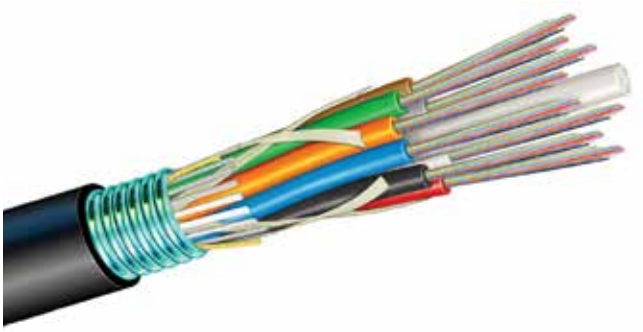
Made to Order, Delivered to Customer Project Requirements

Gel-Free Water Blocking Construction for Clean, Solvent-Free Termination

Bend-Insensitive Fibers for Optimum Low Loss Cable Performance

RoHS Compliant Armored Design, with Fiber and Cable Made Locally

HUBBELL OptiChannel HFCH4 Series Outdoor Armored Loose Tube Fiber Cable



Hubbell's OptiChannel HFCH4 Series Outdoor, Armored, Loose Tube, Non-Gel Fiber Cables are designed for direct burial, duct or aerial lashed applications where armored protection is required. Flexible color coded buffer tubes with dry loose tube fibers in groups of twelve are equally spaced around an all-dielectric central strength member, with a 600 pound pull rating. Additional layers of strength yarns, water blocking binders and a corrugated steel armor layer complete the construction, with a rugged polyethylene outer jacket. Premium bend-insensitive fibers are used in all Hubbell HFCH Series OM3, OM4 and OS2 loose tube cables for optimum cable bend loss performance. HFCH Series cables are supported by the Hubbell Mission Critical® 25-year link warranty.

FEATURES

- Bright colored E-Z strip fiber coatings for contractor-friendly termination
- Color coded buffer tubes for easy identification
- Gel-free loose tube armored construction with 600lb cable pulling load rating
- Corrugated steel armored protection from rodents, abrasion, crush and impact
- Premium bend-insensitive fibers, proof tested to 200kpsi for maximum reliability
- Fibers Supported: OM1, OM3, OM4, OS2

SPECIFICATIONS

- Cable jacket: Black polyethylene, non-flame rated
- Fiber count: 6, 12, 24, 48, 72, 96, 144, 288
- Fiber grouping: 12 fibers per buffer tube
- Fiber coating: 250µm bright colored acrylate
- Temperature range:
  - Storage: -40° F to +167° F (-40° C to +75° C)
  - Installation: -22° F to +140° F (-30° C to +60° C)
  - Operation: -40° F to +158° F (-40° C to +70° C)
- Mechanical specifications: see chart
- Optical fiber specifications: see Page 3

STANDARDS

- Telcordia GR-20
- ANSI/ICEA S-87-640
- TIA-492 Series Optical Fiber standards
- TIA-568.3 Optical Fiber cabling standards
- TIA-758 Outside Plant cabling standard
- RUS 7 CFR 1755
- IEC 60794-3-11 OSP cables

CABLE JACKET AND BUFFER COLOR CODES

- Outer Jacket: Black with white print legend
- Buffer tube colors:
  - Blue, Orange, Brown, Slate, White, Red
  - Red, Black, Yellow, Violet, Rose, Aqua
- Fiber coating color codes and pairing sequence:
  - 1-Blue, 2-Orange, 3-Green, 4-Brown, 5-Slate, 6-White
  - 7-Red, 8-Black, 9-Yellow, 10-Violet, 11-Rose, 12-Aqua
- Repeat coating colors 1 through 12 for each buffer tube
- Cable markings (2 foot intervals):
  - Hubbell catalog number, cable type, fiber type, fiber count, date
  - Agency listing and test number, NESC hand set symbol
- Sequential length increment: every foot

APPLICATIONS

- Aerial lashed, duct or direct burial deployment
- Exposed, shared or unprotected outdoor pathways
- Campus underground building to building backbone
- Data Center main distribution frame to remote facilities
- Metro area and service provider networks
- City, town and community FTTH services

OUTDOOR, ARMORED, NON-GEL, LOOSE TUBE FIBER CABLE

Configuration			Catalog Number
xxx	=	Fiber count (012 to 288 strand)	**HFCH4xxxBKn**
BK	=	Black cable jacket	
n	=	'**6**' for 62.5µm OM1 Multimode '**3**' for 50µm OM3 Multimode '**4**' for 50µm OM4 Multimode '**S**' for 9µm OS2 Singlemode	

Example: **HFCH4144BKS**
System Description: **CBL, FIBER, SM, 144F, OSP, ARM, LT, BK**

DELIVERY

HFCH4 Series fiber cables are priced and delivered in feet. Reel size and weight depends on cable diameter and length ordered. Cable orders are shipped on one reel unless specific cuts are required. Cut charges apply to multi-reel orders. Specify cable put-up lengths on purchase order. Production over-run tolerance of +5% may also apply.

Test Data is included with each reel delivered.

MOQ for all cables: 3,280 feet (1,000 meters)

CABLE DESIGN INFORMATION

HFCH4 Series: Outdoor, Armored, Loose Tube, Single Jacket

Fiber Count	Buffer Tubes	Filler Tubes	Fibers Per Tube	Cable Diameter in (mm)	Cable Weight lb/kft (kg/km)	Bend Radius (w/Load) in (cm)	Bend Radius (No Load) in (cm)	Max Pulling Load lb (N)	Max Operating Load lb (N)
6	1	4	6	0.46 (11.8)	89 (132)	9 (24)	5 (12)	600 (2670)	180 (801)
12	1	4	12	0.46 (11.8)	89 (132)	9 (24)	5 (12)	600 (2670)	180 (801)
24	2	3	12	0.46 (11.8)	89 (132)	9 (24)	5 (12)	600 (2670)	180 (801)
48	4	1	12	0.46 (11.8)	89 (132)	9 (24)	5 (12)	600 (2670)	180 (801)
72	6	0	12	0.50 (12.6)	97 (145)	10 (25)	5 (13)	600 (2670)	180 (801)
96	8	0	12	0.56 (14.3)	125 (186)	11 (29)	6 (14)	600 (2670)	180 (801)
144	12	0	12	0.69 (17.6)	176 (262)	14 (35)	7 (18)	600 (2670)	180 (801)
288	24	0	12	0.81 (20.7)	214 (319)	16 (42)	8 (21)	600 (2670)	180 (801)

CABLE APPLICATION GUIDELINES: DISTANCE AND CHANNEL ATTENUATION LIMITS

IEEE 802.3 Fiber Ethernet Application	Transmitter Wavelength (nm)	Maximum Supportable Distance (m)					Maximum Channel Attenuation (dB)				
		Multimode				Single-mode OS2	Multimode				Single-mode OS2
		62.5/125 OM1	50/125 OM2	50/125 OM3	50/125 OM4		62.5/125 OM1	50/125 OM2	50/125 OM3	50/125 OM4	
10GBASE-S	850	33	82	300	550	N/A	2.4	2.3	2.6	2.9	N/A
10GBASE-L	1310	N/A	N/A	N/A	N/A	10 km	N/A	N/A	N/A	N/A	6.2
10GBASE-E	1550	N/A	N/A	N/A	N/A	40 km	N/A	N/A	N/A	N/A	11.0
25GBASE-SR	850	N/A	N/A	70	100	N/A	N/A	N/A	1.8	1.9	N/A
40GBASE-SR4	850	N/A	N/A	100	150	N/A	N/A	N/A	1.9	1.5	N/A
100GBASE-SR10	850	N/A	N/A	100	150	N/A	N/A	N/A	1.9	1.5	N/A
100GBASE-SR4	850	N/A	N/A	70	100	N/A	N/A	N/A	1.8	1.9	N/A
40GBASE-LR4	1310	N/A	N/A	N/A	N/A	10 km	N/A	N/A	N/A	N/A	6.7
40GBASE-ER4	1550	N/A	N/A	N/A	N/A	40 km	N/A	N/A	N/A	N/A	19
100GBASE-LR4	1310	N/A	N/A	N/A	N/A	10 km	N/A	N/A	N/A	N/A	6.3

Note: S = Short wavelength, L = Long wavelength, E = Extended wavelength
SR4 = Short Range, 4 lanes in parallel (8 fibers), SR10 = Short Range, 10 lanes in parallel (20 fibers)
LR4/ER4 = 4 WDM wavelengths over 1 lane (2 fibers)

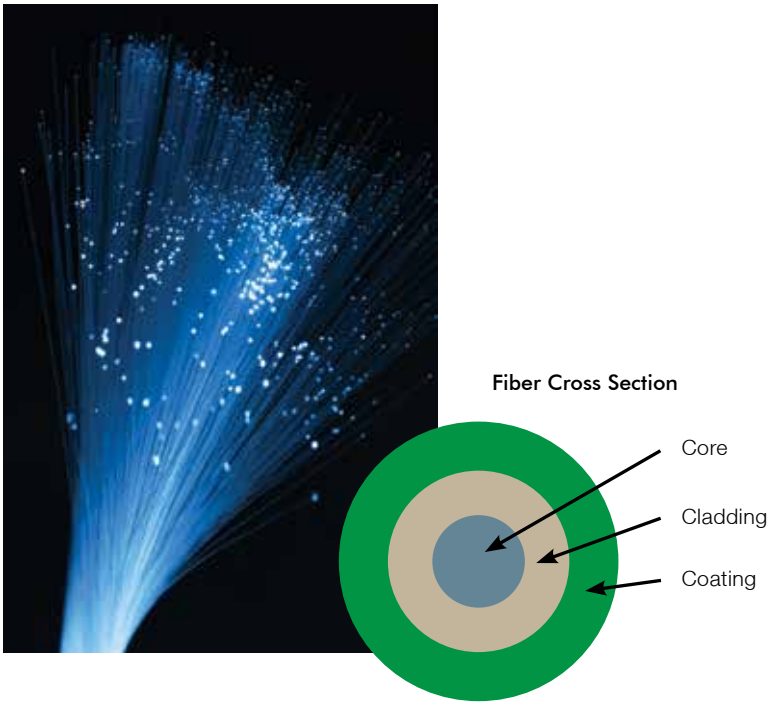
INSTALLATION REQUIREMENTS

- Verify channel distance and attenuation budget with network application (see chart above).
- During installation or operation, comply with maximum loading, minimum bend radius and temperature limits.
- Always pull cables by the internal strength member or fiber damage may result. Do not exceed load limits.
- Use proper tools for stripping and dressing out cable to avoid fiber damage.
- Adhere to best installation practices, avoiding kinks, crushing and abrasion. Always use proper cable supports.

Optical Fiber Specifications for Hubbell HFCH Series Loose Tube Cables

FEATURES

- High purity glass fiber, made with advanced vapor deposition and precision draw process
- Proof tested > 200kpsi for maximum strength
- Low bend-induced attenuation for enhanced cable operating performance
- Low dispersion, laser optimized OM3 and OM4
- Low water peak G652D singlemode, enhanced for 1310 to 1550nm operating wavelengths



SPECIFICATIONS

- OM1: graded index core, non-laser optimized
- OM3 and OM4: graded index core, laser optimized
- OS2: low water peak, step index core
- OS2 proof strength: > 200kpsi
- Multimode proof strength: > 100kpsi
- Fiber coating: 250µm bright colored acrylate
- Temperature test range: -60c to +85c
- Geometry and performance: see charts below

STANDARDS

- TIA-492AAAA-A: OM1 Optical Fiber Standard
- TIA-492AAAC-B: OM3 Optical Fiber Standard
- TIA-492AAAD: OM4 Optical Fiber Standard
- TIA-492CAAB: OS2 Optical Fiber Standard
- ITU-T-G652D: OS2 Optical Fiber Standard

OPTICAL FIBER DIMENSIONAL SPECIFICATIONS

Fiber Type	Core Diameter (microns)	Cladding Diameter (microns)	Core-Clad Concentricity (microns)	Cladding Non-Circularity	Core Non-Circularity	Coating Diameter (microns)	Coating-Cladding Concentricity (microns)
OM1	62.5 ± 2.0µm	125 ± 1.0µm	≤ 1.0µm	≤ 0.7%	≤ 5.0%	242 ± 5µm	< 10.0µm
OM3	50.0 ± 2.0µm	125 ± 1.0µm	≤ 1.0µm	≤ 0.7%	≤ 5.0%	242 ± 5µm	< 6.0µm
OM4	50.0 ± 2.0µm	125 ± 1.0µm	≤ 1.0µm	≤ 0.7%	≤ 5.0%	242 ± 5µm	< 6.0µm
OS2	8.8µm*	125 ± 0.4µm	≤ 0.3µm	≤ 0.3%	n/a	242 ± 5µm	< 12µm

**OS2 mode field diameter at 1310nm: 9.2 ± 0.4µm; OS2 mode field diameter at 1550nm: 10.4 ± 0.4µm.*

OPTICAL FIBER PERFORMANCE SPECIFICATIONS

Fiber Type	Max Attenuation (dB/km)		Laser-Based EMB (MHz·km)		1 Gb/s Link Distance (meters)		10 Gb/s Link Distance (meters)		40/100 Gb/s Link Distance (meters)	
	850nm	1300nm	850nm	1300nm	850nm	1300nm	850nm	1300nm	850nm	1300nm
OM1	≤ 2.9	≤ 0.6	220	n/a	300	550	26	n/a	n/a	n/a
OM3	≤ 2.3	≤ 0.6	≥ 2000	n/a	1,000	550	300	n/a	100	n/a
OM4	≤ 2.3	≤ 0.6	≥ 4700	n/a	1,100	550	550	n/a	150	n/a
	1310nm	1550nm	1310nm	1550nm	1310nm	1550nm	1310nm	1550nm	1310nm	1550nm
OS2	≤ 0.35	≤ 0.22	n/a	n/a	n/a	n/a	10km	40km	10km	40km

Note: Fiber attenuation is un-cabled. All link distance limits are based on 1.0 dB max connector loss.
OM3, OM4, and OS2 are bend-insensitive type for optimum cable bend loss performance.

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