

QUALITY CONTROL FLOW CHART OF T-CONNECTOR GUMI

QC FLOW CHART : 4-QC-0081

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**I. Purpose**

- To set up the manufacturing processes which are implemented in Fujikura Fiber Optics Vietnam
- To determine Quality control items of each process

II. Application

- This guideline is applied for **T-Connector GUMI**
- This document concerns to Production function, Production engineering function, Quality Assurance function and Planning function.

III. Reference Documents

- Specification:

| No | Specification | Product Name | Remark |
|----|--------------------|-----------------------|--------|
| 1 | S-GAISHI-71-2186-3 | KY-T-Connector S-LG | |
| 2 | S-GAISHI-71-2186-3 | KY-T-connector S-LM-R | |

- FMEA No.: 0-PR-012-0-FO-001-4-RC-0070 version 5

IV. Term definition

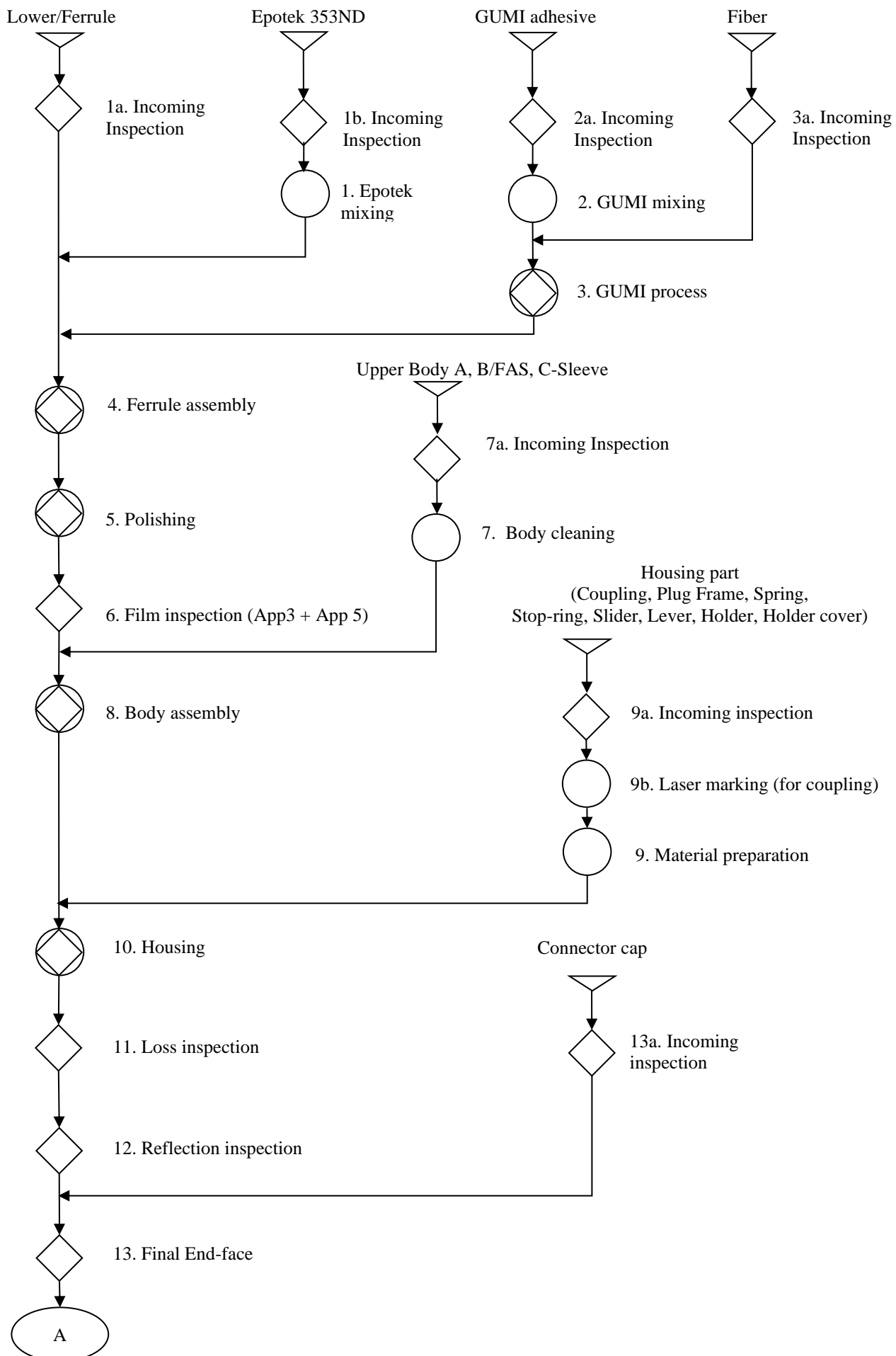
- FOV: Fujikura Fiber Optics Vietnam Ltd.,
- PRD: Production section
- PRE: Production Engineering
- QAE: Quality Assurance Engineering
- LOG: Logistic section
- PLN: Planning section
- OCAP: Out of Control Action Plan
- T-Connector GUMI: one kind of products which are manufacture in FOV.

Checked by : Nguyen Ba Phuoc
Date : Follow DMS

Approved by: Nguyen Trung Kien
Date : Follow DMS

Prepared by: Thu DTM + Cross check by: Thu TT
Date: 03-Oct-2024

Originator: Tran Cong Minh
Date: 14-Sep-2014

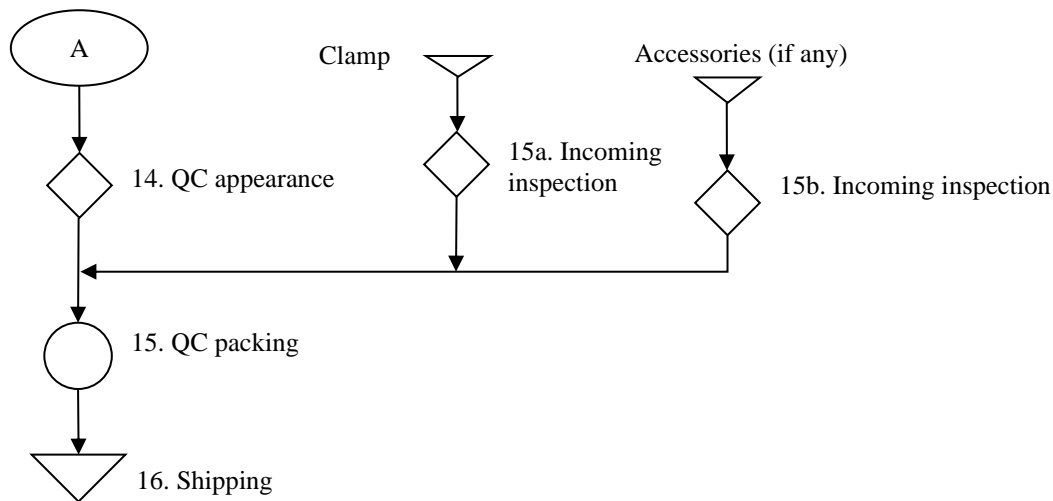
V. Content:**1. QC flow chart for all processes**

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2. Quality Control Items for each process:

| Process | | Quality control items | Instrument | Sampling size | Related document | SIC |
|---------|---|--|---------------------------------|--------------------------|----------------------------------|----------|
| No | Name | | | | | |
| 1a | Incoming Inspection (Lower body) | Refer to 9-PR-012 | | | | LOG, QAE |
| 1b | Incoming inspection (Epotek 353ND) | Refer to 9-PR-012 | | | | LOG, QAE |
| 1 | Epotek mixing | - Epotek 353ND Lot No. - Expiry date | Visual | All | 4-OP-0081, 9-PR-008-4-WI-0003 | PRD, PRE |
| | | - Type of adhesive - Amount of each part | Measure software | | | |
| | | - Mixing time | Clock | | | |
| | | - Life time of adhesive | Visual | | | |
| | | - Remove air bubble for grease | Centrifugal | | | |
| 2a | Incoming inspection (Gumi adhesive: FW-L, FW-H) | Refer to 9-PR-012 | | | | LOG, QAE |
| 2 | GUMI mixing | - Gumi adhesive Lot No. - Expiry date | Visual | All | 4-OP-0081, 9-PR-008-4-WI-0003 | PRD, PRE |
| | | - Type of adhesive | Visual | | | |
| | | - Amount of each part | Scale | | | |
| | | - Mixing time | Clock | | | |
| | | - Air bubble checking - Pot time of adhesive | Visual | | | |
| | | - Centrifugal time | Centrifugal | | | |
| | | 3a | Incoming inspection (Fiber FBG) | | | |
| 3 | Gumi process | - FBG fiber serial number - FBG color - Quantity of fiber | Visual | All | 4-OP-0081, 9-PR-008-4-WI-0003 | PRD, PRE |
| | | - Length of fiber | Length checking jig | All | | |
| | | - Fiber screening (if any) | Manual | All | | |
| | | - Shape of GUMI | Visual | All | | |
| | | - Thickness of GUMI | Nikon | 3samples/ machine/day | | |
| | | - Pot time of mixture | Visual | All | | |
| | | - Curing fiber | Heater, Timer | All | | |
| 4 | Ferrule assembly | -Epotek flow out on tip, cone of ferrule. - Lower body Lot No | Visual | 3samples/jig | 4-OP-0081 9-PR-008-4-WI-0003 | PRD, PRE |
| | | - Fiber Serial No - Ferrule Assembly tool No. - Pot life of adhesive | Visual | All | | |

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|----|--|--|-------------------------|--|--|----------------------------------|----------|
| | | - Assembly tool No (ferrule-lower body)(if any) | | | | | |
| | | - Position of bare fiber. - Check adhesive flow out - Shape of GUMI | Microscope | | | | |
| | | - Ferrule checking length (if any) | Dial gauge | | | | |
| | | - Heating Temperature - Heating time | Heater, timer | | | | |
| | | - Ring gauge check | Ring gauge | | | | |
| 5 | Polishing | - Polishing condition | Manual | All | 4-OP-528 4-OP-0397 | PRD, PRE | |
| | | - Ferrule and fiber end face | Microscope | All | 9-PR-008-4-WI-0003 | | |
| | | - Interferometer checking | Interferometer | Sampling 2 Jig/shift | | | |
| 6 | Film inspection (App 3 + App 5) | - V-Groove surface. | Air gun | <div>14</div> | 4-OP-0081 9-PR-008-4-WI-0003 | PRD, PRE | |
| | | - End face of GUMI - V-Groove surface. - Position of bare fiber in V-Groove. - End of fiber in 4 marks. | Microscope | | | | |
| 7a | Incoming inspection (Upper body A,B/FAS, C-Sleeve) | Refer to 9-PR-012 | | | | LOG, QAE | |
| 7 | Body cleaning | - Lot, quantity, ID of Upper body A, B/FAS. | Visual | | All | 4-OP-0081, 9-PR-008-4-WI-0003 | PRD, PRE |
| | | - Cleaning time | Ultrasonic machine | All | | | |
| 8 | Body assembly | -Lot, quantity, ID of Upper A,B/FAS; C-Sleeve | Manual | All | 4-OP-0081, 9-PR-008-4-WI-0003 | PRD, PRE | |
| | | - Assembly tool No. - Sleeve, Upper body: position and direction | Visual | All | | | |
| | | -Body: No contamination | Vacuum machine, Shimazu | All | | | |
| 9a | Incoming inspection (Housing part) | Refer to 9-PR-012 | | | | LOG, QAE | |
| 9b | Laser making (for coupling) | - Marking condition | Laser machine | All | 4-OP-577, 9-PR-008-4-WI-0003 | PRD, PRE | |
| | | - Appearance of coupling | Visual | All | | | |
| 9 | Material preparation | - Lot No of housing part. - Appearance. | Visual | All | 4-OP-0081, 9-PR-008-4-WI-0003 | PRD, PRE | |
| 10 | Housing | - Lot No of Housing part - Quantity - Ferrule cleanness - Housing parts' direction | Visual | All | 4-OP-0081 9-PR-008-4-WI-0003 | PRD, PRE | |
| | | - Laser printing number. | Visual | Sampling 1/12 | | | |
| | | - Spring Movement | Manual | All | | | |
| 11 | Loss inspection | - System control No. - Loss value | Loss system | - Sampling 3 wavelengths: 10pcs/PO - 2 wavelengths: All | 4-OP-0081 9-PR-008-4-WI-0003 000-5-WI-0688, 000-5-WI-0878 | PRD, PRE, PLN | |
| | | - Endface of master cord | Microscope | | | | |
| | | - Appearance of measuring fiber | Microscope | 1pc/6 products | 4-OP-0081 | PRD, PRE | |
| 12 | Reflect inspection | - FBG position - No fiber broken - FBG high | Reflectometer | Sampling 1pc/shift | 4-OP-0081, 9-PR-008-4-WI-0003 | PRD, PRE | |

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|-----|-------------------------------------|--|------------|-----|----------------------------------|----------|
| 13a | Incoming inspection (Connector cap) | Refer to 9-PR-012 | | | | LOG, QAE |
| 13 | Final end-face | - Ferrule and fiber endface | Microscope | All | 4-OP-0397 9-PR-008-4-WI-0003 | PRD, PRE |
| 14 | QC appearance | - Product appearance | Visual | All | 4-OP-0081, 9-PR-008-4-WI-0003 | PRD, QAE |
| 15a | Incoming inspection (Clamp) | Refer to 9-PR-012 | | | | LOG, QAE |
| 15b | Incoming inspection (Accessories) | Refer to 9-PR-012 | | | | LOG, QAE |
| 15 | QC fixing label and packing | - Product quantity - Attachment quantity - Contamination - Packing consumption quality and appearance - Test report - PO No | Visual | All | 4-OP-0081, 9-PR-008-4-WI-0003 | PRD, QAE |
| 16 | Shipping | - Quantity of product - PO No. - Invoice No | Visual | All | 4-OP-0081 | LOG |

VI. Record

| No. | Record | Retention time | Responsibility for keeping |
|-----|--------|----------------|----------------------------|
| - | - | - | - |

Identification, storage, protection, retrieval & disposition of these records refer to 0-PR-004 Control of record.

Note: Nonconforming product/material shall be identified & controlled according to relevant procedures: 9-PR-008.

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REVISION HISTORY

| Date | Person | Ver | Description | | Reason of change | Requester |
|-------------|-----------------------|-----|---|---|---|--|
| | | | Old contents | New contents | | |
| 03-Oct-2024 | Duong Thi Mong Thu | 14 | 6. Film inspection: Gumi surface (for App 5) | 6. Film inspection (App3 + App 5) - End face of GUMI - V-Groove surface. - Position of bare fiber in V-Groove. - End of fiber in 4 marks. | Cancel 4M change 9-PR-0014-9-FO-0001-4-RC-0141 | Nguyen Ba Phuoc |
| 01-Oct-2024 | Duong Thi Mong Thu | 13 | 6. Film inspection | 6. Film inspection: Gumi surface (for App 5) | Document review | Nguyen Ba Phuoc |
| | | | 13.Loss inspection: N/A | 13.Loss inspection: Add 000-5-WI-0878 | | |
| | | | N/A | Update 9-PR-008-4-WI-0003 to some processes | | |
| 04-Sep-2024 | Duong Thi Mong Thu | 12 | III. Reference documents S-GAISHI-71-2186-2 | III. Reference documents S-GAISHI-71-2186-3 | Customer release new specification | Nguyen Ba Phuoc |
| | | | 6. Film inspection: - End face of GUMI - V-Groove surface. - Position of bare fiber in V-Groove. - End of fiber in 4 marks. | 6. Film inspection: - V-Groove surface. | Follow 9-PR-0014-9-FO-0001-4-RC-0141 | |
| 10-Apr-24 | Nguyen Ly Thien Ngan | 11 | III. Reference documents No.1,2: Specification: S-GAISHI-71-2128-6 V. Content 2. Process condition and control items 9-QC-001 QCE 4-OP-504 4-OP-609 | III. Reference documents No.3,4: Specification: S-GAISHI-71-2186-2 V. Content 2. Process condition and control items 9-PR-012 QAE 4-OP-0397 4-OP-577 9-PR-008-4-WI-0003 000-5-WI-0688 | Customer release new specification Document review Combine to general OP Apply new template 0-PR-001-0-TEM-003 | Pham Dinh Hieu |
| 04-Sep-18 | Nguyen Thi Lan Phuong | 10 | - Item 11: Surface of bare fiber, Check adhesive outflow. | - Item 11: + Remove: Surface of bare fiber, Check adhesive outflow + Add: End of fiber in 4 marks. | - Improvement with 4M: 4-Pr-007-4-Fo-001-4-RC-0512 | Deputy Div. Manager Nguyen Trung Kien |
| 24-Jul-18 | Duong Xuan Mai | 09 | - Item 8: wrong order step of checking items: Length of fiber - SIC: PRD1 , QCS | - Item 8: correct the order: Length of fiber - SIC: + Incoming process: PIC is LOG, QAE + Do process: PIC is PRD, PRE + Check process: PIC is PRD, QAE, QAE + Packing process: PRD, QAE, QAE | - Correction - Follow to WI: 000-5-WI-0749 | Deputy Div. Manager Nguyen Trung Kien |
| 01-Sep-17 | Nguyen Thi Lan Phuong | 08 | - Item 24,26: QAS; Item 27: PLN. | - Item 24,26: QAS -> QCS; Item 27: PLN -> LOG. | - Update | Dept. Manager Nguyen Trung Kien |
| 22-Dec-16 | Nguyen Thi Lan Phuong | 07 | - Check appearance of measuring fiber 100% | - Check appearance of measuring fiber 1pc/6 products | - Improvement with 4M: 4-PR-007-4-FO-001-4-RC-0097 | Dept. Manager Nguyen Trung Kien |