

# IRCE Data Cables

## International Standards

**ISO/IEC 11801**  
**IEC 61156-5**  
**ANSI/TIA/EIA 568-A e B.2**  
**EN 50173 - EN 50288**

## Basic abbreviations

**Att.** : Attenuation

**NEXT** : Near End Crosstalk

**RL** : Return Loss

**UTP** : Unshielded twisted pair

**FTP**: Foil shielded twisted pair

**S-FTP** : Foil and braid shielded twisted pair

**S-STP** : Individual foil shielded t.p. with braid

## Buildings structured wiring systems

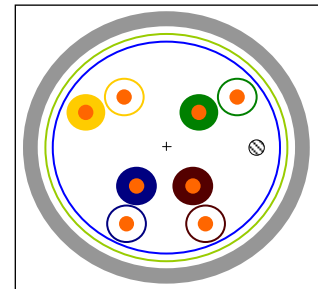
**Inter-Building backbone cable (IB):** when in a site there are two or several buildings a campus cable is used to connect and integrate the network within the overall area; this campus cable is usually an optical cable based upon 62.5/125mm Multimode fibre.

**Raiser/Backbone cable (BC):** network backbones and server connections inside a building; the solution can be both a fiber optic cable or a system of screened twisted pair copper cables with high performance - Category 5e , 6 or 7 with data transmission rate from 100 to 1000 Mbps.

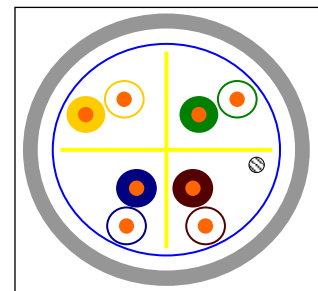
**Horizontal cables (HO):** when building system layout is defined, twisted pair cables provide the communication link between and inside specific work areas; 4 pair 24 AWG UTP and shielded FTP S-FTP for high speed networks operating at up to 100 Mbps, used in lengths of up to 90 meters.

**Work Area cables (WA):** high performance flexible patch cables are used for final linking from a wall connection to networked equipment; these cables are available unshielded or foil/braid shielded in size from 14 mm<sup>2</sup> (26 AWG) to 22 mm<sup>2</sup> (24AWG), are suitable for use up to 100 Mbps and meet the cross-talk (NEXT) requirements of Category 5 cables.

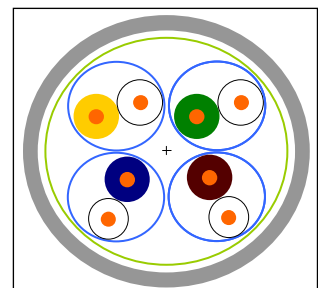
## Category 5e



## Category 6



## Category 7



## Copper Data Cable Class specifications and Category comparison

Cable type	Category 5 <sup>e</sup>	Category 6	Category 7
Link class	D	E	F
Bandwidth	100 MHz	250 MHz	600 MHz
Standards	ISO/IEC 11801-1/2 ANSI/TIA/EIA 568-A-5	ISO/IEC 11801-2 ANSI/TIA/EIA 568-B	To be completely defined
Typical applications	16 Mbps Token Ring 155 Mbps ATM 100 BASE-T 100Mbps TP PMD 1000 BASE-T	622 Mbps 1,2 Mbps ATM 1000 BASE-T	1,2 Mbps ATM 1000 BASE-T
Notes	Preferred over Category 5 wiring for new installation; addition to Category 5 requirements include Return Loss, NEXT (tightened by 3 dB) and PS NEXT & PS ELFEXT	Almost completely specified, supports Gigabit Ethernet requirements and other very high speed application reducing wiring costs.	

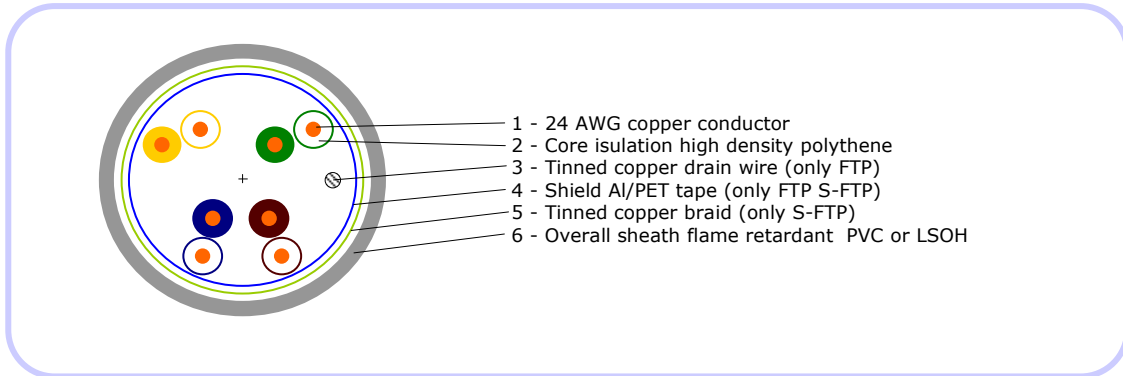
## Data cables delivery program

Product type	Type of packaging	Meters	Meters per pallet
CAT 5e UTP & PATCH	Box (REELEX <sup>®</sup> )	305	6100
CAT 5e FTP, S-FTP	Box (REELEX <sup>®</sup> )	305	4880
CAT 5e all types	Drum 500 mm	1000	6000
CAT 5e UTP & PATCH	Drum 400 mm	500	9000
CAT 5e FTP SFTP	Drum 400 mm	500	6000
CAT 6 UTP & PATCH	Box (REELEX <sup>®</sup> )	305	6100
CAT 6 FTP	Drum 500 mm	500	3000
CAT 7 all types	Drum 500 mm	500	3000
CAT 7 all types	Drum 600 mm	1000	4000

## Category 5e

### Installation cable

Horizontal and Building Backbone cable Class D



#### Electrical data:

	Standard			UTP			FTP			S-FTP		
	Att.	NEXT	RL	Att.	NEXT	RL	Att.	NEXT	RL	Att.	NEXT	RL
1 MHz	2,1	65,3	20,0	2	74	28	2	73	26	2	72	26
4 MHz	4,1	56,3	23,0	3,9	64	29	4	63	27	4	62	27
10 MHz	6,5	50,3	25,0	6,2	57	29	6,3	58	27	6,3	56	27
16 MHz	8,2	47,2	25,0	7,8	54	29	7,9	53	27	7,9	52	27
20 MHz	9,3	45,8	25,0	8,8	52	30	8,9	50	28	8,9	51	28
32,25 MHz	11,7	42,9	21,5	11	50	30	11,2	48	28	11,2	47	28
62,50 MHz	17,0	38,4	21,5	16	46	30	16,2	44	28	16,2	43	28
100 MHz	22,0	35,3	20,1	20,7	42	30	20,9	40	28	20,9	39	28
125 MHz				22,5	40	30	22,6	37	28	22,6	36	28
155 MHz				25	38	29	25	35	27	25	34	27
200 MHz				28,5	36	28	28,5	33	26	28,5	32	26
250 MHz												
300 MHz												
600 MHz												

PSNEXT at 100 MHz - dB  
 PSELFEXT at 100 MHz - dB  
 Char. Impedance at 1-200 MHz -  $\Omega$   
 DC loop-resistance -  $\Omega$ /Km  
 Resistance unbalance, max - %  
 Capacitance unbalance, max - pF/Km  
 Capacitance - pF/m  
 Velocity of propagation

32,5	42	42	42
21	28	28	28
100±15	100±15	100±15	100±15
max 300	170	170	170
2	< 0,5	< 0,5	< 0,5
1600	< 300	< 300	< 300
max 55,8	48	52	50
0,65	0,7	0,7	0,7

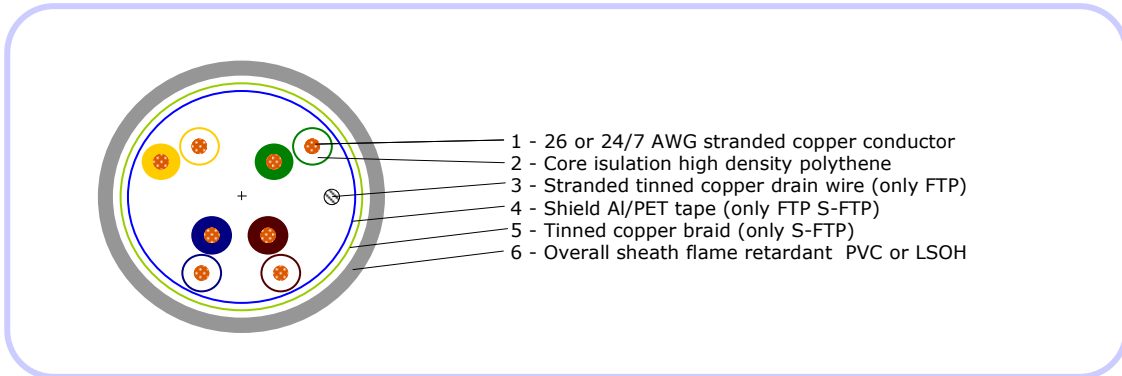
#### Mechanical data:

Cu - mm  
 Conductor - mm  
 Screen - mm  
 Outer diameter - mm  
 Outer sheath color standard -  
 Bending radius - min  
 Temp. Range - °C  
 Weight PVC / LSOH - Kg/Km

0,4-0,6	0,515	0,515	0,515
max 1,6	0,9	1	1,05
	-	Al/PET foil	Al/PET foil and braid
max 20	5,3	6,2	6,4
	Grey, RAL 7035	Grey, RAL 7035	Grey, RAL 7035
4xD	4xD	4xD	4xD
-20° - +60°	-20° - +60°	-20° - +60°	-20° - +60°
	33/32	40/39	48/47

## Category 5e Patch Cable

Work area cable



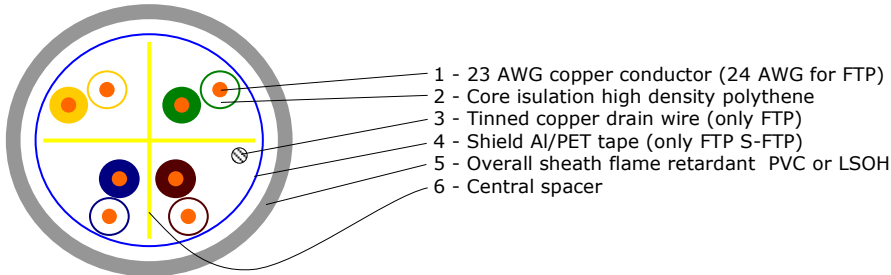
### Electrical data:

		Standard		UTP		FTP		S-FTP	
		Att.	NEXT	Att.	NEXT	Att.	NEXT	Att.	NEXT
1 MHz		3,2	62,3	2,5	74	2,7	73	2,7	73
4 MHz		6	56,3	5,6	64	5,8	63	5,8	63
10 MHz		9,5	50,3	9,1	57	9,3	58	9,3	58
16 MHz		12,1	47,2	11,7	54	11,2	53	11,2	53
20 MHz		13,6	45,8	13	52	13,2	50	13,2	50
32,25 MHz		17,1	42,9	16,5	50	16,8	48	16,8	48
62,50 MHz		24,8	38,4	24	46	24,5	44	24,5	44
100 MHz		32	35,3	31	42	31,6	40	31,6	40
125 MHz		36	33,8	32	40	32	37	32	37
155 MHz		40	32,4	34	38	34	35	34	35
200 MHz		47	30,7	36	37	36	37	36	37
250 MHz									
300 MHz									
600 MHz									
PSNEXT at 100 MHz -	dB			40		38		38	
PSELFEXT at 100 MHz -	dB			27		26		26	
Char. Impedance at 1-200 MHz -	$\Omega$	100±15		100±15		100±15		100±15	
DC loop-resistance -	$\Omega$ /Km	max 450		260		260		260	
Resistance unbalance, max -	%	2		< 0,5		< 0,5		< 0,5	
Capacitance unbalance, max -	pF/Km	1600		< 300		< 300		< 300	
Capacitance -	pF/m	max 55,8		47		50		52	
Velocity of propagation		0,65		0,7		0,7		0,7	
<b>Mechanical data:</b>									
Cu -	mm			0,14 mm <sup>2</sup>		0,14 mm <sup>2</sup>		0,14 mm <sup>2</sup>	
Conductor -	mm			0,8		0,95		0,95	
Screen -				-		Al/PET foil		Al/PET foil and braid	
Outer diameter -	mm			5,1		5,6		5,8	
Outer sheath color standard -				Grey, RAL 7035		Grey, RAL 7035		Grey, RAL 7035	
Bending radius -	min			4xD		4xD		4xD	
Temp. Range -	°C			-20° - +60°		-20° - +60°		-20° - +60°	
Weight PVC / LSOH -	Kg/Km			30/30		36/35		42/41	

## Category 6

### Installation cable

Horizontal and Building Backbone cable Class E



- 1 - 23 AWG copper conductor (24 AWG for FTP)
- 2 - Core insulation high density polythene
- 3 - Tinned copper drain wire (only FTP)
- 4 - Shield Al/PET tape (only FTP S-FTP)
- 5 - Overall sheath flame retardant PVC or LSOH
- 6 - Central spacer

#### Electrical data:

	Standard			UTP			FTP		
	Att.	NEXT	RL	Att.	NEXT	RL	Att.	NEXT	RL
1 MHz	2,1	66	23	2	74	27	2	74	27
4 MHz	3,8	65,3	23	3,7	70	27	3,7	70	27
10 MHz	6	59,3	23	5,9	62	27	5,9	62	27
16 MHz	7,6	56,2	23	7,5	59	27	7,5	59	27
20 MHz	8,5	54,8	23	8,3	57	27	8,3	57	27
32,25 MHz	10,7	51,9	23	10,5	55	27	10,5	55	27
62,50 MHz	15,5	47,4	23	15,1	50	27	15,1	50	27
100 MHz	19,9	44,3	23	19,5	47	27	19,5	47	27
125 MHz	22,5	42,8	22	22	46	26	22	46	26
155 MHz	25,3	41,4	21,1	24,5	45	25	24,5	45	25
200 MHz	29,1	39,8	20	28	44	24	28	44	24
250 MHz	33	38,3	19	31	44	22	31	44	22
300 MHz									
600 MHz									

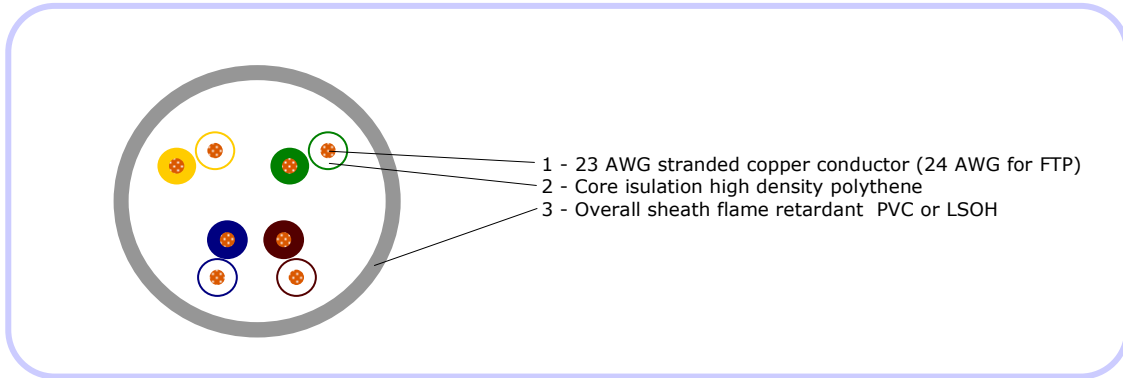
PSNEXT at 100 MHz -	dB	100±15, ±18 f>100 MHz	100±15	100±15
PSELFEXT at 100 MHz -	dB	max 450	145	145
Char. Impedance at 1-200 MHz -	Ω		< 0,5	< 0,5
DC loop-resistance -	Ω/Km	2	< 500	< 500
Resistance unbalance, max -	%	1600	48	52
Capacitance unbalance, max -	pF/Km	-	0,71	0,71
Capacitance - pF/m		0,65		
Velocity of propagation				

#### Mechanical data:

Cu -	mm	0,4-0,6	0,565	0,565
Conductor -	mm	max 1,6	1,1	1,2
Screen -			-	Al/PET foil
Outer diameter -	mm	max 20	6,8	7,4
Outer sheath color standard -			Grey, RAL 7035	Grey, RAL 7035
Bending radius -	min	4xD	4xD	4xD
Temp. Range -	°C	-20° - +60°	-20° - +60°	-20° - +60°
Weight PVC / LSOH -	Kg/Km		45/44	50/48

## Category 6 Patch cable

Work area cable

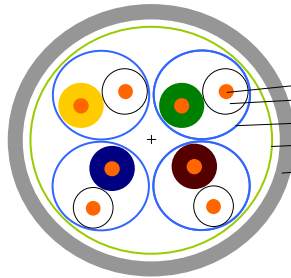


Electrical data:	Standard		UTP	
	Att.	NEXT	Att.	NEXT
1 MHz	3,1	66	3,1	72
4 MHz	5,8	65,3	5,7	68
10 MHz	9	59,3	8,9	60
16 MHz	11,4	56,2	11,3	57
20 MHz	12,8	54,8	12,7	56
32,25 MHz	16,1	51,9	16	54
62,50 MHz	23,2	47,4	23	49
100 MHz	29,9	44,3	29,7	46
125 MHz	33,8	42,8	33,6	45
155 MHz	38	41,4	37,8	44
200 MHz	43,7	39,8	40	43
250 MHz	49,5	38,3	41	42
300 MHz				
600 MHz				
PSNEXT at 100 MHz -	dB		dB	
PSELFEXT at 100 MHz -	dB		dB	
Char. Impedance at 1-200 MHz -	$\Omega$		$\Omega$	
DC loop-resistance -	$\Omega$ /Km		$\Omega$ /Km	
Resistance unbalance, max -	%		%	
Capacitance unbalance, max -	pF/Km		pF/Km	
Capacitance - pF/m	-		-	
Velocity of propagation	0,65		0,71	
<b>Mechanical data:</b>				
Cu -	mm		0,20 mm <sup>2</sup>	
Conductor -	mm		1	
Screen -			-	
Outer diameter -	mm		6,4	
Outer sheath color standard -			Grey, RAL 7035	
Bending radius -	min		4xD	
Temp. Range -	°C		-20° - +60°	
Weight PVC / LSOH -	Kg/Km		35/34	

## Category 7

### Installation cable

Horizontal and Building Backbone cable (Class F)



- 1 - 23 AWG stranded copper conductor
- 2 - Core insulation foam-skin polythene
- 3 - Individual shield Al/PET tape
- 4 - Tinned copper braid
- 5 - Overall sheath LSOH or flame retardant PVC

#### Electrical data:

1 MHz
4 MHz
10 MHz
16 MHz
20 MHz
32,25 MHz
62,50 MHz
100 MHz
125 MHz
155 MHz
200 MHz
250 MHz
300 MHz
600 MHz

PSNEXT at 100 MHz -	dB
PSELFEXT at 100 MHz -	dB
Char. Impedance at 1-200 MHz -	$\Omega$
DC loop-resistance -	$\Omega$ /Km
Resistance unbalance, max -	%
Capacitance unbalance, max -	pF/Km
Capacitance - pF/m	
Velocity of propagation	

#### Mechanical data:

Cu -	mm
Conductor -	mm
Screen -	
Outer diameter -	mm
Outer sheath color standard -	
Bending radius -	min
Temp. Range -	$^{\circ}$ C
Weight PVC / LSOH -	Kg/Km

#### Standard

Att.	NEXT	RL
2,0	80	23
3,7	80	23
5,9	80	23
7,4	80	23
8,3	80	23
10,4	79,6	23
14,4	75,1	23
19,0	72,4	23
21,4	71	21,5
24,0	69,6	21,5
27,5	67,9	21,5
31,0	66,5	21,5
34,2	65,3	20,7
50,1	60,8	17,7

#### S-STP

Att.	NEXT	RL
2,0	90	25
3,7	90	25
5,8	90	25
7,3	90	25
8,1	90	25
10,3	88	25
14,7	85	25
18,8	85	25
21,2	79	24
23,7	78	24
27,1	77	24
30,3	77	24
33,5	75	23
48	72	26

100 $\pm$ 15/18/25 f>100/250 MHz
max 300
2
1600
-
-

100 $\pm$ 15
155
< 1
< 500
48
0,72

0,4-0,6

0,56
1,4
Al/PET foil and braid
8,2
Grey, RAL 7035
4xD
-20 $^{\circ}$ - +60 $^{\circ}$
74/72