



FIBER OPTIC DIVISION

Master Product Catalog

Single-Mode · Multi-Mode · MTP/MPO · Ribbon · Aerial · Armored · Industrial · Hybrid

Comprehensive fiber optic cable solutions engineered for utility infrastructure, AI data centers, hyperscale networks, industrial automation, and outdoor plant. Manufactured to ITU-T, IEC, TIA, and IEEE standards. Stocked in Reno NV, Houston TX, and Salt Lake City UT for rapid delivery across North America.

13 Product Lines	6,912F Max Fiber Count	500kV ADSS Voltage	400G–1.6T Data Center Ready
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DISTRIBUTED BY GCP Energy LLC	STOCKING Reno, NV · Houston, TX · Salt Lake City, UT	CONTACT brady@gcpenergy.us favad@gcpenergy.us	WEB mirabelenergy.us gcpenergy.us
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Table of Contents

FIBER OPTIC — SINGLEMODE

- › OS2 Singlemode 9/125 μ m (G.652.D / G.657)

FIBER OPTIC — MULTIMODE

- › Multimode OM3 / OM4 / OM5 — 50/125 μ m

HIGH-DENSITY CONNECTIVITY

- › MTP/MPO Trunk Systems — 12–32 Core

OUTSIDE PLANT — AERIAL

- › ADSS Aerial Self-Supporting (AT & AP Jacket)

OUTSIDE PLANT — UNDERGROUND

- › Armored Loose Tube (Steel / Aluminum)
- › All-Dielectric Loose Tube (ADCF)

RIBBON & HIGH-COUNT

- › Rollable Ribbon — Up to 6,912 Fiber
- › Armored Ribbon — Flat & Rollable
- › All-Dielectric Ribbon

BUILDING ENTRY & DISTRIBUTION

- › Indoor/Outdoor Dual-Rated (OFNP/OFNR)
- › Breakout Cable — Direct Termination

INDUSTRIAL & SPECIALTY

- › Industrial Ruggedized Loose-Tube
- › Hybrid Composite (Fiber + Copper / PoE)

CONDUIT & ACCESSORIES

- › HDPE Innerduct — 1.25" (33mm)

PRICING & CONTACT

OS2 Singlemode Fiber — 9/125µm

ITU-T G.652.D / G.657 · Bend-Insensitive · AI Data Center & Long-Haul Transmission

≤0.4 dB/km <small>Max Attenuation</small>	400G–1.6T <small>Speed Support</small>	G.657 Rated <small>Bend-Insensitive</small>	12–256F <small>Strand Options</small>
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PRODUCT OVERVIEW

Mirabel OS2 single-mode fiber is engineered for AI cluster interconnects, hyperscale data center backbone runs, and utility transmission infrastructure requiring maximum reach with minimal signal attenuation. With a 9/125µm core/cladding geometry, OS2 supports distances exceeding 10km at 1310nm and 40km+ at 1550nm — the preferred medium for 400G, 800G, and emerging 1.6T transceivers. Bend-insensitive G.657.A1/A2 variants maintain signal integrity in tightly packed cable trays common in modern AI infrastructure.

KEY APPLICATIONS

- AI cluster and GPU interconnects — hyperscale data centers
- Long-haul campus and inter-building backbone (10km–40km+)
- MTP/MPO trunk systems — 12, 24, 32-core parallel optics
- Utility substation and transmission fiber (OPGW/ADSS companion)
- Cloud data center spine-leaf architecture backbone
- High-density cable trays and tight-radius routing (G.657)

KEY SPECIFICATIONS

Fiber Standard	OS2 9/125µm — ITU-T G.652.D and G.657.A1/A2 bend-insensitive
Attenuation	≤0.40 dB/km @ 1310nm / ≤0.40 dB/km @ 1550nm (G.657.A2: ≤0.35 @ 1550nm)
Speed Support	400G / 800G coherent and direct-detect; 1.6T ready
Connector Compat.	MTP/MPO 12/16/24/32-core high-density connector systems
Constructions	Tight-buffered, loose-tube, ribbon, and ADSS
Zero-Water-Peak	ZWP design — full E-band (1360–1460nm) compatibility
Operating Temp	-40°C to 70°C outdoor / -20°C to 70°C indoor
Jacket Options	LSZH, plenum (OFNP), riser (OFNR), and armored

TECHNICAL SPECIFICATIONS

Parameter	OS2 Standard	G.657.A2 Bend-Insensitive
Core / Cladding	9 / 125 µm	9 / 125 µm
Atten. @ 1310nm	≤0.40 dB/km	≤0.40 dB/km
Atten. @ 1550nm	≤0.40 dB/km	≤0.35 dB/km
Min Bend Radius	30 mm	7.5 mm (Class A2)
PMD Coefficient	≤0.20 ps/√km	≤0.20 ps/√km
Fiber Count Options	12–256 strands	12–256 strands

<p>PART / ORDER INFO</p> <p>12 · 24 · 48 · 144 · 256 strand counts Standard and custom reel lengths</p>	<p>STOCKING LOCATIONS</p> <p>Reno, NV Houston, TX Salt Lake City, UT</p>	<p>WEB & CONTACT</p> <p>mirabelenergy.us gcpenergy.us brady@gcpenergy.us</p>
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Multimode Fiber — OM3 / OM4 / OM5

IEC 60793-2-10 | 50/125µm | Data Center Server-to-Switch & High-Speed LAN

4700 MHz-km <small>OM4 Bandwidth</small>	28000 MHz-km <small>OM5 Bandwidth</small>	400G Ready <small>Max Speed</small>	50/125µm <small>Core Diameter</small>
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PRODUCT OVERVIEW

Mirabel multimode fiber delivers cost-effective, high-bandwidth performance for server-to-switch, top-of-rack, and end-of-row connections in modern AI data centers and HPC environments. OM4 is the dominant choice for 100G/400G short-reach links. OM5 (Wide Band Multimode — WBMMF) extends capability to 850–953nm, enabling SWDM for 40G, 100G, and 400G over fewer strands — reducing cable plant complexity. All grades are laser-optimized for 850nm VCSELs and fully compatible with MTP/MPO high-density connector systems.

KEY APPLICATIONS

- Data center server-to-switch and top-of-rack (ToR)
- Storage area network (SAN) and NVMe fabric interconnects
- HPC and AI cluster short-reach links
- 40G / 100G / 400G parallel optic MTP/MPO (OM4/OM5)
- Campus LAN backbone and intra-building horizontal distribution
- SWDM4 and BiDi transceiver applications (OM5)

KEY SPECIFICATIONS

OM3	2000 MHz-km EMB — 100G to 100m, 40G to 150m
OM4	4700 MHz-km EMB — 100G to 150m, 400G to 100m
OM5	28000 MHz-km — SWDM capable, 850–953nm wavelength range
Core Geometry	50/125µm laser-optimized graded-index for VCSEL compatibility
Jacket Color	Aqua (OM3/OM4) / Lime-green (OM5) per TIA standards
Connector Systems	MTP/MPO 12/24-core and LC duplex compatible
Constructions	Tight-buffered, loose-tube, breakout, distribution
Jacket Options	LSZH, OFNP (plenum), OFNR (riser), armored

TECHNICAL SPECIFICATIONS

Parameter	OM3	OM4	OM5
Core / Cladding	50/125 µm	50/125 µm	50/125 µm
Bandwidth (EMB)	2000 MHz-km	4700 MHz-km	28000 MHz-km
Atten. @ 850nm	≤3.5 dB/km	≤3.0 dB/km	≤3.0 dB/km
100G Reach	Up to 100m	Up to 150m	Up to 150m
400G Reach	N/A	Up to 100m	Up to 150m (SWDM)
Wavelength	850nm	850nm	850–953nm

PART / ORDER INFO 12 · 24 · 48 · 144 strand counts OM3, OM4, OM5 grades stocked	STOCKING LOCATIONS Reno, NV Houston, TX Salt Lake City, UT	WEB & CONTACT mirabelenergy.us gcpenergy.us brady@gcpenergy.us
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MTP/MPO High-Density Trunk Systems

TIA-604-5 · IEC 61754-7 · IEEE 802.3 | 12–32 Core | OS2 / OM4 / OM5

12/16/24/32 Core Options	≤0.35 dB Insertion Loss	≥26 dB Return Loss	400G/800G Speed Support
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PRODUCT OVERVIEW

MTP/MPO multi-fiber connectorized trunk cables are the workhorse of modern AI data center cabling. Parallel optical transmission across 12, 16, 24, or 32 fibers through a single connector interface dramatically reduces installation time, improves airflow, and provides the density required for 400G and 800G parallel transceivers. Mirabel pre-terminated assemblies are factory-tested and precision-polished — eliminating on-site splicing, reducing labor, and ensuring insertion loss that meets or exceeds TIA and IEC specifications.

KEY APPLICATIONS

- AI data center spine-leaf fabric — GPU cluster interconnects
- 400G / 800G QSFP-DD and OSFP transceiver patching
- Pre-terminated plug-and-play data hall trunk infrastructure
- Structured cabling backbone — colocation and hyperscale
- Cross-connect and meet-me room high-density patching
- Migration path to 1.6T — future-proofed infrastructure

KEY SPECIFICATIONS

Connector Options	MTP Elite / MPO-16 / MPO-24 / MPO-32
Polarity	Type A, B, and C — compatible with all major OEM switch platforms
Fiber Types	OS2 9/125µm (SM) and OM4/OM5 50/125µm (MM)
Testing	Factory-terminated; 100% insertion loss tested — plug-and-play
Insertion Loss	≤0.35 dB per mated pair
Return Loss	≥26 dB PC/UPC ≥65 dB APC
Standard Lengths	3m–100m; custom lengths on request
Cassette Compat.	VSFF (SN, MDC, MMC) breakout cassette systems

TECHNICAL SPECIFICATIONS

Parameter	OS2 (SM)	OM4/OM5 (MM)
Connector Type	MTP/MPO Elite	MTP/MPO Elite
Core Count	12 / 24 / 32	12 / 24 / 32
Insertion Loss	≤0.35 dB	≤0.35 dB
Return Loss (UPC)	≥26 dB	≥20 dB
Return Loss (APC)	≥65 dB	N/A
Wavelength	1310 / 1550nm	850 / 953nm
Standard Lengths	3–100m (custom)	3–100m (custom)

PART / ORDER INFO 12 · 16 · 24 · 32-core OS2 / OM4 / OM5 Type A / B / C polarity available	STOCKING LOCATIONS Reno, NV Houston, TX Salt Lake City, UT	WEB & CONTACT mirabelenergy.us gcpenergy.us brady@gcpenergy.us
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ADSS Aerial Self-Supporting Fiber

IEEE 1222 · ANSI/NEMA WC 74 · IEC 60794-4 | Utility Overhead Line Fiber

Up to 800m+ Max Span	Up to 500kV Voltage Class	All-Dielectric Construction	12–144F Fiber Count
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PRODUCT OVERVIEW

Mirabel ADSS aerial fiber cable attaches to utility transmission and distribution structures — wood poles, steel lattice towers, and concrete — without requiring a separate messenger wire or grounding. The all-dielectric construction eliminates induced voltage risk on transmission line corridors, making ADSS the preferred fiber solution for utilities deploying protection relay fiber, SCADA communications, and grid modernization networks alongside energized conductors. AT and AP jacket grades serve low and high electrical stress environments.

KEY APPLICATIONS

- Transmission and distribution protection relay fiber (OPGW alternative)
- SCADA, EMS, and grid automation on utility ROW
- Inter-substation fiber backbone on transmission corridors
- Rural electric cooperative communications deployment
- Wind and solar farm fiber on distribution infrastructure
- Municipal utility and public power fiber backbone

KEY SPECIFICATIONS

Construction	All-dielectric — no induced voltage, no grounding on HV corridors
Jacket Grades	AT (low electrical stress) and AP (high electrical stress)
Span Ratings	100m to 800m+ depending on tensile member selection
Voltage Rating	Rated for corridors up to 500kV (AP jacket)
Fiber Type	OS2 9/125µm single-mode — 12 to 144 fiber count options
Water Blocking	Dry-block or water-blocking tape — no gel cleanup
Live-Line	Compatible with live-line stringing tools and procedures
Jacket	UV-resistant black PE Operating temp: -40°C to 70°C

TECHNICAL SPECIFICATIONS

Parameter	AT Jacket (Low Stress)	AP Jacket (High Stress)
Application	Low E-field	High E-field (HV lines)
Max Span	Up to 300m	Up to 800m+
Max Voltage ROW	Up to 115kV	Up to 500kV
Fiber Type	OS2 9/125µm	OS2 9/125µm
Fiber Counts	12–144	12–144
Jacket	Black UV-PE	Black UV-PE

PART / ORDER INFO 12 · 24 · 48 · 96 · 144 strand counts AT and AP jacket grades Span engineering available	STOCKING LOCATIONS Reno, NV Houston, TX Salt Lake City, UT	WEB & CONTACT mirabelenergy.us gcpenergy.us brady@gcpenergy.us
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Armored Loose Tube Fiber Cable

Telcordia GR-20 · IEC 60794-3 | Steel / Aluminum Armor | OSP Duct & Direct Burial

Steel/Al Armor <small>Construction</small>	Gel-Free <small>Water Block</small>	≥2,200 N/cm <small>Crush Rating</small>	12–144F <small>Strand Counts</small>
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PRODUCT OVERVIEW

Mirabel armored loose tube fiber provides mechanical protection for industrial, utility, and underground infrastructure. Interlocked aluminum (IAC) or corrugated steel armor delivers crush resistance and rodent protection for exposed runs in equipment rooms, industrial plants, and cable tray environments. Gel-free dry-block water blocking eliminates cleanup associated with gel-filled designs, significantly accelerating splice and termination operations.

KEY APPLICATIONS

- Industrial plant and manufacturing facility fiber backbone
- Utility substation control building and relay house interconnects
- Renewable energy (solar / wind) site fiber infrastructure
- Exposed industrial cable tray in harsh environments
- Mining facility communications and control fiber runs
- Underground duct runs requiring armored mechanical protection

KEY SPECIFICATIONS

Armor Options	Interlocked aluminum (IAC) or corrugated steel armor
Water Blocking	Gel-free dry-block — fast, clean splicing and termination
Burial Rating	Rated for direct burial per NEC Article 770 / NESC
Fiber Types	OS2 single-mode (9/125µm) and OM4 multi-mode (50/125µm)
Crush Resistance	≥2,200 N/cm (interlocked armor)
Operating Temp	-40°C to 70°C
Jacket Options	LSZH and PE available
Fiber Counts	12 · 24 · 48 · 96 · 144 strands

TECHNICAL SPECIFICATIONS

Parameter	Armored (IAC)	Direct Burial
Armor Type	Interlocked Al/Steel	None (PE jacket)
Crush Resistance	≥2,200 N/cm	≥1,000 N/cm
Water Blocking	Dry-block	Dry-block / Gel
Min Install Temp	-40°C	-20°C
Jacket	LSZH / PVC	PE (black, UV-rated)
Fiber Counts	12–144	12–144
Burial Rating	In conduit	Direct burial OK

PART / ORDER INFO 12 · 24 · 48 · 96 · 144 strand counts OS2 and OM4 Armored or direct burial	STOCKING LOCATIONS Reno, NV Houston, TX Salt Lake City, UT	WEB & CONTACT mirabelenergy.us gcpenergy.us brady@gcpenergy.us
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All-Dielectric Loose Tube Fiber Cable

IEC 60794-3 · Telcordia GR-20 | No Metallic Elements | Lightning-Safe Deployment

No Metal <small>Construction</small>	Gel-Free <small>Water Block</small>	12–144F <small>Fiber Counts</small>	OS2/OM4 <small>Fiber Types</small>
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PRODUCT OVERVIEW

Mirabel all-dielectric loose tube fiber contains no metallic elements — inherently safe for deployment near lightning exposure, high electromagnetic fields, or environments where grounding metallic armor is impractical. Engineered with aramid or fiberglass strength members and PE or LSZH outer jackets, these cables are suitable for duct, direct burial, and lashed aerial. Dry-block water blocking provides moisture protection without gel-filled mess.

KEY APPLICATIONS

- Deployment near high-voltage transmission lines — no grounding required
- Areas with high lightning frequency — no metallic ground path
- Duct, direct burial, and lashed aerial applications
- Utility substation and ROW where metallic armor is restricted
- Campus and industrial fiber runs avoiding EMI interference
- ADSS companion underground infrastructure builds

KEY SPECIFICATIONS

Metallic Content	None — fully dielectric construction
Strength Members	Aramid yarn (Kevlar) or fiberglass rods
Water Blocking	Gel-free dry-block or dry water-blocking tape
Fiber Types	OS2 9/125µm single-mode, OM3/OM4 multimode available
Jacket Options	PE (direct burial rated) / LSZH (indoor/transition)
Fiber Counts	12 · 24 · 48 · 96 · 144 strands
Installation	Duct pull, direct burial, or lashed aerial
Operating Temp	-40°C to 70°C

TECHNICAL SPECIFICATIONS

Parameter	All-Dielectric Loose Tube
Armor	None (fully dielectric)
Strength Members	Aramid / FRP
Fiber Counts	12–144
Fiber Type	OS2 / OM3 / OM4
Jacket	PE / LSZH
Water Blocking	Dry-block
Burial Rating	In conduit or direct burial

PART / ORDER INFO 12 · 24 · 48 · 96 · 144 strand counts OS2, OM3, OM4 available	STOCKING LOCATIONS Reno, NV Houston, TX Salt Lake City, UT	WEB & CONTACT mirabelenergy.us gcpenergy.us brady@gcpenergy.us
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Rollable Ribbon — High-Count Fiber Cable

IEC 60793-2-50 · TIA-598 · ITU-T G.652.D | Up to 6,912 Fibers | Mass-Fusion Ready

6,912 Fibers <small>Max Count</small>	~30 sec <small>Splice / Ribbon</small>	Rollable Core <small>Ribbon Type</small>	Gel-Free <small>Water Block</small>
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PRODUCT OVERVIEW

Rollable ribbon fiber delivers the highest-density deployment technology available for hyperscale data center backbone, long-haul telecom, and metro network infrastructure. Unlike traditional flat ribbon, rollable ribbon units flex for compact cross-sections while retaining the ability to fan out flat for ultra-fast mass-fusion splicing — achieving splice times as low as 30 seconds per 12-fiber ribbon. Mirabel rollable ribbon cables range from 144 to 6,912 fiber counts in OS2 construction, enabling a single cable to replace dozens of smaller-count tubes in conduit-constrained environments.

KEY APPLICATIONS

- Hyperscale data center backbone and intra-campus high-count runs
- Long-haul and metro fiber — conduit-constrained corridors
- Telecom central office and PoP feeder cable
- Utility fiber backbone alongside transmission line ROW
- Municipal and smart city FTTP/FTTH builds
- Maximum fiber density per conduit unit area applications

KEY SPECIFICATIONS

Ribbon Type	Rollable ribbon — compact cross-section, mass-fusion splice ready
Fiber Counts	144 · 288 · 432 · 864 · 1728 · 3456 · 6912 fibers
Fiber Standard	OS2 9/125µm ITU-T G.652.D — attenuation ≤0.35 dB/km @ 1550nm
Splice Speed	Mass-fusion splicing: 12-fiber ribbon in ~30 seconds
Water Blocking	Gel-free / dry-block — no gel cleanup at splice points
Constructions	Central tube and stranded loose-tube constructions available
Armor Options	Interlocked steel, direct burial, and duct variants
Cassette Compat.	Compatible with ribbon fan-out and MTP/MPO cassette systems

TECHNICAL SPECIFICATIONS

Parameter	Standard OS2 (144–864F)	High-Count (1728–6912F)
Fiber Type	OS2 9/125µm	OS2 9/125µm
Atten. @ 1310nm	≤0.40 dB/km	≤0.40 dB/km
Atten. @ 1550nm	≤0.35 dB/km	≤0.35 dB/km
Ribbon Width	12-fiber standard	12-fiber standard
Jacket Type	LSZH / PE / Armored	PE / Armored
Water Blocking	Dry-block (gel-free)	Dry-block (gel-free)

PART / ORDER INFO 144 · 288 · 432 · 864 · 1728 · 3456 · 6912 fiber counts Custom reel lengths available	STOCKING LOCATIONS Reno, NV Houston, TX Salt Lake City, UT	WEB & CONTACT mirabelenergy.us gcpenergy.us brady@gcpenergy.us
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Armored Ribbon Fiber Cable

IEC 60793-2-50 · Telcordia GR-20 | Flat & Rollable Ribbon | Armored OSP & Industrial

Steel/Al Armor Construction	Gel-Free Water Block	Ribbon Core Splice Type	12–144F Strand Counts
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PRODUCT OVERVIEW

Mirabel armored ribbon fiber combines the mass-splice density advantages of ribbon construction with mechanical protection of steel or aluminum armor. Ideal for demanding industrial environments, utility infrastructure, and underground OSP runs where both high fiber count and physical protection are required. Available in flat ribbon and rollable ribbon configurations with gel-free dry-block water blocking.

KEY APPLICATIONS

- Underground duct and direct burial requiring armored protection
- Industrial plant and manufacturing facilities with cable tray runs
- Utility backbone requiring high fiber count and mechanical strength
- Mining operations requiring protected high-count fiber runs
- Campus backbone where rodent protection is required
- Aerial lashed runs needing crush and impact resistance

KEY SPECIFICATIONS

Armor Type	Interlocked aluminum (IAC) or corrugated steel armor
Ribbon Type	Flat ribbon and rollable ribbon variants available
Water Blocking	Gel-free dry-block — clean splicing and termination
Fiber Types	OS2 single-mode (9/125µm) and OM4 multimode (50/125µm)
Fiber Counts	12 · 24 · 48 · 96 · 144 strands
Jacket Options	LSZH or PE depending on installation environment
Operating Temp	-40°C to 70°C
Standards	Telcordia GR-20 · IEC 60794-3

TECHNICAL SPECIFICATIONS

Parameter	Armored Flat Ribbon	Armored Rollable Ribbon
Armor	Interlocked Al/Steel	Interlocked Al/Steel
Ribbon Type	Flat 12-fiber	Rollable 12-fiber
Fiber Type	OS2 / OM4	OS2 / OM4
Fiber Counts	12–144	12–144
Water Blocking	Dry-block	Dry-block
Jacket	LSZH / PE	LSZH / PE

PART / ORDER INFO 12 · 24 · 48 · 96 · 144 strand counts OS2 and OM4 Flat and rollable ribbon	STOCKING LOCATIONS Reno, NV Houston, TX Salt Lake City, UT	WEB & CONTACT mirabelenergy.us gcpenergy.us brady@gcpenergy.us
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All-Dielectric Ribbon Fiber Cable

IEC 60793-2-50 · TIA-598 | No Metallic Elements | High-Count Gel-Free Ribbon

No Metal <small>Construction</small>	Gel-Free <small>Water Block</small>	12–144F <small>Fiber Counts</small>	OS2/OM4 <small>Fiber Types</small>
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PRODUCT OVERVIEW

Mirabel all-dielectric ribbon fiber delivers the density advantages of ribbon construction in a fully non-metallic design — ideal for environments near energized utility infrastructure, lightning-prone areas, or where metallic components create safety or grounding concerns. Dry-block water blocking and aramid or fiberglass strength members provide reliable moisture protection without metallic elements.

KEY APPLICATIONS

- Deployment near energized conductors where metallic armor is restricted
- Lightning-prone areas — no metallic ground path
- High fiber-count OSP requiring non-metallic construction
- Utility ROW alongside high-voltage transmission corridors
- Central office and PoP feeder cable in EMI-sensitive environments
- FTTP/FTTH builds with strict metallic-free conduit requirements

KEY SPECIFICATIONS

Metallic Content	None — fully dielectric
Ribbon Type	Flat 12-fiber ribbon, mass-fusion splice ready
Strength Members	Aramid yarn (Kevlar) or fiberglass rods
Water Blocking	Gel-free dry-block
Fiber Types	OS2 9/125µm single-mode, OM4 multimode available
Fiber Counts	12 · 24 · 48 · 96 · 144 strands
Jacket Options	PE (outdoor) / LSZH (indoor transition)
Operating Temp	-40°C to 70°C

TECHNICAL SPECIFICATIONS

Parameter	All-Dielectric Ribbon
Armor	None (fully dielectric)
Strength Members	Aramid / FRP
Ribbon Type	Flat 12-fiber standard
Fiber Type	OS2 / OM4
Fiber Counts	12–144
Jacket	PE / LSZH
Water Blocking	Dry-block (gel-free)

PART / ORDER INFO 12 · 24 · 48 · 96 · 144 strand counts OS2 and OM4 available	STOCKING LOCATIONS Reno, NV Houston, TX Salt Lake City, UT	WEB & CONTACT mirabelenergy.us gcpenergy.us brady@gcpenergy.us
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Indoor/Outdoor & Breakout Fiber Cable

NEC Article 770 · UL 1581 · OFNP / OFNR | Dual-Rated | Direct Termination

OFNP/OFNR <small>Fire Rating</small>	No Splice <small>Building Entry</small>	Direct Term. <small>Breakout</small>	OS2/OM3/OM4 <small>Fiber Types</small>
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PRODUCT OVERVIEW

Mirabel indoor/outdoor dual-rated and breakout fiber cables eliminate the transition splice at the building entry point — reducing material cost, installation time, and failure points. Dual-rated cables meet both outdoor UV/moisture requirements and indoor NEC plenum (OFNP) or riser (OFNR) fire performance ratings. Breakout constructions provide individually jacketed sub-units enabling direct connector termination without breakout kits — ideal for equipment rooms, patch panels, and structured cabling.

KEY APPLICATIONS

- Building entry — outside plant to inside without transition splice
- Equipment room and patch panel direct termination (breakout)
- Data center structured cabling — horizontal and backbone
- Campus buildings — plenum and riser-rated distribution
- Industrial facilities requiring LSZH fire performance
- Telecom rooms, MDF/IDF, and server room fiber termination

KEY SPECIFICATIONS

Dual Rating	Outdoor UV/moisture + indoor NEC plenum (OFNP) or riser (OFNR)
Building Entry	Eliminates transition splice — single continuous run from OSP to panel
Breakout Sub-units	Individually 900µm tight-buffered per fiber sub-unit
Fiber Counts	2 · 4 · 6 · 12 · 24 · 48 fibers
Fiber Types	OS2 (9/125µm), OM3, and OM4 (50/125µm)
Jacket	LSZH (Low Smoke Zero Halogen) for enclosed indoor environments
Termination	Direct LC, SC, ST connector termination without fanout (breakout)
Flame Rating	OFNP (plenum) / OFNR (riser) per UL 1581 / NEC 770

TECHNICAL SPECIFICATIONS

Parameter	Indoor/Outdoor (Distribution)	Breakout
Sub-Unit	Loose tube / tight buffer	Individually jacketed
Connector Term.	Fanout kit required	Direct termination
Jacket Rating	OFNP / OFNR / LSZH	OFNP / OFNR / LSZH
UV Resistance	Yes	Yes
Fiber Counts	4–48	2–24
Fiber Types	OS2 / OM3 / OM4	OS2 / OM3 / OM4

<p>PART / ORDER INFO</p> <p>2 · 4 · 6 · 12 · 24 · 48 strand counts OS2, OM3, OM4 OFNP, OFNR, LSZH</p>	<p>STOCKING LOCATIONS</p> <p>Reno, NV Houston, TX Salt Lake City, UT</p>	<p>WEB & CONTACT</p> <p>mirabelenergy.us gcpenergy.us brady@gcpenergy.us</p>
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Industrial Ruggedized & Hybrid Composite Fiber

IEC 60794-1 · IEC 61158 · NFPA 79 | Fiber + Copper | Industrial Automation & Renewables

Single Jacket Fiber + Copper	Up to 90W PoE Ready	-40°C to 85°C Temp Range	Cont. Flex Flex Rating
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PRODUCT OVERVIEW

Mirabel industrial and hybrid composite fiber cables are designed for demanding environments in manufacturing automation, process control, security systems, renewable energy sites, and industrial communications. Ruggedized loose-tube designs provide moisture protection without gel, with reinforced strength members and heavy-duty jackets rated for continuous flex, chemical exposure, and temperature extremes. Hybrid composite cables combine fiber optic strands with copper conductors in a single jacket for simultaneous data and power (PoE) over a single run.

KEY APPLICATIONS

- Industrial automation and factory floor fiber communications
- IP video surveillance — fiber data + PoE copper in single run
- Renewable energy site (solar/wind) monitoring and control fiber
- Outdoor access control and perimeter security systems
- Process control, SCADA, and industrial IoT sensor networks
- Oil and gas facility instrumentation and communications

KEY SPECIFICATIONS

Ruggedized Design	Gel-free moisture block, aramid strength members, heavy-duty jacket
Hybrid Composite	2–12 OS2/OM4 fibers + 2–8 copper conductors, single jacket
PoE Capability	PoE+ (30W) and PoE++ (90W) rated copper pairs
Outer Jacket	Heavy-duty TPE or PUR — oil, chemical, and UV resistant
Flex Versions	Continuous flex for robotic and drag-chain applications
Operating Temp	-40°C to 85°C standard / -55°C to 85°C extreme cold
Flame Rating	Flame-retardant and LSZH options for enclosed industrial spaces
EMI Shielding	Available with or without overall shield (OS)

TECHNICAL SPECIFICATIONS

Parameter	Ruggedized Loose-Tube	Hybrid Fiber+Copper
Fiber Count	4–48	2–12 fibers
Copper Pairs	None	2–8 pairs (PoE rated)
Jacket Material	TPE / PUR	TPE / PUR
Operating Temp.	-40°C to 85°C	-40°C to 85°C
Flex Rating	Static / Flex	Static / Continuous flex
EMI Shielding	Optional OS	Optional OS

PART / ORDER INFO Custom fiber+copper configurations available Gel-free Continuous flex grades stocked	STOCKING LOCATIONS Reno, NV Houston, TX Salt Lake City, UT	WEB & CONTACT mirabelenergy.us gcpenergy.us brady@gcpenergy.us
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HDPE Innerduct — 1.25" (33mm)

ASTM F2160 · NEMA TC-7 | Microduct | Conduit Pathway Management

1.25" (33mm) <small>Nominal Size</small>	HDPE <small>Material</small>	ASTM F2160 <small>Standard</small>	500/1000 ft <small>Reel Lengths</small>
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PRODUCT OVERVIEW

Mirabel HDPE innerduct provides a dedicated pathway for fiber optic cables within larger conduit systems, protecting fiber from abrasion, contamination, and interference from co-installed cables. The 1.25" (33mm) nominal size is the most widely specified innerduct dimension for single-cable fiber protection in utility, telecom, and data center OSP builds. HDPE construction delivers exceptional resistance to moisture, chemicals, UV, and soil pressure, while the smooth interior bore minimizes pulling tension.

KEY APPLICATIONS

- Fiber cable protection within conduit — utility and telecom OSP
- Data center campus underground distribution pathway systems
- Municipal fiber-to-the-premises (FTTP) conduit builds
- Renewable energy site underground fiber cable protection
- Substation and transmission corridor underground fiber pathways
- Co-installation protection in congested multi-cable conduits

KEY SPECIFICATIONS

Material	High-density polyethylene (HDPE) — corrugated and smooth wall
Nominal Size	1.25 inch (33mm) OD — standard utility and telecom specification
Interior	Smooth bore interior minimizes cable pulling tension
Resistance	Excellent moisture, chemical, and UV resistance
Pull Tape Option	Pre-installed pull tape available for immediate cable pulling
Color Coding	Orange (standard) and custom colors for pathway identification
Reel Lengths	Standard 500ft and 1000ft reels; custom lengths available
Standards	ASTM F2160 · NEMA TC-7

TECHNICAL SPECIFICATIONS

Parameter	1.25" Smooth Wall	1.25" Corrugated
Nominal OD	1.25 inch (33mm)	1.25 inch (33mm)
Material	HDPE	HDPE
Interior	Smooth bore	Smooth bore
Flexibility	Standard	High-flex
Color	Orange / Custom	Orange / Custom
Pull Tape	Optional	Optional
Reel Length	500 / 1000 ft	500 / 1000 ft

PART / ORDER INFO	STOCKING LOCATIONS	WEB & CONTACT
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500ft and 1000ft reels | Orange and custom colors Pre-pulled
tape option available

Reno, NV Houston, TX Salt Lake City,
UT

mirabelenergy.us gcpenergy.us
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PRICING & AVAILABILITY

Reach out directly to the GCP Energy managing partner for your region for pricing, availability, and project support on all Mirabel products.

<p>BRADY JENKINS Co-Founder & Managing Partner — GCP Energy LLC ■ Western U.S. — Salt Lake City, UT</p> <p>MV/HV cable, mining cable (MSHA documentation available), fiber, and Western U.S. distributor relationships.</p> <p>✉ brady@gcpenergy.us</p> <p>■ gcpenergy.us</p>	<p>FAVAD JANJUA Co-Founder & Managing Partner — GCP Energy LLC ■ Southern & Central U.S. — Houston, TX</p> <p>MV/HV cable, fiber optic, and Southern U.S. / Gulf Coast distributor and contractor relationships out of Houston stock.</p> <p>✉ favad@gcpenergy.us</p> <p>■ gcpenergy.us</p>
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PRODUCT LINES AVAILABLE

OS2 / OM3 / OM4 / OM5 Fiber	MTP/MPO Trunk Cable Systems	ADSS Aerial Self-Supporting
Armored Loose Tube OSP	All-Dielectric Loose Tube	Rollable Ribbon (up to 6,912F)
Armored Direct Burial Fiber	Indoor/Outdoor Dual-Rated	Industrial Hybrid Fiber+Copper
MV Power Cable (5–35kV)	HV Transmission (69–500kV)	Mining Cable — MSHA Compliant

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