Single-Mode Fiber Optic Cable — OS2

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

PRODUCT OVERVIEW

Mirabel Energy USA OS2 single-mode fiber is the dominant choice 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 fiber supports transmission distances exceeding 10km at 1310nm and 40km+ at 1550nm — making it the preferred medium for 400G, 800G, and the emerging 1.6T transceiver generation. Bend-insensitive OS2 variants (G.657.A1/A2) maintain signal integrity in high-density, tightly packed cable trays and tight-radius routing environments common in modern AI infrastructure. Analysts project that over 70% of AI data center connections will adopt MTP/MPO or MTP-LC hybrid OS2 systems by 2027.

≤0.4 dB/km	1310 / 1550nm	400G / 800G / 1.6T	G.657 Rated
Max Attenuation	Wavelength	Speed Support	Bend Radius

APPLICATIONS

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

KEY SPECIFICATIONS

- OS2 9/125µm — ITU-T G.652.D and G.657.A1/A2 bend-insensitive available
- Max attenuation ≤0.4 dB/km @ 1310nm / ≤0.4 dB/km @ 1550nm
- Supports 400G / 800G coherent and direct-detect optics; ready for 1.6T
- Compatible with MTP/MPO 12/16/24/32-core high-density connector systems
- Available in tight-buffered, loose-tube, ribbon, and ADSS constructions
- Zero-water-peak (ZWP) design — full E-band (1360–1460nm) compatibility
- Operating temperature: -40°C to 70°C (outdoor) / -20°C to 70°C (indoor)
- LSZH, plenum (OFNP), riser (OFNR), and armored jacket options

TECHNICAL SPECIFICATIONS

Parameter	OS2 Standard	G.657.A2 Bend-Ins.
Core / Cladding	9 / 125 µm	9 / 125 µm
Attenuation @ 1310nm	≤0.40 dB/km	≤0.40 dB/km
Attenuation @ 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
Chromatic Dispersion	≤18 ps/nm·km	≤18 ps/nm·km
Fiber Count Options	12–256 strands	12–256 strands

PART / ORDER INFO
12 · 24 · 48 · 144 · 256 strand counts | Standard & custom reel lengths

STOCKING LOCATIONS
Reno, NV · Houston, TX
Project-phased delivery available

OEM REPRESENTATIVE
GCP Energy LLC — Salt Lake City, UT
portal.gcpenergy.us

Multi-Mode Fiber Optic Cable — OM3 / OM4 / OM5

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

PRODUCT OVERVIEW

Mirabel Energy USA multi-mode fiber cables deliver cost-effective, high-bandwidth performance for the server-to-switch, top-of-rack, and end-of-row connections that form the dense fabric of modern AI data centers and high-performance computing environments. OM4 remains the dominant choice for 100G/400G short-reach links, while OM5 (Wide Band Multi-Mode Fiber — WBMMF) extends capability into the 850–953nm wavelength range, enabling short-wave division multiplexing (SWDM) for 40G, 100G, and 400G over fewer fiber strands — reducing cable plant complexity and infrastructure cost. All grades are optimized for 850nm VCSEL-based transceivers and are fully compatible with MTP/MPO high-density connector systems.

4700 MHz·km	28000 MHz·km	400G	50 / 125 µm
OM4 Bandwidth	OM5 Bandwidth	Max Speed	Core Diameter

APPLICATIONS

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

KEY SPECIFICATIONS

- OM3: 2000 MHz·km EMB — 100G up to 100m, 40G up to 150m
- OM4: 4700 MHz·km EMB — 100G up to 150m, 400G up to 100m
- OM5: 28000 MHz·km — SWDM capable, 850–953nm wavelength range
- 50/125µm laser-optimized graded-index core for VCSEL compatibility
- Aqua jacket (OM3/OM4) / Lime-green jacket (OM5) per TIA standards
- Compatible with MTP/MPO 12/24-core and LC duplex connector systems
- Available in tight-buffered, loose-tube, breakout, and distribution constructions
- LSZH, plenum (OFNP), riser (OFNR), and armored jacket options available

TECHNICAL SPECIFICATIONS

Parameter	OM4 (50/125µm)	OM5 (50/125µm)
Core / Cladding	50 / 125 µm	50 / 125 µm
Bandwidth (EMB)	4700 MHz·km	28000 MHz·km
Attenuation @ 850nm	≤3.0 dB/km	≤3.0 dB/km
Attenuation @ 1300nm	≤1.0 dB/km	≤1.5 dB/km
100G Reach (SR4)	Up to 150m	Up to 150m
400G Reach (SR4)	Up to 100m	Up to 150m (SWDM)
Wavelength Range	850nm	850–953nm

PART / ORDER INFO
12 · 24 · 48 · 144 strand counts | OM3, OM4, OM5 grades stocked

STOCKING LOCATIONS
Reno, NV · Houston, TX
Project-phased delivery available

OEM REPRESENTATIVE
GCP Energy LLC — Salt Lake City, UT
portal.gcpenergy.us

MTP/MPO High-Density Trunk Cable Systems

12 · 16 · 24 · 32-Core | OS2 / OM4 / OM5 | AI Data Center Parallel Optics Workhorse

PRODUCT OVERVIEW

MTP/MPO multi-fiber connectorized trunk cables are widely recognized as the 'workhorse' of modern AI data center cabling infrastructure. By enabling parallel optical transmission across 12, 16, 24, or 32 fibers through a single connector interface, MTP/MPO systems dramatically reduce installation time, improve airflow through less cable bulk, and provide the density required to support 400G and 800G parallel transceiver technology. Mirabel Energy USA pre-terminated MTP/MPO trunk assemblies are factory-tested and precision-polished — eliminating on-site splicing, reducing labor cost, and ensuring insertion loss performance that meets or exceeds TIA and IEC specifications. Available in OS2 single-mode and OM4/OM5 multi-mode, with Type A (straight), Type B (reversed), and Type C (pairs-flipped) polarity configurations to support all major switch and transceiver architectures.

12 / 16 / 24 / 32	≤0.35 dB	≥26 dB (APC: ≥65dB)	400G / 800G
Core Options	Insertion Loss	Return Loss	Speed

APPLICATIONS

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

KEY SPECIFICATIONS

- MTP Elite / MPO-16 / MPO-24 / MPO-32 connector options
- Type A, B, and C polarity — compatible with all major OEM switch platforms
- OS2 9/125µm (single-mode) and OM4/OM5 50/125µm (multi-mode) available
- Factory-terminated and 100% insertion loss tested — plug-and-play
- Insertion loss ≤0.35 dB per mated pair | Return loss ≥26 dB PC / ≥65 dB APC
- Available in 3m–100m standard lengths; custom lengths on request
- Low-smoke zero-halogen (LSZH) jacket — data center fire code compliant
- Compatible with 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 (PC/UPC)	≥26 dB	≥20 dB
Return Loss (APC)	≥65 dB	N/A
Operating 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

STOCKING LOCATIONS
Reno, NV · Houston, TX
Project-phased delivery available

OEM REPRESENTATIVE
GCP Energy LLC — Salt Lake City, UT
portal.gcpenergy.us

Rollable Ribbon & High-Count Fiber Cable

Up to 6,912 Fibers | Mass-Fusion Splice Ready | Hyperscale Infrastructure & Long-Haul

PRODUCT OVERVIEW

Rollable ribbon fiber cable represents the highest-density fiber 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 cable cross-sections while retaining the ability to be fanned out flat for ultra-fast mass-fusion splicing — achieving splice times as low as 30 seconds per 12-fiber ribbon. Mirabel Energy USA rollable ribbon cables are available from 144 to 6,912 fiber counts in OS2 single-mode construction, enabling a single cable to replace dozens of smaller count tubes in space- and conduit-constrained environments. Engineered for long-term reliability in duct, direct burial, and aerial deployments.

6,912 Fibers	~30 sec / ribbon	vs. Stranded	Rollable Ribbon
Max Fiber Count	Splice Time	Density Gain	Construction

APPLICATIONS

- Hyperscale data center backbone and intra-campus high-count runs
- Long-haul and metro fiber network — conduit-constrained corridors
- Telecom central office and PoP (Point of Presence) feeder cable
- Utility fiber backbone alongside transmission line ROW
- Municipal and smart city fiber-to-the-premises (FTTP/FTTH) builds
- Any application requiring maximum fiber density per conduit unit area

KEY SPECIFICATIONS

- Rollable ribbon units — compact cross-section, mass-fusion splice ready
- Fiber counts: 144 · 288 · 432 · 864 · 1728 · 3456 · 6912
- OS2 9/125µm ITU-T G.652.D — attenuation ≤0.35 dB/km @ 1550nm
- Mass-fusion splicing: 12-fiber ribbon in ~30 seconds
- Gel-free / dry-block water blocking — no gel cleanup at splice points
- Central tube and stranded loose-tube constructions available
- Armored (interlocked steel), direct burial, and duct variants
- Compatible with standard ribbon fan-out kits and MTP/MPO cassette systems

TECHNICAL SPECIFICATIONS

Parameter	Standard OS2 Ribbon	High-Count (≥1728F)
Fiber Type	OS2 9/125µm	OS2 9/125µm
Fiber Counts	144–864	1728–6912
Atten. @ 1310nm	≤0.40 dB/km	≤0.40 dB/km
Atten. @ 1550nm	≤0.35 dB/km	≤0.35 dB/km
Ribbon Width	12-fiber std.	12-fiber std.
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

STOCKING LOCATIONS
Reno, NV · Houston, TX
Project-phased delivery available

OEM REPRESENTATIVE
GCP Energy LLC — Salt Lake City, UT
portal.gcpenergy.us

Armored & Direct Burial Fiber Optic Cable

Steel / Dielectric Armor | Gel-Free Dry-Block | Industrial, Utility & Underground Infrastructure

PRODUCT OVERVIEW

Mirabel Energy USA armored and direct burial fiber cables are engineered for the mechanical, moisture, and environmental demands of industrial, utility, and underground infrastructure deployments. Interlocked aluminum or corrugated steel armor provides crush resistance and rodent protection for exposed runs in equipment rooms, industrial plants, and cable tray environments. Gel-free dry-block water blocking eliminates the cleanup associated with traditional gel-filled designs — significantly accelerating splice and termination operations. Direct burial variants are rated for installation in soil without conduit, making them the preferred choice for utility substation fiber, inter-building campus runs, and renewable energy site fiber infrastructure.

Steel / Al Armor	Gel-Free Dry	Per NEC/NESC	12 – 144
Crush Resistance	Water Block	Burial Depth	Fiber Counts

APPLICATIONS

- Industrial plant and manufacturing facility fiber backbone
- Utility substation control building and relay house interconnects
- Renewable energy (solar / wind) site fiber infrastructure
- Direct buried inter-building campus runs — no conduit required
- Exposed industrial cable tray and raceway in harsh environments
- Mining facility communications and control fiber runs

KEY SPECIFICATIONS

- Interlocked aluminum armor (IAC) or corrugated steel armor options
- Gel-free dry-block water blocking — fast, clean splicing and termination
- Rated for direct burial per NEC Article 770 / NESC guidelines
- OS2 single-mode (9/125µm) and OM4 multi-mode (50/125µm) available
- Fiber counts: 12 · 24 · 48 · 96 · 144 strands
- All-dielectric (ADCF) designs available for areas with lightning exposure
- Crush load resistance: ≥2,200 N/cm (interlocked armor)
- Operating temperature: -40°C to 70°C | LSZH and PE jacket options

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 Material	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
Project-phased delivery available

OEM REPRESENTATIVE
GCP Energy LLC — Salt Lake City, UT
portal.gcpenergy.us

ADSS Aerial Self-Supporting Fiber Optic Cable

All-Dielectric Self-Supporting | No Messenger Wire Required | Utility Overhead Line Fiber

PRODUCT OVERVIEW

Mirabel Energy USA ADSS (All-Dielectric Self-Supporting) aerial fiber cable is engineered specifically for attachment to utility transmission and distribution structures — including wood poles, steel lattice towers, and concrete structures — without requiring a separate messenger wire or grounding considerations. The all-dielectric construction eliminates induced voltage risk on transmission line corridors, making ADSS the preferred fiber solution for electric utilities deploying protection relay fiber, SCADA communications, and grid modernization networks alongside energized conductors. Span lengths from 100m to 800m+ are supported through engineered tensile strength member selection, with AT and AP jacket grades available for low and high electrical stress environments.

Up to 800m+	Up to 500kV ROW	All-Dielectric	OS2 / SM
Max Span	Voltage Class	Construction	Fiber Type

APPLICATIONS

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

KEY SPECIFICATIONS

- All-dielectric — no induced voltage, no grounding required on HV corridors
- AT jacket (low electrical stress) and AP jacket (high electrical stress) grades
- Span ratings from 100m to 800m+ depending on tensile member selection
- Rated for installation on corridors up to 500kV (high-stress AP jacket)
- OS2 9/125µm single-mode — 12 to 144 fiber count options
- Dry-block or water-blocking tape construction — no gel cleanup
- Designed for stringing under live-line conditions (live-line compatible tools)
- UV-resistant black PE jacket | Operating temp: -40°C to 70°C

TECHNICAL SPECIFICATIONS

Parameter	AT Jacket (Low Stress)	AP Jacket (High Stress)
Application Zone	Low E-field	High E-field (HV lines)
Max Span (light ice)	Up to 300m	Up to 800m+
Max Voltage ROW	Up to 115kV	Up to 500kV
RTS (Max Rated Load)	Per span design	Per span design
Fiber Type	OS2 9/125µm	OS2 9/125µm
Fiber Counts	12–144	12–144
Jacket Color	Black (UV-rated)	Black (UV-rated)

PART / ORDER INFO
12 · 24 · 48 · 96 · 144 strand counts | AT and AP jacket grades | Span engineering available

STOCKING LOCATIONS
Reno, NV · Houston, TX
Project-phased delivery available

OEM REPRESENTATIVE
GCP Energy LLC — Salt Lake City, UT
portal.gcpenergy.us

Indoor/Outdoor Rated & Breakout Fiber Optic Cable

Dual-Rated OFNP/OFNR · LSZH | Direct Termination | Building Entry & Equipment Room

PRODUCT OVERVIEW

Mirabel Energy USA indoor/outdoor dual-rated and breakout fiber cables eliminate the need for a transition splice at the building entry point — reducing material cost, installation time, and potential failure points in the fiber plant. Dual-rated cables meet both outdoor UV/moisture exposure requirements and indoor NEC plenum (OFNP) or riser (OFNR) fire performance ratings, allowing a single cable to run from the outside plant entry point directly to the termination panel without interruption. Breakout cable constructions provide individually jacketed sub-units for each fiber or fiber pair — enabling direct termination at connectors without the need for breakout kits or fanout assemblies, ideal for equipment rooms, patch panels, and structured cabling installations where clean, labeled cable management matters.

OFNP / OFNR / LSZH	No Transition Splice	Individually Jacketed	OS2 · OM3 · OM4
Jacket Rating	Entry Type	Sub-Units	Fiber Types

APPLICATIONS

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

KEY SPECIFICATIONS

- Dual-rated: outdoor UV/moisture resistant + indoor NEC plenum (OFNP) or riser (OFNR)
- Eliminates building entry transition splice — single continuous run from OSP to panel
- Breakout sub-construction: individually 900µm tight-buffered per fiber sub-unit
- Available in 2, 4, 6, 12, 24, 48 fiber counts
- OS2 (9/125µm), OM3, and OM4 (50/125µm) fiber grades available
- LSZH (Low Smoke Zero Halogen) jacket for enclosed indoor environments
- Suitable for direct LC, SC, ST connector termination without fanout hardware
- Flame rating: OFNP (plenum) / OFNR (riser) per UL 1581 / NEC 770

TECHNICAL SPECIFICATIONS

Parameter	Indoor/Outdoor (Distribution)	Breakout
Sub-Unit Construction	Loose tube / tight buffer	Individually jacketed
Connector Termination	Fanout kit required	Direct termination
Jacket Rating	OFNP / OFNR / LSZH	OFNP / OFNR / LSZH
UV Resistance	Yes (outdoor rated)	Yes (outdoor rated)
Fiber Counts	4–48	2–24
Fiber Types	OS2 / OM3 / OM4	OS2 / OM3 / OM4
Min Bend Radius	10× cable OD	10× cable OD

PART / ORDER INFO
2 · 4 · 6 · 12 · 24 · 48 strand counts | OS2, OM3, OM4 | OFNP, OFNR, LSZH

STOCKING LOCATIONS
Reno, NV · Houston, TX
Project-phased delivery available

OEM REPRESENTATIVE
GCP Energy LLC — Salt Lake City, UT
portal.gcpenergy.us

Industrial, Ruggedized & Hybrid Composite Fiber Cable

Ruggedized Loose-Tube · Hybrid Fiber+Copper | Industrial Automation · Security · Renewables

PRODUCT OVERVIEW

Mirabel Energy USA industrial and hybrid composite fiber cables are designed for the demanding environments encountered in manufacturing automation, process control, security systems, renewable energy sites, and industrial communications infrastructure. 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 — enabling simultaneous data transmission and power delivery (including PoE) over a single cable run. This configuration is widely adopted for IP surveillance cameras, industrial IoT sensors, outdoor access control, and renewable energy monitoring systems where conduit space is limited and running separate fiber and power cables is impractical.

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

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 cabling

KEY SPECIFICATIONS

- Ruggedized loose-tube: gel-free moisture block, aramid strength members
- Hybrid composite: 2–12 OS2/OM4 fibers + 2–8 copper conductors, single jacket
- PoE+ (30W) and PoE++ (90W) rated copper pairs in hybrid constructions
- Heavy-duty TPE or PUR outer jacket — oil, chemical, and UV resistant
- Continuous flex versions available for robotic and drag-chain applications
- Operating temperature: -40°C to 85°C (standard) / -55°C to 85°C (extreme cold)
- Flame-retardant and LSZH options for enclosed industrial spaces
- Available with and without overall shield (OS) for EMI-sensitive environments

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
Water Blocking	Gel-free dry-block	Gel-free dry-block

PART / ORDER INFO
Custom fiber+copper configurations available | Gel-free | Continuous flex grades

STOCKING LOCATIONS
Reno, NV · Houston, TX
Project-phased delivery available

OEM REPRESENTATIVE
GCP Energy LLC — Salt Lake City, UT
portal.gcpenergy.us