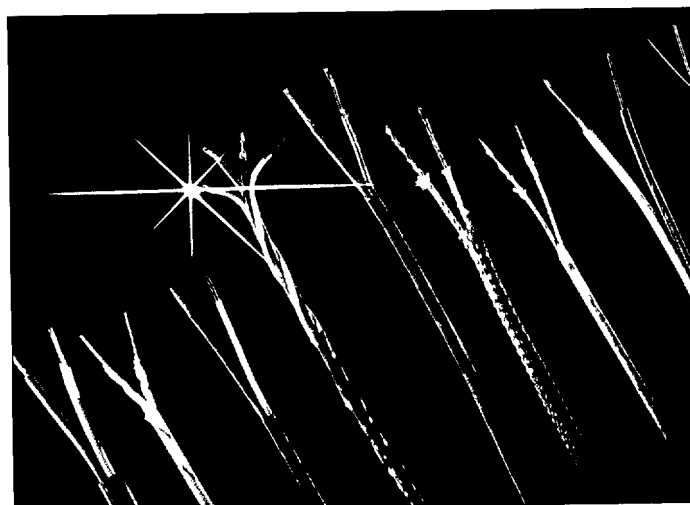


LABFACILITY
TEMPERATURE TECHNOLOGY

BASE METAL THERMOCOUPLE EXTENSION & COMPENSATING WIRES AND CABLES

TEMPERATURE
SENSING

- ◆ Wide range of high quality bare and insulated wires
- ◆ Types E,J,K,N,T,U and Vx
- ◆ Various insulations and configurations
- ◆ Competitive pricing
- ◆ Choice of colour codes BS EN4937 Part 30 1993 (IEC 584-3) or BS1843:1952
- ◆ Large stockholding
- ◆ Special cables available to order
- ◆ Full range of thermocouple connectors available from stock



If the cable you require is not shown – please call our sales department

PVC insulated, “fig 8”



Single pair of solid or stranded conductors, PVC insulated and welded together in fig 8 section
Tolerance class 2
Insulation rating -10 to +105°C

Type (calibration)	Conductor Dimensions				Order Code BS1843:1952	Order Code BS EN4937 pt30.1993 IEC 584-3
	No. of Strands	Strand Ømm	mm ²	SWG		
J	1	0.508	0.210	25	WJ-001	} details on application
K	1	0.508	0.210	25	WK-001	
K	7	0.2	0.219	36	WK-002	
T	1	0.508	0.210	25	WT-001	

PVC insulated, Flat Pair



Single pair of solid or stranded conductors, PVC insulated, laid flat and PVC sheathed
Tolerance class 2
Insulation rating -10 to +105°C

Type (calibration)	Conductor Dimensions				Order Code BS1843:1952	Order Code BS EN4937 pt30.1993 IEC 584-3
	No. of Strands	Strand Ømm	mm ²	SWG		
J	7	0.2	0.219	36	WJ-005	WJ-200
J	13	0.2	0.410	36	WJ-006	*
J	23	0.2	0.671	36	WJ-007	*
K	1	0.508	0.210	25	WK-008	*
K	7	0.2	0.219	36	WK-009	WK-150 ✗
K	13	0.2	0.410	36	WK-010	*
K	23	0.2	0.671	36	WK-011	*
T	7	0.2	0.219	36	WT-008	WT-200 ✗
T	13	0.2	0.410	36	WT-009	WT-201
T	23	0.2	0.671	36	WT-010	*
N	7	0.2	0.219	36	WN-001	WN-100
N	13	0.2	0.410	36	WN-002	*
N	23	0.2	0.671	36	WN-003	*
Vx	7	0.2	0.219	36	WV-008	WV-100
Vx	13	0.2	0.410	36	WV-009	WV-101
Vx	23	0.2	0.671	36	WV-010	*
E	7	0.2	0.219	36	WE-001	*
E	13	0.2	0.410	36	WE-002	*
U	7	0.2	0.219	36	WU-001	WU-099
U	13	0.2	0.410	36	WU-002	WU-100

* details on application

PVC Insulated with Mylar Aluminium Tape Screen



Single pair of stranded conductors, PVC insulated Pair twisted together
Screened with mylar aluminium tapes and bare copper drain wire PVC sheathed
Tolerance class: 2
Insulation rating -10 to +105°C

Type (calibration)	Conductor Dimensions				Order Code BSI843:1952	Order Code BS EN4937 pt30.1993 IEC 584-3
	No. of Strands	Strand Ømm	mm ²	SWG		
J	7	0.2	0.219	36	WJ-009	WJ-241
K	7	0.2	0.219	36	WK-074	WK-359
T	7	0.2	0.219	36	WV-011	*
Vx	7	0.2	0.219	36	WN-029	WV-102
N	7	0.2	0.219	36	WN-016	*

PTFE / PFA Insulated, Flat Pair



Single pair of solid or stranded conductors, PTFE / PFA insulated, laid flat and PTFE / PFA sheathed
Tolerance class: 1
Insulation rating -75 to +250°C
Note: PTFE insulation is wrapped, PFA is extruded. Either supplied according to availability.

Type (calibration)	Conductor Dimensions				Order Code BSI843:1952	Order Code BS EN4937 pt30.1993 IEC 584-3
	No. of Strands	Strand Ømm	mm ²	SWG		
J	7	0.2	0.219	36	WJ-026	*
K	1	0.315	0.078	30	WK-035	WK-300
K	7	0.2	0.219	36	WK-036	WK-302
N	7	0.2	0.219	36	WN-014	*
T	1	0.315	0.078	30	WT-044	*
T	1	0.508	0.210	25	WT-045	*
T	7	0.2	0.219	36	WT-046	WT-330

PTFE / PFA Insulated, Twin Twisted Pair



Single pair of solid or stranded conductors, PTFE / PFA insulated, pair twisted together
Tolerance Class: 1
Insulation rating -75 to 250°C
Note: PTFE insulation is wrapped, PFA is extruded. Either supplied according to availability.

Type (calibration)	Conductor Dimensions				Order Code BSI843:1952	Order Code BS EN4937 pt30.1993 IEC 584-3
	No. of Strands	Strand Ømm	mm ²	SWG		
J	1	0.2	0.032	36	WJ-018	*
J	1	0.315	0.078	30	WJ-019	*
J	1	0.508	0.210	25	WJ-020	*
J	7	0.2	0.219	36	WJ-021	*
K	1	0.2	0.032	36	WK-020	WK-200
K	1	0.315	0.078	30	WK-021	WK-201
K	1	0.508	0.210	25	WK-022	*
K	7	0.2	0.219	36	WK-023	WK-303
T	1	0.2	0.032	36	WT-030	WT-300
T	1	0.315	0.078	30	WT-031	WT-301
T	1	0.508	0.210	25	WT-032	*
T	7	0.2	0.219	36	WT-033	*
N	1	0.2	0.032	36	WN-006	WN-120
N	1	0.315	0.078	30	WN-007	*
E	1	0.508	0.210	25	WE-023	*
U	1	0.2	0.032	36	WU-012	*
U	1	0.508	0.210	25	WU-014	*

PFA Insulated, Single Shot Pair – available to order



Single pair of solid conductors, embedded in circular section extruded PFA
Tolerance Class: 1
Insulation rating -75 to 250°C
Type (calibration) K, J, T

Fine Gauge Wires with PTFE Insulation (50ft Spools)

Thin wall PTFE insulated fine gauge wire (0.003" PTFE wall) Single wires Tolerance class 2 Insulation rating -75 to +250°C

Type	Conductor Dimensions				Order Code ANSI C96	Order Code BS EN4937 pt30.1993 IEC 584-3
	No. of Strands	Strand Ømm	mm²	SWG		
T Cu	1	0.076	0.0046	45	WT-100	*
T Con	1	0.076	0.0046	45	WT-101	*
K NiCr	1	0.076	0.0046	45	WK-100	*
K NiAL	1	0.076	0.0046	45	WK-101	*
T Cu	1	0.127	0.0127	40	WT-102	*
T Con	1	0.127	0.0127	40	WT-103	*
K NiCr	1	0.127	0.0127	40	WK-102	*
K NiAL	1	0.127	0.0127	40	WK-103	*

Glassfibre Insulated, Flat Pair



Single pair of solid or stranded conductors, glassfibre insulated, laid flat and glassfibre braided overall
Impregnated with Silicone varnish
Tolerance class 2
Insulation rating -60 to 350/400°C

Type (calibration)	Conductor Dimensions				Order Code BSI843:1952	Order Code BS EN4937 pt30.1993 IEC 584-3
	No. of Strands	Strand Ømm	mm²	SWG		
J	1	0.2	0.32	36	WJ-031	*
J	1	0.315	0.078	30	WJ-032	WJ-230
J	1	0.508	0.210	25	WJ-033	*
J	7	0.2	0.219	36	WJ-034	WJ-231
J	13	0.2	0.410	36	WJ-035	*
K	1	0.2	0.032	36	WK-040	*
K	1	0.315	0.078	30	WK-041	WK-351
K	1	0.508	0.210	25	WK-042	*
K	1	0.711	0.397	22	WK-043	*
K	7	0.2	0.219	36	WK-044	*
K	13	0.2	0.410	36	WK-045	*
T	1	0.2	0.032	36	WT-055	*
T	1	0.315	0.078	30	WT-056	WT-356
T	1	0.508	0.210	25	WT-057	*
T	7	0.2	0.219	36	WT-058	*
T	13	0.2	0.410	36	WT-059	*
N	1	0.315	0.078	30	WN-011	WN-130
N	7	0.2	0.219	36	WN-013	*

Glassfibre Insulated with Stainless Steel Overbraid



Single pair of stranded conductors, glassfibre insulated, laid flat and glassfibre braided overall
Impregnated with silicone varnish
Overall stainless steel braided
Tolerance class 2
Insulation rating -60 to +350 / 400°C

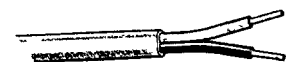
Type (calibration)	Conductor Dimensions				Order Code BSI843:1952	Order Code BS EN4937 pt30.1993 IEC 584-3
	No. of Strands	Strand Ømm	mm²	SWG		
J	7	0.2	0.219	36	WJ-040	WJ-240
J	14	0.2	0.442	36	WJ-042	*
K	7	0.2	0.219	36	WK-075	*
T	7	0.2	0.219	36	WT-070	*
N	7	0.2	0.219	36	WN-015	*
U	7	0.2	0.219	36	WU-032	*

High Temperature Glassfibre Insulated Flat Pair (700°C)

Single pair of solid or stranded conductors, special glassfibre insulated, laid flat and special glassfibre braided overall Tolerance class 2
Insulation rating -60 to +700°C

Type (calibration)	Conductor Dimensions				Order Code BSI843:1952	Order Code BS EN4937 pt30.1993 IEC 584-3
	No. of Strands	Strand Ømm	mm²	SWG		
K	1	0.508	0.210	25	WK-057	*
K	7	0.2	0.219	36	WK-058	*

Ceramic Fibre Insulation (1000°C)



Single pair of solid conductors, ceramic fibre insulated, laid flat and ceramic fibre insulated overall
Tolerance Class 2
Insulation rating -60 to +1000°C

Type (calibration)	Conductor Dimensions				Order Code BSI843:1952	Order Code BS EN4937 pt30.1993 IEC 584-3
	No. of Strands	Strand Ømm	mm²	SWG		
K	1	0.508	0.210	25	WK-081	*

*details on application

Bare Wire Matched Pair

Type (calibration)	Conductor Dimensions				Order Code BS1843:1952	Order Code BS EN4937 pt30.1993 IEC 584-3
	No. of Strands	Strand Ømm	mm ²	SWG		
J	1	0.508	0.210	25	WB-003	*
K	1	0.2	0.032	36	WB-004	*
K	1	0.315	0.078	30	WB-005	*
K	1	0.508	0.210	25	WB-006	*

*details on application

Copper Cables for Use With RTD Sensors

No. of Cores	Conductor Dimensions				Order Code	Insulation / Construction
	No. of Strands	Strand Ømm	mm ²	SWG		
2	19	0.16	0.382	38	WC-012	TEFZEL
2	7	0.2	0.219	36	WC-016	FIBREGLASS + St
						STEEL OVERBRAID
4	7	0.2	0.219	36	WC-015	FIBREGLASS + St
						STEEL OVERBRAID
4	7	0.2	0.219	36	WC-006	PVC + SCREEN
4	7	0.2	0.219	36	WC-007	PVC (NO SCREEN)
4	7	0.2	0.219	36	WC-014	PTFE + SCREEN
4	7	0.2	0.219	36	WC-041	SILICONE RUBBER

Many other RTD cables available – details on application

Insulation Colour Codes

Extension & Compensating Leads

TYPE	CONDUCTORS	+/	British BS1843 1952	IEC584 3 1989, mod BS4937 Part 30 1993	Cable Code
E	NICKEL CHROMIUM/CONSTANTAN (Nickel Chromium/Copper Nickel Chromel/Constantan Ti/Advance NiCr/Constantan)				EX
J	IRON/CONSTANTAN (Iron/Copper Nickel Fe/Konst Iron/Advance Fe/Constantan I/C)				JX
K	NICKEL CHROMIUM/NICKEL ALUMINIUM* (NiCr/Ni Chromel/Alumel, C/A Ti/T2 NiCr/Ni NiCr/NiAl)				KX
N	NICROSIL/NISIL				NX NC
T	COPPER/CONSTANTAN (Copper/Copper Nickel Cu/Con Copper/Advance)				TX
Yx	COPPER/CONSTANTAN (LOW NICKEL) (Cu/Constantan) Compensating for K (Cu/Constantan)				KCB
U	COPPER/COPPER NICKEL Compensating for Platinum 10% or 13% Rhodium/Platinum (Codes S & R respectively) (Copper/Cupronic Cu/CuNi Copper/No 11 Alloy)				RCA SCA

* Magnetic () Alternative & Trade Names for Thermocouple connectors body colours are as outer sheath colours above (2nd column)

Thermocouple Wire

Twin, single conductor, having a temperature / e m f relationship to the appropriate standard over the complete temperature range

Extension Cable

Twin, stranded conductors for connection between measuring thermocouple and instrument (or external reference junction) of the same materials as the thermocouple and having the same e m f / temperature characteristics over a temperature range limited by the insulation material

Compensating Wire or Cable

Twin, single or stranded conductors for connection between measuring thermocouple and instrument (or external reference junction) of different composition from the thermocouple material, but having similar e m f / temperature characteristics over a limited temperature range Types U and Yx in Conductors Table

Connection of Thermocouples to Measuring Instruments

Ordinary copper wires should never be used, as the error will be equal to the difference in temperature between the connecting point of the thermocouple and the instrument (or external reference junction)

Extension or compensating wire or cable must be employed, and it is essential that the same polarity is maintained. If the polarity is reversed, the error is equal to twice the temperature difference between the connecting point of the thermocouple and the instrument (or external reference junction). For maximum accuracy extension cables should be used, and the terminals and connectors should be of thermocouple materials to maintain continuity

Single / Multi-strand

The choice is mainly determined by the application (e.g. termination considerations and internal diameter of associated sheath). Generally, single strand wires are used for hot junctions, and multi-strand for extensions of the thermocouple as being more flexible. The greater the effective conductor diameter, the lower the value of thermocouple loop resistance, an important consideration with long cable runs

Guide to Wire and Cable Insulation and Coverings

For maximum accuracy extension cables should be used and terminals and connectors should be of thermocouple materials to maintain continuity

Which Insulation Material ?	Usable temperature range	Application Notes
PVC	-10°C to 105°C	Good general purpose insulation for "light" environments. Waterproof and very flexible.
PTFE	75°C to 250/300°C	Resistant to oils, acids, other adverse agents and fluids. Good mechanical strength and flexibility.
Glassfibre (varnished)	-60°C to 350/400°C	Good temperature range but will not prevent ingress of fluids. Fairly flexible but does not provide good mechanical protection.
High Temperature	-60°C to 700°C	Will withstand temperature up to 700°C but will not prevent ingress of fluids. Fairly flexible, not good protection against physical disturbance.
Ceramic Fibre	0°C to 1000°C	Will withstand high temperature, up to 1000°C. Will not protect against fluids or physical disturbance.
Glassfibre (varnished) stainless steel over braid	-60°C to 350/400°C	Good resistance to physical disturbance and high temperature (up to 400°C). Will not prevent ingress of fluids.

All information in this brochure is for general guidance and not necessarily definitive.

All dimensions are nominal.

Specifications and availability may be subject to change.

The Labfacility "Thermometry" Wall Chart and Temperature Handbook provide comprehensive data on thermocouple wires and cable and on thermocouple and RTD sensors.

Thermocouple Wire Tolerances

The figures shown in the tables are those appropriate to the measuring junction temperatures in the final column. In most cases the error expressed in degrees Celsius will be larger at lower thermocouple junction temperatures.

Type	Tolerance Class 1	Tolerance Class 2	Cable Temp range	Measuring junction temperature
JX	±85 µV(±1.5°C)	±140 µV(±2.5°C)	-25° to +200°C	500°C
TX	±30 µV(±0.5°C)	±60 µV(±1.0°C)	-25° to +100°C	300°C
EX	±120 µV(±1.5°C)	±200 µV(±2.5°C)	-25° to +200°C	500°C
KX	±60 µV(±1.5°C)	±100 µV(±2.5°C)	-25° to +200°C	900°C
NX	±60 µV(±1.5°C)	±100 µV(±2.5°C)	-25° to +200°C	900°C
KCA	—	±100 µV(±2.5°C)	0° to +150°C	900°C
KCB	—	±100 µV(±2.5°C)	0° to +100°C	900°C
NC	—	±100 µV(±2.5°C)	0° to +150°C	900°C
RCA	—	±30 µV(±2.5°C)	0° to +100°C	1000°C
RCB	—	±60 µV(±5.0°C)	0° to +200°C	1000°C
SCA	—	±30 µV(±2.5°C)	0° to +100°C	1000°C
KCA	—	±60 µV(±5.0°C)	0° to +200°C	1000°C

Notes 1 Cable temperature range may be restricted to figures lower than those shown in the table because of temperature limitations imposed by the insulant.

2 A cable comprising two copper conductors may be used with type B thermocouples. The expected maximum additional deviation within the cable temperature range 0°C to +100°C is 40 µV. The equivalent in temperature is 3.5°C when the measuring junction of the thermocouple is at 1400°C.



Teddington Certificate No 4746



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