

Temperature Probe Technology

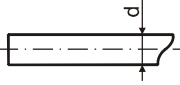
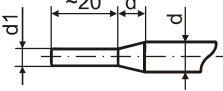
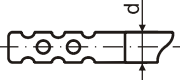
RESISTANCE THERMOMETERS (RTDs)			
Code	Sensor	W ₁₀₀	Norm
RB	Pt50	1.385	IEC 751
RD	Pt100	1.385	IEC 751
RF	Pt500	1.385	IEC 751
RG	Pt1000	1.385	IEC 751
RJ	Cu53	1.426	GOST 6651-78
RH	Cu50	1.428	GOST 6651-09
RK	Cu100	1.428	GOST 6651-09
RN	Ni120	1.672	DIN 43750
RP	PTC 1k (25 °C)	-	
RQ	PTC 2k (25 °C)	-	
Ptx Tolerance	Class 'A'	Class 'B'	Class '2xB'
-200 °C	± 0.55 °C	± 1.30 °C	± 2.60 °C
-100 °C	± 0.35 °C	± 0.80 °C	± 1.60 °C
0 °C	± 0.15 °C	± 0.30 °C	± 0.60 °C
100 °C	± 0.35 °C	± 0.80 °C	± 1.60 °C
200 °C	± 0.55 °C	± 1.30 °C	± 2.60 °C
300 °C	± 0.75 °C	± 1.80 °C	± 3.60 °C
400 °C	± 0.95 °C	± 2.30 °C	± 4.60 °C
500 °C	± 1.15 °C	± 2.80 °C	± 5.60 °C
600 °C	± 1.35 °C	± 3.30 °C	± 6.60 °C

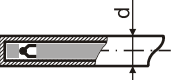
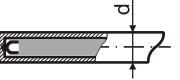
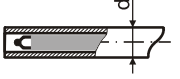

THERMOCOUPLES (T/Cs)			
Code	Sensor	Class	Norm
B	Pt30Rh-Pt6Rh	1, 2	IEC 584
C	Wo5Re-Wo26Re	2	ASTM E988
E	NiCr-CuNi	1, 2	IEC 584
J	Fe-CuNi	1, 2	IEC 584
K	NiCr-Ni	1, 2	IEC 584
L	NiCr-CuNi	1, 2	IEC 584
XK	NiCr-CuNi	1, 2	GOST P8.585-2004
N	NiCrSi-NiSi	1, 2	IEC 584
R	Pt13Rh-Pt	1, 2	IEC 584
S	Pt10Rh-Pt	1, 2	IEC 584
T	Cu-CuNi	1, 2	IEC 584
Code	Class '1' Tolerance	Class '2' Tolerance	
B	-	± 0.25% (600...1700 °C)	
C	-	± 4.5 °C (to 450 °C); 1.0% (to 2320 °C)	
E	± 2.5 °C (to 333 °C); 0.75% (to 950 °C)	± 2.5 °C (to 333 °C); 0.75% (to 950 °C)	
J	± 1.5 °C (to 375 °C); 0.4% (to 750 °C)	± 2.5 °C (to 333 °C); 0.75% (to 750 °C)	
K	± 1.5 °C (to 375 °C); 0.4% (to 1000 °C)	± 2.5 °C (to 333 °C); 0.75% (to 1200 °C)	
N	± 1.5 °C (to 375 °C); 0.4% (to 1000 °C)	± 2.5 °C (to 333 °C); 0.75% (to 1200 °C)	
T	± 0.5 °C (to 125 °C); 0.4% (to 350 °C)	± 1.0 °C (to 133 °C); 0.75% (to 350 °C)	
R / S	± 1.0 °C (to 1100 °C); 0.3% (to 1600 °C)	± 1.5 °C (to 600 °C); 0.25% (to 1600 °C)	

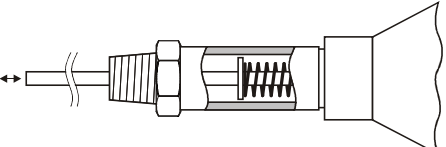
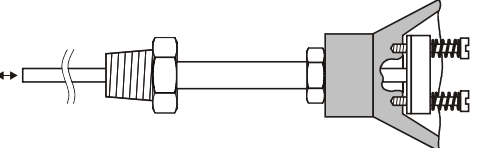
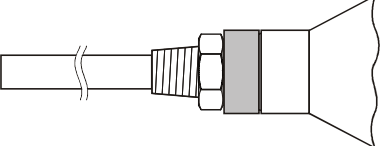

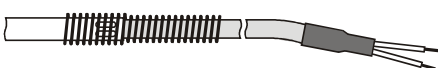
TEMPERATURE RANGES					
Code	Range	Code	Range	Code	Range
T1	-50...400 °C	T11	-50...600 °C	T21	0...1300 °C
T2	-200...600 °C	T12	-50...100 °C	T22	-200...200 °C
T3	0...850 °C	T13	0...1000 °C	T23	0...300 °C
T4	0...800 °C	T14	0...1600 °C	T24	-50...500 °C
T5	0...1500 °C	T15	0...1700 °C	T25	-20...60 °C
T6	0...1200 °C	T16	0...1100 °C	T26	-200...150 °C
T7	0...200 °C	T17	-50...50 °C	T27	-50...250 °C
T8	0...400 °C	T18	0...50 °C	T28	-200...850 °C
T9	-50...200 °C	T19	0...100 °C		
T10	-10...60 °C	T20	0...150 °C		

COMPATIBILITY FOR MINERAL-INSULATED THERMOCOUPLES										
	d [mm]	1.0	1.5	2.0	3.0	4.5	6.0	8.0	10.0	
SHEATH MATERIAL	1.4541 (321)	1x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N	
	1.4571 (316Ti)	1x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N	
	1.4404 (316L)	1x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	call	
	2.4816 Inconel 600	1x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N
	1.4841 (310)	1x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	call
	1.4762 (446)	call	call	call	call	call	call	1x: J, K, E, N 2x: J, K, E, N	1x: J, K, E, N 2x: J, K, E, N	call
	1.4876 Incolloy 800	call	call	call	call	call	call	call	call	call
	Nicrobell®	call	call	call	call	1x: J, K, E, N	1x: J, K, E, N	1x: J, K, E, N	call	call

COMECO reserves the right of changing specifications without prior notice!

RTD PROBE TIP SHAPES				
Code	Shape Design	Description	Specifications	Applications
X		standard closed shape	- straight and even tube - IP68 - standard operating pressure	general applications
N		narrowed closed shape	- $d1 = 4 (d6/8); 5 (d10/12); 6 (d \geq 14)$ - IP68 - standard operating pressure	suitable for liquid environments requiring faster response
P		pitted tip shape	- straight and even tube - IP20 - 0 bar operating pressure	fast-response measurements in <u>non-pressurized</u> gaseous environments

T/C PROBE TIP SHAPES				
Code	Shape Design	Description	Specifications	Applications
X		standard closed shape	- thermocouple "hot junction" is <u>isolated</u> from the metal sheath - IP68 - standard operating pressure	general applications with electrically <u>isolated</u> thermocouple
G		grounded shape	- "hot junction" is <u>connected</u> to the metal sheath end cap - IP68 - standard operating pressure	suitable for applications, where faster response is needed and the electrical grounding is acceptable
O		open-tube shape	- straight tube without end cap and hidden "hot junction" - IP00 - 0 bar operating pressure	fast-response measurements in <u>non-pressurized</u> gaseous environments
E		shape with exposed "hot junction"	- straight tube without end cap - IP00 - 0 bar operating pressure	suitable for <u>non-pressurized</u> gaseous environments, where very fast-response measurements is required

SENSOR DESIGN OPTIONS				
Code	Design	Description	Specifications	Applications
OA		spring-loaded adapter	- mounted between protection head and process connection - a power spring inside the adapter assures sensor rod to TW contact - sealed from the head (IP65)	suitable for probes with external TW (TSDS), where good thermal conductivity is required as well as high IP (ATEX versions)
OS		spring-loaded insert	- a terminal block equipped with 2 springs pressing the insert to protection tube bottom - replaceable insert - not sealed from the head (IP42)	suitable for probes with complete TW and replaceable insert, when faster response is required
OT		thermal isolation	- mounted between protection head and process connection - made of low thermal conductivity material depending on the process temperature (POM or PTFE)	reduces temperature radiation error especially in low-temperature gas measurements with probes having massive protection heads
OB		braid termination lead	- additional wire lead soldered or welded to the cable braid or screen - 20...30 mm length - protected by heat-shrink tube	allows grounding of cable braid/screen/shield in the applications requiring increased EMI protection
OS		cable protection spring	- additional SS spring covering the cable crimping place - 50...100 mm length - protects against bending	suitable for applications where cable may move (bend) against the sensor sheath

COMECO reserves the right of changing specifications without prior notice!