INSTALLATION GUIDE

Fiber Optic Installation Guide

Handling, pulling, splicing, termination and testing — field practice for fiber-optic cable plant.

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A practical field reference for installing fiber-optic cable plant: handling, pulling, splicing, termination and testing. It reflects widely accepted industry practice for the product classes PROSKY supplies and is intended for trained installers; project specifications and local safety regulations always take precedence.

1 · Safety essentials

- Never look into a fiber end or connector — infrared transmission is invisible. Verify a fiber is dark with a power meter, not by eye.
- Collect every cleaved fiber shard in a closed container; shards penetrate skin and clothing.
- No food or drink at splicing workstations; wear safety glasses when cleaving.
- Follow ladder, lift, confined-space (manholes) and traffic-control procedures — civil hazards on fiber jobs outweigh optical ones.
- Isopropyl alcohol and gel solvents are flammable: ventilate and keep ignition sources away.

2 · Cable handling and transport

- Transport and store reels upright on the flange edge; never lay a reel flat or drop it from a vehicle.
- Roll reels only in the direction marked on the flange, and only for short repositioning.
- Keep the cable's rated temperature range in mind during cold-weather installs — sheaths stiffen and crack risk rises below the install-temperature floor.
- Seal cut cable ends immediately with end caps or tape — moisture ingress into a loose-tube core travels far beyond the visible end.

2a · Route survey before the first pull

- Walk the route with the design pack: confirm duct condition, pole condition and loading, chamber access, and every crossing that needs a permit.
- Mark closure, slack-loop and distribution-box positions on the ground plan — moving them after the pull wastes cable and splices.
- Measure actual route length and add service loops before cutting drum lengths; drum plans should leave no joint in an inaccessible position.
- Note environmental constraints per segment — UV exposure, standing water, rodent pressure, anti-tracking zones near HV lines — and check each against the cable class ordered.

3 · The two numbers that rule every install

Limit	Typical class value	Consequence when exceeded
Minimum bend radius	20× cable Ø dynamic (during pull) · 10× static (fixed)	Macrobend attenuation now; fiber fatigue and breaks later
Maximum tensile load	Per datasheet (e.g. 3000 N install-class outdoor cable)	Fiber strain, higher attenuation, shortened service life

Typical values for this product class — request the certified PROSKY datasheet for guaranteed figures.

4 · Duct installation

- Prove and rod/rope the duct first; verify duct fill ratio ≤ 40 % of the cross section including the new cable.
- Attach the pulling rope to the cable's strength member with a grip and swivel — never to the sheath or fibers.
- Use cable lubricant on long or multi-bend pulls; place intermediate assist points so no section exceeds the rated tension.
- For long routes, prefer center-pull / figure-8 staging: pull to a mid-point, figure-8 the slack on the ground, then pull the remainder onward.
- Leave slack loops (typically 10 – 20 m) at closures, entries and every few hundred meters per the project design.

5 · Aerial installation

- Lashed construction: pull the cable under controlled tension with cable blocks, then lash to the messenger with stainless lashing wire.
- ADSS: respect the span class — sag/tension tables belong to the cable class and span; fit the matched suspension and dead-end (tension) hardware.
- Maintain clearances to power conductors and ground per local code; ADSS placed in supply space may require the anti-tracking sheath class.
- Install drip loops at every pole entry and hardware transition.

6 · Direct burial

- Use armored cable classes; trench below the local frost/protection depth (commonly 0.6 – 1.2 m) on bedding sand, with warning tape above.
- Backfill in compacted layers free of rocks against the sheath.
- Place tracer wire or markers on non-metallic routes — locating an unmarked dielectric cable later is costly.

6a · Mid-span access and closures

- For uncut (mid-span) architectures, ring-cut and remove the sheath over the marked window length only; open a single loose tube and leave the rest intact through the closure's storage basin.
- Anchor sheath and strength member on both sides of the closure; the fibers must never carry mechanical load across the joint.
- Select the closure class for the environment — dome closures for underground chambers and direct burial, in-line closures for aerial mounting — and torque the seals per the closure's instructions.
- Pressure-test gasket-sealed closures where the design requires it before backfilling or closing the chamber.

7 · Splicing

- Fusion splicing is the default for permanent joints: strip, clean with IPA, cleave at 90° ± 0.5°, splice, then protect with a heat-shrink sleeve seated in the tray.

- Target loss ≤ 0.05 dB per fusion splice; re-make any splice the splicer estimates above 0.1 dB.
- Mechanical splices suit restorations and low-count jobs; expect ~0.1 – 0.3 dB and record them as such in the loss budget.
- Dress tray slack at ≥ 30 mm bend radius; one tube per tray where hardware allows; label trays to the splice diagram.

8 · Termination and connector hygiene

- Choose pigtail splicing (lowest, most repeatable loss) or field-installable connectors (fastest at the drop) per the project standard.
- Inspect every connector end-face with a scope before mating; clean with dry click-cleaners first, wet-to-dry only when needed.
- APC (angled, green) and UPC (blue) connectors never mate with each other.
- Cap every open port and parked connector — always.

Connector quick reference

Connector	Polish	Typical IL / RL	Typical use
SC/APC	Angled 8°	≤ 0.3 dB / ≥ 60 dB	PON / FTTH distribution and drops
SC/UPC	Ultra PC	≤ 0.3 dB / ≥ 50 dB	General single-mode patching
LC/UPC	Ultra PC	≤ 0.3 dB / ≥ 50 dB	High-density panels, transceivers
LC/APC	Angled 8°	≤ 0.3 dB / ≥ 60 dB	Dense PON frames
Field-installable SC/APC	Angled 8°	≤ 0.5 dB / ≥ 50 dB	Drop termination at the wall outlet

Typical values for this product class — request the certified PROSKY datasheet for guaranteed figures.

9 · Testing and acceptance

Test	Instrument	Typical acceptance practice
Insertion loss (Tier 1)	Light source + power meter (OLTS)	Measured loss ≤ calculated link budget at 1310/1550 nm (1490/1577 nm for PON)
Event characterisation (Tier 2)	OTDR (both directions)	No reflective event > –40 dB; splice events within design; bidirectional average for splice loss
Continuity / polarity	VFL or OLTS	Correct fiber mapping end to end

Typical values for this product class — request the certified PROSKY datasheet for guaranteed figures.

Budget rule of thumb: fiber attenuation (0.35 dB/km @1310, 0.22 dB/km @1550 typical) + 0.05 dB per splice + 0.3 dB per mated connector pair + splitter loss per ratio — then hold ≥ 3 dB margin against ageing and repairs.

9a · Slack management and storage

- Store slack as figure-8s or on storage brackets — never as a single tight coil, which twists the cable when deployed.
- Aerial slack: use snowshoe/storage brackets sized to the cable's static bend radius, mounted clear of climbing space.

- Underground slack: rack loops on chamber wall brackets with identification tags; keep loops off the chamber floor and out of water.
- Every closure gets enough slack to re-splice on a work bench or splicing vehicle — typically 10 m each side minimum.

9b · Bonding, grounding and temperature

- Metallic elements (steel armor, steel messengers, metallic strength members) must be bonded and grounded at closures and building entries per local electrical code; all-dielectric routes avoid this work entirely.
- Respect the cable's installation temperature floor (commonly –5 °C to 0 °C for PE-sheathed classes): below it, store drums warm and install promptly.
- In sustained heat, reduce pulling speed and re-check lubricant — sheath friction rises with temperature.
- Leave aerial sag per the span table at the actual installation temperature — cables shrink taut in winter and stretch in summer.

10 · Documentation

- Record route as-built (GPS/stationing), splice diagrams, tray maps and test results per fiber; archive OTDR traces in native format.
- Label both ends of every cable, every closure and every panel port with the scheme defined in the project plan.
- Update plant records the same day — undocumented plant becomes unmaintainable plant.

11 · Troubleshooting quick table

Symptom	Most likely cause	First action
High loss, one fiber	Bad splice or macrobend on that fiber	OTDR from both ends; locate and re-work the event
High loss, whole cable	Bend-radius violation or crush along the route	Inspect entries, clamps and pull points; OTDR for a distributed rise
High reflectance event	Dirty / damaged connector or mechanical splice	Inspect and clean end-faces; re-terminate if scored
Intermittent loss	Loose connector, temperature-cycling macrobend	Re-seat connectors; check slack storage and tray dressing
No light at drop	Wrong port mapping or unspliced fiber	Verify port records; VFL trace from the distribution box

Typical values for this product class — request the certified PROSKY datasheet for guaranteed figures.

12 · Installer's toolkit checklist

- **Prepare:** jacket strippers, tube cutters, aramid shears, cleaning wipes and IPA, gel solvent for loose-tube work
- **Join:** fusion splicer with spare electrodes, precision cleaver, splice sleeves, mechanical splices for restoration

- **Terminate:** field-installable connectors, pigtails, end-face inspection scope, click cleaners
- **Test:** optical power meter and light source, VFL, OTDR with launch box, PON-wavelength filters where live testing is required
- **Route:** duct rods, cable grips and swivels, lubricant, cable blocks, tension meter for engineered pulls

Common mistakes checklist

- Pulling by the sheath instead of the strength member
- Violating bend radius at the last meter — wall boxes and pole entries
- Skipping end-face inspection because 'it is a new connector'
- Cutting slack loops short to save cable
- Leaving splice trays undocumented until 'later'
- Testing at 1550 nm only — macrobends that pass 1310 nm show at 1550 nm, but connector faults can hide; test both.
- Coiling drop slack tighter than the 15 mm class radius inside terminal boxes

PROSKY supplies every product class referenced in this guide — cables, closures, distribution boxes, splitters, connectors, patch cords, FTTH accessories and the testing and installation tools themselves. Class datasheets are available at proskytele.com/resources; certified figures are issued per order.