

ACOLAN[®] 2001

Information related to cable installation

Colours coding:

ACOPTIC		
Optical fibre or internal sheath number	FOTAG Coding	France Télécom Coding
1	blue	red
2	orange	blue
3	green	green
4	brown	yellow
5	grey	purple
6	white	colourless
7	red	orange
8	black	grey
9	yellow	brown
10	purple	black
11	pink	turquoise
12	turquoise	pink

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Pair number	Coding for CTD 20 - 4P/8P/12P cables	
	Wire 1	Wire 2
1	grey	white
2	blue	green
3	orange	yellow
4	purple	brown

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Pair Number	FOTAG Coding	
	Wire 1	Wire 2
1	white/blue ring	blue
2	white/orange ring	orange
3	white/green ring	green
4	white/brown ring	brown

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Quad number	Pair number	Coding for CTD 20 and L120 32P/64P/128P cables	
		Wire 1	Wire 2
1	1	grey	white
	2	purple	blue
2	3	grey	yellow
	4	purple	brown
3	5	grey	black
	6	purple	red
4	7	grey	green
	8	purple	white

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Pair number	Coding for L120-4P/8P/12P cables	
	Wire 1	Wire 2
1	grey	white
2	blue	pink
3	orange	yellow
4	purple	brown

Insulation and sheaths:

	LSOH	Polyethylene (Pe)	PVC
Tensile strength	ppp	pppp	ppp
Flexibility	pp	ppp	ppp
Tearing resistance	ppp	pppp	ppp
Abrasion resistance	ppp	pppp	ppp
Service temperature	- 20°C + 90°C	- 40°C + 70°C	- 15°C + 105°C
Fire resistance	ppp	p	ppp
Low opacity smoke emissions	pppp	ppp	p
Low acid gas emission	pppp	pppp	p
Low toxicity of smoke	pppp	pppp	p
Water resistance	ppp	pppp	p
U.V. resistance	ppp	pppp	ppp
Oil resistance	pp	ppp	ppp
Ageing resistance	ppp	pppp	pppp
	pppp Excellent	pp Good	p Poor

Conversion of AWG gauge into mm:

AWG	34/1	32/1	30/1	28/1	26/1	24/1	23/1	22/1	20/1	18/1	16/1	14/1
Nominal diameter (mm)	0.16	0.203	0.254	0.32	0.404	0.511	0.55	0.643	0.813	1.204	1.29	1.628
AWG	32/7	30/7	28/7	26/7	24/7	22/7	20/7	18/7	16/7			
Nominal diameter (mm)	0.079	0.102	0.127	0.16	0.203	0.254	0.32	0.404	0.51			
AWG	26/19	24/19	22/19	20/19	18/19	16/19	14/19					
Nominal diameter (mm)	0.101	0.127	0.16	0.203	0.254	0.287	0.361					

A/B =

A : Gauge of single or multi-strand conductor.

B : Number of strands.

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Standards defining reaction to fire

Flame retardant properties:

European standard	EN 50265.2.1
International standard	IEC 60332-1
French standard	NF C 32-070 2.1 (Category C2)
Other standards	UL 1581 (VW1) ISO 6722

The test is carried out on an insulated wire or cable installed vertically. The tests according to IEC 332-1 and NFC 32070 2.1 are similar, the sole difference being the time during which the flame is applied. IEC 332-1 values are given according to cable diameter, NFC 32070 2.1 according to cable weight.

Fire retardant properties:

European standard	EN 50266
International standard	IEC 60332-3
French standard	NF C 32-070 2.2 (Category C1) NFC 32-072 ou EN 50266
Other standards	IEEE 383

The tests according to IEC 332-3 (NFC 32072) comprise 3 categories of test (A - B - C), depending on the volume of combustible material. These tests determine the fire propagation properties of a number of vertically layered cables placed in front of a 20 KW burner.

Category	Volume of combustible material (litre/metre)	Duration of application of flamme (min.)
A	7	40
B	3.5	40
C	1.5	20

The test is satisfactory if the carbonised part of the cable sample does not extend more than 2.50 m above the lower base of the burner.

For standard NFC 32070-2.2 (or Category C1), a vertically installed cable or a bundle of cables is exposed to the effects of a radiating oven (approx. 830°C) and forced ventilation. Pilot flames arranged above the oven burn off the emitted gasses. The test duration is 30 minutes.

The test is satisfactory if the carbonised part of the cable sample does not extend more than 0.80 m above the upper base of the oven.

Fire resistance:

European standard	EN 50200
International standard	IEC 60331
French standard	NF C 32-070.2.3 (Category CR1)

The tests according to IEC 331 and NFC 32070 CR1 are somewhat different but both define the fire resistance properties of a cable during and after prolonged exposure to fire.

Smoke emission standards:

European standard	EN 50268
International standard	IEC 61034
French standard	NF C 20-902 NF C 32073

The tests defined by the standards are based on the measurement of the opacity of the smoke emitted during combustion of the materials. For both standards the materials are subjected to a radiant heat source, with or without the application of a flame. The speed of obscuration is then measured over a given time. The test to IEC 1034 is performed on the cable itself, that to NFC 20902 on its constituent materials.

Emission of toxic and corrosive gas

Toxicity

International standard	IEC 754.1
French standard	NF C 20-454

The tests defined by these standards serve to define the Conventional Toxicity Index (CTI) of the gasses emitted by the insulating or sleeving material during combustion at 800 °C.

Corrosiveness

European standard	EN 50267
International standard	IEC 60754.2
French standard	NF C 32-074 NF C 20-453

The tests defined by these standards serve to define the acidity of the gasses emitted by the insulation or sleeving material during combustion at 800 °C.

Standard NF C 32-062:

This standard specifies the properties of LSOH (Low Smoke Zero Halogen) materials used for the insulation or sleeving of telecommunication cables. The combustion properties of materials which meet the requirements of standard NFC 32062 are in accordance with the European standards recommendations for cabling.

Volume 1: low combustion materials for the insulation and protection of communications cables with special fire performance properties.

Book 2: halogen-free thermoplastic cable sleeving materials.

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Connector color coding

T 568A :

COREL[®] :

GLOSSARY

ACR:

Attenuation to Crosstalk Ratio.

Alupe:

Aluminium tape with polyethylene backing serving as shielding.

Aramid fibres:

Material used for reinforcing optical cables (in particular for strengthening in tension).

Attenuation:

Reduction in the level of a signal in the transmission medium, measured in dB per unit length.

ATM:

Asynchronous Transfer Mode.

AWG:

American Wire Gauge. Specification concerning the diameter of copper conductors.

Backbone:

Main network to which are connected all of the networks and sub networks. Cable connecting the main (or building) distribution frame to the intermediate cross-connect.

Bandwidth:

Sum of frequencies available for transmitting a message.

Bit/s or Bps:

Bits per second.

Braid:

Braid formed of metal wire serving as an armour providing good flexible mechanical protection and/or a shield.

Bundle:

A grouping of several conductors within a cable in order to separate them for ease of identification.

Category 5:

Specification of characteristics up to 100 MHz. Transmission of voice and data up to 100 Mbps. With the improvement in the performance of cables and in the absence of additional specifications, those cables which can be used at over 100 MHz are designated Category 5+.

CENELEC:

European Committee for Electrical Standardisation.

Central strength member:

Made of FRP or steel, it serves to reinforce the structure of certain optical fibre cables.

Class:

Definition of the characteristics of an installation or a link (class A, B, C, D). Depends on the category of the components used and their installation.

Chromatic dispersion:

Phenomenon which alters the transmission of data in optical fibres. It depends essentially on the material used for the fibres.

Common screen:

Coating, generally formed of a metallic braid or tape providing effective protection against external high frequency interference.

Continuity wire:

Tinned copper wire placed longitudinally or helically and ensuring the electrical continuity of the screen when connected.

COREL:

Cablage Ouvert pour Réseau d'Entreprise Locaux.

Corrugated steel:

Used on certain optical fibre cables as protection against rodents and to provide increased tensile and compressive strength.

CREDO:

Cercle de réflexion pour le Développement de l'Optique.

CTD:

Data transmission cable.

DECIBEL (dB):

Logarithmic unit used to express the ratio between two powers P. For an optical fibre, this ratio in dB is given by $dB = 10 \log_{10} P(\text{input})/P(\text{output})$.

Dielectric:

Non-metallic. Dielectric optical fibre cables contain no metal and are not conductors.

Dielectric losses:

Power loss caused by a capacitive current between the dielectric element and the core. These losses cause the insulation to heat and increase with voltage, temperature and frequency.

EIA:

Electronic Industry Association.

Fire resistance:

The fire resistance of a cable defines its ability to perform its function in the event of fire.

FDDI:

Fiber Distributed Data Interface. 100 Megabit optical fibre LAN (ring topology).

FOTAG:

IEEE 802.8 colour coding: blue, orange, green, brown, grey, white, red, black, yellow, purple, pink, green.

FRP:

Fibre Reinforced Plastic.

Glass fibre:

Material for strengthening and protecting cables against rodents.

GLOSSARY

Horizontal cable:

Cable connecting the intermediate distribution frame and the point of distribution.

Insulation resistance:

Resistance opposing the passage of current across the insulating envelope. This constitutes the electrical insulation of the conductor.

Interference:

Data transmission cables may be subject to interference. This interference is either internal in origin, caused by crosstalk or external, caused by power cables situated in the near vicinity. Interference can be either electromagnetic or electrostatic.

IEC:

International Electrotechnical Commission.

IEEE:

Institute of Electrical and Electronic Engineers.

Individual shielding (or screening):

Coating, generally formed of metallic tape around a pair or a quad to provide protection against interference from the other conductors.

ISO:

International Standards Organisation.

ISDN:

Integrated Service Digital Network for the transmission of Voice, Video and Data signals over long distances.

Jumper cable:

Flexible cables for patching within intermediate distribution frames.

LAN:

Local Area Network.

LED:

Light Emitting Diode.

Mbit/s or MBPs:

Megabits per second (10^6 bits per second).

Multiways:

Assembly of individually sleeved bundles of 4 pairs.

NEXT:

Near End Crosstalk.

NF:

«Norme Française» (French Standard).

Optoelectronic:

Qualifies a device having at least one electrical input and which responds to optical energy, emits or alters a light beam or uses a light beam for its internal operation. Operates as an electrical-optical or optical-electrical transducer.

Patch cords:

Cables used for the connection between the points of connection and the terminals, workstations, etc.

Pigtail:

Pre-terminated fibre a few metres long intended to be spliced to the end of a cable.

PE:

See polyethylene.

Polyethylene (PE):

Sleeving material having excellent mechanical properties.

PVC:

Sleeving material having good mechanical and ageing properties.

Quad:

Assembly of 4 conductors in a "star quad". It consists of 2 pairs formed by each couple of unadjoining conductors.

Rate of transmission:

Volume of data that can be transmitted over a cable in a given time (in Mbit/s for voice data images networks).

Reaction to fire:

The reaction to fire of a cable defines the role it plays in the propagation of fire. It can be either "fire retardant" or "flame retardant".

Refraction Index:

Ratio of the speed of light in a vacuum and that in the medium considered.

Reflectometer:

Measuring apparatus used for checking for optical transmission line mismatch (due to errors of connection, cutting or crushing of optical fibres).

Ripcord:

A ripcord is incorporated in a jacket for ease of stripping the cable. It can also serve as a colour-coded manufacturer's identification thread.

Screen:

See shielding.

SCP:

Multi-purpose Cabling System (QUANTE-POUYET).

Splice:

Operation serving to connect a fibre without possibility of modification other than to throw away the connector, cut back the fibre and use another connector.

VDI: Voice - Data - Images.**Zc:**

Characteristic Impedance.