GAGITECK INC.

Whitepaper

Certified Cabling: What Fiber and Copper Test Reports Prove

A buyer's guide to Cat6, Cat6A and fiber certification, Tier 1 and Tier 2 testing, and what to require at closeout

Published October 2026 · For IT managers, facilities teams and project managers buying structured cabling and fiber work
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Key takeaways

- A certification report is the only proof that a cable run meets its category; a link light or a ping test is not.
- Cat6A supports 10 Gb/s Ethernet over the full 100-meter channel; Cat6 supports it only on shorter runs.
- Copper is certified as a permanent link (panel to jack) or a channel (including patch cords); your spec should say which.
- Tier 1 fiber testing measures total loss against a budget; Tier 2 adds an OTDR trace that locates every connector, splice and fault.
- Require test files in the tester's native format, not only PDFs, plus labels to TIA-606 and as-built drawings.

1 Why certification matters

Two cable runs can look identical and perform very differently. A kinked pair, an untwisted termination or a dirty fiber connector can pass a basic continuity check and still fail at speed.

Certification uses a calibrated field tester to measure each run against the limits in the ANSI/TIA-568 standards for its category or fiber type, and saves a pass or fail record. That record is what proves the installation, supports a manufacturer warranty and settles disputes later.

2 Copper categories in brief

- Cat6 is specified to 250 MHz. It supports 1 Gb/s Ethernet to 100 meters, and 10 Gb/s only on shorter runs, generally up to about 55 meters depending on the environment.
- Cat6A is specified to 500 MHz and supports 10 Gb/s Ethernet over the full 100-meter channel. It is the usual choice for new access points and anything expected to run multi-gigabit speeds.

Pick the category for the speeds the run must carry over its life, not the speeds you need today. Cabling usually outlasts several generations of switches and access points.

3 Permanent link or channel

A permanent link test covers the installed cable from the patch panel to the wall jack, up to 90 meters. A channel test covers the whole path a device uses, including patch cords at both ends, up to 100 meters.

Installers usually certify the permanent link, because patch cords change over time. Some warranties and specifications call for channel testing. Write the requirement into your scope so the right adapters are used.

A copper certification report shows a pass or fail for each run plus measurements such as wire map, length, insertion loss, near-end crosstalk (NEXT and PSNEXT) and return loss. Look for the margin, meaning how far each result sits from the limit; runs that pass by a hair deserve a second look.

4 Fiber Tier 1: light-loss testing

Tier 1 testing, also called basic testing, uses an optical loss test set (a light source and power meter) to measure the total loss of each link. The result is compared with a loss budget calculated from the link's length, connectors and splices.

Under TIA-568.3-D, each mated connector pair may lose up to 0.75 dB and each splice up to 0.3 dB, plus the fiber's own attenuation per kilometer. A link that exceeds its budget fails even if light gets through.

Ask for the reference method used and the loss budget for each link. For multimode fiber, testing with an encircled-flux compliant launch makes results repeatable and comparable between testers.

5 Fiber Tier 2: OTDR traces

Tier 2, or extended, testing adds an optical time-domain reflectometer (OTDR). The OTDR sends pulses down the fiber and plots what comes back, showing the location and loss of every connector, splice, bend and break along the strand.

An OTDR trace is what lets you find a bad splice in the middle of a campus run, prove where a fault sits, and keep a fingerprint of the link for future troubleshooting. Launch and receive cables are needed so the first and last connectors can be measured. Testing in both directions and averaging the results gives the most accurate splice losses.

Tier 2 is worth requiring for backbones, outside plant, long runs and any link you will be responsible for maintaining.

6 What to require at closeout

- Certification results for every copper run and fiber link, with the tester model and calibration date.
- Test files in the tester's native format as well as PDF, so results can be re-examined.

- OTDR traces and event tables for fiber where Tier 2 is in scope.
- Labels at both ends of every run following TIA-606, matching the report.
- As-built drawings showing pathways, drop locations and rack elevations.
- Photos of racks, terminations and cable management.

Work should also follow BICSI installation practices and the National Electrical Code as adopted in your state and city, including any low-voltage permits and inspections.

7 Red flags in a test report

- Missing runs, or more runs installed than tested.
- Results without a tester model, serial number or calibration date.
- PDF summaries only, with no native files.
- Many runs passing with almost no margin.
- Fiber results with no stated reference method or loss budget.
- Labels in the report that don't match the labels on the wall.

✓ Checklist

- [ ] Category chosen for the life of the cabling (Cat6A for multi-gig and new APs)
- [ ] Permanent link or channel testing specified
- [ ] Fiber Tier 1 required for every link; Tier 2 (OTDR) for backbones and outside plant
- [ ] Native test files, PDFs, tester model and calibration date required
- [ ] TIA-606 labeling and as-built drawings in the deliverables
- [ ] BICSI practices and local code, permits and inspections in the scope

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