

Made to Order, Delivered to
Customer Project Requirements

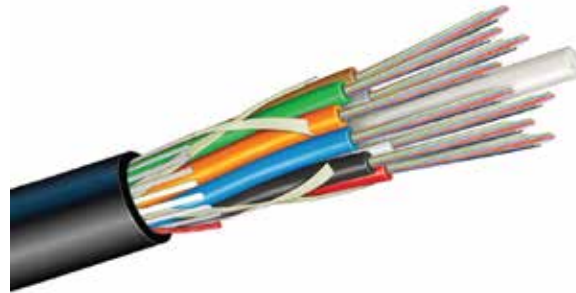
Gel-Free Water Blocking Construction
for Clean, Solvent-Free Termination

Bend-Insensitive Fibers for Optimum
Low Loss Cable Performance

RoHS Compliant Design, with Fiber
and Cable Made Locally

FIBERHUBB™

**HFCH3 Series Outdoor
Loose Tube Fiber Cable**



FEATURES

- Bright colored E-Z strip fiber coatings and tubes for contractor-friendly termination
- Color coded buffer tubes for easy identification
- Gel-free loose tube all-dielectric construction with 600lb cable pulling load rating
- Polyethylene jacket for environmental protection and mechanical durability
- 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

Hubbell's FIBERHUBB HFCH3 Series Outdoor, Loose Tube, Non-Gel Fiber Cables are designed for direct burial, duct or aerial lashed applications. 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 rip cord 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.

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
- 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, NON-GEL, LOOSE TUBE FIBER CABLE

| | |
|--|--------------------------------|
| Configuration | Catalog Number |
| xxx = Fiber count (012 to 288 strand) | HFCH3xxxrBK_n |
| 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: **HFCH3144BKS**
 System Description: **CBL, FIBER, SM, 144F, OSP, LT, BK**

DELIVERY

HFCH3 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

HFCH3 Series: Outdoor, 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 | 0.40 (10.1) | 43 (64) | 8 (20) | 4 (10) | 600 (2670) | 180 (801) |
| 12 | 1 | 4 | 12 | 0.40 (10.1) | 43 (64) | 8 (20) | 4 (10) | 600 (2670) | 180 (801) |
| 24 | 2 | 3 | 12 | 0.40 (10.1) | 43 (64) | 8 (20) | 4 (10) | 600 (2670) | 180 (801) |
| 48 | 4 | 1 | 12 | 0.40 (10.1) | 43 (64) | 8 (20) | 4 (10) | 600 (2670) | 180 (801) |
| 72 | 6 | 0 | 12 | 0.43 (10.9) | 50 (75) | 9 (22) | 4 (11) | 600 (2670) | 180 (801) |
| 96 | 8 | 0 | 12 | 0.50 (12.6) | 65 (97) | 10 (25) | 5 (13) | 600 (2670) | 180 (801) |
| 144 | 12 | 0 | 12 | 0.63 (15.9) | 105 (156) | 13 (32) | 6 (16) | 600 (2670) | 180 (801) |
| 288 | 24 | 0 | 12 | 0.72 (18.3) | 145 (216) | 14 (37) | 7 (18) | 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

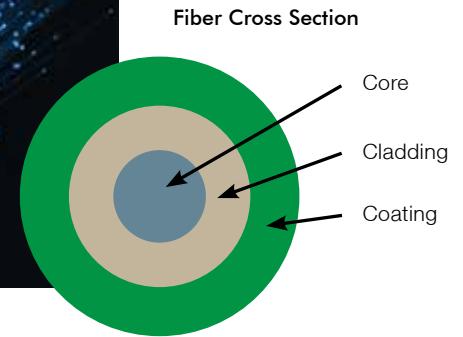
- High purity glass fiber, made with advanced vapor deposition and precision draw process
- Proof tested > 200kpsi for maximum strength
- Low bend-induced attenuation for enhanced cable operating performance
- Low dispersion, laser optimized OM3 and OM4
- Low water peak G652D singlemode, enhanced for 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: > 100kpsii
- 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.