付図．２　作業指図書様式例

To：FOV　　CC.：　　Ｎｏ．EN-01214

Working Direction / 作業指図書		Issued by 発行部門	Kokikai	
Product Group	Optical cord with MPO connector	Date of Issue 発行日	10 Sep. 2024	
Product Type 製品名	Optical cord with MPO 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 cord		S.Takahashi	M.Hirose	Y.Watanabe

1. Purpose/目的

Fujikura consider to apply optical cord by YOFC and SHYS 12F cord.
To evaluate reliablity of these materials, reliability shall be conducted by using samples made by FOV.
The test refers to Telcordia GR-1435.

2. Scope/適用範囲

Table 1 Sample list and plan of testing

Item No.	Prodct name	Spec	Qty
#1	YOFC SM(G657A1) 12FΦ3mm cord x FJK MPO	Follow “Sample type 1”	40
#2	SHYS SM(G657A1) 12FΦ3mm cord x FJK MPO	Follow “Sample type 1”	40
#3	YOFC MM(OM3) 12FΦ3mm cord x FJK MPO	Follow “Sample type 2”	40
#4	SHYS MM(OM3) 12FΦ3mm cord x FJK MPO	Follow “Sample type 2”	40

(Note1) Cord aging condition: 70℃,48hour
(Note2) These tests should be finished and the test report should be submit by 9 Dec.
(Note3) Detail material information should be refered to Table 2, Table 3 and Table 4.

Table 2 Material list for MPO SM

No.	Parts name	Model No.	Note
1	12MT Boot	PNJHY-0005-71-25/DR PT-01169	
2	PA 12MT-GB-TP with Dimple	PNJHY-0005-71-25/ DRPT-10200	

3	Pin Clamp F	PNJHY-0010-71-110/DRPT-01173	For Female
4	Pin Clamp M2	PNJHY-0010-71-131/DRPT-10033	For male
5	Premier Pin 4 (Lead Free)	PNJHY-0010-71-158/DRPT-10517	For male
6	Spring(A)N	PNJHY-0010-71-02/DRPT-01176	
7	Spring Push SP for 2D	PNJHY-0010-71-147/DRPT-10206	
8	MPO Round Boot 3mm	PNJHY-0010-71-127/DRPT-01174	
9	Ring N3	PNJHY-0010-71-21/DRPT-01175	
10	Cap B	PNJHY-0010-71-95/DRPT-01178	
11	Housing Assembly (Green)	PNJHY-0010-72-21/DRAS-13264	
12	Housing Assembly (Beige)	PNJHY-0010-72-24/DRAS-13267	

Table 3 Material list for MPO MM

No.	Parts name	Model No.	Note
1	12MT Boot	PNJHY-0005-71-25/DRPT-01169	
2	12MT-LLMM-TP (WR)	PNJHY-0005-22-44/DRPT-11172	
3	Pin Clamp F	PNJHY-0010-71-110/DRPT-01173	For Female
4	Pin Clamp M2	PNJHY-0010-71-131/DRPT-10033	For male
5	Premier Pin 4 (Lead Free)	PNJHY-0010-71-158/DRPT-10517	For male
6	Spring(A)N	PNJHY-0010-71-02/DRPT-01176	
7	Spring Push SP for 2D	PNJHY-0010-71-147/DRPT-10206	
8	MPO Round Boot 3mm	PNJHY-0010-71-127/DRPT-01174	
9	Ring N3	PNJHY-0010-71-21/DRPT-01175	
10	Cap B	PNJHY-0010-71-95/DRPT-01178	

11	Housing Assembly (Green)	PNJHY-0010-72-21/DRAS-13264	
12	Housing Assembly (Beige)	PNJHY-0010-72-24/DRAS-13267	

Table 3 Material list for MPO cord

No.	Item	Product Name	Model No.	Note
1	YOFC SM 12F cord	Φ3 Round cord, 12 fiber, SM(Yellow)	MFCC-R7A0-1-0A00-1VY-012B6a1	
2	YOFC MM 12F cord	Φ3 Round cord, 12 fiber, OM3	MFCC-R7A0-0A00-1VY-012BIOM3	
3	SHYS SM 12F cord	Φ3 Round cord, 12 fiber, SM(Yellow)	None	SR15E(G657A1)/OFNR
4	SHYS MM 12F cord	Φ3 Round cord, 12 fiber, OM3(Aqua)	None	OM3/OFNR

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

Table 4 Material list for MPO cord

Group	Test Item	Qty
		Item#1~Item#6[pcs]
Group A	TIA 568. E-3 Environmental Test	10 (Including spare of 2pcs connectors)
Group B	TIA 568. E-3 Mechanical Test(1)	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)
Group E	TIA 568. E-3 Mechanical test(2) Additional Proof test	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.
※ Samples should be connected by USConec adapter C9857.

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

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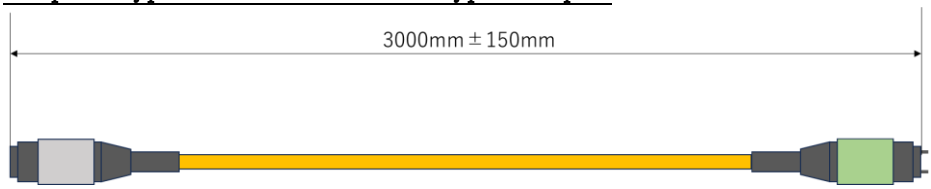
Rev	Date	History	Reason	PIC
1	10 Sep. 2024	Originai issue	-	Y.Watanabe

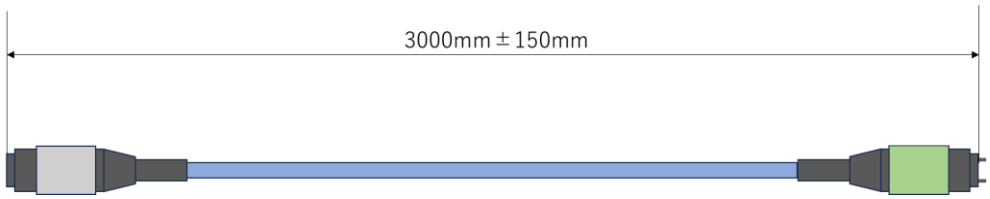
Appendix#1: Structure/Spec/Procedure for sample making

Sample type 1: SM 12F cord type sample



Ferrule end face appearance: RQFU-10205(1)
Ferrule end face geometry: RQFU-10074
Initial IL≦0.35dB (1310nm, 1550nm)
Initial RL≧55dB (1310nm, 1550nm)
※Initial optical characteristics should be measured by Master Cord.
(Master Cord spec: T.B.D)

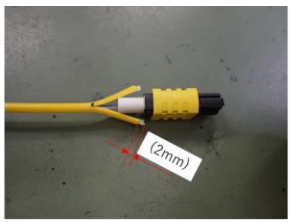
Sample type 1: MM 12F cord type sample



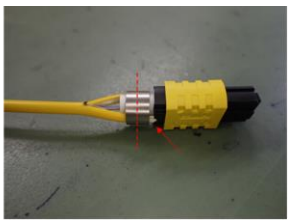
Ferrule end face appearance: RQFU-10205
Ferrule end face geometry: RQFU-10143
Initial IL≦0.5dB (850nm)
Initial RL≧20dB (850nm)
※Initial optical characteristics should be measured by Master Cord.
(Master Cord spec: T.B.D)

Crimping procedure

When crimping Crimp ring, Kevlar, outer jacket and spring push, FOV should follow below procedure.



Kevlar is longer than outer jacket by (2mm) before crimping.



Operator set crimping ring on outer jacket.
Below items should be met.
-Crimping ring should be boot side than center of spring push.
-Kevlar have to protrude from end-face of crimp ring.

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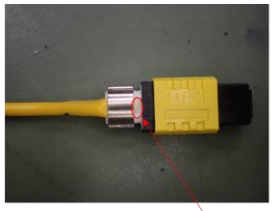

Crimp the ring

Adhesive applying area

Apply Cemedine PPX to Kevlar protrudes from crimp ring.
Applying direction: Both key up side and key down side
Applying amount: one drop
※If too much adhesive is applied, fiber will be broken.
FOV have to control and manage adhesive amount carefully.

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;
MM: 850nm
SM: 1310nm, 1550nm
※FOV follow order of test items for each sample Groups as above Tables.