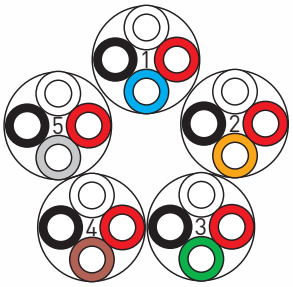
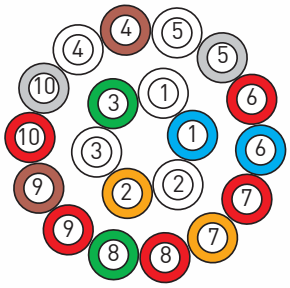
Cable Design Criteria

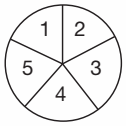


Sub-Unit (Group) Construction
(10 Pairs) Each sub-unit (group)
made up of 5 quads (10 pairs)

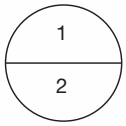


Sub-Unit (Group) Construction
made up of 10 Pairs

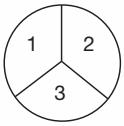
Unit or Core Construction of Telephone Cables Up to 100 Pairs



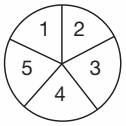
10 Pair core
(Made up of 1 sub-unit)



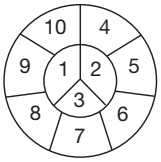
20 Pair core
(2 sub-unit)



30 Pair core
(3 sub-unit)

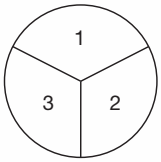


50 Pair unit or core
(5 sub-unit)

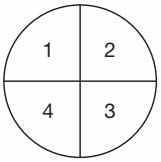


100 Pair unit or core
(10 sub-unit)

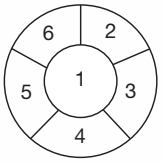
Unit or Core Construction of Telephone Cables Including 100 Pairs and More



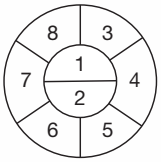
150 Pair core
(3x50 pair unit)



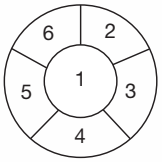
200 Pair core
(4x50 pair unit)



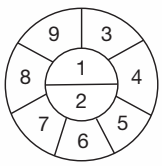
300 Pair core
(6x50 pair unit)



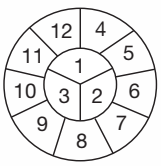
400 Pair core
(8x50 pair unit)



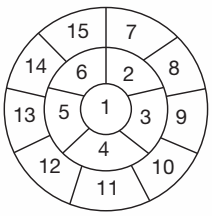
600 Pair core
(6x100 pair unit)



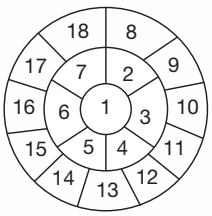
900 Pair core
(9x100 pair unit)



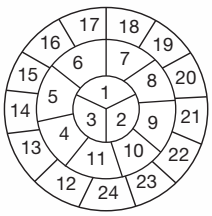
1200 Pair core
(12x100 pair unit)



1500 Pair core
(15x100 pair unit)



1800 Pair core
(18x100 pair unit)



2400 Pair core
(24x100 pair unit)

Binding Tape Colors of Sub-Unit and Unit

No	Color of binding	No	Color of binding
1	Blue	13	Yellow-Green
2	Orange	14	Yellow-Brown
3	Green	15	Yellow-Grey
4	Brown	16	Voilet-Blue
5	Grey	17	Voilet-Orange
6	White-Blue	18	Voilet-Green
7	White-Orange	19	Voilet-Brown
8	White-Green	20	Voilet-Grey
9	White-Brown	21	Red-Blue
10	White-Grey	22	Red-Orange
11	Yellow-Blue	23	Red-Green
12	Yellow-Orange	24	Red-Brown

Color Code of Insulation For 25 Pair System

No	Conductor A	No	Conductor B
1	White	1	Blue
2	White	2	Orange
3	White	3	Green
4	White	4	Brown
5	White	5	Grey
6	Red	6	Blue
7	Red	7	Orange
8	Red	8	Green
9	Red	9	Brown
10	Red	10	Grey
11	Black	11	Blue
12	Black	12	Orange
13	Black	13	Green
14	Black	14	Brown
15	Black	15	Grey
16	Yellow	16	Blue
17	Yellow	17	Orange
18	Yellow	18	Green
19	Yellow	19	Brown
20	Yellow	20	Grey
21	Voilet	21	Blue
22	Voilet	22	Orange
23	Voilet	23	Green
24	Voilet	24	Brown
25	Voilet	25	Grey

Color Codes of Insulation for 10 pair System

Pair No	Wire A	Wire B
1	White	Blue
2	White	Orange
3	White	Green
4	White	Brown
5	White	Green
6	Red	Blue
7	Red	Orange
8	Red	Green
9	Red	Brown
10	Red	Grey

Color Codes of Insulation for Star Quad System

Quad No	Wire A	Wire B	Wire C	Wire D
1	White	Blue	Red	Black
2	White	Orange	Red	Black
3	White	Green	Red	Black
4	White	Brown	Red	Black
5	White	Grey	Red	Black

Color Code of Group For 25 Pair System

No	Color of binding	No	Color of binding
1	White-Blue	14	Black-Brown
2	White-Orange	15	Black-Grey
3	White-Green	16	Yellow-Blue
4	White-Brown	17	Yellow-Orange
5	White-Grey	18	Yellow-Green
6	Red-Blue	19	Yellow-Brown
7	Red-Orange	20	Yellow-Grey
8	Red-Green	21	Voilet-Blue
9	Red-Brown	22	Voilet-Orange
10	Red-Grey	23	Voilet-Green
11	Black-Blue	24	Voilet-Brown
12	Black-Orange	25	Voilet-Grey
13	Black-Green		

Color Codes Binding Yarn for 10 pair System

Grup No	Color of Binding Yarn
1	Blue
2	Orange
3	Green
4	Brown
5	Grey
6	Red
7	White
8	Black
9	Yellow
10	Voilet

Color Codes of Group for Star Quad System

Grup No	Color of Binding Yarn
1	Blue
2	Orange
3	Green
4	Brown
5	Grey
6	White-Blue
7	White-Orange
8	White-Green
9	White-Brown
10	White-Grey

Cable Core Construction

Number of Pairs in Cable	Core Construction	Number of quads, sub-units and units layers				
		1st Layer	2nd Layer	3rd Layer	Notes	
10	Quad	5			1	
20	Sub-Unit	2				
30	Sub-Unit	3				
50	Sub-Unit	5			2	
100	Sub-Unit	3	7		3	■
150	50 Pair Unit	3				■
200	50 Pair Unit	4				■
300	50 Pair Unit	1	5			■
400	50 Pair Unit	2	6			■
600	100 Pair Unit	1	5			■
900	100 Pair Unit	2	7			■
1200	100 Pair Unit	3	9			■
1500	100 Pair Unit	1	5	9		■
1800	100 Pair Unit	1	6	11	4	■
2400	100 Pair Unit	3	8	13		■

1- Sub-Unit construction also
2- 50 pair unit construction also
3- 100 pair construction also
4- Cables exceeding 1800 pairs, shall be produced according to customer request

■ Max. 2% spare pairs in relation with the total quarantied number of pairs shall be put within layers in proper way.

PVC Insulated Pair Type Cables

Electrical Characteristics				
Conductor Diameter			0,5	0,6
Conductor Resistance @ 20°C (Ω/km)		Max.	93,0	64,6
		Avg.	89,4	62,1
Mutual Capacitance @800 Hz (nf/km)		Max.	100	100
		Avg.	90	90
Capacitance Unbalance PF/ 500 mt	Between Pair	Max.	900	900
		Avg.	500	500
	Between Adjacent Pairs	Max.	900	900
		Avg.	500	500
Insulation Resistance @ 500 V DC (M Ohm km)		Min	250	250
Dielectric Strength AC Voltage for 1 min	Pair to Pair		1000	1000
	Pair to Ground		1000	1000

PE Insulated Pair Type Cables

Electrical Characteristics							
Conductor Diameter			0,4 mm	0,5 mm	0,6 mm	0,8 mm	0,9 mm
Conductor Resistance @ 20°C (Ω/km)		Max	150	96	66,6	36,8	30
		Avg.	144	92	63,9	35,9	28
Mutual Capacitance @ 800 Hz (nf/km)		Max	64	64	64	64	65
		Avg.	55	56	55	55	59
Capacitance Unbalance PF/ 500 mt	Between Pair	Max	250	250	250	250	
		Avg.	150	150	100	100	100
	Unbalance to Earth	Max	2000	--	2000	2000	--
		Avg.	1000	1000	1000	1000	--
Insulation Resistance @ 500 V DC (M Ohm km)		Min	1500	1500	1500	1500	1500
Dielectric Strength AC Voltage for 1 min	Pair to Pair		500	500	500	500	1000
	Pair to Ground		1000	2000	2000	2000	3000

PE Insulated Quad Type Cables

Electrical Characteristics						
Conductor Diameter			0,4 mm	0,5 mm	0,6 mm	0,9 mm
Conductor Resistance @ 20°C (Ω/km)		Max	146,6	93,0	64,6	28,8
		Avg.	139,4	89,4	62,1	27,6
Mutual Capacitance @800 Hz (nf/km)		Max	56	56	51	51
		Avg.	50	50	45	45
Capacitance Unbalance PF/ 500 mt	Between Pair	Max	500	500	325	325
		Avg.	125	125	60	60
	Between Adjacent Quads	Max	375	375	370	370
		Avg.	125	125	60	60
	Unbalance to Earth	Max	2000	2000	1300	1300
		Avg.	500	500	325	325
Insulation Resistance @ 500 V DC (M Ohm km)		Min	10000	10000	10000	10000
Dielectric Strength AC Voltage for 1 min	Pair to Pair		1000	1000	1400	2100
	Pair to Ground		1000	1000	1400	2100
DC Voltage for 3 Seconds *Pair-Screen			6300	6300	6300	6300

*Only for PAP type cables.

Type Codes of Copper Insulated Cables

A-BCDEFG HxI...JKLMN

A Basic Types

A- - Outdoor telephone cables
J- - Installation cables
AJ- - Outdoor cable with protection against inductive influences
T- - Terminating cable

B Insulation Types

02Y - Cellular PE
2Y - Solid PE
02YS - Foam Skin Insulating cover of cellular PE with additional skin of solid polyolefine.
Y - PVC
H - LSZH

C Filling

F - Petroleum jelly filling
Blank - Unfilled

D Screening Material

(St) - Static shield of plastic-backed aluminum Tape for indoor cables
D - Shield of copper wire whipping over one stranding element (e.g. pair)
LR - Corrugated alumnium tape
Blank - No screen

E Bedding Material

2Y - PE
Y - PVC
H - LSZH
M - Lead Sheath
MZ - Special Alloyed Lead Sheath
Blank - No Bedding

F Armouring Material

b - Armouring
SR - Corrugated steel tape
T - Messenger of galvanized steel wires.
Blank - No Armour

G Sheath Material

2Y - PE
Y - PVC
H - LSZH
(L)2Y - Laminated sheath (shield of PE coated aluminium tape bonded with PE sheath).
M - Lead Sheath
MZ - Special Alloyed Lead Sheath
Blank - No Sheath

H Number of Pairs/Quads

2x2 - 2 Pairs
2x4 - 2 Quads

I Conductor Size

0.4 - 0.4mm
0.5 - 0.5mm
0.6 - 0.6mm
0.8 - 0.8mm
0.9 - 0.9mm

J Stranding Element

PiC - Pairs shielded with copper braid
PiMF - Pairs shielded with aluminium/polyester tape
St - Star Quad(Phantom)
StI - Star Quad(trunk cable)
StIII - Star Quad (local cable)
TIC - Triple shielded with copper braid
TiMF - Triple shielded with aluminium/polyester tape

K Cable Type

S - Railway signaling cable

L Types of Stranding

Lg - Stranded in layers
Bd - Unit Type stranding

M Copper/Steel Tape/Braid Screen Options

(.....Cu) - Total cross section of copper shield in mm sq
(fK) - Longitdinally applied copper tape, supplement to (St)
2B...- two layers of steel tape, thickness of steel tape in mm

N Fire Resistance Options

E30 - 30mins circuit integrity according to DIN VDE 4102 Part 12
E60 - 60mins circuit integrity according to DIN VDE 4102 Part 12
F180 - 950°C 180mins Insulation integrity according to IEC 60331&VDE 0427-814

Type Codes of Fiber Optic Cables

A-BCDEFG HxI...JKLMN

Type Codes for Optical Cables DIN / VDE

Code	Explanation of the Code
A	Outdoor Cable
B	Armoring
(BN)	Glass Yarn Non-metallic armoring
D	Loose Buffer Tube
E	Single Mode Fiber
F	Filling Compound in the cable Core
FR	Cable with the improved burning behavior
G	Multi mode Fiber
H	Halogen free jacket
J	Indoor Cable
K	Slotted Core
(L)	Laminated Aluminum Sheath
LG	Stranded in Layers
CT	Central Tube construction
S	Metallic Elements in core
Q	Dry Swellable material in the cable core
(SR)	Armoring by laminated corrugated longitudinal overlapped steel tape
(SG)	Armoring by laminated smooth longitudinal overlapped steel tape
Y	Jacket or protective cover of Polyvinyl chloride (PVC)
2Y	Jacket or protective cover of Polyethylene(PE)
4Y	Jacket or protective cover of Polyamide(PA)
(ZN)	Non-Metallic anti buckling and strength member
(ZM)	Non-Metallic anti buckling and strength member in the Jacket