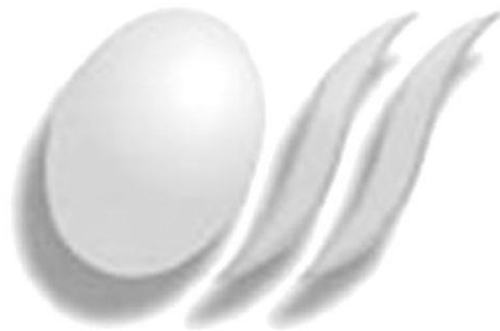


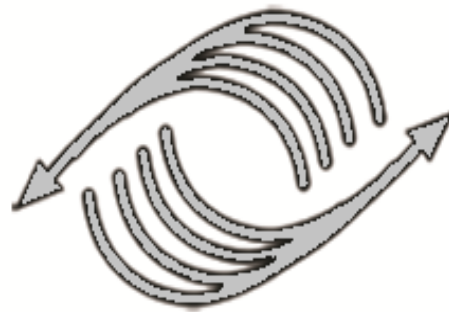
**CODE: 0203-000**

**SHAHID GHANDI COMMUNICATION CABLE CO.**

**TECHNICAL SPECIFICATION FOR  
OPTICAL CONDUIT FILLED CABLE  
(OCFC)**



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## **SPECIFICATION FOR OPTICAL CONDUIT FILLED CABLE**

1. GENERAL
2. OPTICAL FIBER
3. CABLE CONSTRUCTION
4. CABLE SIZES AND GENERAL DATAS
5. MECHANICAL AND FUNCTIONAL TESTS

## 1 - GENERAL

This specification covers in detail the optical, physical and mechanical characteristics of jelly filled conduit optical fiber cables.

## 2 - Optical Fiber

### 2-1 – Optical Characteristics

The fibers may be standard single mode (ITU-T G652B or G652D) and have the following table(1)

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		
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



## 2-2 - Fiber Dimensions

The fiber dimensions will be as following table (2)

TABLE (2)

PARAMETERS	UNIT	VALUE
Cladding diameter	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±15
Coating concentricity error	μm	15
Coating non circularity error	%	10

## 2-3 – Fiber and loose tube identification

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

TABLE (3)

Fiber No.	Color	Fiber 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.



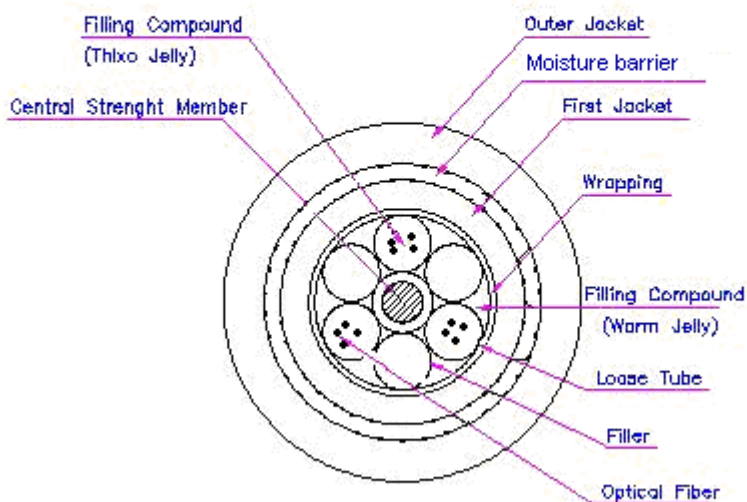
### 3 - CABLE CONSTRUCTION

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

TABLE (4)

Subject	Description
3-1- Optical fiber	Single mode fiber as ITU G.652B or ITU-T G652D. 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 12 optical fibers, filled with thixotropic 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 diameter 2.5mm.
3-4- Core	Loose tubes will be stranded around central strength member by SZ stranding method. For adapting the loose tubes to central element the fillers of PP or HDPE may be used in cable construction.
3-5- Wrapping	A layer of Polyester tape with a sufficient thickness applied longitudinally over loose tubes. The core will be filled with a suitable filling compound
3-6- Rip cord	2 Diametrically opposed rip cords will be placed over the swellable 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.
3-7- First jacket	A black LDPE jacket in accordance to ASTM D-1248. The nominal thickness of the jacket is 1.5 mm.
3-8- Moisture barrier	An aluminum tape with copolymer coating on both sides will be applied longitudinally with an adequate overlap. The Aluminum thickness is 200 micron and the copolymer coating on each side has the thickness about 38 microns.
3-9- Outer jacket	A black HDPE jacket in according to ASTM-D1248 will be applied on aluminuml tape. The nominal jacket thickness is 2mm.

FIG. (1)



#### 4 - CABLE SIZES AND GENERAL DATAS

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

TABLE (5-A)

PARAMETERS	N1x4	N2x4	N3x4	N4x4	N5x4	<b>N6x4</b>
Number of tubes	1	2	3	4	5	6
Fiber per tubes	4	4	4	4	4	4
Number of fibers	4	8	12	16	24	6
Central Strength Member(mm)	2.5	2.5	2.5	2.5	2.5	2.5
Pulling tension (N)*						
Operation	2100	2100	2100	2100	2100	2100
Installation	3300	3300	3300	3300	3300	3300
Overall diameter (mm)	16	16	16	16	16	16
Weight (Kg/km)	260	260	260	260	260	260



TABLE (5-B)

PARAMETERS	N1x6	N2x6	N4x6	N8x6	N12x6
Number of tubes	1	2	4	8	8
Fiber per tubes	6	6	6	6	6
Number of fibers	6	12	24	48	72
Central Strength Member(mm)	2.5	2.5	2.5	2.5	3
Pulling tension (N)*	2100	2100	2100	2200	2800
	3300	3300	3300	3600	4700
Overall diameter (mm)	16	16	16	17	21
Weight (Kg/km)	260	260	260	320	430

\* Note: The pulling tension may be increased as an option by using the messenger with higher diameter .

## 5 - Mechanical and Functional tests

Mechanical and functional tests are in accordance with the following table(6).

TABLE (6)

ITEM	CONDITIOND	REFERENCE
WATER PENETRATION	1 m Length / 1 m height / 1 hours no drop	FOTP-82
COMPRESSION	220 N / on 10 mm section of cable	EIA/TIA 455-41
FLEXING	25 mechanical flexing / heave diameter 20 times the cable diameter	EIA/TIA 455-104
IMPACT	660 g weight / 1 m height / In 2 at 3 locations along cable	EIA/TIA 455-25
TENSILE & BENDING	Pulling force 3000 N (As technical spec)	EIA/TIA 455-33
TWIST	2 m length / 10 cycles of mechanical twisting	EIA/TIA 455-85
LOW OR HIGH TEMPRATURE BEND	sheave diameter 20 times the cable diameter / 4 full turns / 4 hours / at temperatures -30°C & +60°C	EIA/TIA 455-37
KNOT	10 kg weight / in cross sectional diameter of the knot	EIA/TIA 455-87
TEMPRATURE CYCLING	2 hours from 0°C to -40°C / 8 hours in -40°C / 4 hours from -40°C to +85°C / 8 hours in +85°C / 2 hours from +85°C to 0°C / 5 cycles	IEC 794-1-F1

Note:

The change in attenuation will not exceed 0.05 dB at 1550 nm.