Fiber Optic Cables

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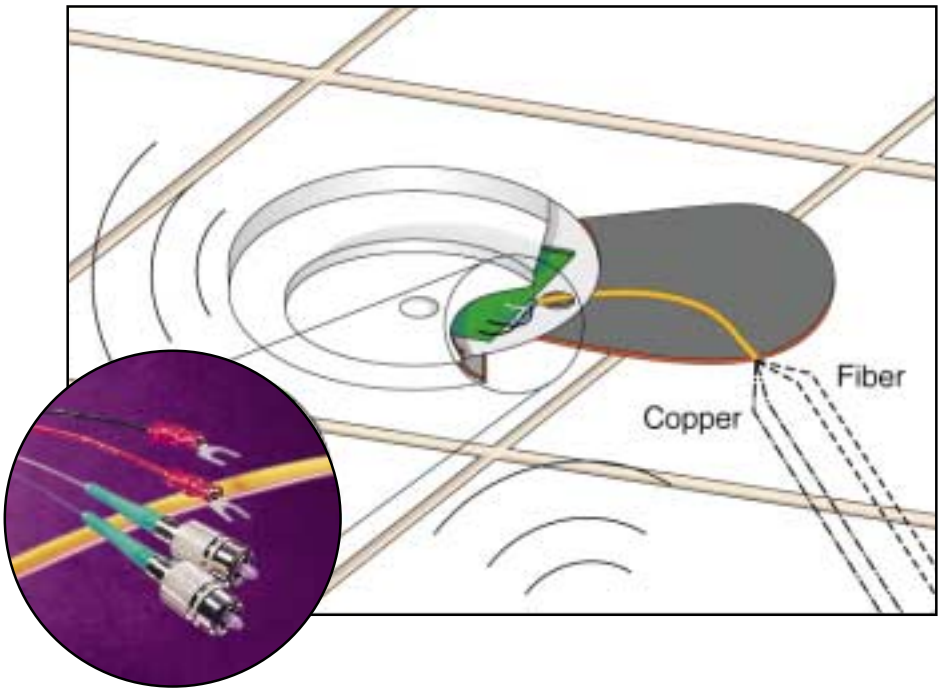
Composite Cable Systems



For PCS and Cellular Premise Antennas

Andrew premise antenna cables, featuring a unique blend of copper and fiber optic elements in one cable, simplify the design and decrease the installation costs of premise PCS and cellular systems. Andrew fully tests these assemblies to ensure electrical and optical performance. This testing reduces the risk of system installation defects due to inherent problems with field installation of fiber optic connectors.

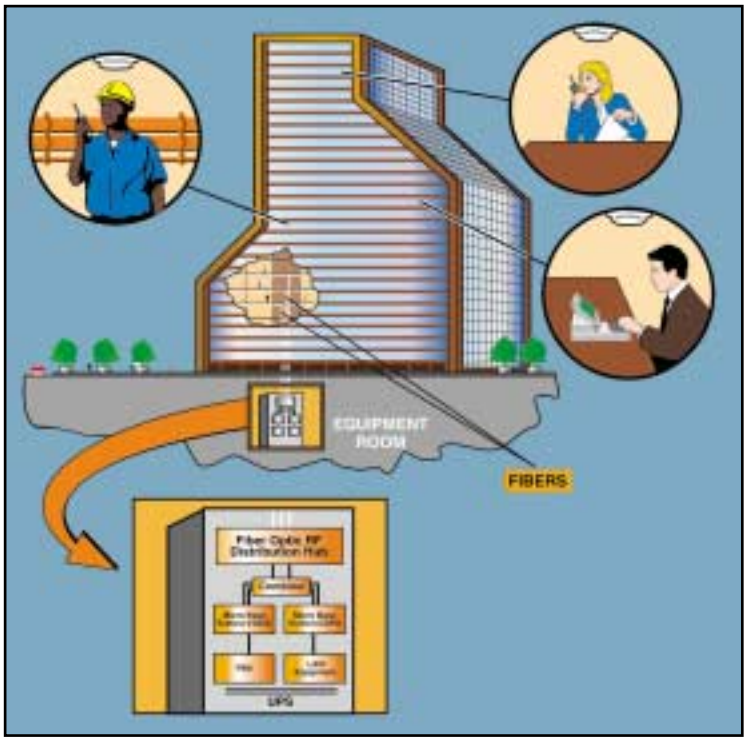
Unique Composite Design. Andrew premise cables are specifically engineered for use within buildings in self-supporting cellular and PCS systems. The composite design runs electrical power and optical fiber together in one cable to each base station antenna, so there are no ac power or stepdown transformers to install. And there's no bulky ductwork*, because Andrew protects the cable with a unique sheathing design. Best of all, when you incorporate an integrated uninterruptible power supply at the head end you're assured of a reliable, completely independent communication system, even in power outages.

A Full Range of Options. For your convenience we maintain an inventory of the most common cable products and standard assembly lengths. We will also prepare complete fiber optic cable assemblies made to customer system requirements. Different wire gauges and single mode, dispersion shifted single mode, and multimode fiber types are all available. Finally, when field connectorization is desired, Andrew provides pigtail cords with connectors that can be spliced on cable assemblies for easy installation.

Lower Life Cycle Costs. The Andrew composite fiber optic solution minimizes installed and long-term costs. With the composite electro/optical cable designed specifically for these applications, the need for conduits and the associated maintenance costs is significantly reduced. And as your system expands the fiber optic cable can be accessed directly and easily to upgrade antenna system infrastructure or redirect cables.

Andrew composite premise antenna cables are another in a series of innovations from Andrew Corporation, a global provider of communications technologies that cover the entire spectrum of voice, data, and video transmission. Bringing reliability, flexibility, and lower costs to your premise PCS and cellular systems, Andrew composite premise antenna cables are the value-added solution to your antenna installation challenges.

*Subject to local codes



Cut Installation Time and Costs with Andrew Composite Cables

Installation (Typical)

- Site Survey
- Install Ductwork
- Install Power & Transformer at Each Antenna Site
- Install Fiber Optic Cable
- Install Antenna & Base Station Equipment
- Commissioning

Simplified Installation with Andrew Composite Cables

- Site Survey
- Install Composite Cable
- Install Antenna & Base Station Equipment
- Commissioning

Savings:
TIME & COST
Ductwork and Local Power are Not Required with Andrew Composite Cables†

† Subject to local building codes.

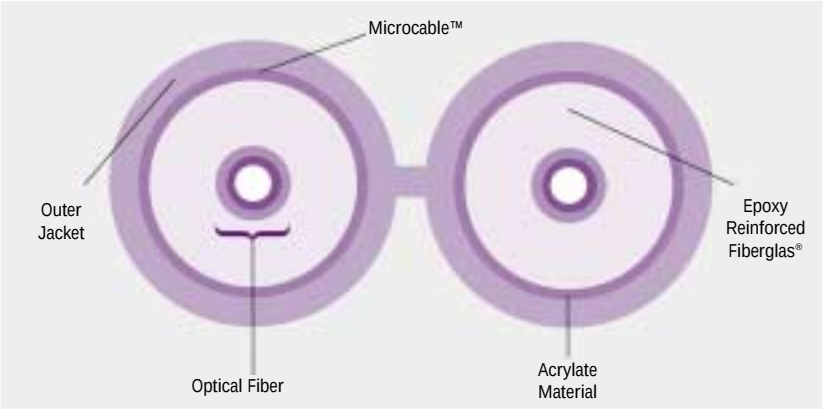
Duplex Optical Fiber Cable

Plenum Rated

Andrew indoor duplex cables combine two Andrew Microcable™ elements in one cable encapsulated in a figure-8 jacket. A plenum rated cable, it is ideally suited to indoor antenna remoting for cellular and PCS systems, in-building applications, and in industrial environments for communication and sensor systems.

Andrew Microcable is a unique product consisting of a single mode or dispersion shifted single mode optical fiber, encased in a reinforcing Fiberglas® epoxy matrix for high tensile strength and crush resistance in a lightweight, compact package. The two single mode or dispersion shifted single mode Microcable elements provide the duplex cable with a tensile strength of 180 lb (81.7 kg) and allow easy and robust ST®, SC, FC, and other connector attachment. The duplex cable is also suitable for riser applications, and can be easily divided into two single cables.

All Andrew fiber optic cables meet strict performance standards, ensuring quality and reliability, and follow in the tradition of HELIAX® and RADIAX® cables, offering the best value for your investment.



Mechanical Characteristics

Cable Type Numbers	**242750-1**	**242750-2**
Number of Fibers	2	2
Fiber Type	Single Mode	Dispersion Shifted Single Mode
Fiber Buffer Type	Tight, Fiberglas® Epoxy	Tight, Fiberglas Epoxy
Fiber Buffer Diameter, in (mm)	0.032 (0.8)	0.032 (0.8)
Cable Diameter, in (mm)	0.095 X 0.180 (2.4 X 4.6)	0.095 X 0.180 (2.4 X 4.6)
Cable Weight, lb/1000 ft (kg/km)	11 (16)	11 (16)
Tensile Strength		
Installation, Short Term, lb (N)	180 (800)	180 (800)
Operational, Long Term, lb (N)	60 (267)	60 (267)
Minimum Bend Radius,		
Installation, Short Term, in (mm)	2 (50)	2 (50)
Operational, Long Term, in (mm)	1.5 (38)	1.5 (38)
Operating Temperature Range, °F (°C)	14 to 158 (-10 to 70)	14 to 158 (-10 to 70)
Storage Temperature Range, °F (°C)	-40 to 158 (-40 to 70)	-40 to 158 (-40 to 70)
UL Listing	OFNP	OFNP
Jacket Material	PVDF	PVDF
Cable Assembly Type Numbers		
FC/APC	**242761-1**	**242761-5**
FC	**242761-2**	**242761-6**
ST®	**242761-3**	**242761-7**
SC	**242761-4**	**242761-8**

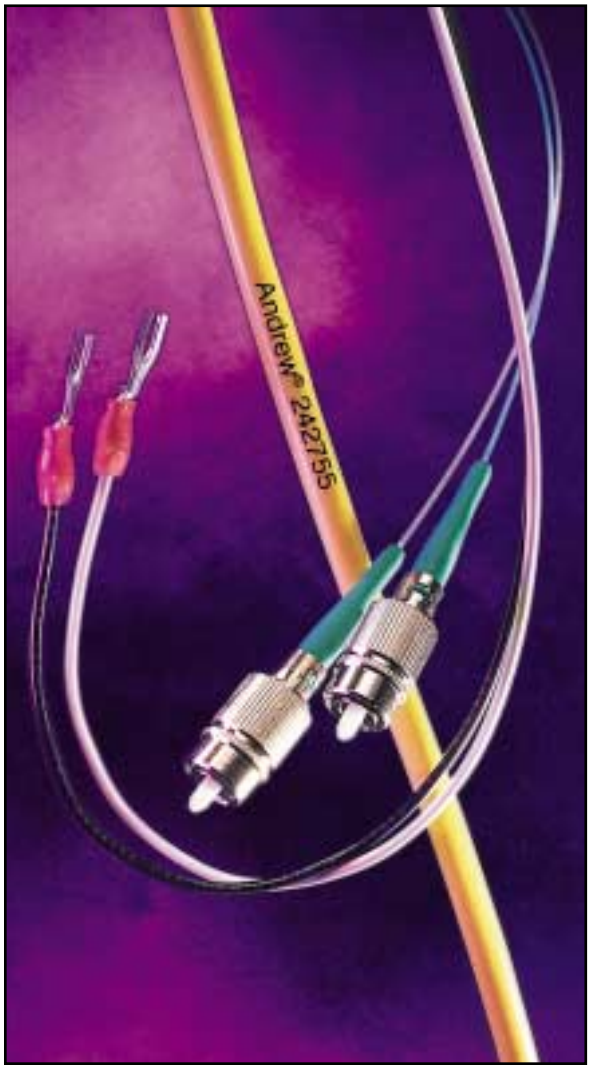
Optical Characteristics

Fiber Type	**Single Mode**	**Dispersion Shifted Single Mode**
Maximum Attenuation at 1310 nm, dB/km	0.5	0.5
Maximum Attenuation at 1550 nm, dB/km	0.6	0.35
Cable Cutoff Wavelength (nm)	<1260	<1260
Mode-Field Diameter at 1310 nm (µm)	9.3 ± 0.5	–
Mode-Field Diameter at 1550 nm (µm)	10.5 ± 1.0	8.1 ± 0.7
Zero Dispersion Wavelength (nm)	1301.5–1321.5	1535–1565
Cladding Diameter (µm)	125.0 ± 1.0	125.0 ± 1.0
Core-Clad Concentricity (µm)	≤0.8	≤0.8
Cladding Non-Circularity (%)	≤1.0	≤1.0
Coating Diameter (µm)	245 ± 10	245 ± 10
FC/APC Maximum Insertion Loss (dB)	0.5	0.5
FC, ST®, SC Maximum Insertion Loss (dB)	0.4	0.4
FC/APC Minimum Return Loss (dB)	60	60
FC, ST, SC Minimum Return Loss (dB)	50	50

ST is a registered trademark of AT&T.

Composite Optical Fiber Cable

Riser Rated

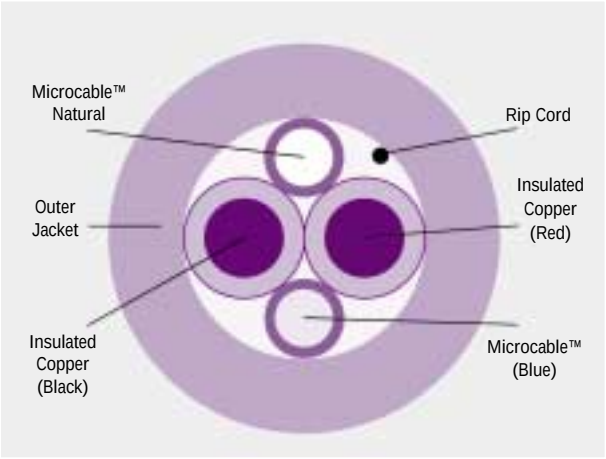


Andrew indoor composite cables combine two Andrew Microcable™ elements with two insulated copper conductors to provide electrical current and fiber optic capability in one cable. This riser rated cable is ideally suited to indoor antenna remoting for cellular and PCS systems and for communication and sensor systems in industrial environments.

Several configurations of composite cable are available, including single mode and dispersion shifted single mode fibers with 18 or 14 AWG copper conductors. Andrew Microcable is a unique product consisting of a single mode or dispersion shifted single mode optical fiber, encased in a reinforcing Fiberglas® epoxy matrix for high tensile strength and crush resistance in a lightweight, compact package. The Microcable elements provide easy and robust connector attachment, while the copper conductors can be terminated with any standard electrical wire termination. A No. 6 spade terminal is installed on the copper conductor in the cable assemblies. A rip cord provides fast and efficient access to the cable's optical and electrical elements.

All Andrew fiber optic cables meet strict performance standards, ensuring quality and reliability, and follow in the tradition of HELIAX® and RADIAX® cables, offering the best value for your investment.

Fiberglas is a registered trademark of Owens-Corning Fiberglas Technology, Inc.



Mechanical Characteristics

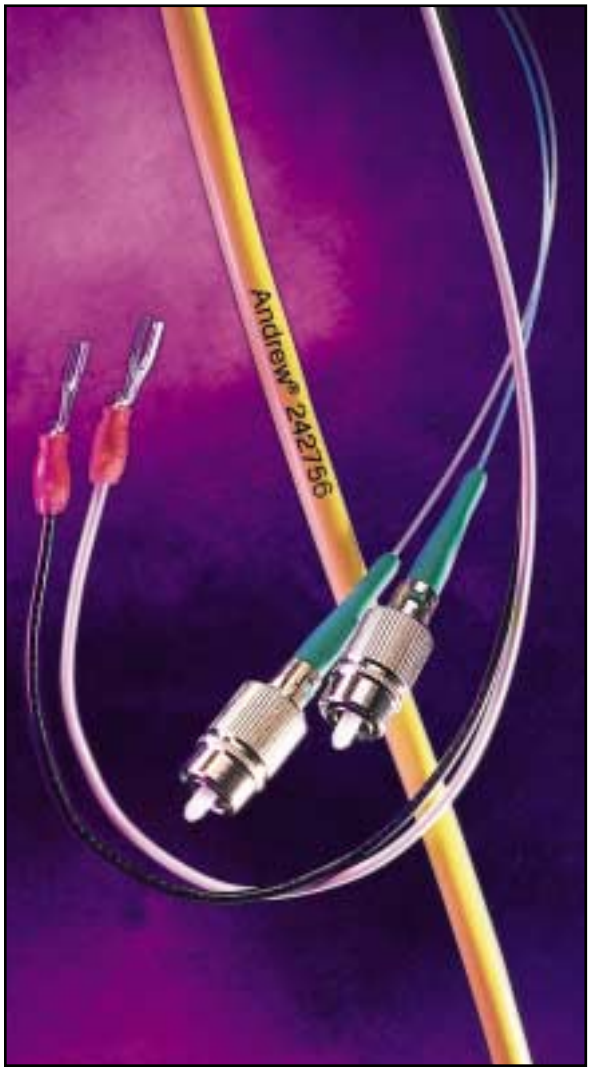
Cable Type Numbers	**242748-1**	**242748-2**	**242748-4**	**242748-5**
Number of Fibers	2	2	2	2
Fiber Type	Single Mode	Single Mode	Dispersion Shifted Single Mode	Dispersion Shifted Single Mode
Fiber Buffer Type	Tight, Fiberglas® Epoxy	Tight, Fiberglas Epoxy	Tight, Fiberglas Epoxy	Tight, Fiberglas Epoxy
Fiber Buffer Diameter, in (mm)	0.032 (0.8)	0.032 (0.8)	0.032 (0.8)	0.032 (0.8)
Cable Diameter, in (mm)	0.21 (5.3)	0.27 (6.9)	0.21 (5.3)	0.27 (6.9)
Cable Weight, lb/1000 ft (kg/km)	27 (40)	52 (78)	27 (40)	52 (78)
Tensile Strength				
Installation, Short Term, lb (N)	180 (800)	180 (800)	180 (800)	180 (800
Operational, Long Term, lb (N)	60 (267)	60 (267)	60 (267)	60 (267)
Minimum Bend Radius				
Installation, Short Term, in (mm)	4 (100)	5.4 (135)	4 (100)	5.4 (135)
Operational, Long Term, in (mm)	3 (75)	4 (100)	3 (75)	4 (100)
Operating Temperature Range, °F (°C)	14 to 158 (-10 to 70)	14 to 158 (-10 to 70)	14 to 158 (-10 to 70)	14 to 158 (-10 to 70)
Storage Temperature Range, °F (°C)	-40 to 158 (-40 to 70)	-40 to 158 (-40 to 70)	-40 to 158 (-40 to 70)	-40 to 158 (-40 to 70)
Number of Copper Conductors	2	2	2	2
Copper Conductor, AWG (Stranding)	18 (7 X 26)	14 (41 X 30)	18 (7 X 26)	14 (41 X 30)
Nominal DCR, ohms/1000 ft (ohms/km)	5.86 (19.2)	2.53 (8.30)	5.86 (19.2)	2.53 (8.30)
Nominal Maximum Current (amperes)	10	17	10	17
UL Listing	CL2R-OF	CL2R-OF	CL2R-OF	CL2R-OF
Jacket Material	PVC	PVC	PVC	PVC
Cable Assembly Type Numbers				
FC/APC	**242755-1**	**242757-1**	**242755-5**	**242757-5**
FC	**242755-2**	**242757-2**	**242755-6**	**242757-6**
ST®	**242755-3**	**242757-3**	**242755-7**	**242757-7**
SC	**242755-4**	**242757-4**	**242755-8**	**242757-8**

Optical Characteristics

Fiber Type	**Single Mode**	**Dispersion Shifted Single Mode**
Maximum Attenuation at 1310 nm, dB/km	0.5	0.5
Maximum Attenuation at 1550 nm, dB/km	0.6	0.35
Cable Cutoff Wavelength (nm)	<1260	<1260
Mode-Field Diameter at 1310 nm (µm)	9.3 ± 0.5	–
Mode-Field Diameter at 1550 nm (µm)	10.5 ± 1.0	8.1 ± 0.7
Zero Dispersion Wavelength (nm)	1301.5–1321.5	1535–1565
Cladding Diameter (µm)	125.0 ± 1.0	125.0 ± 1.0
Core-Clad Concentricity (µm)	≤0.8	≤0.8
Cladding Non-Circularity (%)	≤1.0	≤1.0
Coating Diameter (µm)	245 ± 10	245 ± 10
FC/APC Maximum Insertion Loss (dB)	0.5	0.5
FC, ST®, SC Maximum Insertion Loss (dB)	0.4	0.4
FC/APC Minimum Return Loss (dB)	60	60
FC, ST, SC Minimum Return Loss (dB)	50	50

Composite Optical Fiber Cable

Plenum Rated



Andrew indoor composite cables combine two Andrew Microcable™ elements with two insulated copper conductors to provide electrical current and fiber optic capability in one cable. This plenum rated cable is ideally suited to indoor antenna remoting for cellular and PCS systems and for communication and sensor systems in industrial environments.

Several configurations of composite cable are available, including single mode and dispersion shifted single mode fibers with 18 or 14 AWG copper conductors. Andrew Microcable is a unique product consisting of a single mode or dispersion shifted single mode optical fiber, encased in a reinforcing Fiberglas® epoxy matrix for high tensile strength and crush resistance in a lightweight, compact package. The Microcable elements provide easy and robust connector attachment, while the copper conductors can be terminated with any standard electrical wire termination. A No. 6 spade terminal is installed on the copper conductor in the cable assemblies. A rip cord provides fast and efficient access to the cable's optical and electrical elements.

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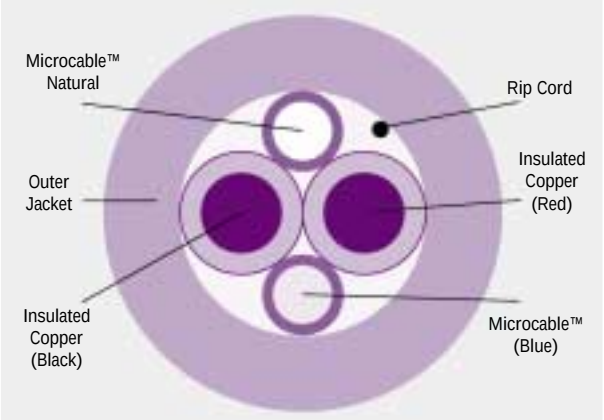


Mechanical Characteristics

Cable Type Numbers	**242749-1**	**242749-2**	**242749-4**	**242749-5**
Number of Fibers	2	2	2	2
Fiber Type	Single Mode	Single Mode	Dispersion Shifted Single Mode	Dispersion Shifted Single Mode
Fiber Buffer Type	Tight, Fiberglas® Epoxy	Tight, Fiberglas Epoxy	Tight, Fiberglas Epoxy	Tight, Fiberglas Epoxy
Fiber Buffer Diameter, in (mm)	0.032 (0.8)	0.032 (0.8)	0.032 (0.8)	0.032 (0.8)
Cable Diameter, in (mm)	0.21 (5.3)	0.27 (6.9)	0.21 (5.3)	0.27 (6.9)
Cable Weight, lb/1000 ft (kg/km)	27 (40)	52 (78)	27 (40)	52 (78)
Tensile Strength				
Installation, Short Term, lb (N)	180 (800)	180 (800)	180 (800)	180 (800)
Operational, Long Term, lb (N)	60 (267)	60 (267)	60 (267)	60 (267)
Minimum Bend Radius				
Installation, Short Term, in (mm)	4 (100)	5.4 (135)	4 (100)	5.4 (135)
Operational, Long Term, in (mm)	3 (75)	4 (100)	3 (75)	4 (100)
Operating Temperature Range, °F (°C)	14 to 158 (-10 to 70)	14 to 158 (-10 to 70)	14 to 158 (-10 to 70)	14 to 158 (-10 to 70)
Storage Temperature Range, °F (°C)	-40 to 158 (-40 to 70)	-40 to 158 (-40 to 70)	-40 to 158 (-40 to 70)	-40 to 158 (-40 to 70)
Number of Copper Conductors	2	2	2	2
Copper Conductor, AWG (Stranding)	18 (7 X 26)	14 (41 X 30)	18 (7 X 26)	14 (41 X 30)
Nominal DCR, ohms/1000 ft (ohms/km)	5.86 (19.2)	2.53 (8.30)	5.86 (19.2)	2.53 (8.30)
Nominal Maximum Current (amperes)	10	17	10	17
UL Listing	CL2R-OF	CL2R-OF	CL2R-OF	CL2R-OF
Jacket Material	PVDF	PVDF	PVDF	PVDF
Cable Assembly Type Numbers				
FC/APC	**242756-1**	**242758-1**	**242756-5**	**242758-5**
FC	**242756-2**	**242758-2**	**242756-6**	**242758-6**
ST®	**242756-3**	**242758-3**	**242756-7**	**242758-7**
SC	**242756-4**	**242758-4**	**242756-8**	**242758-8**

Optical Characteristics

Fiber Type	**Single Mode**	**Dispersion Shifted Single Mode**
Maximum Attenuation at 1310 nm, dB/km	0.5	0.5
Maximum Attenuation at 1550 nm, dB/km	0.6	0.35
Cable Cutoff Wavelength (nm)	<1260	<1260
Mode-Field Diameter at 1310 nm (µm)	9.3 ± 0.5	–
Mode-Field Diameter at 1550 nm (µm)	10.5 ± 1.0	8.1 ± 0.7
Zero Dispersion Wavelength (nm)	1301.5–1321.5	1535–1565
Cladding Diameter (µm)	125.0 ± 1.0	125.0 ± 1.0
Core-Clad Concentricity (µm)	≤0.8	≤0.8
Cladding Non-Circularity (%)	≤1.0	≤1.0
Coating Diameter (µm)	245 ± 10	245 ± 10
FC/APC Maximum Insertion Loss (dB)	0.5	0.5
FC, ST®, SC Maximum Insertion Loss (dB)	0.4	0.4
FC/APC Minimum Return Loss (dB)	60	60
FC, ST, SC Minimum Return Loss (dB)	50	50

Composite Optical Fiber Cable

Outdoor Rated

Outdoor composite cables from Andrew Corporation combine one to six optical fibers with two insulated copper conductors to provide electrical and fiber optic capability in one cable. This cable can be terminated with standard optical and electrical connectors in a variety of lengths to provide cable assemblies. These outdoor products are ideally suited to outdoor antenna remoting for cellular, PCS, VSAT, and SATCOM systems, and for communication, process control, and sensors in industrial environments.

The cable consists of a central gel-filled, water-blocked, loose buffer tube flanked by two parallel insulated 18- or 10-gauge stranded copper conductors. Each buffer tube contains one to six color-coded single mode optical fibers. Two rip cords provide fast and efficient access to the cable's optical and electrical elements. The copper conductors, buffer tube, and rip cords are surrounded by a water blocking tape that provides longitudinal water blocking. The entire core, along with a GRP strength member on either side, is surrounded by a UV stabilized polyethylene jacket.

Several configurations of composite cable and assemblies are available, all using single mode optical fiber. The optical fibers provide easy and robust FC/APC, ST®, SC, FC, and other connector attachment, while the copper conductors can be terminated with any standard electrical wire termination.

All Andrew fiber optic cables meet strict performance standards, ensuring quality and reliability, and follow in the tradition of HELIAX® and RADIAX® cables, offering the best value for your investment.

ST is a registered trademark of AT&T.

Mechanical Characteristics

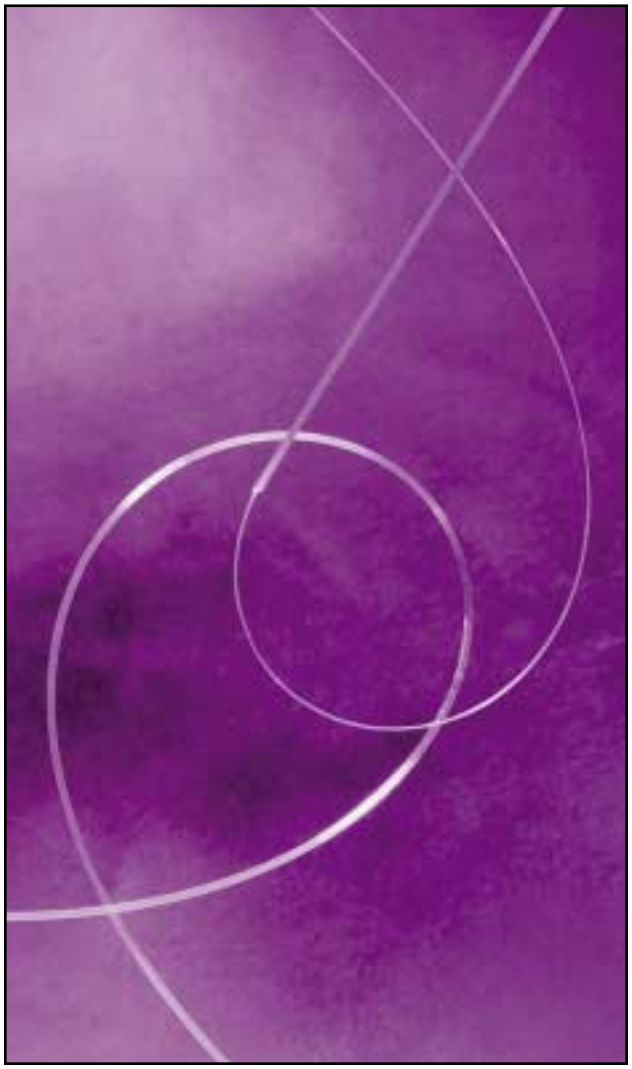
Cable Type Numbers	**242949-(*)**	**242951-(*)**	**242953-(*)**
Number of Fibers	1,2,4 or 6	1,2,4 or 6	1,2,4 or 6
Fiber Type	Single Mode	Single Mode	Single Mode
Fiber Buffer Type	Loose, Gel Filled	Loose, Gel Filled	Loose, Gel Filled
Fiber Buffer Diameter, in (mm)	0.118 (3.0)	0.118 (3.0)	0.118 (3.0)
Cable Diameter, in (mm)	0.30 X 0.62 (7.6 X 15.7)	0.30 X 0.62 (7.6 X 15.7)	0.24 X 0.45 (6.1 X 11.4)
Cable Weight, lb/1000 ft (kg/km)	78 (116)	140 (209)	42 (61)
Tensile Strength			
Installation, Short Term, lb (N)	500 (2200)	600 (2700)	400 (1800)
Operational, Long Term, lb (N)	112 (500)	135 (600)	90 (400)
Minimum Bend Radius			
Installation, Short Term, in (mm)	6 (150)	6 (150)	5 (125)
Operational, Long Term, in (mm)	4.5 (115)	4.5 (115)	3.6 (90)
Operating Temperature Range, °F (°C)	-40 to 140 (-40 to 60)	-40 to 185 (-40 to 85)	-40 to 140 (-40 to 60)
Storage Temperature Range, °F (°C)	-40 to 140 (-40 to 60)	-40 to 185 (-40 to 85)	-40 to 140 (-40 to 60)
Number of Copper Conductors	2	2	0
Copper Conductor, AWG (Stranding)	18 (7 X 26)	10 (105 X 30)	–
Nominal DCR, ohms/1000 ft (ohms/km)	5.86 (19.2)	.99 (3.24)	–
Nominal Maximum Current (amperes)	10	25	–
Jacket Material	LLDPE	HDPE	LLDPE
Cable Assembly Type Numbers			
FC/APC	**242950-(*)1**	**242952-(*)1**	**242954-(*)1**
FC	**242950-(*)2**	**242952-(*)2**	**242954-(*)2**
ST®	**242950-(*)3**	**242952-(*)3**	**242954-(*)3**
SC	**242950-(*)4**	**242952-(*)4**	**242954-(*)4**

* Please specify number of fibers 1, 2, 4 or 6. ST is a registered trademark of AT&T.

Optical Characteristics

Fiber Type	**Single Mode**
Maximum Attenuation at 1310 nm, dB/km	0.45
Maximum Attenuation at 1550 nm, dB/km	0.35
Cable Cutoff Wavelength (nm)	<1260
Mode-Field Diameter at 1310 nm (µm)	9.3 ± 0.5
Mode-Field Diameter at 1550 nm (µm)	10.5 ± 1.0
Zero Dispersion Wavelength (nm)	1301.5–1321.5
Cladding Diameter (µm)	125.0 ± 1.0
Core-Clad Concentricity (µm)	≤0.8
Cladding Non-Circularity (%)	≤1.0
Coating Diameter (µm)	245 ± 10
FC/APC Maximum Insertion Loss (dB)	0.5
FC, ST®, SC Maximum Insertion Loss (dB)	0.4
FC/APC Minimum Return Loss (dB)	60
FC, ST, SC Minimum Return Loss (dB)	50

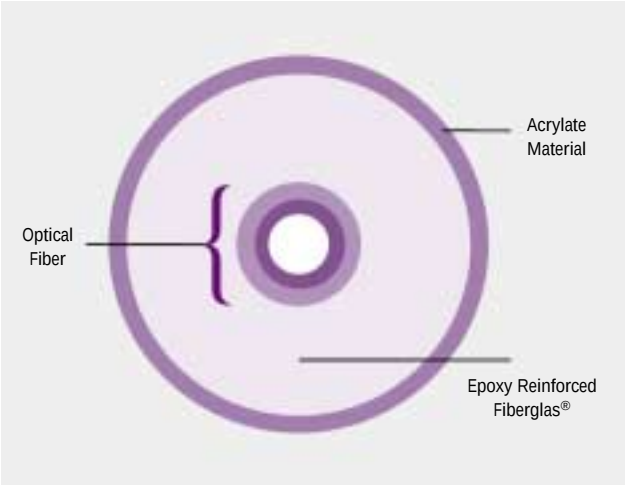
Ruggedized Microcable™ Tether Cable



Andrew ruggedized Microcable™ tether cable is a high quality cable available at low cost, making it ideal for expendable applications. A lightweight and durable optical data link, it is intended for use in both wet and dry locations within moderate temperature ranges. Continuous lengths range from a few meters up to 20,000 meters.

The Microcable tether cable is ideal for use as a patch cord with ST®, SC, FC, and other connectors, and can be used as a fiber optic element in various all-fiber or composite cable configurations. Andrew Microcable is a unique product consisting of a single mode or dispersion shifted single mode optical fiber, encased in a reinforcing Fiberglas® epoxy matrix for high tensile strength and crush resistance in a lightweight, compact package.

All Andrew fiber optic cables meet strict performance standards, ensuring quality and reliability, and follow in the tradition of HELIAX® and RADIAX® cables, offering the best value for your investment.



Mechanical Characteristics

Cable Type Numbers	241106-3*	241106-4	241106-5	241106-6
Number of Fibers	1	1	1	1
Fiber Type	Dispersion Shifted Single Mode	Multimode	Single Mode	Dispersion Shifted Single Mode
Fiber Buffer Type	Tight, Fiberglas® Epoxy	Tight, Fiberglas Epoxy	Tight, Fiberglas Epoxy	Tight, Fiberglas Epoxy
Fiber Buffer Diameter, in (mm)	0.032 (0.8)	0.032 (0.8)	0.032 (0.8)	0.032 (0.8)
Cable Diameter, in (mm)	0.032 (0.8)	0.032 (0.8)	0.032 (0.8)	0.032 (0.8)
Cable Weight, lb/1000 ft (kg/km)	0.61 (0.9)	0.61 (0.9)	0.61 (0.9)	0.61 (0.9)
Tensile Strength				
Ultimate, lb (N)	90 (400)	60 (266)	90 (400)	80 (355)
Working, lb (N)	30 (133)	20 (89)	30 (133)	30 (133)
Minimum Bend Radius				
Working, in (mm)	0.7 (18)	1.5 (38)	0.7 (18)	0.7 (18)
Operating Temperature Range, °F (°C)	14 to 158 (-10 to 70)	14 to 158 (-10 to 70)	14 to 158 (-10 to 70)	14 to 158 (-10 to 70)
Storage Temperature Range, °F (°C)	-40 to 158 (-40 to 70)	-40 to 158 (-40 to 70)	-40 to 158 (-40 to 70)	-40 to 158 (-40 to 70)
Crush Resistance, ft•lb/in (N/cm)	12.5 (22)	10 (17)	12.5 (22)	12.5 (22)
Hydrostatic Pressure Resistance, lb/in2 (kPa)	5000 (34,500)	–	–	5000 (34,500)
Specific Gravity	1.74	1.74	1.74	1.74

* Product complies with NOSC Specification 946-0004-91, 3 Feb 1992.

Optical Characteristics

Fiber Type	Single Mode	Dispersion Shifted Single Mode	Multimode
Maximum Attenuation at 850 nm, dB/km	–	–	5.0
Maximum Attenuation at 1300 nm, dB/km	–	–	1.75
Maximum Attenuation at 1310 nm, dB/km	0.5	0.5 (0.4*)	–
Maximum Attenuation at 1550 nm, dB/km	0.6	0.35 (0.25*)	–
Minimum Bandwidth at 850 nm (MHz•km)	–	–	160
Minimum Bandwidth at 1300 nm (MHz•km)	–	–	500
Cable Cutoff Wavelength (nm)	<1260	<1260	–
Core Diameter (µm)	–	–	62.5 ± 3.0
Core Non-Circularity (%)	–	–	≤5.0
Mode-Field Diameter at 1310 nm (µm)	9.3 ± 0.5	–	–
Mode-Field Diameter at 1550 nm (µm)	10.5 ± 1.0	8.1 ± 0.7	–
Zero Dispersion Wavelength (nm)	1301.5–1321.5	1535–1565	1332–1354
Cladding Diameter (µm)	125.0 ± 1.0	125.0 ± 1.0	125.0 ± 2.0
Core-Clad Concentricity (µm)	≤0.8	≤0.8	≤3.0
Cladding Non-Circularity (%)	≤1.0	≤1.0	≤2.0
Numerical Aperture	–	–	0.275 ± 0.015
Coating Diameter (µm)	245 ± 10	245 ± 10	245 ± 10

* Specification applies to product 241106-3 only.