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EMPOWERING PROCESS MANAGEMENT

Thermocouple

Wires & Cables

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EMPOWERING PROCESS MANAGEMENT

CONTENTS

EMPOWERING PROCESS MANAGEMENT

THERMOCOUPLE CABLE CONDUCTORS

Thermocouple Cables are manufactured from three different thermocouple wire materials and accordingly they are designated as

Thermocouple Cable

Thermocouple Cables are manufactured from wire materials which is same as that of thermocouple with standard & special grade limits of error (thermal tolerance) as per ANSI MC 96.1 and CLASS 1, 2 & 3 as per IEC 60584-2. As they are of high accuracy in thermal tolerance, these cables are normally used directly for sensor manufacturing.

Thermocouple Extension Cable:

Thermocouple Extension Cables are manufactured from wire materials which are similar to that of thermocouple but its accuracy is limited up to 200 °C. Refer table. They are mostly used as an extension cables from thermocouple sensor to the control unit.

Thermocouple Compensating Cable:

For certain noble metal thermocouples like S, R, B and also K & N, compensating grade cables are being designed with different metal than those of thermocouple whose accuracy is also limited up to 200 °C. They are used as an extension cables from thermocouple sensor to the control unit.

THERMOCOUPLE ALLOY COMBINATION (Table 01)

Type of TC	THERMOCOUPLE (t) GRADE		Type of TC	EXTENSION (e) / COMPENSATING (c) GRADE	
	Metal Alloy + ve Leg	Metal Alloy - ve Leg		Metal Alloy + ve Leg	Metal Alloy - ve Leg
Jt	Iron , Fe	Copper Nickel, Cu Ni	**Jx**	Iron , Fe	Copper Nickel, Cu Ni
Kt	Nickel Chromium, Ni Cr	Nickel Aluminum, Ni Al	**Kx**	Nickel Chromium, Ni Cr	Nickel Aluminum, Ni Al
			Kca	Iron, Fe	Copper Nickel, Cu Ni
			Kcb	Copper, Cu	Copper Nickel, Cu Ni
Tt	Copper , Cu	Copper Nickel, Cu Ni	**Tx**	Copper , Cu	Copper Nickel, Cu Ni
Et	Nickel Chromium, Ni Cr	Copper Nickel, Cu Ni	**Ex**	Nickel Chromium, Ni Cr	Copper Nickel, Cu Ni
Nt	Nickel Chromium, Silicone, Ni Cr Si	Nickel Silicone, Ni Si	**Nx**	Nickel Chromium, Silicone, Ni Cr Si	Nickel Silicone, Ni Si
			Nc	Copper, Cu	Copper Nickel, Cu Ni
R	Platinum Rhodium, Pt Rh 13%	Platinum, Pt	**Rc**	Copper, Cu	Copper Nickel, Cu Ni
S	Platinum Rhodium, Pt Rh 1%	Platinum, Pt	**Sc**	Copper, Cu	Copper Nickel, Cu Ni
B	Platinum Rhodium, Pt Rh 6%	Platinum Rhodium, Pt Rh 30%	**Bc**	Copper, Cu	Copper, Cu

- ***ELTEC CABLES & INSTRUMENTS*** *offer wires & cables of* ***thermocouple grade*** *for* ***J, K, T, E & N*** *type of thermocouple. Suffix with* ***t***
- ***ELTEC CABLES & INSTRUMENTS*** *offer wires & cables of* ***extension grade*** *for* ***J, K, T, E & N*** *type of thermocouple. Suffix with* ***e***
- ***ELTEC CABLES & INSTRUMENTS*** *offer wires & cables of* ***compensating grade*** *for* ***K, N, R, S & B*** *type of thermocouple. Suffix with* ***c***

PROPERTIES OF INSULATING MATERIAL (Table 02)

Insulating Material	Continuous Operating Temperature	Flexibility	Flame Retardness	Abrasion	Acid	Solvent	Base	Moisture
PVC Extruded	90˚C (194°F)	Very Good	Good	Good	Good	Fair	Good	Excellent
SILICONE RUBBER Extruded	180°C (356°F)	Excellent	Good	Fair	Poor	Fair	Good	Very Good
FEP Extruded	200˚C (392°F)	Very Good	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
PFA Extruded	250˚C (482°F)	Very Good	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
PTFE Fused Tape	260˚C (500°F)	Good	Excellent	Very Good	Excellent	Excellent	Excellent	Excellent
KAPTON Tapped	300 °C (572 °F)	Good	Very Good	Very Good	Excellent	Excellent	Excellent	Excellent
GLASS FIBER Braided	500°C (932°F)	Good	Excellent	Good	Good	Excellent	Good	Good
CERAMIC FIBER Braided	1000°C (1832°F)	Good	Excellent	Fair	Good	Excellent	Good	Good

PVC - Polyvinyl Chloride
FEP - Fluorinated Ethylene Propylene
PFA - Perfluorinated Tetrafluroehtylene
PTFE - Poly Tetra Fluroethylene

WIRE APPLIACATION GUIDE (Table 03)

CORE INSULATION	SHEATH INSULATION	MAX. TEMPERATURE	INSULATING MATERIAL CHARACTERISTICS
PVC	PVC	90˚C (194°F)	Economical & Versatile for normal application
FEP	FEP	200˚C (392°F)	Resistance to moisture & abrasion and economical construction for higher temperature
PFA	PFA	260˚C (500°F)	Resistance to moisture & abrasion, same properties as FEP but higher temperature rating
SILICONE	SILICONE	180°C (356°F)	Excellent flexibility & softness with good temperature resistant
PTFE TAPPED	PTFE	260˚C (500°F)	Resistance to abrasion, oil, moisture etc. with high electrical properties.
KAPTON TAPPED	KAPTON	300 °C (572 °F)	Excellent Moisture and Abrasion Resistance, Retains Much Physical Integrity After Gamma Radiation.
FIBER GLASS	FIBER GLASS	400°C (932°F)	High temperature resistant & flame retardant
CERAMIC FIBER	CERAMIC FIBER	800°C(1832°F)	Extreme temperature resistant & flame retardant

THERMOCOUPLE WIRE COLOR CODE

Most countries developed their own thermocouple wire color codes years ago. Today, there are two governing bodies that are globally recognized for setting the accepted color codes standards: ***ASTM*** *International (formerly known as American Society for Testing and Materials or ASTM) and* ***IEC*** *(International Electrotechnical Commission).* ***ASTM E230-03*** *is the standard adopted by the United States. The standard recognized in Europe is* ***IEC 584-3***

International Thermocouple Color Codes - Thermocouple and Extension Grade Wires

Table 04

	United States Color codes ANSI MC96.1 1982		IEC 60584-3 Color coding		Redundant national Color coding for insulation of thermocouple cable			
					British to BS1843	Gtmnml to DIN 13711	French to NFC 42324	Japanese to JIS C 1610-1981
	Thermocouple Grade	Extension Grade	Thermocouple Grade	Intrinsically Safe				
Type K Thermocouple	KK	KX						
Type T Thermocouple	TT	TX						
Type J Thermocouple	JJ	JX						
Type N Thermocouple	NN	NX						
Type E Thermocouple	EE	EX						
Type S Thermocouple	None Established	SX						
Type R Thermocouple	None Established	RX						
Type B Thermocouple	None Established	BX						

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THERMOCOUPLE TOLERANCES (Table 05)

Thermal Tolerances of **ELTEC** THERMCOUPLE WIRES & CABLES conforms to AMERICAN LIMITS OF ERROR ***ASTM E230-ANSI MC 96.1*** & ***IEC*** *Tolerance Class* ***EN 60584*** *– 2,* ***JIS C 1602***

American Limits of Error ***ASTM E230-ANSI MC 96.1***

Thermocouple Designation	Temperature Range °C (°F)	Standard Grade Limits ° C (°F) whichever is greater	Special Grade Limits °C(°F) Whichever is greater
Thermocouple Grade Wires			
J	**0 (32) to 750 (1382)**	**±2.2 (4.0) or ±0.75%**	**±1.1 (2.0) or 0.4%**
K	**0 (32) to 1250 (2282)**	**±2.2 (4.0) or ±0.75%**	**±1.1 (2.0) or 0.4%**
	-200 (-328) to 0 (32)	**±2.2 (4.0) or ±2%**	**-----**
T	**0 (32) to 350 (662)**	**±1.0 (1.8) or ±0.75%**	**±0.5 (1.0) or 0.4%**
	-200 (-328) to 0 (32)	**±1.0 (1.8) or ±1.5%**	**-----**
E	**0 (32) to 900 (1652)**	**±1.7 (3.0) or ±0.5%**	**±1.0 (1.8) or 0.4%**
	-200 (-328) to 0 (32)	**±1.7 (3.0) or ±1%**	**-----**
N	**0 (32) to 1300 (2372)**	**±2.2 (4.0) or ±0.75%**	**±1.1 (2.0) or 0.4%**
	-270(-454) to 0 (32)	**±2.2 (4.0) or ±2%**	**-----**
Extension / Compensating Grade Wires			
Jx	**0 (32) to 200 (400)**	**±2.2 (4.0)**	
Kx or Kc	**0 (32) to 200 (400)**	**±2.2 (4.0)**	
Tx	**32 (0) to 100 (212)**	**±1.0 (1.8)**	
Nx or Nc	**0 (32) to 200 (400)**	**±1.7 (3.1)**	
Rc or Sc or Bc	**0 (32) to 200 (400)**	**±5.0 (9.0)**	

IEC Tolerance Class ***EN 60584 – 2, JIS C 1602 (Tble 06)***

IEC CODE		Class 1 °C (°F)	Class 2 °C (°F)	Class 3 °C (°F)
J	Temp Range Tolerance value Temp Range Tolerance Value	-40 to 375 ± 1.5 ˚C 375 to 750 ±0.4% Reading	-40 to 333 ˚C ± 2.5 ˚C 333 to 750 ˚C ±0.75% Reading	Not Established
K, N	Temp Range Tolerance value Temp Range Tolerance Value	-40 to 375 ˚C ± 1.5 ˚C 375 to 1000 ˚C ±0.4%	-40 to 333 ˚C ± 2.5 ˚C 333 to 1200 ˚C ±0.75% Reading	-167 to 40 ˚C ±2.5 ˚C -200 to -167˚C ±1.5% Reading
T	Temp Range Tolerance value Temp Range Tolerance Value	-40 to 125 ˚C ± 0.5 ˚C 125 to 350 ˚C ±0.4% Reading	-40 to 133 ˚C ± 1˚C 133 to 350 ˚C ±0.75% Reading	-67 to 40 ˚C ±1 ˚C -200 to -67˚C ±1.5% Reading
E	Temp Range Tolerance value Temp Range Tolerance Value	-40 to 375 ˚C ± 1.5 ˚C 375 to 800 ˚C ±0.4% Reading	-40 to 333 ˚C ± 2.5 ˚C 333 to 900 ˚C ±0.75% Reading	-167 to 40 ˚C ±2.5 ˚C -200 to 167˚C ±1.5% Reading
R, S	Temp Range Tolerance value Temp Range Tolerance Value	0 to 1100 ˚C ± 1 ˚C 1100 to 1600 ˚C ±{1+0.3% x (Rdg-1100)] ˚C	0 to 600 ˚C ± 1.5 ˚C 600 to 1600 ˚C ±0.25% Reading	Not Established
B	Temp Range Tolerance value Temp Range Tolerance Value	Not Established	600 to 1700 ˚C ±0.25% Reading	-600 to 800 ˚C +4˚C 800 to 1700˚C ±0.5% Reading

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THERMOCOUPLE WIRE CHART (Table 06)

PART NO.	Wire Size in AWG	Wire Type	INSULATION		Max. Temp.	Overall Dimension
			CORE	OVERALL		
K TYPE WIRE with INDIVIDUAL CORE & OVERALL CERAMIC FIBER INSULATION						
Kt-14 CC	14	Solid			1000 °C	
Kt-16 CC	16	Solid			1000 °C	
Kt-18 CC	18	Solid			1000 °C	
Kt-20 CC	20	Solid	CERAMIC YARN	CERAMIC YARN	1000 °C	
Kt-22 CC	22	Solid			1000 °C	
Kt-24 CC	24	Solid			1000 °C	
K TYPE WIRE with INDIVIDUAL CORE FIBER GLASS INSULATED & TWISTED						
Kt-14 FF	14	Solid			400 °C	
Kt-16 FF	16	Solid			400 °C	
Kt-18 FF	18	Solid			400 °C	
Kt-20 FF	20	Solid	FIBER GLASS INSULATED	TWISTED PAIR	400 °C	
Kt-22 FF	22	Solid			400 °C	
K TYPE WIRE with INDIVIDUAL CORE & OVERALL FIBER GLASS INSULATION						
Kt-14 FF	14	Solid			400 °C	
Kt-16 FF	16	Solid			400 °C	
Kt-18 FF	18	Solid			400 °C	
Kt-20 FF	20	Solid			400 °C	
Kt-22 FF	22	Solid	FIBER GLASS BRAID	FIBER GLASS BRAID	400 °C	
Kt-24 FF	24	Solid			400 °C	
Kt-24FFM	24M	7*32			400 °C	
K TYPE WIRE with INDIVIDUAL CORE & OVERALL FIBER GLASS INSULATION & STAINLESS STEEL BRAID						
Kt-14 FFS	14	Solid			400 °C	
Kt-16 FFS	16	Solid			400 °C	
Kt-18 FFS	18	Solid			400 °C	
Kt-20 FFS	20	Solid			400 °C	
Kt-22 FFS	22	Solid	FIBER GLASS BRAID	FIBER GLASS BRAID WITH STAINLESS STEEL METAL OVER BRAID	400 °C	
Kt-24 FFS	24	Solid			400 °C	
Kt-24FFSM	24M	7*32			400 °C	
K TYPE WIRE with INDIVIDUAL CORE & OVERALL PTFE INSULATION						
Kt-14 TT	14	Solid			260 °C	
Kt-16 TT	16	Solid			260 °C	
Kt-18 TT	18	Solid			260 °C	
Kt-20 TT	20	Solid			260 °C	
Kt-22 TT	22	Solid	Fused PTFE (POLY TETRA FLURO ETHYLENE	Fused PTFE (POLY TETRA FLURO ETHYLENE	260 °C	
Kt-24 TT	24	Solid			260°C	
Kt-24TTSM	24M	7*32			260 °C	
Kt-30 TT	30	Solid			260 °C	

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PART NO.	Wire ize in AWG	Wire Type	INSULATION		Max. Temp.	Overall Dimension
			CORE	OVERALL		
K TYPE WIRE with INDIVIDUAL CORE & OVERALL PTFE INSULATION with STAINLESS STEEL BRAID						
Kt-14 TTS	14	Solid			260 °C	
Kt-16 TTS	16	Solid				
Kt-18 TTS	18	Solid			260 °C	
Kt-20 TTS	20	Solid			260 °C	
Kt-22 TTS	22	Solid	FUSED PTFE (POLY TETRA FLURO ETHYLENE)	FUSED PTFE & SS Metal Over Braid	260 °C	
Kt-24 TTS	24	Solid			260 °C	
Kt-24TTSM	24M	7*32			260°C	
Kt-30 TTS	30	Solid			260 °C	
K TYPE WIRE with INDIVIDUAL CORE & OVERALL PTFE INSULATION, SS SHIELD & OUTER PTFE JACKET						
Kt-14 TTST	14	Solid			260 °C	
Kt-16 TTST	16	Solid				
Kt-18 TTST	18	Solid			260 °C	
Kt-20 TTST	20	Solid			260 °C	
Kt-22 TTST	22	Solid	FUSED PTFE (POLY TETRA FLURO ETHYLENE)	FUSED PTFE SS SHIELD & OUTER PTFE JACKET	260 °C	
Kt-24 TTST	24	Solid			260 °C	
Kt-24TTSMT	24M	7*32			260°C	
Kt-30 TTST	30	Solid			260 °C	
K TYPE WIRE INDIVIDUAL CORE PTFE INSULATED & OVERALL FIBER GLASS & STAINLESS STEEL BRAID						
Kt-14 TFS	14	Solid			260 °C	
Kt-16 TFS	16	Solid			260 °C	
Kt-18 TFS	18	Solid			260 °C	
Kt-20 TFS	20	Solid			260 °C	
Kt-22 TFS	22	Solid	FUSED PTFE (POLY TETRA FLURO ETHYLENE	FIBER GLASS JACKET & Outside SS Metal Over Braid	260 °C	
Kt-24 TFS	24	Solid			260 °C	
Kt-24TFSM	24M	7*32				
Kt-30 TFS	30	Solid			260 °C	
K TYPE WIRE with INDIVIDUAL CORE & OVERALL PFA INSULATION						
Kt-14 PF	14	Solid			250 °C	
Kt-16 PF	16	Solid			250 °C	
Kt-18 PF	18	Solid			250 °C	
Kt-20 PF	20	Solid			250 °C	
Kt-22 PF	22	Solid	Extruded PFA	Extruded PFA	250 °C	
Kt-24 PF	24	Solid			250°C	
Kt-24 PFPFM	24M	7*32			250 °C	
Kt-30 PFPF	30	Solid			250 °C	

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PART NO.	Wire Size in AWG	Wire Type	INSULATION		Max. Temp.	Overall Dimension
			CORE	OVERALL		
K TYPE WIRE with INDIVIDUAL CORE & OVERALL FEP INSULATION						
Kt-14 EPEP	14	Solid			200 °C	
Kt-16 EPEP	16	Solid			200 °C	
Kt-18 EPEP	18	Solid			200 °C	
Kt-20 EPEP	20	Solid			200 °C	
Kt-22 EPEP	22	Solid	Extruded FEP	Extruded FEP	200 °C	
Kt-24 EPEP	24	Solid			200°C	
Kt-24EPEPSM	24M	7*32			200 °C	
Kt-30 EPEP	30	Solid			200 °C	
K TYPE WIRE with INDIVIDUAL CORE & OVERALL SILICONE RUBBER INSULATION						
Kt-24 SRSR	24	Solid			180 °C	
Kt-24 SRSRM	24 M	7*32			180 °C	
K TYPE WIRE with INDIVIDUAL CORE PTFE INSULATED & OVERALL SILICONE RUBBER						
Kt-24 TSR	24	Solid	PTFE	SILICONE RUBBER	180 °C	
Kt- 24 TSR	24M	7*32			180 °C	
K TYPE WIRE with INDIVIDUAL CORE & OVERALL PVC INSULATION						
Kt-14 PP	14	Solid			90 °C	
Kt-16 PP	16	Solid			90 °C	
Kt-18 PP	18	Solid			90 °C	
Kt-20 PP	20	Solid			90 °C	
Kt-22 PP	22	Solid	Extruded PVC	Extruded PVC	90 °C	
Kt-24 PP	24	Solid			90 °C	
Kt-24PPM	24M	7*32			90 °C	
Kt-30 PP	30	Solid			90 °C	
K TYPE WIRE with INDIVIDUAL CORE & OVERALL PVC INSULATION						
Kt-14 PP	14	Solid			90 °C	
Kt-16 PP	16	Solid			90 °C	
Kt-18 PP	18	Solid			90 °C	
Kt-20 PP	20	Solid			90 °C	
Kt-22 PP	22	Solid	Extruded PVC	Shield with Al. Mylar & Drain Wire	90 °C	
Kt-24 PP	24	Solid			90 °C	
Kt-24PPM	24M	7*32			90 °C	
Kt-30 PP	30	Solid			90 °C	

- *K TYPE wires shown has color or color traces as per ANSI MC 96.1. Optional color coding available*
- *Additional K TYPE WIRE with other wire sizes in solid & stranded combination are available*
- *Additional K TYPE WIRE with other different Insulation & overall combination are also available*
- *All above K TYPE WIRE are available in DUPLEX in twisted form*
- *All above K TYPE WIRES are available in EXTENSION & COMPNESATING GRADE. Designated as Kx & Kc respectively*

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K TYPE THERMOCOUPLE WIRE ORDERING CODE

# 1	K THERMOCOUPOLE WIRE
t	Thermocouple Grade
e	Extension Grade
c	Compensating Grade

# 2	Wire Size in AWG / SWG
14	*Solid*
16	*Solid*
18	*Solid*
20	*Solid*
22	*Solid*
24	*Solid*
24M	*7 * 32 - 7 strands of 32 AWG*
X	*Others specify*

# 3	No. of Pair
00	*Two Core Simplex*
2P	*Four Core Duplex*
X	*Others Please specify*

# 4	Insulation	
C	*Ceramic Yarn Braided*	*- Max. Temp. up to 1000 °C*
F	*Fiber Glass Braided*	*- Max. Temp. up to 500 °C*
T	*PTFE Wrapped & Sintered*	*- Max. Temp. up to 260 °C*
EP	*FEP Extruded*	*- Max. Temp. up to 250 °C*
PF	*PFA Extruded*	*- Max. Temp. up to 260 °C*
SR	*Silicone Rubber Extruded*	*- Max. Temp. up to 180 °C*
P	*PVC Extruded*	*- Max. Temp. up to 90°C*

# 5	Outer Jacket	
C	*Ceramic Yarn Braided*	*- Extreme Temperature Application & flame retardant*
F	*Fiber Glass Braided*	*- Flame Retardant & for high temperature application*
T	*PTFE Wrapped & Sintered*	*- Resistance to oil, moisture, abrasion etc.*
EP	*FEP Extruded*	*- Resistance to oil, moisture etc. & economical for high temp.*
PF	*PFA Extruded*	*- Resistance to oil, moisture etc. but higher temperature rating*
SR	*Silicone Rubber Extruded*	*- Excellent flexibility & softness with good temperature resistant*
P	*PVC Extruded*	*- Economical & versatile for most of applications*

# 6	Metal Shield
0	*No Metal braid*
S	*SS Metal Over Braid*
TC	*Tin Plated Copper Over Braid*
SC	*Silver Plated Copper Over Braid*
Al.	*Aluminum wire with drain wire*

# 7	Outer Insulation
0	*No outer Insulation*
T	*PTFE Wrapped & Sintered*
EP	*FEP Extruded*
PF	*PFA Extruded*
SR	*Silicone Rubber Extruded*
P	*PVC Extruded*

Kt	24	00	T	T	S	T

K Type Thermocouple Grade Single Pair, 24 GAGE PTFE Insulated, SS Shielded & Overall PTFE Jacketed Cable

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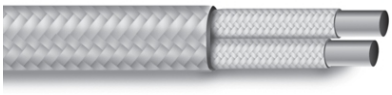
HEAVY CERAMIC FIBER Insulated Thermocouple Wire Max. Temp. up to 1000 °C



CERAMIC FIBER *INSULATION is ideal for EXTREME TEMPERATURE APPLICATION.*

APPLICATIONS	PRODUCT FEATURES
• *Metal Production*	• *Continuous use up to 1000 °C*
• *Furnaces & Ovens*	• *Single exposure up to 1250 °C*
• *Braided Thermocouple Replacement*	• *Good Thermal Durability & Strength*
• *Heat Treatment*	• *Flame Retardant*
• *Brick And Tile kiln*	• *Superior Abrasion Resistance*
• *Steel & Aluminum*	• *Better flexibility*

PRODUCT SPECIFICTIONS:	
Conductor	*Solid or stranded thermocouple grade wires from 12 AWG to 24 AWG (2.44mm to 0.52mm)*
Core Insulation	*Braided Ceramic Fiber*
Construction	*Parallel Conductors*
No. of Pair	*1*
Outer Sheath	*Braided Ceramic Fiber*
SS JACKET	*Outside SS Metal braid*
Color Coding	*Supplied white without tracers*

- *Optional High Temperature Impregnation*
- *Other sizes in SWG and also different construction in other stranded sizes are available on request*
- *Optional construction of twisted conductors.*
- *Duplex construction are also available*
- *Optional color tracers for positive & negative polarity*

TYPE OF TC	Metal Alloy + ve leg	Metal Alloy – ve leg	Thermal Tolerance
K	*Ni Cr*	*Ni Al*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584-2*
E	*Ni Cr*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*
N	*Ni Cr Si*	*Ni Si*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*

- *Thermocouple wires are normally supplied to meet tolerance above 0 °C. If material is reqd. to meet tolerance below 0 °C, the purchaser should clarify the same in Purchase Order. Special selection of material is reqd.*
- *Initial calibration & Tolerance suggested, its requirement should be discussed well in advance before placing the order.*

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TYPE OF CABLE	Wire Size AWG	Type of Wire	Type K	Type N	Type E
Individual Core & Overall Jacket of BRAIDED CERAMIC FIBER	7 * 32	Stranded	Kt-7*32 CC	Nt-7*32CC	Et-7*32CC
	24	Solid	Kt-24 CC		
	22	Solid	Kt-22 CC		
	20	Solid	Kt-20 CC		
	18	Solid	Kt-18 CC		
	16	Solid	Kt-16 CC		
	14	Solid	Kt-14 CC		
	12	Solid	Kt-12 CC		
Individual Core & Overall Jacket of BRAIDED CERAMIC FIBER with Outside SS Metal Over Braid	7 * 32	Stranded	Kt-7*32 CCS	Nt-7*36CCS	Et-7*36CCS
	24	Solid	Kt-24 CCS		
	22	Solid	Kt-22 CC S		
	20	Solid	Kt-20 CCS		
	18	Solid	Kt-18 CCS		
	16	Solid	Kt-16 CCS		
	14	Solid	Kt-14 CCS		
	12	Solid	Kt-12 CCS		

- *CC – INSULATION & JACKET OF CERAMIC FIBER BRAID*
- *CCS – INSULATION & JACKET OF CERAMIC FIBER BRAID with Outside SS METAL BRAID*
- *Duplex construction are suffix with D i.e. KtD ___*

Initial Calibration Tolerances as per ASTM E230 and ANSI MC96.1

Tolerance-Reference Junction 0°C (32 °F)

Thermocouple Designation	Temperature Range °C (°F)	Standard Grade Limits ° C (°F) whichever is greater	Special Grade Limits °C(°F) Whichever is greater
Thermocouple Grade Wires			
J	0 (32) to 750 (1382)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
K	0 (32) to 1250 (2282)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
	-200 (-328) to 0 (32)	±2.2 (4.0) or ±2%	-----
T	0 (32) to 350 (662)	±1.0 (1.8) or ±0.75%	±0.5 (1.0) or 0.4%
	-200 (-328) to 0 (32)	±1.0 (1.8) or ±1.5%	-----
E	0 (32) to 900 (1652)	±1.7 (3.0) or ±0.5%	±1.0 (1.8) or 0.4%
	-200 (-328) to 0 (32)	±1.7 (3.0) or ±1%	-----
N	0 (32) to 1300 (2372)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
	-270(-454) to 0 (32)	±2.2 (4.0) or ±2%	-----

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EMPOWERING PROCESS MANAGEMENT

FIBER GLASS Insulated Thermocouple Wire Max. Temp. Up to 500 °C

FIBER GLASS INSULATION *is ideal for general application requiring moderate abrasion, moisture resistance & high temperature resistance. Designed for high temperature application in metal industries, forgings, aluminum, plastic processing equipments etc.*

APPLICATIONS	PRODUCT FEATURES
• *Manufacturing of Temperature Sensors*	• *Continuous use up to 500 °C*
• *Furnaces & Ovens*	• *Single exposure up to 650 °C*
• *Plastic Processing Equipments*	• *Good Thermal Durability & Strength*
• *Heat Treatment*	• *Flame Retardant*
• *Thermocouple Circuits*	• *Superior Abrasion Resistance*
• *Various Processing Industries*	• *Better flexibility*

PRODUCT SPECIFICTIONS:	
Conductor	*Solid or stranded thermocouple extension grade wires from 12 AWG to 22 AWG (2.44mm to 0.63mm)*
Core Insulation	*Braided Fiber Glass with high temperature impregnation **
Construction	*Parallel Conductors*
No. of Pair	*1*
Outer Sheath	*Braided Fiber Glass with high temperature impregnation **
SS JACKET	*Outside SS Metal Over Braid*
Color Coding	*Confirms to ANSI MC 96.1 (International Color Codes available), Refer Table*

- *Impregnation maintained up to **200 °C**. Option for supply of wire without impregnation for continuous operation at elevated temperature*
- *Other sizes in SWG and also different construction in other stranded sizes are available on request*
- *Optional construction of twisted conductors.*
- *Duplex construction are also available*
- *Optional Color coding: IEC 60584 – 3, BS 1843, DIN 13711, JIS C 1610 – 1981, NFC 42334 as per requirement*

TYPE OF TC	Metal Alloy + ve leg	Metal Alloy – ve leg	Thermal Tolerance
J	*Fe*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*
K	*Ni Cr*	*Ni Al*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584-2*
T	*Cu*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584- 2*
E	*Ni Cr*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*
N	*Ni Cr Si*	*Ni Si*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*

- *Thermocouple wires are normally supplied to meet tolerance above 0 °C. If material is reqd. to meet tolerance below 0 °C, the purchaser should clarify the same in Purchase Order. Special selection of material is reqd.*
- *Initial calibration & Tolerance suggested, its requirement should be discussed well in advance before placing the order.*
- ***R & S** extension wires are also manufactured with copper as positive and different nickel alloys respective for R & S.*
- ***B** Type extension wire is manufactured with Copper as positive & negative for transition below 100 °C*

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EMPOWERING PROCESS MANAGEMENT

TYPE OF CABLE	Wire Size AWG	Type of Wire	Type K	Type J	Type T	Type N	Type E
Individual Core & Overall Jacket of FIBER GLASS BRAID	7 * 32	Stranded	Kt-7*32 FF	Jt-7*32FF	Tt-7*32FF	Nt-7*32FF	Et-7*32FF
	24	Solid	Kt-24 FF	Jt-24FF	Tt-24FF		
	22	Solid	Kt-22 FF	Jt-22FF			
	20	Solid	Kt-20 FF	Jt-20FF			
	18	Solid	Kt-18 FF	Jt-18FF			
	16	Solid	Kt-16 FF	Jt-16FF			
	14	Solid	Kt-14 FF	Jt-14FF			
	12	Solid	Kt-12 FF	Jt-12FF			
Individual Core & Overall Jacket of FIBER GLASS BRAID with SS Metal Over Braid	7 * 32	Stranded	Kt-7*32 FFS	Jt-7*32FFS	Tt-7*32FFS	Nt-7*32FFS	Et-7*32FF
	24	Solid	Kt-24 FFS	Jt-24FFS	Tt-24FFS		
	22	Solid	Kt-22 FF S	Jt-22FFS			
	20	Solid	Kt-20 FFS	Jt-20FFS			
	18	Solid	Kt-18 FFS	Jt-18FFS			
	16	Solid	Kt-16 FFS	Jt-16FFS			
	14	Solid	Kt-14 FFS	Jt-14FFS			
	12	Solid	Kt-12 FFS	Jt-12FFS			

- *FF – INSULATION & JACKET OF FIBER GLASS BRAID*
- *FFS – INSULATION & JACKET OF FIBER GLASS BRAID with Outside SS METAL BRAID*
- *Duplex construction are suffix with D i.e. KtD ___*
- *Extension & Compensating Grade Wire are suffix with e & c respectively*

Initial Calibration Tolerances as per ASTM E230 and ANSI MC96.1

Tolerance-Reference Junction 0°C (32 °F)

Thermocouple Designation	Temperature Range °C (°F)	Standard Grade Limits ° C (°F) whichever is greater	Special Grade Limits °C(°F) Whichever is greater
Thermocouple Grade Wires			
Jt	0 (32) to 750 (1382)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
Kt	0 (32) to 1250 (2282)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
	-200 (-328) to 0 (32)	±2.2 (4.0) or ±2%	-----
Tt	0 (32) to 350 (662)	±1.0 (1.8) or ±0.75%	±0.5 (1.0) or 0.4%
	-200 (-328) to 0 (32)	±1.0 (1.8) or ±1.5%	-----
Et	0 (32) to 900 (1652)	±1.7 (3.0) or ±0.5%	±1.0 (1.8) or 0.4%
	-200 (-328) to 0 (32)	±1.7 (3.0) or ±1%	-----
Nt	0 (32) to 1300 (2372)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
	-270(-454) to 0 (32)	±2.2 (4.0) or ±2%	-----
Extension / Compensating Grade Wires			
Jx	0 (32) to 200 (400)	±2.2 (4.0)	
Kx or Kc	0 (32) to 200 (400)	±2.2 (4.0)	
Tx	32 (0) to 100 (212)	±1.0 (1.8)	
Ex	0 (32) to 200 (400)	±1.7 (3.1)	
Nx or Nc	0 (32) to 200 (400)	±2.2 (4.0)	
Rc or Sc or Bc	0 (32) to 200 (400)	±5.0 (9.0)	

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EMPOWERING PROCESS MANAGEMENT

FIBER GLASS Insulated Twisted Pair Thermocouple Wire Max. Temp. Up to 500 °C:

FIBER GLASS INSULATION *is ideal for general application requiring moderate abrasion, moisture resistance & high temperature resistance. Fiber Glass is closely & tightly braided over the thermocouple conductors and pair twisted. It is widely used in consumable application especially used in sensor manufacturing & heat treatment applications and has a superior performance in high abrasive elements.*

APPLICATIONS	PRODUCT FEATURES
• *Temperature Sensors*	• *Continuous use up to 500 °C*
• *Heat Treatment*	• *Single exposure up to 650 °C*
• *Component Testing*	• *Good Thermal Durability & Strength*
• *Furnaces & Ovens Testing*	• *Flame Retardant*
• *Metal Production*	• *Superior Abrasion Resistance*
• *Various Processing Industries*	• *Better flexibility*

PRODUCT SPECIFICTIONS:	
Conductor	*Solid or stranded thermocouple extension grade wires from 12 AWG to 24 AWG (2.44mm to 0.51mm)*
Core Insulation	*Braided Fiber Glass with high temperature impregnation*
Construction	*Twisted Conductors*
No. of Pair	*1, 2 or more*
Color Coding	*Confirms to ANSI MC 96.1 (International Color Codes available)*

- *Impregnation maintained up to **200 °C**. Option for supply of wire without impregnation for continuous operation at elevated temperature.*
- *Other sizes in SWG and also different construction in other stranded sizes are available on request*
- *Duplex construction are also available*
- *Optional Color coding: IEC 60584 – 3, BS 1843, DIN 13711, JIS C 1610 – 1981, NFC 42334 as per requirement*

TYPE OF TC	Metal Alloy + ve leg	Metal Alloy – ve leg	Thermal Tolerance
J	*Fe*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*
K	*Ni Cr*	*Ni Al*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584-2*
T	*Cu*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584- 2*
E	*Ni Cr*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*
N	*Ni Cr Si*	*Ni Si*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*

- *Thermocouple wires are normally supplied to meet tolerance above 0 °C. If material is reqd. to meet tolerance below 0 °C, the purchaser should clarify the same in Purchase Order. Special selection of material is reqd.*
- *Initial calibration & Tolerance suggested, its requirement should be discussed well in advance before placing the order.*
- ***R & S** extension wires are also manufactured with copper as positive and different nickel alloys respective for R & S.*
- ***B** Type extension wire is manufactured with Copper as positive & negative for transition below 100 °C*

TYPE OF CABLE	Wire Size AWG	Type of Wire	Type K	Type J	Type T	Type N	Type E
Individual Core FIBER GLASS BRAIDED & TWISTED	7 * 32	Stranded	Kt-7*32 F	Jt-7*32 F	Tt-7*32 F	Nt-7*32 F	Et-7*32 F
	24	Solid	Kt-24 F	Jt-24 F	Tt-24 F		
	22	Solid	Kt-22 F	Jt-22 F			
	20	Solid	Kt-20 F	Jt-20 F			
	18	Solid	Kt-20 F	Jt-18 F			
	16	Solid	Kt-20 F	Jt-16 F			
	14	Solid	Kt-20 F	Jt-14 F			
	12	Solid	Kt-20 F	Jt-12 F			

- *Duplex construction are suffix with D i.e. KtD*
- *Extension & Compensating Grade Wire are suffix with t & c respectively.*

Initial Calibration Tolerances as per ASTM E230 and ANSI MC96.1

Tolerance-Reference Junction 0°C (32 °F)

Thermocouple Designation	Temperature Range °C (°F)	Standard Grade Limits ° C (°F) whichever is greater	Special Grade Limits °C(°F) Whichever is greater
Thermocouple Grade Wires			
Jt	0 (32) to 750 (1382)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
Kt	0 (32) to 1250 (2282) -200 (-328) to 0 (32)	±2.2 (4.0) or ±0.75% ±2.2 (4.0) or ±2%	±1.1 (2.0) or 0.4% -----
Tt	0 (32) to 350 (662) -200 (-328) to 0 (32)	±1.0 (1.8) or ±0.75% ±1.0 (1.8) or ±1.5%	±0.5 (1.0) or 0.4% -----
Et	0 (32) to 900 (1652) -200 (-328) to 0 (32)	±1.7 (3.0) or ±0.5% ±1.7 (3.0) or ±1%	±1.0 (1.8) or 0.4% -----
Nt	0 (32) to 1300 (2372) -270(-454) to 0 (32)	±2.2 (4.0) or ±0.75% ±2.2 (4.0) or ±2%	±1.1 (2.0) or 0.4% -----
Extension / Compensating Grade Wires			
Jx	0 (32) to 200 (400)	±2.2 (4.0)	
Kx or Kc	0 (32) to 200 (400)	±2.2 (4.0)	
Tx	32 (0) to 100 (212)	±1.0 (1.8)	
Ex	0 (32) to 200 (400)	±1.7 (3.1)	
Nx or Nc	0 (32) to 200 (400)	±2.2 (4.0)	
Rc or Sc or Bc	0 (32) to 200 (400)	±5.0 (9.0)	

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EMPOWERING PROCESS MANAGEMENT

PTFE Insulated Thermocouple Wire Max. Temp. Up to 260 °C

PTFE *Insulation becomes an excellent solution where chemical fumes & other liquids make all type of Insulation vulnerable as it is chemically inert to most of industrial chemicals. It has outstanding mechanical & electrical properties and has temperature range from* ***-65 °C to 260 °C****. It is flame retardant and none propagating in fire conditions.*

ELTEC PTFE *Insulated* ***Thermocouple Wires*** *conforms to US Military* ***MIL – W – 16878*** *and Indian defense specifications* ***JSS 51034****. As per these standards, these wires are classified in three main working voltage grades.*

GRADE	SPARK TESTING	DIE ELECTRIC TESTING
ET (250 V)	2500 V AC	1500 V AC
E (600 V)	3400 V AC	2000 V AC
EE (1000 V)	5000 V AC	3000 V AC

APPLICATIONS	PRODUCT FEATURES
• Manufacturing of Temperature Sensors	• Continuous use up to 260 °C
• Aerospace & Cryogenics	• Single exposure up to 400 °C
• FDA Approved Products	• Inert to most chemical & fluids
• Chemicals & Pharmaceuticals	• Unaffected by lubricants
• Laboratories	• Flame Retardant
• Food Processing Plants	• Immune to agene fungus & water absorption
• Packaging	• Resistant to gamma radiation

PRODUCT SPECIFICTIONS:	
Conductor	*Solid or stranded thermocouple extension wires from 12 AWG to 24 AWG (2.44mm to 0.51mm)*
Core Insulation	*Fused PTFE tape*
Construction	*Parallel Conductors*
No. of Pair	*1*
Outer Sheath	*Fused PTFE tape*
SS JACKET	*Optional Outside SS Metal braid*
Color Coding	*Confirms to ANSI MC 96.1 (International Color Code Available)*

- *Other sizes in SWG and also different construction in other stranded sizes are available on request*
- *Optional construction of twisted conductors.*
- *Duplex construction are also available*
- *Optional Color coding: IEC 60584 – 3, BS 1843, DIN 13711, JIS C 1610 – 1981, NFC 42334 as per requirement*

TYPE OF TC	Metal Alloy + ve leg	Metal Alloy – ve leg	Thermal Tolerance
J	Fe	Cu Ni	ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2
K	Ni Cr	Ni Al	ASTM E 230 – ANSI MC 96.1 & IEC EN 60584-2
T	Cu	Cu Ni	ASTM E 230 – ANSI MC 96.1 & IEC EN 60584- 2
E	Ni Cr	Cu Ni	ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2
N	Ni Cr Si	Ni Si	ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2

- *Thermocouple wires are normally supplied to meet tolerance above 0 °C. If material is reqd. to meet tolerance below 0 °C, the purchaser should clarify the same in Purchase Order. Special selection of material is reqd.*
- *Initial calibration & Tolerance suggested, its requirement should be discussed well in advance before placing the order.*
- ***R & S*** *extension wires are also manufactured with copper as positive and different nickel alloys respective for R & S.*
- ***B*** *Type extension wire is manufactured with Copper as positive & negative for transition below 100 °C*

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EMPOWERING PROCESS MANAGEMENT

TYPE OF CABLE	Wire Size AWG	Type of Wire	Type K	Type J	Type T	Type N	Type E
Individual Core & Overall Jacket of Fused PTFE	7 * 32	Stranded	Kt-7*32 TT	Jt-7*32TT	Tt-7*32TT	Nt-7*32TT	Et-7*32TT
	24	Solid	Kt-24 TT	Jt-24TT	Tt-24TT		
	22	Solid	Kt-22 TT	Jt-22TT			
	20	Solid	Kt-20 TT	Jt-20TT			
	18	Solid	Kt-18 TT	Jt-18TT			
	16	Solid	Kt-16 TT	Jt-16TT			
	14	Solid	Kt-14 TT	Jt-14TT			
	12	Solid	Kt-12 TT	Jt-12TT			
Individual Core & Overall Jacket of Fused PTFE with Outside SS Metal Over Braid	7 * 32	Stranded	Kt-7*32 TTS	Jt-7*36TTS	Tt-7*36TTS	Nt-7*36TTS	Et-7*36TT
	24	Solid	Kt-24 TTS	Jt-24TTS	Tt-24TTS		
	22	Solid	Kt-22 TT S	Jt-22TTS			
	20	Solid	Kt-20 TTS	Jt-20TTS			
	18	Solid	Kt-18 TTS	Jt-18TTS			
	16	Solid	Kt-16 TTS	Jt-16TTS			
	14	Solid	Kt-14 TTS	Jt-14TTS			
	12	Solid	Kt-12 TTS	Jt-12TTS			

- *TT – Insulation & Jacket OF FUSED PTFE TAPE.*
- *TTS – Insulation & Jacket of FUSED PTFE TAPE with Outside SS METAL BRAID*
- *Duplex construction are suffix with D i.e. KtD ___*
- *Extension & Compensating Grade Wire are suffix with e & c respectively*

Initial Calibration Tolerances as per ASTM E230 and ANSI MC96.1

Tolerance-Reference Junction 0°C (32 °F)

Thermocouple Designation	Temperature Range °C (°F)	Standard Grade Limits ° C (°F) whichever is greater	Special Grade Limits °C(°F) Whichever is greater
Thermocouple Grade Wires			
Jt	0 (32) to 750 (1382)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
Kt	0 (32) to 1250 (2282)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
	-200 (-328) to 0 (32)	±2.2 (4.0) or ±2%	-----
Tt	0 (32) to 350 (662)	±1.0 (1.8) or ±0.75%	±0.5 (1.0) or 0.4%
	-200 (-328) to 0 (32)	±1.0 (1.8) or ±1.5%	-----
Et	0 (32) to 900 (1652)	±1.7 (3.0) or ±0.5%	±1.0 (1.8) or 0.4%
	-200 (-328) to 0 (32)	±1.7 (3.0) or ±1%	-----
Nt	0 (32) to 1300 (2372)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
	-270(-454) to 0 (32)	±2.2 (4.0) or ±2%	-----
Extension / Compensating Grade Wires			
Jx	0 (32) to 200 (400)	±2.2 (4.0)	
Kx or Kc	0 (32) to 200 (400)	±2.2 (4.0)	
Tx	32 (0) to 100 (212)	±1.0 (1.8)	
Ex	0 (32) to 200 (400)	±1.7 (3.1)	
Nx or Nc	0 (32) to 200 (400)	±2.2 (4.0)	
Rc or Sc or Bc	0 (32) to 200 (400)	±5.0 (9.0)	

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EMPOWERING PROCESS MANAGEMENT

PTFE Insulated & FIBER GLASS Sheathed Thermocouple Wire Max. Temp. Up to 260 °C

The conductors are insulated with **PTFE** (fluro polymer) and then braided with high temperature **FIBER GLASS YARN**. This cable has special features of both PTFE & FIBER GLASS Insulation i.e. better temperature withstanding capacity, chemical & moisture resistance and better abrasion resistance.

***ELTEC PTFE** Insulated **Thermocouple Wires** conforms to US Military **MIL – W – 16878** and Indian defense specifications **JSS 51034**. As per these standards, these wires are classified in three main working voltage grades.*

GRADE	SPARK TESTING	DIE ELECTRIC TESTING
ET (250 V)	2500 V AC	1500 V AC
E (600 V)	3400 V AC	2000 V AC
EE (1000 V)	5000 V AC	3000 V AC

APPLICATIONS

- *Manufacturing of Temperature Sensors*
- *Furnaces & Ovens*
- *Plastic Processing Equipments*
- *Heat Treatment*
- *Thermocouple Circuits*
- *Various Processing Industries*

PRODUCT FEATURES

- *Continuous use up to 260 °C*
- *Single exposure up to 650 °C*
- *Good Thermal Durability & Strength*
- *Flame Retardant*
- *Superior Abrasion Resistance*
- *Better flexibility*

PRODUCT SPECIFICTIONS:	
Conductor	*Solid or stranded thermocouple extension grade wires from 12 AWG to 24 AWG (2.44mm to 0.51mm)*
Core Insulation	*Fused PTFE TAPE*
Construction	*Parallel Conductors*
No. of Pair	*1*
Outer Sheath	*Braided Fiber Glass with high temperature impregnation **
SS JACKET	*Outside SS Metal Over Braid*
Color Coding	*Confirms to ANSI MC 96.1 (International Color Codes available)*

- *Impregnation maintained up to **200 °C**. Option for supply of wire without impregnation for continuous operation at elevated temperature.*
- *Other sizes in SWG and also different construction in other stranded sizes are available on request*
- *Optional construction of twisted conductors.*
- *Duplex construction are also available*
- *Optional Color coding: IEC 60584 – 3, BS 1843, DIN 13711, JIS C 1610 – 1981, NFC 42334 as per requirement*

TYPE OF TC	Metal Alloy + ve leg	Metal Alloy – ve leg	Thermal Tolerance
J	*Fe*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*
K	*Ni Cr*	*Ni Al*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584-2*
T	*Cu*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584- 2*
E	*Ni Cr*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*
N	*Ni Cr Si*	*Ni Si*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*

- *Thermocouple wires are normally supplied to meet tolerance above 0 °C. If material is reqd. to meet tolerance below 0 °C, the purchaser should clarify the same in Purchase Order. Special selection of material is reqd.*
- *Initial calibration & Tolerance suggested, its requirement should be discussed well in advance before placing the order.*
- ***R & S** extension wires are also manufactured with copper as positive and different nickel alloys respective for R & S.*
- ***B** Type extension wire is manufactured with Copper as positive & negative for transition below 100 °C*

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EMPOWERING PROCESS MANAGEMENT

TYPE OF CABLE	Wire Size AWG	Type of Wire	Type K	Type J	Type T	Type N	Type E
Individual Core Insulated with Fused PTFE & Overall Jacket of FIBER GLASS BRAID	7 * 32	Stranded	Kt-7*32 TF	Jt-7*32TF	Tt-7*32TF	Nt-7*32TF	Et-7*32TF
	24	Solid	Kt-24 TF	Jt-24TF	Tt-24TF		
	22	Solid	Kt-22 TF	Jt-22TF			
	20	Solid	Kt-20 TF	Jt-20TF			
	18	Solid	Kt-18 TF	Jt-18TF			
	16	Solid	Kt-16 TF	Jt-16TF			
	14	Solid	Kt-14 TF	Jt-14TF			
	12	Solid	Kt-12 TF	Jt-12TF			
Individual Core Insulated with Fused PTFE , Overall Jacket of FIBER GLASS BRAID & Outside SS Metal OVER BRAID	7 * 32	Stranded	Kt-32 TFS	Jt-7*32TFS	Tt-7*32TFS	Nt-7*32TFS	Et-7*32TFS
	24	Solid	Kt-24 TFS	Jt-24TFS	Tt-24TFS		
	22	Solid	Kt-22 TF S	Jt-22TFS			
	20	Solid	Kt-20 TFS	Jt-20TFS			
	18	Solid	Kt-18 TFS	Jt-18TFS			
	16	Solid	Kt-16 TFS	Jt-16TFS			
	14	Solid	Kt-14 TFS	Jt-14TFS			
	12	Solid	Kt-12 TFS	Jt-12TFS			

- *TF – PTFE INSULATION*
- *TFS – PTFE INSULATION & JACKET OF FIBER GLASS BRAID with Outside SS METAL BRAID*
- *Duplex construction are suffix with D i.e. KxD ___*
- *Extension & Compensating Grade Wire are suffix with t & c respectively*

Initial Calibration Tolerances as per ASTM E230 and ANSI MC96.1

Tolerance-Reference Junction 0°C (32 °F)

Thermocouple Designation	Temperature Range °C (°F)	Standard Grade Limits ° C (°F) whichever is greater	Special Grade Limits °C(°F) Whichever is greater
Thermocouple Grade Wires			
Jt	0 (32) to 750 (1382)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
Kt	0 (32) to 1250 (2282)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
	-200 (-328) to 0 (32)	±2.2 (4.0) or ±2%	-----
Tt	0 (32) to 350 (662)	±1.0 (1.8) or ±0.75%	±0.5 (1.0) or 0.4%
	-200 (-328) to 0 (32)	±1.0 (1.8) or ±1.5%	-----
Et	0 (32) to 900 (1652)	±1.7 (3.0) or ±0.5%	±1.0 (1.8) or 0.4%
	-200 (-328) to 0 (32)	±1.7 (3.0) or ±1%	-----
Nt	0 (32) to 1300 (2372)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
	-270(-454) to 0 (32)	±2.2 (4.0) or ±2%	-----
Extension / Compensating Grade Wires			
Jx	0 (32) to 200 (400)	±2.2 (4.0)	
Kx or Kc	0 (32) to 200 (400)	±2.2 (4.0)	
Tx	32 (0) to 100 (212)	±1.0 (1.8)	
Ex	0 (32) to 200 (400)	±1.7 (3.1)	
Nx or Nc	0 (32) to 200 (400)	±2.2 (4.0)	
Rc or Sc or Bc	0 (32) to 200 (400)	±5.0 (9.0)	

ELTEC CABLES & INSTRUMENTS
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EMPOWERING PROCESS MANAGEMENT

PTFE INSULATED & SS Shielded Thermocouple Wire Max. Temp. Up to 260 °C

PTFE *Insulation becomes an excellent solution where chemical fumes & other liquids make all type of Insulation vulnerable as it is chemically inert to most of industrial chemicals. It has outstanding mechanical & electrical properties and has temperature range from* ***-65 °C to 260 °C****.*

ELTEC PTFE *Insulated* ***Thermocouple Wires*** *conforms to US Military* ***MIL – W – 16878*** *and Indian defense specifications* ***JSS 51034****. As per these standards, these wires are classified in three main working voltage grades.*

GRADE	SPARK TESTING	DIE ELECTRIC TESTING
ET (250 V)	2500 V AC	1500 V AC
E (600 V)	3400 V AC	2000 V AC
EE (1000 V)	5000 V AC	3000 V AC

APPLICATIONS	PRODUCT FEATURES
• Manufacturing of Temperature Sensors	• Continuous use up to 260 °C
• Aerospace & Cryogenics	• Single exposure up to 400 °C
• Power Generating Plants	• Inert to most chemical & fluids
• Chemical & Petroleum Plants	• Unaffected by lubricants
• Laboratories	• Flame Retardant
• Field Heat Treating	• Shielded construction provides noise reduction
• Packaging	• Resistant to gamma radiation

PRODUCT SPECIFICTIONS:	
Conductor	Solid or stranded thermocouple extension wires from 12 AWG to 24 AWG (2.44mm to 0.51mm)
Core Insulation	Fused PTFE tape
Construction	Parallel Conductors
No. of Pair	1
Inner Sheath	Fused PTFE tape
Shield	Copper / SS Braid
Outer Sheath	Fused PTFE tape
Color Coding	Confirms to ANSI MC 96.1 (International Color Code Available), Refer Table

- *Other sizes in SWG and also different construction in other stranded sizes are available on request*
- *Optional construction of twisted conductors.*
- *Duplex construction are also available*
- *Optional Color coding: IEC 60584 – 3, BS 1843, DIN 13711, JIS C 1610 – 1981, NFC 42334 as per requirement*

TYPE OF TC	Metal Alloy + ve leg	Metal Alloy – ve leg	Thermal Tolerance
J	Fe	Cu Ni	ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2
K	Ni Cr	Ni Al	ASTM E 230 – ANSI MC 96.1 & IEC EN 60584-2
T	Cu	Cu Ni	ASTM E 230 – ANSI MC 96.1 & IEC EN 60584- 2
E	Ni Cr	Cu Ni	ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2
N	Ni Cr Si	Ni Si	ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2

- *Thermocouple wires are normally supplied to meet tolerance above 0 °C. If material is reqd. to meet tolerance below 0 °C, the purchaser should clearify the same in Purchase Order. Special selection of material is reqd.*
- *Initial calibration & Tolerance suggested, its requirement should be discussed well in advance before placing the order.*
- ***R & S*** *extension wires are also manufactured with copper as positive and different nickel alloys respective for R & S.*
- ***B*** *Type extension wire is manufactured with Copper as positive & negative for transition below 100 °C*

TYPE OF CABLE	Wire Size AWG	Type of Wire	Type K	Type J	Type T	Type N	Type E
Individual Core PTFE Insulated, SS Metal Braid & Outside Fused PTFE Jacket	7 * 32	Stranded	Kt-7*32 TTST	Jt-7*32TTST	Tt-7*32TTST	Nt-7*32TTST	Et-7*32TTST
	24	Solid	Kt-24 TTST	Jt-24TTST	Tt-24TTST		
	22	Solid	Kt-22 TT ST	Jt-22TTST			
	20	Solid	Kt-20 TTST	Jt-20TTST			
	18	Solid	Kt-18 TTST	Jt-18TTST			
	16	Solid	Kt-16 TTST	Jt-16TTST			
	14	Solid	Kt-14 TTST	Jt-14TTST			
	12	Solid	Kt-12 TTST	Jt-12TTST			

- *TTST– Insulation of Fused PTFE wih SS Shield and Inner & Outer jacket of Fused PTFE.*
- *Duplex construction are suffix with D i.e. KxD ___ Duplex construction are suffix with D i.e. KtD ___*
- *Extension & Compensating Grade Wire are suffix with e & c respectively*

Initial Calibration Tolerances as per ASTM E230 and ANSI MC96.1

Tolerance-Reference Junction 0°C (32 °F)

Thermocouple Designation	Temperature Range °C (°F)	Standard Grade Limits ° C (°F) whichever is greater	Special Grade Limits °C(°F) Whichever is greater
Thermocouple Grade Wires			
Jt	0 (32) to 750 (1382)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
Kt	0 (32) to 1250 (2282)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
	-200 (-328) to 0 (32)	±2.2 (4.0) or ±2%	-----
Tt	0 (32) to 350 (662)	±1.0 (1.8) or ±0.75%	±0.5 (1.0) or 0.4%
	-200 (-328) to 0 (32)	±1.0 (1.8) or ±1.5%	-----
Et	0 (32) to 900 (1652)	±1.7 (3.0) or ±0.5%	±1.0 (1.8) or 0.4%
	-200 (-328) to 0 (32)	±1.7 (3.0) or ±1%	-----
Nt	0 (32) to 1300 (2372)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
	-270(-454) to 0 (32)	±2.2 (4.0) or ±2%	-----
Extension / Compensating Grade Wires			
Jx	0 (32) to 200 (400)	±2.2 (4.0)	
Kx or Kc	0 (32) to 200 (400)	±2.2 (4.0)	
Tx	32 (0) to 100 (212)	±1.0 (1.8)	
Ex	0 (32) to 200 (400)	±1.7 (3.1)	
Nx or Nc	0 (32) to 200 (400)	±2.2 (4.0)	
Rc or Sc or Bc	0 (32) to 200 (400)	±5.0 (9.0)	

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EMPOWERING PROCESS MANAGEMENT

FEP Insulated Thermocouple Wire Max. Temp. Up to 200 °C

FEP *Insulation is carried out by an extrusion process and has a temperature withstanding capacity up to* ***200 °C****. It is flame retardant and non propagating in fire conditions. Resistant to moisture, chemical & solvent. Smooth finish and economical construction for high temperature range made it an ideal for various food grade applications.*

APPLICATIONS	PRODUCT FEATURES
• *Manufacturing of Temperature Sensors*	• *Continuous use up to 200 °C*
• *Aerospace & Cryogenics*	• *Single exposure up to 400 °C*
• *FDA Approved Products*	• *Chemical Resistant*
• *Chemicals & Pharmaceuticals*	• *Moisture Resistant*
• *Petrochemical Plants*	• *Flame Retardant*
• *Food Processing Plants*	• *Smoother surface finish*
• *Packaging*	• *Good Electrical Properties*

PRODUCT SPECIFICTIONS:	
Conductor	*Solid or stranded thermocouple extension wires from 12 AWG to 24 AWG (2.44mm to 0.51mm)*
Core Insulation	*Flame Retardant extruded FEP*
Construction	*Parallel Conductors*
No. of Pair	*1*
Outer Sheath	*Flame Retardant extruded FEP*
SS JACKET	*Optional Outside SS Metal Over Braid*
Color Coding	*Confirms to ANSI MC 96.1 (International Color Code Available)*

- *Other sizes in SWG and also different construction in other stranded sizes are available on request*
- *Optional construction of twisted conductors.*
- *Duplex construction are also available*
- *Optional Color coding: IEC 60584 – 3, BS 1843, DIN 13711, JIS C 1610 – 1981, NFC 42334 as per requirement*

TYPE OF TC	Metal Alloy + ve leg	Metal Alloy – ve leg	Thermal Tolerance
J	*Fe*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*
K	*Ni Cr*	*Ni Al*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584-2*
T	*Cu*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584- 2*
E	*Ni Cr*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*
N	*Ni Cr Si*	*Ni Si*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*

- *Thermocouple wires are normally supplied to meet tolerance above 0 °C. If material is reqd. to meet tolerance below 0 °C, the purchaser should clearify the same in Purchase Order. Special selection of material is reqd.*
- *Initial calibration & Tolerance suggested, its requirement should be discussed well in advance before placing the order.*
- ***R & S*** *extension wires are also manufactured with copper as positive and different nickel alloys respective for R & S.*
- ***B*** *Type extension wire is manufactured with Copper as positive & negative for transition below 100 °C*

TYPE OF CABLE	Wire Size AWG	Type of Wire	Type K	Type J	Type T	Type N	Type E
Individual Core & Overall Jacket of Extruded FEP	7 * 32	Stranded	Kt-7*32 EP	Jx-7*32EP	Tx-7*32EP	Nx-7*32EP	Ex-7*32EP
	24	Solid	Kt-24 EP	Jx-24EP	Tx-24EP		
	22	Solid	Kt-22 EP	Jx-22EP			
	20	Solid	Kt-20 EP	Jx-20EP			
	18	Solid	Kt-18 EP	Jx-18EP			
	16	Solid	Kt-16 EP	Jx-16EP			
	14	Solid	Kt-14 EP	Jx-14EP			
	12	Solid	Kt-12 EP	Jx-12EP			
Individual Core & Overall Jacket of Extruded FEP & Outside SS Metal Over Braid	7 * 32	Stranded	Kt-7*32EPS	Jx-7*32EPS	Tx-*32EPS	Nx-7*32EPS	Ex-7*32EPS
	24	Solid	Kt-24 EPS	Jx-24FEPS	Tx-24EPS		
	22	Solid	Kt-22 EP S	Jx-22EPS			
	20	Solid	Kt-20 EPS	Jx-20EPS			
	18	Solid	Kt-18EPS	Jx-18EPS			
	16	Solid	Kt-16 EPS	Jx-16EPS			
	14	Solid	Kt-14 EPS	Jx-14EPS			
	12	Solid	Kt-12EPS	Jx-12EPS			

- *EP – Insulation & Jacket OF FEP.*
- *EPS – Insulation & Jacket of FEP with Outside SS METAL BRAID.*
- *Duplex construction are suffix with D i.e. KtD ___*
- *Extension & Compensating Grade Wire are suffix with e & c respectively.*

Initial Calibration Tolerances as per ASTM E230 and ANSI MC96.1

Tolerance-Reference Junction 0°C (32 °F)

Thermocouple Designation	Temperature Range °C (°F)	Standard Grade Limits ° C (°F) whichever is greater	Special Grade Limits °C(°F) Whichever is greater
Thermocouple Grade Wires			
Jt	0 (32) to 750 (1382)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
Kt	0 (32) to 1250 (2282) -200 (-328) to 0 (32)	±2.2 (4.0) or ±0.75% ±2.2 (4.0) or ±2%	±1.1 (2.0) or 0.4% -----
Tt	0 (32) to 350 (662) -200 (-328) to 0 (32)	±1.0 (1.8) or ±0.75% ±1.0 (1.8) or ±1.5%	±0.5 (1.0) or 0.4% -----
Et	0 (32) to 900 (1652) -200 (-328) to 0 (32)	±1.7 (3.0) or ±0.5% ±1.7 (3.0) or ±1%	±1.0 (1.8) or 0.4% -----
Nt	0 (32) to 1300 (2372) -270(-454) to 0 (32)	±2.2 (4.0) or ±0.75% ±2.2 (4.0) or ±2%	±1.1 (2.0) or 0.4% -----
Extension / Compensating Grade Wires			
Jx	0 (32) to 200 (400)	±2.2 (4.0)	
Kx or Kc	0 (32) to 200 (400)	±2.2 (4.0)	
Tx	32 (0) to 100 (212)	±1.0 (1.8)	
Ex	0 (32) to 200 (400)	±1.7 (3.1)	
Nx or Nc	0 (32) to 200 (400)	±2.2 (4.0)	
Rc or Sc or Bc	0 (32) to 200 (400)	±5.0 (9.0)	

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EMPOWERING PROCESS MANAGEMENT

PFA Insulated Thermocouple Wire Max. Temp. Up to 250 °C

***PFA** Insulation is carried out by an extrusion process and has a temperature withstanding capacity up to **250 °C**. It is flame retardant and non propagating in fire conditions. Resistant to moisture, chemical & solvent. Smooth finish and economical construction for high temperature range made it an ideal for various food grade applications.*

APPLICATIONS	PRODUCT FEATURES
• *Manufacturing of Temperature Sensors*	• *Continuous use up to 260 °C*
• *Aerospace & Cryogenics*	• *Smooth External surface finish*
• *FDA Approved Products*	• *Flame Retardant*
• *Chemicals & Pharmaceuticals*	• *Excellent resistant to chemicals*
• *Petrochemical Plants*	• *Excellent electrical properties*
• *Food Processing Plants*	• *Moisture Resistant*
• *Packaging*	• *Resistance to gamma radiation*

PRODUCT SPECIFICTIONS:	
Conductor	*Solid or stranded thermocouple extension wires from 12 AWG to 24 AWG (2.44mm to 0.51mm)*
Core Insulation	*Flame Retardant extruded PFA*
Construction	*Parallel Conductors*
No. of Pair	*1*
Outer Sheath	*Flame Retardant extruded PFA*
SS JACKET	*Optional Outside SS Metal Over braid*
Color Coding	*Confirms to ANSI MC 96.1 (International Color Code Available)*

- *Other sizes in SWG and also different construction in other stranded sizes are available on request*
- *Optional construction of twisted conductors.*
- *Duplex construction are also available*
- *Optional Color coding: IEC 60584 – 3, BS 1843, DIN 13711, JIS C 1610 – 1981, NFC 42334 as per requirement*

TYPE OF TC	Metal Alloy + ve leg	Metal Alloy – ve leg	Thermal Tolerance
J	*Fe*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*
K	*Ni Cr*	*Ni Al*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584-2*
T	*Cu*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584- 2*
E	*Ni Cr*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*
N	*Ni Cr Si*	*Ni Si*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*

- *Thermocouple wires are normally supplied to meet tolerance above 0 °C. If material is reqd. to meet tolerance below 0 °C, the purchaser should clearify the same in Purchase Order. Special selection of material is reqd.*
- *Initial calibration & Tolerance suggested, its requirement should be discussed well in advance before placing the order.*
- ***R & S** extension wires are also manufactured with copper as positive and different nickel alloys respective for R & S.*
- ***B** Type extension wire is manufactured with Copper as positive & negative for transition below 100 °C*

TYPE OF CABLE	Wire Size AWG	Type of Wire	Type K	Type J	Type T	Type N	Type E
Individual Core & Overall Jacket of Extruded PFA	7 * 32	Stranded	Kt-7*32 PF	Jx-7*32 PF	Tx-7*32 PF	Nx-7*32 PF	Ex-7*32 PF
	24	Solid	Kt-24 PF	Jx-24F PF	Tx-24 PF		
	22	Solid	Kt-22 PF	Jx-22F PF			
	20	Solid	Kt-20 PF	Jx-20F PF			
	18	Solid	Kt-18 PF	Jx-18 PF			
	16	Solid	Kt-16 PF	Jx-16 PF			
	14	Solid	Kt-14 PF	Jx-14 PF			
	12	Solid	Kt-12 PF	Jx-12 PF			
Individual Core & Overall Jacket of Extruded PFA & Outside SS Metal Over Braid	7 * 32	Stranded	Kt-7*32 PFS	Jx-7*32 PFS	Tx-*32 PFS	Nx-7*32 PFS	Ex-7*32 PFS
	24	Solid	Kt-24 PFS	Jx-24F PFS	Tx-24 PFS		
	22	Solid	Kt-22 PFS	Jx-22 PFS			
	20	Solid	Kt-20 PFS	Jx-20 PFS			
	18	Solid	Kt-18 PFS	Jx-18 PFS			
	16	Solid	Kt-16 PFS	Jx-16 PFS			
	14	Solid	Kt-14 PFS	Jx-14 PFS			
	12	Solid	Kt-12 PFS	Jx-12 PFS			

- *PF– Insulation & Jacket OF PFA.*
- *PFS – Insulation & Jacket of FEP with Outside SS METAL BRAID.*
- *Duplex construction are suffix with D i.e. KtD ___*
- *Extension & Compensating Grade Wire are suffix with e & c respectively.*

Initial Calibration Tolerances as per ASTM E230 and ANSI MC96.1

Tolerance-Reference Junction 0°C (32 °F)

Thermocouple Designation	Temperature Range °C (°F)	Standard Grade Limits ° C (°F) whichever is greater	Special Grade Limits °C(°F) Whichever is greater
Thermocouple Grade Wires			
Jt	0 (32) to 750 (1382)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
Kt	0 (32) to 1250 (2282) -200 (-328) to 0 (32)	±2.2 (4.0) or ±0.75% ±2.2 (4.0) or ±2%	±1.1 (2.0) or 0.4% -----
Tt	0 (32) to 350 (662) -200 (-328) to 0 (32)	±1.0 (1.8) or ±0.75% ±1.0 (1.8) or ±1.5%	±0.5 (1.0) or 0.4% -----
Et	0 (32) to 900 (1652) -200 (-328) to 0 (32)	±1.7 (3.0) or ±0.5% ±1.7 (3.0) or ±1%	±1.0 (1.8) or 0.4% -----
Nt	0 (32) to 1300 (2372) -270(-454) to 0 (32)	±2.2 (4.0) or ±0.75% ±2.2 (4.0) or ±2%	±1.1 (2.0) or 0.4% -----
Extension / Compensating Grade Wires			
Jx	0 (32) to 200 (400)	±2.2 (4.0)	
Kx or Kc	0 (32) to 200 (400)	±2.2 (4.0)	
Tx	32 (0) to 100 (212)	±1.0 (1.8)	
Ex	0 (32) to 200 (400)	±1.7 (3.1)	
Nx or Nc	0 (32) to 200 (400)	±2.2 (4.0)	
Rc or Sc or Bc	0 (32) to 200 (400)	±5.0 (9.0)	

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EMPOWERING PROCESS MANAGEMENT

SILICONE RUBBER Insulated Thermocouple Wire Max. Temp. Up to 180 °C:

Silicone Rubber Insulation *provides superior flexibility, excellent softness, resistant to moisture and can be immersed in water for a longer period of time without much effect on its electrical & mechanical properties. Wide operating temperature range from* ***-55 °C to 200 °C***

APPLICATIONS	PRODUCT FEATURES
• *Medical Equipments*	• *Continuous use up to 180 °C*
• *Food Equipments*	• *Single Exposure up to 260 °C*
• *Pharmaceuticals*	• *Excellent Flexibility*
• *Laboratories*	• *Excellent softness*
• *Thermocouple Circuits*	• *Resistant to moisture*
• *General Industry*	• *Resistant to oil, solvent & chemicals*

PRODUCT SPECIFICTIONS:	
Conductor	*Solid or stranded thermocouple wires from 12 AWG to 24 AWG (2.44mm to 0.51mm)*
Core Insulation	*Extruded Silicone Rubber*
Construction	*Parallel Conductors*
No. of Pair	*1*
Inner Sheath	*Silicone Rubber*
Armored (Optional)	*WIRE ARMORED or SS METAL OVER BRAID*
Color Coding	*Confirms to ANSI MC 96.1 (International Color Code Available), Refer Color Code*

- *Other sizes in SWG and also different construction in other stranded sizes are available on request*
- *Optional construction of twisted conductors & shielding*
- *Duplex construction are also available*
- *Optional Color coding: IEC 60584 – 3, BS 1843, DIN 13711, JIS C 1610 – 1981, NFC 42334 as per requirement*

TYPE OF TC	Metal Alloy + ve leg	Metal Alloy – ve leg	Thermal Tolerance
J	*Fe*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*
K	*Ni Cr*	*Ni Al*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584-2*
T	*Cu*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584- 2*
E	*Ni Cr*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*
N	*Ni Cr Si*	*Ni Si*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*

- *Thermocouple wires are normally supplied to meet tolerance above 0 °C. If material is reqd. to meet tolerance below 0 °C, the purchaser should clearify the same in Purchase Order. Special selection of material is reqd.*
- *Initial calibration & Tolerance suggested, its requirement should be discussed well in advance before placing the order.*
- ***R & S*** *extension wires are also manufactured with copper as positive and different nickel alloys respective for R & S.*
- ***B*** *Type extension wire is manufactured with Copper as positive & negative for transition below 100 °C*

TYPE OF CABLE	Wire Size AWG	Type of Wire	Type K	Type J	Type T	Type N	Type E
Individual Core & Jacket of Extruded SILICONE RUBBER	7 * 32	Stranded	Kt-7*32 SR	Jt-7*32SR	Tt-7*32SR	Nt-7*32SR	Et-7*32SR
	24	Solid	Kt-24 SR	Jt-24SR	Tt-24SR		
	22	Solid	Kt-22 SR	Jt-22SR			
	20	Solid	Kt-20 SR	Jt-20SR			
	18	Solid	Kt-18 SR	Jt-18SR			
	16	Solid	Kt-16 SR	Jt-16SR			
	14	Solid	Kt-14 SR	Jt-14SR			
	12	Solid	Kt-12 SR	Jt-12SR			

- *SR – INSULATION & JACKET OF PVC*
- *Duplex construction are suffix with D i.e. KtD ___*
- *Extension & Compensating Grade Wire are suffix with e & c respectively.*

Initial Calibration Tolerances as per ASTM E230 and ANSI MC96.1

Tolerance-Reference Junction 0°C (32 °F)

Thermocouple Designation	Temperature Range °C (°F)	Standard Grade Limits ° C (°F) whichever is greater	Special Grade Limits °C(°F) Whichever is greater
Thermocouple Grade Wires			
Jt	0 (32) to 750 (1382)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
Kt	0 (32) to 1250 (2282) -200 (-328) to 0 (32)	±2.2 (4.0) or ±0.75% ±2.2 (4.0) or ±2%	±1.1 (2.0) or 0.4% -----
Tt	0 (32) to 350 (662) -200 (-328) to 0 (32)	±1.0 (1.8) or ±0.75% ±1.0 (1.8) or ±1.5%	±0.5 (1.0) or 0.4% -----
Et	0 (32) to 900 (1652) -200 (-328) to 0 (32)	±1.7 (3.0) or ±0.5% ±1.7 (3.0) or ±1%	±1.0 (1.8) or 0.4% -----
Nt	0 (32) to 1300 (2372) -270(-454) to 0 (32)	±2.2 (4.0) or ±0.75% ±2.2 (4.0) or ±2%	±1.1 (2.0) or 0.4% -----
Extension / Compensating Grade Wires			
Jx	0 (32) to 200 (400)	±2.2 (4.0)	
Kx or Kc	0 (32) to 200 (400)	±2.2 (4.0)	
Tx	32 (0) to 100 (212)	±1.0 (1.8)	
Ex	0 (32) to 200 (400)	±1.7 (3.1)	
Nx or Nc	0 (32) to 200 (400)	±2.2 (4.0)	
Rc or Sc or Bc	0 (32) to 200 (400)	±5.0 (9.0)	

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EMPOWERING PROCESS MANAGEMENT

PVC INSULATED THERMOCOULE WIRE:

***PVC** is most popular & economical Insulation for THERMOCOUPLE WIRES with a withstanding capacity up to **90 °C**.*

APPALICATIONS	PRODUCT FEATURES
• *Plastic & General Machinery*	• *Continuous use up to 90°C*
• *Heating and Air Conditioning*	• *Good moisture, chemical & solvent resistance*
• *Plastic Processing Equipments*	• *Good Thermal Durability & Strength*
• *Laboratories*	• *Flame Retardant*
• *Thermocouple Circuits*	• *Superior Abrasion Resistance*
• *General Industry*	• *Better flexibility*
• *Appliances*	• *Most economical & popular insulation*

PRODUCT SPECIFICTIONS:	
Conductor	*Solid or stranded thermocouple extension wires from 12 AWG to 22 AWG (2.44mm to 0.63mm)*
Core Insulation	*Flame Retardant PVC*
Construction	*Parallel Conductors*
No. of Pair	*1*
Inner Sheath	*Flame Retardant PVC*
Armored (Optional)	*WIRE ARMORED or SS METAL OVERBRAID*
Outer sheath	*Flame Retardant PVC*
Color Coding	*Confirms to ANSI MC 96.1 (International Color Code Available)*

- *Other sizes in SWG and also different construction in other stranded sizes are available on request*
- *Optional construction of twisted conductors & shielding*
- *Duplex construction are also available*
- *Optional Color coding: IEC 60584 – 3, BS 1843, DIN 13711, JIS C 1610 – 1981, NFC 42334 as per requirement*

TYPE OF TC	Metal Alloy + ve leg	Metal Alloy – ve leg	Thermal Tolerance
J	*Fe*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*
K	*Ni Cr*	*Ni Al*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584-2*
T	*Cu*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584- 2*
E	*Ni Cr*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*
N	*Ni Cr Si*	*Ni Si*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*

- *Thermocouple wires are normally supplied to meet tolerance above 0 °C. If material is reqd. to meet tolerance below 0 °C, the purchaser should clearify the same in Purchase Order. Special selection of material is reqd.*
- *Initial calibration & Tolerance suggested, its requirement should be discussed well in advance before placing the order.*
- ***R & S** extension wires are also manufactured with copper as positive and different nickel alloys respective for R & S.*
- ***B** Type extension wire is manufactured with Copper as positive & negative for transition below 100 °C*

TYPE OF CABLE	Wire Size AWG	Type of Wire	Type K	Type J	Type T	Type N	Type E
Individual Core & Overall Jacket of Extruded PVC	7 * 32	Stranded	Kt-7*32 PPA	Jt-7*32PPA	Tt-7*32PPA	Nt-7*32PPA	Et-7*32PPA
	24	Solid	Kt-24 PPA	Jt-24PPA	Tt-24PPA		
	22	Solid	Kt-22 PPA	Jt-22PPA			
	20	Solid	Kt-20 PPA	Jt-20PPA			
	18	Solid	Kt-18 PPA	Jt-18PPA			
	16	Solid	Kt-16 PPA	Jt-16PPA			
	14	Solid	Kt-14 PPA	Jt-14PPA			
	12	Solid	Kt-12 PPA	Jt-12PPA			
Individual Core & Overall Jacket of Extruded PVC with ARMORING	7 * 32	Stranded	Kt-7*32 PPA	Jt-7*32PPA	Tt-7*32PPA	Nt-7*32PPA	Et-7*32PPA
	24	Solid	Kt-24 PPA	Jt-24PPA	Tt-24PPA		
	22	Solid	Kt-22 PPA	Jt-22PPA			
	20	Solid	Kt-20 PPA	Jt-20PPA			
	18	Solid	Kt-18 PPA	Jt-18PPA			
	16	Solid	Kt-16 PPA	Jt-16PPA			
	14	Solid	Kt-14 PPA	Jt-14PPA			
	12	Solid	Kt-12 PPA	Jt-12PPA			

- *PP – INSULATION & JACKET OF PVC*
- *PPA – INSULATION & JACKET OF PVC with Wire Armored*
- *Duplex construction are suffix with D i.e. KtD ___*
- *Extension & Compensating Grade Wire are suffix with e & c respectively*

Initial Calibration Tolerances as per ASTM E230 and ANSI MC96.1

Tolerance-Reference Junction 0°C (32 °F)

Thermocouple Designation	Temperature Range °C (°F)	Standard Grade Limits ° C (°F) whichever is greater	Special Grade Limits °C(°F) Whichever is greater
Thermocouple Grade Wires			
Jt	0 (32) to 750 (1382)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
Kt	0 (32) to 1250 (2282)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
	-200 (-328) to 0 (32)	±2.2 (4.0) or ±2%	-----
Tt	0 (32) to 350 (662)	±1.0 (1.8) or ±0.75%	±0.5 (1.0) or 0.4%
	-200 (-328) to 0 (32)	±1.0 (1.8) or ±1.5%	-----
Et	0 (32) to 900 (1652)	±1.7 (3.0) or ±0.5%	±1.0 (1.8) or 0.4%
	-200 (-328) to 0 (32)	±1.7 (3.0) or ±1%	-----
Nt	0 (32) to 1300 (2372)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
	-270(-454) to 0 (32)	±2.2 (4.0) or ±2%	-----
Extension / Compensating Grade Wires			
Jx	0 (32) to 200 (400)	±2.2 (4.0)	
Kx or Kc	0 (32) to 200 (400)	±2.2 (4.0)	
Tx	32 (0) to 100 (212)	±1.0 (1.8)	
Ex	0 (32) to 200 (400)	±1.7 (3.1)	
Nx or Nc	0 (32) to 200 (400)	±2.2 (4.0)	
Rc or Sc or Bc	0 (32) to 200 (400)	±5.0 (9.0)	

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EMPOWERING PROCESS MANAGEMENT

PVC INSULATED SHIELDED THERMOCOULE WIRE:

In an industrial environment of induced voltage and electrical noise, PVC Insulated twisted overall shielded thermocouple pairs is an ideal selection. Twisted pairs & aluminum Mylar shield provides protection against cross talk, static & magnetic noise in thermocouple circuits.

APPALICATIONS	PRODUCT FEATURES
• *Utilities & Industrial Plants*	• *Temp. Range: 105 °C & Rated 300 V*
• *Construction of New plants*	• *Flame Retardant*
• *Petrochemicals & Oil Refineries*	• *Moisture, Chemical & Solvent Resistant*
• *Testing Rig Set Up*	• *Excellent Die Electric Strength*
• *Thermocouple Circuits*	• *100% shield contact for noise reduction*

PRODUCT SPECIFICATIONS	
Conductor	*Solid or stranded thermocouple extension grade wires from 12 AWG to 22 AWG (2.44mm to 0.63mm) as per ASTM E 230 & ANSI 96.1*
Core Insulation	*Flame Retardant PVC with nominal thickness of 0.40mm*
No. of Pair	*1 or more optional*
Pair Laying	*Shielded Pairs with communication wire are laid suitably and binded with polyester tape*
Cable Shield	*0.05 mm Aluminum Mylar /polyester tape, 25% overlap*
Drain Wire	*22 AWG - 7 strands of Annealed Tinned Copper Wire.*
Outer Sheath	*Flame Retardant PVC*
Color Coding	*Confirms to ANSI MC 96.1 (International Color Code Available), Refer Table*

- *Other sizes in SWG and also different construction in other stranded sizes are available on request*
- *Optional Insulation such as HR PVC / LSZH / LSOH*
- *Optional construction of twisted conductors & shielding*
- *Duplex construction are also available*
- *Optional Color coding: IEC 60584 – 3, BS 1843, DIN 13711, JIS C 1610 – 1981, NFC 42334 as per requirement*

TYPE OF TC	Metal Alloy + ve leg	Metal Alloy – ve leg	Thermal Tolerance
J	*Fe*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*
K	*Ni Cr*	*Ni Al*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584-2*
T	*Cu*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584- 2*
E	*Ni Cr*	*Cu Ni*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*
N	*Ni Cr Si*	*Ni Si*	*ASTM E 230 – ANSI MC 96.1 & IEC EN 60584 - 2*

- *Thermocouple wires are normally supplied to meet tolerance above 0 °C. If material is reqd. to meet tolerance below 0 °C, the purchaser should clarify the same in Purchase Order. Special selection of material is reqd.*
- *Initial calibration & Tolerance suggested, its requirement should be discussed well in advance before placing the order.*
- ***R & S** extension wires are also manufactured with copper as positive and different nickel alloys respective for R & S.*
- ***B** Type extension wire is manufactured with Copper as positive & negative for transition below 100 °C*

TYPE OF CABLE	Wire Size AWG	Type of Wire	Type K	Type J	Type T	Type N	Type E
SHIELDED PVC INSULATED & SHEATHED THERMOCOUPLE WIRE	7 * 32	Stranded	Kt-7*32 PSh	Jt-7*32PSh	Tt-7*32Sh	Nx-7*32PSh	Et-7*32PSh
	24	Solid	Kt-24 PSh	Jt-24PSh	Tt-24PSh		
	22	Solid	Kt-22 PSh	Jt-22PSh			
	20	Solid	Kt-20 PSh	Jt-20PSh			
	18	Solid	Kt-18 PSh	Jt-18PSh			
	16	Solid	Kt-16 PSh	Jt-16PSh			
	14	Solid	Kt-14 PSh	Jt-14PSh			
	12	Solid	Kt-12 PSh	Jt-12PSh			

- *PP – INSULATION & JACKET OF PVC*
- *PSh – INSULATION & JACKET OF PVC with Cable shield of Alu. Mylar and drain wire*
- *Duplex construction are suffix with D i.e. KtD ___*
- *Extension & Compensating Grade Wire are suffix with e & c respectively.*

Initial Calibration Tolerances as per ASTM E230 and ANSI MC96.1

Tolerance-Reference Junction 0°C (32 °F)

Thermocouple Designation	Temperature Range °C (°F)	Standard Grade Limits ° C (°F) whichever is greater	Special Grade Limits °C(°F) Whichever is greater
Thermocouple Grade Wires			
Jt	0 (32) to 750 (1382)	±2.2 (4.0) or ±0.75%	±1.1 (2.0) or 0.4%
Kt	0 (32) to 1250 (2282) -200 (-328) to 0 (32)	±2.2 (4.0) or ±0.75% ±2.2 (4.0) or ±2%	±1.1 (2.0) or 0.4% -----
Tt	0 (32) to 350 (662) -200 (-328) to 0 (32)	±1.0 (1.8) or ±0.75% ±1.0 (1.8) or ±1.5%	±0.5 (1.0) or 0.4% -----
Et	0 (32) to 900 (1652) -200 (-328) to 0 (32)	±1.7 (3.0) or ±0.5% ±1.7 (3.0) or ±1%	±1.0 (1.8) or 0.4% -----
Nt	0 (32) to 1300 (2372) -270(-454) to 0 (32)	±2.2 (4.0) or ±0.75% ±2.2 (4.0) or ±2%	±1.1 (2.0) or 0.4% -----
Extension / Compensating Grade Wires			
Jx	0 (32) to 200 (400)	±2.2 (4.0)	
Kx or Kc	0 (32) to 200 (400)	±2.2 (4.0)	
Tx	32 (0) to 100 (212)	±1.0 (1.8)	
Ex	0 (32) to 200 (400)	±1.7 (3.1)	
Nx or Nc	0 (32) to 200 (400)	±2.2 (4.0)	
Rc or Sc or Bc	0 (32) to 200 (400)	±5.0 (9.0)	

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EMPOWERING PROCESS MANAGEMENT

Overall Shield PVC Insulated Multi pair THERMOCOUPLE EXTENSION CABLES

In an industrial environment of induced voltage and electrical noise, PVC Insulated twisted overall shielded thermocouple pairs is an ideal selection. Twisted pairs & aluminum Mylar shield provides protection against cross talk, static & magnetic noise in thermocouple circuits.

APPLICATIONS	PRODUCT FEATURES
• *Utilities & Industrial Plants*	• *Temp. Range: 90 °C & Rated 300 V*
• *Construction of New plants*	• *Flame Retardant*
• *Petrochemicals & Oil Refineries*	• *Moisture, Chemical & Solvent Resistant*
• *Testing Rig Set Up*	• *Excellent Die Electric Strength*
• *Thermocouple Circuits*	• *100% shield contact for noise reduction*

PRODUCT SPECIFICATIONS	
Conductor	*Solid or stranded thermocouple extension grade wires from 12 AWG to 22 AWG (2.44mm to 0.63mm) as per ASTM E 230 & ANSI 96.1*
Core Insulation	*Flame Retardant PVC with nominal thickness of 0.40mm*
No. of Pair	*2, 4, 6, 8, 16, 20, 24, 36 and more*
Communication Wire	*22 AWG – 7 strands Tinned Copper wire Orange color PVC Insulated (4 Pair & larger)*
Pair Laying	*Shielded Pairs with communication wire are laid suitably and binded with polyester tape*
Cable Shield	*0.05 mm Aluminum Mylar /polyester tape, 25% overlap*
Drain Wire	*22 AWG - 7 strands of Annealed Tinned Copper Wire.*
Outer Sheath	*Flame Retardant PVC*
Color Coding	*Confirms to ANSI MC 96.1 (International Color Code Available)*

- *PVC, HR PVC, FRLS, LSOH, LSZH, HPER etc. Insulation & Outer Jacket as per clients specifications*
- *Optional Color coding: IEC 60584 – 3, BS 1843, DIN 13711, JIS C 1610 – 1981, NFC 42334 as per requirement*

ELECTRICAL CHARACTERISTICS	
IR @ 20°C, 500V, C/C	*> 100 mΩ/Km*
IR @ 20°C, 500V, C/S	*> 50 mΩ/Km*
HV - Test, C/C	*1.2 Kv, 1.0 Min.*
HV - Test, C/S	*1. Kv, 1.0 Min.*

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EMPOWERING PROCESS MANAGEMENT

Overall Shield & Armored PVC Insulated Multi Pair THERMOCOUPLE EXTENSION CABLES

Armored Thermocouple Extension Wires are used for underground applications as GI wire armoring gives strong mechanical protection. Twisted pairs & aluminum Mylar shield provides protection against cross talk, static & magnetic noise in thermocouple circuits.

APPLICATIONS	PRODUCT FEATURES
• *Industrial Plants*	• *Temperature Range: 90 °C & Rated 300 V*
• *Petrochemicals & Oil Refineries*	• *Flame Retardant*
• *Steel & Power Plants*	• *Sunlight Resistant*

PRODUCT SPECIFICATIONS	
Conductor	*Solid or stranded thermocouple extension grade wires from 12 AWG to 22 AWG (2.44mm to 0.63mm) as per ASTM E 230 & ANSI 96.1*
Core Insulation	*Flame Retardant PVC with nominal thickness of 0.40mm*
No. of Pair	*2, 4, 6, 8, 16, 20, 24, 36 and more*
Communication Wire	*22 AWG – 7 strands Tinned Copper wire Orange color PVC Insulated (4 Pair & larger)*
Pair Laying	*Shielded Pairs with communication wire are laid suitably and binded with polyester tape*
Cable Shield	*0.05 mm Aluminum Mylar /polyester tape, 25% overlap*
Drain Wire	*22 AWG - 7 strands of Annealed Tinned Copper Wire.*
Inner Sheath	*Flame Retardant PVC*
Armoring	*GI Round Wire or strip with min. 80% coverage*
Outer Sheath	*Flame Retardant PVC*
Color Coding	*Confirms to ANSI MC 96.1 (International Color Code Available), Refer Table*

- *PVC, HR PVC, FRLS, LSOH, LSZH, HPER etc. Insulation & Outer Jacket as per clients specifications*
- *Optional Color coding: IEC 60584 – 3, BS 1843, DIN 13711, JIS C 1610 – 1981, NFC 42334 as per requirement*

ELECTRICAL PROPERTIES	
IR @ 20°C, 500V, C/C	*> 100 mΩ/Km*
IR @ 20°C, 500V, C/S	*> 50 mΩ/Km*
HV - Test, C/C	*1.2 Kv, 1.0 Min.*
HV - Test, C/S	*1. Kv, 1.0 Min.*

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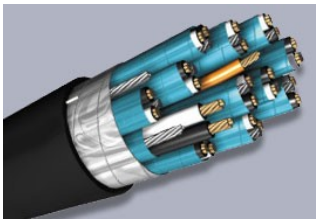
EMPOWERING PROCESS MANAGEMENT

Individual & Overall Shield PVC Insulated Multi Pair THERMOCOUPLE EXTENSION CABLES



In an industrial environment with electrolytic processes and nearby large motors, generators, transformers, induction heating, relay controls, power lines or control wire induced voltage and electrical noise, PVC Insulated twisted individual & overall shielded thermocouple pairs is an ideal selection. Twisted pairs & aluminum Mylar shield provides protection against cross talk, static & magnetic noise in thermocouple circuits.

APPLICATIONS	PRODUCT FEATURES
• *Utilities & Industrial Plants*	• *Temperature Range: 90 °C & Rated 300 V*
• *Construction of New plants*	• *Flame Retardant*
• *Petrochemicals & Oil Refineries*	• *Moisture, Chemical & Solvent Resistant*
• *Testing Rig Set Up*	• *Excellent Die Electric Strength*
• *Thermocouple Circuits*	• *100% shield contact for noise reduction*

PRODUCT SPECIFICATIONS	
Conductor	*Solid or stranded thermocouple extension grade wires from 12 AWG to 22 AWG (2.44mm to 0.63mm) as per ASTM E 230 & ANSI 96.1*
Core Insulation	*Flame Retardant PVC with nominal thickness of 0.40mm*
No. of Pair	*2, 4, 6, 8, 16, 20, 24, 36 and more*
Individual Pair Shield	*0.05mm Aluminum Mylar tape with 125% coverage*
Drain Wire	*22 AWG - 7 strands Annealed Tinned Copper wire*
Communication Wire	*22 AWG – 7 strands Tinned Copper wire Orange color PVC Insulated (4 Pair & larger)*
Pair Laying	*Shielded Pairs with communication wire are laid suitably and binded with polyester tape*
Cable Shield	*0.05 mm Aluminum Mylar /polyester tape, 25% overlap*
Drain Wire	*22 AWG - 7 strands of Annealed Tinned Copper Wire.*
Outer Sheath	*Flame Retardant PVC*
Color Coding	*Confirms to ANSI MC 96.1 (International Color Code Available), Refer Table*

- *PVC, HR PVC, FRLS, LSOH, LSZH, HPER etc. Insulation & Outer Jacket as per clients specifications*
- *Optional Color coding: IEC 60584 – 3, BS 1843, DIN 13711, JIS C 1610 – 1981, NFC 42334 as per requirement*

ELECTRICAL CHARACTERISTICS	
IR @ 20°C, 500V, C/C	*> 100 mΩ/Km*
IR @ 20°C, 500V, C/S	*> 50 mΩ/Km*
HV - Test, C/C	*1.2 Kv, 1.0 Min.*
HV - Test, C/S	*1. Kv, 1.0 Min.*

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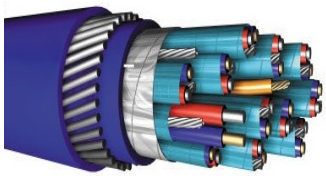
EMPOWERING PROCESS MANAGEMENT

Individual & Overall Shield Armored PVC Multi Pair THERMOCOUPLE EXTENSION CABLES



Armored Thermocouple Extension Wires are used for underground applications as GI wire armoring gives strong mechanical protection. Twisted pairs & aluminum Mylar shield provides protection against cross talk, static & magnetic noise in thermocouple circuits.

APPLICATIONS	PRODUCT FEATURES
• *Industrial Plants*	• *Temperature Range: 90 °C & Rated 300 V*
• *Petrochemicals & Oil Refineries*	• *Flame Retardant*
• *Steel & Power Plants*	• *Sunlight Resistant*

PRODUCT FEATURES	
Conductor	*Solid or stranded thermocouple extension grade wires from 12 AWG to 22 AWG (2.44mm to 0.63mm) as per ASTM E 230 & ANSI 96.1*
Core Insulation	*Flame Retardant PVC with nominal thickness of 0.40mm*
No. of Pair	*2, 4, 6, 8, 16, 20, 24, 36 and more*
Individual Pair Shield	*0.05mm Aluminum Mylar tape with 125% coverage*
Drain Wire	*22 AWG - 7 strands Annealed Tinned Copper wire*
Communication Wire	*22 AWG – 7 strands Tinned Copper wire Orange color PVC Insulated (4 Pair & larger)*
Pair Laying	*Shielded Pairs with communication wire are laid suitably and binded with polyester tape*
Cable Shield	*0.05 mm Aluminum Mylar /polyester tape, 25% overlap*
Drain Wire	*22 AWG - 7 strands of Annealed Tinned Copper Wire.*
Inner Sheath	*Flame Retardant PVC*
Armoring	*GI Round Wire or strip with min. 80% coverage*
Outer Sheath	*Flame Retardant PVC*
Color Coding	*Confirms to ANSI MC 96.1 (International Color Code Available), Refer Table*

- *PVC, HR PVC, FRLS, LSOH, LSZH, HPER etc. Insulation & Outer Jacket as per clients specifications*
- *Optional Color coding: IEC 60584 – 3, BS 1843, DIN 13711, JIS C 1610 – 1981, NFC 42334 as per requirement*

ELECTRICAL CHARACTERISTICS	
IR @ 20°C, 500V, C/C	*> 100 mΩ/Km*
IR @ 20°C, 500V, C/S	*> 50 mΩ/Km*
HV - Test, C/C	*1.2 Kv, 1.0 Min.*
HV - Test, C/S	*1. Kv, 1.0 Min.*

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TYPE OF TC	Metal Alloy +ve leg	Metal Alloy –ve leg	Measuring Temp. Range	Thermal Tolerance
J	*Fe*	*Cu Ni*	*0 °C to 750 °C*	*Standard Tolerance as per ASTM E 230 - ANSI MC 96.1*
K	*Ni Cr*	*Ni Al*	*0 °C to 1000 °C*	*Standard Tolerance as per ASTM E 230 – ANSI MC 96.1*
T	*Cu*	*Cu Ni*	*0 °C to 350 °C*	*Standard Tolerance as per ASTM E 230 - ANSI MC 96.1*
E	*Ni Cr*	*Cu Ni*	*0 °C to800 °C*	*Standard Tolerance as per ASTM E 230 - ANSI MC 96.1*
N	*Ni Cr Si*	*Ni Si*	*0 °C to 1000 °C*	*Standard Tolerance as per ASTM E 230 - ANSI MC 96.1*
R or S	*Cu*	*Cu Ni*	*0 °C to 1600 °C*	*N.A.*
B	*Cu*	*Cu*	*600 °C to 1700 °C*	*N.A. Only for Transition above 100 °C*

- *Initial Calibration tolerance as per IEC 584 & ANSI MC 96.1 up to 200 °C*
- *Thermocouple wires are normally supplied to meet tolerance above 0 °C. If material is reqd. to meet tolerance below 0 °C, the purchaser should clarify the same in Purchase Order. Special selection of material is reqd.*
- *Copper & Copper Nickel alloys can be used for R & S Type Extension Wire.*
- *Copper Vs Copper can be used for B Type Extension Wire for transition below 100 °C*

Initial Calibration Tolerances ***as per ASTM E230 and ANSI MC96.1 for EXTENSION GRADE WIRES***

Tolerance-Reference Junction 0 °C ***(32°F)***

Thermocouple Designation	Temperature Range °C (°F)	Standard Grade Limits °C (°F) whichever is greater	Special Grade Limits °C (°F) Whichever is greater
Jx	0 (32) to 200 (400)	±2.2 (4.0)	------
Kx or Kc	0 (32) to 200 (400)	±2.2 (4.0)	------
Tx	0 (32) to 100 (212)	±1.0 (1.8)	------
Nx or Nc	0 (32) to 200 (400)	±2.2 (4.0)	------
Ex	0 (32) to 200 (400)	±1.7 (3.1)	------
Sc or Rc	0 (32) to 200 (400)	±5.0 (9.0)	------
Bc	0 (32) to 100 (212)	±4.2 (7.6)	------

ORDERING CODE:

Wire Size in SWG/AWG	*Type of Wire*	*Type of TC*	*TC Grade*	*No. of Pairs*	*Insulation*	*Type of Shield*	*Armored*
12 14 16 18 20 22	*Solid* *Stranded*	*J* *K* *T* *E* *N* *R* *S* *B*	*x* *c*	*2* *4* *6* *--* *--* *--* *--* *36*	*HR PVC* *FR PVC* *XLPE*	*IS* *OS*	*A* *U*

Example: ***16 AWG SOLID Kx 4P FR PVC IS OS A*** ***-*** *16 AWG SOLID K TYPE EXTENSION GRADE FR PVC INSULATED & SHEATHED INDIVIDUAL & OVER ALL SHIELD ARMORD THERMOCOUPLE CABLE*

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16, Bhaktinagar Station Plot, Rajkot-360 002. INDIA.
Tel. : +91 281 2480400 URL : www.thermocouplewire.co.in
E-mail : eltecin@gmail.com I sales@thermocouplewire.co.in

eltec

EMPOWERING PROCESS MANAGEMENT

CE JAS-ANZ

CERTIFICATIONS:

RICL ®
Facilitating Businesses for Enhanced Efficiency

Certificate of Registration

This is to certify that

Eltec Cables & Instruments

16, Bhaktinagar Station Plot, Rajkot - 360002 (Gujarat), India.

has been assessed by RICL and found to comply with the requirements of

ISO 9001 : 2015
Quality Management System

For the following activities:

Manufacturer and Exporter of Thermocouple Wires & Cables, RTD Cables, Instrumentation Cables, High Temperature PTFE, Fiber Glass Wires & Cables, Temperature Sensors such as Thermocouple, RTD PT 100 & Thermowell.

This Certificate is Valid from 13/01/2020 Until 12/01/2021

Date of Initial Certification: 13/01/2020
Ist Surveillance on or before: 12/12/2020
IInd Surveillance on or before: 12/12/2021
Certification Valid Until: 12/01/2023

Certificate No.: 20RQ01AH

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

JAS-ANZ

www.jas-anz.org/register

Director
Royal Impact Certification Ltd.
Certificate details entered into JAS-ANZ register on 13/01/2020

623, Tower-B, iThum, Plot No. A - 40, Sector - 62, Noida 201301, India.
www.isointernational.org, info@isointernational.org
Phone : +91 120 4113893
This Certificate can be verified at: www.isointernational.org and www.jas-anz.org

This Certificate remains the property of Royal Impact Certification Limited. Must be returned on request or if certificate is withdrawn. Validity of this certificate is subject to successful surveillance audits. RICL is accredited by JAS-ANZ. URL of Joint Accreditation System of Australia & New Zealand- www.jas-anz.org/register

CERTIFICATIONS:

PROGRESSIVE

PRODUCT CERTIFICATE
EC Attestation of Conformity

ELTEC CABLES & INSTRUMENTS

Address : 16, BHAKTINAGAR STATION PLOT, RAJKOT - 360002, GUJARAT - INDIA.

Is in compliance with Directive
LVD/HVD - 2004/108/EC, 94/9/EC, 2006/95/EC, 2006/42/EC

For The following product

THERMOCOUPLE WIRES,
RTD CABLES,
INSTRUMENTATION CABLES,
HIGH TEMPERATURE PTFE,
FIBER GLASS WIRES & CABLES,
TEMPERATURE SENSORS THERMOCOUPLE,
RTD PT 100.

In accordance with
TCF No. CE/01

The present certificate exclusively refers to the product above identified, in accordance to TCF submitted in PICL. Any Changes or modification implemented on the mentioned Product will not be covered by this certificate.

Registration No.:PICL/CE/1016/8896
Certificate Issue Date: 22.10.2016
1st Surveillance: 10.2017
2nd Surveillance: 10.2018

Certificate Expire Date: 21.10.2021
4th Surveillance: 10.2020
3rd Surveillance: 10.2019

Head of Certificate

CE

This Certificate of Registration is granted subject to the Regulations approved by the Board.
PROGRESSIVE INTERNATIONAL CERTIFICATIONS LTD.
Office 4, 219, Kensington High Street, Kensington, London, W8 6BD, England.
E-mail.: info@picluk.com, Website: www.picluk.com
For current validity of this certificate. Please visit our website

Certificate of Registration

PROGRESSIVE

The Governing Board of
Progressive International Certifications Limited
hereby grant to:

ELTEC CABLES & INSTRUMENTS

Address to which this Certificate refers:

16, BHAKTINAGAR STATION PLOT, RAJKOT - 360002, GUJARAT - INDIA.

RoHS

(Directive - 2011/65/EU)

The certificate of compliance is based on a test procedure or an evaluation of the above-mentioned product. This is to certify that the above-mentioned product is in compliance with the RoHS Directive (2011/65/EU) of the European parliament and commission Decision on the Restriction of the certain Hazardous Substances [Lead (pb); Mercury (Hg); cadmium (cd); Hexavalent chromium (cr); polybrominated biphenyls (pBBs) and polybrominated diphenyl ethers (PBDEs)] in Electrical and Electronic equipment

Approved Scope to which this Certificate refers

THERMOCOUPLE WIRES & CABLES, RTD CABLES, INSTRUMENTATION CABLES, HIGH TEMPERATURE PTFE, FIBER GLASS WIRES & CABLES, TEMPERATURE SENSORS THERMOCOUPLE, RTD PT 100.

Certificate No.: PICL/ROHS/0317/8354
Certificate Issue Date: 02.03.2017
1st Surveillance: 03.2018

Certificate Expire Date: 01.03.2020
2nd Surveillance: 03.2019

Head of Certificate

QM 005

This Certificate of Registration is granted subject to the Regulations approved by the Board.
PROGRESSIVE INTERNATIONAL CERTIFICATIONS LTD.
Prakruti, Plot No. 03, Sector 21 Kharghar, Navi Mumbai - 410210, India.
Ph. +91 8080091139, E-mail.: info@progressiveltd.com, Website: www.progressiveltd.com
For current validity of this certificate. Please visit our website

USE OF ACCREDITATION MARK INDICATES ACCREDITATION IN RESPECT OF THE ACTIVITIES COVERED BY ACCREDITATION INSTITUTE ASSESMENT BODY (EUROPE) CERTIFICATION NUMBER 005

ELTEC CABLES & INSTRUMENTS
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E-mail : eltecin@gmail.com I sales@thermocouplewire.co.in