TecniKabel

SPECIAL ELECTRICAL CABLES

RAILWAYS

ROLLING STOCK AND SIGNALLING CABLES

TECNIKABEL
HAS A CONSTANT FOCUS ON PRODUCT INNOVATION
IN ORDER TO OBTAIN A COMPETITIVE EDGE, CONCENTRATING ON RESEARCH AND DEVELOPMENT.

TECNIKABEL is a leading company in Europe in the special electrical cables sector.
Established in 1978, it immediately focused its business activity on research and innovation.
Wherever the future is designed TECNIKABEL is in the front line:

- **Collaborating with leading companies in various sectors**
- **Fully satisfying the needs of its customers**
- **Focusing on continual improvement in its quality and reliability targets**

In its production plants TECNIKABEL realises cables intended for the widest variety of applications, from automation to railways, from telecommunications to
industrial electronics, from audio video to defence, from off-shore to solar energy, from naval and submarine to the electromedical sector, with maximum priority given to technical support from the very start of the cable design phases.

- **A rigorous analysis of applications**
- **Evaluation of the most suitable materials for any environment**
- **Optimisation of product costs**

make it possible to suggest and realise original solutions that fully satisfy the specific requests of our customers.
Each TECNIKABEL cable contains everything needed to ensure our products are reliable with every type of voltage.

Our high quality levels are guaranteed by a modern production process controlled at every stage.
Our staff's high degree of know-how and our company quality system have been recognised and certified in compliance with UNI EN ISO 9001:2000 standards since 1994, under the control of national (CISQ and IMQ) and international (IQNET) certification bodies.

PRODUCTION
Constantly updated production systems, accurate operating procedures and expert operators who promote efficient, flexible production. In more than 35 years of business, we have manufactured more than 26,000 different types of cables.

LABORATORY TESTS
We carry out extremely stringent tests on our cables, simulating critical conditions of use.
In addition to the classical tests required by current regulations, we have constructed special machinery for various types of mechanical and electrical tests.

FINAL INSPECTIONS
At the end of the production processes, each cable is inspected to verify its electrical performances and complete compliance with the buyer's specifications.

RESEARCH AND DEVELOPMENT INTO MATERIALS
Our thirty years' experience has encouraged us towards a continuous search for new materials in order to optimize performance, costsand to achieve the standards required by our customers.

TECNIKABEL has always dedicated particular attention to quality and to customer service, starting from the initial phases of the sale.
Over the years, leading sector associations such as UL and CSA have recognized the quality and performance of our cables, issuing more than 600 approvals.
Also in the railway sector, our cables have received the most important approvals issued by companies such as:
RFI, TRENITALIA, ANSALDO STS, ANSALDOBREDA ALSTOM, FIREMA, THALES, MERMEC,
GE TRANSPORTATION, PESA

Railways networks are a strategic factor in Europe and all over the world in rebalancing the transportation, offering fast, safe travel for passengers and goods in full respect of the environment, of the territory and preservation of energy.
Ever more frequently, the concept of **"sustainable mobility"** is required to provide a solution to the increase in the density of the population who travel for reasons off work in urban and suburban areas.
This environment comprises trolleybuses, trams, conventional subways and automatic underground transport systems.

Medium- and long-distance high speed trains is another **fast-developing** sector.
Considerable worldwide expansion of passenger and goods transport is forecast in the next few years.

Reliability and safety are fundamental factors of the quality of any product and the railway cables sector is certainly no exception to this rule.

IRIS Certification

HEADQUARTER

AUTOMATION
RAILWAYS
OIL / GAS
TELECOMMUNICATION
AUDIOVIDEO
HEALTHCARE
SUBMARINE
NAVAL
SUN
DEFENSE
HYBRID
OPTICAL

RAILWAYS

ROLLING STOCK AND SIGNALLING CABLES


V300 ZEFIRO

ROLLING STOCK

- POWER AND CONTROL CABLES HAVING SPECIAL FIRE PERFORMANCE
- FIRE RESISTANT POWER AND CONTROL CABLES
- MINIATURIZED CABLES
- TRANSMISSION CABLES
- ETHERNET CABLES
- COAXIAL CABLES
- CCTV/VGA/AUDIO CABLES
- RF VALIDATION TICKET CABLES
- WIRE WRAP TERMI POINT
- OPTICAL FIBER

TECNIKABEL produces a wide range of cables for the “rolling stock” sector in compliance with national ad international standards and regulations.

The cables are available in a standard configuration and according to the technical specifications of the buyer.

Special attention is dedicated to the behavior of cables having special fire performance characteristics and low emission of toxic fumes and gases.

POWER AND CONTROL CABLES
HAVING SPECIAL FIRE PERFORMANCE

APPLICATIONS

EN 50264 specifies requirements for construction and dimensions of single core and muticore cables of the following type and voltage ratings :

Single Core (EN 50264-2-1) and Single Core with reduce dimensions (EN 50264-3-1)

- 0,6/1kV unscreened, unsheathed (1,0mm² to 400mm²)
- 1,8/3kV unscreened, unsheathed (1,5mm² to 400mm²)
- 1,8/3kV unscreened, sheathed (1,5mm² to 400mm²)
- 3,6/6kV unscreened, sheathed (2,5mm² to 400mm²)

Multicore (EN 50264-2-2) and Multicore with reduce dimensions (EN 50264-3-2)

- 300/500V screened or unscreened (1mm², 1,5mm² and 2,5mm², number of cores from 2 to 40)
- 0,6/1kV screened or unscreened (1,5mm² to 50mm², number of cores from 2 to 4)

Note : Not all conductor sizes or number of cores are specified.

All cables have Class 5 Tinned Copper Conductors according to IEC 60228, Halogen-Free Insulation and Halogen-Free Sheath. They are for use in railway rolling stock as fixed wiring, or wiring where limited flexing in operation is encountered.
The requirements provide for a continuous conductor temperature not exceeding 90°C and maximum temperature for short circuit conditions of 200°C based on a duration of 5 seconds.
Under fire conditions the cables exhibit special performance characteristics in respect of maximum permissible flame propagation (flame spread) and maximum permissible emission of smoke and toxic gases.


TECNIKABEL EN 50264-2-1 3600V 1x16mm² M
TECNIKABEL EN 50264-2-1 3600V 1x35mm² M
TECNIKABEL EN 50264-2-1 3600V 1x50mm² M
TECNIKABEL EN 50264-2-1 3600V 1x70mm² M
TECNIKABEL EN 50264-2-1 3600V 1x95mm² M
TECNIKABEL EN 50264-2-1 3600V 1x120mm² M
TECNIKABEL EN 50264-2-1 3600V 1x185mm² M

OTHER CHARACTERISTICS

Standard Reference
EN 50264, EN 50305, EN 50355, EN 50343, DIN 5510, UNI 11170, NFPA 130, CEN-TS 45545-2

Electrical Resistance at 20°C
IEC 60228 Class 5

Insulation Resistance at 20°C
EN 50305 6.4.1

Maximum Conductor Temperature for Short Circuit
200°C for 5 seconds

Minimum Bending Radius
5 x Ø (unscreened)
10 x Ø (screened)

Temperature Range
-40°C ÷ + 90°C acc.to Code Designations
-25°C ÷ + 90°C acc.to Code Designations

Test on cables and materials
The electrical, physical and mechanical tests are compliant with the prescription of rule EN 50264-1.

CODE DESIGNATIONS

Insulation System (EN 50264-2-1 and 2-2)

EI 101	Low Temperature Resistant, Oil Resistant	Code Designation C
EI 102	Extra Low Temperature Resistant, Oil Resistant	Code Designation F
EI 103	Low Temperature Resistant, Extra Oil and Fuel Resistant	Code Designation J
EI 104	Extra Low Temperature Resistant, Extra Oil and Fuel Resistant	Code Designation M
EI 105	Extra Low Temperature Resistant, Non Oil Resistant	Code Designation O

Insulation System (EN 50264-3-1 and 3-2)

EI 106	Low Temperature Resistant, Oil Resistant	Code Designation C
EI 107	Extra Low Temperature Resistant, Oil Resistant	Code Designation F
EI 108	Low Temperature Resistant, Extra Oil and Fuel Resistant	Code Designation J
EI 109	Extra Low Temperature Resistant, Extra Oil and Fuel Resistant	Code Designation M
EI 110	Extra Low Temperature Resistant, Non Oil Resistant	Code Designation O

Sheath Type (EN50264-2-1, EN50264-2-2, EN50264-3-1 and EN50264-3-2)

EM 101	Low Temperature Resistant, Oil Resistant	Code Designation C
EM 102	Extra Low Temperature Resistant, Oil Resistant	Code Designation F
EM 103	Low Temperature Resistant, Extra Oil and Fuel Resistant	Code Designation J
EM 104	Extra Low Temperature Resistant, Extra Oil and Fuel Resistant	Code Designation M

SINGLE-CORE CABLES UNSHEATHED 0,6/1kV

CONDUCTOR
Material
class 5 tinned copper conductor complying with CEI EN 60228
Separator
eventual polyester colored tape

INSULATION
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter see table 1
Color
black if not elsewhere specified

Table 1

Nominal section [mm^2]	Average insulation thickness [mm]	External diameter [mm]	
		Minimum	Maximum
1	0,8	2,8	3,2
1,5	0,8	3,0	3,5
2,5	0,8	3,4	3,9
4	0,8	3,9	4,6
6	0,9	4,6	5,4
10	1,1	5,8	6,8
16	1,1	7,2	8,5
25	1,3	8,6	10,0
35	1,3	10,2	11,5
50	1,5	11,6	13,5
70	1,5	13,3	15,5
95	1,6	14,9	17,4
120	1,6	16,5	19,3
150	1,9	18,5	21,7
185	1,9	20,1	23,6
240	2,1	22,9	26,8
300	2,2	25,4	29,7
400	2,3	28,7	33,6

SINGLE-CORE CABLES UNSHEATHED 1,8/3kV

CONDUCTOR
Material
class 5 tinned copper conductor complying with CEI EN 60228
Separator
eventual polyester colored tape

INSULATION
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter see table 2
Color
black if not elsewhere specified

Table 2

Nominal section [mm^2]	Average insulation thickness [mm]	External diameter [mm]	
		Minimum	Maximum
1,5	2,5	6,2	7,3
2,5	2,5	6,6	7,8
4	2,5	7,1	8,4
6	2,5	7,6	8,9
10	2,5	8,4	9,9
16	2,5	9,5	11,1
25	2,5	10,8	12,7
35	2,5	12,0	14,1
50	2,5	13,4	15,7
70	2,5	15,1	17,7
95	2,7	16,9	19,8
120	2,7	18,5	21,7
150	2,7	20,0	23,4
185	2,7	21,6	25,3
240	2,7	24,1	28,2
300	2,7	26,3	30,8
400	2,9	29,8	34,9

SINGLE-CORE CABLES SHEATHED 1,8/3kV

CONDUCTOR
Material
class 5 tinned copper conductor complying with CEI EN 60228
Separator
eventual polyester colored tape

INSULATION
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 3
Color
black if not elsewhere specified

SHEATH
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 3
Color
black if not elsewhere specified

Table 3

Nominal section [mm^2]	Average insulation thickness [mm]	Average sheath thickness [mm]	External diameter [mm]	
			Minimum	Maximum
1,5	1,3	1,4	6,7	7,8
2,5	1,3	1,4	7,1	8,3
4	1,3	1,4	7,6	8,9
6	1,3	1,4	8,1	9,5
10	2,2	1,4	10,6	12,4
16	2,2	1,4	11,7	13,6
25	2,2	1,4	13,0	15,2
35	2,2	1,4	14,2	16,6
50	2,2	1,4	15,6	18,3
70	2,2	1,5	17,5	20,5
95	2,4	1,6	19,6	22,3
120	2,4	1,6	21,1	24,6
150	2,4	1,7	22,7	26,6
185	2,4	1,7	24,0	28,1
240	2,4	1,8	27,0	31,6
300	2,4	1,9	29,4	34,4
400	2,6	2,0	32,7	38,3

SINGLE-CORE CABLES SHEATHED 3,6/6kV

CONDUCTOR
Material
class 5 tinned copper conductor complying with CEI EN 60228
Separator
semiconductor black tape applied across cable with overlapping

INSULATION
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 4
Color
black if not elsewhere specified

SHEATH
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 4
Color
black if not elsewhere specified

Table 4

Nominal section [mm^2]	Average insulation thickness [mm]	Average sheath thickness [mm]	External diameter [mm]	
			Minimum	Maximum
2,5	3,0	1,4	10,5	12,3
4	3,0	1,4	11,0	12,9
6	3,0	1,4	11,5	13,4
10	3,0	1,4	12,3	14,4
16	3,0	1,4	13,3	15,6
25	3,0	1,4	14,7	17,2
35	3,0	1,4	15,9	18,6
50	3,0	1,5	17,5	20,5
70	3,0	1,5	19,2	22,4
95	3,0	1,6	20,8	24,3
120	3,1	1,7	22,7	26,6
150	3,1	1,7	24,2	28,4
185	3,2	1,8	26,2	30,7
240	3,4	1,9	29,2	34,2
300	3,4	1,9	31,5	36,9
400	3,4	2,0	34,8	40,7

MULTI-CORE UNSCREENED CABLES WITH SHEATH 300/500V

CONDUCTOR
Material
class 5 tinned copper conductor complying with CEI EN 60228
Separator
eventual polyester colored tape

INSULATION
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 5
Color
black numbered if not elsewhere specified (upon request one core could be yellow/green)

ASSEMBLING
N° conductors + eventual filler and tape are assembled together

SHEATH
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 5
Color
black if not elsewhere specified

Number and nominal Section [n x mm^2]	Insulation average thickness [mm]	Insulating diameter [mm]	Sheath average thickness [mm]	External diameter [mm]	
				Minimum	Minimum
2 x 1	0,6	2,6	1,4	7,2	8,5
4 x 1	0,6	2,6	1,4	8,2	9,6
7 x 1	0,6	2,6	1,4	9,6	11,2
9 x 1	0,6	2,6	1,4	11,5	13,4
12 x 1	0,6	2,6	1,4	12,3	14,4
19 x 1	0,6	2,6	1,4	14,5	16,6
24 x 1	0,6	2,6	1,5	16,7	19,6
32 x 1	0,6	2,6	1,6	18,5	21,7
37 x 1	0,6	2,6	1,6	19,2	22,4
40 x 1	0,6	2,6	1,6	19,9	23,3
4 x 1,5	0,7	3,0	1,4	9,2	10,8
7 x 1,5	0,7	3,0	1,4	10,9	12,8
9 x 1,5	0,7	3,0	1,4	13,1	15,3
12 x 1,5	0,7	3,0	1,4	14,0	16,4
19 x 1,5	0,7	3,0	1,5	16,5	19,4
24 x 1,5	0,7	3,0	1,6	19,5	22,8
32 x 1,5	0,7	3,0	1,7	21,5	25,2
37 x 1,5	0,7	3,0	1,7	22,4	26,2
4 x 2,5	0,8	3,7	1,4	10,7	12,5
7 x 2,5	0,8	3,7	1,4	12,7	14,9
9 x 2,5	0,8	3,7	1,5	15,6	18,3
12 x 2,5	0,8	3,7	1,5	16,7	19,6
19 x 2,5	0,8	3,7	1,6	19,7	23,1
24 x 2,5	0,8	3,7	1,8	23,5	27,5

Table 5

MULTI-CORE SCREENED CABLES WITH SHEATH 300/500V

CONDUCTOR
Material
class 5 tinned copper conductor complying with CEI EN 60228
Separator
eventual polyester colored tape

INSULATION
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 6
Color
black numbered if not elsewhere specified (upon request one core could be yellow/green)

ASSEMBLING
N° conductors + eventual filler and tape are assembled together

SCREENING
The screen is a braid of tinned copper

SHEATH
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 6
Color
black if not elsewhere specified

Number and nominal section [n x mm^2]	Insulation average thickness [mm]	Insulation diameter [mm]	Maximum diameter of screen thread [mm]	Average thickness of sheath [mm]	External diameter [mm]	
					Minimum	Maximum
2 x 1	0,6	2,6	0,16	1,4	8,1	9,5
4 x 1	0,6	2,6	0,16	1,4	9,0	10,6
7 x 1	0,6	2,6	0,16	1,4	10,4	12,2
9 x 1	0,6	2,6	0,21	1,4	12,5	14,6
12 x 1	0,6	2,6	0,21	1,4	13,3	15,6
19 x 1	0,6	2,6	0,26	1,5	15,7	18,4
24 x 1	0,6	2,6	0,26	1,6	18,1	21,2
32 x 1	0,6	2,6	0,26	1,6	19,7	23,1
37 x 1	0,6	2,6	0,26	1,7	20,7	24,2
40 x 1	0,6	2,6	0,26	1,7	21,4	25,1
4 x 1,5	0,7	3,0	0,16	1,4	10,1	11,8
7 x 1,5	0,7	3,0	0,21	1,4	11,9	14,0
9 x 1,5	0,7	3,0	0,21	1,4	14,1	16,5
12 x 1,5	0,7	3,0	0,21	1,4	15,8	18,5
19 x 1,5	0,7	3,0	0,26	1,5	17,8	20,8
24 x 1,5	0,7	3,0	0,26	1,6	20,7	23,1
32 x 1,5	0,7	3,0	0,26	1,7	22,7	24,2
37 x 1,5	0,7	3,0	0,26	1,7	23,6	25,1
4 x 2,5	0,8	3,7	0,21	1,4	11,8	13,9
7 x 2,5	0,8	3,7	0,21	1,4	13,7	16,1
9 x 2,5	0,8	3,7	0,26	1,5	16,8	19,7
12 x 2,5	0,8	3,7	0,26	1,5	18,0	21,1
19 x 2,5	0,8	3,7	0,26	1,6	21,1	24,6
24 x 2,5	0,8	3,7	0,26	1,8	24,7	28,9

Table 6

MULTI-CORE UNSCREENED CABLES WITH SHEATH 0,6/1kV

CONDUCTOR
Material
class 5 tinned copper conductor complying with CEI EN 60228
Separator
eventual polyester colored tape

INSULATION
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 7
Color
black numbered if not elsewhere specified (upon request one core could be yellow/green)

ASSEMBLING
N° conductors + eventual filler and tape are assembled together

SHEATH
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 7
Color
black if not elsewhere specified

Number and nominal section [n x mm^2]	Insulation average thickness [mm]	Insulation diameter [mm]	Average thickness of sheath [mm]	External diameter [mm]	
				Minimum	Minimum
2 x 1,5	0,8	3,3	1,4	8,5	9,9
3 x 1,5	0,8	3,3	1,4	8,9	10,5
4 x 1,5	0,8	3,3	1,4	9,7	11,3
2 x 2,5	0,8	3,7	1,4	9,3	10,9
3 x 2,5	0,8	3,7	1,4	9,9	11,6
4 x 2,5	0,8	3,7	1,4	10,7	12,5
2 x 4	0,8	4,3	1,4	10,3	12,1
3 x 4	0,8	4,3	1,4	11,0	12,9
4 x 4	0,8	4,3	1,4	11,9	14,0
2 x 6	0,9	5,0	1,4	11,8	13,9
3 x 6	0,9	5,0	1,4	12,5	14,6
4 x 6	0,9	5,0	1,4	13,7	16,1
2 x 10	1,1	6,6	1,4	14,3	16,7
3 x 10	1,1	6,6	1,5	15,3	17,9
4 x 10	1,1	6,6	1,5	16,9	19,8
2 x 16	1,1	7,9	1,5	16,5	19,4
3 x 16	1,1	7,9	1,6	17,8	20,8
4 x 16	1,1	7,9	1,6	19,6	22,9
2 x 25	1,3	9,7	1,6	20,1	23,5
3 x 25	1,3	9,7	1,7	21,6	25,3
4 x 25	1,3	9,7	1,8	24,1	28,2
2 x 35	1,3	11,0	1,7	22,7	26,6
3 x 35	1,3	11,0	1,8	24,4	28,6
4 x 35 o 3x35+1x25	1,3	11,0	1,9	28,5	34,2
2 x 50	1,5	13,1	1,9	26,7	31,2
3 x 50	1,5	13,1	1,9	28,2	33,3
4 x 50 o 3x50+1x25	1,5	13,1	2,0	33,4	40,0

Table 7

MULTI-CORE SCREENED CABLES WITH SHEATH 0,6/1kV

CONDUCTOR
Material
class 5 tinned copper conductor complying with CEI EN 60228
Separator
eventual polyester colored tape

INSULATION
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 8
Color
black numbered if not elsewhere specified (upon request one core could be yellow/green)

ASSEMBLING
N° conductors + eventual filler and tape are assembled together

SCREENING
The screen is a braid of tinned copper

SHEATH
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 8
Color
black if not elsewhere specified

Number and nominal section [n x mm^2]	Insulation average thickness [mm]	Insulation diameter [mm]	Maximum diameter of screen thread [mm]	Average thickness of sheath [mm]	External diameter [mm]	
					Minimum	Maximum
2 x 1,5	0,8	3,3	0,16	1,4	9,3	10,9
3 x 1,5	0,8	3,3	0,16	1,4	9,8	11,4
4 x 1,5	0,8	3,3	0,16	1,4	10,5	12,3
2 x 2,5	0,8	3,7	0,16	1,4	10,2	11,9
3 x 2,5	0,8	3,7	0,16	1,4	10,7	12,5
4 x 2,5	0,8	3,7	0,21	1,4	11,8	13,9
2 x 4	0,8	4,3	0,21	1,4	11,5	13,4
3 x 4	0,8	4,3	0,21	1,4	12,0	14,1
4 x 4	0,8	4,3	0,21	1,4	13,1	15,3
2 x 6	0,9	5,0	0,21	1,4	12,9	15,1
3 x 6	0,9	5,0	0,21	1,4	13,6	16,0
4 x 6	0,9	5,0	0,21	1,4	14,9	17,4
2 x 10	1,1	6,6	0,21	1,5	15,5	18,2
3 x 10	1,1	6,6	0,26	1,5	16,7	19,6
4 x 10	1,1	6,6	0,26	1,6	18,4	21,6
2 x 16	1,1	7,9	0,26	1,5	17,9	20,9
3 x 16	1,1	7,9	0,26	1,6	19,1	22,3
4 x 16	1,1	7,9	0,26	1,7	21,1	24,6
2 x 25	1,3	9,7	0,26	1,7	21,6	25,3
3 x 25	1,3	9,7	0,26	1,7	22,9	26,8
4 x 25	1,3	9,7	0,31	1,8	25,6	29,9
2 x 35	1,3	11,0	0,31	1,8	24,4	28,6
3 x 35	1,3	11,0	0,31	1,8	26,0	30,5
4 x 35 o 3x35+1x25	1,3	11,0	0,31	1,9	30,0	35,1
2 x 50	1,5	13,1	0,31	1,9	28,2	33,0
3 x 50	1,5	13,1	0,31	2,0	30,3	35,4
4 x 50 o 3x50+1x25	1,5	13,1	0,31	2,1	34,9	40,8

Table 8

Train Interior

SINGLE-CORE CABLES UNSHEATHED 0,6/1kV

CONDUCTOR
Material
class 5 tinned copper conductor complying with CEI EN 60228
Separator
eventual polyester colored tape

INSULATION
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter see table 9
Color
black if not elsewhere specified

Table 9

Nominal section [mm^2]	Average insulation thickness [mm]	External diameter [mm]	
		Minimum	Maximum
1	0,6	2,4	2,8
1,5	0,7	2,8	3,3
2,5	0,7	3,2	3,8
4	0,7	3,8	4,4
6	0,7	4,2	5,0
10	0,7	5,1	5,9
16	0,7	6,1	7,2
25	0,9	7,8	9,1
35	0,9	9,0	10,6
50	1,0	10,6	12,4
70	1,1	12,5	14,6
95	1,1	13,9	16,3
120	1,2	15,7	18,4
150	1,4	17,6	20,6
185	1,6	19,6	22,9
240	1,7	22,2	26,0
300	1,8	24,6	28,8
400	2,0	28,1	32,9

REDUCED DIMENSIONS SINGLE-CORE CABLES COMPLYING WITH EN 50264-3-1

SINGLE-CORE CABLES UNSHEATHED 1,8/3kV

CONDUCTOR
Material
class 5 tinned copper conductor complying with CEI EN 60228
Separator
eventual polyester colored tape

INSULATION
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter see table 10
Color
black if not elsewhere specified

Table 10

Nominal section [mm^2]	Average insulation thickness [mm]	External diameter [mm]	
		Minimum	Maximum
1,5	2,0	5,3	6,2
2,5	2,0	5,7	6,7
4	2,0	6,2	7,3
6	2,0	6,7	7,8
10	2,0	7,5	8,8
16	2,0	8,6	10,0
25	2,0	9,9	11,6
35	2,0	11,1	13,0
50	2,0	12,5	14,6
70	2,0	14,2	16,6
95	2,2	16,0	18,7
120	2,2	17,6	20,6
150	2,2	19,1	22,3
185	2,4	20,9	24,4
240	2,4	23,7	27,5
300	2,4	25,6	30,1
400	2,6	29,2	34,2

SINGLE-CORE CABLES SHEATHED 1,8/3kV

CONDUCTOR
Material
class 5 tinned copper conductor complying with CEI EN 60228
Separator
eventual polyester colored tape

INSULATION
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 11
Color
black if not elsewhere specified

SHEATH
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 11
Color
black if not elsewhere specified

Table 11

Nominal section [mm^2]	Average insulation thickness [mm]	Average sheath thickness [mm]	External diameter [mm]	
			Minimum	Maximum
1,5	1,3	0,8	5,7	6,7
2,5	1,3	0,8	6,0	7,0
4	1,3	0,8	6,5	7,6
6	1,3	0,8	7,0	8,1
10	1,5	0,8	8,2	9,6
16	1,5	0,8	9,2	10,8
25	1,8	1,0	11,5	13,4
35	1,8	1,0	12,7	14,9
50	1,8	1,0	14,1	16,5
70	1,8	1,0	15,8	18,5
95	2,2	1,0	18,0	21,0
120	2,2	1,0	19,6	22,9
150	2,2	1,2	21,4	25,1
185	2,4	1,2	23,4	27,4
240	2,4	1,2	25,9	30,3
300	2,4	1,2	28,1	32,9
400	2,6	1,4	32,0	37,4

REDUCED DIMENSIONS SINGLE-CORE CABLES COMPLYING WITH EN 50264-3-1

SINGLE-CORE CABLES SHEATHED 3,6/6kV

CONDUCTOR
Material
class 5 tinned copper conductor complying with CEI EN 60228
Separator
semiconductor black tape applied across cable with overlapping

INSULATION
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 12
Color
black if not elsewhere specified

SHEATH
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 12
Color
black if not elsewhere specified

Table 12

Nominal section [mm^2]	Average insulation thickness [mm]	Average sheath thickness [mm]	External diameter [mm]	
			Minimum	Maximum
2,5	2,6	0,8	8,6	10,1
4	2,6	0,8	9,1	10,7
6	2,6	0,8	9,6	11,2
10	2,6	0,8	10,4	12,2
16	2,6	0,8	11,5	13,4
25	2,9	1,0	13,7	16,1
35	2,9	1,0	14,9	17,5
50	2,9	1,0	16,4	19,1
70	2,9	1,0	18,0	21,1
95	2,9	1,0	19,5	22,8
120	2,9	1,2	21,4	25,1
150	2,9	1,2	22,9	2,8
185	3,2	1,2	25,1	29,4
240	3,4	1,4	28,3	33,1
300	3,4	1,4	30,6	35,8
400	3,4	1,4	33,7	39,4

All Tecnikabel cables are suitable for use in interior of public places

MULTI-CORE UNSCREENED CABLES WITH SHEATH 300/500V

CONDUCTOR
Material
class 5 tinned copper conductor complying with CEI EN 60228
Separator
eventual polyester colored tape

INSULATION
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 13
Color
black numbered if not elsewhere specified (upon request one core could be yellow/green)

ASSEMBLING
N° conductors + eventual filler and tape are assembled together

SHEATH
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 13
Color
black if not elsewhere specified

Number and nominal Section [n x mm^2]	Insulation average thickness [mm]	Insulation diameter [mm]	Sheath average thickness [mm]	External diameter [mm]	
				Minimum	Minimum
2 x 1	0,4	2,2	0,6	5,3	6,2
4 x 1	0,4	2,2	0,6	6,1	7,2
7 x 1	0,4	2,2	0,7	7,5	8,7
9 x 1	0,4	2,2	0,7	9,1	10,6
12 x 1	0,4	2,2	0,7	9,8	11,5
19 x 1	0,4	2,2	0,8	11,7	13,7
24 x 1	0,4	2,2	1,0	14,1	16,5
32 x 1	0,4	2,2	1,0	15,5	18,2
37 x 1	0,4	2,2	1,0	16,1	18,9
40 x 1	0,4	2,2	1,0	16,7	19,6
4 x 1,5	0,5	2,6	0,7	7,3	8,6
7 x 1,5	0,5	2,6	0,7	8,7	10,2
9 x 1,5	0,5	2,6	0,8	10,9	12,7
12 x 1,5	0,5	2,6	0,8	11,8	13,8
19 x 1,5	0,5	2,6	1,0	14,2	16,6
24 x 1,5	0,5	2,6	1,0	16,6	19,5
32 x 1,5	0,5	2,6	1,2	18,7	21,9
37 x 1,5	0,5	2,6	1,2	19,5	22,8
4 x 2,5	0,5	3,1	0,7	8,3	9,8
7 x 2,5	0,5	3,1	0,8	10,2	11,9
9 x 2,5	0,5	3,1	1,0	12,9	15,1
12 x 2,5	0,5	3,1	1,0	13,9	16,3
19 x 2,5	0,5	3,1	1,0	16,3	19,1
24 x 2,5	0,5	3,1	1,2	19,6	22,9

MULTI-CORE SCREENED CABLES WITH SHEATH 300/500V

CONDUCTOR
Material
class 5 tinned copper conductor complying with CEI EN 60228
Separator
eventual polyester colored tape

INSULATION
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 14
Color
black numbered if not elsewhere specified (upon request one core could be yellow/green)

ASSEMBLING
N° conductors + eventual filler and tape are assembled together

SCREENING
The screen is a braid of tinned copper

SHEATH
Material
Type LSZH Compound Code Designation complying with EN 50264-1
Thickness and external diameter: see table 14
Color
black if not elsewhere specified

Number and nominal section [n x mm^2]	Insulation average thickness [mm]	Insulation diameter [mm]	Maximum diameter of screen thread [mm]	Average thickness of sheath [mm]	External diameter [mm]	
					Minimum	Maximum
2 x 1	0,4	2,2	0,16	0,6	6,0	7,1
4 x 1	0,4	2,2	0,16	0,7	7,0	8,2
7 x 1	0,4	2,2	0,16	0,7	8,2	9,6
9 x 1	0,4	2,2	0,21	0,8	10,2	11,9
12 x 1	0,4	2,2	0,21	0,8	10,9	12,7
19 x 1	0,4	2,2	0,26	1,0	13,2	15,4
24 x 1	0,4	2,2	0,26	1,0	15,2	17,8
32 x 1	0,4	2,2	0,26	1,0	16,6	19,4
37 x 1	0,4	2,2	0,26	1,0	17,2	20,1
40 x 1	0,4	2,2	0,26	1,2	18,2	21,3
4 x 1,5	0,5	2,6	0,16	0,7	8,0	9,4
7 x 1,5	0,5	2,6	0,21	0,7	9,6	11,3
9 x 1,5	0,5	2,6	0,21	1,0	12,1	14,2
12 x 1,5	0,5	2,6	0,21	1,0	13,0	15,2
19 x 1,5	0,5	2,6	0,26	1,0	15,3	17,9
24 x 1,5	0,5	2,6	0,26	1,2	18,1	21,2
32 x 1,5	0,5	2,6	0,26	1,2	19,8	23,2
37 x 1,5	0,5	2,6	0,26	1,2	20,5	24,0
4 x 2,5	0,5	3,1	0,21	0,7	9,2	10,8
7 x 2,5	0,5	3,1	0,21	0,8	11,1	13,0
9 x 2,5	0,5	3,1	0,26	1,0	13,9	16,3
12 x 2,5	0,5	3,1	0,26	1,0	15,0	17,5
19 x 2,5	0,5	3,1	0,26	1,2	17,8	20,8
24 x 2,5	0,5	3,1	0,26	1,2	20,6	24,1

Table 14

MULTI-CORE UNSCREENED CABLES WITH SHEATH 0,6/1Kv

CONDUCTOR
Material
class 5 tinned copper conductor complying with CEI EN 60228
Separator
eventual polyester colored tape

INSULATION
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 15
Color
black numbered if not elsewhere specified (upon request one core could be yellow/green)

ASSEMBLING
N° conductors + eventual filler and tape are assembled together

SHEATH
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 15
Color
black if not elsewhere specified

Number and nominal section [n x mm^2]	Insulation average thickness [mm]	Insulation diameter [mm]	Average thickness of sheath [mm]	External diameter [mm]	
				Minimum	Minimum
2 x 1,5	0,7	3,1	0,7	7,2	9,0
3 x 1,5	0,7	3,1	0,7	7,7	9,5
4 x 1,5	0,7	3,1	0,7	8,5	10,5
2 x 2,5	0,7	3,5	0,7	8,0	10,0
3 x 2,5	0,7	3,5	0,7	8,5	10,5
4 x 2,5	0,7	3,5	0,7	9,4	11,6
2 x 4	0,7	4,1	0,7	9,1	11,3
3 x 4	0,7	4,1	0,7	9,7	12,0
4 x 4	0,7	4,1	0,8	10,9	13,4
2 x 6	0,7	4,6	0,8	10,1	12,4
3 x 6	0,7	4,6	0,8	10,7	13,2
4 x 6	0,7	4,6	1,0	12,2	14,9
2 x 10	0,7	5,8	1,0	12,5	15,4
3 x 10	0,7	5,8	1,0	13,3	16,5
4 x 10	0,7	5,8	1,0	14,7	18,2
2 x 16	0,7	7,1	1,0	14,9	18,4
3 x 16	0,7	7,1	1,0	16,0	19,6
4 x 16	0,7	7,1	1,2	18,0	22,1
2 x 25	0,9	8,9	1,2	18,7	23,0
3 x 25	0,9	8,9	1,2	20,0	24,7
4 x 25	0,9	8,9	1,4	22,6	27,6
2 x 35	0,9	10,2	1,2	21,2	25,9
3 x 35	0,9	10,2	1,2	23,0	28,2
4 x 35 o 3x35+1x25	0,9	10,2	1,4	25,7	31,2
2 x 50	1,0	12,3	1,4	25,1	30,7
3 x 50	1,0	12,3	1,4	26,3	32,2
4 x 50 o 3x50+1x25	1,0	12,3	1,6	30,0	36,5

Table 15

MULTI-CORE SCREENED CABLES WITH SHEATH 0,6/1kV

CONDUCTOR
Material
class 5 tinned copper conductor complying with CEI EN 60228
Separator
eventual polyester colored tape

INSULATION
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 16
Color
black numbered if not elsewhere specified (upon request one core could be yellow/green)

ASSEMBLING
N° conductors + eventual filler and tape are assembled together

SCREENING
The screen is a braid of tinned copper

SHEATH
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 16
Color
black if not elsewhere specified

Number and nominal section [n x mm^2]	Insulation average thickness [mm]	Insulation diameter [mm]	Maximum diameter of screen thread [mm]	Average thickness of sheath [mm]	External diameter [mm]	
					Minimum	Maximum
2 x 1,5	0,7	3,1	0,16	0,7	7,9	9,9
3 x 1,5	0,7	3,1	0,16	0,7	8,4	10,4
4 x 1,5	0,7	3,1	0,16	0,7	9,1	11,3
2 x 2,5	0,7	3,5	0,16	0,7	8,7	10,7
3 x 2,5	0,7	3,5	0,16	0,7	9,2	11,4
4 x 2,5	0,7	3,5	0,21	0,8	10,4	12,9
2 x 4	0,7	4,1	0,21	0,8	10,2	12,7
3 x 4	0,7	4,1	0,21	0,8	10,8	13,3
4 x 4	0,7	4,1	0,21	0,8	11,8	14,5
2 x 6	0,7	4,6	0,21	0,8	10,9	13,6
3 x 6	0,7	4,6	0,21	0,8	11,6	14,3
4 x 6	0,7	4,6	0,21	1,0	13,1	16,1
2 x 10	0,7	5,8	0,21	1,0	13,4	16,6
3 x 10	0,7	5,8	0,26	1,0	14,4	18,0
4 x 10	0,7	5,8	0,26	1,0	15,9	19,5
2 x 16	0,7	7,1	0,26	1,0	16,0	19,8
3 x 16	0,7	7,1	0,26	1,2	17,4	21,3
4 x 16	0,7	7,1	0,26	1,2	19,3	23,6
2 x 25	0,9	8,9	0,26	1,2	19,8	24,6
3 x 25	0,9	8,9	0,26	1,2	21,3	26,1
4 x 25	0,9	8,9	0,31	1,4	24,0	29,3
2 x 35	0,9	10,2	0,31	1,4	22,8	27,9
3 x 35	0,9	10,2	0,31	1,4	24,5	29,8
4 x 35 o 3x35+1x25	0,9	10,2	0,31	1,4	26,9	32,9
2 x 50	1,0	12,3	0,31	1,4	26,4	32,3
3 x 50	1,0	12,3	0,31	1,6	28,3	34,6
4 x 50 o 3x50+1x25	1,0	12,3	0,31	1,6	31,5	38,2

Table 16

FIRE RESISTANT POWER AND CONTROL CABLES
HAVING SPECIAL FIRE PERFORMANCE

APPLICATIONS

EN 50200 Single and multi core fire resistant cables, suitable for emergency systems in case of alarm, lightning, communication installations. Used on board of rolling stock in railways, metro and tramways.

- **Single-Core Unscreened and Unsheathed Cables 0,6/1kV**
- **Multi-Core Unscreened Cables with Sheath 300/500V**
- **Single-Core and Multi-Core Screened Cables with Sheath 300/500V**

All cables have Class 5 Tinned Copper Conductors according to IEC 60228,
Halogen-Free Insulation and Halogen-Free Sheath. They are for use in railway rolling stock as fixed wiring, or wiring where limited flexing in operation is encountered.
The requirements provide for a continuous conductor temperature not exceeding 90°C and maximum temperature for short circuit conditions of 200°C based on a duration of 5 seconds.
Under fire conditions the cables exhibit special performance characteristics in respect of maximum permissible flame propagation (flame spread) and maximum permissible emission of smoke and toxic gases.

EN 50200

OTHER CHARACTERISTICS

Standard Reference
EN 50200, EN 50264, EN 50305, EN 50355, EN 50343, DIN 5510, UNI 11170, NFPA 130, CEN-TS 45545-2

Electrical Resistance at 20°C
IEC 60228 Class 5

Fire Resistant Test Complying with EN 50200
830°C for 120 minutes

Insulation Resistance at 20°C
EN 50305 6.4.1

Maximum Conductor Temperature for Short Circuit
200°C for 5 seconds

Minimum Bending Radius
5 x Ø (unscreened)
10 x Ø (screened)

Temperature Range
-40°C ÷ + 90°C acc.to Code Designations
-25°C ÷ + 90°C acc.to Code Designations

Test on cables and materials
The electrical, physical and mechanical tests are compliant with the prescription of rule EN 50264-1.

CODE DESIGNATIONS

Insulation System (EN 50264-2-1 and 2-2)

EI 101	Low Temperature Resistant, Oil Resistant	Code Designation C
EI 102	Extra Low Temperature Resistant, Oil Resistant	Code Designation F
EI 103	Low Temperature Resistant, Extra Oil and Fuel Resistant	Code Designation J
EI 104	Extra Low Temperature Resistant, Extra Oil and Fuel Resistant	Code Designation M
EI 105	Extra Low Temperature Resistant, Non Oil Resistant	Code Designation O

Insulation System (EN 50264-3-1 and 3-2)

EI 106	Low Temperature Resistant, Oil Resistant	Code Designation C
EI 107	Extra Low Temperature Resistant, Oil Resistant	Code Designation F
EI 108	Low Temperature Resistant, Extra Oil and Fuel Resistant	Code Designation J
EI 109	Extra Low Temperature Resistant, Extra Oil and Fuel Resistant	Code Designation M
EI 110	Extra Low Temperature Resistant, Non Oil Resistant	Code Designation O

Sheath Type (EN50264-2-1, EN50264-2-2, EN50264-3-1 and EN50264-3-2)

EM 101	Low Temperature Resistant, Oil Resistant	Code Designation C
EM 102	Extra Low Temperature Resistant, Oil Resistant	Code Designation F
EM 103	Low Temperature Resistant, Extra Oil and Fuel Resistant	Code Designation J
EM 104	Extra Low Temperature Resistant, Extra Oil and Fuel Resistant	Code Designation M

SINGLE-CORE CABLES UNSHEATHED 0,6/1kV

CONDUCTOR
Material
class 5 tinned copper conductor complying with CEI EN 60228

FIRE PROTECTION
Material
Glass-Mica tape

INSULATION
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter see table 1
Color
Red if not elsewhere specified

Table 1

Nominal Section [mm^2]	Average insulation thickness [mm]	Max external diameter [mm]
1	0,8	3,5
1,5	0,8	3,8
2,5	0,8	4,2
4	0,8	4,9
6	0,9	5,7
10	1,1	7,1
16	1,1	8,8
25	1,3	10,3
35	1,3	11,8
50	1,5	13,8
70	1,5	15,8
95	1,6	17,7
120	1,6	19,6
150	1,9	22,0
185	1,9	24,0

MULTI-CORE UNSCREENED CABLES WITH SHEATH 300/500V

CONDUCTOR
Material
class 5 tinned copper conductor complying with CEI EN 60228

FIRE PROTECTION
Material
Glass-Mica tape

INSULATION
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 2
Color
black numbered if not elsewhere specified (upon request one core could be yellow/green)

ASSEMBLING
N° conductors + eventual filler and tape are assembled together

SHEATH
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 1
Color
Red if not elsewhere specified

Table 2

Nominal Section [mm^2]	Minimum thickness [mm]		Max external diameter [mm]
	Insulation	Sheath	
2 x 1	0,6	1,4	9,5
2 x 1,5	0,7	1,4	10,3
2 x 2,5	0,8	1,4	11,7
2 x 4	0,8	1,4	12,7
3 x 1	0,6	1,4	9,9
3 x 1,5	0,7	1,4	10,8
3 x 2,5	0,8	1,4	12,4
3 x 4	0,8	1,4	13,6
4 x 1	0,6	1,4	10,7
4 x 1,5	0,7	1,4	11,9
4 x 2,5	0,8	1,4	13,6
4 x 4	0,8	1,4	15

SINGLE-CORE AND MULTI-CORE SCREENED CABLES WITH SHEATH 300/500V

CONDUCTOR
Material
class 5 tinned copper conductor complying with CEI EN 60228

FIRE PROTECTION
Material
Glass-Mica tape

INSULATION
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 3
Color
black numbered if not elsewhere specified (upon request one core could be yellow/green)

ASSEMBLING
N° conductors + eventual filler and tape are assembled together

SCREENING
The screen is a braid of tinned copper

SHEATH
Material
Type LSZH Compound see Code Designation complying with EN 50264-1
Thickness and external diameter: see table 3
Color
Red if not elsewhere specified

N° x nominal Section [mm²]	Minimum thickness [mm]		Max external diameter [mm]
	Insulation	Sheath	
1 x 1	0,6	1,4	7
1 x 1,5	0,7	1,4	7,6
1 x 2,5	0,8	1,4	8,4
1 x 4	0,8	1,4	9
2 x 0,75 (*)	0,6	1,4	8,9
2 x 1	0,6	1,4	10,5
2 x 1,5	0,7	1,4	11,3
2 x 2,5	0,8	1,4	12,9
2 x 4	0,8	1,4	14
3 x 1	0,6	1,4	10,9
3 x 1,5	0,7	1,4	11,8
3 x 2,5	0,8	1,4	13,7
3 x 4	0,8	1,4	15
4 x 1	0,6	1,4	11,7
4 x 1,5	0,7	1,4	12,9
4 x 2,5	0,8	1,4	15
4 x 4	0,8	1,4	16,5
6x 1	0,6	1,4	13,3
6 x 1,5	0,7	1,4	14,6
6 x 2,5	0,8	1,4	17
6 x 4	0,8	1,5	18,6

Table 3

(*) ZO: Characteristic Impedance @ ≥ 1 MHz = 70 Ω ± 10%

MINIATURIZED CABLES

HAVING SPECIAL FIRE PERFORMANCE THIN WALL

APPLICATIONS

EN 50306 specifies requirements for, construction and dimensions of, single core, multicore and multipairs cables rated 300V to earth, of the following type:

Single Core (EN 50306-2)

- 300/500V unscreened (0,50mm² to 2,5mm²)

Multicore and Multipairs with standard wall sheathed (EN 50306-4)

- 300/500V unscreened, sheathed for either exposed or protected wiring (0,50mm² to 2,5mm², number of cores from 2 to 48)
- 300/500V screened, sheathed for either exposed or protected wiring (0,50mm² to 2,5mm², number of cores from 2 to 8)
- 300/500V screened, sheathed for either exposed or protected wiring (0,50mm² to 2,5mm², number of pairs from 2 to 8)

Note : Not all conductor sizes or number of cores are specified.

All cables have stranded Tinned Copper Conductors, thin wall thickness Halogen Free Insulation and standard thickness Halogen Free Sheath. Cable types are specified for use Exposed situations (Class E), and for Protected situations (Class P). They are for use in railway rolling stock as fixed wiring, or wiring where limited flexing in operation is encountered.
The requirements provide for a continuous operational life at temperatures of 105°C for single core and 90°C for multicore/multipairs cables, and a maximum temperature for short circuit conditions of 160°C based on a duration of 5 seconds.
Under fire conditions the cables exhibit special performance characteristics in respect of maximum permissible flame propagation (flame spread) and maximum permissible emission of smoke and toxic gases.

EN 50306-4

OTHER CHARACTERISTICS

Standard Reference
EN 50264, EN 50305, EN 50355, EN 50343, DIN 5510, UNI 11170, NFPA 130, CEN-TS 45545-2

Electrical Resistance at 20°C
IEC 60228 Class 5

Insulation Resistance at 20°C and 90°C
EN 50305 6.4.1 and 6.4.2

Minimum Bending Radius
4 x Ø (unscreened)
5 x Ø (screened)

Temperature Range
-40°C ÷ + 105°C acc.to Code Designations (Single Core)
-25°C ÷ + 105°C acc.to Code Designations (Single Core)
-40°C ÷ + 90°C acc.to Code Designations (Multicore/pair)
-25°C ÷ + 90°C acc.to Code Designations (Multicore/pair)

Test on cables and materials
The electrical, physical and mechanical tests are compliant with the prescription of rule EN 50264-1.

CODE DESIGNATIONS

Insulation System (50306-1, EN 50306-2)

Low Temperature Resistant, Oil Resistant	Code Designation C
Extra Low Temperature Resistant, Oil Resistant	Code Designation F
Low Temperature Resistant, Extra Oil and Fuel Resistant	Code Designation J
Extra Low Temperature Resistant, Extra Oil and Fuel Resistant	Code Designation M

Sheath Type (EN50264-1, 50306-1, EN50306-4)

EM 101 Low Temperature Resistant, Oil Resistant	Code Designation C
EM 102 Extra Low Temperature Resistant, Oil Resistant	Code Designation F
EM 103 Low Temperature Resistant, Extra Oil and Fuel Resistant	Code Designation J
EM 104 Extra Low Temperature Resistant, Extra Oil and Fuel Resistant	Code Designation M

SINGLE-CORE CABLES UNSHEATHED 300/500V

CONDUCTOR
Material
tinned copper complying with CEI EN 60228. Configuration according to table A

INSULATION
Material
double layer of olefinic thermoplastic mixture see Code Designations complying with EN 50306-1
Thickness and external diameter: see table A
Color
White if not elsewhere specified

Table A

CONDUCTOR								
		Diameter [mm]						
Nominal section [mm^2]	Number and diameter of strands [mm]	min	max	Maximum electrical resistance [Ω/km]	Minimum insulation thickness [mm]	Minimum insulation resistance at 20°C [MΩxkm]	External diameter [mm] min	External diameter [mm] max
0,5	19x0,18	0,80	0,95	40,1	0,18	600	1,15	1,45
0,75	37x0,16 (a)	1,00	1,15	26,7	0,18	500	1,35	1,65
1	37x0,18 (a)	1,10	1,30	20,0	0,18	500	1,45	1,80
1,5	37x0,23 (a)	1,45	1,65	13,7	0,22	400	1,95	2,30
2,5	37x0,30 (a)	1,85	2,15	8,21	0,28	400	2,50	2,85

(a) Also formationwith 19 strands is possible.

Table A1

Nominal section [mm^2]	Minimum charge for dynamic charge [N]	Stripping force for adherence [N] min	Stripping force for adherence [N] max
0,5	70	7	45
0,75	70	8	60
1	70	12	70
1,5	100	15	90
2,5	120	25	150

Note: Available also fire resistant construction complying with EN 50200 standard.

MULTI-CORE UNSCREENED CABLES WITH SHEATH 300/500V

CONDUCTOR
Material
tinned copper conductor complying with CEI EN 60228.
Construction as per table A

INSULATION
Material
double layer of olefinic thermoplastic mixture see Code Designations complying with EN 50306-1
Thickness and outer diameter: see table A
Color
white numbered if not elsewhere specified

ASSEMBLING
N° conductors + eventual filler and tape are assembled together

SHEATH
Material
Type LSZH Compound see Code Designations complying with EN 50264-1
Thickness and outer diameter according to cable class, E exposed, P protected: see table B
Color
black if not elsewhere specified

Note: Available also fire resistant construction complying with EN 50200 standard.

Table B

Core number and nominal section [mm^2]	Class E cables			Class P cables		
	Minimum sheath thickness [mm]	External diameter [mm]		Minimum sheath thickness [mm]	External diameter [mm]	
		min	max		min	max
4x0,5	1,0	5,5	6,5	0,42	4,1	5,1
5x0,5	1,0	5,8	6,9	0,42	4,4	5,5
7x0,5	1,0	6,3	7,3	0,42	4,9	5,9
9x0,5	1,0	6,3	7,3	0,42	4,9	5,9
13x0,5	1,0	8,3	9,3	0,56	7,3	8,3
19x0,5	1,0	9,0	10,2	0,56	8,1	9,1
37x0,5	1,0	12,3	13,5	0,56	10,8	12,0
4x0,75	1,0	6,0	7,0	0,42	4,6	5,6
7x0,75	1,0	6,9	7,9	0,42	5,5	6,5
13x0,75	1,0	9,1	10,3	0,56	8,2	9,2
19x0,75	1,0	10,0	11,2	0,56	9,0	10,2
37x0,75	1,0	13,2	14,4	0,56	12,2	13,4
48x0,75	1,0	14,8	16,4	0,56	13,9	15,5
4x1	1,0	6,3	7,3	0,42	4,9	5,9
7x1	1,0	7,3	8,3	0,42	6,0	7,0
13x1	1,0	9,7	10,9	0,56	8,7	9,9
19x1	1,0	10,7	11,9	0,56	9,8	11,0
37x1	1,0	14,0	15,6	0,56	13,3	14,5
4x1,5	1,0	7,4	8,4	0,42	6,0	7,0
7x1,5	1,0	8,6	9,8	0,56	7,7	8,7
13x1,5	1,0	11,7	12,9	0,56	10,7	11,9
19x1,5	1,0	13,0	14,2	0,56	12,0	13,2
37x1,5	1,0	17,2	18,8	0,56	16,2	17,8
2x2,5	1,0	7,7	8,7	0,56	6,7	7,7
3x2,5	1,0	8,1	9,1	0,56	7,7	8,1
4x2,5	1,0	8,8	10,0	0,56	7,9	8,9

MULTI-CORE SCREENED CABLES WITH SHEATH 300/500V

CONDUCTOR
Material
tinned copper complying with CEI EN 60228. Construction according to table A

INSULATION
Material
double layer of olefinic thermoplastic mixture see Code Designations complying with EN 50306-1
Thickness and outer diameter: see table A
Color
white numbered if not elsewhere specified

ASSEMBLING
N° conductors + eventual filler and tape are assembled together

SCREENING
The screen is a braid of tinned copper

SHEATH
Material
Type LSZH Compound see Code Designations complying with EN 50264-1
Thickness and outer diameter according to class of cable, E exposed, P protected: see table C
Color
black if not elsewhere specified

Note: Available also fire resistant construction complying with EN 50200 standard.

Table C

Core number and nominal section [mm^2]	Class E cables			Class P cables		
	Minimum sheath thickness [mm]	External diameter [mm]		Minimum sheath thickness [mm]	External diameter [mm]	
		min	max		min	max
2x0,5	1,0	5,5	6,5	0,42	4,1	5,1
3x0,5	1,0	5,7	6,7	0,42	4,3	5,3
4x0,5	1,0	6,1	7,1	0,42	4,7	5,7
6x0,5	1,0	6,9	7,9	0,42	5,5	6,5
8x0,5	1,0	7,5	8,5	0,42	6,0	7,0
2x0,75	1,0	5,9	6,9	0,42	4,5	5,5
3x0,75	1,0	6,2	7,2	0,42	4,7	5,7
4x0,75	1,0	6,5	7,5	0,42	5,2	6,2
6x0,75	1,0	7,5	8,5	0,42	6,1	7,1
8x0,75	1,0	8,2	9,2	0,42	6,6	7,6
2x1	1,0	6,2	7,2	0,42	4,7	5,7
3x1	1,0	6,5	7,5	0,42	5,1	6,0
4x1	1,0	6,9	7,9	0,42	5,5	6,5
6x1	1,0	8,0	9,0	0,42	6,6	7,6
8x1	1,0	8,6	9,8	0,56	7,7	8,7
2x1,5	1,0	7,1	8,1	0,42	5,7	6,7
3x1,5	1,0	7,4	8,4	0,42	6,0	7,0
4x1,5	1,0	8,0	9,0	0,42	6,6	7,6
6x1,5	1,0	9,2	10,4	0,56	8,3	9,3
8x1,5	1,0	10,2	11,4	0,56	8,9	10,1
2x2,5	1,0	8,3	9,3	0,56	7,3	8,3
3x2,5	1,0	8,6	9,8	0,56	7,7	8,7
4x2,5	1,0	9,4	10,6	0,56	8,4	9,6

MULTI-PAIR CABLES - INDIVIDUALLY SCREENED AND SHEATED WITH AN OVERALL SHEATH 300/500V

CONDUCTOR
Material
tinned copper complying with CEI EN 60228. Construction according to table A

INSULATION
Material
double layer of olefinic thermoplastic mixture see Code Designations complying with EN 50306-1
Thickness and outer diameter: see table A
Color
white numbered if not elsewhere specified

PAIR
Each pair screened and sheathed

ASSEMBLING
N° pairs screened and sheathed + eventual filler and tape are assembled together

SHEATH
Material
Type LSZH Compound see Code Designations complying with EN 50264-1
Thickness and outer diameter according to class of cable, E exposed, P protected: see table D
Color
black if not elsewhere specified

Core number and nominal section [mm^2]	Class E cables			Class P cables		
	Minimum sheath thickness [mm]	External diameter [mm]		Minimum sheath thickness [mm]	External diameter [mm]	
		min	max		min	max
2x2x0,5	1,0	10,1	11,3	0,56	9,0	10,2
3x2x0,5	1,0	10,8	12,0	0,56	9,6	10,8
4x2x0,5	1,0	11,8	13,0	0,56	10,7	11,9
7x2x0,5	1,0	13,9	15,5	0,56	13,0	14,2
2x2x0,75	1,0	10,9	12,1	0,56	9,8	11,0
3x2x0,75	1,0	11,6	12,8	0,56	10,5	11,7
4x2x0,75	1,0	12,8	14,0	0,56	11,6	12,8
7x2x0,75	1,0	15,1	16,7	0,56	14,0	15,6
2x2x1	1,0	11,3	12,5	0,56	10,2	11,6
3x2x1	1,0	12,0	13,2	0,56	10,9	12,1
4x2x1	1,0	13,2	14,4	0,56	12,1	13,3
7x2x1	1,0	15,7	17,3	0,56	14,6	16,2
2x2x1,5	1,0	13,3	14,5	0,56	12,2	13,4
3x2x1,5	1,0	14,0	15,6	0,56	13,1	14,3
4x2x1,5	1,0	15,5	17,1	0,56	14,3	15,9
7x2x1,5	1,0	18,7	20,3	0,56	17,6	19,2

Table D

Note: Available also fire resistant construction complying with EN 50200 standard.

TRANSMISSION CABLES

Train Interior

MVB - MULTIFUNCTION VEHICLE BUS

Type TK-MVB4x0,50

Conductor: Stranded tinned copper 22AWG
Insulation: Special thermoplastic polymer
Colours: White - Red - Black - Blue
Assembling: 4 conductors + eventual filler and tape are assembled together
Screen: Aluminium/Mylar tape + tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colours: Black or Green

Type TK-MVB4x0,50FR

Conductor: Stranded tinned copper 22AWG
Insulation: Special thermoplastic polymer
Colours: White - Red - Black – Blue
Protection: Flame barrier tape
Assembling: 4 conductors + eventual filler and tape are assembled together
Screen: Aluminium/Mylar tape + tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Green

Type TK-MVB2x0,50

Conductor: Stranded tinned copper 22AWG
Insulation: Special thermoplastic polymer
Colours: Red - Blue
Assembling: 2 conductors + eventual filler and tape are assembled together
Screen: Aluminium/Mylar tape + tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colours: Black or Green

Type TK-MVB2x0,50FR

Conductor: Stranded tinned copper 22AWG
Insulation: Special thermoplastic polymer
Colours: White - Black
Protection: Flame barrier tape
Assembling: 2 conductors + eventual filler and tape are assembled together
Screen: Aluminium/Mylar tape + tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Green

Note: other characteristics see TK-MVB TECHNICAL DATA

		MVB4x0,50	MVB4x0,50FR	MVB2x0,50	MVB2x0,50FR
Conductor resistance		≤ 40,1 Ω/km	≤ 40,1 Ω/km	≤ 40,1 Ω/km	≤ 40,1 Ω/km
Insulation resistance		≥ 500 MΩxkm	≥ 500 MΩxkm	≥ 500 MΩxkm	≥ 500 MΩxkm
Voltage rating		300/500 V	300/500 V	300/500 V	300/500 V
Test voltage		2000 V	2000 V	2000 V	2000 V
Characteristic Impedance	@0,5÷3 MHz	120 ±12 Ω	120 ±12 Ω	120 ±12 Ω	120 ±12 Ω
	@ 1,5 MHz	120 ±6 Ω	120 ±6 Ω	120 ±6 Ω	120 ±6 Ω
Transfer Impedance@ ≤ 20MHz		≤ 1 mΩ/m	≤ 1 mΩ/m	≤ 1 mΩ/m	≤ 1 mΩ/m
Mutual Capacitance		≤ 46 pF/m	≤ 46 pF/m	≤ 46 pF/m	≤ 46 pF/m
Nominal Velocity of Propagation		78 %	78 %	78 %	78 %
Attenuation	@ 1,5MHz	≤ 15 dB/km	≤ 15 dB/km	≤ 15 dB/km	≤ 15 dB/km
	@ 3 MHz	≤ 20 dB/km	≤ 20 dB/km	≤ 20 dB/km	≤ 20 dB/km
Nominal weight		90 kg/km	100 kg/km	65 kg/km	85 kg/km
Nominal diameter		7,4 mm	8,00mm	6,8 mm	7,5 mm
Minimum bending radius		10xØ	10xØ	10xØ	10xØ

Temperature Range -40÷ +90°C
Flame propagation EN 50305 9.1
Low Smoke
Halogen Free
Toxic gas

RS 485

Type TK-RS485-2x2x0,50

Conductor: Stranded tinned copper 0,50mm²
Insulation: Special thermoplastic polymer
Colours: White - Red ; Black - Blue
Pair: Two conductors twisted togheter
Assembling: 2 pairs + eventual filler and tape are assembled together
Screen: Aluminium/Mylar tape + tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Type TK-RS485-2x0,50+1x0,50

Pair 2x0,5 with controlled impedance
Conductor: Stranded tinned copper 0,50mm²
Insulation: Special thermoplastic polymer
Pair Colour: White - Red
Single core
Conductor: stranded tinned copper 0,50mm²
Insulation: Special double layers of oleolefinic insulation according to EN50306
Colours: Black
Assembling: 1 pair and Single core + eventual filler and tape are assembled together
Screen: Aluminium/Mylar tape + tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Type TK-RS485-2x0,60

Conductor: Stranded tinned copper 0,60mm²
Insulation: Special thermoplastic polymer
Pairs Colour: White - Red
First Screen: Tinned copper braid
Inner Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Second Screen: Tinned copper braid
Inner Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Note: other characteristics see TK-RS485 TECHNICAL DATA

		RS485-2x2x0,50	RS485-2x0,50+1x0,50	RS485-2x0,60
Conductor resistance		≤ 40,1 Ω/km	≤ 40,1 Ω/km	≤ 32,2 Ω/km
Insulation resistance		≥ 500 MΩxkm	≥ 500 MΩxkm	≥ 3000 MΩxkm
Voltage rating		300/500 V	300/500 V	300/500 V
Test voltage		2000 V	2000 V	2000 V
Characteristic Impedance	@0,75÷3 MHz	120 ±12 Ω	120 ±12 Ω	
	@ 1 MHz		120 ±6 Ω	120 ±6 Ω
Transfer Impedance@ ≤ 30MHz		≤ 30 mΩ/m	≤ 30 mΩ/m	≤ 10 mΩ/m
Mutual Capacitance		≤ 46 pF/m	≤ 46 pF/m	≤ 50 pF/m
Nominal Velocity of Propagation		78 %	78 %	78 %
Attenuation	@ 1 MHz	≤ 12,5 dB/km	≤ 12,5 dB/km	
	@ 2 MHz	≤ 18 dB/km	≤ 18 dB/km	
	@ 3 MHz	≤ 22,5dB/km	≤ 22,5dB/km	
	@ 200 KHz			≤ 6dB/km
Nominal weight		180 kg/km	70 kg/km	125 kg/km
Nominal diameter		10,2 mm	6,8mm	8,8 mm
Minimum Bending radius		10xØ	10xØ	5xØ

Temperature Range -40÷ +90°C
Flame propagation EN 50305 9.1
Low Smoke
Halogen Free
Toxic gas

CAN BUS

Type TK-CANBUS-2x(2x0,25)

Conductor: Stranded tinned copper 0,25mm²
Insulation: Special thermoplastic polymer
Colours: White - Red ; Black –Blue
Pairs Screen: Aluminium/Mylar tape + tinned copper braid
Pairs Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Overall Screen: Tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Type TK-CANBUS-2x(2x0,50)

Conductor: Stranded tinned copper 0,50mm²
Insulation: Special thermoplastic polymer
Colours: White - Red ; Black –Blue
Pairs Screen: Aluminium/Mylar tape + tinned copper braid
Pairs Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Overall Screen: Tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Note: other characteristics see TK-CANBUS TECHNICAL DATA

			CANBUS-2x2x0,25	CANBUS-2x2x0,50
Conductor resistance			≤ 93,8 Ω/km	≤ 40,1 Ω/km
Insulation resistance			≥ 500 MΩxkm	≥ 500 MΩxkm
Voltage rating			300/500 V	300/500 V
Test voltage			2000 V	2000 V
Characteristic Impedance	@0,75÷3 MHz		120 ±12 Ω	120 ±12 Ω
Transfer Impedance@ ≤ 30MHz			≤ 30 mΩ/m	≤ 30 mΩ/m
Mutual Capacitance			≤ 46 pF/m	≤ 46 pF/m
Nominal Velocity of Propagation			78 %	78 %
Attenuation	@ 1 MHz		≤ 22,8 dB/km	≤ 12,5 dB/km
	@ 2 MHz		≤ 33,7dB/km	≤ 18 dB/km
	@ 3 MHz		≤ 43,7,5dB/km	≤ 22,5dB/km
Nominal weight			180 kg/km	365 kg/km
Nominal diameter			11,8 mm	16,5mm
Minimum bending radius			10xØ	10xØ

Temperature Range -40÷ +90°C
Flame propagation EN 50266-2-4
Low Smoke
Halogen Free
Toxic gas

UIC CABLES
WTB (WIRED TRAIN BUS)

Type TK-WTB 2x0,50

Conductor: Stranded tinned copper 0,50mm²
Insulation: Special thermoplastic polymer
Colours: White - Black
Screen: Tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Type TK-WTB 2x0,75

Conductor: Stranded tinned copper 0,75mm²
Insulation: Special thermoplastic polymer
Colours: White - Black
Screen: Tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Type TK-WTB 2x0,75FR

Conductor: Stranded tinned copper 0,75mm²
Insulation: Special thermoplastic polymer
Colours: White - Black
Protection: Flame barrier tape
Screen: Aluminium/Mylar tape + tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Blue

Note: other characteristics see TK-UIC TECHNICAL DATA

TK-WTB 2x0,75FR

UIC CABLES
WTB (WIRED TRAIN BUS)

Type TK-UIC 9CORE
4x10mm²+2x6mm²+1x2,5mm²+2x0,75mm²

Pair 2x0,75 with controlled impedance
Conductor: Stranded tinned copper 0,75mm²
Insulation: Special thermoplastic polymer
Pair Colour: White- Black
Pair Screen: Aluminium/Mylar tape + tinned copper braid
Pair Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black
Signal / Power elements
Conductor: Stranded tinned copper 10mm²
Insulation: Cross-linked Material type EI105
Colours: White numbered
Conductor: Stranded tinned copper 6mm²
Insulation: Cross-linked polymer type EI105
Colours: White numbered
Conductor: Stranded tinned copper 2,5mm²
Insulation: Cross-linked Material type EI105
Colours: White numbered
Assembling: N° conductors + eventual filler and tape are assembled together
Overall Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Type TK-UIC 12CORE
2x4x1mm²+1x4x1mm²

Conductor: Stranded tinned copper 1mm²
Insulation: Cross-linked Halogen free
Colours: Red-Yellow-Black numbered
Protection: Flame barrier tape
Assembling: N° conductors + eventual filler and tape are assembled together
Inner sheath: Cross-linked Halogen free
Screen: Tinned copper braid
Sheath: Cross-linked Material, Flame Retardant, Halogen Free
Colour: Black

Note: other characteristics see TK-UIC TECHNICAL DATA

UIC CABLES
WTB (WIRED TRAIN BUS)

Type TK-UIC 16CORE
3x4x1mm²+1x4x1mm²

Quad 4x1 with controlled impedance
Conductor: Stranded tinned copper 1 mm²
Insulation: Special thermoplastic polymer
Colours: White numbered
Signal Quad 4x1
Conductor: Stranded tinned copper 1 mm²
Insulation: Double layers of olefinic insulation according to EN50306
Colours: White numbered
Assembling: N° conductors + eventual filler and tape are assembled together
Screen: Tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Type TK-UIC 18CORE
3x4x1mm²+1x4x1mm²+2x0,75mm²

Pair 2x0,75 with controlled impedance
Conductor: Stranded tinned copper 0,75mm²
Insulation: Special thermoplastic polymer
Pair Colours: White- Black
Pair Screen: Tinned copper braid
Pair Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black
Quad 4x1 with controlled impedance
Conductor: Stranded tinned copper 1 mm²
Insulation: Special thermoplastic polymer
Colour: White numbered
Signal Quad 4x1
Conductor: Stranded tinned copper 1 mm²
Insulation: Double layers of olefinic insulation according to EN50306
Colour: White numbered
Assembling: N° conductors + eventual filler and tape are assembled together
Screen: Tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Note: other characteristics see TK-UIC TECHNICAL DATA

		WTB2x0,50	WTB2x0,75	WTB2x0,75FR
Conductor resistance		≤ 40,1 Ω/km	≤ 26 Ω/km	≤ 26 Ω/km
Insulation resistance		≥ 500 MΩxkm	≥ 500 MΩxkm	≥ 500 MΩxkm
Voltage rating		300/500 V	300/500 V	300/500 V
Test voltage		1500 V	1500 V	1500 V
Characteristic Impedance	@0,5÷2 MHz	120 ±12 Ω	120 ±12 Ω	120 ±12 Ω
	@ 1 MHz	120 ±6 Ω	120 ±6 Ω	120 ±6 Ω
Transfer Impedance@ ≤ 20MHz		≤ 20 mΩ/m	≤ 20 mΩ/m	≤ 20 mΩ/m
Mutual Capacitance		≤ 65 pF/m	≤ 65 pF/m	≤ 65 pF/m
Attenuation	@ 1MHz	≤ 11 dB/km	≤ 10 dB/km	≤ 12 dB/km
	@ 2 MHz	≤ 17 dB/km	≤ 12 dB/km	≤ 14 dB/km
Nominal weight		90 kg/km	100 kg/km	65 kg/km
Nominal diameter		8,0 mm	8,00mm	6,8 mm
Minimum bending radius		10xØ	10xØ	10xØ

TK-UIC TECHNICAL DATA

		UIC9CORE	UIC12CORE	UIC16CORE	UIC18CORE
Conductor resistance		≤ 26 Ω/km (0,75mm²) ≤ 1,95 Ω/km (10mm²) ≤ 3,39Ω/km (6mm²) ≤ 8,21 Ω/km (2,5mm²)	≤ 20 Ω/km	≤ 20 Ω/km	≤ 26,7 Ω/km (0,75mm²) ≤ 20 Ω/km (1mm²)
Insulation resistance		≥ 500 MΩxkm	≥ 400 MΩxkm	≥ 500 MΩxkm	≥ 500 MΩxkm
Voltage rating		300/500 V	250 V	300/500 V	300/500 V
Test voltage		1500 V	1500 V	1500 V	2000 V
Characteristic Impedance	@0,5÷2 MHz	120 ±12 Ω*			120 ±12 Ω*
	@ 1 MHz				120 ±6 Ω*
	@ 0,5 MHz			120 ±6 Ω**	120 ±6 Ω**
Transfer Impedance@ ≤ 30MHz		≤ 30 mΩ/m			≤ 30 mΩ/m*
Transfer Impedance@ ≤ 20MHz				≤ 50 mΩ/m**	≤ 50 mΩ/m
Mutual Capacitance		≤ 65 pF/m*		≤ 65 pF/m**	≤ 65 pF/m* **
Attenuation	@ 1 MHz	≤ 10 dB/km*			≤ 10 dB/km*
	@ 2 MHz	≤ 12 dB/km*			≤ 12 dB/km*
Nominal weight		1050 kg/km	500 kg/km	360 kg/km	515 kg/km
Nominal diameter		26,5 mm	18,0mm	168 mm	18,0mm
Minimum bending radius		10xØ	6xØ	10xØ	7,5xØ

*Only for pair 0,75mm²
**Only for quad 1mm² with impedance 120 Ω

Temperature Range -40÷ +90°C
Flame propagation EN 50266-2-4
Low Smoke
Halogen Free
Toxic gas

ETHERNET CABLES

CATEGORY 5 ENHANCED

Type TK-SFTP 2x2xAWG22

Conductor: Stranded tinned copper 22AWG
Insulation: Special thermoplastic polymer
Pair Colours: White-Blue; Yellow- Orange
Assembling: 2 pairs + eventual filler and tape are assembled together
Screen: Aluminium/Mylar tape + tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colours: Black or Green

Type TK-SFTP 4x2xAWG22

Conductor: Stranded tinned copper 22AWG
Insulation: Special thermoplastic polymer
Pair Colours: White-Blue; White-Orange; White-Green; White-Brown
Assembling: 4 pairs + eventual filler and tape are assembled together
Screen: Aluminium/Mylar tape + tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Green

Type TK-SFTP 4xAWG22

Conductor: Stranded tinned copper 22AWG
Insulation: Special thermoplastic polymer
Quad Colours: White-Blue; Yellow-Orange
Assembling: 4 conductors + eventual filler and tape are assembled together
Inner Sheath: Halogen free material
Screen: Aluminium/Mylar tape + tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Green

Type TK-SFTP 4x2x2AWG26

Conductor: Stranded tinned copper 26AWG
Insulation: Polyethylene
Pair Colours: White/Blue-Blue; White/Orange-Orange; White/Green-Green; White/Brown- Brown
Assembling: 4 pairs + eventual filler and tape are assembled together
Screen: Aluminium/Mylar tape + tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Note: other characteristics see TK-SFTP Category 5 Enhanced TECHNICAL DATA

		SFTP2x2xAWG22	SFTP4x2xAWG22	SFTP4xAWG22	SFTP4x2xAWG26
Conductor resistance		≤ 60 Ω/km	≤ 60 Ω/km	≤ 60 Ω/km	≤ 170 Ω/km
Insulation resistance		≥ 500 MΩxkm	≥ 500 MΩxkm	≥ 500 MΩxkm	≥ 500 MΩxkm
Voltage rating		300V	300V	300V	300V
Test voltage		700 V	700 V	700 V	700 V
Characteristic Impedance	@1÷100 MHz	100 ±15 Ω	100 ±15 Ω	100 ±15 Ω	120 ±12 Ω
Transfer Impedance@ ≤ 10MHz		≤ 10 mΩ/m	≤ 10 mΩ/m	≤ 13 mΩ/m	≤ 1 mΩ/m
Mutual Capacitance		52 pF/m	52 pF/m	≤ 65 pF/m	55 pF/m
Nominal Velocity of Propagation		78 %	78 %	78 %	66 %
Attenuation	@ 1MHz	≤ 2,4 dB/100m	≤ 2,4 dB/100m	≤ 2,4 dB/100m	≤ 3,2 dB/100m
	@ 4 MHz	≤ 4,9 dB/100m	≤ 4,9 dB/100m	≤ 4,9 dB/100m	≤ 6,0 dB/100m
	@ 10 MHz	≤ 7,8 dB/100m	≤ 7,8 dB/100m	≤ 7,8 dB/100m	≤ 10,0 dB/100m
	@ 31,25 MHz	≤ 14,0 dB/100m	≤ 14,0 dB/100m	≤ 14,0 dB/100m	≤ 17,1 dB/100m
	@ 100 MHz	≤ 26,4 dB/100m	≤ 26,4 dB/100m	≤ 26,4 dB/100m	≤ 33,0 dB/100m
Next	@ 1MHz	≥ 65,3 dB/100m	≥ 65,3 dB/100m	≥ 65,3 dB/100m	≥ 65,3 dB/100m
	@ 4 MHz	≥ 56,3 dB/100m	≥ 56,3 dB/100m	≥ 56,3 dB/100m	≥ 56,3 dB/100m
	@ 10 MHz	≥ 50,3 dB/100m	≥ 50,3 dB/100m	≥ 50,3 dB/100m	≥ 50,3 dB/100m
	@ 31,25 MHz	≥ 42,9 dB/100m	≥ 42,9 dB/100m	≥ 42,9 dB/100m	≥ 42,9 dB/100m
	@ 100 MHz	≥ 35,3 dB/100m	≥ 35,3 dB/100m	≥ 35,3 dB/100m	≥ 35,3 dB/100m
Return loss	@ 4MHz	≥ 23 dB/100m	≥ 23 dB/100m	≥ 23 dB/100m	
	@ 10 MHz	≥ 25 dB/100m	≥ 25 dB/100m	≥ 25 dB/100m	
	@ 20 MHz	≥ 25 dB/100m	≥ 25 dB/100m	≥ 25 dB/100m	
	@ 31,25 MHz	≥ 23,6 dB/100m	≥ 23,6 dB/100m	≥ 23,6 dB/100m	
	@ 100 MHz	≥ 20,1 dB/100m	≥ 20,1 dB/100m	≥ 20,1 dB/100m	
Nominal weight		95 kg/km	115 kg/km	65 kg/km	65 kg/km
Nominal diameter		8 mm	8,50mm	6,5 mm	6,5 mm
Minimum bending radius		10xØ	10xØ	10xØ	10xØ

Temperature Range -40÷ +90°C
Flame propagation EN 50305 9.1
Low Smoke
Halogen Free
Toxic gas

CATEGORY 7

Type TK-SSTP 4x2xAWG23

Conductor: Stranded tinned copper 23AWG
Insulation: Foam Polyolefin
Pair Colours: White-Blue; White-Orange; White-Green; White-Brown
Pair Screen: Aluminium/Mylar tape
Assembling: 4 pairs + eventual filler and tape are assembled together
Overall Screen: Tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Type TK-SSTP 4x2xAWG24

Conductor: Stranded tinned copper 24AWG
Insulation: Foam Polyolefin
Pair Colours: White-Blue; White-Orange; White-Green; White-Brown
Pair Screen: Aluminium/Mylar tape
Assembling: 4 pairs + eventual filler and tape are assembled together
Overall Screen: Tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Note: other characteristics see TK-SSFTP Category 7 TECHNICAL DATA

			SSTP4x2xAWG23	SSTP4x2xAWG24
	Conductor resistance		≤ 69,5 Ω/km	≤ 168 Ω/km
	Insulation resistance		≥ 500 MΩxkm	≥ 500 MΩxkm
	Voltage rating		125 V	300V
	Test voltage		700 V	700 V
	Characteristic Impedance	@1÷600 MHz	100 ±15 Ω	100 ±15 Ω
	Transfer Impedance	@ ≤ 10MHz	≤ 10 mΩ/m	≤ 10 mΩ/m
		@ 30MHz	≤ 15 mΩ/m	≤ 15 mΩ/m
		@ 100MHz		≤ 20 mΩ/m
	Mutual Capacitance		43 pF/m	43 pF/m
	Nominal Velocity of Propagation		78 %	78 %
	Attenuation	@ 1MHz	≤ 2,9 dB/100m	≤ 2,9 dB/100m
		@ 10 MHz	≤ 8,5 dB/100m	≤ 8,5 dB/100m
		@ 31,25 MHz	≤ 15,2 dB/100m	≤ 15,2 dB/100m
		@ 100 MHz	≤ 27,8 dB/100m	≤ 27,8 dB/100m
		@ 200 MHz	≤ 40,1 dB/100m	≤ 40,1 dB/100m
		@ 300 MHz	≤ 50,0 dB/100m	≤ 50,0 dB/100m
		@ 600 MHz	≤ 73,3 dB/100m	≤ 73,3 dB/100m
	Next	@ 1MHz	≥ 80 dB/100m	≥ 77 dB/100m
		@ 10 MHz	≥ 80 dB/100m	≥ 77 dB/100m
		@ 31,25 MHz	≥ 80 dB/100m	≥ 77 dB/100m
		@ 100 MHz	≥ 72,4 dB/100m	≥ 69,4 dB/100m
		@ 200 MHz	≥ 67,9 dB/100m	≥ 64,9 dB/100m
		@ 300 MHz	≥ 65,3 dB/100m	≥ 62,3 dB/100m
		@ 600 MHz	≥ 60,8 dB/100m	≥ 57,8 dB/100m
	Return loss	@ 4MHz	≥ 23,1 dB/100m	≥ 23,1 dB/100m
		@ 10 MHz	≥ 25 dB/100m	≥ 25 dB/100m
		@ 31,25 MHz	≥ 23,6 dB/100m	≥ 23,6 dB/100m
		@ 100 MHz	≥ 20,1 dB/100m	≥ 20,1 dB/100m
		@ 200 MHz	≥ 17,3 dB/100m	≥ 17,3 dB/100m
		@ 300 MHz	≥ 17,3 dB/100m	≥ 17,3 dB/100m
		@ 600 MHz	≥ 17,3 dB/100m	≥ 17,3 dB/100m
	Nominal weight		91 kg/km	97 kg/km
	Nominal diameter		8,8 mm	8,30mm
	Minimum bending radius		8xØ	6xØ

Temperature Range -40÷ +90°C
Flame propagation EN 50305 9.1
Low Smoke
Halogen Free
Toxic gas

COAXIAL CABLES

On-board Security Camera

75 Ω

Type **TK-RG59**

Conductor: Stranded tinned copper 20AWG
Insulation: Foam Polyolefin
Screen: Tinned copper braid (with eventual tape)
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Green

Note: other characteristics see TK-Coaxial TECHNICAL DATA

50 Ω

Type TK-RG213

Conductor: Stranded tinned copper 20AWG
Insulation: Special thermoplastic polymer
Screen: Copper braid (with eventual tape)
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Type TK-RG223

Conductor: Silver copper 0,9 mm
Insulation: Special thermoplastic polymer
First Screen: Silver copper braid
Second Screen: Silver copper braid (with eventual tape)
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Type TK-RG316

Conductor: Stranded Silver copperweld 7x0,16 mm
Insulation: Special thermoplastic polymer
Screen: Silver copper braid + Aluminium /Mylar tape
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Type TK-RG400

Conductor: Stranded Silver copper 19x0,20 mm
Insulation: Special thermoplastic polymer
First Screen: Silver copper braid
Second Screen: Silver copper braid + Aluminium /Mylar tape
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Note: other characteristics see TK-Coaxial TECHNICAL DATA

50 Ω

Type **TK-RG58**

Conductor: Stranded tinned copper 19x0,18 mm
Insulation: XLPE
Screen: Tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Type **TK-RG214**

Conductor: Stranded silver copper 7x0,75 mm
Insulation: XLPE
First Screen: Silver copper braid
Second Screen: Silver copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Type **TK-RG142**

Conductor: Silver copper 0,95 mm
Insulation: Special thermoplastic polymer
First Screen: Silver copper braid
Second Screen: Silver copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Type **TK-RG174**

Conductor: Stranded copperweld 7x0,16mm
Insulation: XLPE
Screen: Tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Note: other characteristics see TK-Coaxial TECHNICAL DATA

		RG59	RG213	RG223	RG316	RG400
Conductor resistance		≤ 30 Ω/km	≤ 5,77 Ω/km	≤ 29,43 Ω/km	≤ 276 Ω/km	≤ 30 Ω/km
Insulation resistance			≥ 500 MΩxkm			
Voltage rating		500 V	3700 V	1900 V	500 V	750 V
Test voltage		2000 V	10000 V		2000 V	1000 V
Characteristic Impedance		75 ±3 Ω	50 ±2 Ω	50 ±2 Ω	50 ±2 Ω	50 ±2 Ω
Mutual Capacitance		56 pF/m	105 pF/m	105 pF/m	≤ 95 pF/m	≤ 98 pF/m
Nominal Velocity of Propagation		78 %	66 %	66 %	70 %	71%
Attenuation	@ 5 MHz	≤ 2,20 dB/100m				
	@ 10 MHz	≤ 3,20 dB/100m	≤ 1,80 dB/100m	≤ 7 dB/100m	≤ 19,7 dB/100m	
	@ 50 MHz	≤ 7,90 dB/100m		≤ 15,7 dB/100m	≤ 24,6 dB/100m	
	@ 100 MHz	≤ 11,20 dB/100m		≤ 27 dB/100m	≤ 36 dB/100m	
	@ 200 MHz	≤ 16,10 dB/100m	≤ 8,86 dB/100m			
	@ 400 MHz	≤ 23,30 dB/100m	≤ 13,5 dB/100m	≤ 39 dB/100m	≤ 68,9 dB/100m	≤ 31,3 dB/100m
	@ 1000 MHz	≤ 39,40 dB/100m		≤ 68,9 dB/100m	≤ 102 dB/100m	
	@ 3000 MHz		≤ 52,5 dB/100m		≤ 205 dB/100m	≤ 100,7 dB/100m
Nominal weight		65 kg/km	160 kg/km	55 kg/km	15 kg/km	50 kg/km
Nominal diameter		6,15 mm	10,30 mm	5,4 mm	3,1 mm	4,95 mm
Minimum bending radius		8 x Ø	8 x Ø	8 x Ø	12 x Ø	8 x Ø

		RG58	RG214	RG142	RG174
Conductor resistance		≤ 37,5 Ω/km	≤ 6 Ω/km	≤ 25,5 Ω/km	≤ 290 Ω/km
Insulation resistance					
Voltage rating					
Test voltage		5000 V	10000 V	5000 V	2000 V
Characteristic Impedance		50 ±2 Ω	50 ±2 Ω	50 ±2 Ω	50 ±2 Ω
Mutual Capacitance		100 pF/m	100 pF/m	100 pF/m	100 pF/m
Nominal Velocity of Propagation		66 %	66 %	72 %	66 %
Attenuation	@ 50 MHz	≤ 9,7 dB/100m	≤ 4,7 dB/100m		≤ 17,5 dB/100m
	@ 100 MHz	≤ 13,9 dB/100m	≤ 7,1 dB/100m		≤ 25,8 dB/100m
	@ 200 MHz	≤ 20,4 dB/100m	≤ 10,4 dB/100m		≤ 38,2 dB/100m
	@ 300 MHz			≤ 27 dB/100m	
	@ 400 MHz	≤ 30.0 dB/100m			≤ 54,9 dB/100m
	@ 500 MHz		≤ 17,4 dB/100m		
	@ 600 MHz	≤ 37,9 dB/100m		≤ 40 dB/100m	≤ 68,6 dB/100m
	@ 860 MHz	≤ 46,9 dB/100m			≤ 81,2 dB/100m
	@ 900 MHz			≤ 51 dB/100m	
	@ 1000 MHz	≤ 51,8 dB/100m	≤ 26,2 dB/100m		≤ 87,5 dB/100m
	@ 1200 MHz			≤ 61 dB/100m	
	@ 1500 MHz			≤ 69 dB/100m	
	@ 3000 MHz		≤ 55 dB/100m	≤ 107 dB/100m	
Nominal weight		40 kg/km	205 Kg/km	60 Kg/km	12,5 Kg/km
Nominal diameter		4,95 mm	10,8 mm	5,0 mm	2,80 mm
Minimum bending radius		6 x Ø	5 x Ø	5 x Ø	5 x Ø

Temperature range:	-40°C +90°C
Flame retardant propagation:	EN 60332-1-2
Fire retardant propagation:	EN 50305 par. 9.1
Low smoke density:	EN 61034-2 ≥ 70 %
Halogen acid gas emission:	EN 50267-2-1 ≤ 0,5%
Degree of acidity of gases evolved during of the combustion	EN 50267-2-2
Ph:	≥ 4,3
Conduttivity:	≤ 10 µS/mm
No toxic gases:	≤ 3 EN 50305 par. 9.2

Temperature Range -40÷ +90°C
Flame propagation EN 50305 9.1
Low Smoke
Halogen Free
Toxic gas

CCTV / VGA / AUDIO CABLES

CCTV / VGA CABLES

Type TK-CCTV/VGA

3Coax75Ω+3x26AWG

Coax
Conductor: Stranded tinned copper 28AWG
Insulation: Special thermoplastic polymer
Screen: Tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colours: Red-Green-Blue

26AWG
Conductor: Stranded tinned copper 26AWG
Insulation: Cross-linked Material type EI105
Colours: White-Orange-Brown
Assembling: N° conductors + eventual filler and tape are assembled together
Screen: Tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Grey

Note: other characteristics see TK-CCTV/VGA TECHNICAL DATA

AUDIO CABLES

Type TK-AUDIO CABLE
3x(2x0,60)

Conductor: Stranded tinned copper 0,60 mm²
Insulation: Special thermoplastic polymer
Colours: White – Blue; White–Orange; White-Green
Pair Screen: Tinned copper braid
Pair Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colours: Black Numbered
Assembling: 3 elements + eventual filler and tape are assembled together
Screen: Tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

		CCTV/VGA	AUDIO
Conductor resistance		≤ 230 Ω/km (28AWG) ≤ 140 Ω/km (26AWG)	≤ 37 Ω/km
Insulation resistance		≥ 500 MΩxkm	≥ 2500 MΩxkm
Voltage rating		30 V	300/500 V
Test voltage		1000 V	2000 V
Characteristic Impedance	@1MHz	75 ±10 Ω*	110 ±10 Ω
Transfer Impedance@ ≤ 30MHz		≤ 30 mΩ/m	
Mutual Capacitance		≤ 56 pF/m*	≤ 50 pF/m
Nominal Velocity of Propagation		80 %*	78 %
Nominal weight		115 kg/km	335 kg/km
Nominal diameter		8,8mm	15,5mm
Minimum bending radius		10xØ	10xØ

*Only for Coax

Temperature Range -40÷ +90°C
Flame propagation EN 50305 9.1
Low Smoke
Halogen Free
Toxic gas

Note: other characteristics see TK-CCTV/VGA TECHNICAL DATA

RF VALIDATION TICKET CABLES


To Trains

RF VALIDATION TICKET CABLES

Type TK-2x22AWG

Conductor: Stranded tinned copper 22AWG
Insulation: Special double layer of oleolefinic insulation according to EN50306
Colors: White - Red
Assembling: 2 conductors + eventual filler and tape are assembled together
Screen: Tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Type TK-4x22AWG+2x22AWG

Single pair Screened
Conductor: Stranded tinned copper 22AWG
Insulation: Special double layer of oleolefinic insulation according to EN50306
Pair Colour: White - Red
Pair Screen: Tinned copper braid
Other elements
Conductor: Stranded tinned copper 22AWG
Insulation: Special double layer of oleolefinic insulation according to EN50306
Colours: Black-Orange-Blue-Brown
Assembling: N° elements + eventual filler and tape are assembled together
Screen : Tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Type TK-8x22AWG+2x(2x22AWG)

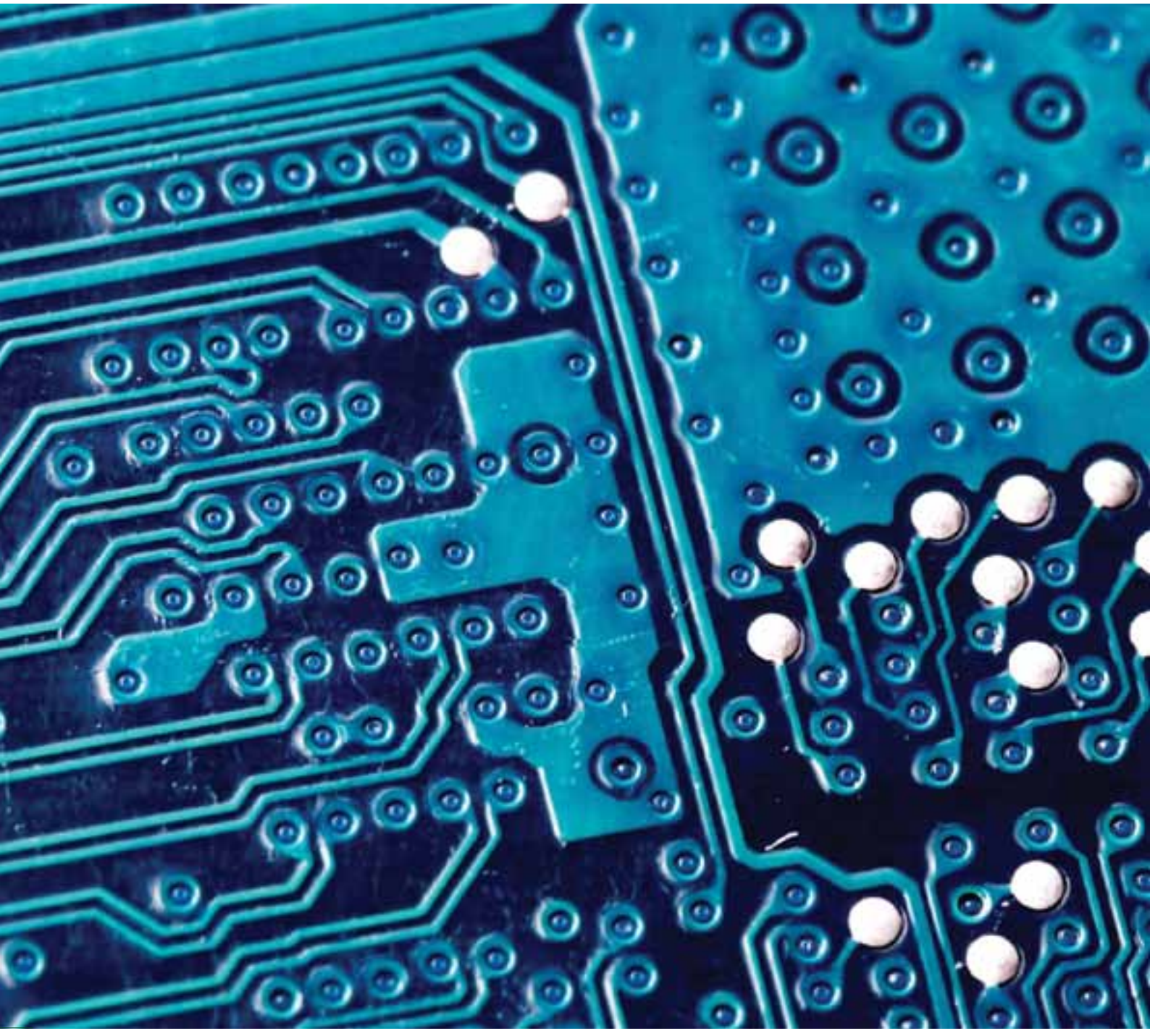
Single pair Screened
Conductor: Stranded tinned copper 22AWG
Insulation: Special double layer of oleolefinic insulation according to EN50306
Pair Colours: White – Red; Black- Orange
Pair Screen: tinned copper braid
Other elements
Conductor: Stranded tinned copper 22AWG
Insulation: Special double layer of oleolefinic insulation according to EN50306
Colours: Blue-Brown-Green-Pink-Violet-White/Red-White/Black-White/Orange
Assembling: N ° elements + eventually filler and tape are assembled together
Screen: Tinned copper braid
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colour: Black

Note: other characteristics see TK-RF TECHNICAL DATA

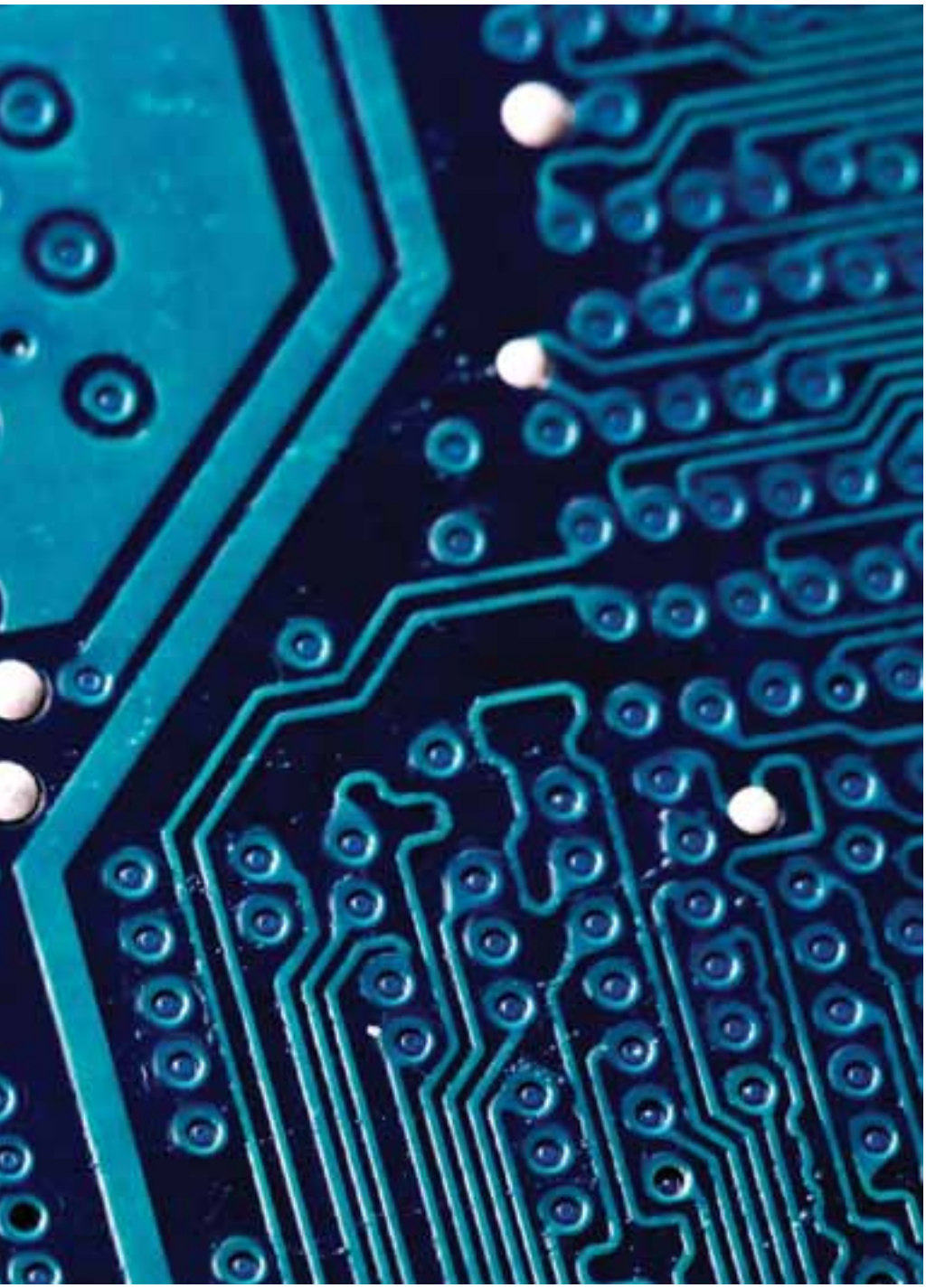
	2x22AWG	4x22AWG+2x22AWG	8x22AWG+2x(2X22AWG)
Conductor resistance	≤ 55 Ω/km	≤ 55 Ω/km	≤ 55 Ω/km
Insulation resistance	≥ 250 MΩxkm	≥ 250 MΩxkm	≥ 250 MΩxkm
Voltage rating	300/500 V	300/500 V	300/500 V
Test voltage	2000 V	2000 V	2000 V
Nominal weight	40 kg/km	90 kg/km	170 kg/km
Nominal diameter	5 mm	7 mm	10,4 mm
Minimum bending radius	10xØ	10xØ	10xØ

Temperature Range -40÷ +90°C
Flame propagation EN 50305 9.1
Low Smoke
Halogen Free
Toxic gas

WIRE WRAP TERMI POINT



Printed Circuit Board



WIRE WRAP TERMI POINT

Type **TK-WIRE-WRAP**

Conductor: Solid tinned copper
Insulation: Special oleolefinic insulation according to EN50306
Colour: Red

Type **TK-HIGH INSULATION**

Conductor: Stranded tinned copper
Insulation: Special oleolefinic insulation according to EN50306
Twisted only for multicore

TK-WIRE WRAP TECHNICAL DATA

	WIRE WRAP	HIGH INSULATION		MULTICORE HIGH INSULATION	
	1x26AWG	1x1 mm²	1x1,5mm²	2x20AWG	3x20AWG
Nominal diameter of conductor	0,4 mm	19x0.25mm	37x0,23mm	19x0,20 mm	19x0,20 mm
Conductor resistance	≤ 142,6 Ω/km				
Insulation resistance					
Voltage rating	300/500 V	1,8/3 kV	1,8/3 kV	1,8/3 kV	1,8/3 kV
Test voltage	2000 V	6500 V	6500 V	6500 V	6500 V
Nominal weight	2,4 kg/km	12 kg/km	12 kg/km	15 kg/km	23 kg/km
Nominal diameter	0,95 mm	2,1 mm	2,45 mm	3,80 mm	4,1 mm
Minimum bending radius	4xØ	4xØ	4xØ	4xØ	4xØ

Temperature Range -40÷ +105°C
Flame propagation EN 50305 9.1
Low Smoke
Halogen Free
Toxic gas

Note: other characteristics see TK-Wire Wrap TECHNICAL DATA

OPTICAL FIBER

Optical Fiber Strands

OPTICAL FIBER

Type **TK-TIGHT**

Fiber optic: Tight buffered nominal diameter 0,9mm
N° Tight assembling with aramidic yarns protection
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colours: Orange /Blue or Green

Type **TK-BREAKOUT**

Fiber optic: Tight buffered nominal diameter 0,9mm
Protection: Aramidic yarns
Inner sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
N° fiber optic sheated assembling toghether
Sheath: Cross-linked Material type EM 104, Flame Retardant, Halogen Free
Colours: Orange /Blue or Green

OPTICAL FIBER TECHNICAL DATA

	TIGHT					BREAKOUT						
Number of fiber	4	6	8	12	24	1	2	4	6	8	12	24
Nominal diameter of tight	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9
Nominal diameter of inner sheath								2,5	2,5	2,5	2,5	2,5
Nominal weight	25	30	35	45	70	6	13	60	90	130	150	320
Nominal diameter	5,2	6,0	6,2	6,7	8,5	2,5	2,5x5,5	8	9.5	11	13	18.5
Minimum bending radius	10xØ	10xØ	10xØ	10xØ	10xØ	10xØ	10xØ	10xØ	10xØ	10xØ	10xØ	10xØ

Temperature Range -40÷ +105°C
Flame propagation EN 50305 9.1
Low Smoke
Halogen Free
Toxic gas

Note: other characteristics see TK-Optical Fiber TECHNICAL DATA

	MM62,5 IEC 60793-2-10 Type A1b Telcordia GR-20- CORE	MM50 ITU-T G651.1 IEC 60793-2-10 Type A1a.1 Telcordia GR-20- CORE	MM50-OM3 ISO/IEC 11801 IEC 60793-2-10 Type A1a.2 Telcordia GR-20- CORE	MM50-OM4 ISO/IEC 11801 IEC 60793-2-10 Type A1a.2 Telcordia GR-20- CORE
Core Diameter	62,5±2 µm	50±2 µm	50±2 µm	50±2 µm
Core non-circularity	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Cladding diameter	125±1,0 µm	125±1,0 µm	125±1,0 µm	125±1,0 µm
Coating diameter	242±5 µm	242±5 µm	242±5 µm	242±5 µm
Cladding non-circularity	≤ 0,7 %	≤ 0,7 %	≤ 0,7 %	≤ 0,7 %
Core/Cladding concentricity error	≤ 1,0 µm	≤ 1,0 µm	≤ 1,0 µm	≤ 1,0 µm
Coating/cladding concentricity error	≤ 10 µm	≤ 6 µm	≤ 6 µm	≤ 6 µm
Numerical Aperture	0,275 ± 0,015 µm	0,200 ± 0,015 µm	0,200 ± 0,015 µm	0,200 ± 0,015 µm
Attenuation @ 850 nm	≤ 3,50 dB/km	≤ 2,80 dB/km	≤ 2,80 dB/km	≤ 2,80 dB/km
Attenuation @ 1300nm	≤ 1,00 dB/km	≤ 0,80 dB/km	≤ 0,80 dB/km	≤ 0,80 dB/km
Bandwidth @ 850 nm	≥ 200 MHz*km	≥ 500 MHz*km	≥ 1500 MHz*km	≥ 3500 MHz*km
Bandwidth @ 1300 nm	≥ 500 MHz*km	≥ 500 MHz*km	≥ 500 MHz*km	≥ 500 MHz*km
Proof test	³ 100 kpsi	³ 100 kpsi	³ 100 kpsi	³ 100 kpsi

	MULTIMODE STEP INDEX IEC 793-1 A.2.2.
Core diameter	200±5 µm
Cladding diameter	230 -0+10 µm
Coating diameter	500±30 µm
Core/clad offset	≤ 5 µm
Wavelength	820 nm
Bandwidth	20 MHz*km
Numerical Aperture	0,39±0,02 µm
Attenuation @ 820 nm	≤ 6 dB/km
Proof test	³ 150 kpsi


FIBER

	SMR-LWP ITU-T G652D IEC 60793-2-50 Type B.1.3 Telcordia GR-20- CORE	SMR ITU-T G657A IEC 60793-2-50 Type B.1.3 and B.6.A Telcordia GR-20- CORE	SMR ITU-T G657B IEC 60793-2-50 Type B.1.3 and B.6.A & B	SMR NZD ITU-T G655.E ITU-T G656 IEC 60793-2-50 Type B4/B5
Mode field Diameter @ 1310 nm	9,0±0,4 μm	9,0 ± 0,4 μm	8,9 ± 0,4 μm	
Mode field Diameter @ 1550 nm	10,1±0,5μm	10,1 ± 0,5 μm	9,9 ± 0,5 μm	9,2 ± 0,5 μm
Cladding diameter	125±0,7 μm	125± 0,7 μm	125± 0,7 μm	125± 1,0 μm
Coating diameter	242±7 μm	242±7 μm	242±7 μm	242±7 μm
Cladding non-circularity	≤ 0,7 %	≤ 0,7 %	≤ 0,7 %	≤ 1,0 %
Core/Cladding concentricity error	≤ 0,5 μm	≤ 0,5 μm	≤ 0,5 μm	≤ 0,6 μm
Coating/cladding concentricity error	≤ 12 μm	≤ 12 μm	≤ 12 μm	≤ 12 μm
Cable Cut off wavelength	≤ 1260 nm	≤ 1260 nm	≤ 1260 nm	≤ 1300 nm
Zero dispersion wavelength (λ_0)	1300÷1322 μm	1300÷1322 μm	1300÷1324 μm	≤ 1440 nm
Dispersion slope (S_0) @ (λ_0)	≤ 0,090 ps/(nm^2 * km)	≤ 0,090 ps/(nm^2 * km)	≤ 0,092 ps/(nm^2 * km)	
Chromatic dispersion @ 1285 – 1330 nm	≤ 3,5 ps/(nm * km)	≤ 3,5 ps/(nm * km)		
Chromatic dispersion @ 1550 nm	≤ 18 ps /(nm * km)	≤ 18 ps/(nm * km)		
Chromatic dispersion @ 1625 nm	≤ 22 ps/(nm * km)	≤ 22 ps/(nm * km)		
Chromatic dispersion @ 1530 – 1565 nm				5,5 ÷ 10 ps/(nm * km)
Chromatic dispersion @ 1565 – 1625 nm				7,5 ÷ 13,8 ps/(nm * km)
PMD @ 1550 nm	≤ 0,1 ps/√ km	≤ 0,1 ps/√ km	≤ 0,1 ps/√ km	≤ 0,2 ps/√ km
Attenuation @ 1310 nm	≤ 0,35 dB/km	≤ 0,35 dB/km	≤ 0,35 dB/km	≤ 0,40 dB/km
Attenuation @ 1383nm	≤ 0,35 dB/km	≤ 0,35 dB/km	≤ 0,35 dB/km	≤ 1,00 dB/km
Attenuation @ 1550 nm	≤ 0,25 dB/km	≤ 0,25 dB/km	≤ 0,25 dB/km	≤ 0,25 dB/km
Attenuation @ 1625 nm	≤ 0,28 dB/km	≤ 0,28 dB/km	≤ 0,28 dB/km	≤ 0,28dB/km
Attenuation with bending				
Mandrel Radius 15mm @1550 10 turns		≤ 0,25 dB	≤ 0,03 dB	
Mandrel Radius 15mm @1625 10 turns		≤ 1,0 dB	≤ 0,1 dB	
Mandrel Radius 10mm @1550 1 turns		≤ 0,75 dB	≤ 0,1 dB	
Mandrel Radius 10mm @1625 1 turns		≤ 1,5 dB	≤ 0,2 dB	
Mandrel Radius 7,5mm @1550 1 turns			≤ 0,5dB	
Mandrel Radius 7,5mm @1625 1 turns			≤ 1,0 dB	
Proof test	[3] 100 kpsi	[3] 100 kpsi	[3] 100 kpsi	[3] 100 kpsi

RAILWAY SIGNALLING

Some cables of this type are installed along the railway embankment (ballast) for the following systems:

- SIGNALLING
- SAFETY
- POWERING OF AUTOMATIC BLOCK
- POWERING OF LIGHTING AND MOTIVE FORCE
- TELECOMMUNICATIONS

or where emergency functioning of the equipment is required.

Others are used for internal wiring and powering of the equipment.

TECNIKABEL is specialized in the family of halogen-free, fire-retardant cables with reduced emission of toxic fumes and gases; these cables are usually installed in tunnels or places where there is a risk for persons and/or for the equipment installed.

RAILWAY SIGNALLING

- **Electric cables** for fixed laying in the internal circuits of modular technology signalling and safety systems
- Armored and unarmored **electric cables** for the external circuits of signalling and safety systems, fire-retardant and with reduced emission of fumes, toxic and corrosive
- gases-operating voltage 450/750V
- **Electric cables** for fixed laying for the automatic block powering, fire-retardant and with reduced emission of fumes, toxic and corrosive gases-operating voltage 2.3/3 kV
- **Electric cables** for fixed laying in the internal circuits of signalling and safety systems,
- fire-retardant and with reduced emission of fumes, toxic and corrosive gases
- **Electric cables** for fixed laying in the internal circuits of modular technology signalling and safety systems, fire-retardant and with reduced emission of fumes, toxic and corrosive gases
- **Electric cables** for fixed laying for lighting and motion, fire-retardant and with reduced emission of fumes, toxic and corrosive gases. Nominal voltage 0.6/1kV
- **Electric cables** for fixed laying for emergency and safety systems, fire-resistant and with reduced emission of fumes, toxic and corrosive gases. Nominal voltage 0.6/1 kV
- 4 x 7/10 pair **telecommunications cables** with corrugated steel armor bonded to the external sheath (H9)
- Imbalance detection **cable with polyethylene insulation** with two individual screened pairs protected lengthwise with double-plated aluminium strip and bonded to the intermediate polyethylene sheath with coil of galvanized steel wires with **PVC** external sheath
- Imbalance detection **cable with polyethylene insulation** with two individual screened pairs protected lengthwise with double-plated aluminum strip and bonded to the intermediate polyethylene sheath with coil of galvanized steel wires with **PVC** external sheath
- 16mm dropper for overhead railway electric traction line hangers 3 kV d.c. and 25 kV a.c.
- SCMT cables for BOA-Encoder connection up to 1 km, 3 km and 5 km
- Hybrid CDB/AF cables steel/copper alloy
- 380 V power cables for RED systems
- POC, PPD, PPS connections cables
- Railways ADSS Bullet-Proof Optical Cable
- Railways ADSS Optical Cable
- Railways All Dielectric Fire Resistant & Rodent Proof Optical Cable
- Railways All Dielectric Rodent Proof Optical Cable
- Railways All Dielectric Fire Resistant & Rodent Proof Optical Cable

Optical Cable 32 O.F.

Signalling Cable Armoured

Notes

Notes

Notes

Notes

Notes

CONTACT

TURIN: Via Brandizzo, 243 - 10088 Volpiano (TO) Italy - Tel. +39 011 9951997 - Fax +39 011 9953062
ROME: Via Casali delle Cornacchiole, 154 - 00178 Rome - Italy - Tel. +39 06 50992552 - Fax +39 06 50514022
Website: www.tecnikabel.it

TecniKabel

SPECIAL ELECTRICAL CABLES

AGENT/DEALER

CONTACT

TURIN: Via Brandizzo, 243 - 10088 Volpiano (TO) Italy - Tel. +39 011 9951997 - Fax +39 011 9953062
ROME: Via Casali delle Cornacchiole, 154 - 00178 Rome - Italy - Tel. +39 06 50992552 - Fax +39 06 50514022
Website: www.tecnikabel.it