FUJIKURA FIBER OPTICS VIETNAM LTD.

# TECHNICAL REPORT

| Form: 4-Pr-007-4-Fo-005 | Version: 08 | Page: 1/3 | |
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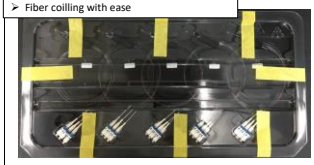
Record No (get by EIC program): 4-PR-007-4-fo-005-9-RC-0071 — Date: 22-Mar-22

Report title: Changing packing method for Acacia products

| Prepared by: ChauVNB | Checked by:HienNTN | Reviewed by Technical Advisor (if any) | Approved by: DucTNM 5-Apr-22 |
|---|---|---|---|

**I. Background:**

CNC would like to transfer package without using PDMS contamination material such as pink sponge INOAC EAS-3. This package is used for SFF, SFF NH and LFF.
This technical report is made to testing for ability of new packing design could protect product from damage during transportation.

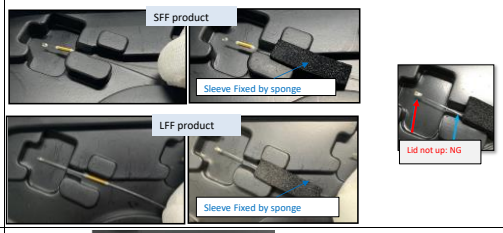
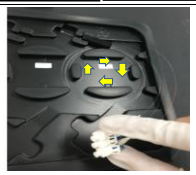
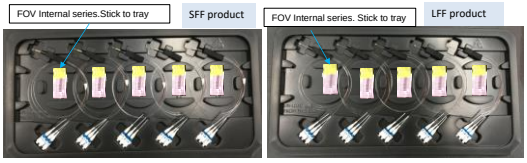
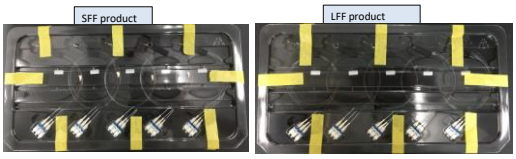
| Product | Current packing method | New packing method | Drawing No of new packing method |
|---|---|---|---|
| SFF (or SFF NH) |  ➢ Too much PDMS pink sponge. ➢ Label wraped to fiber ➢ Fiber coilling complicated |  ➢ Only 1 small Non PMDS sponge per product ➢ Label stick to tray ➢ Fiber coilling with ease | +Package case type C: 7-DWM-0567 ver.E (Test report: 000-4-TSR-927) +Package cover type C: 7-DWM-0568 ver.D (Test report: 000-4-TSR-928) +Sponge: 7-DWM-0648 (Test report: 000-4-TSR-1040) |
| LFF |  |  | +Package case type C: 7-DWM-0567 ver.E (Test report: 000-4-TSR-927) +Package cover type C: 7-DWM-0568 ver.D (Test report: 000-4-TSR-928) +Sponge: 7-DWM-0648 ver.02 (Test report: 000-4-TSR-1040) |

**II. Conclusion:**

-We can apply new packing method include new tray as well as quality don't change based on testing result
-Productivity of packing process was improve with new packing method (use new type of label):21s/set

**III. Analysis (Yield ratio, Productivity, Cpk, Process Reliability, product's reliability...):**

1. Details of changing packing method in new tray

| Step | New method | | Remark |
|---|---|---|---|
| Preparation | - Stick label into black tray directly. |   | We applied new label (LBL0048,size: 7mmx15mm) instead of current label (PLA0130, 25.4x38.1mm) to prevent risk fiber damage when inserting current label into product. |
| Array packing | - Insert array &sleeve into tray & fixed by black sponge.<br>- Lid need to be up to prevent fiber twist. |   | |
| Fiber packing | - Wrap fiber into tray. |  | |
| LC connector packing | - Put LC connectors into tray.<br>- Check boot position.<br>- Stick internal serial number into tray at this position. |   | Current process is to insert internal label into product. By sticking label into tray, we could prevent fiber damage by inserting and removing tape at QC Appearance process. |
| Finishing | - Remove internal Serial Number after mapping with label into system.<br>-Close the package cover.<br>- Fix by 8 tapes at correct positions as picture. |   | Reduce operation:insert 23pcs small pink sponge (SPG0084) & 2 pcs large pink sponge (SPG0055, SPG0085) in current method<br>SPG0084: 7-DWM-0521A<br>SPG0085: 7-DWM-0522A<br>SPG0055: 7-DWG-0454 |

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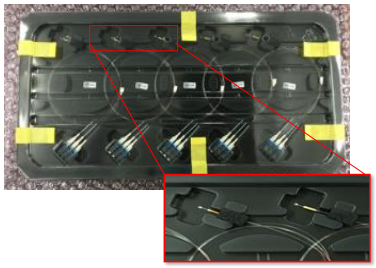
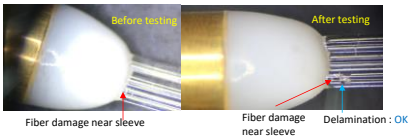
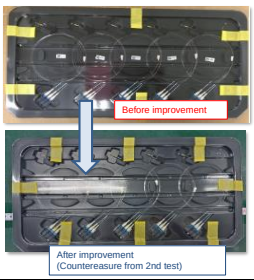
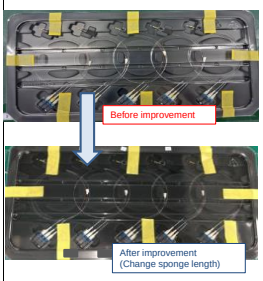
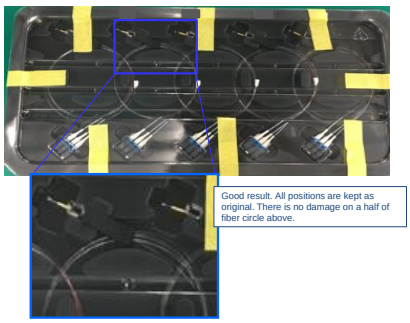
2. Evaluation test for new packing method

We verified tray follow WD: EN-00374(2)

2.1 SFF product

2.1.1 Drop test

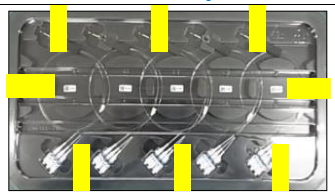
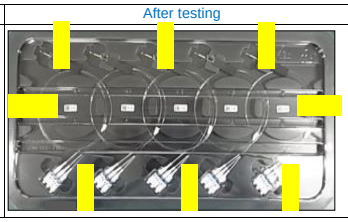
We verified new packing method on new tray by drop test condition: GR63 5.3.1 for Category A follow WD: EN-00374(2)

| Times | Before drop test | After drop test | Conclusion |
|---|---|---|---|
| First drop test |  |  | -All product's appreance is OK by microscope follow current Apperance criteria. After testing, we found 1/5pcs have new defect: Delamination near sleeve. Follow current criteria, it is OK & only happened on product which have fiber damaged before testing. And the fiber damaged is still same level, no larger than before testing. So we don't action for this case.<br>  <br>-The array No.2 & No.3 is moved. We think that it can be come from removing the SN of sponge after packing so have gap between product & sponge. We decided 2nd testing time to confirm again. |
| Second drop test |  |  | - All product's appearance is OK by microscope follow current apperance criteria.<br>- The fiber of first product jumed out of position as picture beside.<br><br>=> Investigation: During observe the packing tray, we could see a risk that there's a small gap created between packing tray body and packing tray during droptest. This gap make the space for fiber jump out. We need to make this position fixxed better.<br>=>Countermeasure:<br>+ Make additional tapes from 6pcs to 8pcs<br>+ We fixed 3pcs tape at sponge position No. 1,3,5 to prevent gap between cover & sponge.<br>+ We fixed 3pcs tape on the right of LC connector No. 1,3,5.<br>+ We fixed 2 pcs tape at stoper of tray.<br>=> We decided 3rd time drop test to verify effectiveness of this improvement. |
| Third drop testing |  |  | -All of part position(fiber, array, sleeve, LC connectors) is fixed and not moving<br>-Because this 3rd drop test confirm the improvement of both 1st drop test & 2nd drop test so we only check the product position is still kept or moved.<br>-We use the result of appearance of product in 2nd testing time to confirm for 3rd time. |
| Fourth drop test |  |  | During first drop test for LFF product base on all of improvement SFF product, the fiber of second LFF product still jumped out.<br>So we apply new structure of sponge from 7-DWM-0648 ver.01 to 7-DWM-0648 ver.02, especially change length from 15mm to 29mm for both SFF & LFF product as final actions to keep fiber in this position.<br>=> We decided 4th time drop test to verify effectiveness of this improvement.<br><br>=> Result:<br>-All of part position(fiber, array, sleeve, LC connectors) is fixed and not moving.<br>-Because this 4th drop test confirm additional improvement so we only check the product position is still kept or moved. And inspect the apperance of a half of fiber cycle as beside. The result is **OK**<br>-We use the result of appearance of product in 2nd testing time to confirm for 4th time. |

**Note: During testing used temporary LC cap (MCOTH0197-PNJHY-0048-22-34) but it isn't effect to testing result

2.1.2. Vibration test GR-63 4.4

The result is OK. There isn't abnormal after testing

| No | Before testing | After testing | Remark |
|---|---|---|---|
| 1 |  |  | The product's appearance is checked OK<br>All of part position(fiber, array, sleeve, LC connectors) is fixed, not move.<br>No found new defects (misalignment of the product, fiber burse out, scratches on the product, etc) after testing. |

Conclusion:

-We can apply new packing method include new tray as well as quality don't change based on testing result.

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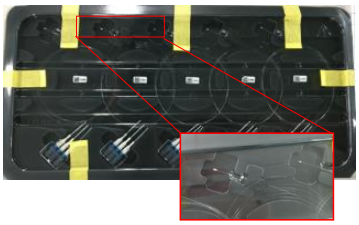
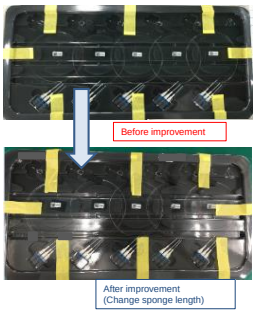
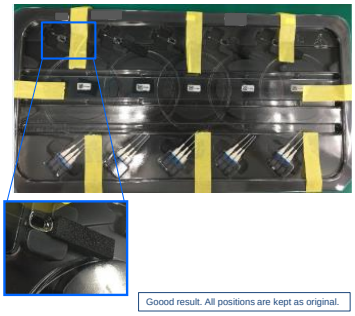
2.2 LFF product

2.2.1 Drop test

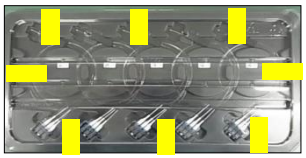
We verified new packing method on new tray by drop test condition: GR63 5.3.1 for Category A

| Times | Before drop test | After drop test | Conclusion |
|---|---|---|---|
| First drop test |  |  | -All product's appreance is OK by microscope follow current Apperance criteria.<br>-The fiber of second product jumed out of position as picture beside.<br><br>=> Investigation: Although we take many actions from SFF products, fiber still jumped out because the size of LFF fiber is only 0.16mm, very small.<br>so we need to make this position fixed better.<br>=>Countermeasure:<br>+ Apply new structure sponge's length is 29±1 instead of Sponge W8.5xL15XH8.5 to prevent completely risk fiber jumped out.<br><br>=> We decided 2nd time drop test to verify effectiveness of this improvement. |
| Second drop test |  |  | -All product's appreance is OK by microscope follow current Apperance criteria.<br>-All of part position(fiber, array, sleeve, LC connectors) is fixed and not moving.<br>-The fiber of first product is between sponge & packing tray body, still not jump out of position as picture beside-> Judge it: **OK** |

**Note: During testing used temporary LC cap (MCOTH0197-PNJHY-0048-22-34) but it isn't effect to testing result

2.1.2. Vibration test GR-63 4.4

The result is OK. There isn't abnormal after testing

| No | Before testing | After testing | Remark |
|---|---|---|---|
| 1 |  |  | The product's appearance is checked OK<br>All of part position(fiber, array, sleeve, LC connectors) is fixed, not move.<br>No found new defects (misalignment of the product, fiber burse out, scratches on the product, etc) after testing. |

**Note: During testing used temporary LC cap (MCOTH0197-PNJHY-0048-22-34) but it isn't effect to testing result because this cap the same structure with final LC cap(C-09-1500-05), only different color.

Conclusion:

-We can apply new packing method include new tray as well as quality don't change based on testing result.

IV. Appendix standardization (revised quality documentation):

N/A

V. Others:

**PRE3 controlled**