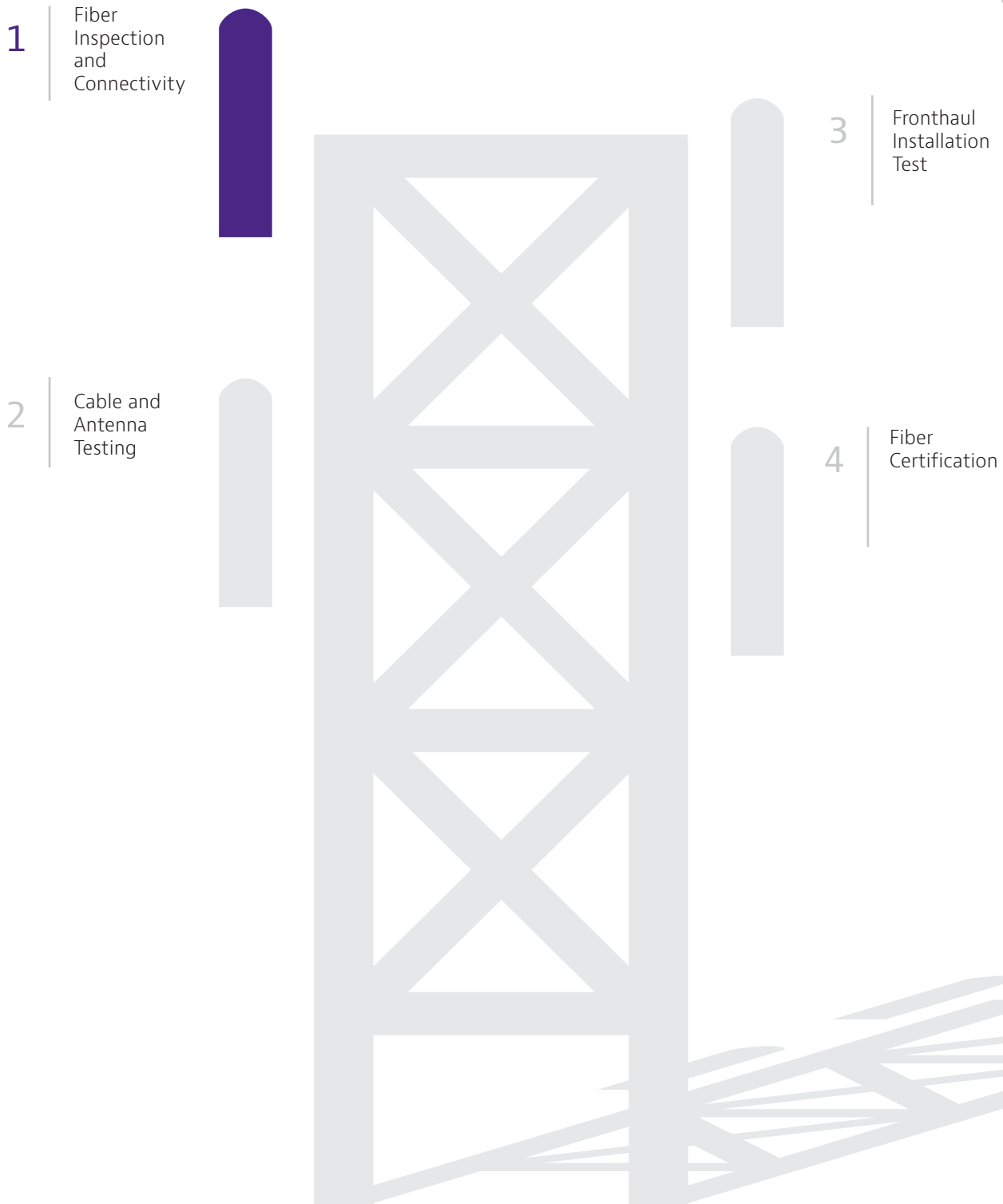


# Essentials of Fiber to the Antenna: Fiber Inspection and Connectivity



Fiber connectors enable fiber-to-fiber mating by aligning the two optical fibers. Fiber connectors come in various types and have different characteristics for use in different applications. The main components of a fiber connector are detailed in the following figures:

1. **Body**  
Houses the ferrule that secures the fiber in place
2. **Ferrule**  
Thin cylinder where the fiber is mounted and acts as the fiber alignment mechanism
3. **Fiber Cladding**  
Glass layer surrounding the core, which prevents the signal in the core from escaping
4. **Fiber Core**  
The critical center layer of the fiber; the conduit that light passes through

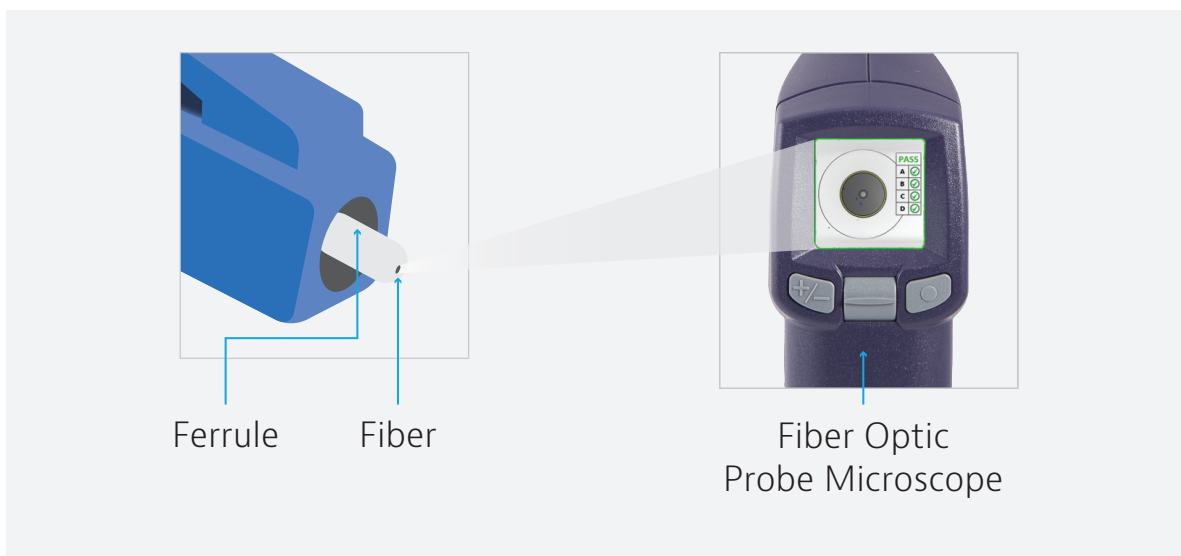


Figure 1: Fiber Connector end face viewed through a microscope

Light is transmitted and retained in the core of the optical fiber by total internal reflection. Any dust particles will impact the performance of the transmission of the signal through the fiber. Particles closer to the core will have more impact than those farther out.

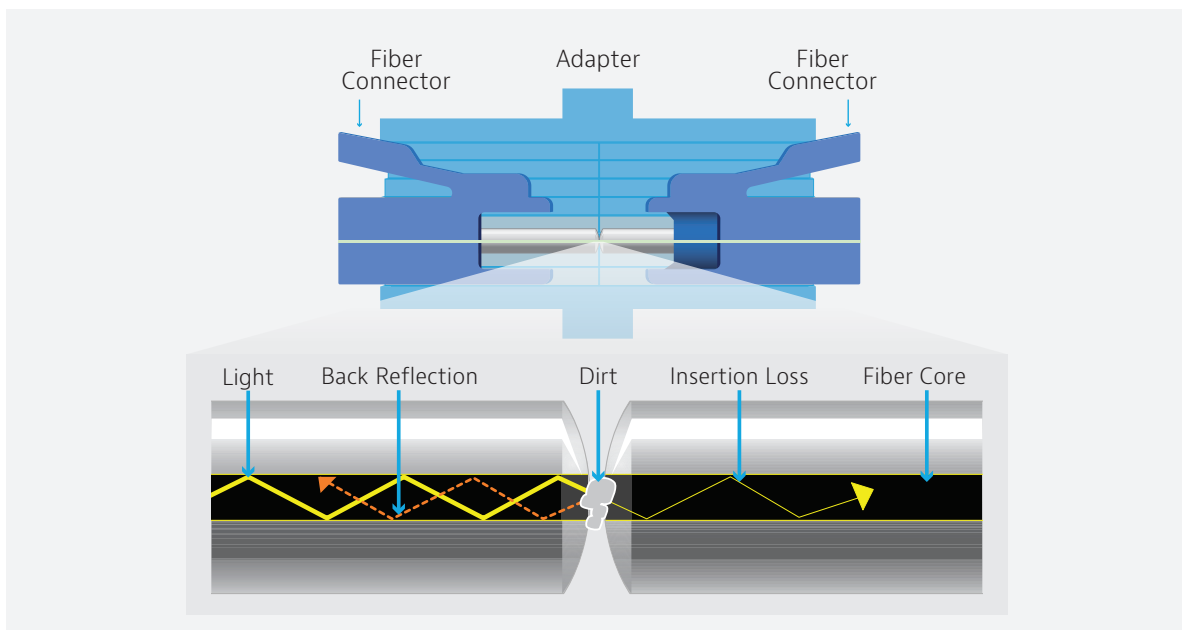


Figure 2: Cross-section of a contaminated fiber connection

**Contamination** is the #1 source of troubleshooting in optical networks. A single particle mated into the core of a fiber can cause significant **back reflection**, **insertion loss**, and even **equipment damage**. Each time connectors are mated, particles around the core become displaced, causing them to migrate and spread across the fiber surface. Particles larger than 5  $\mu\text{m}$  usually explode and multiply upon mating. These large particles can create barriers (**air gaps**) that prevent physical contact. Particles smaller than 5  $\mu\text{m}$  tend to embed into the fiber surface creating pits and chips. Dirt particles near or on the fiber core significantly affect signal performance. **BOTH sides** of the fiber connection must be free of contamination before connecting.

Connector inspection and cleaning are simple steps with immense benefits. Each time a technician has to connect an optical fiber to another one or to a patchcord, both sides of the connector must be inspected and cleaned. Use appropriate cleaning material (e.g. IBC™ cleaner, cotton swab, dust air sprays, etc.)

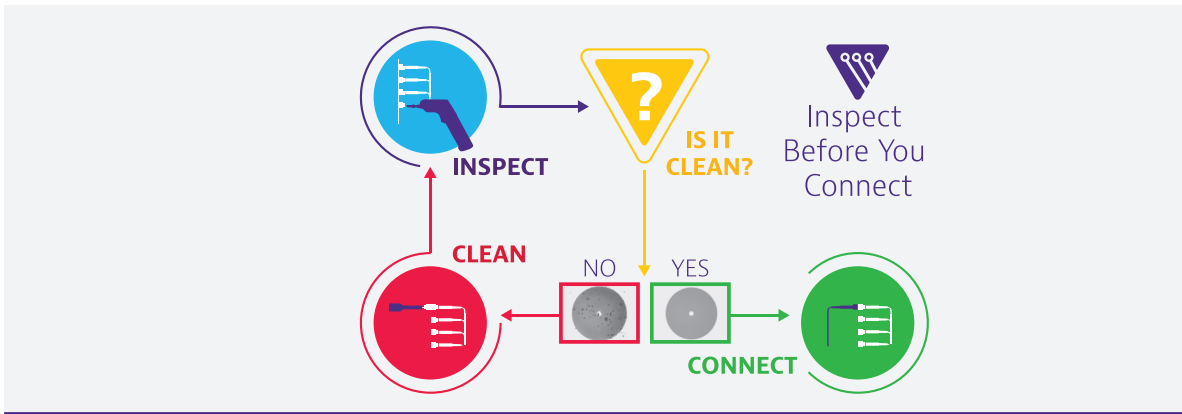


Figure 3: Inspect Before You Connect:

Following the **Inspect Before You Connect** process ensures fiber end faces are clean prior to mating connectors:

**Step 1 – Inspect:**

Use a video inspection scope to inspect the connector end face on both sides.  
If the connector is dirty, go to step 2. If the connector is clean, go to step 4.

**Step 2 – Clean:**

If the fiber is dirty, use a cleaning tool to clean the fiber end face.

**Step 3 – Re-inspect:**

Use the video inspection scope to re-inspect and confirm the fiber is clean.  
If the fiber is still dirty, then go back to step 2. If the fiber is clean, go to step 4

**Step 4 – Connect:**

If both the male and female connectors are clean, they are ready to be mated.

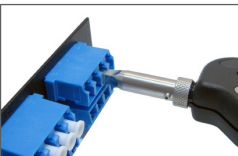

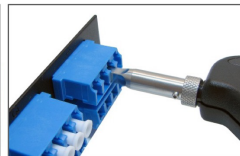

<b>1</b>	<b>Inspect</b>	<b>2</b>	<b>Clean</b>	<b>3</b>	<b>Re-inspect</b>	<b>4</b>	<b>Connect</b>
							
<ul style="list-style-type: none"> <li>■ Use a probe microscope to <b>INSPECT</b> the fiber.</li> <li>– <b>If the fiber is dirty</b>, go to Step 2, Clean.</li> <li>– <b>If the fiber is clean</b>, go to Step 4, Connect.</li> </ul>		<ul style="list-style-type: none"> <li>■ If the fiber is dirty, use a simple cleaning tool to <b>CLEAN</b> the fiber surface.</li> </ul>		<ul style="list-style-type: none"> <li>■ Use a probe microscope to <b>RE-INSPECT</b> (confirm fiber is clean).</li> <li>– <b>If the fiber is still dirty</b>, repeat Step 2, Clean.</li> <li>– <b>If the fiber is clean</b>, go to Step 4, Connect.</li> </ul>		<ul style="list-style-type: none"> <li>■ If the fiber is clean, <b>CONNECT</b> the connector.</li> <li><b>NOTE:</b> Be sure to <b>inspect both sides</b> (patch cord "male" and bulkhead "female") of the fiber interconnect.</li> </ul>	

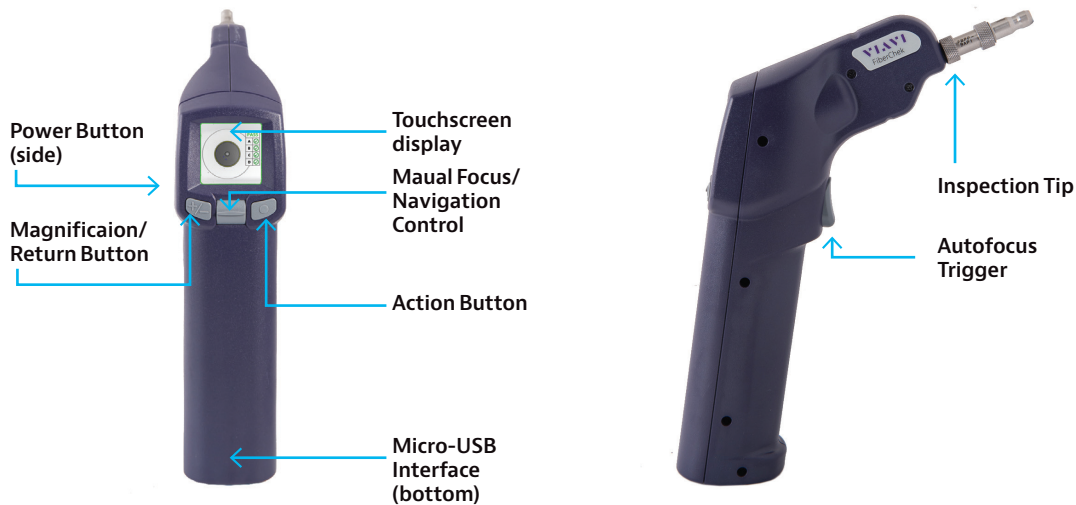


Figure 4: VIAVI FiberChek Probe Microscope

VIAVI FiberChek™ builds on industry-leading VIAVI expertise in fiber inspection to deliver an all-in-one handheld for technicians at every skill level. Meeting all fiber inspection needs with built-in image viewing, auto-focus, pass/fail analysis, and results storage and recall, the FiberChek probe completely automates inspection workflows to ensure fast and accurate performance. Used alone or connected to other devices (via WiFi and USB), the FiberChek probe is the essential fiber tool for every technician.

Key Capabilities	Description	VIAVI Advantage
<b>Fully Autonomous Inspection</b>	Technicians get a complete fiber-inspection solution in the palm of their hand. There is no need to connect to other devices to inspect, test, or store	<ul style="list-style-type: none"> <li>• Eliminates variation in results</li> <li>• Certifies and records product quality at time of inspection</li> <li>• Enables technicians of all skill levels to certify quality reliably and systematically</li> <li>• Makes advanced pass/fail criteria simple to use</li> <li>• Improves product and network performance and yields</li> <li>• Due to its unique design FiberChek probe can test connectors located anywhere in a telco or enterprise network</li> <li>• Test any fiber connector type with one device.</li> </ul>
<b>Test Connector in any Location</b>	Fiber connections are present everywhere for different type of networks, some are more easily accessible than others.	
<b>Test any Connector</b>	Supports all existing FBPT inspection tips such as standard, long reach, ribbon, 60-degree angled, and many more.	

## VIAMI FiberChek™ Controls



### Automate your Inspection Workflow with the Press of a Button

By implementing the simple yet important process of proactive visual inspection and cleaning, technicians can avoid poor optical signal performance and potential equipment damage. Network failures can be significantly minimized by up to 80%. Maintaining best practices with an Inspect Before You Connect workflow is essential, but without the right tools, it is difficult and time consuming. FiberChek eliminates these challenges by fully automating every detail of the inspection workflow.

### Conclusion

FiberChek™ allows technicians to complete jobs faster, correctly, and on time. Its integrated touch screen with live fiber viewing, auto-center, auto-focus, built-in fiber end-face analysis, and user-selectable acceptance profiles allows technicians to quickly certify any kind of fiber connectors. Its ability to store results on device or export to other VIAMI instruments via WiFi or USB helps deliver acceptance reports in a timely fashion.