THERMO-AND COMPENSATING CABLES

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CONTENTS

Materials and manufacturing methods of thermocouple, extention and compensating cables

Conductor materials:
Thermocouples, extension and compensating materials according to national and international standards e.g. DIN IEC 584, DIN 43710/13/14, ANSI, NFC, BS, GOST, JIS, alloys according to customers` specifications

Conductor cross sections:
0,14 up to 2,5 mm2, solid or stranded

Insulation- and sheath materials:
- Fluoropolymers: PTFE, FEP, ETFE, PFA, MFA, PVDF, ECTFE
- SiR: standard compounds and compounds according to customers' requirements
- Elastomers: EPDM, EVM, ACM, HNBR, CSM, FPM, CR, CM, XVH
- Thermoplastic elastomers (TPE - E, -O, -U, -V)
- Special thermoplastics: PEI, PEEK, PEI/SIR
- Thermoplastics: PVC, LDPE, HDPE, PP, PA
- Inorganic materials: glass fibre, mica, ceramic fibre
- Organic Materials: Kevlar®

Twisting:
2 to 120 cores in layers as well as pair twisting

Screen materials:
- Cu bare, tp, sp, np, braids and servings
- wrappings with different foil materials with drain wires (longitudinal or wound)

Foil wrappings:
PTFE, polyester-, aluminium-, copper cladded aluminium-, copper- and Kapton®-foils

Armourings:
Braids of galvanized steel wire or stainless steel wire

Specifications:
DIN IEC 584, DIN 43710/13/14, ANSI MC 96.1-1982, NFC 42-324, BS 4937, GOST, JIS, 1610 etc.

Applications:
Chemical industry, sensors, temperature measuring technology etc.

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Thermocouples according to DIN, ANSI, NFC — **(DIN) IEC 584**

type	class 1		class 2		class 3	
	temperature range	tolerance	temperatur range	tolerance	temperature range	tolerance
T	- 40 up to + 350 °C	± 0,5 °C or 0,4 %	- 40 up to + 350 °C	± 1,0 °C or 0,75 %	- 200 up tos + 40 °C	± 1,0 °C or 1,5 %
J	- 40 up to + 750 °C	± 1,5 °C or 0,4 %	- 40 up to + 750 °C	± 2,5 °C or 0,75 %	—	—
K	- 40 up to + 1000 °C	± 1,5 °C or 0,4 %	- 40 up to + 1200 °C	± 2,5 °C or 0,75 %	- 200 up to + 40 °C	± 2,5 °C or 1,5 %
E	- 40 up to + 800 °C	± 1,5 °C or 0,4 %	- 40 up to + 900 °C	± 2,5 °C or 0,75 %	- 200 up to + 40 °C	± 2,5 °C or 1,5 %
N	- 40 up to + 1000 °C	± 1,5 °C or 0,4 %	- 40 up to + 1200 °C	± 2,5 °C or 0,75 %	- 200 up to + 40 °C	± 2,5 °C or 1,5 %

Thermocouples according to DIN, ANSI, NFC — **ANSI MC 96.1-1982**

type	temperature range	standard	special
T	0 up to 350 °C	± 1,0 °C or 0,75 %	0,5 °C or 0,4 %
J	0 up to 750 °C	± 2,2 °C or 0,75 %	1,1 °C or 0,4 %
K	0 up to 1250 °C	± 2,2 °C or 0,75 %	1,1 °C or 0,4 %
E	0 up to 900 °C	± 1,7 °C or 0,50 %	1,0 °C or 0,4 %

Thermocouples according to DIN, ANSI, NFC — **NFC 42-324**

type	class 1		class 2		class 3	
	temperature range	tolerance	temperature range	tolerance	temperature range	tolerance
T	- 40 up to 350°C	± 0,5 °C or 0,4 %	- 40 up to + 350 °C	± 1,0 °C or 0,75 %	- 200 up to + 40 °C	± 1,0 °C or 2 %
J	- 40 up to 750°C	± 1,5 °C or 0,4 %	- 40 up to + 750 °C	± 2,5 °C or 0,75 %	—	± 2,5 °C or 2 %
K	- 40 up to + 1000 °C	± 1,5 °C or 0,4 %	- 40 up to + 1000 °C	± 2,5 °C or 0,75 %	- 200 up to + 40 °C	± 2,5 °C or 2 %
E	- 40 up to + 800 °C	± 1,5 °C or 0,4 %	- 40 up to + 900 °C	± 2,5 °C or 0,75 %	- 200 up to + 40 °C	± 2,5 °C or 2 %

Thermocouples according to DIN, ANSI, NFC — **DIN 43710/1985**

type	temperature range	
U	0 up to + 400 °C ± 3 °C	+ 400 up to + 600 °C ± 0,75 %
L	0 up to + 700 °C ± 3 °C	+ 700 up to + 900 °C ± 0,75 %

Thermocouple cables according to DIN, ANSI, NFC — (DIN) IEC 584

type	temperature range	tolerance class	
		1	2
TX	- 25 up to + 100 °C	± 30 µV (± 0,5 °C)	± 60 µV (± 1,0 °C)
JX	- 25 up to + 200 °C	± 85 µV (± 1,5 °C)	± 140 µV (± 2,5 °C)
KX	- 25 up to + 200 °C	± 60 µV (± 1,5 °C)	± 100 µV (± 2,5 °C)
EX	- 25 up to + 200 °C	± 120 µV (± 1,5 °C)	± 200 µV (± 2,5 °C)
NX	- 25 up to + 200 °C	± 60 µV (± 1,5 °C)	± 100 µV (± 2,5 °C)

Thermocouple cables according to DIN, ANSI, NFC — ANSI MC 96.1 - 1982

type	temperature range	standard	special
TX	0 up to + 100 °C	± 1,0 °C	± 0,5 °C
JX	0 up to + 200 °C	± 2,2 °C	± 1,1 °C
KX	0 up to + 200 °C	± 2,2 °C	—
EX	0 up to + 200 °C	± 1,7 °C	—

Thermocouple cables according to DIN, ANSI, NFC — NFC 42-324

type	temperature range	tolerance
TX	- 25 up to + 250 °C	± 0,5 °C
JX	- 25 up to + 250 °C	± 1,5 °C
KX	- 25 up to + 250 °C	± 1,5 °C
EX	- 25 up to + 250 °C	± 1,5 °C

Compensating cables according to DIN and NFC **(DIN) IEC 584**

type	temperature range	tolerance (class B)
KCB	0 up to + 100 °C	± 100 µV (± 2,5 °C)
KCA	0 up to + 150 °C	± 100 µV (± 2,5 °C)
NC	0 up to + 150 °C	± 100 µV (± 2,5 °C)
RCA/SCA	0 up to + 100 °C	± 30 µV (± 2,5 °C)
RCB/SCB	0 up to + 200 °C	± 60 µV (± 5,0 °C)

Compensating cables according to DIN and NFC **NFC 42-324**

type	temperature range	tolerance
TC	- 25 up to + 100 °C	± 1 °C
JC	- 25 up to + 250 °C	± 3 °C
EC	- 25 up to + 250 °C	± 3 °C
KC	- 25 up to + 200 °C	± 3 °C
VC	- 25 up to + 100 °C	± 3 °C
WC	- 25 up to + 200 °C	± 3 °C
SC	- 25 up to + 200 °C	± 7 °C
BC	- 25 up to + 200 °C	± 4 °C

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Colour code of Thermocouple Exten

Symbol of couple	Material combinations +	-	DIN IEC 584 [1] DIN 43722 / DIN EN 60584 DIN 43714 draft 7/90	DIN 43710 [4] / 43713 [4] / 43714 [4]
			Colour code Ext.	Comp.	Colour code Ext.	Comp.
T	Cu	Cu Ni	TX -25°C to +100°C		
U	Cu	Cu Ni			UX [2] 0°C to +200°C	
J	Fe	Cu Ni	JX -25°C to +200°C		
L	Fe	Cu Ni			LX 0°c to +200°C	
E	NiCr	Cu Ni	EX -25°C to +200°C		
K	NiCr	Ni	KX -25°C to +200°C		KX -25°C to +200°C	
	Fe	Cu Ni		KCA 0°C to +150°C	3)	SoNiCr-SoNi 0° to +200°C
	Cu	Cu Ni		KCB 0°C to +100°C		
N	NiCrSi	Ni Si	NX -25°C to +200°C	NC 0°C to +150°C		
R S	Pt13Rh Pt10Rh	Pt Pt	A 0°C to +100°C B 0°C to +200°C	SCA/RCA SCB/RCB	3)	≙ DIN IEC (SoPtRh-SoPt0°C to +200°C)
B	Pt30Rh	Pt6Rh	2)	BC 0°C to +100°C		

1)DIN IEC 584-Issue 92
2)To DIN 43710/85
3)Sequenzes SoNiCr ao will be replaced according to DIN 43713 draft 8/91 ≙ DIN IEC 584

4)Standard was cancelled
Cables for intrinsecally safe circuits can wear blue sheats in accordance with thermocouple stripes

sion and Compensating cables

ANSI MC 96.1		BS 4937		NF C 42-324	
Colour code		**Colour code**		**Colour code**	
Ext.	**Comp.**	**Ext.**	**Comp.**	**Ext.**	**Comp.**
TX 0°C to +100°C		TX 0°C to +100°C		TX -25°C to +250°C	TC -25°C to +100°C
JX 0°C to +200°C		JX 0°C to +200°C		JX -25°C to +250°C	JC -25°C to +250°C
EX 0°C to +200°C		EX 0°C to +200°C		EX -25°C to +250°C	EC -25°C to +250°C
KX 0°C to +200°C		KX 0°C to +200°C		KX -25°C to +250°C	KC -25°C to +200°C
					WC -25°C to +200°C
			VX 0°C to +100°C		VC -25°C to +100°C
	SX 0°C to +200°C		SX 0°C to +200°C		SC -25°C to +200°C
	BX 0°C to +100°C				BC -25°C to +200°C

KX Thermocouple Extension
KPX ≙positive conductor for THL KX
KNX≙negative conductor for THL KX

KCA Compensating cables
KPCA≙positive condoctor for AGL KC
KPCA≙negative conductor for AGL KC
(A≙0/+100°C)

UL- and CSA-approved cables

With increasing globalization the combination of national and international approvals becomes more and more important. In order to distribute products worldwide it is imperative to employ an international standard, not only in the field of domestic appliances.

In our particular case it is not sufficient to offer cables and wires with only one national approval (e.g. VDE). Each cable should meet the requirements of several national and international standards. (e.g. combination of UL-, CSA-, and VDE-approvals).

HEW-KABEL/CDT offers a wide range of products approved by the following bodies:

It is not possible to list all combinations in this catalogue. Therefore please send us your detailed inquiries.

On the following pages we provide an overview of the currently available UL- and CSA-approvals. Those are continuously updated and extended.

For further information about approved cables please refer to the corresponding product group.