付図．２　作業指図書様式例

To：FOV　　CC.：　　Ｎｏ．EN-01216

Working Direction / 作業指図書		Issued by 発行部門	Kokikai	
Product Group	Optical cord with LC connector	Date of Issue 発行日	12 Sep. 2024	
Product Type 製品名	Optical cord with LC connector	☐ Deadline 適用期間	30 Mar. 2025	
		☐ P/O 発注番号	T.B.D	
Title/件名		Approved by	Checked by	Written by
Reliability test for Low Cost 2F Round cord		S.Takahashi	M.Hirose	Y.Watanabe

1. Purpose/目的

Fujikura consider to apply optical cord by YOFC and SHYS 2F round cord.
To evaluate reliablity of these materials, reliability test shall be conducted by using samples made by FOV.
The test refers to TIA568.E-3.

2. Scope/適用範囲

Table 1 Sample list and plan of testing

Item No.	Prodct name	Spec	Qty
#1	YOFC SM 2F Round cord x LC Connector kit 34.4mm boot	Follow “Sample type 1”	40
#2	SHYS SM 2F Round cord x LC Connector kit 34.4mm boot	Follow “Sample type 1	40
#3	YOFC SM 2F Round cord x LC Connector kit 25mm boot	Follow “Sample type 1”	40
#4	SHYS SM 2F Round cord x LC Connector kit 25mm boot	Follow “Sample type 1”	40

(Note1) No need cord aging
(Note2) These tests should be finished and the test report should be submitted until 9 Dec.
(Note3) Detail material information should be refered to Table 2.

※FOV should prepare for cords from supplier(not FJK).

Table 2 Material list for 2F Round Cord

Sample Item No.	Item	Product Name	Model No.	Note
	LC Connector kit 34.4mm boot	LC Uniboot Connector with 34.4mm Boot	OYH-JS-ZP-078 (Supplier Model No.)	
	LC ferrule	LC プラグ SM JUMPER	Use ferrule from PNJHY-0048-22-03E (SPSU-10329(1))	
1	YOFC SM 2F Round cord	Indoor Cable	MFCC-R7A0-2.0-0A00-1V_-002	Refer to Appendix#5.
	LC Connector kit 34.4mm boot	LC Uniboot Connector with 34.4mm Boot	OYH-JS-ZP-078 (Supplier Model No.)	
	LC ferrule	LC プラグ SM JUMPER	Use ferrule from PNJHY-0048-22-03E (SPSU-10329(1))	
2	SHYS SM 2F Round cord	Φ2 Round cord, 2 fiber, SM(Yellow)	89818-05-C01	Refer to Appendix#4. Fiber count=2 OFNR/G657A1
	LC Connector kit with 25mm boot	LC Uniboot Connector with 25mm boot	OYH-JS-ZP-255 (Supplier Model No)	
	LC ferrule	LC プラグ SM JUMPER	Use ferrule from PNJHY-0048-22-03E (SPSU-10329(1))	
3	YOFC SM 2F Round cord	Indoor Cable	MFCC-R7A0-2.0-0A00-1V_-002	Refer to Appendix#5.
	LC Connector kit with 25mm boot	LC Uniboot Connector with 25mm boot	OYH-JS-ZP-255 (Supplier Model No)	
	LC ferrule	LC プラグ SM JUMPER	Use ferrule from PNJHY-0048-22-03E (SPSU-10329(1))	
4	SHYS SM 2F Round cord	Φ2 Round cord, 2 fiber, SM(Yellow)	89818-05-C01	Refer to Appendix#4. Fiber count=2 OFNR/G657A1

Table 3 Test plan for each sample

Group	Test Item	Qty Item#1~Item#4[pcs]
Group A	TIA 568. E-3 Environmental Test	10 (Including spare of 2pcs connectors)
Group B	TIA 568. E-3 Mechanical Test	10 (Including spare of 2pcs connectors)
Group C	TIA 568. E-3 Durability	10 (Including spare of 2pcs connectors)
Group D	TIA 568. E-3 Strength of Coupling	10 (Including spare of 2pcs connectors)

3. Details of work/指示詳細

(1)FOV make sample following with Chap.2 and Appendix#1.
(2)Samples are tested according to Appendix#2.
(3)After all test is finished, FOV submit report and ship all of product sample to CNC.

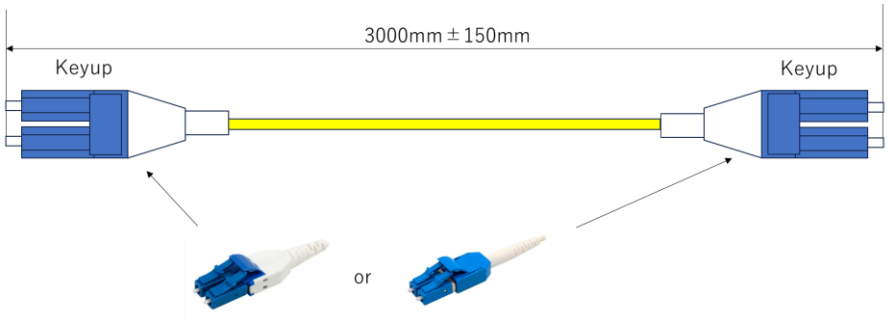
4. Request of feedback/フィードバック要求項目（必要な場合は記入すること）
FOV submit test result report before shipping sample to CNC.
・Endface Geometry when initial inspection: PASS/FAIL and measurement result
・Endface Appearance when initial inspection: PASS/FAIL
・IL, RL: PASS/FAIL and measurement result for each test items

5.Inquiries/問合せ先
Takahashi Shigeo (shigeo.takahashi@jp.fujikura.com)
Hirose Masayuki (masayuki.hirose@jp.fujikura.com)
Tranhuu Hau (hau.tranhuu@jp.fujikura.com)
Yamamoto Masayuki (masayuki.yamamoto@jp.fujikura.com)
Watanabe Yuho (yuho.watanabe@jp.fujikura.com)

Rev	Date	History	Reason	PIC
1	10 Sep. 2024	Originai issue	-	Y.Watanabe

Appendix#1: Structure/Spec/Procedure for sample making

Sample type 1: SM cord type sample



Radius of Curvature: 7~25mm
Fiber Height: -50 ~ ;50nm
Apex Offset: ≦50um
IL<0.5dB
RL>40dB

Zone (diameter)	Defects (diameter)	Scratches (width)
A: core zone 25 µm	< 2 µm no limit ≥ 2 µm and ≤ 3 µm maximum 1 > 3 µm none	< 3 µm no limit ≥ 3 µm none
B: cladding zone 25 µm to 110 µm	≤ 25 µm no limit > 25 µm none	No limit

※Initial optical characteristics should be measured by Master Cord.
Master Cord spec: 4-COS-0038
FLC(M)/bbb-2PS-UPC/eee-LM-SR15EC-s-IL1-RL1
bbb, eee, L :FOV can select parameter.

Appendix#2: Evaluation item and instruction for testing

Group A

	Inspection item	Condition	Criteria	Note
1	Low Temp	-10° C, 4 days	Initial: Max IL < 0.75dB During IL<0.3dB Final: Max IL <0.75dB Min RL >20dB(MM), >35dB(SM)	FOV have to monitor optical characteristics during load (For MPO sample, only 1ch, 6ch and 12ch fiber have to be monitored.)
2	Temperature life	60° C, 4 days	Initial: Max IL < 0.75dB During IL: None Final: Max IL <0.75dB Min RL >20dB(MM), >35dB(SM)	FOV have to monitor optical characteristics during load (For MPO sample, only 1ch, 6ch and 12ch fiber have to be monitored.)
3	Humidity	40° C, 90-95%RH, 4 days	Initial: Max IL < 0.75dB During IL<0.4dB Final: Max IL <0.75dB Min RL >20dB(MM), >35dB(SM)	FOV have to monitor optical characteristics during load (For MPO sample, only 1ch, 6ch and 12ch fiber have to be monitored.)

Group B

	Inspection item	Condition	Criteria	Note
1	Impact	1.5m, 5 drops	Initial: Max IL < 0.75dB During IL: None Final: Max IL <0.75dB Min RL >20dB(MM), >35dB(SM)	Impact by steal block with 13mm at least ※Refer to remark 1 for apparatus
2	Flex	4.9N, ±90°, 100 cycles	Initial: Max IL < 0.75dB During IL: None Final: Max IL <0.75dB Min RL >20dB(MM), >35dB(SM)	
3	Twist	15N, ±900°, 10 cycles	Initial: Max IL < 0.75dB During IL: - Final: Max IL <0.75dB Min RL >20dB(MM), >35dB(SM)	
4	Cable retention 0°	50N (Load application rate: 5N/s), min 5sec	Initial: Max IL < 0.75dB During IL: - Final: Max IL <0.75dB Final: IL(Change) <0.5dB Min RL >20dB(MM), >35dB(SM)	FOV try to follow load application rate: 5N/s. But 5N/s is target value and FOV don't have to guarantee it.
5	Cable retention 90°	19.4N (Load application rate: 5N/s), min 5sec	Initial: Max IL < 0.75dB During IL: - Final: Max IL <0.75dB Final: IL(Change) <0.5dB Min RL >20dB(MM), >35dB(SM)	FOV try to follow load application rate: 5N/s. But 5N/s is target value and FOV don't have to guarantee it.

Group C

	Inspection item	Condition	Criteria	Note
1	Durability	500 insertions	Initial: Max IL < 0.75dB During IL: - Final: Max IL <0.75dB Min RL >20dB(MM), >35dB(SM)	Cleaning timing; Clean MTC and DUT end-face per 5 connection

Group D

	Inspection item	Condition	Criteria	Note
2	Strength of Coupling Mechanism	40N (Load application rate: 2N/s), min 5sec	Initial: Max IL < 0.75dB During IL: None Final: Max IL <0.75dB Min RL >20dB(MM), >35dB(SM)	Detail of Test procedure and tools: TBD

※Measure optical characteristics by Master Cord
※Measurement wavelength;
SM: 1310nm, 1550nm
※FOV follow order of test items for each sample Groups as above Tables.

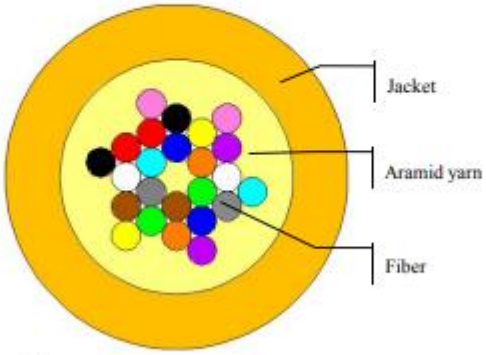
Appendix#4: Cord spec

※FOV use Appendix#4 to prepare material from SHYS.

Shenzhen Youngsun Com Optical Fiber Cable Co., Ltd.
www.youngsuncom.com

Indoor Cable Series

Cable Structure



Cable Technical Parameters

Fiber	Type	SM/MM	
	Count	2~24	
Cable	OD(mm)	3.0±0.2	
	Material	LSZH/OFNR	OFNP
Cable weight(kg/km) ± 10%		9.8	
Max.tensile Strength(N)	Short-term	440	
	Long-term	220	
Min.Bending Radius(mm)	Dynamic	20D	
	Static	10D	
Max.Crush Resistance(N/100mm)	Short-term	750	
	Long-term	300	
Cable attenuation	850nm	≤3.5dB/km	
	1300nm	≤1.5dB/km	
	1310nm	≤0.4dB/km	
	1550nm	≤0.3dB/km	
Strength Members		Aramid yarn	
Temperature range	Storage or transportation	-20℃~+70℃	
	Operation	-10℃~+60℃	0℃~+60℃

Appendix#5: Cord spec

※FOV use Appendix#5 to prepare material from YOFC.

Indoor Cable

YOFC
Smart Link Better Life.

Product

1 Product Description

Micro fiber indoor cable uses several Ø250μm colored fiber as optical communication medium, the colored fiber wrapped with a layer of aramid yarn as strength member units, and the cable is completed with a jacket.

2 Requirements

2.1 Function requirements

Indoor any purpose cable distribution;

Routing and patching for data center and indoor communication network location.

2.2 Design and test criteria

Comply with standard IEC 60794, IEC 60793;

2.3 Structure requirements

2.3.1 Structure parameters

Items		Specification
Fiber count		2
Optical fiber	Diameter(±5μm)	250
	Color	1. Blue 2. Orange
Cable	Core reinforce	Aramid yarn
	Sheath material	PVC(OFNR)
	Color	Yellow for single mode fiber; Orange for multi mode fiber; *Or other color available upon request*
	Out diameter(±0.15mm)	2.0
	Cable weight(kg/km)	Approx. 2.6

YANGTZE OPTICAL FIBRE AND CABLE (SHANGHAI) COMPANY LTD.
ADD: No.212, East Jiangtian Road, Songjiang,Shanghai, China　ZIP CORD: 201613
TEL: +86-21-67753000　FAX: +86-21-57747070
YN.TC240618-002　CN.TC240618-002

Indoor Cable

YOFC
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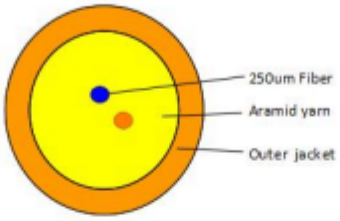
MFCC-R7A0-2.0-0A00-1V_-002

2.3.2 Construction



2.3.3 Optical properties

Table 2. Single-mode

Fiber type		Single-mode G657A1 (1310/1550nm)	Single-mode G657A2 (1310/1550nm)
Attenuation	Typical	0.36/0.22	0.36/0.22
	Maximum	0.5/0.4	0.5/0.4
Zero Dispersion Slope		≤0.092 ps/km·nm^2	≤0.092 ps/km·nm^2
Dispersion(1285~1340nm)		-3.5 – 3.5ps/(nm·km)	-3.5 – 3.5ps/(nm·km)
Mode field Diameter(@1310nm)		8.8±0.4 μm	8.8±0.4 μm
Cutoff wavelength cable(nm)		≤1260 nm	≤1260 nm
Min bend radius(mm)		10 mm	7.5 mm
Cladding diameter(μm)		125±1.0	125±1.0

Table 3. Multi-mode

Fiber type		Multi -mode (50/125μm) (850/1300nm)	Multi -mode BIOM3 (850/1300nm)	Multi -mode BIOM4 (850/1300nm)
Attenuation(dB)	Typical	3.0/1.0	3.0/1.0	3.0/1.0
	Maximum	3.5/1.5	3.5/1.5	3.5/1.5
Bandwidth(MHz·km)		≥500/≥500	≥1500/≥500	≥3500/≥500
Effective modal bandwidth		----/----	≥2000/----	≥4700/----
10 Gigabit Ethernet SX (M)		----	≤300/----	≤550/----
Min bend radius(mm)		30	7.5	7.5
Cladding diameter(μm)		125±1.0	125±1.0	125±1.0

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