SHAHID GHANDI COMMUNICATION CABLE CO.

CODE: 0202-000

TECHNICAL SPECIFICTION FOR

OPTICAL BURIED UNFILLED CABLE (OBUC-SM)

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OCTOBER 2011

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SPECIFICATION FOR

OPTICAL BURIED UNFILLED CABLE

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 (ITU-G652) 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	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/nm2.Km	=0.092
Nominal Mode Field Diameter	1310nm	µm	9.2±0.4
	1550nm	µm	10.4±0.8
Cable Fiber Cut-off Wavelength	(?cc)	nm	<1260
Polarization Mode Dispersion	1310nm	Ps/vKm	<0.2
	1550nm	Ps/vKm	<0.2

NOTE: For ITU-T G652 D the attenuation at 1383 will be < 0.31 dB/Km

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 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.

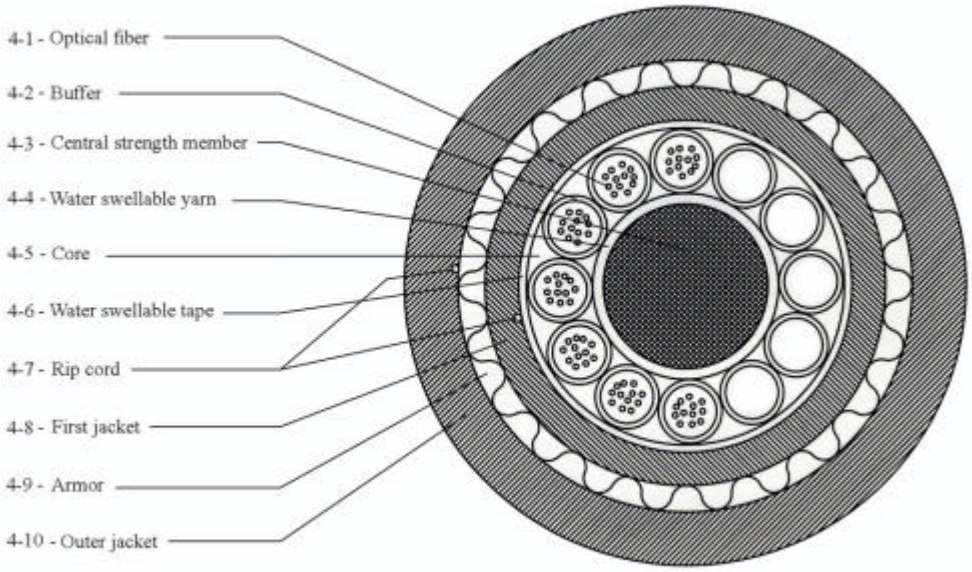
3 - CABLE CONSTRUCTION

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

TABLE (4)

Subject	Description
3-1- Optical fiber	Single mode fiber as ITU G.652. The fibers are color coded and properly operate at a wide range of temperature from -40 ºC up to +80 ºC.
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 2.5mm.
3-4- Water swell able yarn	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 SZ stranding method. For adapting the loose tubes to central element the fillers of PP or HDPE may be used in cable construction.
3-6- Water swell able tape	A layer of water swell able 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- First jacket	A black LDPE jacket in accordance to ASTM D-1248. The nominal thickness of the jacket is 1.5 mm.
3-9- Armor	A corrugated steel tape will be applied on inner jacket. This layer act as anti rodent. The overlap shall not be less than 3mm.
3-10- Outer jacket	A black HDPE jacket in according to ASTM-D1248 will be applied on corrugated steel tape. The nominal jacket thickness is 2mm.

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).

TABLE (5-A)

PARAMETERS		1×2	2×2	3×2	4×2	5×2	6×2
Number of tubes		1	2	3	4	5	6
Fiber per tubes		4	4	4	4	4	4
Number of fibers		2	4	6	8	10	12
Central Strength Member(mm)		2.5	2.5	2.5	2.5	2.5	2.5
Pulling tension (N)	Operation	2400	2400	2400	2400	2400	2400
	Installation	3400	3400	3400	3400	3400	3400
Overall diameter (mm)		17	17	17	17	17	17
Weight (Kg/km)		255	255	255	255	255	255

TABLE (5-B)

PARAMETERS		1×4	2×4	3×4	4×4	5×4	6×4	10×4
Number of tubes		1	2	3	4	5	6	10
Fiber per tubes		4	4	4	4	4	4	4
Number of fibers		4	8	12	16	20	24	40
Central Strength Member(mm)		2.5	2.5	2.5	2.5	2.5	2.5	2.5
Pulling tension (N)	Operation	2400	2400	2400	2400	2400	2400	2800
	Installation	3400	3400	3400	3400	3400	3400	4500
Overall diameter (mm)		17	17	17	17	17	17	20.5
Weight (Kg/km)		255	255	255	255	255	260	355

TABLE (5-C)

PARAMETERS		1×6	2×6	2×6+1×4	4×6	6×6
Number of tubes		2	2	3	4	6
Fiber per tubes		6	6	4 & 6	6	6
Number of fibers		6	12	16	24	36
Central Strength Member(mm)		2.5	2.5	2.5	2.5	2.5
Pulling Tension (N)	Operation	2400	2400	2400	2400	2400
	Installation	3400	3400	3400	3400	3400
Overall diameter (mm)		17	17	17	17	17
Weight (Kg/km)		255	255	255	255	255

TABLE (5-D)

PARAMETERS		1×12	2×12	4×12	8×12	10×12	12×12
Number of tubes		1	2	4	8	10	12
Fiber per tubes		12	12	12	12	12	12
Number of fibers		12	24	48	96	120	144
Central Strength Member(mm)		3	3	3	3	4	4
Pulling tension (N)	Operation	3100	3100	3100	2700	3300	2900
	Installation	5000	5000	5000	4700	6300	6100
Overall diameter (mm)		18.5	18.5	18.5	20.5	22.5	24
Weight (Kg/km)		295	296	297	355	420	485

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.