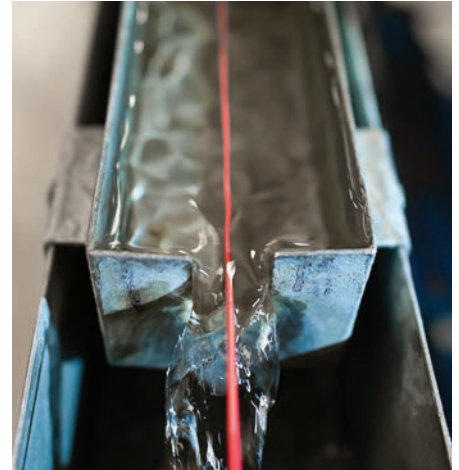
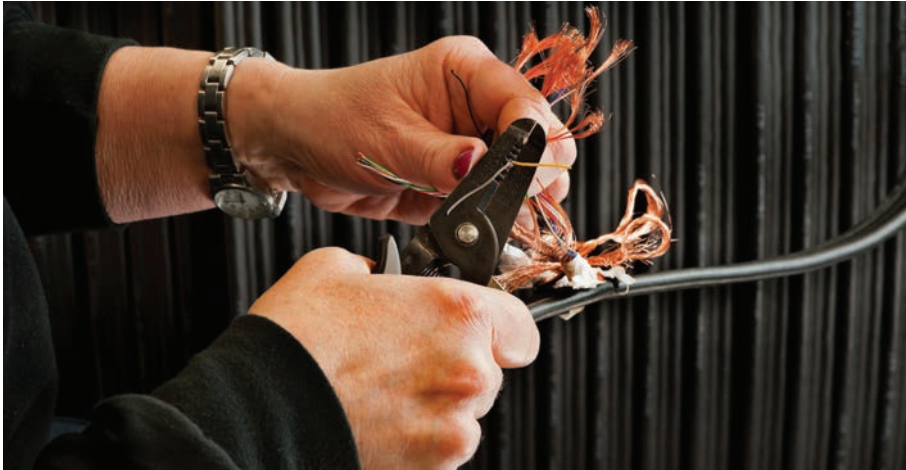


Habia Cable



Habiatherm
Cables for temperature sensing applications

Contents			Page	
Habiatherm	Cable descriptions (new)	Extension and compensation cables	3	
	Cable descriptions (old)	Extension and compensation cables	4	
	Habiatherm	National and international colour codes	5	
	Habiatherm HT3	PTFE / PFA	Multi core cables, unshielded	6
			Multi core shielded cables	7
	Habiatherm PT 100	ETFE / ETFE	Multi core shielded cables	8
	ETFE	PT100 Insulation and sheath	Material information	9
	PFA	HT3 Sheath	Material information	10
	PTFE	HT3 Insulation	Material information	11

Introduction

Thermocouples are widely used to measure temperature. This works on the thermoelectric effect; whereby a metal will generate a voltage when heated. By taking the differential voltage generated when two different metals in the same circuit are heated it is possible to measure changes in temperature as a change in voltage.

In order to get an accurate measurement, expensive metals are commonly used within the temperature probe itself. For long cable runs however, the cost of these metals becomes prohibitive and for that reason Habia Cable manufacture a range of extension and compensation cables. As standard, Habia Cable offers Class 1 thermocouples which provide the tightest tolerance and most accurate measurements.

Thermocouple cables are split into two different types:

Extension cables

Extension cables exhibit the same voltage and temperature characteristics as the thermocouple over a limited range. By using similar metals to the thermocouple they have the advantage of minimising any mismatch in the circuit. The standard types supplied by Habia Cable are:

- EX uses a Nickel Chromium (Chromel) positive leg with a Copper Nickel (Constantan) negative leg for measurements with a tolerance of $\pm 120\mu\text{V}$ (Class 1) or $\pm 200\mu\text{V}$ (Class 2).
- JX uses an Iron positive leg with a Copper Nickel (Constantan) negative leg for measurements with a tolerance of $\pm 85\mu\text{V}$ (Class 1) or $\pm 140\mu\text{V}$ (Class 2).
- KX uses a Nickel Chromium (or Chromel) positive leg with a Nickel Aluminium (Alumel) negative leg. Some standards allow for the use of a simple Nickel leg to be used as the negative for measurements with a tolerance of $\pm 60\mu\text{V}$ (Class 1) or $\pm 100\mu\text{V}$ (Class 2).
- NX uses a Nickel Chromium Silicone (Nicrosil) positive leg with a Nickel Silicone (NiSil) negative leg for measurements with a tolerance of $\pm 60\mu\text{V}$ (Class 1) or $\pm 100\mu\text{V}$ (Class 2).
- TX uses a Copper positive leg with a Copper Nickel (Constantan) negative leg for measurements with a tolerance of $\pm 30\mu\text{V}$ (Class 1) or $\pm 60\mu\text{V}$ (Class 2).

Compensation cables

Compensation cables also exhibit similar voltage and temperature characteristics as the thermocouple over a limited range and they offer a cost saving over both the thermocouple and extension cables; however as they use dissimilar metals they are less precise than the extension cables:

- KCB uses a Copper positive leg with Copper Nickel (Constantan) negative leg for measurements with a tolerance of $\pm 100\mu\text{V}$ (Class 2 only).
- RCS/SCA uses a Copper positive leg with Copper Nickel (Constantan) negative leg for measurements with a tolerance of $\pm 30\mu\text{V}$ (Class 2 only).

An alternative solution is to use a resistance measurement cable:

Resistance measurement cables

- PT100 uses plated copper cores and operates on the principle that electrical resistance changes with temperature. Most electrical conductors have a positive temperature coefficient resulting in increased resistance as the temperature increases.

As a custom design cable manufacturer, Habia is able to offer from a wide range of materials as Habiatherm cables. We are also able to combine Habiatherm components within other multicore cables as composites, reducing the need for multiple cable runs. Although there are many combinations that can be produced, typical extension or compensation cables are twin core (positive and negative) cables with stranded conductors. Habia will endeavour to propose a design that lines up with an existing standard such as NEMA-HP3 for PTFE wires, however it is also possible for custom sizes to be used.

Photo credit (cover): The Stahl-Zentrum Dusseldorf

Habiatherm Extension and compensation cables

Habiatherm

Habiatherm

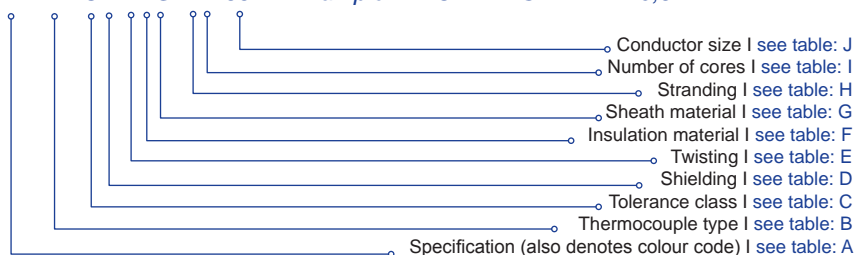
Additives...

The most essential factor when measuring temperature is accuracy. Therefore there are three different standard classes for the conductors:

- Class 1 conductors offer the best measuring range for high temperature measurement.
- Class 2 conductors offer a lower cost, but cannot measure over such a tight temperature range.
- Class 3 conductors are the suitable option for low temperature measuring.

Cable descriptions for custom design (new)

AAA BB-C DEFG-H IxJJ Example: IEC-KX-1 STEK-K 2x0,5



Cable description options (old)		
Specification (A)		
National or international standard		e.g. IEC, BS, DIN, ANSI, JISC
Thermocouple type (B)		
EX		NiCr / CuNi
JX		Fe / CuNi
KX		NiCr / Ni
NX		NiCrSiil / NiSi
TX		Cu / CuNi
SX		E-Cu / S-Cu
Tolerance class (C)		
1		
2		
3		
Shielding (D)		
Shielded		S
Un-shielded		U
Twisting (E)		
Twisted		T
Flat		F
Insulation material (F)		
Habia material references apply	refer to material information section for details	(e.g. PTFE = E, FEP = K,)
Sheathing material (G)		
Habia material references apply	refer to material information section for details	(e.g. PTFE = E, FEP = K,)
Stranding (H)		
Many-stranded conductor (e.g. 19 strands)		Many-stranded conductor (e.g. 19 strands)
Lesser-stranded conductor (e.g. 7 strands)		Lesser-stranded conductor (e.g. 7 strands)
Solid conductor		Solid conductor
Number of cores (I)		
Cores		#x (e.g. 1 pair = 2x)
Pairs		2x #x (e.g. 2 pairs = 2x 2x)
Conductor size (J)		
AWG		## (e.g. 18 AWG = 18)
Cross-sectional area		#,# (e.g. 0,5sqmm = 0,5)

Additives...

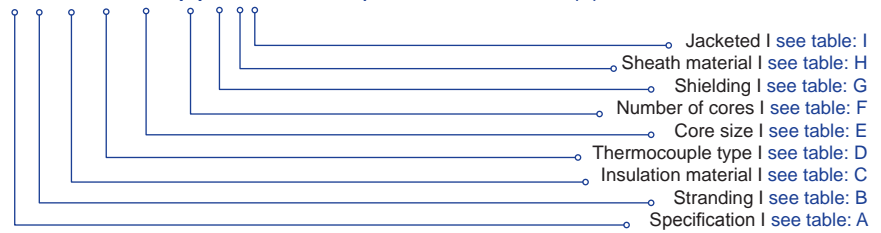
When Habia acquired Isotec GmbH, Habia adopted the existing Isotec numbering for thermocouple cable types to simplify the transition for our customers.

Since both companies had long histories of producing thermocouple cables it is for this reason that both cable descriptions have been in use and may be found throughout Habia designs.

Both description methods are equally valid.

Cable descriptions for custom design (old)

AAB CC D EEE (F) GHJ Example: *THL 5Y K 0,5 (2) SFJ*



Cable description options (old)		
Specification (A)		
Extension cable		TH
Compensation cable		AG
Conductor stranding (B)		
Stranded conductor		L
Solid conductor		D
Insulation material (C)		
Historical Isotec material references apply	PTFE	5Y
	FEP	6Y
	ETFE	7Y
	TWI 205	8Y
	PFA	PFA
	RV	RV
Thermocouple type (D)		
E		NiCr / CuNi
J		Fe / CuNi
K		NiCr / Ni
N		NiCrSi / NiSi
T		Cu / CuNi
S		E-Cu / S-Cu
Core size (E)		
AWG		## (e.g. 18 AWG = 18)
Cross-sectional area		#.# (e.g. 0,5sqmm = 0,5)
Arrangement (F)		
Cores		(#) (e.g. 1 pair = (2))
Pairs		(# x #) (e.g. 2 pairs = 2x2)
Un-twisted (flat) pairs		(# fl) (e.g. 2 cores = (2fl))
Braiding material (G)		
Tin Plated Copper		T
Silver Plated Copper		S
Nickel Plated Copper		N
Stainless Steel		V
Aluminium foil		A
Jacket material (H)		
Historical Isotec material references apply	PTFE	T
	FEP	F
	ETFE	Z
	PFA	P
	HFR 150	Si
	TWI 205	K
Jacketed (I)		
Jacketed		J
Un-jacketed		(blank if no jacket required)

Habiatherm National and international colour codes

Habiatherm

Habiatherm

Additives...

Some older and customer-specific colour codes are still in circulation that can appear to be contradictory to established standards.

Of particular note is an old KX type where the colours for positive and negative are reversed (White for positive and Green for negative) compared to the international specification: IEC 60584.3.

Standards

There are many national and international standards that cover the supply of thermocouple extension and compensation cables.

As standard practice, Habia Cable will recommend the use of the International Standard: IEC 60584.3: 1989, however the company also recognises the British, German, American and Japanese standards and these colour codes can be produced at no extra cost and as always, Habia Cable is able to design and build customized cables with colours to our customer's request.

Colour coding														
Extension Cables	International IEC 60584.3: 1989		British BS 1843		German DIN 43714		American ANSI MC96.1		Japanese JISC 1601					
EX (NiCr / CuNi)	Violet +	White -	Brown +	Blue -	Red +	Black -	Violet +	Red -	Red +	White -				
JX (Fe / CuNi)	Black +	White -	Yellow +	Blue -	Red +	Blue -	White +	Red -	Red +	White -				
KX (NiCr / NiAl)	Green +	White -	Brown +	Blue -	Red +	Green -	Yellow +	Red -	Red +	White -				
NX (NiCrSiI / NiSiI)	Pink +	White -	Orange +	Blue -	N/A		Orange +	Red -	N/A					
TX (Cu / CuNi)	Brown +	White -	White +	Blue -	Red +	Brown -	Blue +	Red -	Red +	White -				
KCB (Cu / CuNi)	Green +	White -	White +	Blue -	Red +	Green -	Brown +	Red -	Red +	White -				
RCA / SCA (Cu / CuNi)	Orange +	White -	White +	Blue -	Red +	White -	Black +	Red -	Red +	White -				

Habiatherm

Habiatherm

Multi core cable, unshielded

Temperature	-65°C to +260°C
Voltage	600/1000V AC
Test voltage	3000V AC
Flame retardant	IEC 60332-3
Smoke generation	IEC 61034-2

IEC 60584.3: 1989

Construction

Conductor	EX: Nickel Chromel (+) and Copper Nickel (-) JX: Iron (+) and Copper Nickel (-) KX: Nickel Chromel (+) and Nickel Alumel (-)	Insulation	PTFE
Shield	-	Sheath	PFA

Identification (IEC 60584.3: 1989)

Marking: TYPE TC CORES x SIZE SCREEN ORDER REFERENCE YEAR-WEEK
(e.g. Habiatherm HT3 EX 2x 0,22 700044725 2012-W39)

Application

Intended to meet extreme environments where temperature and / or fluid resistance is of critical importance. Habiatherm HT3 cables can be produced in a wide range of sizes, combination of cores and screening options.

Description	Construction							Electrical amps at 40°C max	NSN	Order reference
	no. / size CSA	conductor Ø	insulation Ø	cabled Ø	shield (s) Ø	sheath (s) Ø	weight g/m			
HT3 EX 2x0,22	2x 0,22	0,60	1,10	2,2	-	2,7	11	-	-	700044725
HT3 EX 2x1,2	2x 1,23	1,42	2,08	4,2	-	4,9	43	-	-	700044727
HT3 JX 2x0,22	2x 0,22	0,60	1,10	2,2	-	2,7	11	-	-	700044728
HT3 JX 2x1,2	2x 1,23	1,42	2,08	4,2	-	4,9	41	-	-	700044729
HT3 KX 2x0,22	2x 0,22	0,60	1,10	2,2	-	2,7	11	-	-	700044730
HT3 KX 2x0,5	2x 0,50	0,95	1,45	2,9	-	3,4	18	-	-	700044731
HT3 KX 2x0,75	2x 0,75	1,10	1,65	3,3	-	3,8	25	-	-	700044732
HT3 KX 2x1,2	2x 1,23	1,42	2,03	4,1	-	4,8	41	-	-	700044733

Other designs are available for this part of the standard and will be incorporated on an on-going basis - should you require an item that is not included within this table, please contact one of our sales offices.

Cable Construction									
EX	JX	KX	-	-	-	-	-	-	-

Habiatherm HT3 (PTFE / PFA)

600V / 260°C

Habiatherm

Habiatherm

Multi core cable, screened

Temperature	-65°C to +260°C
Voltage	600/1000V AC
Test voltage	3000V AC
Flame retardant	IEC 60332-3
Smoke generation	IEC 61034-2

IEC 60584.3: 1989

Construction

Conductor	EX: Nickel Chromel (+) and Copper Nickel (-) JX: Iron (+) and Copper Nickel (-) KX: Nickel Chromel (+) and Nickel Alumel (-)	Insulation	PTFE
Shield	-	Sheath	PFA

Identification (IEC 60584.3: 1989)

Marking: TYPE TC CORES x SIZE SCREEN ORDER REFERENCE YEAR-WEEK
(e.g. Habiatherm HT3 EX 2x 0,22 (Screen) 700044734 2012-W39)

Application

Intended to meet extreme environments where temperature and / or fluid resistance is of critical importance. Habiatherm HT3 cables can be produced in a wide range of sizes, combination of cores and screening options.

Description	Construction							Electrical amps at 40°C max	NSN	Order reference
	no. / size CSA	conductor Ø	insulation Ø	cabled Ø	shield (s) Ø	sheath (s) Ø	weight g/m			
HT3 EX 2x0,22 (Screen)	2x 0,22	0,60	1,10	2,2	2,7	3,2	19	-	-	700044734
HT3 EX 2x1,2 (Screen)	2x 1,23	1,42	2,08	4,1	4,6	5,3	56	-	-	700044735
HT3 JX 2x0,22 (Screen)	2x 0,22	0,60	1,10	2,2	2,7	3,2	19	-	-	700044736
HT3 JX 2x1,2 (Screen)	2x 1,23	1,42	2,08	4,1	4,6	5,3	56	-	-	700044737
HT3 KX 2x0,22 (Screen)	2x 0,22	0,60	1,10	2,2	2,7	3,2	19	-	-	700044738
HT3 KX 2x0,5 (Screen)	2x 0,50	0,95	1,45	2,9	3,4	3,9	29	-	-	700044739
HT3 KX 2x0,75 (Screen)	2x 0,75	1,10	1,65	3,3	3,8	4,3	35	-	-	700044740
HT3 KX 2x1,2 (Screen)	2x 1,23	1,42	2,03	4,1	4,6	5,3	54	-	-	700044741

Other designs are available for this part of the standard and will be incorporated on an on-going basis - should you require an item that is not included within this table, please contact one of our sales offices.

Cable Construction									
EX	JX	KX	-	-	-	-	-	-	-

Habiatherm

Habiatherm

Multi core cable, unscreened

Temperature	-65°C to +155°C
Voltage	600/1000V AC
Test voltage	3000V AC
Flame retardant	IEC 60332-3
Smoke generation	IEC 61034-2

IEC 60584.3: 1989

Construction

Conductor	Tin Plated Copper (TPC)	Insulation	ETFE
Shield	Braid of Tin Plated Copper (T)	Sheath	ETFE

Identification (IEC 60584.3: 1989)



Marking: TYPE CORES x SIZE VOLTAGE SCREEN ORDER REFERENCE YEAR-WEEK
 (e.g. Habiatherm PT100 4x 0,22sqmm 600V S 7000443269 2012-W39)

Application

PT100 resistance thermometers operate on the principle that electrical conductor resistance changes with temperature.

Description	Construction							Electrical amps at 40°C max	NSN	Order reference
	no. / size CSA	conductor Ø	insulation Ø	cabled Ø	shield (s) Ø	sheath (s) Ø	weight g/m			
PT100 4x 0,22 STZZ	4x 0,22	0,60	0,91	2,2	2,7	3,2	23	7	-	700044326
PT100 4x 0,5 STZZ	4x 0,50	0,88	1,44	3,5	4,0	4,7	44	11	-	700044327
PT100 8x 0,22 STZZ	8x 0,22	0,60	0,91	3,5	4,0	4,7	46	5	-	700044328
PT100 8x 0,5 STZZ	8x 0,50	0,88	1,44	5,5	6,1	6,8	92	9	-	700044330

Other designs are available for this part of the standard and will be incorporated on an on-going basis - should you require an item that is not included within this table, please contact one of our sales offices.

Cable Construction									
4x	8x								
									

Key properties

Chemicals	(Acids) (Bases) (Fuels) (Oils)	Excellent Excellent Excellent Excellent
Flame retardant		
Low smoke generation		
Mechanically resistant		

Insulation, inner & outer sheath

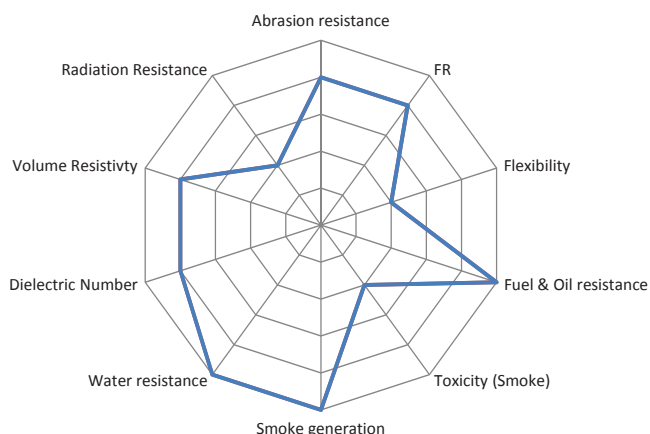
Applications

Used extensively in both military and industrial applications as a thin-wall material suitable for both insulation and jacketing.

Properties

ETFE is a tough material with excellent tear strength, good tensile strength with moderate stiffness, outstanding impact strength and a good flex-life. ETFE has a broad and useful temperature range and retains remarkable toughness at very low temperatures. Embrittlement temperature is below -100°C with a normal, operational -65°C. At high temperatures ETFE passes some of the most severe flame tests. The chemical resistance of ETFE is all but unsurpassed by other insulation and sheathing materials.

Properties		Results			
Test		Method	Conditions		Value
Physical and mechanical	Continuous service temperature	IEC 60216	20,000 hrs		+155°C
	Density	ASTM D792	-		1.7 g/cm ³
	Elongation at break	IEC 60811-1-1	50mm/min		250%
	Hardness	ASTM D2240	Shore D		67
	Radiation resistance	IEC 60544	-		10 ⁵ Gy
	Temperature range	Internal	-		-100°C +155°C
	Tensile strength at break	IEC 60811-1-1	50mm/min		>35 MPa
Electrical	Water absorption	ASTM D570	25°C		< 0.01%
	Dielectric constant	ASTM D150	0.1 kHz	10 MHz	2.6 2.6
	Dielectric strength	-	-		-
	Dissipation factor	ASTM D150	1.2 kHz	10 MHz	0.001 0.004
	Volume resistivity	Internal	25°C	90°C	10 ¹⁶ Ω/cm 10 ¹⁶ Ω/cm
Flammability	Combustion corrosivity	DIN 57472-813	-		pH 2.6 / 2700uS/cm
	Flammability	UL 94	1.6mm		V-0
	Flame retardancy	-	-		-
	Oxygen index	ASTM D2863	-		31%
	Smoke density	ASTM E662	Flaming	Non-flaming	300 20
	Smoke index	Def Stan 61-12 Pt 18/2	per m wire		1
	Temperature index	NES 715	-		290°C
	Toxicity index	Def Stan 61-12 Pt 18/2	per m wire		5



Available colours					
Black	Brown	Red	Orange	Yellow	Green
Blue	Violet	Grey	White	Pink	Natural

Key properties

Chemicals	(Acids) (Bases) (Fuels) (Oils)	Excellent Excellent Excellent Excellent
Abrasion resistant		
Flame retardant		
Low smoke generation		
Mechanically tough		

Insulation, inner & outer sheath

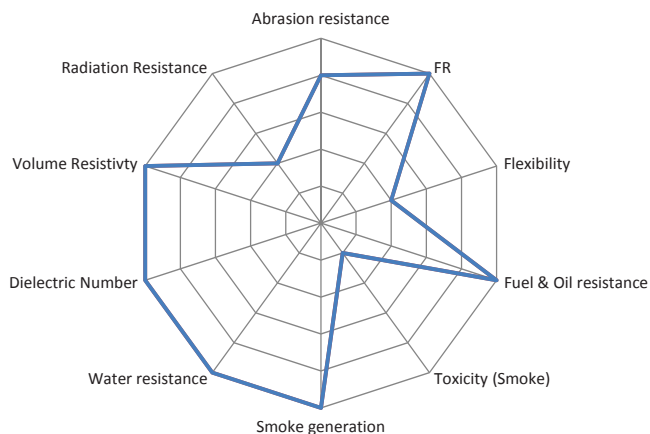
Applications

PFA is used for many high temperature industrial applications such as gas turbines. With many of the same performance properties as PTFE, it is often used as the overall sheath material for PTFE insulated multicore cables. The extrusion properties of PFA allow it to be used in larger sizes and for longer lengths than PTFE.

Properties

PFA shares the excellent electrical and mechanical performance of PTFE with the added advantage of being easily and conventionally extruded. PFA has the lowest out-gassing properties of any Habia material with a total mass loss of just 0.01%. It is suitable for use from -200°C in a fixed application or -65°C up to +200°C in dynamic use.

Properties		Results			
Test		Method	Conditions		Value
Physical and mechanical	Continuous service temperature	Internal	-		+260°C
	Density	ASTM D 792	-		2.15 g/cm ³
	Elongation at break	ASTM D 638	-		300%
	Hardness	ASTM D 2240	Shore D		60
	Radiation resistance	IEC 60544	-		10 ⁴ Gy
	Temperature range	Internal	-		-200°C +260°C
	Tensile strength at break	ASTM D 638	-		28 MPa
	Water absorption	ASTM D 570	25°C		<0.01%
Electrical	Dielectric constant	ASTM D 150	0.1 kHz	10 MHz	2.1 2.1
	Dielectric strength	ASTM D 149	0.25mm film	3.2mm sheet	>80 kV/mm 20 kV/mm
	Dissipation factor	ASTM D 150	0.1 kHz	10 MHz	0.0001 0.0003
	Volume resistivity	ASTM D 257	-		10 ¹⁸ Ω/cm
Flammability	Combustion corrosivity	DIN 57472-813	-		pH 2.3 / 2700 uS/cm
	Flammability	UL 94	1.6mm		V-0
	Flame retardancy	-	-		-
	Oxygen index	ASTM D 2863	-		>95%
	Smoke density	ASTM E662	Flaming	Non-flaming	<10 <10
	Smoke index	-	-		-
	Temperature index	NES 715	-		>400°C
	Toxicity index	-	-		-



Available colours					
Black	Brown	Red	Orange	Yellow	Green
Blue	Violet	Grey	White	Pink	Natural

Key properties

Chemicals	(Acids) (Bases) (Fuels) (Oils)	Excellent Excellent Excellent Excellent
Abrasion resistant		
Flame retardant		
Low smoke generation		
Mechanically tough		

Insulation, inner & outer sheath

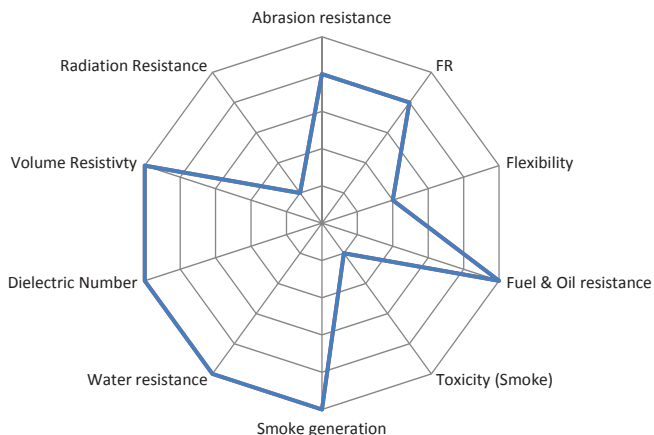
Applications

PTFE is extensively used in a wide variety of applications. Particularly suited to datacoms where it is used as the dielectric material for coaxials and data pairs, due to its stability over an extensive frequency range. It is used for many high temperature applications such as gas turbines and high voltage gas ignition wires. Due to its thin-wall properties, PTFE is used in aerospace and even in vacuum.

Properties

PTFE offers unparalleled electrical performance with the lowest dielectric constant of any solid plastic, together with excellent mechanical properties. Amongst these are a remarkable solder resistance and extremely low out-gassing. It is suitable for use from (fixed installed) -200°C or (dynamic) -65°C up to +200°C. PTFE is processed by either tape-wrapping or cold ram-extrusion and sintering.

Properties		Results			
Test		Method	Conditions		Value
Physical and mechanical	Continuous service temperature	IEC 60216	20,000hrs		+260°C
	Density	ASTM D 792	-		2.2 g/cm ³
	Elongation at break	ASTM D 638	-		400%
	Hardness	ASTM D 2240	Shore D		58
	Radiation resistance	IEC 60544	-		10 ³ Gy
	Temperature range	Internal	-		-200°C +260°C
	Tensile strength at break	ASTM D 638	-		32 MPa
	Water absorption	ASTM D 570	-		<0.01%
Electrical	Dielectric constant	ASTM D 150	0.1 kHz	10 MHz	2.1 2.1
	Dielectric strength	ASTM D 149	-		24 kV/mm
	Dissipation factor	ASTM D 150	0.1 kHz	10 MHz	0.0001 0.0002
	Volume resistivity	ASTM D 257	-		10 ¹⁸ Ω/cm
Flammability	Combustion corrosivity	DIN 57472-813	-		pH 2.2 / 4100uS/cm
	Flammability	UL 94	1.6mm		V-0
	Flame retardancy	-	-		-
	Oxygen index	ASTM D 2863	-		>95%
	Smoke density	ASTM E662	Flaming	Non-flaming	<10 <10
	Smoke index	-	-		-
	Temperature index	NES 715	-		>400°C
	Toxicity index	-	-		-



Available colours					
Black	Brown	Red	Orange	Yellow	Green
Blue	Violet	Grey	White	Pink	Natural

Head Office

SWEDEN

Habia Cable AB
Kanalvägen 18, Box 5076
SE-194 05 Upplands Väsby
Sweden
Tel: +46 (0) 8 630 74 40
Fax: +46 (0) 8 630 74 81
Email: info.se@habia.com

CHINA

Habia Cable China Ltd
No 16 Changjiang Middle Road
New District of Changzhou
CN-213022 Jiangsu
China
Tel: +86 (0) 5198 511 8010
Fax: +86 (0) 5198 510 2998
Email: info.cn@habia.com

GERMANY

Habia Cable Production GmbH
Oststrasse 91
DE-22844 Norderstedt
Germany
Tel: +49 (0) 40 53 53 50 0
Fax: +49 (0) 40 53 53 50 35
Email: info.de@habia.com

POLAND

Habia Cable SP.Z.O.O.
Lubieszyn 8
PL-72-002 Doluje
Poland
Tel: +48 (0) 91 311 56 50
Fax: +48 (0) 91 311 88 87
Email: info.pl@habia.com

SWEDEN

Habia Cable AB
Elementvägen 8, Box 8
SE-815 04 Söderfors
Sweden
Tel: +46 (0) 293 220 00
Fax: +46 (0) 293 307 51
Email: info.se@habia.com

SWEDEN

Habia Cable CS Technology AB
Dalénum 27
SE-181 70 Lidingö
Sweden
Tel: +46 (0) 8 544 813 40
Fax: +46 (0) 8 544 813 49
Email: info.cst@habia.com

CHINA

Habia Cable China Ltd
No 16 Changjiang Middle Road
New District of Changzhou
CN-213022 Jiangsu
China
Tel: +86 (0) 5198 511 8010
Fax: +86 (0) 5198 510 2998
Email: info.cn@habia.com

DENMARK

Habia Cable AB
Buchwaldsgade 50
DK-5000 Odense C.
Denmark
Tel: +45 (0) 70 22 83 03
Fax: +45 (0) 47 17 50 10
Email: info.dk@habia.com

FINLAND

Habia Cable AB
Jukolansuora 3 C5
FI-04340 Tuusula
Finland
Tel: +358 (0) 20 155 25 30
Fax: +358 (0) 20 155 25 39
Email: info.fi@habia.com

FRANCE

Habia Cable SA
100 Avenue Denis Papin
FR-45800 Saint Jean de Braye
France
Tel: +33 (0) 2 38 22 15 70
Fax: +33 (0) 2 38 22 15 79
Email: info.fr@habia.com

GERMANY

Habia Cable GmbH
Zeppelinstrasse 5/1
DE-89231 Neu-Ulm
Germany
Tel: +49 (0) 731 70 47 95 0
Fax: +49 (0) 731 70 47 95 99
Email: info.de@habia.com

HONG KONG

Habia Cable Asia Ltd
Flat 1109, 11/F Fast Industrial Building
658 Castle Peak Road
Lai Chi Kok
Kowloon
Hong Kong
Tel: +852 2591 1375
Fax: +852 2838 0229
Email: info.hk@habia.com

INDIA

Habia Cable
#1/1, Sai Towers
First Floor, R.V Road
Behind Kempegowda Statue
IN-560 004 Bangalore
India
Tel: +91 99 724 82254
Email: info.in@habia.com

KOREA

Habia Cable Asia Ltd
Korea Branch Office
Rm 309, Suseo-Tower
725 Suseo-dong
Gangnam-gu, Seoul
135-757
Korea
Tel: +82 (0) 2 504 6674
Fax: +82 (0) 2 504 6675
Email: info.kr@habia.com

NETHERLANDS

Habia Cable BV
Voorerf 33
4824 GM Breda
The Netherlands
Tel: +31 (0) 76 541 6400
Fax: +31 (0) 76 541 8289
Email: info.nl@habia.com

NORWAY

Habia Cable AB
Riddervoldsgate 4
0256 Oslo
Norway
Tel: +47 (0) 99 09 09 30
Fax: +46 (0) 8 630 74 81
Email: info.no@habia.com

SWEDEN

Habia Cable AB
Kanalvägen 18, Box 5076
SE-194 05 Upplands Väsby
Sweden
Tel: +46 (0) 8 630 74 80
Fax: +46 (0) 8 630 74 81
Email: info.se@habia.com

UNITED KINGDOM

Habia Cable Limited
Unit 10, Short Way
Thornbury
Bristol, BS35 3UT
United Kingdom
Tel: +44 (0) 1454 412522
Fax: +44 (0) 1454 416121
Email: info.uk@habia.com