.374 (60.3)

1. Dimensions are in inches (millimeters).

Rosemount 114C Welded Thermowells

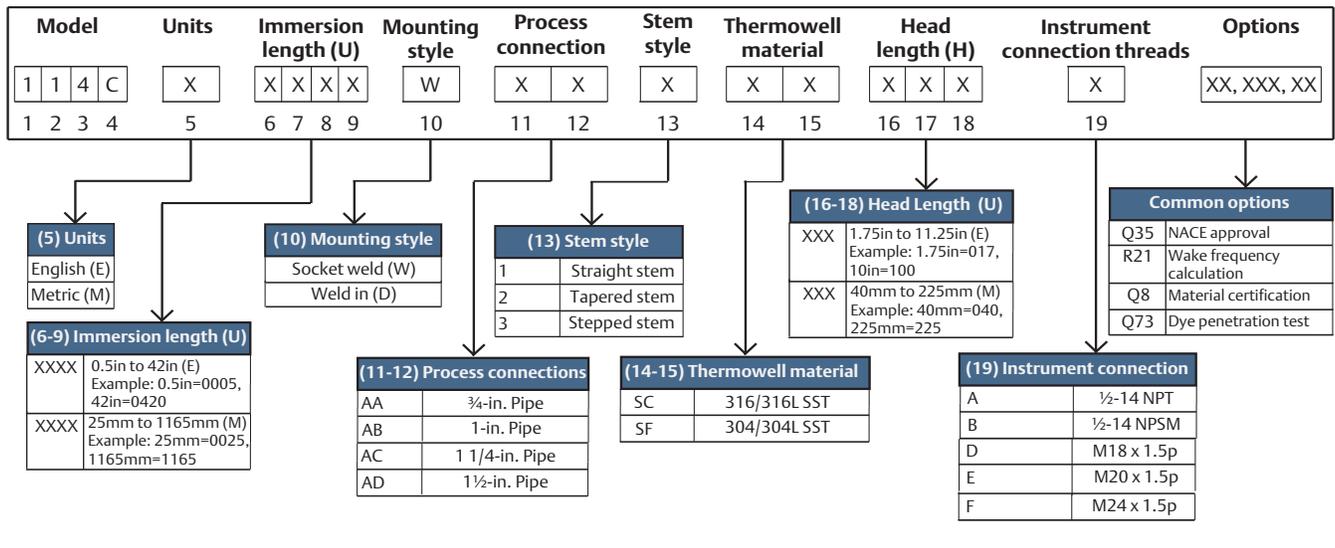


Welded thermowell overview

Welded thermowells are permanently welded to process pipes or tanks. Welded thermowells have the highest pressure rating and are generally used in applications with high velocity flow, high temperature, or extremely high pressure. They are necessary where a leak-proof seal is required.

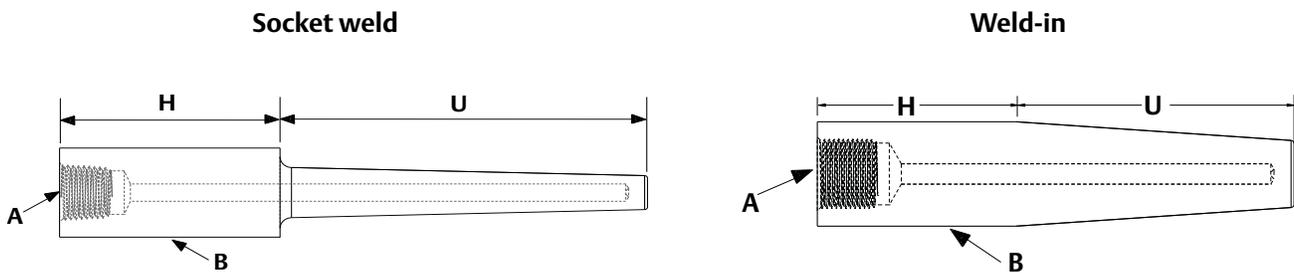
The standard offering figure below shows the thermowell configurations that can typically be shipped in two weeks or less.

Figure 17. Standard Offering–Welded



The common options shown in Figure 17 represent a partial offering; reference the Ordering Table for a full list of available options.

Figure 18. Welded Thermowell Components



- A. Instrument connection
- B. Process connection (dependent on weld point)
- U. Immersion length
- H. Head length

Note

Actual wetted surface varies; it is measured from the weld point to the thermowell tip.

Use the form below to record your model code.

Model	Units	Immersion length (U)	Mounting style	Process connection	Stem style	Thermowell material	Head length (H)	Instrument connection	Options
1 1 4 C									XXXXX
1 2 3 4	5	6 through 9	10	11 and 12	13	14 and 15	16 through 18	19	

Welded ordering information

Figure 19. Model Number Ordering Example

Model				Units	Immersion length (U)				Mounting style	Process connection		Stem style	Thermowell material		Head length (H)	Instrument connection	Options		
1	1	4	C	E	0	0	6	0	W	A	B	1	S	C	0	5	0	A	WR5, Q76...
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	XXXXX

The numbers below the model number ordering example correlate to the character place numbers in the second column of the ordering table.

Table 9. Rosemount 114C Welded Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

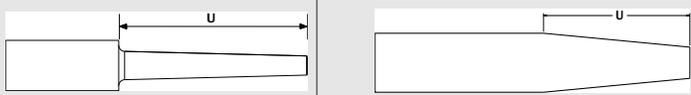
Place #s 1-4	Model	Details		Ref. page
★ 114C	Barstock temperature thermowell	Made with a standard bore diameter of 0.26-in. (6.5mm) and tip wall thickness of 0.25-in. (6.4 mm)		
Place # 5	Dimension units	Details		Ref. page
★ E	English units (inches)	Specifies whether length units will be in inches (in) or millimeters (mm)		53
★ M	Metric units (mm)			53
Place # 6-9	Immersion length (U)			Ref. page
★ xxxx	xxx.x inches, 2 to 60 inches in 1/4-in. increments (when ordered with dimension units code E) Example of a 6.25-in. length where the second decimal is dropped off: 0062			53
★ xxxx	xxxx mm, 25 to 1300 mm in 5-mm increments (when ordered with dimension units code M) Example of a 50 mm length: 0050			53
Place # 10	Mounting style			Ref. page
★ W	Welded–Socket weld			N/A
★ D	Welded–Weld-in (only available in tapered stem profile)			N/A
Place #s 11-12	Process connections			Ref. page
		Welded–Socket weld (W)	Welded–Weld-in (D) (only available in tapered stem profile)	
★ AA	3/4-in. pipe	3/4-in. pipe		N/A
★ AB	1-in. pipe	1-in. pipe		N/A
★ AC	1 1/4-in pipe	1 1/4-in pipe		N/A
★ AD	1 1/2-in. pipe	1 1/2-in. pipe		N/A

Table 9. Rosemount 114C Welded Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

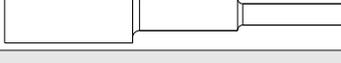
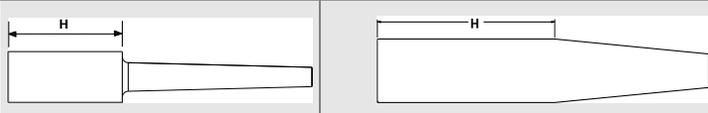
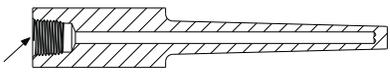
	AE	N/A	Custom diameters (required for Root [Axxx] and tip [Bxxx] modifications)	N/A	
	DA	N/A	DIN 43772-4-7 (18 h7/3.5mm bore/M14)	N/A	
	DB	N/A	DIN 43772-4-7 (24 h7/7.0mm bore/M18)	N/A	
	DC	N/A	DIN 43772-4-7 (26 h7/7.0mm bore/G ^{1/2} or M20)	N/A	
	DD	N/A	DIN 43772-4-7 (26 h7/9.0mm bore/G ^{1/2} or M20)	N/A	
	DE	N/A	DIN 43772-4-7 (32 h7/11.0mm bore/G ^{3/4} or M27)	N/A	
	Place # 13	Stem style	Details	Image	Ref. page
★	1	Straight	Minimum immersion length = 1 in (25mm)		54
★	2	Tapered	Minimum immersion length = 1 in (25mm)		54
★	3	Stepped	Minimum immersion length = 3 in (75mm)		54
	Place #s 14-15	Thermowell material			Ref. page
★	SC	316/316L dual rated			54
	SD	316/316L dual rated (NORSOK)			54
★	SF	304/304L dual rated			54
★	CS	Carbon steel (A-105)			54
	SG	316Ti SST			54
	SL	310 SST			54
	SM	321 SST			54
	AB	Alloy B3			54
	AC	Alloy C-276			54
	AD	Alloy C-4 (w/ 304/304L SST flange)			54
	AE	Alloy C-22 (w/ 304/304L SST flange)			54
	AF	Alloy C-22 (w/ 316/316L SST flange)			54
	AG	Alloy 20			54
	AH	Alloy 400			54
	AJ	Alloy 400 (w/ 304/304L SST flange)			54
	AK	Alloy 600			54
	AL	Alloy 600 (w/ 304/304L SST flange)			54
	MO	Molybdenum			54

Table 9. Rosemount 114C Welded Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

	CA	Chrome-Moly Grade B-11/F-11 Class II		54
	CB	Chrome-Moly Grade B-22/ F-22 Class III		54
	CC	Chrome-Moly Grade F-91		54
	NK	Nickel 200		54
	TT	Titanium Grade 2		54
	DS	Super duplex SST Grade F-53		54
	DT	Super duplex – NORSOK		54
	DU	Duplex 2205 Grade F51		54
	DV	Duplex 2205 – NORSOK		54
Place #s 16-18	Head length (H)			Ref. page
★ xxx	xxx.x inches, 1.75 to 11.25 inches in 1/4-in. increments (when ordered with Dimension units code E) Example of a 6.25-in. length where the second decimal is dropped off: 062 (default head length = 1.75 inches)			56
★ xxx	xxxx mm, 40 to 225 mm in 5-mm increments (when ordered with Dimension units code M) Example of a 50 mm length: 050 (default head length = 45 mm)			56
Place # 19	Instrument connection	Details	Image	Ref. page
★ A	1/2–14 NPT	Female threads		57
★ B	1/2–14 NPSM			57
C	3/4–14 NPT			57
D	M18 x 1.5p			57
E	M20 x 1.5p			57
F	M24 x 1.5p			57
G	G 1/2-in. (BSPF)			57
H	G 3/4-in. (BSPF)			57
J	M27 x 2p			57
K	M14 x 1.5p			57

Options (include with selected model number)

	Sensor/thermowell assemble to options		Details	Ref. page
★ XT	Hand tight assembly of sensor and thermowell		Sensor is threaded into thermowell but only hand tightened	57

Table 9. Rosemount 114C Welded Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

Extended product warranty			Details	Ref. page
★	WR3	3-year limited warranty	This warranty option extends manufacturer's warranty to three or five years for manufacturer related defects	58
★	WR5	5-year limited warranty		58
Wake frequency calculation			Details	Ref. page
★	R21	Wake frequency calculation	Set of calculations to ensure thermowells are safe in certain process conditions	58
NACE approval			Details	Ref. page
★	Q35	NACE approval	Meets MR0175/ISO 15156 and MR0103 requirements	59
PMI testing			Details	Ref. page
	Q76	PMI testing	Verifies chemical composition of material	59
Material certification			Details	Ref. page
★	Q8	Material certification	Certificate for material conformance and traceability in accordance with EN 10204 type 3.1	59
Material tests			Details	Ref. page
	M01	Low temperature Charpy Test	Measures the low temperature ductility of the material	60
	M02	Ultrasonic material test	Examination of steel forgings for flaws and inclusions	60
Surface finish			Details	Ref. page
	Q16	Certification	Certificate showing measured surface finish values	60
	R14	Finish < Ra 0.3µm (12µin)	Improves surface roughness of thermowell	61
Electropolish			Details	Ref. page
	R20	Electropolish	Improves smoothness and surface quality	61
Hydrostatic pressure test			Details	Ref. page
★	Q85	Internal pressure test	Verifies internal structural integrity of thermowell	62
Canadian Registration No.			Details	Ref. page
	Q17	Canadian Registration No.	Canadian approvals for all provinces	62
Dye penetration test			Details	Ref. page
★	Q73	Dye penetration test	Checks quality of welds and material	62

Table 9. Rosemount 114C Welded Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

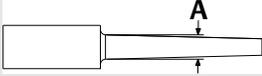
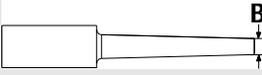
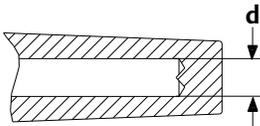
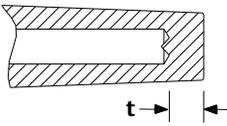
Bore concentricity		Details	Ref. page
Q83	Ultrasonic test	Checks the bore concentricity of the thermowell	62
Special cleaning		Details	Ref. page
Q6	Special cleaning	Oxygen enriched environment cleaning per ASTM G93	63
Thermowell markings		Details	Ref. page
R40	Test markings on thermowell	External marking of the thermowell for specific tests (see reference page for list of tests)	63
Spherical tip		Details	Ref. page
R60	Spherical tip	Changes the flat tip to spherical	63
Plug and chain		Details	Ref. page
R06	Stainless steel	Protects thermowell threads when sensor is not installed	64
R23	Brass		64
Vent hole		Details	Ref. page
R11	Vent hole	Allows for the venting of a thermowell	64
Root diameter (A)			Ref. page
Axxx	x.xx inches, 0.4 to 3.15 inches in 0.01-in. increments (when ordered with Dimension Units Code E) Examples: Code A040 = 0.4-in, Code A315 = 3.15-in.		71
Axxx	x.xx mm, 10 to 80 mm in 0.5-mm increments (when ordered with Dimension Units Code M) Examples: Code A100 = 10.0 mm, Code A755 = 75.5 mm		71
Tip diameter (B)			Ref. page
Bxxx	x.xx inches, 0.4 to 1.80 inches in 0.01-in. increments (when ordered with Dimension Units Code E) Examples: Code B040 = 0.4-in, Code B180 = 1.80-in.		72
Bxxx	x.xx mm, 10 to 46 mm in 0.5-mm. increments (when ordered with Dimension Units Code M) Examples: Code B100 = 10.0 mm, Code B455 = 45.5 mm		72

Table 9. Rosemount 114C Welded Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery lead time. The Expanded offering is subject to additional delivery lead time.

Non-standard bore diameter (d)		Details	Image	Ref. page
D01	0.276-in./7.0 mm	Standard = 0.26-in. (6.5mm)		73
D03	0.138-in./3.5 mm			73
D04	0.385-in./9.8 mm			73
D05	0.354-in./9.0 mm			73
D06	0.433-in./11.0 mm			73
Non-standard tip thickness (t)		Details	Image	Ref. page
T01	0.197-in./5.0 mm	Standard = 0.25-in. (6.4mm)		73
T02	0.236-in./6.0 mm			73

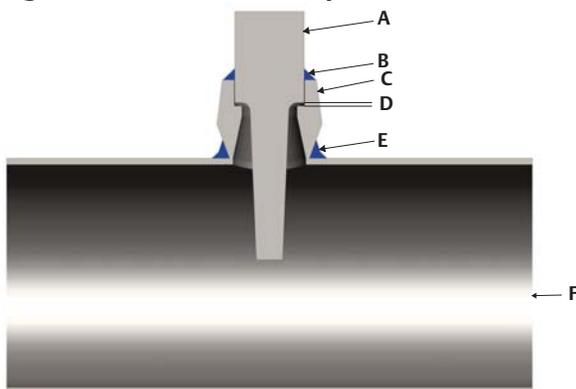
Socket weld installation

Socket weld thermowells are typically welded into a socket weld fitting. Welds should be designed according to the appropriate standards. It is important to order a head length (H) that leaves enough space so the instrument threads will not be deformed by welding at installation. The customer should also make sure the root diameter of the thermowell will fit through the inner diameter of the weld fitting.

Note

When specified in a WFC, the unsupported length for a socket weld thermowell is from the point of weld (B shown below) to the thermowell tip.

Figure 20. Installation Components

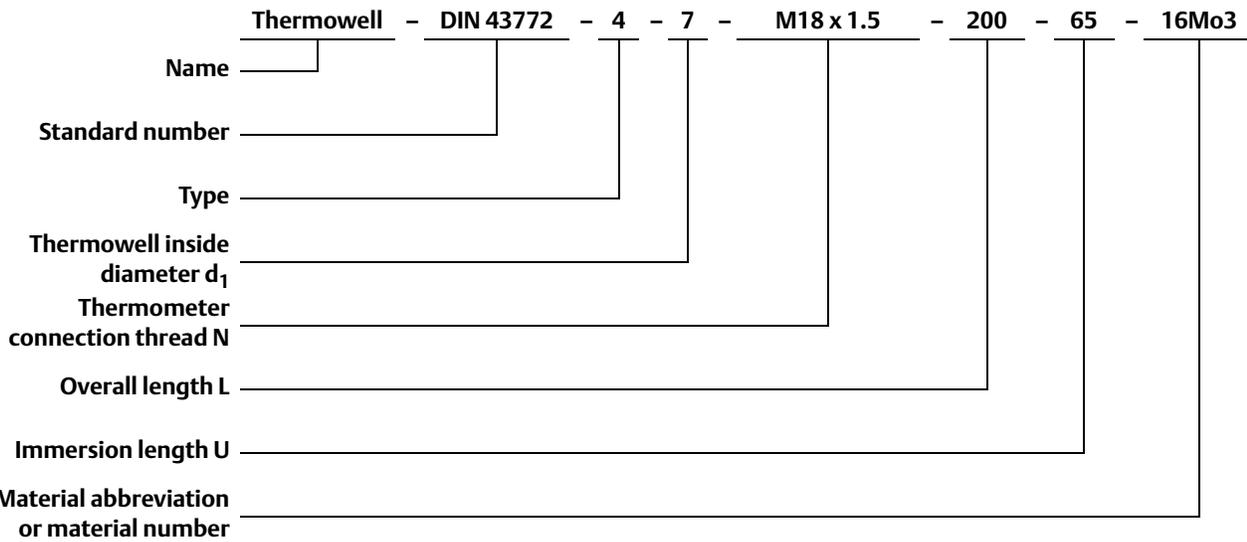


- A. Thermowell
- B. Weld
- C. Socket weld fitting
- D. 1/16-in. gap
- E. Weld
- F. Process

Weld-in Type 4 thermowells according to DIN 43772

This section only defines the requirement necessary to provide a Type 4 thermowell according to the DIN 43772 Standard (for ordering information on weld-in thermowells outside the DIN Standard, see [Table 9 on page 42](#)).

The illustration below shows the breakdown of a model according to the DIN Standard



[Table 10](#), [Table 11](#), and [Table 12](#) show all required thermowell dimensions necessary to conform to DIN 43772 Type 4 and the relationship to the Rosemount 114C Thermowell.

Ordering process

1. Select overall length (L) and immersion length (U) from [Table 10](#).

$U = 65\text{mm}$

$L = 200\text{mm}$

$H = L - U = 135\text{mm}$

Rosemount 114C = U = **0065**

Rosemount 114C = H = **135**

Table 10. DIN Required Lengths

Immersion length (U)		Overall length (L) (U+H)	Head length (H)	
(mm)	Rosemount 114 Code		(mm)	Rosemount 114 Code
65	0065	110	45	045
65	0065	140	75	075
65	0065	200	135	135
125	0125	260	135	135
275	0275	410	135	135

2. Select process connection (PC), instrument connection (IC), and bore diameter (BD) from Table 11.

PC = 18 h7/3.5mm

IC = M14 x 1.5

BD = 3.5mm

Rosemount 114C = 18 h7/3.5mm = **DA**

Rosemount 114C = M14 x 1.5 = **K**

Rosemount 114C = 3.5mm = **D03**

Table 11. DIN Connection Information

Process connection (PC)		Instrument connection (IC)		Bore diameter (BD)	
Type	Rosemount 114 Code	Internal threads	Rosemount 114 Code	(mm)	Rosemount 114 Code
18 h7	DA	M14 x 1.5	K	3.5	D03
24 h7	DB	M18 x 1.5	D	7.0	D01
26 h7	DC	G ^{1/2} (BSPF)	G	7.0	D01
26 h9	DD	M20 x 1.5	E	9.0	D05
32 h11	DE	G ^{3/4} (BSPF)	H	11.0	D06
32 h11	DE	M27 x 2	J	11.0	D06

3. Determine thermowell material from Table 12.

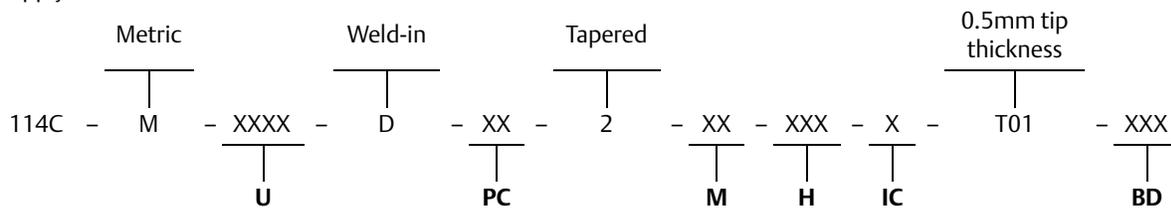
Material = 316 Ti SST

Rosemount 114C = 316 Ti SST = **SG**

Table 12. DIN Material

Thermowell material (M)	Rosemount 114C material code
Molybdenum DIN 1.5415 EN 10273	MO
Chrome-Moly B-11 DIN 1.7335 EN 10273	CA
Chrome-Moly B-22 DIN 1.7380 EN 10273	CB
316 Ti SST DIN 1.4571 EN 10272	SG

4. Apply to Rosemount 114C model as shown below.



Resulting model code: 114C-M-0065-D-DA-2-SG-135-K-T01-D03

Figure 21. Weld Mounted Thermowell Drawings (Weld-in)

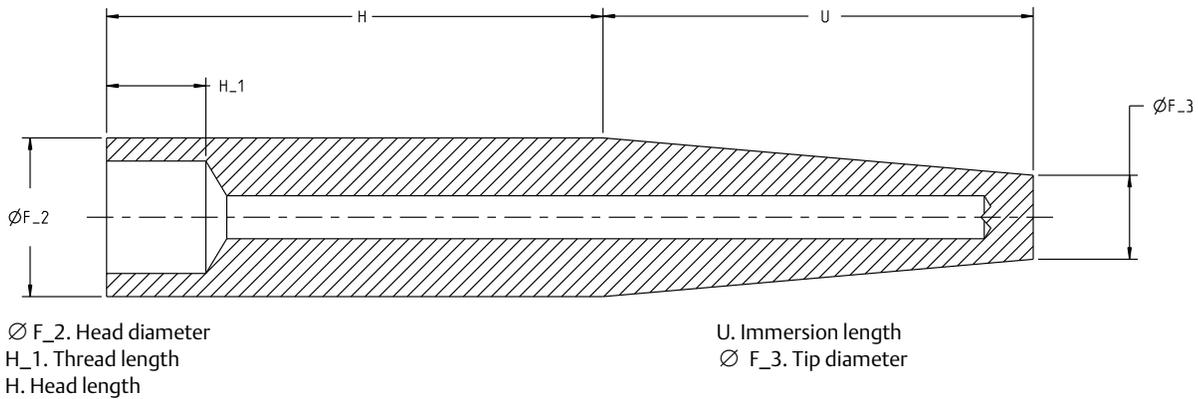


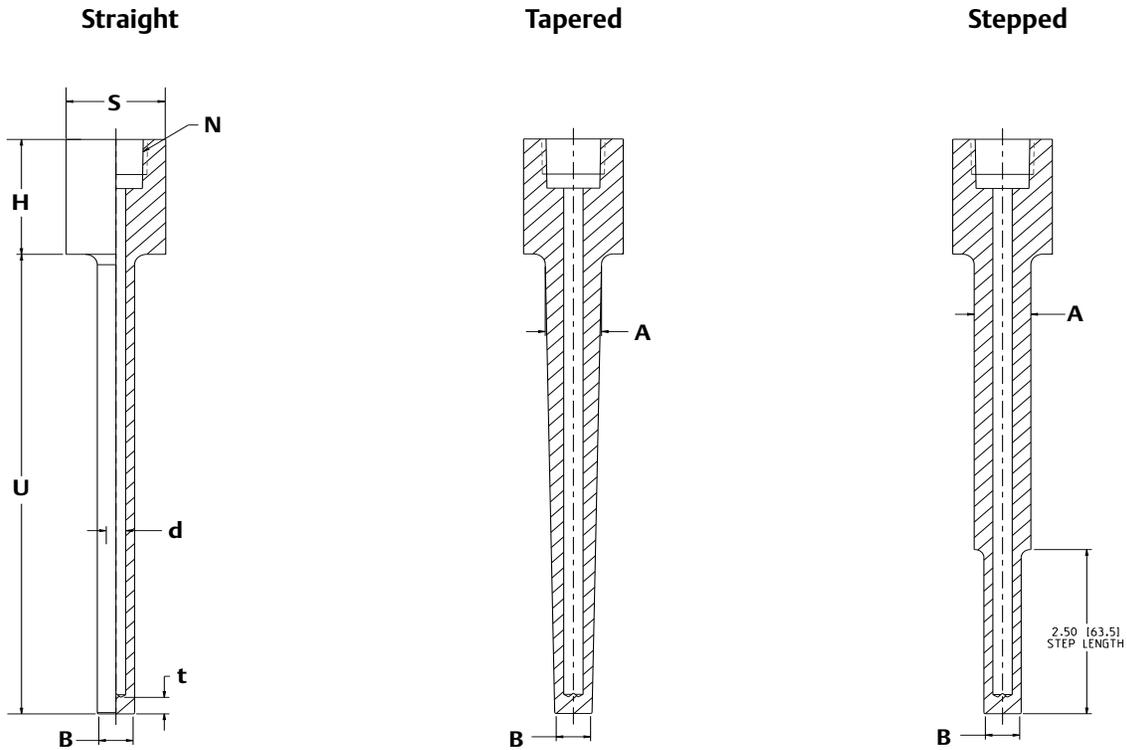
Table 13. DIN Weld Mounted Thermowells (Weld-in)⁽¹⁾

Code	Code D, welded (weld-in) style	Head diameter “Ø F ₂ ”	Tip diameter “Ø F ₃ ”	Thread length “H ₁ ”
	Process connection			
DA	DIN 43772-4-7 (18 h7/3.5mm bore/M14)	18 h7 (+0.000/-0.018mm)	9 ±0.27	16
DB	DIN 43772-4-7 (24 h7/7mm bore/M18)	24 h7 (+0.000/-0.021mm)	12.5 ±0.38	16
DC	DIN 43772-4-7 (26 h7/7mm bore/G ¹ /2 or M20)	26 h7 (+0.000/-0.021mm)	12.5 ±0.38	19
DD	DIN 43772-4-7 (26 h7/9mm bore/G ¹ /2 or M20)	26 h7 (+0.000/-0.021mm)	15 ±0.38	19
DE	DIN 43772-4-7 (32 h11/11mm bore/G ³ /4 or M27)	32 h11 (+0.000/-0.160mm)	17 ±0.38	22

1. Dimensions are in inches (millimeters).

Welded thermowell drawings

Figure 22. Weld Mounted Thermowell Drawings (Socket Weld)⁽¹⁾



1. Total length = U+H.

S. Socket size
 H. Head length
 U. Immersion length
 N. Instrument connection (1/2-in. NPT)

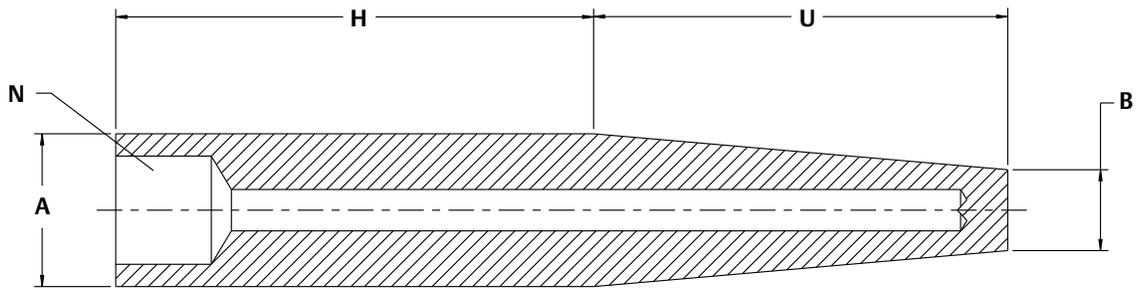
d. Bore diameter
 t. Tip thickness
 B. Tip diameter
 A. Root diameter

Table 14. Weld Mounted Thermowells (Socket Weld)⁽¹⁾

Code	Code W, welded mounting style	Socket size "Ø S"	Root diameter "Ø A"	Tip diameter "Ø B"
	Process connection			
AA	3/4-in. Pipe	1.05 (26.67)	0.75 (19)	0.50 (12.7)
AB	1-in. Pipe	1.32 (33.4)	0.75 (19)	0.50 (12.7)
AC	1 1/4-in. Pipe	1.66 (42.16)	0.75 (19)	0.50 (12.7)
AD	1 1/2-in. Pipe	1.90 (48.26)	0.75 (19)	0.50 (12.7)

1. Dimensions are in inches (millimeters).

Figure 23. Weld Mounted Thermowell Drawings (Weld-in)⁽¹⁾



H. Head length
 U. Immersion length
 N. Instrument connection
 B. Tip diameter
 A. Root diameter

Table 15. Weld Mounted Thermowells (Weld-in)⁽¹⁾

Code	Code D, welded mounting style	Root diameter "Ø A"	Tip diameter "Ø B"
	Process connection		
AA	3/4-in. Pipe	1.050 (26.67)	.748 (19)
AB	1-in. Pipe	1.315 (33.40)	.846 (21.5)
AC	1 1/4-in. Pipe	1.660 (42.16)	1.043 (26.5)
AD	1 1/2-in. Pipe	1.900 (48.26)	1.250 (31.75)
AE	Custom	Specified by design modifier "AXXX"	Specified by design modifier "BXXX"

1. Dimensions are in inches (millimeters).

1. Total length = U+H.

Ordering information detail

Dimension units

[Back to Threaded ordering table](#)

[Back to Flanged ordering table](#)

[Back to Van Stone ordering table](#)

[Back to Welded ordering table](#)

The Rosemount 114C Thermowell has the flexibility to be specified in either inches (E) or millimeters (M).

English units (inches)

If English is selected, all lengths will be in inches.

Metric

If metric is selected, all lengths will be in millimeters.

Immersion length (U)

[Back to Threaded ordering table](#)

[Back to Flanged ordering table](#)

[Back to Van Stone ordering table](#)

[Back to Welded ordering table](#)

The immersion length normally refers to the length of the thermowell stem beginning underneath the process connection to the tip of the thermowell. This length is typically specified by the process designer but the general rule is at least one-third or one-half the pipe diameter.

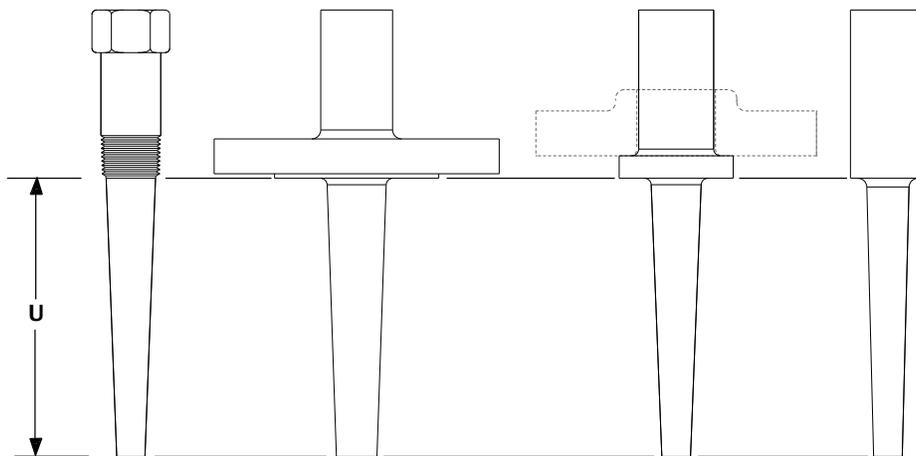


Table 16. Minimum Immersion Length by Profile Style

Profile	Minimum length
Straight	1 in (25mm)
Tapered	1 in (25mm)
Stepped	3 in (75mm)

Note

Long-length thermowells are those longer than 42 inches (1065 mm) and may be manufactured from two or three pieces of barstock.

Stem style

[Back to Threaded ordering table](#)

[Back to Flanged ordering table](#)

[Back to Van Stone ordering table](#)

[Back to Welded ordering table](#)

Straight style thermowells (1)

Straight style thermowells have the same diameter along the entire immersion length. They present the largest profile to the process medium and have the highest drag force compared to other styles with the same root diameter. Because of the large tip diameter, there is more mass to heat which slows the thermal response of the measurement assembly. The minimum immersion length (U) allowed with this profile is 1 in (25mm).



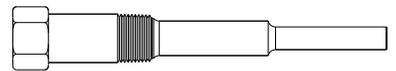
Tapered style thermowells (2)

Tapered style thermowells have an outside diameter that decreases uniformly from root to tip. For the same root diameter, this design represents a good compromise between straight and stepped thermowells. Its drag will be less than a straight style, but greater than a stepped style. The response time will be faster than a straight style and slower than a stepped style. The two general forms of a tapered stem are uniform (tapered from root to tip) and non-uniform (straight portion followed by tapered portion). Because of its profile shape, it is a good compromise for strength between the two other styles. It is the common choice for high velocity flow applications where the flow forces typically are too great to use a stepped well. The tapered design has faster response than the straight style offering an optimal balance of strength and response time factors. The minimum immersion length (U) allowed with this profile is 1 in (25mm).



Stepped style thermowells (3)

Stepped style thermowells have two straight sections with the smaller diameter straight section at the tip. For the same root diameter as a straight profile thermowell, this design has less profile exposure to the flowing process and exhibits less drag force and quicker response time due to the smaller mass at the tip. In general, stepped thermowells will have thinner walls. By the geometry of its design, the stepped well has a higher natural frequency than the other styles with the same root diameter, and is less susceptible to vibration induced failure. Since this design has less material at the tip, it is considered the best thermowell for fast time response. The minimum immersion length (U) allowed with this profile is 3 in (75mm).



Thermowell material

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[Back to Van Stone ordering table](#)

[Back to Welded ordering table](#)

The material of construction is typically the first consideration in choosing a thermowell for any given application. Three factors affect the choice of material:

1. Chemical compatibility with the process media to which the thermowell will be exposed
2. Temperature limits of the material
3. Compatibility with the process piping material to ensure solid, non-corroding welds and junctions

It is important the thermowell conforms to the design specs of the pipe or vessel it will be inserted into to ensure structural and material compatibility. The original process design most likely included temperature, pressure, and corrosive considerations as well as cleaning procedures, agency approvals required, and conformance with codes or standards. Since an installed thermowell essentially becomes part of the process, these original design considerations also apply to the thermowell and will drive the thermowell material of construction and mounting type selection. International pressure vessel codes are explicit about the types of materials and methods of construction allowed.

Table 17. Thermowell Materials

Code	Thermowell material	Flange material	Code	Thermowell material	Flange material
SC	316/316L SST UNS S31600/S31603 ASTM A479	316/316L SST UNS S31600/S31603 ASTM A182 or A240	AB	Alloy B3 UNS N10001 ASTM B335	Alloy B3 UNS N10001 ASTM B333
SD	316/316L SST dual rated (NORSOK) ⁽¹⁾ UNS S31600/S31603 ASTM A479 NORSOK M-630 MDS D57	316/316L SST dual rated (NORSOK) ⁽¹⁾ UNS S31600/S31603 ASTM A182 NORSOK M-630 MDS D54	AC	Alloy C-276 UNS N10276 ASTM B574	Alloy C-276 UNS N10276 ASTM B462 or B575
SF	304/304L SST UNS S30400/S30403 ASTM A479	304/304L SST UNS S30400/S30403 ASTM A182 or A240	AD	Alloy C-4 UNS N06455 ASTM B574	304/304L SST UNS S30400/S30403 ASTM A182 or A240
SG	316Ti SST UNS S31635 ASTM A479	316Ti SST UNS S31635 ASTM A182	AE	Alloy C-22 UNS N06022 ASTM B574	304/304L SST UNS S30400/S30403 ASTM A182 or A240
SH	316/316L SST w/ Tantalum sheath ⁽²⁾ UNS S31600/S31603 ASTM A479	316/316L SST w/ Tantalum sheath UNS S31600/S31603 ASTM A182 or A240	AF	Alloy C-22 UNS N06022 ASTM B574	316/316L SST UNS S31600/S31603 ASTM A182 or A240
	Tantalum sheath UNS R05252		AG	Alloy 20 UNS N08020 ASTM B473	Alloy 20 UNS N08020 ASTM B462 or B463
SJ	316/316L SST w / PFA coating UNS S31600/S31603 ASTM A479	316/ 316L SST w / PFA coating UNS S31600/S31603 ASTM A182 or A240	AH	Alloy 400 UNS N04400 ASTM B164	Alloy 400 UNS N04400 ASTM B564 or B127
SK	304/304L SST w/ PTFE coating UNS S30400/S30403 ASTM A479	304/304L SST w/ PTFE coating UNS S30400/S30403 ASTM A182 or A240	AJ	Alloy 400 UNS N04400 ASTM B164	304/304L SST UNS S30400/S30403 ASTM A182 or A240
SL	310 SST UNS S31008 ASTM A479	310 SST UNS S31008 ASTM A182 or A240	AK	Alloy 600 UNS N06600 ASTM B166	Alloy 600 UNS N06600 ASTM B564 or B168
SM	321 SST UNS S32100 ASTM A479	321 SST UNS S32100 ASTM A182 or A240	AL	Alloy 600 UNS N06600 ASTM B166	304/304L SST UNS S30400/S30403 ASTM A182 or A240
CS	Carbon steel UNS K03504 ASTM A105	Carbon steel UNS K03504 ASTM A105, A216 GR WCB, or A515 GR 70	MD	Molybdenum UNS R03600 ASTM B387	Molybdenum UNS R03630 ASTM A204 or B386
TT	Titanium grade 2 UNS R50400 ASTM B348 GR 2	Titanium grade 2 UNS R50400 ASTM B381 GR 2	CA	Chrome-Moly Grade B-11 UNS K11797 ASTM A739 GR B-11	Chrome-Moly Grade F-11 UNS K11572 ASTM A182 GR F-11 CL2 or A387 GR11 CL2
DS	Super duplex UNS S32750 ASTM A479 GR F53	Super duplex UNS S32750 ASTM A182 GR F53 or A240	CB	Chrome-Moly Grade B-22 UNS K21390 ASTM A739 GR B-22	Chrome-Moly Grade F-22 UNS K21590 ASTM A182 GR F-22 CL3, A217 GR WC9, or A387 GR22 CL2
DU	Duplex 2205 UNS S31803 ASTM A479 GR F51	Duplex 2205 UNS S31803 ASTM A182 GR F51 or A240	DT	Super duplex (NORSOK) ⁽¹⁾ UNS S32750 ASTM A479 GR F53 NORSOK M-630 MDS D57	Duplex 2205 (NORSOK) ⁽¹⁾ UNS S31803 ASTM A182 GR F53 NORSOK M-630 MDS D54
CC	Chrome-Moly Grade F-91 UNS K90901 ASTM A182	Chrome-Moly Grade F-91 UNS K90901 ASTM A182 GR F-9, A217 GR C12A, or A387 GR 91 CL2	DV	Duplex 2205 (NORSOK) ⁽¹⁾ UNS S31803 ASTM A479 GR F51 NORSOK M-630 MDS D47	Duplex 2205 (NORSOK) ⁽¹⁾ UNS S31803 ASTM A182 GR F51 NORSOK M-630 MDS D44
NK	Nickel 200 UNS N02200 ASTM B160	Nickel 200 UNS N02200 ASTM B162 or B564			

1. Material supplier qualified per NORSOK M-650; material qualified per NORSOK M-630.
2. Sheath thickness = 0.01-in. (0.38 mm).

Head length (H)

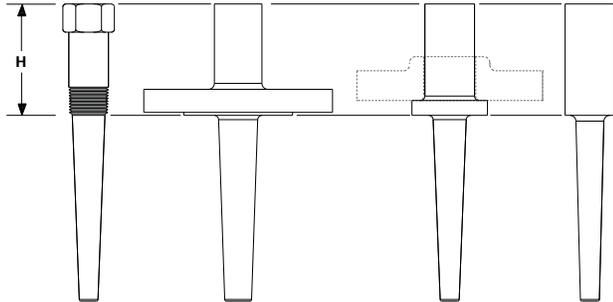
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Head length is the distance from the bottom of the process connection to the top of the thermowell. Each style has a minimum head length; the length specified must meet or exceed that minimum. It is shown below for all process connection styles.



Note

The industry standard minimum head length for flanged and Van Stone thermowells with connections under Class 900 (ASME B16.5) or PN 100 (EN 1092-1) is 2.25 inches (60 mm).

Table 18. Recommended Minimum Head Length⁽¹⁾

Process connection	Minimum head length (H)
Threaded	1.75 (45)
Welded	

1. Dimensions are in inches (millimeters).

Table 19. Recommended Minimum Head Length by Connection Class for ASME B16.5⁽¹⁾

Connection size	Connection class				
	150	300	400/600	900/1500	2500
Flanged					
³ / ₄	N/A	1.75 (45)	N/A	N/A	N/A
1	1.75 (45)	1.75 (45)	1.75 (45)	2.00 (50)	N/A
1 ¹ / ₂	1.75 (45)	1.75 (45)	1.75 (45)	2.00 (50)	2.50 (65)
2	1.75 (45)	1.75 (45)	1.75 (45)	2.25 (60)	2.75 (70)
3	1.75 (45)	N/A	N/A	N/A	N/A
4	1.75 (45)	N/A	N/A	N/A	N/A
6	1.75 (45)	N/A	N/A	N/A	N/A
Van Stone					
1	1.75 (45)	1.75 (45)	1.75 (45)	2.00 (50)	2.25 (60)
1 ¹ / ₂	1.75 (45)	1.75 (45)	1.75 (45)	2.25 (60)	2.75 (70)
2	1.75 (45)	1.75 (45)	2.00 (50)	2.75 (70)	3.25 (80)
Van Stone with RTJ					
1	1.75 (45)	1.75 (45)	2.25 (60)	2.25 (60)	2.50 (65)
1 ¹ / ₂	1.75 (45)	2.00 (50)	2.00 (50)	2.50 (65)	3.00 (75)
2	1.75 (45)	2.00 (50)	2.25 (60)	3.00 (75)	3.50 (90)

1. Dimensions are in inches (millimeters).

Table 20. Recommended Minimum Head Length by Connection Class for EN 1092-1⁽¹⁾

Connection size	Connection class				
	PN 2.5/6	PN 10/16	PN 25/40	PN 63	PN 100
Flanged					
DN 20	40	45		50	
DN 25	40	45		50	
DN 40	40	45		50	
DN 50	45	45		50	
DN 65	45	50		50	
DN 80	40	45	50	55	60
DN 100	40	45	50	55	60

1. Dimensions are in millimeters.

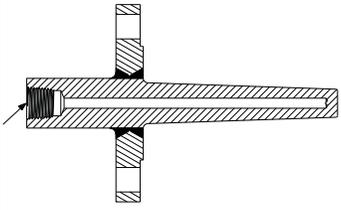
Instrument connection

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Thread	Specification	
1/2-14 NPT	SAE-AS 71082	
1/2-14 NPSM	ASME B1.20.1, 8 threads minimum	
3/4-14 NPT	SAE-AS 71082	
M18 x 1.5p	BS 3643	
M20 x 1.5p		
M24 x 1.5p		
M27 x 2p		
M14 x 1.5p		
G1/2-in. (BSPF)	ISO 228/1 (BS 2779)	
G3/4-in. (BSPF)	ISO 228/1 (BS 2779)	

Sensor/thermowell assemble to options (XT, XW)

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XT

This option is selected when a Rosemount 214C Sensor is ordered with the Rosemount 114C Thermowell. This ensures the sensor is threaded into the thermowell, but only hand tightened.

XW

This option is selected when a Rosemount 214C Sensor is ordered with the Rosemount 114C Thermowell. This ensures the sensor is threaded into the thermowell and torqued for a process-ready installation.

Extended product warranty (WR3, WR5)

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The extended product warranty options are available in three or five year coverage plans. In the model string, order option codes WR3 for a three year extended warranty or WR5 for a five year warranty. This coverage is an extension of the manufacturer's limited warranty and states that the goods manufactured or services provided by seller will be free from defects in materials or workmanship under normal use and care until the expiration of the applicable warranty period.

Wake frequency calculation (R21)

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The ASME PTC 19.3TW-2016 is internationally recognized as a mechanical design standard yielding reliable thermowell service in a wide range of temperature measurement applications. It includes evaluation of stresses applied to a barstock thermowell as installed in a process based on the design, material, mounting method, and process conditions. The documentation provided will detail the process information, thermowell geometry, and comprehensive calculation analysis. It will also provide an acceptable or unacceptable statement based on the analysis.

There are four quantitative criteria in ASME PTC 19.3 TW-2016 for a thermowell to be found acceptable for a particular set of process conditions:

Frequency Limit: the resonant frequency of the thermowell must be sufficiently high so that destructive oscillations are not excited by the fluid flow.

Dynamic Stress Limit: the maximum primary dynamic stress must not exceed the allowable fatigue stress limit. If the design requires that the thermowell pass through the in-line resonance to get to the operating conditions, there is an additional fatigue check at resonance.

Static Stress Limit: the maximum steady-state stress on the thermowell must not exceed the allowable stress, as determined by the Von Mises criteria.

Hydrostatic Pressure Limit: the external pressure must not exceed the pressure ratings of the thermowell tip, shank, and flange (or threads).

In addition, the suitability of the thermowell material for the process environment must be considered. This means the designer must evaluate how corrosion and erosion affects the thermowell as well as how exposure to the process conditions affects material properties.

For detailed information about this standard, refer to the Thermowell Calculations [White Paper](#).

NACE approval (Q35)

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This option certifies that thermowell materials used are compliant to NACE MR0175/ISO 15156 and NACE MR0103. The material certification provided will list compliance to the referenced standard.

Material code	NACE certified material
SC	316/316L Dual Rated
SF	304/304L Dual Rated
SL	310 SST
SM	321 SST
AB	Alloy B3
AC	Alloy C-276
AG	Alloy 20
AH	Alloy 400
AK	Alloy 600
CA	Chrome-Moly Grade B-11/F-11 Class II
CB	Chrome-Moly Grade B-22/ F-22 Class III

PMI testing (Q76)

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Positive Material Identification (PMI) is a test that verifies the thermowell material is as specified by the Rosemount 114C model code. X-ray/radiograph fluorescence (XRF) is used to provide elemental analysis in a nondestructive manner. The certificate will provide PMI results in comparison with the applicable material standards for each individual thermowell and state the reference standard. Two points are provided on flanges. All other thermowell components (including welds) will have a single point. XRF will not detect carbon in steels. PMI can be marked on the thermowell by choosing option Q40.

Material certification (Q8)

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Material certificate and traceability in accordance with EN 10204 Type 3.1 Inspection Certificate. The certificate provided will document the heat code, chemical analysis, and testing required by material standards.

Low temperature Charpy test (M01)

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Test is performed in accordance with ASTM A370 and report will be include in the Material Traceability Report (Q8). This report must be ordered if any documentation is required. Charpy test will be done to check toughness of the raw bar and flange material used for the construction of the thermowell. The table below shows the material available with the option, test temperature, and acceptance criteria.

Material	Material codes	Charpy temperature	Acceptance impact value
Duplex	DS – Super Duplex DT – Super Duplex (NORSOK) DU – Duplex DV – Duplex (NORSOK)	-58 °F (-50 °C)	Average: 45 J (33 ft-lbs) Minimum: 35 J (26 ft-lbs)
300 Series SST	SC – 316/316L SST SD – 316/316L SST (NORSOK) SF – 304/304L SG – 316 Ti SH – 316/316L with Tantalum sheath SJ – 316/316L with PFA coating SK – 304/304L with PTFE coating SM – 321 SST	-321 °F (-196 °C)	Average: 60 J (44 ft-lbs) Minimum: 55 J (41 ft-lbs)

Ultrasonic material test (M02)

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Ultrasonic examination will be done to check quality of the raw bar and flange material used for thermowell construction. The testing shall be performed in accordance with procedures specified in ASTM A388 by a Level 2 inspector. Calibration and acceptance criteria shall be per API 6A.

Surface finish certification (Q16)

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Thermowell surface finish is typically done to remove all the burrs and sharp edges which smooths the thermowell stem surface. The Rosemount 114C comes with a standard surface finish of T32 μ in. CLA N6 (8 μ m Ra) or better. This option provides a certificate that documents the maximum surface finish reading for stem and flange (when applicable) and a pass/fail statement. Improved surface finish options are also available for the Rosemount 114C (see options R14 and R20).

Surface finish < Ra 0.3µm (12µin) (R14)

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Improves surface finish to be less than Ra 0.3µm. An improved surface finish will increase corrosion resistance and make the thermowell easier to clean. This is common in sanitary applications.

Electropolish (R20)

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The electropolish process uses a combination of electrical current and chemicals to improve the surface finish. The surface will appear shiny and polished. It can have an advantage over mechanical polishing because there is no cold work involved that can lead to scratches, strains, metal debris, and embedded abrasives on the surface. An improved surface finish will increase corrosion resistance and make the thermowell easier to clean. This is common in sanitary applications.

External hydrostatic pressure test (Q5)

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Thermowells are tested at room temperature for 10 minutes. Water is certified to have a chlorine content of greater than 30 ppm. The certificate will document the chlorine content, hydrostatic test pressure level, duration, and test results. The pressure rating (in psi) for the different thermowell mounting styles is given below.

Flanged and Van Stone

Hydrostatic pressure test levels are in accordance with ASME B16.5. When the table below and the standard conflict, the standard shall govern.

Flange class (lbs)	Thermowell material (psi)				
	NK	AH	SA through SM, AD, AE, AF, AJ, AL	CS	AG, AK, CA, AB, AC, CB, CC, DU, DS
150	300	350	425	450	450
300	725	900	1100	1125	1125
600	1450	1800	2175	2225	2250
1500 (900)	3600	4500	5400	5575	5625
2500	6000	7500	9000	9275	9375

DIN Flanged thermowells

Table 21. External Pressure Test–DIN

DIN flanged thermowells	
Nominal pressure (bar)	Test pressure (bar)
16	40
40	100
100	250
Test to 2.5x nominal pressure rating	

Threaded thermowells

1500 psi

Internal hydrostatic pressure test (Q85)

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This test is performed at room temperature for a minimum of 10 minutes to 3000 PSI. The water used here is certified to ensure a chloride content of less than 30 PPM. The certificate provided will document the chloride content, hydrostatic test level, duration, and results.

Canadian Registration No. (Q17)

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Any pressure vessel, piping system, or fitting used in Canada is required by law to have a CRN (Canadian Registration Number). This ensures all pressure vessels, piping systems, and fittings are built under appropriate quality control programs. This CRN is for all Canadian provinces.

Dye penetration test (Q73)

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Dye or liquid penetration testings are performed by ASME Level II or III trained inspectors. These tests are all done in accordance to ASME Section V, Article 6 with an acceptance criteria per ASME Section III, Div 1 NB-2546. The certificate will document the inspectors name, dye penetration acceptance criteria, and test result.

Bore concentricity (Q83)

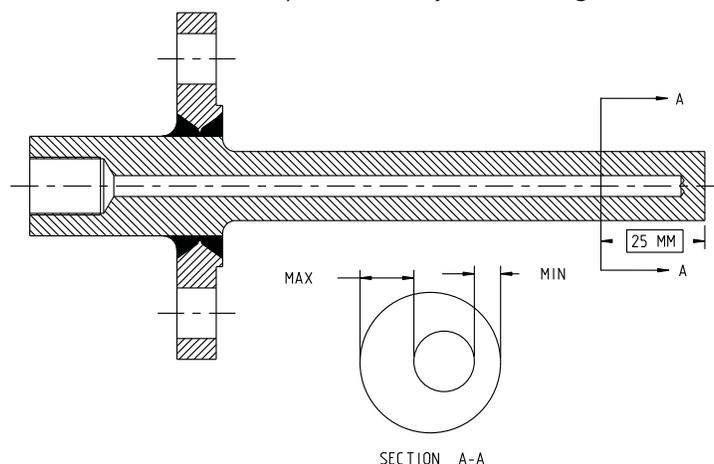
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Ultrasonic examination performed to check bore concentricity. Min and max wall thickness measurements shall be recorded 25 mm or 1 inch from the thermowell tip. Concentricity shall meeting the following criteria and min wall thickness of 2.7 mm (see image below).



Special cleaning (Q6)

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Special cleaning for oxygen/special service to be performed in accordance to ASTM G93. The procedure to be qualified using ASTM G93 Type II quantitative tests. The documentation provided for this test will have a compliance statement to ASTM G93. All cleaned thermowells will come in a sealed plastic bag to prevent contamination.

Thermowell markings (R40)

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This options provides the ability to have certain test markings on the thermowell. Below are the tests available for this option.

- Q5 - external pressure tests the values and units
- Q85 - PMI will be marked on the head length portion of the thermowell and on the top of the flange if applicable

X-ray/radiograph test (Q81)

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This test involves performing an X-ray/radiograph on the weld joints to examine for any internal imperfections and is only available on full penetration flanged thermowells. Testing is done in accordance to ASME Section VIII Div 1 per UW51 and conducted by a Level 2 Inspector. The certificate provided with this option will document the results.

Spherical tip (R60)

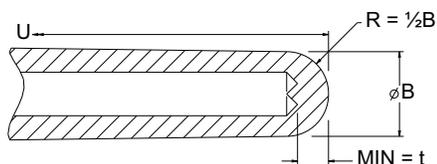
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Radius of spherical tip (B) is the same as the specified thermowell tip radius. Thermowell will still maintain specified "U" length.



Stainless steel plug and chain (R06)

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The plug and chain are made from stainless steel. This plug is used to protect the thermowell threads when a sensor isn't installed. It also keeps elements such as rain, dust, and dirt out of the thermowell.



Brass plug and chain (R23)

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The plug and chain are made from brass. This plug is used to protect the thermowell threads when a sensor isn't installed. It also keeps elements such as rain, dust, and dirt out of the thermowell.



Vent hole (R11)

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The vent hole allows for the venting of a thermowell. Vent or weep holes are often used to prevent gas buildup in certain applications. This option is useful in applications where gas build up is a concern. Process fluid leakage from the vent hole is an indicator of thermowell failure.



Flange face – concentric serrations (R09)

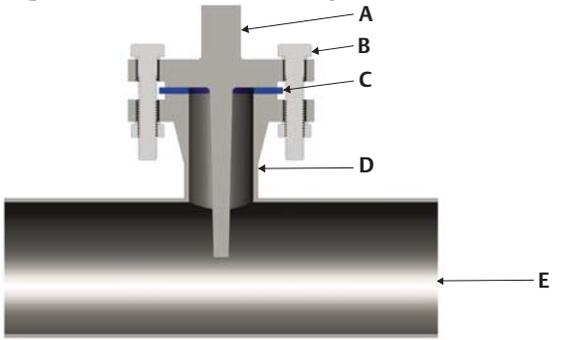
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This option changes the flange face so it has concentric serrations covering the wetted portion of the flange raised face. It is installed with an inside bolt circle (IBC) gasket/ring gasket, which extends to and is centered by the bolts. This flange face is designed per the ASME B16.5 standard.



Figure 24. Installation Components



- A. Thermowell
- B. Bolt/washers
- C. Ring gasket
- D. Nozzle and mating flange
- E. Process

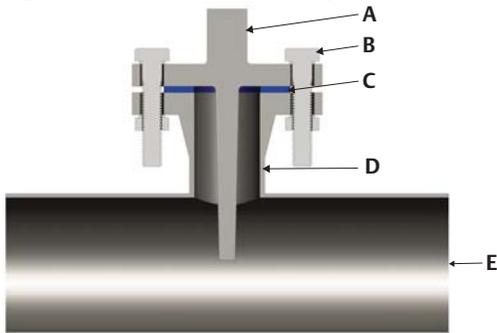
Flange face – flat (R10)

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This option changes the flange face so it has no raised section on the wetted portion of the flange face. The flat face is finished with spiral serrations. This style is frequently used where the mating flange is made from a casting or fragile material. It can be installed with ring gaskets or full face gaskets that extend past the bolt holes. This flange face is designed per the ASME B16.5 standard.



Figure 25. Installation Components



- A. Thermowell
- B. Bolt/washers
- C. Ring gasket
- D. Nozzle and mating flange
- E. Process

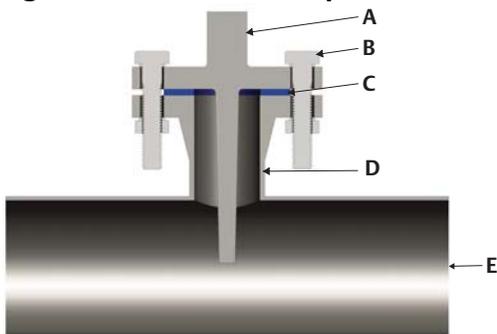
Raised face – Type B2 (R15)

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This option provides a smoother finish to the flange face compared to the standard Type B1 flange face.



Figure 26. Installation Components



- A. Thermowell
- B. Bolt/washers
- C. Ring gasket
- D. Nozzle and mating flange
- E. Process

Flange face – RTJ (R16)

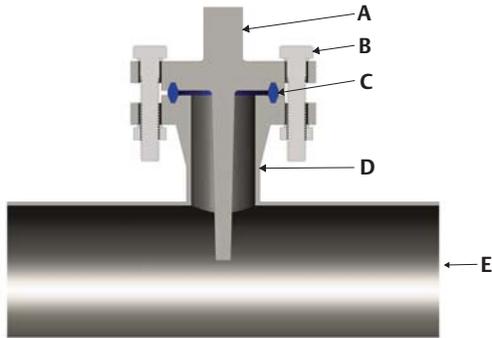
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This option changes the flange face so it has a ring type joint (RTJ). The RTJ flange face is common for high pressure applications using Class 600 flanges or higher. Both mating flanges have grooves that can accept a RTJ gasket which is usually made of solid metal. This flange face is designed per the ASME B16.5 standard.



Figure 27. Installation Components



- A. Thermowell
- B. Bolt/washers
- C. Ring gasket
- D. Nozzle and mating flange
- E. Process

Flange face – groove, Type D (R18)

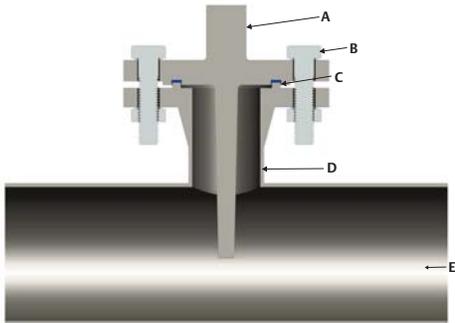
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Type C “tongue” will mount to Type D “groove”.



Figure 28. Installation Components



- A. Thermowell
- B. Bolt/washers
- C. Ring gasket
- D. Nozzle and mating flange
- E. Process

Flange face – tongue, Type C (R19)

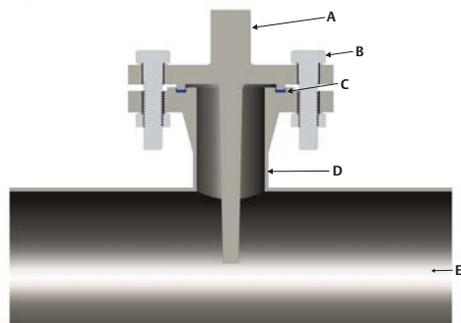
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Type C “tongue” will mount to Type D “groove”.



Figure 29. Installation Components



- A. Thermowell
- B. Bolt/washers
- C. Ring gasket
- D. Nozzle and mating flange
- E. Process

Flange face – spigot, Type E (R24)

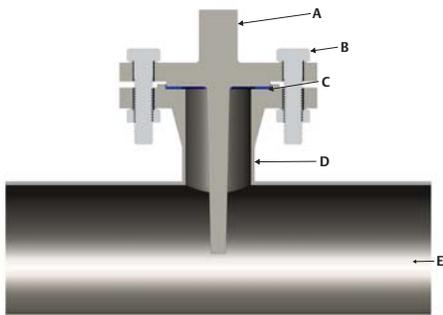
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Type E “spigot” will mount to type F “recess”.



Figure 30. Installation Components



- A. Thermowell
- B. Bolt/washers
- C. Ring gasket
- D. Nozzle and mating flange
- E. Process

Flange face – recess, Type F (R25)

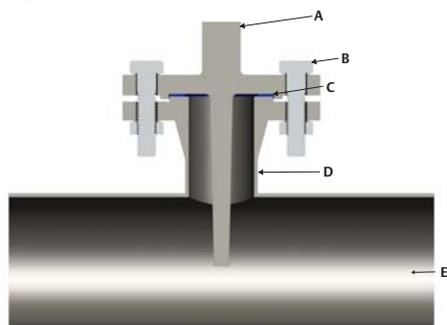
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Type E “spigot” will mount to type F “recess”.



Figure 31. Installation Components



- A. Thermowell
- B. Bolt/washers
- C. Ring gasket
- D. Nozzle and mating flange
- E. Process

Thermowells with wrench flats (R37)

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This option only applies to threaded thermowells made from exotic materials. By default, these thermowells are made with two wrench flats; this option must be selected to get hex (6) wrench flats.

Figure 32. Wrench Flats

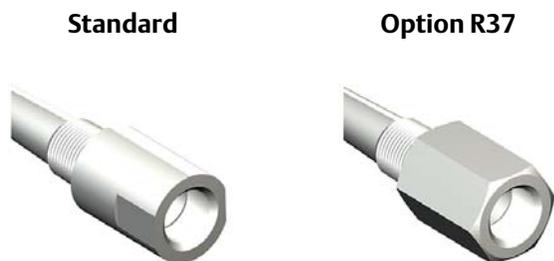


Table 22. Exotic Materials

Code	Material	Code	Material	Code	Material
AB	Alloy B3	AJ	Alloy 400 (w/304/304L SST flange)	NK	Nickel 200
AC	Alloy C-276	AK	Alloy 600	TT	Titanium Grade 2
AD	Alloy C-4 (w/304/304L SST flange)	AL	Alloy 600 (w/ 304/304L SST flange)	DS	Super duplex SST Grade F-53
AE	Alloy C-22 (w/304/304L SST flange)	MO	Molybdenum	DT	Super duplex SST Grade F-53 (NORSOK)
AF	Alloy C-22 (w/316/316L SST flange)	CA	Chrome-Moly Grade B-11/F-11 Class II	DU	Duplex 2205 Grade F-51
AG	Alloy 20	CB	Chrome-Moly Grade B-22/ F-22 Class III	DV	Duplex 2205 Grade F-51 (NORSOK)
AH	Alloy 400	CC	Chrome-Moly Grade F-91		

Root diameter (A0XX)

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Larger root diameters will provide greater strength. Changing the root diameter is helpful when designing a thermowell to pass wake frequency calculations.

Guidelines on specifying design modifiers based on the stem profile are as follows:

- Straight – only root diameter (Axxx) should be specified
- Tapered – both root (Axxx) and tip diameter (Bxxx) must be specified
- Stepped – if root diameter (Axxx) only is specified, the tip will be standard 0.5-in diameter; if tip diameter (Bxxx) is ordered, root diameter (Axxx) must also be specified

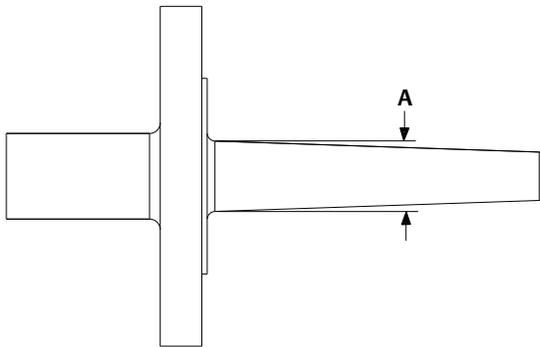


Table 23. Sample Root Diameters

Code	Dimension (E)	Code	Dimension (M)
A040	0.4-in.	A100	10 mm
A045	0.45-in.	A110	11 mm
A100	1.00-in.	A205	20.5 mm
A310	3.10-in.	A790	79 mm
A315	3.15-in.	A800	80 mm

Tip diameter (B0XX)

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Smaller tip diameters will improve time response. Changing the tip diameter is helpful when designing a thermowell to pass wake frequency calculations.

Guidelines on specifying design modifiers based on the stem profile are as follows:

- Straight – only root diameter (Axxx) should be specified
- Tapered – both root (Axxx) and tip diameter (Bxxx) must be specified
- Stepped – if root diameter (Axxx) only is specified, the tip will be standard 0.5-in. diameter; if tip diameter (Bxxx) is ordered, root diameter (Axxx) must also be specified

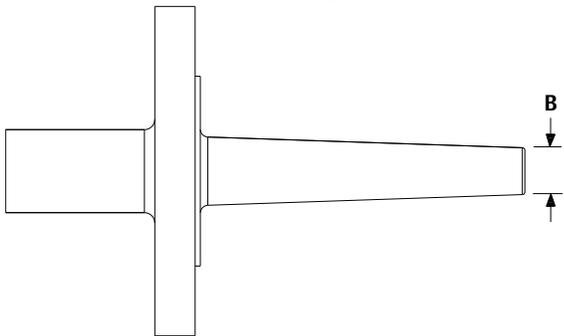


Table 24. Sample Tip Diameters

Code	Dimension (E)	Code	Dimension (M)
B040	0.4-in.	B120	12 mm
B045	0.45-in.	B130	13 mm
B100	1.00-in.	B205	20.5 mm
B175	1.75-in.	B450	45 mm
B180	1.80-in.	B460	46 mm

Bore diameter (d0X)

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Bore diameter (d) can be selected to accommodate different temperature sensor sizes. Time response is improved when the sensor and thermowells have a tighter fit.

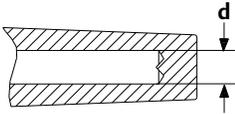


Table 25. Available Bore Diameters

Code	Dimension
D01	0.276-in./7.0 mm
D03	0.138-in./3.5 mm
D04	0.385-in./9.8 mm

Tip thickness (t0X)

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- [Back to Welded ordering table](#)

Tip thickness (t) is specified as the minimum thickness and measured from the top of the gun drill web as shown in the figure below.

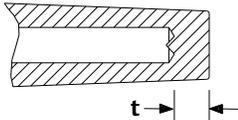


Table 26. Available Tip Thicknesses

Code	Dimension
T01	0.197-in./5.0 mm
T02	0.236-in./6.0 mm

Lap flange material for Van Stone design (C0X)

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This option is only available when the Van Stone (V) mounting configuration is selected. By default, a Van Stone thermowell comes with a carbon steel A105 lap flange. These options give the choice of having the thermowell ordered without a flange, with a 316/316LSST flange, or with a flange of similar material as the thermowell stem. Below are some model string examples of the standard offering and options for reference:

Example Model: 114CE0030VAA2SC032A – carbon steel A105 lap flange with 316/316L SST thermowell stem provided (standard)



Example Model: 114CE0030VAA2SC032AC01 – no lap flange, only thermowell stem provided



Example Model: 114CE0030VAA2SC032AC02 – changes default carbon steel A105 lap cover flange to 316/316LSST flange



Example Model: 114CE0030VAA2SC032AC03 – changes default cover flange to match thermowell stem material



Global Headquarters

Emerson Process Management

6021 Innovation Blvd.
Shakopee, MN 55379, USA
+1 800 999 9307 or +1 952 906 8888
+1 952 949 7001
RFQ.RMD-RCC@EmersonProcess.com

North America Regional Office

Emerson Process Management

8200 Market Blvd.
Chanhassen, MN 55317, USA
+1 800 999 9307 or +1 952 906 8888
+1 952 949 7001
RMT-NA.RCCRFQ@Emerson.com

Latin America Regional Office

Emerson Process Management

1300 Concord Terrace, Suite 400
Sunrise, FL 33323, USA
+1 954 846 5030
+1 954 846 5121
RFQ.RMD-RCC@EmersonProcess.com

Europe Regional Office

Emerson Process Management Europe GmbH

Neuhofstrasse 19a P.O. Box 1046
CH 6340 Baar
Switzerland
+41 (0) 41 768 6111
+41 (0) 41 768 6300
RFQ.RMD-RCC@EmersonProcess.com

Asia Pacific Regional Office

Emerson Process Management Asia Pacific Pte Ltd

1 Pandan Crescent
Singapore 128461
+65 6777 8211
+65 6777 0947
Enquiries@AP.EmersonProcess.com

Middle East and Africa Regional Office

Emerson Process Management

Emerson FZE P.O. Box 17033,
Jebel Ali Free Zone - South 2
Dubai, United Arab Emirates
+971 4 8118100
+971 4 8865465
RFQ.RMTMEA@Emerson.com

 [Linkedin.com/company/Emerson-Process-Management](https://www.linkedin.com/company/Emerson-Process-Management)

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