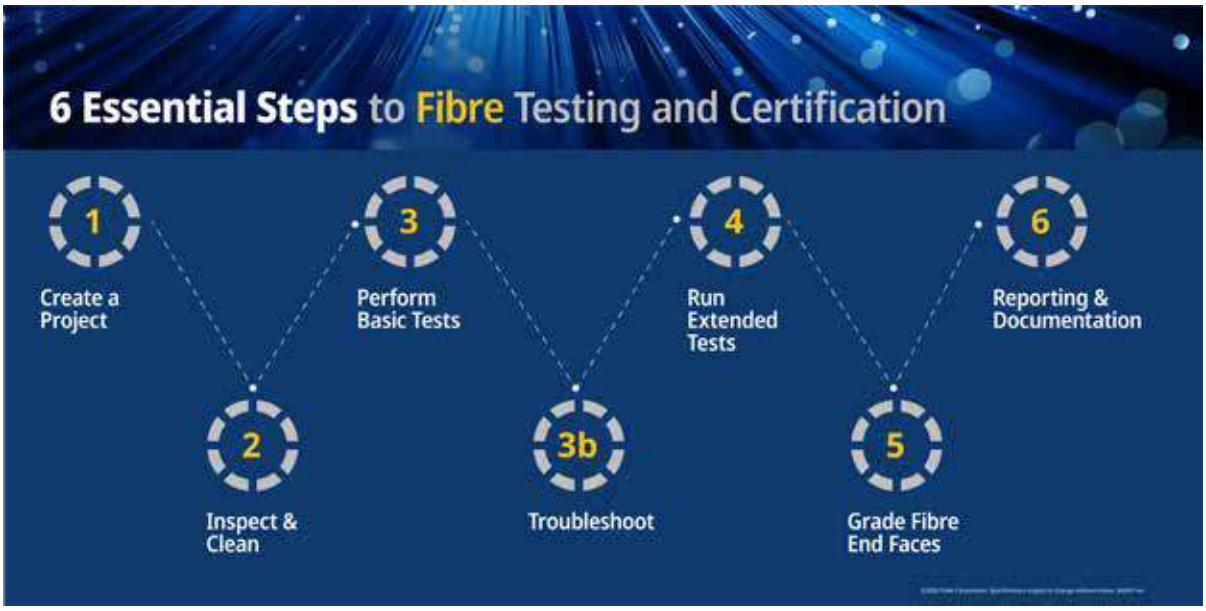
FLUKE networks

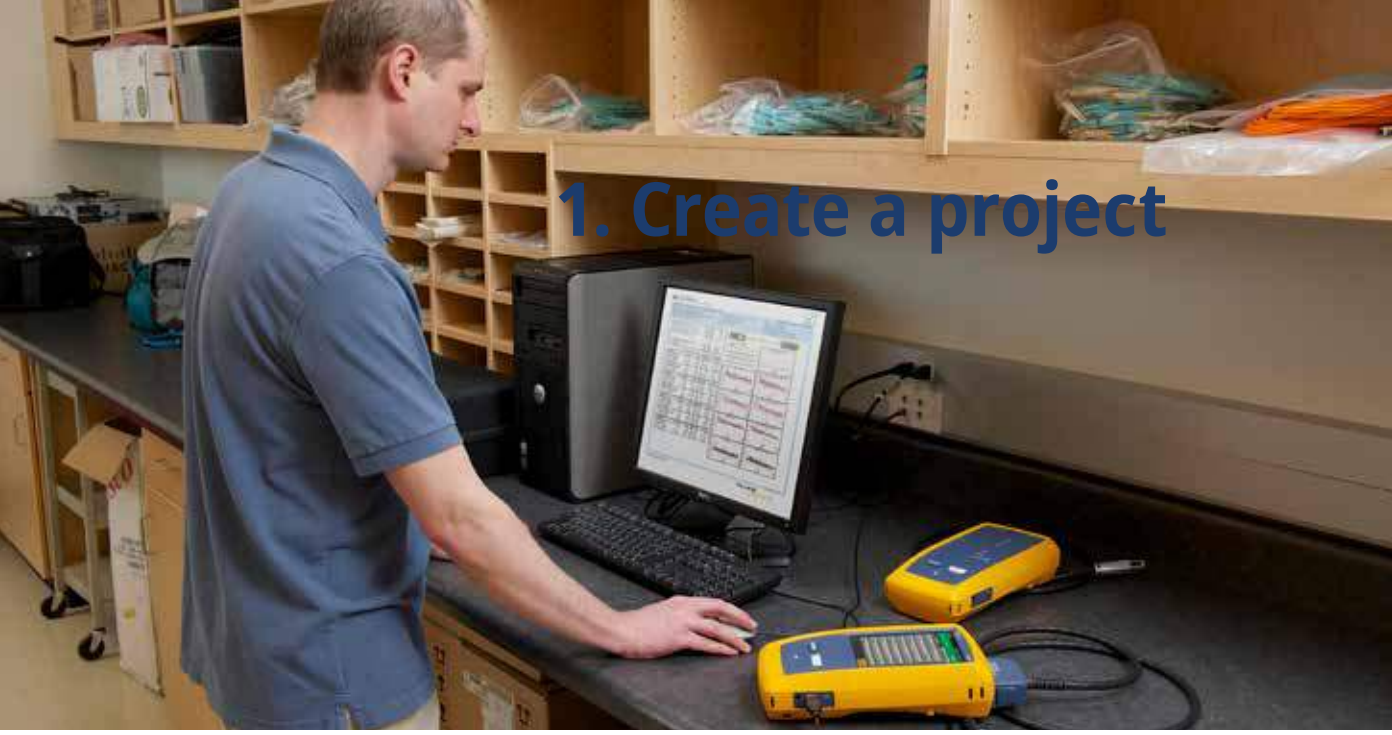
The Right Way to Certify Fibre

A practical guide by Fluke Networks

Data centres and enterprise networks today are denser, faster, and less forgiving than ever. A few tenths of a decibel (dB) can separate a solid link from a chronic trouble ticket. Fibre performance certification is the discipline that ensures every connector, splice, and fibre segment stays within the network loss budget.



These steps will help ensure that you never miss a critical step during fibre testing or troubleshooting, which in turn helps minimise costly installer or contractor callbacks, technician troubleshooting time, and unnecessary network downtime.



1. Create a project

To begin, create a ProjX™ file in your Versiv™ mainframe. This becomes a folder with all project details, which you can use as the project's control centre. Enter the project name and/or contract reference and job number, then add the operator's name and (in most cases) email address. You can then sync the job and access it through LinkWare™ Live, where you can manage all cabling certification jobs anytime, anywhere, with anyone on any device. LinkWare Live enables both project creation and management, as well as uploads of field test results through the Versiv onboard Wi-Fi or wired network options.

Versiv mainframe

Next, create all required test setups (such as multimode fibre, single-mode fibre, copper Cat6A), including test type, media, test limits, and configurations. Correct setup allows tests to be evaluated consistently and automatically. Finally, create Cable ID lists that match the labelling scheme in the field. If you have multiple test setups, build at least one Cable ID list per setup so results don't collide or get mis-assigned.

LinkWare Live

This up-front structure pays off in three ways:

- **Different technicians won't use different limits or naming conventions.**
- **Reduces retesting caused by preventable setup errors.**
- **Ensures that every saved result lands in the right project, under the right test setup, with the right ID.**

2. Inspect and clean

Contamination and damage at the end face is the leading cause of fibre link failure. It is also the easiest to prevent.

Inspect every end face you handle before making connections: test reference cords (TRCs), patch cords, and connectors. Just as important, inspect the input/output ports on the tester (OLTS or OTDR modules). A clean reference cord doesn't matter if the tester port is contaminated.

Follow a disciplined cycle: inspect, clean if necessary, then re-inspect. A one-click cleaner may be sufficient for dust alone. If oils or stubborn contamination are present, use a wet cleaner with a residual-free fibre solvent (such as an acetone-based fibre cleaning solvent) and lint-free wipes or swabs, then finish with a dry wipe. Re-inspect after every cleaning attempt and repeat until the end face is clean. At the same time, be alert for possible damage to the end face. Typically this will appear as a mark which will not clean off. Worst case, the end face will have shattered and cannot be repaired; replacement is then the only option.

Use a video inspection probe or fibre inspection camera that can support automated PASS/FAIL assessment to the IEC 61300-3-35 standard. An inspection camera that integrates with Versiv allows images and results to be stored with the project.

FI-3000

FI-1000 Kit

Fiber Optic Cleaning Kit

Solvent Pen

3. “Basic” (Tier 1) tests

In ISO terminology, “Basic testing” corresponds to “Tier 1 certification” in TIA terminology: end-to-end loss and length measurement compared against a calculated limit. Its purpose is to confirm the link meets the loss budget defined by the selected test limit and the appropriate application performance limits. Each test result will include a list of network applications which are met by the tested link.

Use an Optical Loss Test Set (OLTS) whenever certification is required because it streamlines referencing, automates duplex measurements, and provides an objective PASS/FAIL. CertiFiber™ Pro is the standard OLTS choice for single-core fibre links, usually deployed in pairs as a Tx/Rx solution. Where your infrastructure uses MPO/MMC connectivity (in 8-, 10-, 12-, 16-, or 24-core connectors), use CertiFiber Max to save time in multifibre workflows.

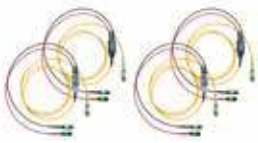
Perform Basic certification with the industry-preferred 1-jumper reference. Connect the stabilized source to the meter with a test reference cord (TRC) and set a reference power level. Verify your TRCs by connecting reference cords through a precision bulkhead adapter and confirming their loss is within acceptable limits. Only then connect to the link under test and measure loss and length per the selected limit.

Most acceptance packages are built primarily from Tier 1 results. If the test result shows PASS, you can proceed. If the result is a FAIL, you can either troubleshoot (first seeking if there is contamination or damage at the connectors, and then retesting) or save the FAIL for later investigation. (Saving the FAIL result maintains cable ID list consistency.)

CertiFiber™ Pro

Encircled Flux TRCs

CertiFiber™ Max



CertiFiber Max Y-Cables

3b. Troubleshoot issues

Failures happen: a broken fibre, a too-tight bend radius, a mispatched connector, a dirty end face. The key is to treat troubleshooting as a controlled step in the workflow, not a surprise detour.

Start with the fastest checks. First, check end faces for contamination, then use a Visual Fault Locator (VFL) to reveal severe bends, breaks, or unexpected routing if visible light escapes the cable. (There is a VFL in both the CertiFiber Pro and Max.) If loss is high, re-inspect end faces; contamination is often the culprit and is usually the fastest fix.

When the fault is not obvious, use an OTDR to locate the distance to the event and characterize where the loss is occurring. An OTDR can identify a break in the run, a tight bend, an unexpected connection, or a poor splice, any of which may cause a loss failure.

Whatever the issue, correct it, then retest Tier 1 certification until you get a PASS. Only after Tier 1 passes should you proceed to Tier 2 Extended testing (if the project requires it).

VisiFault™ VFL

FiberLert™

4. Extended (Tier 2) tests

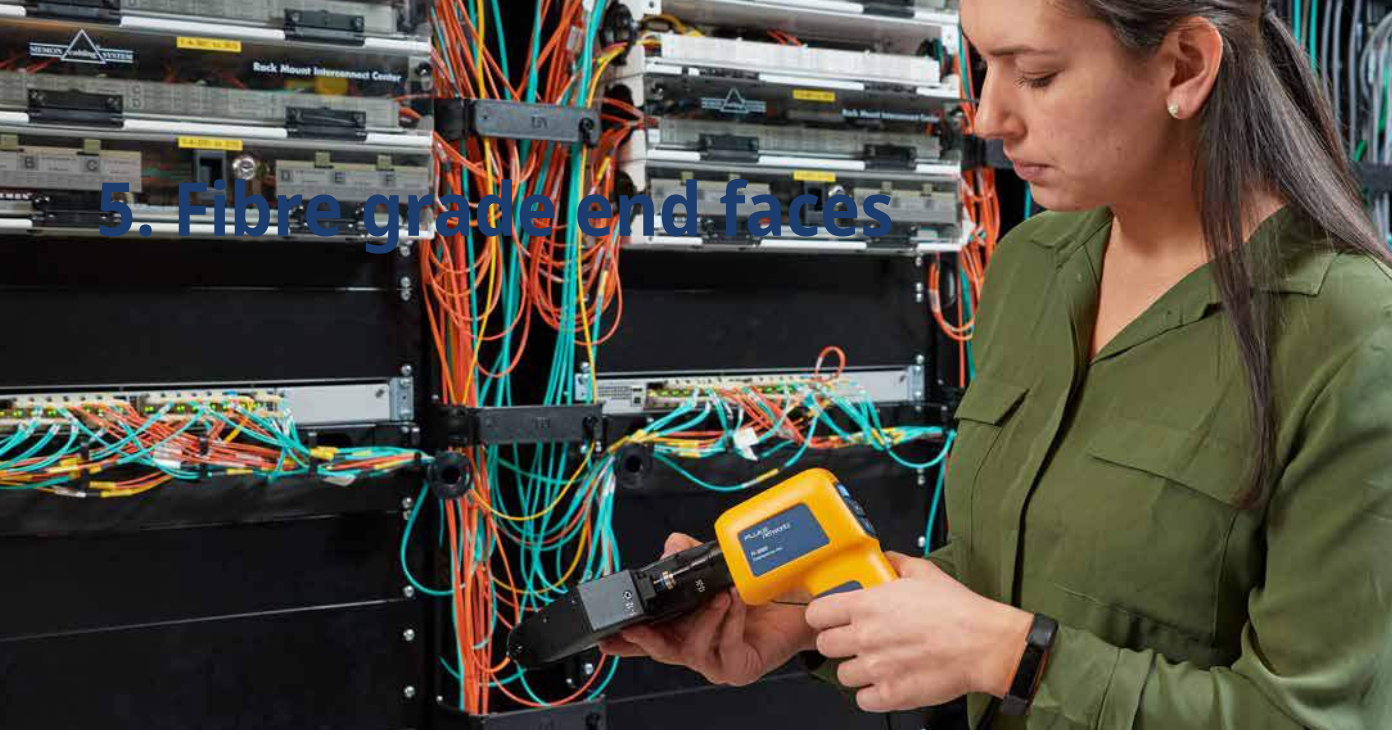
Extended certification — Tier 2 testing — adds OTDR results to support the Optical Loss results from Tier 1. A critical point is that OTDR results are intended to augment OLTS results; standards dictate that they are insufficient for certification by themselves. The principle is that Tier 2 is evidence that explains Tier 1.

Use an OTDR with launch and receive/tail fibres so you can measure the loss and reflectance of the first and last connector and allow for dead-zone limitations. (Only with a receive fibre can you be certain the OTDR is seeing to the end of the link.) Configure appropriate limits, then capture traces from both ends of the link. Fluke Networks SmartLoop™ technology saves time by enabling bi-directional testing of fibre pairs without physically moving the tester to the far end. You must do bi-directional testing to calculate the most accurate event loss values, because directivity differences can skew results in a single direction.

After capturing traces in both directions, calculate the bi-directional average loss for each event (connectors, splices, bends) and compare those values to the event limits defined by the selected standard or project specification. OptiFiber™ Pro does this automatically in SmartLoop mode, or if the paired results are saved as “End 1” and “End 2” under the same Cable ID. Presenting results in a tabular view or an EventMap-style visualization helps technicians interpret what the trace means.

OptiFiber™ Pro OTDR

EventMap



5. Fibre grade end faces

End face grading is about proving condition. After testing is complete, it is ideal to capture an end face image of every connector to record its “as-left” condition (time-stamped after the certification result). Compare the image to an industry standard for end face condition and record a PASS (or FAIL).

This step adds time (about 30 seconds per end) and therefore may not be part of a given project, but it can dramatically reduce disputes later. It provides evidence that the end faces were clean and undamaged at handover. This gives owners confidence and protects installers in case contamination is introduced after they have finished their work.

FI-3000

Store end face images with project results in Versiv/ LinkWare workflows, so the evidence remains linked to the Cable ID and test record.

6. Reporting and documentation

Good record-keeping enables installation accountability, helps resolve disputes, and accelerates troubleshooting. Save results after each measurement and upload them to LinkWare™ PC or LinkWare Live for consolidation and reporting.

For delivery, treat ".FLW" as the authoritative format, because it is widely recognized and secure — once recorded, results cannot be adjusted. PDFs are useful for human review but are less desirable as a primary deliverable because they do not offer the same data integrity.

A strong closeout package typically includes: (1) the ProjX configuration and test setups used, (2) Tier 1 Basic .FLW results, (3) Tier 2 OTDR traces and bi-directional averages if Extended testing was required (also in .FLW format), and (4) optional as-left end face grading images tied to each link's ID.

LinkWare PC

LinkWare Live

Fluke Networks fibre test instruments

	Inspection and Cleaning			MPO/MMC Loss Length Testing (Tier 1 Certification)	Duplex Loss Length Testing (Tier 1 Certification)
	FI-3000™ FiberInspector Ultra (Versiv™ and Wi-Fi)	**FI-1000-KIT Inspection Camera Kit**	**Fiber Optic Cleaning Kit**	**CertiFiber™ Max OLTS**	**CertiFiber™ Pro OLTS**
Check for fibre end-face contamination or damage	✓	✓			✓
Endface inspection grading	✓	With FI-1000 or FI-3000		With FI-1000 or FI-3000	✓
Clean contamination			✓		
Check connectivity				✓	✓
Check polarity				✓	✓
Verify loss over entire link to ensure loss budget not exceeded				✓	✓
Multiple fibre loss testing				✓	✓
Single-mode Tier 1 certification				✓	✓
Multimode encircled flux compliant Tier 1 certification				With EF TRCs	✓
Locate faults					
Tier 2 certification					
Pass/fail results	✓	✓		✓	✓
Document test results	✓	✓		✓	✓
Fibre types supported	Multimode Single-mode	Multimode Single-mode	Multimode Single-mode	Multimode Single-mode	Multimode Single-mode
Source type				LED, FP Laser	LED, FP Laser

Fluke Networks fibre test and troubleshooting instruments

	Fibre and Copper Testing and Certification Kits	Plant Characterization and Troubleshooting (Tier 2 Certification)		
	DSX CableAnalyzer™ (5000QI, 8000QI, and 8000QOI)	**OptiFiber™ Pro OTDR**	**VisiFault™ VFL**	**FiberLert™ Live Fiber Detector**
Check for fibre end-face contamination or damage	✓	✓		
Endface inspection grading	✓	With FI-1000 or FI-3000		
Clean contamination				
Check connectivity	✓	✓	✓	✓
Check polarity	✓	With VFL port	✓	✓
Verify loss over entire link to ensure loss budget not exceeded	✓			
Dual-fibre loss testing	✓			
Single-mode Tier 1 certification	✓			
Multimode encircled flux compliant Tier 1 certification	EF compliant at the bulkhead			
Locate faults	QOI kits only	✓	✓	
Tier 2 certification	QOI kits only	✓		
Pass/fail results	✓	✓		
Document test results	✓	✓		
Fibre types supported	Multimode Single-mode	Multimode Single-mode	Multimode Single-mode	Multimode Single-mode
Source type	LED, FP Laser	LED, FP Laser	Laser	No source, detection only

Ongoing maintenance and support

Certification tools are precision instruments. From day one — and on a yearly basis — it is important to keep your testers calibrated and in good condition. A Fluke Premium Care support plan helps you do that, minimizing downtime and protecting your investment by ensuring service intervals are kept and technical expertise is available when you need it.

Ensure the fibre-based network goes up and stays up

Visit **https://www.flukenetworks.com/knowledge-base** for additional resources to help you establish Fibre testing best practices.

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