

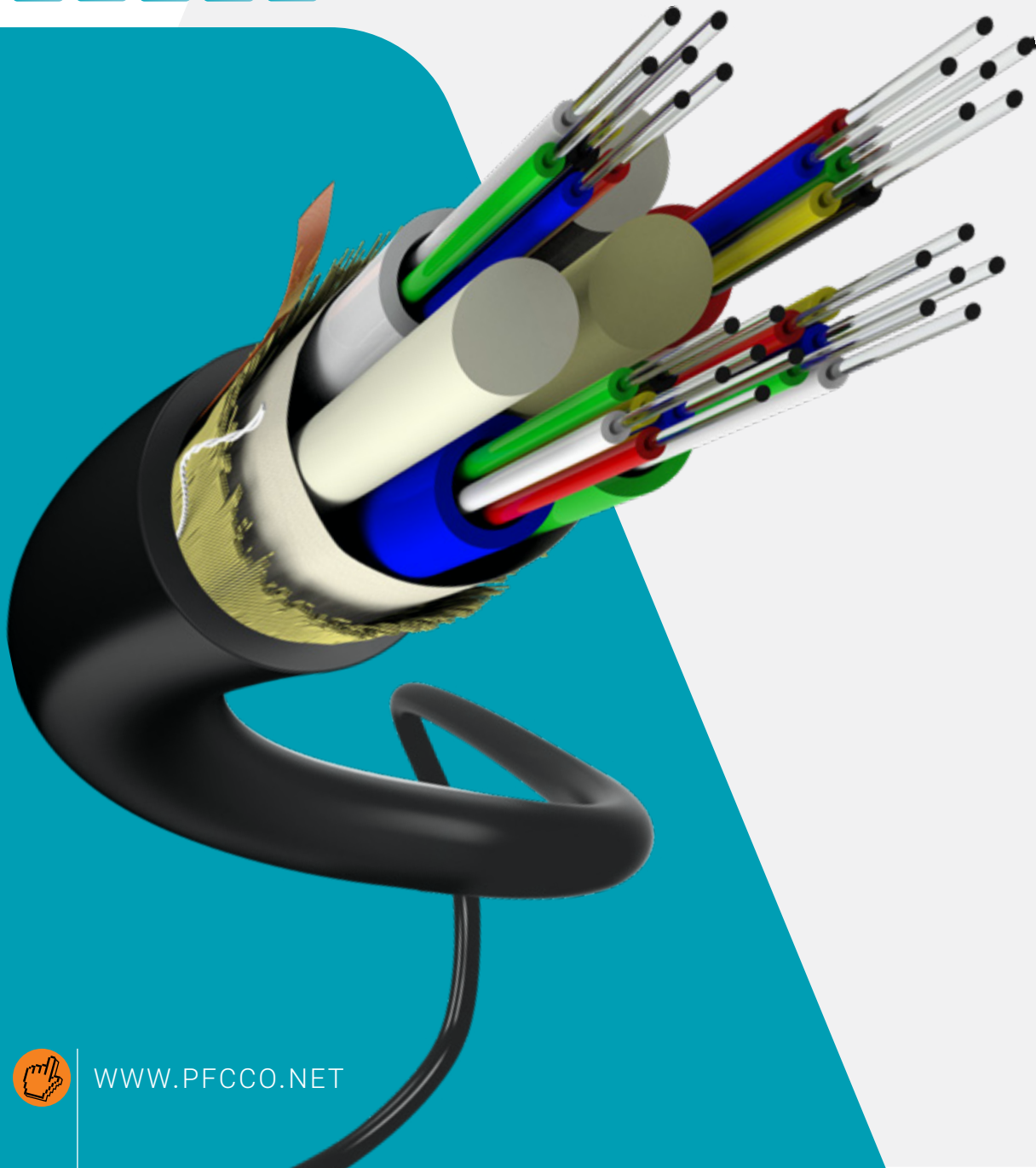
# FIBER OCUC

SM  
MM

MULTI  
TUBE

DUCT

HDPE



SPECIFICATION FOR DATA CABLE

# FIBER

## OCUC

### Outdoor

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## 1- GENERAL

This specification covers in detail the optical, physical and mechanical characteristics of optical cables used in Duct application.

## 2- OPTICAL FIBER

### 2-1 – Optical Characteristics

The fibers may be standard single mode dispersion shifted (ITU-G652) and have the following table (1).

| PARAMETERS (Maximum Individual)   |                    | UNIT                   | VALUE     |
|-----------------------------------|--------------------|------------------------|-----------|
| Fiber Attenuation                 | 1310nm             | dB/km                  | <0.35     |
|                                   | 1550nm             | dB/km                  | <0.25     |
| Temperature Variation Attenuation | -                  | dB/km                  | ≤0.05     |
| Point Discontinuities             | 1310/1550nm        | dB                     | ≤0.10     |
| Water Peak Attenuation            | 1383±3             | dB/km                  | See note  |
| Attenuation Change vs. Wavelength | 1285-1310          | dB/km                  | ≤0.10     |
|                                   | 1525-1575          | dB/km                  | ≤0.05     |
| Attenuation Change vs. Bending    | 100wraps/50mmdia   | dB                     | ≤0.5      |
|                                   | 1wrap/32mmdia      | dB                     | ≤0.05     |
| Zero Dispersion Wavelength        | -                  | nm                     | 1300-1324 |
| Maximum Dispersion                | 1310nm             | Ps/nm.Km               | ≤3.2      |
|                                   | 1550nm             | Ps/nm.Km               | ≤18.0     |
| Zero Dispersion Slope             | -                  | Ps/nm <sup>2</sup> .Km | ≤0.092    |
| Nominal Mode Field Diameter       | 1310nm             | μm                     | 9.2±0.4   |
|                                   | 1550nm             | μm                     | 10.4±0.8  |
| Cable Fiber Cut-off Wavelength    | (λ <sub>cc</sub> ) | nm                     | <1260     |
| Polarization Mode Dispersion      | 1310nm             | Ps/√Km                 | <0.2      |
|                                   | 1550nm             | Ps/√Km                 | <0.2      |

The fibers will be MM Fiber 50/125 have the following properties table (2).  
TABLE (2)

| Item                           | Parameters                    |           | Unit   | Value         |
|--------------------------------|-------------------------------|-----------|--------|---------------|
| 2.1. OPTICAL CHARACTERISTICS   |                               |           |        |               |
| 2.1.1                          | Attenuation                   | @ 850 nm  | dB/km  | Max 2.4       |
|                                |                               | @ 1300 nm | dB/km  | Max 0.6       |
| 2.1.2                          | Bandwidth                     | 850 nm    | MHz-km | Max 1500      |
|                                |                               | 1300 nm@  | MHz-km | Max 500       |
| 2.1.3                          | Point Discontinuity           |           | dB     | Max 0.1       |
| 2.1.4                          | Numerical Aperture            |           | -      | 0.200 ± 0.015 |
| 2.2. DIMENSIONAL SPECIFICATION |                               |           |        |               |
| 2.2.1                          | Core Diameter                 |           | µm     | 50 ± 2.5      |
| 2.2.2                          | Cladding Diameter             |           | µm     | 125.0 ± 1.0   |
| 2.2.3                          | Coating Diameter              |           | µm     | 245 ± 7       |
| 2.2.4                          | Core Non-Circularity          |           | %      | Max 5         |
| 2.2.5                          | Cladding Non-Circularity      |           | %      | Max 0.6       |
| 2.2.6                          | Core/Cladding Eccentricity    |           | µm     | Max 1         |
| 2.2.7                          | Coating/Cladding Eccentricity |           | µm     | Max 10        |



## 2-2 - Fiber Dimensions

The fiber dimensions will be as following table (2).

| PARAMETERS                        | UNIT | VALUE |
|-----------------------------------|------|-------|
| Cladding diameter SM/MM           | μm   | 125±2 |
| Core cladding concentricity error | μm   | Max 1 |
| Core non circularity error        | %    | Max 6 |
| Cladding non circularity error    | %    | Max 2 |
| Diameter of the coated fiber      | μm   | 250±5 |
| Coating concentricity error       | μm   | 15    |
| Coating non circularity error     | %    | 10    |

## 2-3 – Fiber and loose tube identification

Fibers in each loose tube and the tubes will be identified with the following table (3).

| Fiber/Tube No. | Color  | Fiber/Tube No. | Color   |
|----------------|--------|----------------|---------|
| 1              | White  | 7              | Brown   |
| 2              | Red    | 8              | Violet  |
| 3              | Green  | 9              | Orange  |
| 4              | Blue   | 10             | Pink    |
| 5              | Yellow | 11             | Grey    |
| 6              | Black  | 12             | Natural |

Note: For less than 12 core optical cables there should be first colors.

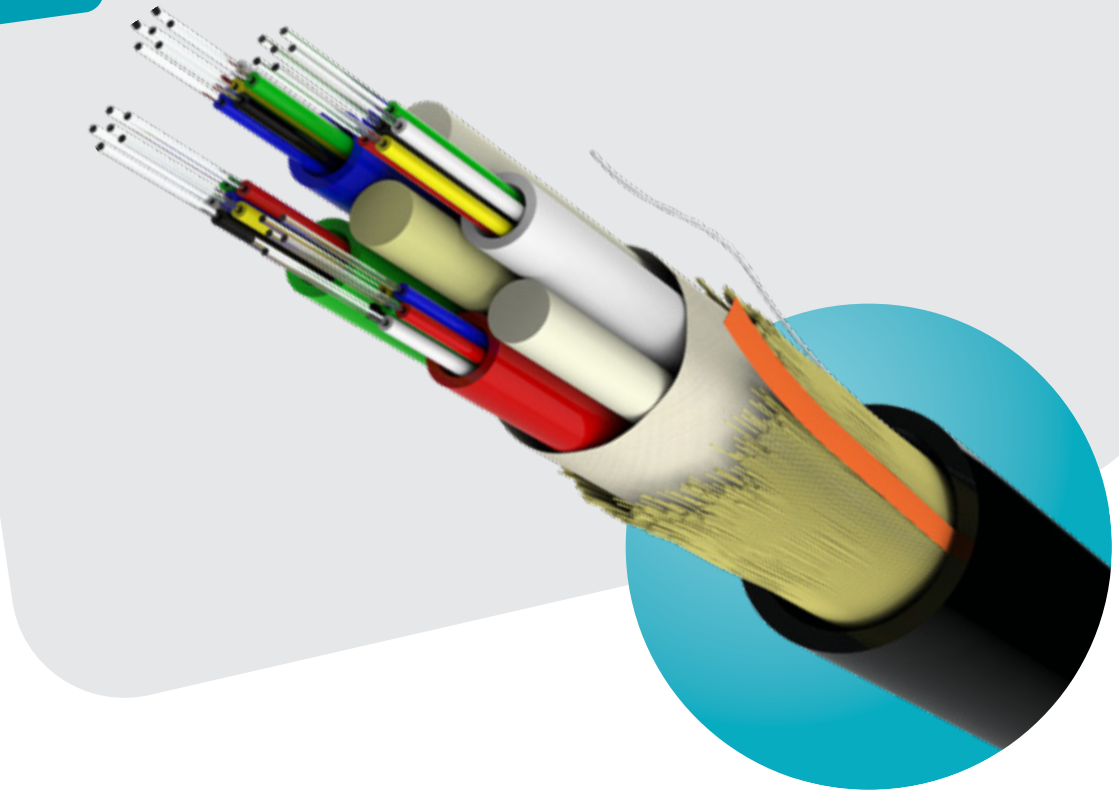


### 3 - CABLE CONSTRUCTION

Cable constructions are in accordance with the following table (4) and FIG. (1)

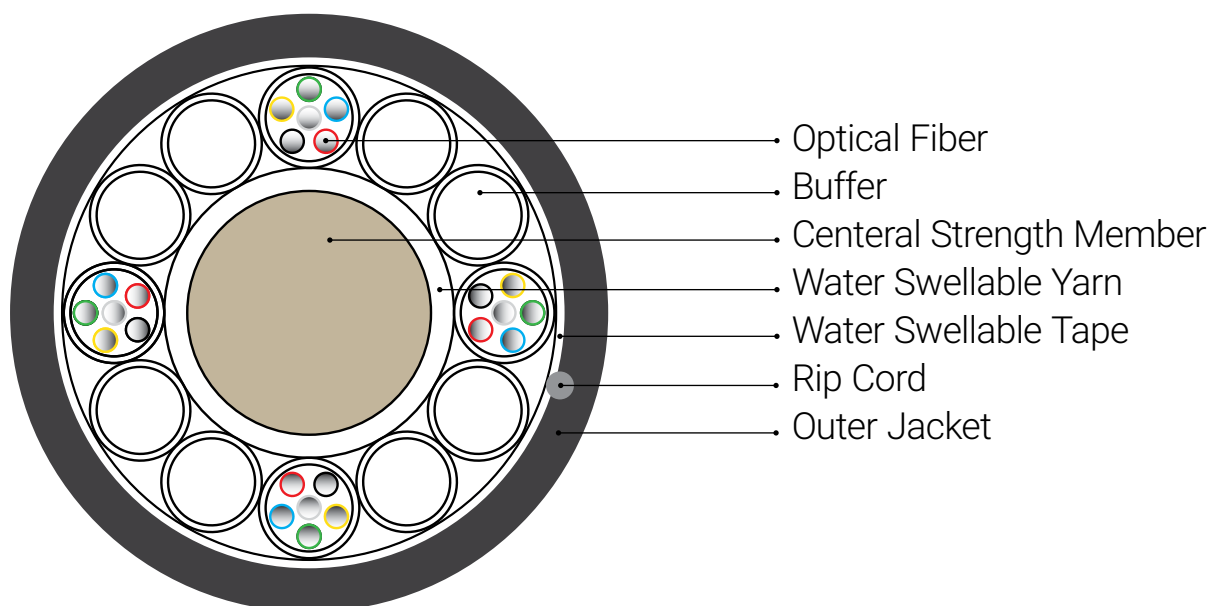
| Subject                               | Description                                                                                                                                                                                                                                             |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3-1- Optical fiber                    | The fibers are color coded and properly operate at a wide range of temperature from -40 °C up to +80 °C.                                                                                                                                                |
| 3-2- Buffer                           | Loose tubes of PBT materials, color coded, contains up to 24 optical fibers, filled with thixo tropic jelly. The jelly is free from dirt, metallic particles and would be non toxic and present no any dermal hazards.                                  |
| 3-3- Central strength member          | Non-metal central strength member (FRP) with minimum nominal diameter 2.5mm.                                                                                                                                                                            |
| 3-4- Water swell able yarn (OPTIONAL) | The water swell able yarn will be wound helically around the Strength member.                                                                                                                                                                           |
| 3-5- Core                             | Loose tubes will be stranded around central strength member by S Z stranding method. For adapting the loose tubes to central element the fillers of HDPE may be used in cable construction.                                                             |
| 3-6- Water swell able tape            | layer of water swellable tape with a sufficient thickness applied longitudinally over loose tubes.                                                                                                                                                      |
| 3-7- Rip cord                         | 2 Diametrically opposed rip cords will be placed over the swell able tape under the inner jacket and 2 rip cords over the steal tape under the outer jacket. The rip cord must be strong and flexible enough to be able to strip or the jackets easily. |
| 3-8- Outer jacket                     | A black HDPE with $2\pm0.1$ thickness                                                                                                                                                                                                                   |





**FIG (1)**

The figure normally shows the general structure



## 4 - CABLE SIZES AND GENERAL DATA'S

### 4-1 - CABLE SIZES AND GENERAL DATA

Cables size and general data are in accordance with the following table (5).

| PARAMETERS                  |              | 1×6  | 2×6  | 4×6  | 8×6  |
|-----------------------------|--------------|------|------|------|------|
| Number of tubes             |              | 1    | 2    | 4    | 8    |
| Fiber per tubes             |              | 6    | 6    | 6    | 6    |
| Number of fibers            |              | 6    | 12   | 24   | 48   |
| Central Strength Member(mm) |              | 2.5  | 2.5  | 2.5  | 2.5  |
| Pulling Tension (N)         | Operation    | 2000 | 2000 | 2000 | 2000 |
|                             | Installation | 3000 | 3000 | 3000 | 3000 |
| Overall diameter (mm)       |              | 13   | 13   | 13   | 15   |
| Weight (Kg/km)              |              | 109  | 109  | 112  | 146  |

### 4-2 – IDENTIFICATION MARKING

Each length of the cable shall be permanently identified as to the manufacturer, year of manufacture, number of tubes, fiber per tubes and cable type. The marking will be printed on the outer jacket.

NOTE: Other method as request





## 5- Transmission Distance Comparison

| Data Rate | Interface Type | Fiber Mode | Wavelength | Maximum Distance |
|-----------|----------------|------------|------------|------------------|
| 1G        | 1000BASE       | SM         | 1310nm     | 10km             |
|           |                | OM2        | 1300nm     | 550m             |
|           |                | OM3        | 1300nm     | 550m             |
| 10G       | 10GBASE        | SM         | 1310nm     | 10km             |
|           |                | OM2        | 1300nm     | 220m             |
|           |                | OM3        | 1300nm     | 220m             |
| 40G       | 40GBASE        | SM         | 1310nm     | 10km             |
|           |                | OM2        | -          | -                |
|           |                | OM3        | 850nm      | 100m             |
| 100G      | 100GBASE       | SM         | 1310nm     | 10km             |
|           |                | OM2        | -          | -                |
|           |                | OM3        | 850nm      | 70m              |

## 6- Total specification

| PARAMETERS            | Description                         |
|-----------------------|-------------------------------------|
| Attenuation at 1550nm | Max 0.25                            |
| Attenuation at 1310nm | Max 0.35                            |
| Attenuation at 850nm  | Max 2.4                             |
| Attenuation at 1300nm | Max 0.6                             |
| Number of tubes       | 2,4,8                               |
| Fiber per tubes       | 6                                   |
| Number of fibers      | 12,24,48                            |
| Fiber Grade           | SM: G.652.D<br>MM: Bend Insensitive |
| Tube Diameter (mm)    | 2.5                                 |
| Overall diameter (mm) | 13                                  |
| Fiber Type            | SM/ MM                              |
| Structure             | Multi Tube                          |
| Number of Jacket      | Single Jacket                       |
| Strength member       | Aramid Yarn                         |
| Outer Jacket          | HDPE-2mm                            |
| Jacket Color          | SM/ MM :Black                       |
| Application           | Outdoor(Anti UV- Duct )             |
| Marker Height (mm)    | 3.0 ± 0.3                           |
| Distance Marker(m)    | 1                                   |
| Color Marker          | White                               |
| Packaging             | Wooden Reel                         |



## شرکت پارسیان فیبر ارتباط

آدرس دفتر مرکزی: تهران  
ضلع شمالی بزرگراه رسالت  
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