

OPERATION PROCEDURE OF GATHERING

Document No: 4-OP-0473	Version: 2	Page:1/13	
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I. Purpose

- To instruct operation method which implemented in Fujikura Fiber Optics Vietnam .

II. Application

- This operation procedure is applied for:

No.	Group
1	MPO Cord assembly
2	Module Coupler Unit
3	IDM Jumper Cord Unit
4	Trillian FAU & Pigtail

- This document concerns to Production function, Quality Assurance function.

III. Reference documents:

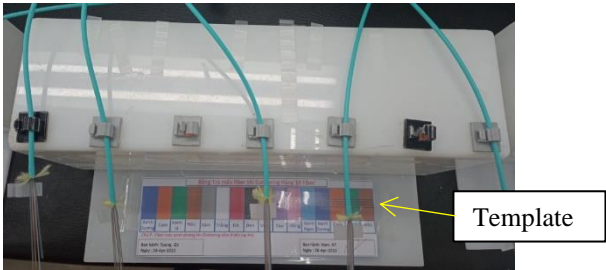
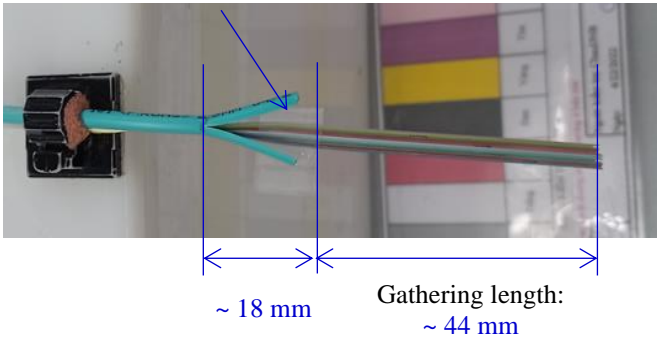

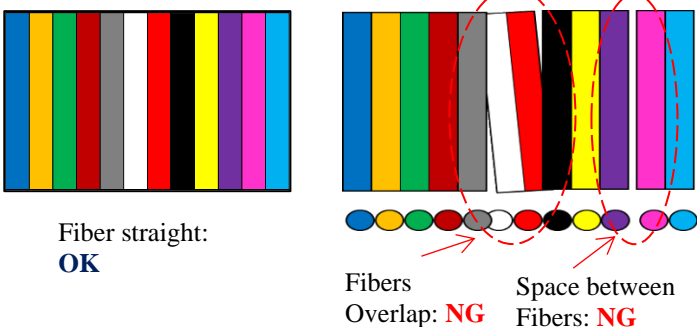
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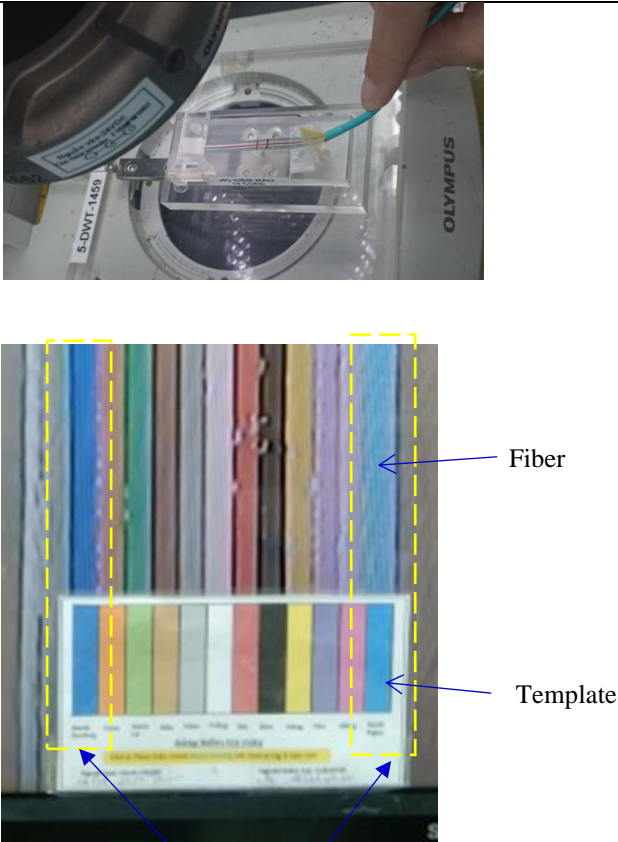
IV. Term definition:

- FOV: Fujikura Fiber Optics Vietnam Ltd.,

Checked by: Nguyen Thanh Ban Date: Follow DMS	Approved by: : Nguyen Trung Kien Date: Follow DMS
Prepared by: TienCTC Date: 22-Aug -2024	Cross check by: ThangVD Date: 22-Aug -2024
	Originator: NamNT, DuongNLT Date: 26-Sep -2022

V. Content**1. MPO with 1 layer (12 fibers, 16 fibers ...)****1.1 Process specifications****a) Gathering by dusper**

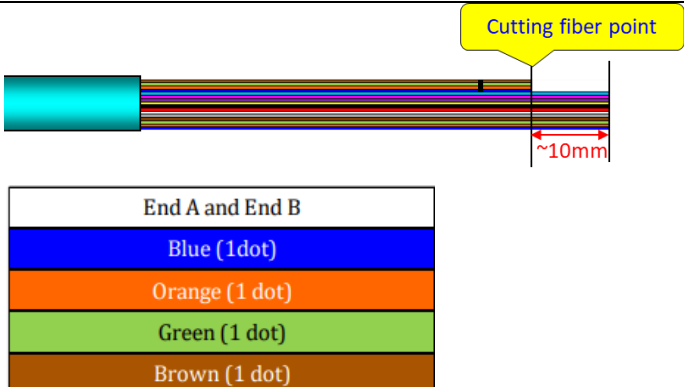
No	Operation	Picture reference	Description
1	Mount product		<ul style="list-style-type: none"> - Mount the product on the shelf clamp to keep the cord. - Put correct template (follow instruction in customer spec) under shelf clamp to check fiber color arrangement.
2	Arrange fiber		<ul style="list-style-type: none"> - Arrange the fiber color follow color in template. - Use scotch tape to fix the fiber group together at gathering length.
3	Gathering		<ul style="list-style-type: none"> - Put the FAA adhesive to the dusper, fold the paper in half, swipe the adhesive in the gathering length. - Replace old dusper with new dusper and do repeat above step for 2nd and 3rd glue strokes, max swipe time is 3.
4	Check appearance		<p>Check that the fiber must be straight, no space or overlap, the glue must cover all the fibers.</p>

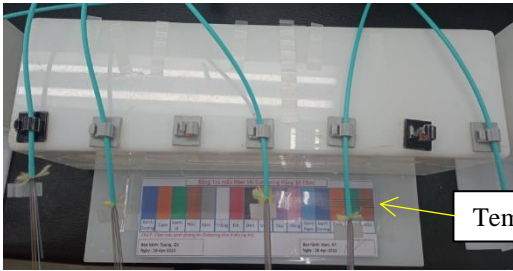
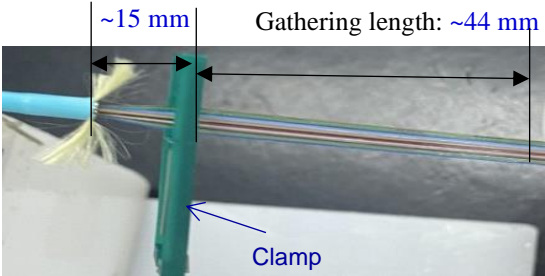

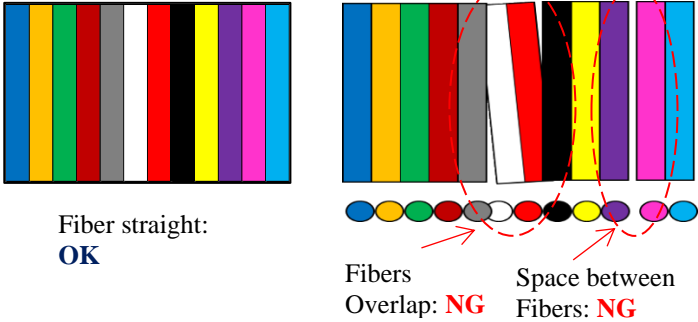

5	FAA drying		Wait for FAA drying time: ~ 3 mins.
6	Check fiber arrangement	 <p>Adjust magnification of Microscope so that Fiber edge must be straight with template edge</p>	<p>- Put fiber into Checking jig under Microscope. Fiber color order must be matched with color on template, no space or overlap between fibers.</p> <p>- After finish checking, remove Scotch tape before move product to next process</p>

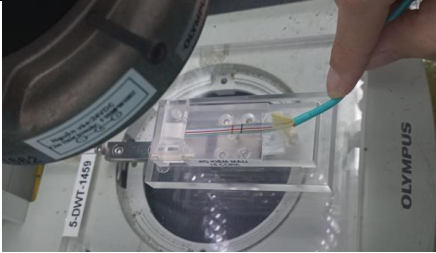
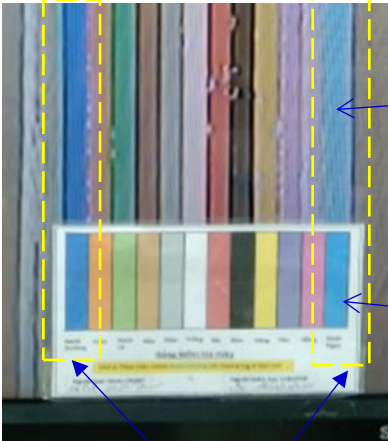
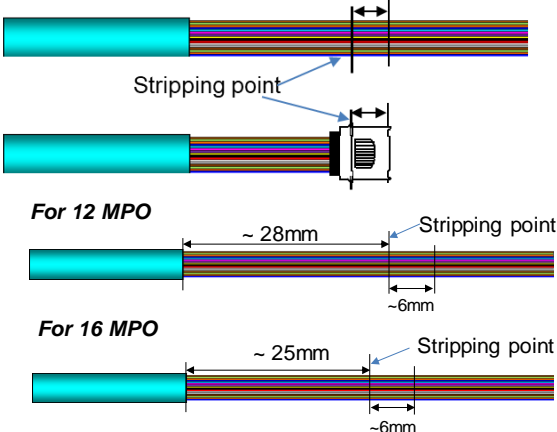


b) Gathering by clamp

Only apply for AFL product

No	Operation	Picture reference	Description					
1	Cut fiber	<div></div> <table><tr><td>End A and End B</td></tr><tr><td>Blue (1 dot)</td></tr><tr><td>Orange (1 dot)</td></tr><tr><td>Green (1 dot)</td></tr><tr><td>Brown (1 dot)</td></tr></table>	End A and End B	Blue (1 dot)	Orange (1 dot)	Green (1 dot)	Brown (1 dot)	<p>Cut ~10mm of fibers as below table for both end A and end B to let visual for operator.</p> <p>Note: Not apply for cable have fiber count <16 fibers.</p>
End A and End B								
Blue (1 dot)								
Orange (1 dot)								
Green (1 dot)								
Brown (1 dot)								

2	Mount product	 <p>Template</p>	<ul style="list-style-type: none"> - Mount the product on the shelf clamp to keep the cord. - Put correct template (follow instruction in customer spec) under shelf clamp to check fiber color arrangement.
2	Arrange fiber	 <p>~15 mm Gathering length: ~44 mm</p> <p>Clamp</p>	<ul style="list-style-type: none"> - Arrange the fiber color follow color in template. - Use clamp to fix the fiber group together at gathering length.
3	Gathering	 <p>Use clamp to swipe the adhesive</p>	<ul style="list-style-type: none"> - Use clamp to swipe the adhesive: 2 times - Use super to swipe the adhesive for 3rd after waiting around 1 minute
4	Check appearance	 <p>Fiber straight: OK</p> <p>Fibers Overlap: NG Space between Fibers: NG</p>	<p>Check that the fiber must be straight, no space or overlap, the glue must cover all the fibers.</p>
5	FAA drying		<p>Wait for FAA drying time: ~ 3 mins.</p>

6	Check fiber arrangement	  <p>Fiber</p> <p>Template</p> <p>Adjust magnification of Microscope so that Fiber edge must be straight with template</p> <p>Checking fiber length: ~6mm (fiber insert to MT ferrule area)</p>  <p>Stripping point</p> <p>For 12 MPO</p> <p>~ 28mm</p> <p>~6mm</p> <p>Stripping point</p> <p>For 16 MPO</p> <p>~ 25mm</p> <p>~6mm</p> <p>Stripping point</p>	<p>- Put fiber into Checking jig under Microscope. Fiber color order must be matched with color on template, no space or overlap between fibers.</p> <p>- After finish checking, remove Scotch tape before move product to next proces</p> <p>- Area to check gathering: ~6mm (fiber insert to MT ferrule area)</p>
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1.2 Process condition

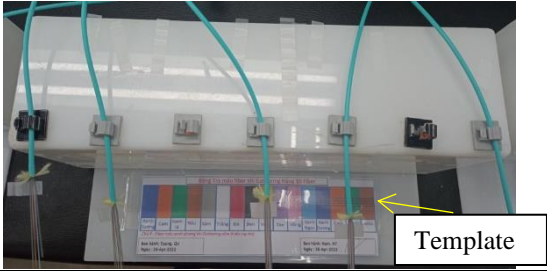
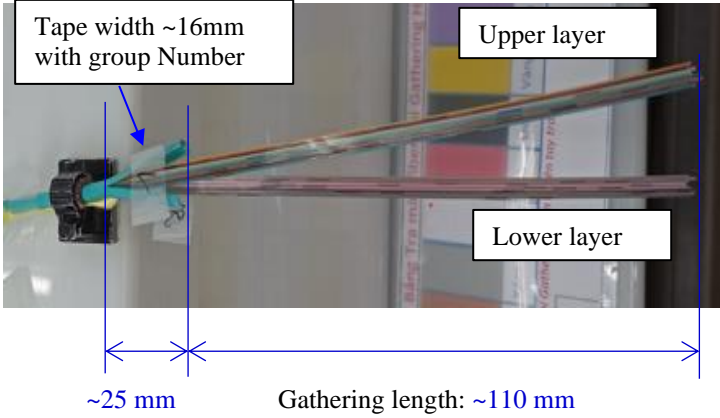

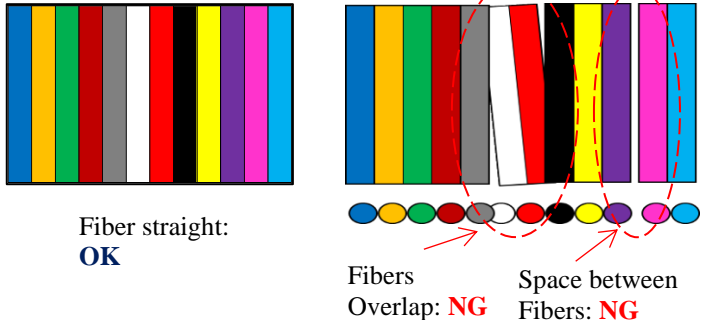
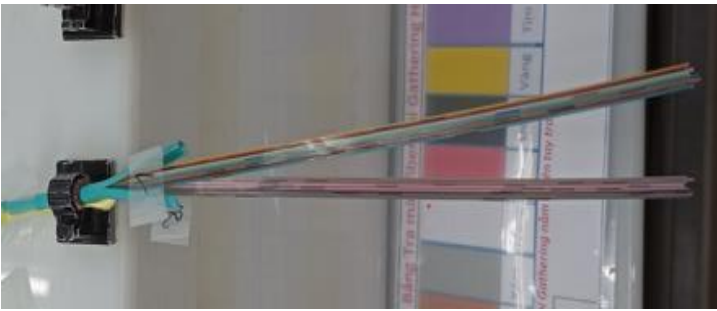
Items	Condition
Adhesive	FAA-03 is in expired date after open the box, store in room temperature.
Fiber arrangement	Must in order and correctly position There is no swap between fibers per each group
Drying time	Timer

1.3 Checking items

Type of record	Item	Record
Quality control items	Refer to relative QC flow chart	Relative check sheet
Identification & trace-ability record	<ul style="list-style-type: none"> - FAA Material Lot No - Operating date - Operator's name. - Microscope no 	

2. MPO with 2 & 4 layers (24 fibers, 32 fibers, 48 fibers, ...)

2.1 Process specifications

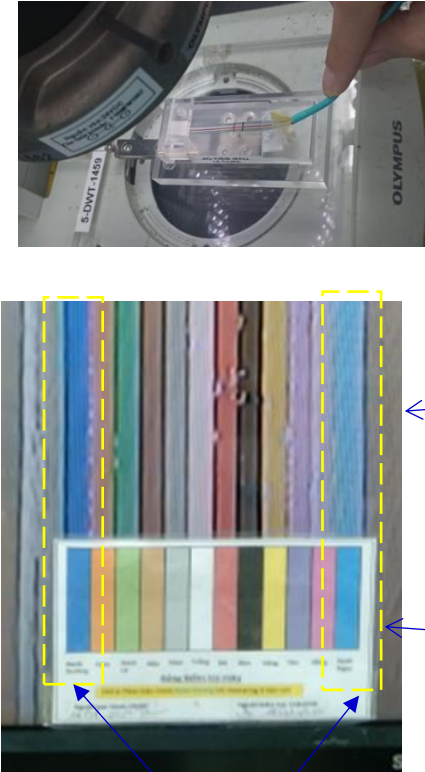
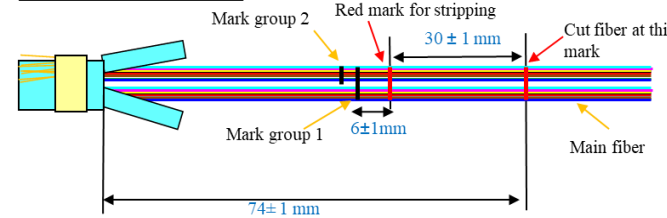
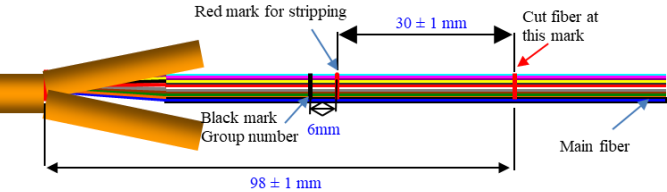
No	Operation	Picture reference	Description
1	Mount product		<ul style="list-style-type: none"> - Mount the product on the shelf clamp to keep the cord. - Put correct template (follow instruction in customer spec) under shelf clamp to check fiber color arrangement.
2	Arrange fiber		<ul style="list-style-type: none"> - Arrange the fiber color follow color in template. - Arrange from Lower layer to Upper layer. - Use scotch tape with group number to fix the fiber group together follow gathering length.
3	Gathering		<ul style="list-style-type: none"> - Put the FAA adhesive to the dusper, fold the paper in half, swipe the adhesive in the gathering length. - Replace old dusper with new dusper and do repeat above step for 2nd and 3rd glue strokes, max swipe time is 3.
4	Check appearance		Check that the fiber must be straight, no space or overlap, the glue must cover all the fibers.
5	FAA drying		Wait for FAA drying time:~ 3 mins.

FUJIKURA FIBER OPTICS VIETNAM LTD.
OPERATION PROCEDURE OF GATHERING

Document No: 4-OP-0473

Version: 2

Page: 7/13

No	Operation	Picture reference	Description
6	Check fiber arrangement	 <p>Adjust magnification of Microscope so that Fiber edge must be straight with template edge</p>	<p>- Put fiber into Checking jig under Microscope. Fiber color order must be matched with color on template, no space or overlap between fibers.</p>
7	Mark fiber	<p>* 2 layers mark</p>  <p>* 4 layers mark</p>  <p>Black mark Group number</p> <p>Red mark for stripping</p> <p>Group 1: 1 black mark</p> <p>Group 2: 2 black marks</p> <p>Group 3: 3 black marks</p> <p>Group 4: 4 black marks</p>	<p>- Mark fiber for stripping follow product requirement. - Then remove the tape before moving to next process.</p>

2.2 Process condition

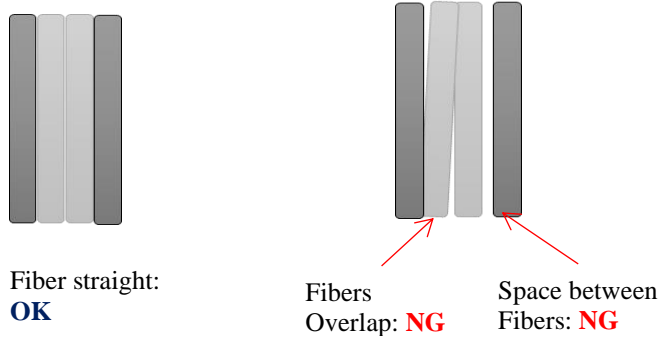
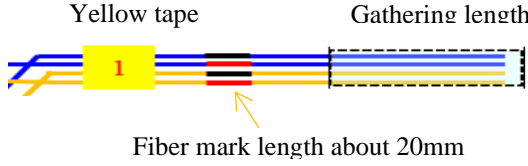
Items	Condition
Adhesive	FAA-03 is in expired date after open the box, store in room temperature.
Fiber arrangement	Must in order and correctly position There is no swap between fibers per each group
Drying time	Timer

2.3 Checking items

Type of record	Item	Record
Quality control items	Refer to relative QC flow chart	Relative check sheet
Identification & trace-ability record	- FAA Material Lot No - Operating date - Operator's name. - Microscope no	

3. Module Coupler unit**3.1 Process specifications**

No	Operation	Picture reference	Description
1	Arrange fiber		<ul style="list-style-type: none"> - Gathering length: 150 ± 20 mm, - Fiber arrangement follow product spec.
2	Gathering		<ul style="list-style-type: none"> - Put the FAA adhesive to the dusper, swipe the adhesive in the gathering length. - Replace old dusper with new dusper and do repeat above step for 2nd and 3rd glue strokes, max swipe time is 3.
3	FAA drying		Wait for FAA drying time: ~ 3 mins.

4	Check appearance	 <p>Fiber straight: OK</p> <p>Fibers Overlap: NG</p> <p>Space between Fibers: NG</p>	Check that the fiber must be straight, no space or overlap, the glue must cover all the fibers
5	Identify group	 <p>Yellow tape</p> <p>Gathering length</p> <p>Fiber mark length about 20mm</p>	Use yellow adhesive tape with written number to classify splicing group of input/output.

3.2 Process condition

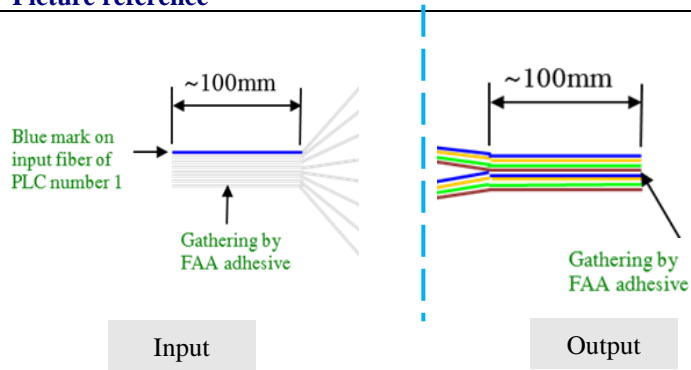
Items	Condition
Gathering length	By Jig/Ruler & Template
Cut fiber	By Scissors/Pliers
Cutting length of fiber	By Jig/ Ruler & Template
Adhesive drying	Timer

3.3 Checking Items

Type of record	Items	Record
Quality control items	Refer to relating QC Flow Chart	Check sheet: Related check sheet
Identification & trace ability record	-Operator name	
	-Date of operation	
	-Coupler/PLC no.	

4. IDM Optical Jumper Unit

4.1 Process specifications


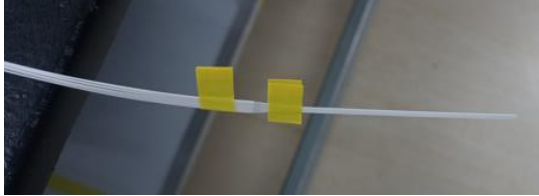
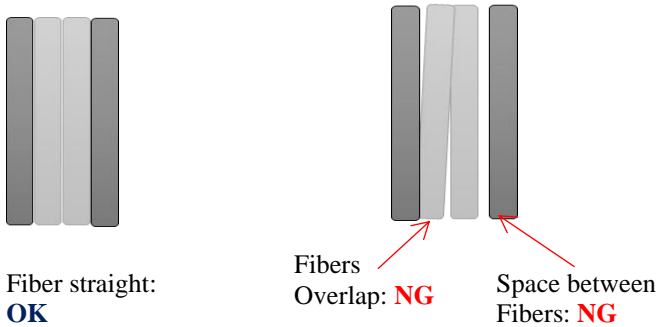
No	Operation	Picture reference	Description
1	Gathering	 <p>Blue mark on input fiber of PLC number 1</p> <p>~100mm</p> <p>Gathering by FAA adhesive</p> <p>Input</p> <p>~100mm</p> <p>Gathering by FAA adhesive</p> <p>Output</p>	<ul style="list-style-type: none"> - Gathering length: ~100 mm. - Fiber arrangement follow product spec.

OPERATION PROCEDURE OF GATHERING

Document No: 4-OP-0473

Version: 2

Page: 10/13

2	Gathering		<p>- Put the FAA adhesive to the dusper, swipe the adhesive in the gathering length.</p> <p>- Replace old dusper with new dusper and do repeat above step for 2nd and 3rd glue strokes, max swipe time is 3.</p>
3	FAA drying		Wait for FAA drying time:~ 3 mins.
4	Check appearance	 <p>Fiber straight: OK</p> <p>Fibers Overlap: NG</p> <p>Space between Fibers: NG</p>	Check that the fiber must be straight, no space or overlap, the glue must not be too thick or too thin.

4.2 Process condition

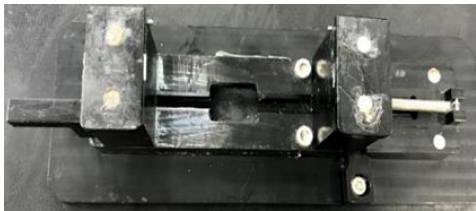
Items	Condition
Gathering length	By Jig/Ruler/Template
Cut fiber	By scissors
Cutting length of fiber	By Jig/Ruler/Template
Drying time	Timer

4.3 Checking items

Type of record	Items	Record
Quality control items	Refer to relating QC Flow Chart	Check sheet: Related check sheet
Identification & trace ability record	-Operator name -Date of operation	

5. Trillian FAU & Pigtail product:

5.1. Process specifications

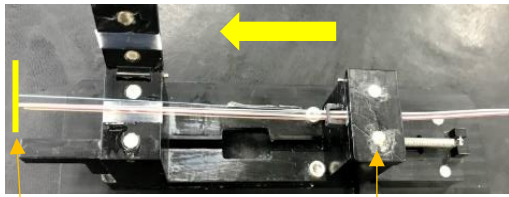
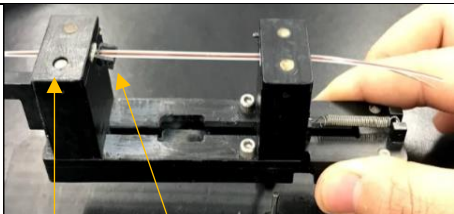
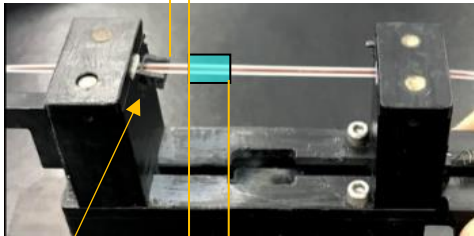
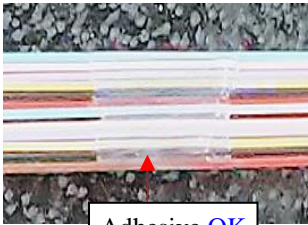
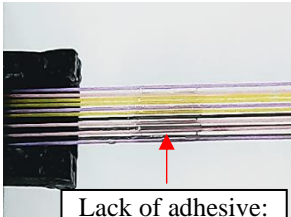
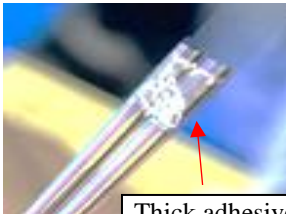

No	Operation	Picture reference	Description
1	Attach the adhesive jig		Attach the adhesive jig to the base

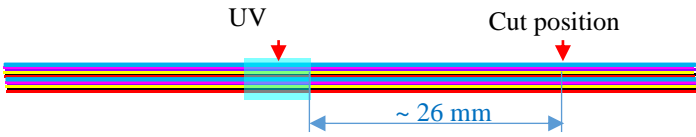

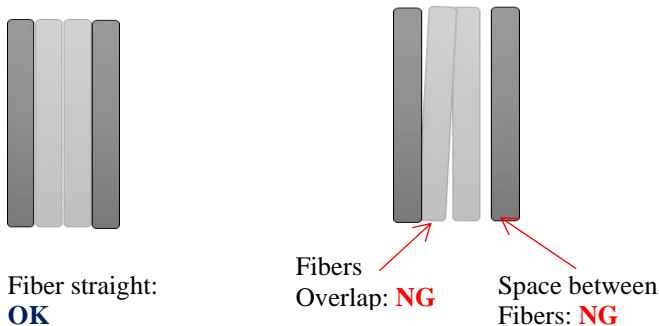
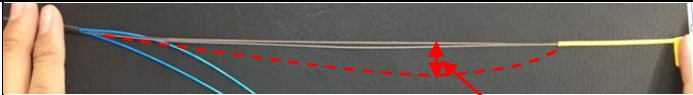
FUJIKURA FIBER OPTICS VIETNAM LTD.
OPERATION PROCEDURE OF GATHERING

Document No: 4-OP-0473

Version: 2

Page: 11/13

2	Set ribbon on jig	<p align="center">Straighten fiber follow arrow direction</p>  <p>Fiber head horizontally with the black gauge</p> <p align="right">Clamp 1</p>	<ul style="list-style-type: none"> - Straighten the fiber. - Place the fiber head horizontally with the black gauge. - Close Clamp 1
3	Set ribbon on jig (continue)	 <p>Clamp 2 MT dummy</p>	<ul style="list-style-type: none"> - Move the MT dummy from Clamp 1 to Clamp 2 to check the fibers is not crossed, between the fiber is straight. - Then close Clamp 2
4	Apply Threebond UV adhesive	<p align="center">2~3 mm from MT dummy</p>  <p>Dummy MT</p> <p align="right">UV adhesive 3~4 mm</p>  <p align="center">Adhesive OK</p>  <p align="center">Lack of adhesive: NG</p>  <p align="center">Thick adhesive : NG</p>	
5	UV curing		<ul style="list-style-type: none"> - Power: 60 ± 10 mW/cm² - Time: 150s

6	Cut residual fiber		
7	Check appearance		<ul style="list-style-type: none"> - Adhesive dry completely (by visual) - No fiber damage around adhesive area
8	Check appearance		Check that the fiber must be straight, no space or overlap, the glue must not be too thick or too thin.
9	Check fiber bend		

5.2. Process conditions

Items	Condition
Gathering	MT dummy, jig, template
Three-bond adhesive curing	UV curing machine

5.3. Checking items

Type of record	Items	Record
Quality control items	Refer to relating QC Flow Chart	Related Check sheet
Identification & trace ability record	-Lot No. -Operator name & code -Date of operation	

VI. Record

- Identification, storage, protection, retrieval, retention time & disposition of these records refer to 0-Pr-004 (Control of Records).
- Note: Nonconforming product, material shall be identified & controlled according to relevant procedures 9-Pr-008 (Control of Nonconforming).

OPERATION PROCEDURE OF GATHERING

Document No: 4-OP-0473

Version: 2

Page: 13/13

REVISION HISTORY

Date	Person	Ver	Description		Reason	Requester
			Old contents	New contents		
22-Aug-2024	TienCTC	2	Item V.1 MPO with 1 layer (12 fibers, 16 fibers ...) 1.1 Process specification - None	Item V.1 MPO with 1 layer (12 fibers, 16 fibers ...) 1.1 Process specification - Add gathering by clamp for AFL product	Follow: 4-Pr-007-4-Fo-0007-4-RC-0197, 9-PR-0014-9-FO-0001-4-RC-0144, 9-PR-0014-9-FO-0001-4-RC-0145	TienDT
26-Sep-2022	Nam NT, Duong NLT	1	-	New Release	New General OP Project	Dep NV