

SHAHID GHANDI COMMUNICATION CABLE CO.

CODE: 0201-000

**TECHNICAL SPECIFICATION FOR
OPTICAL BURIED FILLED CABLE
(OBFC-NZDSF)**



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JULY 2010**

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**SPECIFICATION FOR
*OPTICAL BURIED UNFILLED CABLE***

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

1 - GENERAL

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

2 - OPTICAL FIBER

2-1 – Optical Characteristics

The fibers may be standard single mode Non-Zero Dispersion – Shifted Fiber (ITU-G655) and have the following table (1)

TABLE (1)

PARAMETERS (Maximum Individual)	UNIT	VALUE
Fiber Attenuation	dB/km	=0.23
Point Discontinuities at 1550 nm	dB	=0.1
Attenuation Change vs. Bending 100 wraps 37.5 mm Radius	dB	=0.5
Non-Zero Dispersion Region	nm	1530-1565
Zero Dispersion Slope at 1550 nm	Ps/nm ² .Km	=0.092
Zero Dispersion Wavelength	nm	<1507
Chromatic Dispersion Coefficient(Band 1530-1565 nm)	Ps/nm.Km	2-6
Nominal Mode Field Diameter at 1550 nm	μm	9.6 ± 0.5
Mode Field Concentricity Error at 1550 nm	μm	<0.8
Mode Field Non-Concentricity Error	%	<6
Cable Fiber Cut-off Wavelength	nm	=1480
Polarization Mode Dispersion at 1550 nm	Ps/vKm	<0.2
Proof Stress	GPa	=0.7
Proof Strain	%	=1

2-2 - Fiber Dimensions

The fiber dimensions will be as following table (2)

TABLE (2)

PARAMETERS	UNIT	VALUE
Cladding diameter	μm	125±1
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 and the tubes will be identified with the following table (3).

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)

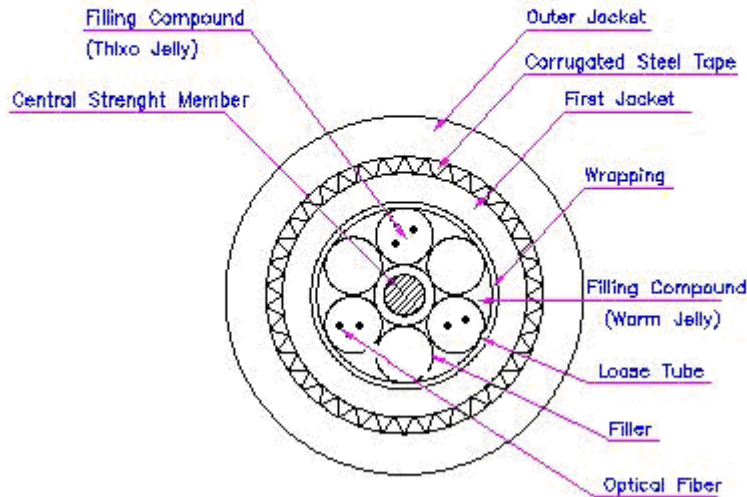
TABLE (4)

Subject	Description
3-1- Optical fiber	Non-Zero Dispersion Shifted Fiber as ITU G.655. 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 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 2.5 mm.
3-4- 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 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 polyester 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- Armor	A corrugated steel tape will be applied on inner jacket. This layer act as anti rodent. The steel tape may be copolymer coated with minimum 0.038 mm coating thickness on each side or tin-plate steel tape with 2.8 grams tin mass on each side.
3-9- Outer jacket	A black HDPE jacket in according to ASTM-D1248 will be applied on corrugated steel tape. The nominal jacket thickness is 2 mm.

FIG. (1)

The figure normally shows the general structure

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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).

TABLE (5)

PARAMETERS	1×4	2×4	1×6	2×6	2×6 +1×4	4×6	8×6	12×6	
Number of tubes	1	2	1	2	3	4	8	12	
Fiber per tubes	4	4	6	6	4 and 6	6	6	6	
Number of fibers	4	8	6	12	16	24	48	72	
Central Strength Member(mm)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3	
Pulling tension (N)	Operation	2400	2400	2400	2400	2400	2400	2600	3100
	Installation	3800	3800	3800	3800	3800	3800	4200	5300
Overall diameter (mm)	16.5	16.5	16.5	16.5	16.5	16.5	18	21.5	
Weight (Kg/km)	257	258	257	258	259	260	312	421	

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 - Mechanical and Functional tests

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

TABLE (6)

ITEM	CONDITIONED	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 As technical spec	EIA/TIA 455-33
TWIST	2 m length / 10 cycles of mechanical twisting	EIA/TIA 455-85
LOW OR HIGH TEMPERATURE 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
TEMPERATURE 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.