ECEFast Sensors - Temperature Products

Custom built temperature probes & components

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Excalibur thermocouples were developed by ECEFast

Custom Made For Your Application

- *Heavy wall, and large gauge wires for maximum life.*
- *Cold welded end closure for consistent properties.*
- *Swaged (reduced OD) to compact MgO high purity insulation and exclude air & gases.*
- *Faster response due to compacted insulation.*
- *Good electrical isolation at high temperatures.*
- *NATA certificate of calibration as standard – if requested.*

NATA Accreditation No 5473

The Excalibur was developed in Australia over a long period, and has been extensively tested in a wide variety of applications. Users report significant increase in life, no bending or distortion and enhanced protection for multi-loop process control systems due to improved isolation. It has been in commercial use for more than 5 years.

Model	Sheath	Mounting	Cal.	Diameter	Length
TS-6	(Inconel ™) alloy 601 2	0 no fitting 1 screw fitting* 2 adjustable flange 3 OEM version – bare 4 custom design	K N	18	standard to 1500mm custom to 2000mm

*specify type & position

- *Alternative sheath materials available – including Alloy TD (some sizes)*
- *Plasma sprayed ceramic coating for extreme abrasion resistance.*
- *Cast iron head in place of standard alloy head.*

Aluminium
Cement
Steel
Power
Chemical
Brick & Tile
Heat Treatment
Mineral Processing

2.7 mm wires
3 mm wall

18 mm diameter

Quality System
Quality Endorsed Company

1800 811 818 - Australia

sales@ecefast.com.au

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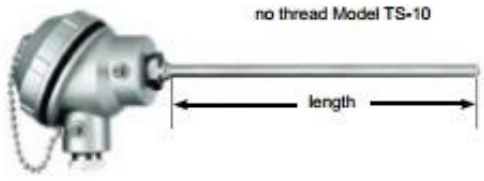
Model TS-10
TS-11



small Aluminium Head

- *Thermocouple (J, K, T, N) mineral insulated cable construction, ungrounded junction, 310 SS sheath.*
- *Pt100, 3 wire 316 SS sheath. Max 260°C. Accuracy Band 1.*

Model			Cal.		Diameter		Length	Optional Head Types	
TS-1	0	no thread	J	type J	3	mm	mm	O	standard alloy head
	1	1/2" BSP SS thread	K	type K	4.5	mm		A	bakelite head
			T	type T	6	mm		C	machined SS head
			N	type N	?	mm			
			P	Pt100					

** Fittings & wells as required*

Model TS-12, 14
TS-13, 15

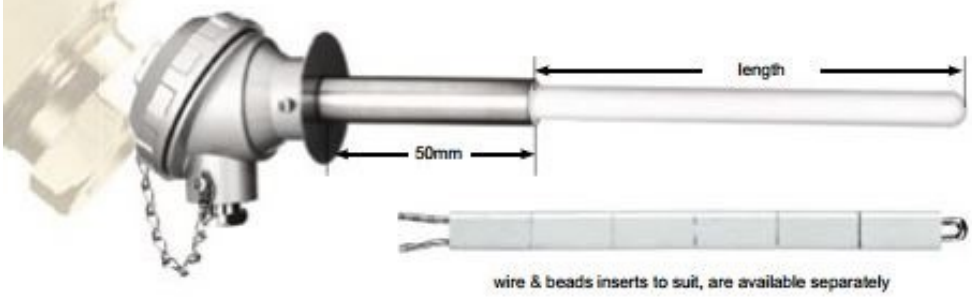
large Aluminium Head

- *Thermocouple (J, K, T, N) mineral insulated cable construction, ungrounded junction, 310 SS sheath.*
- *Pt100, 3 wire 316 SS sheath. Max 260°C. Accuracy Band 1.*

Model			Cal.		Diameter		Length	Optional Head Types	
TS-1	2	no fitting simplex	J	type J	3	mm	mm	O	standard alloy head
	3	1/2" BSP SS thread	K	type K	4.5	mm		A	bakelite head
	4	no fitting duplex	T	type T	6	mm		B	cast SS head
	5	1/2" BSP SS thread, duplex	N	type N	?	mm		C	machined SS head
			P	Pt100					

** Fittings & wells as required*

Model TS-32, 34, 35



wire & beads inserts to suit, are available separately

- *Thermocouple (K, N, R, S) with alloy head & SS support tube for ceramic sheath & insulator.*

Model			Cal.		Length
TS-3	2	14G type K, N	K	type K	mm
	4	0.35mm type R, S	J	type N	
	5	0.5mm type R, S	R	type R	
			S	type S	

Optional Alumina Construction to 1700°C R, S & B only

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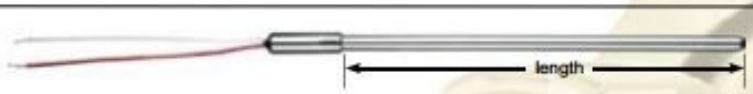
Model TS-30, 31, 33, 36

- *Thermocouple (K, N, R, S) with ceramic terminal block & SS support tube for ceramic sheath & insulator.*

Model			Cal.		Length
TS-3	0	8G type K, N*	K	type K	____ mm
	1	14G type K, N	N	type N	
	3	0.35mm type R, S	R	type R	
	6	0.5mm type R, S	S	type S	

* No SS support bracket for terminal block

Model TS-16



TS-17

TS-19, 20

- *Thermocouple (J, K, T, N) mineral insulated cable construction, ungrounded junction, 310 SS sheath with different end features.*
- *Pt100, 3 wire 316 SS sheath. Max 260°C. Accuracy Band 1.*

Model			Cal.		Diameter		Length		Options	
TS-1	6	75mm PVC tails	J	type J	1.5	mm	____	mm	O	
	7	½"/½" BSP SS fixed	K	type K	3	mm			A	jack in place of plug
	8	2 metre lead*	T	type T	4.5	mm				
	9	mini plug connector	N	type N	6	mm	not for TS-19			
2	0	full size connector	P	Pt100						

* PVC for T/C, Teflon for RTD

Thermocouples for Crucibles & Baths

- *Made very heavy duty for rugged applications*
- *Life is usually limited by sheath material – if you have a preference – ask us!*
- *Some sheath types have restricted sizes – request your preference size & we will quote you the options*
- *In many cases more expensive materials last longer*

TS-60	metal sheath for Zinc
TS-61S	Sialon sheath for aluminium
TS-61L	laminated sheath for aluminium
TS-61C	nitride bonded SiC sheath for aluminium
TS-62	LT1 metal ceramic sheath for copper

specify thermocouple type, L, U, sheath preference, melt type & temperature

Model Number

TS-6##

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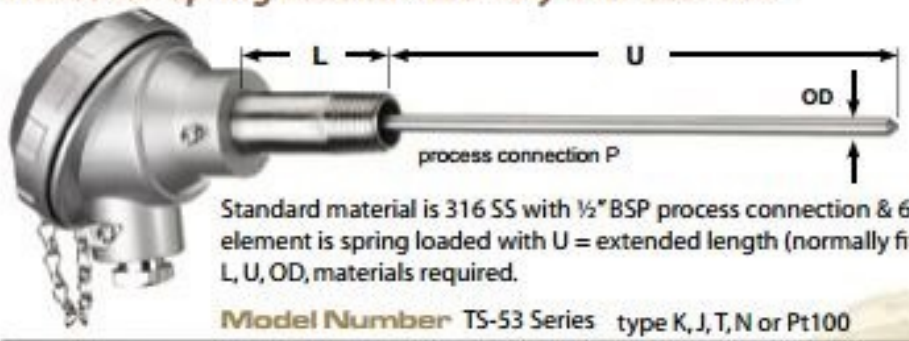
Industrial Nipple Union Nipple With Spring Loaded Sensor

This sensor design is available in a variety of sheath materials for all type thermocouples & RTD's. Standard OD is 6mm & standard process fitting is ½" BSP. Nominate L, U, sheath material, OD, & media type & temperature.

Model Number TS-63 Series type K, J, T, N or Pt100

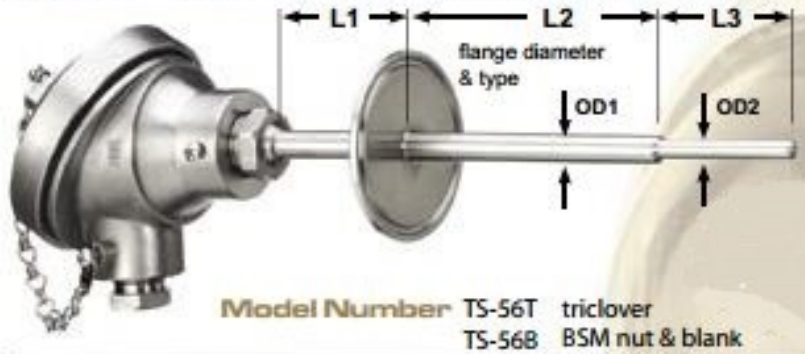
Industrial Spring Loaded Assembly With Standoff



Standard material is 316 SS with ½" BSP process connection & 6 mm OD sensor. The sensor element is spring loaded with U = extended length (normally fitted in thermowell). Nominate L, U, OD, materials required.

Model Number TS-53 Series type K, J, T, N or Pt100

Hygenic Sensor Construction with Flange – Pt100



The assembly can be supplied with tri-clover, BSM nut & blank or other standard sanitary flanges in a diameter to suit. Standard value of OD 1 is 10mm, OD 2 6mm & L3 = 30mm.

Operating temperature is assumed to be <200°C with Pt100 sensor in class A, Custom or special details to be supplied for quotation.

Model Number TS-56T triclover
TS-56B BSM nut & blank

Hygenic Sensor – Loose Nut & Shoulder

The standard assembly will be supplied in 316SS with ½" BSPP following nut. Other sizes are possible when full details or a sample are supplied. Nominate L, U, OD & process connection.

Model Number TS-57 type Pt100 Class A

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Plastic Industry Thermocouples

Model TS 41

Model	Cal.		Length	
TS-41	J	type J	1	1 metre
	K	type K	2	2 metres
			4	4 metres
			6	6 metres

- *Plastic Industry adjustable bayonet thermocouple with wind-on bayonet cap. Constructed using tinned copper covered fibreglass wire - 4.5mm diameter tip.*

Brass Adapters

Model	Length	Options
TS-BEA-12X	22 mm	5 for TS-40
	38 mm	7 for TS-41
	72 mm	

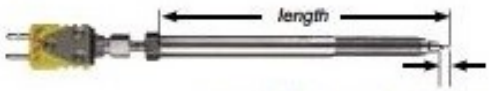
Model TS 43

other bolt sizes on request

Model	Cal.		Length	
TS-43	J	type J	1	1 metre
	K	type K	2	2 metres
			4	4 metres
			6	6 metres

- *M6 thread, bolt type thermocouple complete with swivel retention - using tinned copper covered fibreglass wire.*

Extrusion Melt Thermocouples



adjustable immersion 0 - 25mm

Model	Cal.		Length		
MA-3110	J	type J	100	mm	CK 1
	K	type K	150	mm	CK 1

Model	Cal.		Length	Tip Immersion		
MA-3090	J	type J	100 mm	0	mm	CK 2
	K	type K	150 mm	6	mm	CK 2

flexible extension

fixed immersion

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Thermowells

parallel – machined or fabricated

tapered - machined

step Down - machined or fabricated

Materials

- 304 SS
- 310 SS
- 316 SS
- Inconel 600
- Chrome Moly
- Monel 400
- Hastelloy
- Titanium
- Tantalum

tapered C/W Lagging Extension

weld-In - machined

flanged - machined

Ceramic Material

- Alsint (re-crystallised alumina) 1700°C
- Pythagoras 1400°C
- Sillimantin 1300°C
- Sialon (silicon nitride & alumina)
- Metal ceramic 1375°C
- Halsic I & R. - Silicon Carbide 1600°C

HALDENWANGER

Thermocouple Protection Tubes

Alsint - for Platinum thermocouples to 1700°C.

transparent Quartz - Copper,Gold.

Taylor - Laminated Sheaths.
aluminium, zinc & galvanising applications

Halsic I/R Sintered SiC - corrosion/erosion
resistant to 1650°C.

type LT1 - Metal Ceramic – Copper & Brass

fused silica - non ferrous metals.

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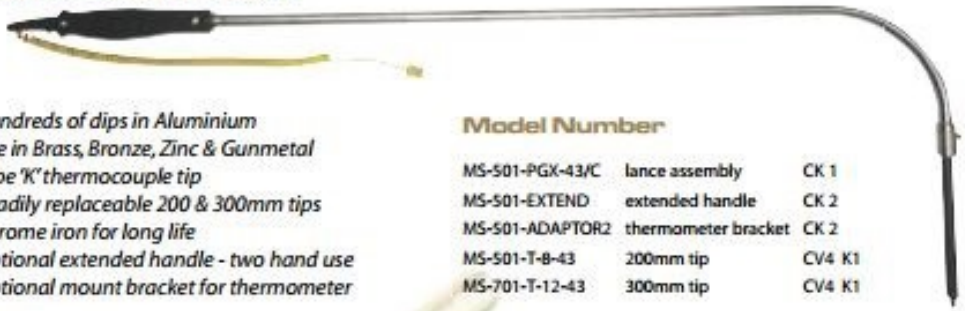
Replaceable Sensor Lance for Non-Ferrous Metals

Marshall Lances & Tips - The Original



- *Hundreds of dips in Aluminium*
- *Use in Brass, Bronze, Zinc & Gunmetal*
- *Type 'K' thermocouple tip*
- *Readily replaceable 200 & 300mm tips*
- *Chrome iron for long life*
- *Optional extended handle - two hand use*
- *Optional mount bracket for thermometer*

Model Number

MS-501-PGX-43/C	lance assembly	CK 1
MS-501-EXTEND	extended handle	CK 2
MS-501-ADAPTOR2	thermometer bracket	CK 2
MS-501-T-8-43	200mm tip	CV4 K1
MS-701-T-12-43	300mm tip	CV4 K1

Sensors For Any Measurement - If It's Not Here We Will Make It

Immersion Probe

type K & T, SS, 3mm dia x 150mm

max. temperature 500°C (400°C for type T)

Model

TS-TP02A BK 1

TS-TP02A-T BK 1

Immersion Probe

type K & T, SS, 3mm dia x 250mm

max. temperature 500°C (400°C for type T)

Model

TS-TP02A-250 BK 1

TS-TP02A-250-T BK 1

Quick Response Surface Probe

Type K 15mm dia x 100mm

max. temperature 500°C

Model

TS-TP04 BK 1

Quick Response Surface Probe

Type K right angle 15mm dia x 100mm

max. temperature 500°C

Model

TS-TP04-RA BK 1

Insertion Probe

Type K & T chisel point 3mm dia x 100mm

max. temperature 300°C

Model

TS-TP05 BK 1

TS-TP05-T BK 1

Insertion Probe

Type K & T, hypodermic 1.5mm dia x 100mm

max. temperature 300°C

Model

TS-TP06 BK 1

TS-TP06-T BK 1

Miniature Surface Probe

Type K 7.5mm dia x 100mm

max. temperature 250°C

Model

KM-SK21M BK 1

Economy 2 Wire Head Transmitters

- *Pt100, Pt1000, Ni100 + linear*
- *Resistive input to 10 KΩ*
- *Non isolated*
- *Accuracy ± 0.3°C*

Model Number
PR-5333A

PR-5333A – RTD

Common Specifications

- ★ *PC programmable*
- ★ *IP68 + Ex. ATEX versions*
- ★ *8 V to 35 V DC supply*
- ★ *Digital filter*
- ★ *Inverted output*
- ★ *Offset to 50% span*
- ★ *Ambient -40 to 85°C*

PR-5331A – universal

- *12 thermocouples + RTD 2, 3, 4 & R*
- *Isolated 1500 V*
- *Accuracy 0.2°C - 1°C*
- *Accuracy ± 0.3°C*

Model Number
PR-5331A3B

PR-5334A – T/C

- *12 thermocouple types*
- *Isolated 1500 V*
- *18 bit ± 1°C accuracy*

Model Number
PR-5334A3B

Economy 2 Wire Head Transmitters

PR-5335A

- *B, E, J, K, L, N, R, S, T, U, W3, W5 thermocouple inputs*
- *Internal or external CJC – min. span 10°C*
- *Pt100, Pt1000. Ni100 & Lin R to 7K*
- *Programmable by P.C. – type 5905*
- *Programmable with HART communications*
- *Differential temperature input*

Using the PR 5335, ECE*Fast* can supply complete temperature or level sensors with isolated 4-20 mA output + HART digital output. Accuracy is from 0.1°C to 0.5°C & 22 bit.

Model Number
PR-5335A

Profibus & Foundation Fieldbus – Universal Transmitters

PR-5350

- *Universal thermocouple, RTD & R inputs*
- *Bus powered 9 to 32 V DC < 11 mA*
- *Isolated to 1500 V AC*
- *Differential temperature measurement*
- *Program via bus*
- *Alarm & PID outputs to bus*

The PR 5350 hockey puck & PR 6350 DIN Rail are the first auto detect bus transmitters for Profibus PA or Foundation Field Bus. These transmitters are extremely rugged, highly accurate & offer advanced functions such as PID control. (see also page 30)

Model Number
PR-5350A

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Small Diameter M.I. Thermocouple Assemblies

- *Sensors in K & T*
- *Diameters 0.25 & 0.5 mm*
- *Material Inconel & Stainless Steel*
- *Custom designs possible*
- *1000mm extension wires*

ECEFast can manufacture Mineral Insulated thermocouples down to 1 mm diameter with insulated junctions. For sizes less than 1mm O.D. we use our partner Marlin Manufacturing in USA, who use special equipment to fabricate these tiny probes. The thermal mass is very low, & being point measuring devices, these small sensors can measure very tiny samples & have extremely fast response – but also have a hygenic all SS construction.

First consider construction of the junction.

Exposed Junction

Not frequently specified because does not utilize benefits of this material.
Bare thermocouple wires are welded to form a junction that extends beyond the sheath for a distance equal to the sheath diameter. Used where fast response is required and contamination is not a factor.

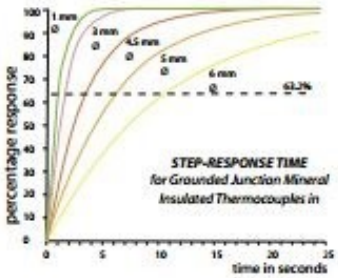
1mm to 22mm diameter available

Grounded Junction

The thermocouple junction is welded directly to the sheath. Provides good thermocouple protection against pressure, moisture & mechanical damage yet retains good response characteristics.

Ungrounded Junction

The junction is electrically & mechanically insulate from the sheath for long life characteristics under maximum corrosion, thermal shock, and vibration conditions. This is the most popular construction & avoids a number of problems when using modern instrumentation. Consider Probe Diameter based on response time desired.



STEP-RESPONSE TIME for Grounded Junction Mineral Insulated Thermocouples in

High Temperature Thermocouples For Special Applications

ECEFast offers thermocouples utilising noble metals & exotic materials for the sheath, thermocouple wires & insulation. These thermocouples are fabricated utilising hard fired refractory oxides & incorporate the highest manufacturing standards to ensure performance & to prevent contamination.

Thermocouples

Platinum-Rhodium vs Platinum

Recommended for use in inert or oxidising atmospheres or for short periods of time in vacuum.

Tungsten vs Tungsten-Rhenium

Recommended for use in vacuum, high purity hydrogen & purity inert atmospheres only.

Sheath Alloys

Platinum virtually non-oxidisable, soluble only in acids generating free chlorine, Halogens attack it at high temperatures. Malleable. Recommended for use in oxidising or inert environments. Maximum operating temperature 1650°C.

Platinum 10% Rhodium has the character of platinum with increased resistance to erosion & higher heat strength. Suitable for oxidising or inert environments. Maximum operating temperature 1700°C.

Tantalum A reactive & refractory metal; reactive because it will oxidise above 290°C, refractory because of its extremely high melting point. Suitable for use in inert or vacuum environments. Hard & tough with good ductility, maximum operating temperature 2480°C.

Molybdenum oxidises at elevated temperatures. Relatively good hot strength. Suitable for inert, vacuum or reducing environments. Maximum operating temperature 2200°C.

Molybdenum 50%/Rhenium 50% Ductile with high hot strength. Suitable in vacuum, hydrogen, nitrogen, cracked ammonia & inert atmospheres. Maximum operating temperature 2200°C

Thermocouples

Calibration	Maximum Op. Temperature	Maximum Exposure Temperature	Recommended Environment
Pt-10% Rh/Pt ANSI type S	1482°C	1704°C	Oxidising Inert
Pt-13% Rh/Pt ANSI type R	1482°C	1704°C	Oxidising Inert
Pt-30% Rh/Pt-6% Rh ANSI type B	1704°C	1770°C	Oxidising Inert
W-5% Re/W-26% Re (C)	2760°C	3000°C	Vacuum, High Purity, Hydrogen Inert

Refractory Oxide Insulators

Material	Approx. Melt Temperature	Maximum Recommended Temperature Hard Fired	Swaged
Magnesia MgO	2800°C		1870°C
Alumina Al_2O_3	2010°C	1760°C	1650°C
Beryllia* BeO	2550°C	2315°C	N/A

*Caution: Beryllia dusts are TOXIC!

Sheath Alloys

Material	Approx. Melt Temperature	Maximum Op. Temperature	Recommended Environment
Platinum	1770°C	1650°C	Oxidising Inert
Platinum 10% Rhodium	1850°C	1705°C	Oxidising Inert
Tantalum	2996°C	2482°C	Vacuum
*Molybdenum	2610°C	2205°C	Vacuum Inert
*Moly 50% Rhenium 50%	2440°C	2205°C	Vacuum, Hydrogen, Nitrogen, Inert, Cracked Ammonia

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Custom Sensors To Your Design

Photocopy this page & fax to +61 3 9538 8197

standard choice for this catagory ☐

Type thermocouple

temperature at hot junction °C ☐

temperature at cold junction °C ☐

Type RTD

minimum operating temperature °C ☐

maximum operating temperature °C ☐

Calibration J ☐ K ☐ N ☐ T ☐ R ☐ S ☐ Pt100 ohms ☐ other ☐

Junction

exposed ☐

grounded ☐

ungrounded ☐

Form

simplex ☐

duplex ☐

Wiring Configuration

2 wire ☐ 3 wire ☐ 4 wire ☐

standard A.N.S.I. thermocouple tolerances & colour codes supplied – for others please enquire

Sheath Material

310 SS ☐

Inconel 600™ ☐

alloy TD ☐

other ☐

Element Type

ceramic wire wound ☐ flat film ☐

class B ☐ band 1 ☐ class A ☐

band 2 ☐ band 3 ☐ band 5 ☐

Probe Size length ☐ mm diameter ☐ mm

N.A.T.A.Calibration Certificate required ☐ number of points ☐ not required ☐

Termination

thermal head large/small

alloy ☐☐

cast iron ☐

stainless cast ☐

stainless machined ☐☐

bakelite ☐☐

connection block ☐ large/small ☐☐

bakelite/ceramic ☐☐

spring loaded (large head only) ☐

transmitter ☐ *see next page*

low cost, prog., RTD, non-isolated ☐

low cost, prog., T/C, isolated ☐

universal, prog., isolated ☐

universal, prog., HART ☐

universal, prog., Profibus/Fieldbus ☐

intrinsically safe ☐

temperature range

high/low °C ☐☐

for transmitter calibration

Connector

Marlin plug standard/mini ☐☐ high temp. ☐☐

Marlin jack standard/mini ☐☐ high temp. ☐☐

transition/pot seal

tails - sep. wires ☐ ☐ length

standard tail length 75mm

extension lead ☐ ☐ length

(above 5M use shielded wire)

PVC ☐

teflon ☐

fibreglass ☐

fibreglass (TCB outer) ☐

fibreglass (SS outer) ☐

Process Connection

fixed ☐ SS

1/2"BSP ☐

1/2"BSPP ☐

other ☐

adjustable ☐

SS / brass ☐☐

1/8"BSP ☐

1/4"BSP ☐

1/2"BSP ☐

3/4"BSP ☐

nipple/union/nipple ☐ *50mm/75mm standard*

☐☐ specify full details

SS ☐

other ☐ .....

flange ☐

Well

fabricated SS ☐

machined SS ☐

'U' length ☐

internal thread ☐

external thread ☐

Sketch With Dimensions

Client Details

Name .....

Company .....

Address .....

.....

Phone .....

Fax .....

Email .....