

Inspection of fiber optic connectors

Edition 2021/01

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1 General Information

Read this document about inspecting fiber-glass connectors carefully. For handling and working with cables and cable systems, we refer to the document General handling manual for cables and cable systems on our homepage. National and local safety regulations must be complied with. HUBER+SUHNER rejects any liability and claims if these provisions and regulations are not complied with. Cables and cable systems may only be tested and inspected by specialist personnel with appropriate training and experience. This document assumes this.

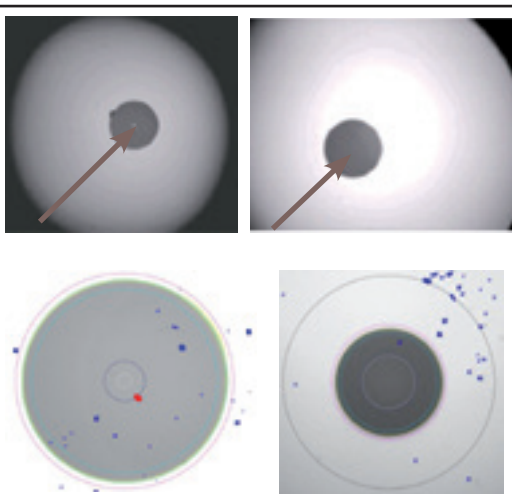

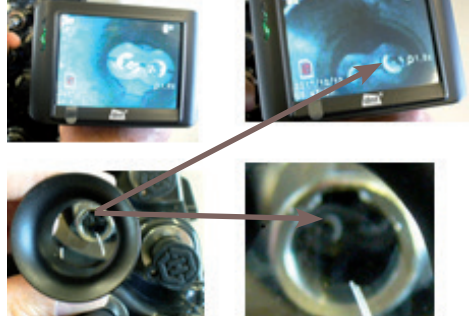
2 Equipment 1

<p>End face and sleeves</p>	<p>VIAVI Fiber Check Fiber microscope</p> <p>Application: Check of the end face the ferrule and interface.</p>	
<p>Accessories</p>	<p>Adapter to VIAVI for Q-ODC2/4 and ODC 2 and ODC 4</p> <p>Application; adapter for various ODC type.</p>	 <p>Mesomatic; FBPT-ODC-G004 / resp G003 FBPT-ODC-Goo2 / resp G001</p> <p>85027329 TOOL-ENDF-QODC-F-ADA H+S 85027330 TOOL-ENDF-QODC-M-ADA H+S</p>

3 Equipment 2

<p>Video endoscope</p>	<p>Findoo MicroCam Camera diameter < 7mm and magnifying lens</p> <p>Application: Sleeve inspection of mating connector. Inspection for big loose parts inside the ODC connectors.</p>	
<p>Loop back</p>	<p>ODC loop back (all types of ODC))</p> <p>Application: Enable measurement of MLEH ODC plug tails. Enable measurement of MLU w/o jumper .</p>	
<p>OTDR</p>	<p>Optical time-domain reflectometer</p> <p>Application: Performance attenuation measurement of FO applications and localising of possible errors.</p>	
<p>Accessories</p>	<p>Measurement cable and adapter for OTDR</p>	
<p>IBC CLEANER for standard and ODC connectors</p>	<p>IBC CLEANER for standard and ODC connectors</p>	
<p>Fluff free tissues/ „sticklers” cleaning solvent and air</p> <p>Cleaning the end faces of connectors and interfaces.</p>	<p>Fluff free tissues/ „sticklers” cleaning solvent and air</p> <p>Cleaning the end faces of connectors and interfaces.</p>	
<p>Laser/red light source</p> <p>Inspection of FO lines for channel allocation and broken fiber.</p>	<p>Laser/red light source</p> <p>Inspection of FO lines for channel allocation and broken fiber.</p>	

4 Procedure

<p>End face cleanness of connectors</p>	<p>Inspect end faces with the VIAVI Fiber check microscope for cleanness</p> <p>Note: The core of the end face is not always visible. The over lay shows the zones for SM & MM. Outside area of zone D; refer to Note1. No MM table shown; treat them like SM.</p> <p>Process: check end face and only if necessary, clean the end face with the IBC cleaner. For persistent dirt use little alcohol on the IBC cleaner and flush with air (sticklers)!</p>	 <p>SM with over lay Rejected: Defect in core zone</p> <p>MM with over lay Pass:</p> <p>Table 1 - Visual requirements for single-mode FC polished connectors, RI ≥ 45 dB</p> <table border="1" data-bbox="845 884 1380 1086"> <thead> <tr> <th>Zone^a</th> <th>Scratches (maximum number of a given dimension)</th> <th>Defects (maximum number of a given dimension)</th> </tr> </thead> <tbody> <tr> <td>A: core 0 µm to 25 µm</td> <td>None</td> <td>None</td> </tr> <tr> <td>B: cladding 25 µm to 115 µm</td> <td>No limit ≤ 3 µm None > 3 µm</td> <td>No limit < 2 µm 5 from 2 µm to 5 µm None > 5 µm</td> </tr> <tr> <td>C: sleeve 115 µm to 135 µm</td> <td>No limit</td> <td>No limit</td> </tr> <tr> <td>D: contact 135 µm to 250 µm</td> <td>No limit</td> <td>None > 10 µm</td> </tr> </tbody> </table> <p><small>NOTE 1: There are no requirements for the area outside the contact zone. Cleaning loose debris beyond this region is recommended good practice. This is of particular concern for multiple-fiber rectangular-ferrule connectors.</small></p> <p><small>NOTE 2: For multiple-fiber rectangular-ferrule connectors, the criteria apply to all fibres in the array.</small></p> <p><small>* For multiple-fiber rectangular-ferrule connectors only the requirements of Zone A and Zone B apply.</small></p>	Zone ^a	Scratches (maximum number of a given dimension)	Defects (maximum number of a given dimension)	A: core 0 µm to 25 µm	None	None	B: cladding 25 µm to 115 µm	No limit ≤ 3 µm None > 3 µm	No limit < 2 µm 5 from 2 µm to 5 µm None > 5 µm	C: sleeve 115 µm to 135 µm	No limit	No limit	D: contact 135 µm to 250 µm	No limit	None > 10 µm
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<p>End face cleanness of mating connector</p>	<p>For the interface to the mating connector use the same criteria as above.</p> <p>Note: The mating connector must be at all time inspected at the same time as the counterpart connectors. Never mate a cleaned connector with a uninspected connector!</p> <p>Refer also to DOC-00004715541 with its detailed description of the cleaning process.</p>																
<p>Sleeve inspection</p>	<p>Inspect sleeves on sockets or in adaptors for breakag.</p> <p>Application: On most ODC` s broken sleeves can be detected with a magnifying lens or in case difficulty use a micro cam.</p>																

Light inspection

E: Inspect fiber and lines for breakage.

Application:
Feed the red light into the one fiber and check for correct allocation, stress and light (no light = broken fiber).



Caution:
Never look directly into the laser light!



correct



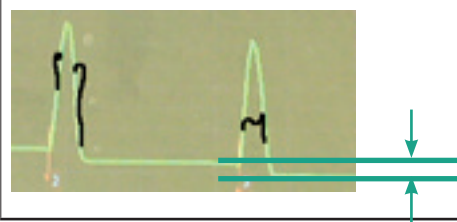
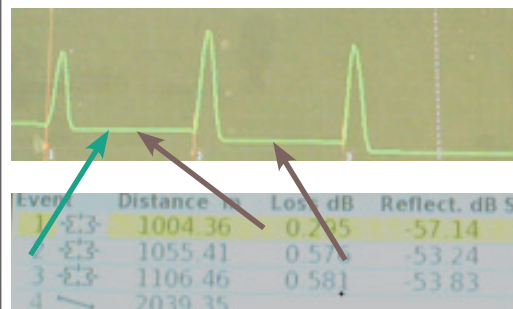
OTDR measurement with loop back on

Measure possible reflections (stress/breakages/events) with an OTDR!

Application:
Interpretation of the OTDR measurement is most important, meaning the correct interpretation of events/ghosts/reflections.

Procedure:

- Attach **launch fiber** – 1000 m > first peak
- Measure each line from the far end (FLC – bottom) a reflection (**peak**) of 14.7dB is expected = no stress along the system. Any event between the first and the second peak would indicate stress or an unexpected reflection along the line = in case of event detected > check for position.
- If no clear statement is possible > repeat the same from ODC end.
- Attach the loop back and measure the line from each end; compare the measurement respectively; calculate the average. The average of these two measurements must stay within the declared tolerance.
- Peaks in the picture indicate connection; however, the IL on the connector is shown **with the levels**.
- Short distances such as < 1 m are difficult to localize, however they will show uneven, scattered peaks and the **levels will drop** (indicating a loss)!



5 Revision history

DOC-0000813293

Revision	Description of detailed changes	Manager/Engineer	Applicable date
00	Author	LOR 4603	26.10.2017
Rev. A	Correction and adaption of text	NED 4570	14.05.2018
Rev. B	Correction and adaption of text	NED 4570	17.09.2020
Rev. C	New layout	MIH 4743	15.01.2021

HUBER+SUHNER
Degersheimerstrasse 14
9100 Herisau
Switzerland
Phone +41 71 353 41 11
hubersuhner.com

HUBER+SUHNER AG
Tumbelenstrasse 20
8330 Pfäffikon ZH
Switzerland
Phone +41 44 952 2211

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