Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions

Technical Information

TWF11, TWF16

Metal or ceramic thermowells
For high temperature assemblies TAF11 and TAF16
Adjustable process connection

Application

TWF11
- Applicable for steel treatment (annealing), concrete furnaces and primaries. Accessory for high temperature assembly TAF11.

TWF16
- Applicable for cement production, steel treatment, incinerators and fluidized bed furnaces. Accessory for high temperature assembly TAF16.

Process temperatures:
- TWF11 up to +1600 °C (+2912 °F)
- TWF16 up to +1700 °C (+3092 °F)

Your benefits

- Long lifetime by usage of innovative thermowell materials with increased wear and chemical resistance
- Long term stable measurement due to sensor protection with non-porous materials
- Replaceable parts

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Endress+Hauser
People for Process Automation

Performance characteristics

Operating conditions

Process temperature

Depends on material, details see section 'Material'.

Process pressure

Depends on material.
Thermowells in high temperature applications are generally designed for use in pressureless processes.
Available process connections can be gastight up to 1 bar, details → 🖹 5.

Permitted flow rate as a function of immersion length

Depends on material and application. For process pressures ≥ 1 bar and a flow rate ≥ 1 m/s it is recommended to order a thermowell stress calculation, please contact your nearest Endress+Hauser sales organisation.

Material

The temperatures for continuous operation specified in the following table are only intended as reference values for use of the various materials in air and without any significant compressive load. The maximum operation temperatures are reduced considerably in some cases where abnormal conditions such as high mechanical load occur or in aggressive media.
Endress+Hauser supplies DIN/EN threaded process connections and flanges made of stainless steel according to AISI 316L (DIN/EN material number 1.4404 or 1.4435). With regard to their temperature stability properties, the materials 1.4404 and 1.4435 are grouped under 13E0 in EN 1092-1 Tab. 18. The chemical composition of the two materials can be identical.

Material name	Short form	Recommended max. temperature for continuous use in air	Properties
AISI 316L/ 1.4404 1.4435	X2CrNiMo17-12-2 X2CrNiMo18-14-3	650 °C (1200 °F)[1)]	▪ Austenitic, stainless steel ▪ High corrosion resistance in general ▪ Particularly high corrosion resistance in chlorine-based and acidic, non-oxidizing atmospheres through the addition of molybdenum (e.g. phosphoric and sulfuric acids, acetic and tartaric acids with a low concentration) ▪ Increased resistance to intergranular corrosion and pitting ▪ Compared to 1.4404, 1.4435 has even higher corrosion resistance and a lower delta ferrite content
AISI 310/ 1.4841	X15CrNiSi25-20	1100 °C (2012 °F)	▪ Austenitic, stainless steel ▪ Good resistance to oxidizing and reducing atmospheres ▪ Due to the higher chromium content well resistant to oxidizing aqueous solution and neutral salts melting at higher temperatures ▪ Only weakly resistant to sulphurous gases
AISI 304/ 1.4301	X5CrNi18-10	850 °C (1562 °F)	▪ Austenitic, stainless steel ▪ Well usable in water and lowly pollute waste water ▪ Only at relatively low temperatures resistant to organic acids, saline solutions, sulphates, alcaline solutions, etc.
AISI 446/ ~1.4762/ ~1.4749	X10CrAl24 / X18CrNi24	1100 °C (2012 °F)	▪ A ferritic, heat resistant, high-chromium stainless steel ▪ Very high resistance to reducing sulphurous gases and salts with low content of oxygen ▪ Very good resistance to constant as well as cyclical thermal stress, to incineration ash-corrosion and to melts of copper, lead and tin ▪ Poorly resistant to gases containing nitrogen
INCONEL®600 / 2.4816	NiCr15Fe	1100 °C (2012 °F)	▪ A nickel/chromium alloy with very good resistance to aggressive, oxidizing and reducing atmospheres, even at high temperatures ▪ Resistant to corrosion caused by chlorine gas and chlorinated media as well as many oxidizing mineral and organic acids, sea water etc. ▪ Corrodible by ultrapure water ▪ Not to be used in a sulfur-containing atmosphere
INCONEL®601 / 2.4851	NiCr23Fe	1200 °C (2192 °F)	▪ High temperature corrosion resistance enhanced by aluminum content ▪ Resistance to oxide spalling and carburization under thermal cycling ▪ Good resistance against molten salt corrosion ▪ Particularly susceptible to sulfidation

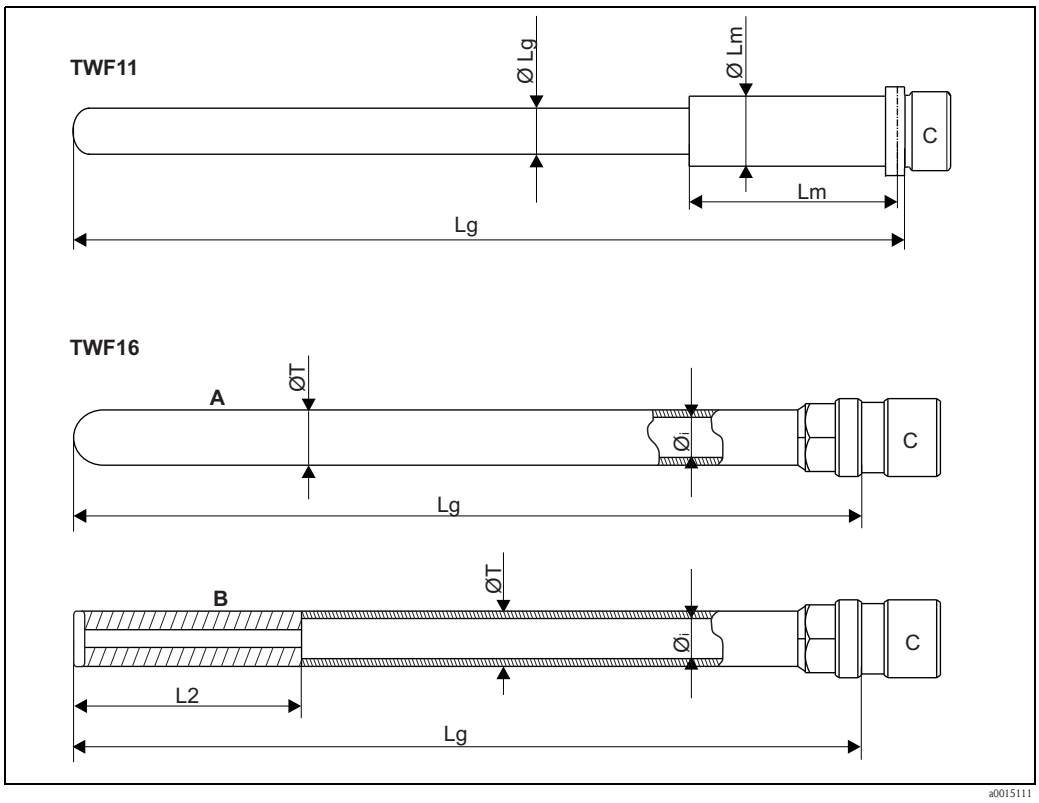
Material name	Short form	Recommended max. temperature for continuous use in air	Properties
INCOLOY®800 HT / 1.4959	X8NiCrAlTi32-21	1100 °C (2012 °F)	■ A nickel/chromium/iron alloy based on the same composition as INCOLOY®800, but has significantly higher creep rupture strength, resultant from the close control of the carbon, aluminum and titatinium contents. ■ Good strength and excellent resistance to oxidation and carburization at high temperature environments. ■ Good resistance to stress corrosion cracking, attack by sulfur, internal oxidation, scaling and corrosion in a multitude of industrial environments. Suitable for sulfurous environments.
HASTELLOY® X / 2.4665	NiCr22Fe18Mo	1150 °C (2102 °F)	■ A nickel/chromium/iron/molybdenum alloy ■ Very resistant to oxidizing and reducing atmospheres ■ Good strength and ductility at high temperatures
Kanthal AF	FeCrAl	1400 °C (2552 °F)	■ A high-temperature ferritic iron/chrominum/aluminum alloy ■ High resistance to sulfurous, carburizing and oxidising environments ■ Good hardness and weldability ■ Good form stability at high temperature ■ Not to be used in a chloride-containing atmosphere and nitrogenous gases (cracked ammonia)
Special nickel/ cobalt alloy	NiCo	1200 °C (2192 °F)	■ A nickel/cobalt alloy ■ Very good resistance to sulfidation and chloride environment ■ Exceptionally good resistance to oxidation, hot corrosion, carburization, metal dusting, and nitridation ■ Good creep resistance ■ Average surface hardness ■ High wear resistance **Recommended applications** ■ Cement industry – gas standpipe: successfully tested with up to 20 times longer lifespan compared to AISI310 – clincker cooler: successfully tested with up to 5 times longer lifespan compared to AISI310 ■ Waste incinerators: successfully tested with up to 12 times longer lifespan than INCONEL® 600 and C276) ■ Fluidized bed furnace (biogas reactor): successfully tested with up to 5 times longer lifespan than e.g. INCOLOY® 800HT or INCONEL® 600.
Ceramic material types according to DIN VDE0335			
C610		1500 °C (2732 °F)	■ Al_2O_3-content approx. 60 %, alkali-content 3 % ■ The most economic non porous ceramic material ■ Highly resistant to hydrogen fluoride, temperature shocks and mechanical influences, normally used for internal and external thermowells as well as insulators
Sinterized silicon carbide	SiC	1650 °C (3000 °F)	■ High thermal shock resistance due to its porosity ■ Good thermal conductivity ■ Very hard and stable at high temperature **Recommended applications** ■ Glass industry: glass feeders, float glass production ■ Ceramic industry ■ Furnaces
Kanthal Super	$MoSi_2$ with a glass phase component	1700 °C (3092 °F)	■ It is not affected by thermal shock ■ Very low porosity (< 1%) and very high hardness ■ Not to be used in environments with chlorine and fluorine compounds ■ Not suitable for mechanical shock affected applications ■ Not to be used in applications with powder
Special silicon nitride ceramic	SiN	1400 °C (2552 °F)	■ Excellent wear and thermal shock resistance ■ No porosity ■ Good heat response ■ Not resistant to impacts (brittleness) **Recommended applications** ■ Cement industry – Cyclone preheater: successfully tested with up to 5 times longer lifespan compared to AISI310 – Secondary airpipe ■ Generally all applications with extreme abrasive conditions; mechanical shocks/impacts have to be avoided because of brittleness

1) Can be used to a limited extent up to 800 °C (1472 °F) for low compressive loads and in non-corrosive media. Please contact your Endress+Hauser sales team for further information.

Mechanical construction

Design, dimensions

All dimensions in mm (in).



TWF11

C	Terminal head connection: M24x1.5 or groove for DIN A head	Ø Lg	Sheath diameter
Lg	Immersion length	Lm	Sleeve length
		Ø Lm	Sleeve diameter

TWF16

A	Version thermowell made from tube	L2	Length bar stock tip
B	Version thermowell made from tube and bar stock tip	Lg	Immersion length
		ØT	Thermowell outer diameter
C	Terminal head connection: M24x1.5 or groove for DIN A head	Øi	Thermowell inner diameter

Thermowell

- Metallic thermowell, usually machined from tubes or bars.
- Ceramic thermowell.

The selection of the thermowell materials majorly depends on the following material properties, which will directly influence the lifetime of the sensor:

- Hardness
- Chemical resistance
- Maximum operating temperature
- Wear/abrasion resistance
- Brittleness
- Porosity for process gases
- Creep resistance

Ceramic materials are commonly used for highest temperatures and, due to their hardness, for applications with high abrasion rates. Attention has to be paid regarding the brittleness of these materials when exposed to high mechanical loads inside the process. When using porous ceramics as external protection sheath, an additional, non-porous inner protection sheath has to be used in order to protect the noble sensor elements from contamination leading to temperature drifts.

Metal alloys generally show higher mechanical resistance but lower maximum temperature limits and less abrasion resistance. All metal alloys are non-porous and usually there is no need for an additional inner protection sheath.

Metal sleeve and process connection
The TWF11 ceramic thermowells are mounted into a metal sleeve which connects them towards the terminal head. Also the process connection is fitted on the metal sleeve due to its higher mechanical strength. The dimensions and material type for the sleeve are related to the process temperatures and immersion lengths of the ceramic thermowells.
All high temperature thermowells are available with an adjustable flange, stop flanges or gas tight compression fittings.

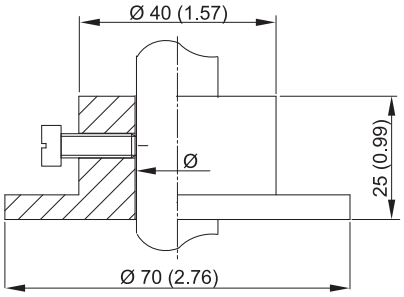
Weight

Depending on length and diameter. Some examples:
- TWF11:
  Material SiC or SiN, Ø Lg = 17 mm (0.7 in), Lg = 800 mm (31.5 in), Lm = 300 mm (11.8 in), material sleeve: AISI 310): 0.8 kg (1.8 lbs)
- TWF16:
  Material SiN, Ø A = 26 mm (1.02 in), Lg = 800 mm (31.5 in): 1.4 kg (3.1 lbs)
  Material Kanthal AF, Lg = 1000 mm (39.4 in): 0.6 kg (1.3 lbs)
  Material NiCo, ¾" schedule 40s, Lg = 1000 mm (39.4 in): 1.9 kg (4.2 lbs)

Process connection

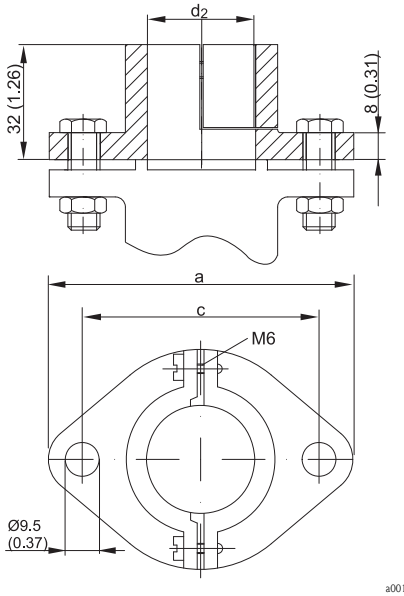
Type

Adjustable flange



- Max. temperature: +350 °C (+662 °F)
- Material: Aluminum
- Ø depends on sleeve (TWF11) or thermowell pipe (TWF16) diameter
- No gas tight connection

Stop flange according to DIN EN 50446

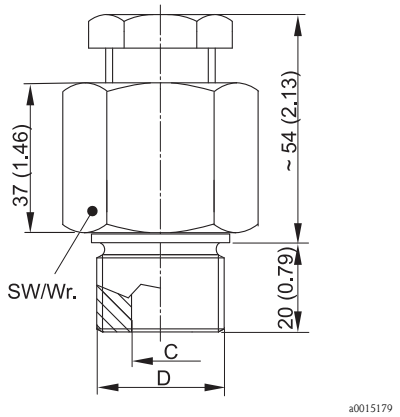


- Max. temperature: +400 °C (+752 °F)
- Material: Cast iron
- No gas tight connection
- Counter flange and gasket is not provided

d2 in mm (in)	a in mm (in)	c in mm (in)	clampable sleeve diameter in mm (in):	Order numbers for reorder as spare part:
23 (0.91)	90 (3.54)	70 (2.76)	21...22 (0.83...0.87)	60000516
33 (1.3)	90 (3.54)	70 (2.76)	31...33 (1.22...1.3)	60000517
16 (0.63)	75 (2.95)	55 (2.16)	14...15 (0.55...0.59)	60008385
29 (1.14)	90 (3.54)	70 (2.76)	27...28 (1.06...1.1)	71039792

Type

Gas tight GCP assembly



- Max. temperature: +350 °C (+662 °F)
- Material: AISI 316Ti
- Maximum process pressure ≤ 1 bar (14.5 psi)

D	C in mm (in)	Clampable sleeve diameter in mm (in)	SW/Wr.	Order numbers for reorder as spare part
G½"	15.5 (0.61) 17.5 (0.69)	13.7...14 (0.54...0.55) 17...17.2 (0.67)	36 36	60019126 60019129
G¾"	15.5 (0.61) 18 (0.71) 19 (0.75) 22.5 (0.89)	13.7...14 (0.54...0.55) 17...17.2 (~0.67) 17.5...18 (0.69...0.71) 21.3...22 (0.84...0.86)	36 36 36 41	71031438 60019130 71125362 60020836
G1"	15.5 (0.61) 18 (0.71) 19 (0.75) 22.5 (0.89) 28 (1.1)	13.7...14 (0.54...0.55) 17...17.2 (~0.67) 17.5...18 (0.69...0.71) 21.3...22 (0.84...0.86) 26.7...27 (1.05...1.06)	41 41 41 41 46	60022699 60021758 71125364 60021757 71001827
G1¼"	29 (1.14)	27.5...28 (~1.1)	55	71125353
G1½"	22.5 (0.89) 29 (1.14) 35 (1.38)	21.3...22 (0.84...0.86) 27.5...28 (~1.1) 33.4...34 (1.32...1.34)	55 55 55	60021425 71125354 60022497

Installation conditions

Orientation

Vertical and horizontal installation. A vertical installation should be preferred due to possible irreversible bending of metal tubes and the brittleness of the ceramic materials, which could be hit by falling parts.

Installation instructions

Recommended maximum immersion length Lg for horizontal mounting:
- 1500 mm (59 in) for diameter > 20 mm (0.8 in)
- 1200 mm (47.3 in) for diameter < 20 mm (0.8 in)

Note!
When installing longer lengths than the recommended maximum in horizontal position, the thermowell might be bend irreversibly under its own weight in the hot environment.

Installation of ceramic sheaths

Thermowells made of ceramic (especially gas tight) are sensitive to fast temperature changes: in order to reduce the risk of thermal shock and prevent the sheaths from failure, gas tight ceramic sheaths must be heated before installation. Two possibilities are applicable:

- Installation with pre-heating
  When the process is already operating at its running conditions at about 1000 °C (1832 °F) or more, the ceramic part of the thermowell must be pre-heated from room temperature to 400 °C (752 °F). It is suggested to use a horizontal, cylindrical cross-section oven or cover the ceramic part with electric heating elements. Do not use direct flames.
  It is suggested to pre-heat the ceramic sheath in situ and then proceed immediately with the insertion. The measuring system shall be installed carefully with an insertion rate of 100 mm/min, avoiding any mechanical shock. If it is not possible to run the pre-heating phase near the plant, the insertion rate must be lowered to 30 mm/min because of the cooling of the system during the transportation.
- Installation without pre-heating
  If the process is running at its working temperature, the thermowell shall be installed inserting the ceramic sheath in the plant for a length equal to the wall thickness (including the insulation material) and left in that position for 2 hours.
  After this time, the device shall be installed at a rate of 30 mm/min avoiding any mechanical shock. At process temperature < 80 °C (176 °F) it is not necessary to consider any insertion rate. It is recommended to avoid any impact or collision among the ceramic sheath and the components of the plant.

Certificates and approvals

CE Mark

The device meets the legal requirements of the EC directives if applicable. Endress+Hauser confirms that the device has been successfully tested by applying the CE mark.

Other standards and guidelines

DIN EN 50446: Straight thermocouple assembly with metal or ceramic protection tube and accessories, including terminal heads

PED approval

The thermowells comply with paragraph 3.3 of the Pressure Equipment Directive (97/23/CE) and are not marked separately.

Ordering information

This information provides an overview of the order options available. The information is not exhaustive, however, and may not be fully up to date. **More detailed** information is available from your local Endress+Hauser representative.

Product structure TWF11

Thermowell TWF11 – High temperature, max. 1600 °C (2912 °F)

010		**Sheath material; Diameter ∅Lg; max. length Lg, max. temperature:**
	AA	C610; 14 mm; 600 mm; max. Temp. 1500 °C (2732 °F)
	AB	C610; 14 mm; 1000 mm; max. Temp. 1500 °C (2732 °F)
	AC	C610; 14 mm; 1500 mm; max. Temp. 1500 °C (2732 °F)
	AD	C610, 17 mm; 600 mm; max. Temp. 1500 °C (2732 °F)
	AE	C610; 17 mm; 1000 mm; max. Temp. 1500 °C (2732 °F)
	AF	C610; 17 mm; 1500 mm; max. Temp. 1500 °C (2732 °F)
	AG	C610; 24 mm; 600 mm; max. Temp. 1500 °C (2732 °F), internal sheath C610 diameter 17 mm
	AH	C610; 24 mm; 1000 mm; max. Temp. 1500 °C (2732 °F), internal sheath C610 diameter 17 mm
	AJ	C610; 24 mm; 1500 mm; max. Temp. 1500 °C (2732 °F), internal sheath C610 diameter 17 mm
	BA	SiC; 17 mm; 550 mm; max. Temp. 1600 °C (2912 °F)
	BB	SiC; 17 mm; 850 mm; max. Temp. 1600 °C (2912 °F)
	BC	SiC; 17 mm; 1150 mm; max. Temp. 1600 °C (2912 °F)
	BD	SiC; 26.6 mm; 600 mm; max. Temp. 1600 °C (2912 °F)
	BE	SiC; 26.6 mm; 800 mm; max. Temp. 1600 °C (2912 °F)
	BF	SiC; 26.6 mm; 1000 mm; max. Temp. 1600 °C (2912 °F)
	BG	SiC; 26.6 mm; 1200 mm; max. Temp. 1600 °C (2912 °F)
	BH	SiC; 26.6 mm; 1400 mm; max. Temp. 1600 °C (2912 °F)
	BI	SiC; 26.6 mm; 1700 mm; max. Temp. 1600 °C (2912 °F)
	CA	SiN; 16 mm; 600 mm; max. Temp. 1400 °C (2552 °F)
	CB	SiN; 16 mm; 900 mm; max. Temp. 1400 °C (2552 °F)
	CC	SiN; 16 mm; 1200 mm; max. Temp. 1400 °C (2552 °F)
	CD	SiN; 22 mm; 900 mm; max. Temp. 1400 °C (2552 °F)
	CE	SiN; 22 mm; 1100 mm; max. Temp. 1400 °C (2552 °F)
	CF	SiN; 22 mm; 1300 mm; max. Temp. 1400 °C (2552 °F)
	CG	SiN; 22 mm; 1500 mm; max. Temp. 1400 °C (2552 °F)

020			**Immersion length Lg:**
		AA	250 mm
		AB	300 mm
		AC	400 mm
		AD	450 mm
		AE	500 mm
		AF	550 mm
		AG	600 mm
		AH	700 mm
		AI	750 mm
		BA	800 mm
		BB	850 mm
		BC	900 mm
		BD	1000 mm
		BE	1050 mm
		BF	1100 mm
		BG	1150 mm
		BH	1200 mm
		BI	1300 mm

020		**Immersion length Lg:**					
		CA	1400 mm				
		CB	1500 mm				
		CD	1600 mm				
		CE	1700 mm				
		X1	..... mm, as specified (300...600 mm)				
		X2	..... mm, as specified (601...1000 mm)				
		X3	..... mm, as specified (1001...1500 mm)				
030			**Sleeve length Lm; Diameter ∅Lm; Material:**				
			B	65 mm; 21.34 mm; AISI 304			
			F	100 mm; 21.34 mm; AISI 304			
			G	150 mm; 21.34 mm; AISI 304			
			H	200 mm; 21.34 mm; AISI 304			
			J	185 mm; 33.4 mm, AISI 304			
			K	300 mm; 33.7 mm; AISI 446			
			L	300 mm; 22 mm; AISI 446			
			M	400 mm; 33.4 mm; AISI 310			
			N	400 mm; 22 mm; AISI 310			
040				**Connection terminal head:**			
				B	Thread M24x1.5		
				F	Groove for DIN A head		
520					**Process connection:**		
					CA	Adjustable flange, D=70 mm	
					CC	Stop flange DIN EN 50446, 21...22 mm, clampable, d2=23 mm, a=90 mm, c=70 mm	
					CE	Stop flange DIN EN 50446, 31...33 mm, clampable, d2=33 mm, a=90 mm, c=70 mm	
					CM	GCP assembly, D=G ¾", C=22.5 mm, gas tight, clampable 21.3...22 mm, Wr.=41	
					CR	GCP assembly, D=G 1", C=22.5 mm, gas tight, clampable 21.3...22 mm, Wr.=41	
					CU	GCP assembly, D=G 1½", C=22.5 mm, gas tight, clampable 21.3...22 mm, Wr.=55	
					CW	GCP assembly, D=G 1½", C=35 mm, gas tight, clampable 33.4...34 mm, Wr.=55	
895						**Marking:**	
						Z1	Tagging (TAG), metal
						Z3	Commissioning label, paper
						Z6	Tagging (TAG), by customer
TWF11-							**← Order code (complete)**

Product structure TWF16

Thermowell TWF16 - High temperature, max. 1700 °C (3092 °F)

010	**Material thermowell; maximum temperature:**					
	A	AISI 310; 1100 °C (2012 °F)				
	B	AISI 316; 800 °C (1472 °F)				
	C	AISI 446; 1100 °C (2012 °F)				
	D	INCONEL 600; 1100 °C (2012 °F)				
	E	INCONEL 601; 1200 °C (2192 °F)				
	F	INCOLOY 800HT; 1100 °C (2012 °F) (with bar stock tip)				
	G	Kanthal Super; 1700 °C (3092 °F)				
	H	Kanthal AF; 1300 °C (2372 °F)				
	I	Hastelloy X; 1200 °C (2192 °F)				
	J	NiCo; 1200 °C (2192 °F)				
	K	SiN; 1400 °C (2552 °F)				
020		**Thermowell diameter ∅T:**				
		A1	14 x 11 mm (AISI 310)			
		A2	17.2 x 14.2 mm (AISI 310)			
		A3	21.3 x 16.3 mm (AISI 310)			
		A4	22 x 18 mm (AISI 310)			
		A5	26.7 x 23.7 mm (AISI 310)			
		B1	21.3 x 15.76 mm (½" schedule 40, AISI 316)			
		B2	26.7 x 20.96 mm (¾" schedule 40, AISI316)			
		C1	21.3 x 15.76 mm (½" schedule 40, AISI 446)			
		C2	26.7 x 20.96 mm (¾" schedule 40, AISI 446)			
		D1	15 x 12 mm (INCONEL 600)			
		D2	17.2 x 13.2 mm (INCONEL 600)			
		D3	21.3 x 15.76 mm (½" schedule 40, INCONEL 600)			
		D4	22 x 18 mm (INCONEL 600)			
		D5	26.7 x 20.96 mm (¾" schedule 40, INCONEL 600)			
		E1	21.3 x 15.76 mm (½" schedule 40s, INCONEL 601			
		E2	22 x 18 mm (INCONEL 601)			
		F1	26.7 x 18.85 mm (¾", schedule 80, INCOLOY 800HT)			
		G1	18 x 10 mm (Kanthal Super), Lmax = 2000 mm			
		G2	22 x 13 mm (Kanthal Super) Lmax = 2000 mm			
		H1	21.3 x 15.76 mm (½" schedule 40, Hastelloy X)			
		H2	26.7 x 20.96 mm (¾" schedule 40, Hastelloy X)			
		J1	21.3 x 15.76 mm (½" schedule 40s, NiCo) Lmax = 2000mm			
		J2	26.7 x 20.96 mm (¾" schedule 40s, NiCo) Lmax = 2000mm			
		K1	22 x 19.4 mm (Kanthal AF), Lmax = 1000 mm			
		L1	22 x 12 mm (SiN), Lmax = 1550 mm			
		L2	28 x 16 mm (SiN), Lmax = 1550 mm			
030			**Thermowell length (immersion length Lg):**			
			A1	660 mm (SiN)		
			A2	810 mm (SiN)		
			A3	960 mm (SiN)		
			A4	1060 mm (SiN)		
			A5	1160 mm (SiN)		
			A6	1260 mm (SiN)		
			A7	1560 mm (SiN)		
			X1	..... mm (200...2000) only for Kanthal Super / NiCo		
			X2	..... mm (200...1000) only for Kanthal AF		
			X3	..... mm (200...2200)		
040				**Bar stock tip; Diameter:**		
				0	Not needed	
				1	INCOLOY 800HT; 26.7 mm	
				2	NiCo; 21.3 mm	
				3	NiCo; 26.7 mm	
050					**Length bar stock tip (L2):**	
					A0	Not needed
					A1	300 mm
					A2	400 mm
					X1	... mm (200...400)
060						**Connection terminal head:**
						1 Thread M24x1.5
						2 Groove for DIN A head

520							**Process connection:**		
							CA	Adjustable flange diameter 70 mm	
							CB	Stop flange DIN EN 50446, 14...15 mm, clampable, d2=16 mm, a=75 mm, c=55 mm	
							CC	Stop flange DIN EN 50446, 21...22 mm, clampable, d2=23 mm, a=90 mm, c=70 mm	
							CD	Stop flange DIN EN 50446, 27...28 mm, clampable, d2=29 mm, a=90 mm, c=70 mm	
							CH	GCP assembly, D=G ½", C=15.5 mm, gas tight, clampable 13.7...15 mm, Wr.=36	
							CI	GCP assembly, D=G ½", C=17.5 mm, gas tight, clampable 17...17.2 mm, Wr.=36	
							CJ	GCP assembly, D=G ¾", C=15.5 mm, gas tight, clampable 13.7...15 mm, Wr.=36	
							CK	GCP assembly, D=G ¾", C=18 mm, gas tight, clampable 17...17.2 mm, Wr.=36	
							CL	GCP assembly, D=G ¾", C=19 mm, gas tight, clampable 17.5...18 mm, Wr.=36	
							CM	GCP assembly, D=G ¾", C=22.5 mm, gas tight, clampable 21.3...22 mm, Wr.=41	
							CN	GCP assembly, D=G 1", C=15.5 mm, gas tight, clampable 13.7...15 mm, Wr.=41	
							CP	GCP assembly, D=G 1", C=18 mm, gas tight, clampable 17...17.2 mm, Wr.=41	
							CQ	GCP assembly, D=G 1", C=19 mm, gas tight, clampable 17.5...18 mm, Wr.=41	
							CR	GCP assembly, D=G 1", C=22.5 mm, gas tight, clampable 21.3...22 mm, Wr.=41	
							CS	GCP assembly, D=G 1", C=28 mm, gas tight, clampable 26.7...27 mm, Wr.=46	
							CT	GCP assembly, D=G 1 ¼", C=29 mm, gas tight, clampable 27.5...28 mm, Wr.=55	
							CU	GCP assembly, D=G 1½", C=22.5 mm, gas tight, clampable 21.3...22 mm, Wr.=55	
							CV	GCP assembly, D=G 1 ½", C=29 mm, gas tight, clampable 27.5...28 mm, Wr.=55	
895								**Marking:**	
								Z1	Tagging (TAG), metal
								Z3	Commissioning label, paper
								Z6	Tagging (TAG), by customer
TWF16-									**← Order code (complete)**

Documentation

High temperature assemblies Omnigrad S TAF11, TAF12x, TAF16 (TI251t/02/en)

Instruments International

Endress+Hauser
Instruments International AG
Kaegenstrasse 2
4153 Reinach
Switzerland

Tel.+41 61 715 81 00
Fax+41 61 715 25 00
www.endress.com
info@ii.endress.com

Endress+Hauser

People for Process Automation

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