



Technical description For a duct cable Containing standard single mode fibers

A technical comment is prepared for optical fiber cables having the following characteristics:

Cable design:

- 12-SM-fibers.
- Operating wavelength at 1310 nm and 1550 nm.
- Non metallic strength and anti-buckling element.
- Loose buffer tubes (dual layer design) SZ-stranded.
- Interstices and buffer tubes fully filled.
- Outer PE-jacket.
- Suitable as: fully dielectric duct cable.

Cable type:

A-DF(ZN)2Y 2x6 E9/125 0.38F3.5 + 0.24H18 LG



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Introduction

Our proposed offer is in full compliance with ITU-T G. 652 and annexes. Furthermore, compliance to the relevant IEC specifications, especially IEC 60793-1,2, IEC 60794-3 is stated.

Optical and mechanical characteristics of a standard single mode fiber

Mode field diameter (1310 nm) :	9.2 micron \pm 0.4 micron
Mode field diameter (1550 nm) :	10.5 micron \pm 1.0 micron
Cladding diameter :	125 micron \pm 1.0 micron
Mode field concentricity error:	\leq 0.8 micron
Cladding non circularity :	\leq 1 %
Refractive index profile :	step
Design :	matched cladding
Effective group index of refraction N_{eff} (at 1310nm):	1.4677
Effective group index of refraction N_{eff} (at 1550nm):	1.4682
Numerical aperture	0.14
Cut off wavelength of cabled fiber :	\leq 1260 nm
Attenuation at 1310 nm :	\leq 0.38 dB/km
Attenuation at 1550 nm :	\leq 0.24 dB/km
Dispersion in the range 1288 to 1339 nm :	\leq 3.5 ps/nm x km
Dispersion at 1550 nm :	\leq 18 ps/nm x km



Core material

The core of the optical fiber, with a higher refractive index compared to the cladding, is made of SiO₂ (Silicon dioxide) doped with GeO₂ (Germanium dioxide).

Cladding material

The cladding of the optical fiber is made of SiO₂ (Silicon dioxide).

Type of primary coating

The primary coating is made of an UV-curable acrylate. It is applied in two layers, each of a different Young's modulus. The inner layer is somewhat softer than the outer one.

This make-up protects the fiber against microbending losses and against abrasion.

Fiber colour coding:

- fiber-# 1 : blue
- fiber-# 2 : yellow
- fiber-# 3 : green
- fiber-# 4 : red
- fiber-# 5 : violet
- fiber-# 6 : white

Dimension of primary coating

The dimension of the primary coating is 245 ± 10 micron.

Mechanical characteristics of the primary coating

The primary coating is easily strippable by means of a mechanical stripping tool. No chemicals are required.

Mechanical characteristics of fiber

Proof test stress: 8 N for 1 second ; strain: 1 %.
Breaking strength of fiber at least: 150 N/mm²



Reverse lay (SZ) stranding

The elements (loose buffer tubes and if necessary filling elements) are stranded around a central member according to the reverse lay method, which means, that the direction of stranding reverses after a predetermined number of revolutions. At the reverse point the elements are laying parallel to the axis of the cable.

A binder is wound around the elements in order to retain them in the proper position.

Cable core

Around a dielectric central member made of fiber reinforced plastic, buffer tubes and filling elements are stranded to form the core of the cable. The central member serving mainly as anti-buckling element will be coated with a PE-jacket, if this is required to obtain the correct stranding radius. The buffer tubes contain up to 12 fibers and are filled with a paraffine oil based filling compound.

Colour coding: buffer tube-# 1 : blue
 buffer tube-# 2 : yellow

Due to stranding of the buffers an overlength of about 0,3 to 0.5 % is produced. (The overlength depends on stranding radius, tube diameter and lay length).

That means, if a tensile force is applied to the cable and hence to the core, an elongation in a wide range will not result in fiber-strain and no attenuation increase is observed.

Cable make up

The interstices of the core are filled with a filling compound too, in order to block any possible water ingress.

Finally an outer PE-jacket (nominal thickness 2.0 mm) is extruded.

The cable marking: CORNING 12C NM 2003 TPC XXXX(continue meter)



Technical characteristics:

**Cable type : A-DF(ZN)2Y
fiber count**

		12
Diameter (D) approx.	[mm]	10.5
Weight approx.	[kg/km]	105
Min. bending radius		
- during installation	[mm]	180
- installed	[mm]	160
Tensile strength		
- short term (during installation)	[N]	2700
- long term (installed)	[N]	1300
Compressive stress/crush	[N/10cm]	2000
(Attenuation increase fully reversible)		
Impact resistance (E=3 Nm, r = 300 mm)	[impacts]	30
(Attenuation increase fully reversible)		
Operating temperature range	[°C]	-30...+70
Installation temperature range	[°C]	-5...+60

Cable Cross-Section

