

CONQUEST® CONDUIT
PRODUCTS

Conduit Products

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ConQuest® – Providing Damage Prevention & Access to Underground Facilities

Interest in underground damage prevention is surging. Federal legislation and an array of state laws have heightened concern on protecting vital underground delivery systems. Companies like yours spend billions to ensure continuity of service. These efforts are even more critical as competition heats up because reliability of service largely decides winners and losers in any industry.

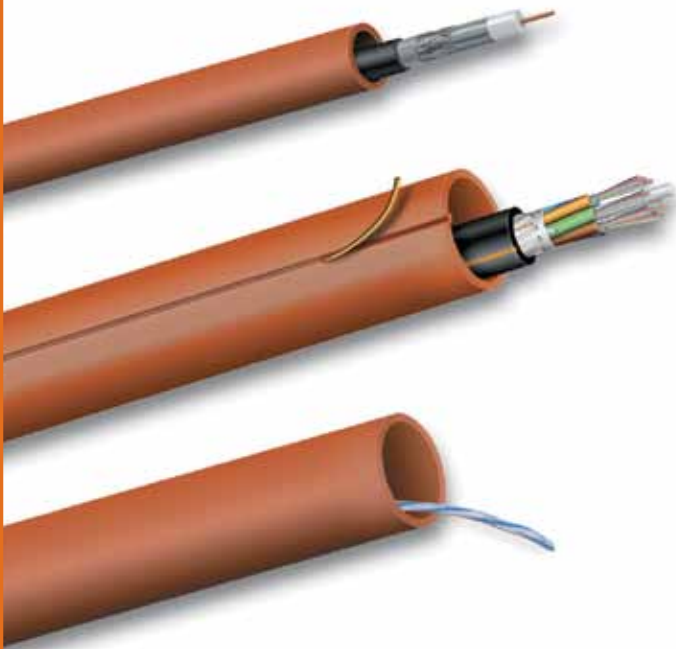
Toneable Conduit™ – Protection & Location in One Tough Package!

CommScope recognizes the challenge of confidently locating underground facilities. Toneable Conduit, the newest member of the ConQuest product family, is a CommScope technological achievement and winner of *Communications Technology*® Magazine 2002 Readers' Choice Award for Best New Transmission & Distribution Line Product. Our patented Toneable Conduit features an embedded tone wire that expedites routine maintenance or emergency restoration services and saves installation labor dollars.



Eliminate Pulling Cable After Conduit Has Been Placed – Specify Cable-In-Conduit

Utility companies and contractors are always digging on public easements. To best protect buried cable from service interruptions, request it pre-installed in a CommScope ConQuest product. These products provide a tough high-density polyethylene conduit factory pre-installed with any CommScope cable. Cable in conduit is becoming standard procedure for broadband operators with an eye on scalability. Today, these operators are building plants which protect today's investment and make future access to cable easy.



Con ♦ Quest

○ **Install Empty ConQuest Conduit for Future Cable Placements**

Sometimes conduit needs to be installed ahead of cable; such as for developing neighborhoods and for some long fiber optic cable placements. ConQuest offers an entire package of products that provide a variety of sizes, wall thicknesses, colors and pre-installed pull lines.



○ **ConQuest Drop in Conduit Facilitates Future Access to Infrastructure**

The buried service wire, the final leg of the outside plant, is often the most vulnerable. Home owners like to dig, landscape, repair sprinklers, etc. That’s why we offer ConQuest, our own brand of conduit products, factory preinstalled with the cable of your choice.

○ **Request a FREE Broadband Applications & Construction Library**

CommScope’s Broadband Applications & Construction Library includes a 4-piece set of valuable reference manuals plus a DVD containing essential training videos on topics such as connectorization, expansion loop formation and fiber optic splicing. These tools teach you how to protect the integrity of your broadband plant while lowering operating/installation costs. From construction and installation practices, to performance and testing of cable – CommScope Construction Manuals are simply a “must-have” for anyone upgrading or maintaining broadband networks.



Download a PDF version at our website:

<http://www.commscope.com> or

request a set by phone at

1-800-982-1708.



○ **CommScope’s Broadband Resource Center™**

This repository of experience, knowledge, services & tools is provided to CommScope customers to assist installers, technicians, engineers, designers or managers of broadband service providers. Tools in various media and formats include: SpanMaster® software for cable sag & tension calculations; center conductor sizing guides; attenuation slide rules; & call center spec assistance & review. Call us at 1-866-333-3BRC (3272) or e-mail brc@commscope.com for answers to product questions or issues related to any CommScope broadband product.

○ **Optimize Construction Efficiencies With ConQuest® PullMaster®**

This FREE downloadable software utility helps system engineering and construction groups model and optimize conduit cable pulls before construction begins. This software provides a user-friendly technique for predicting expected tensions and fill ratios for a specific cable pull. The construction process can then be optimized and “best pull” locations identified, thus helping to reduce frustration and cost for crews in the field.

-
- Feature** **High density polyethylene material**
- Benefits** Superior resistance to cracking or shattering, providing long term stability (even at low temperatures)
Provides heavy protection in rocky soil conditions; Excellent chemical resistance
Lower coefficient of friction and moisture migration rate than traditional PVC stick pipe
-
- Feature** **UV protection**
- Benefit** Superior protection from cracking during storage or when used as a ground riser (see note below)
-
- Feature** **Continuous length conduit**
- Benefits** Installs faster than PVC stick pipe; easy to plow; no couplings or glue required
-
- Feature** **Conduit - internal lubricant**
- Benefit** Provides excellent cable removal and replacement capabilities
-
- Feature** **Pre-installed CommScope cable - the cable of choice**
- Benefits** No field installation of cable into conduit required; cable is better protected from improper field handling; saves installation time and costs
-
- Feature** **CommScope has received RUS acceptance for ConQuest conduit products**
-

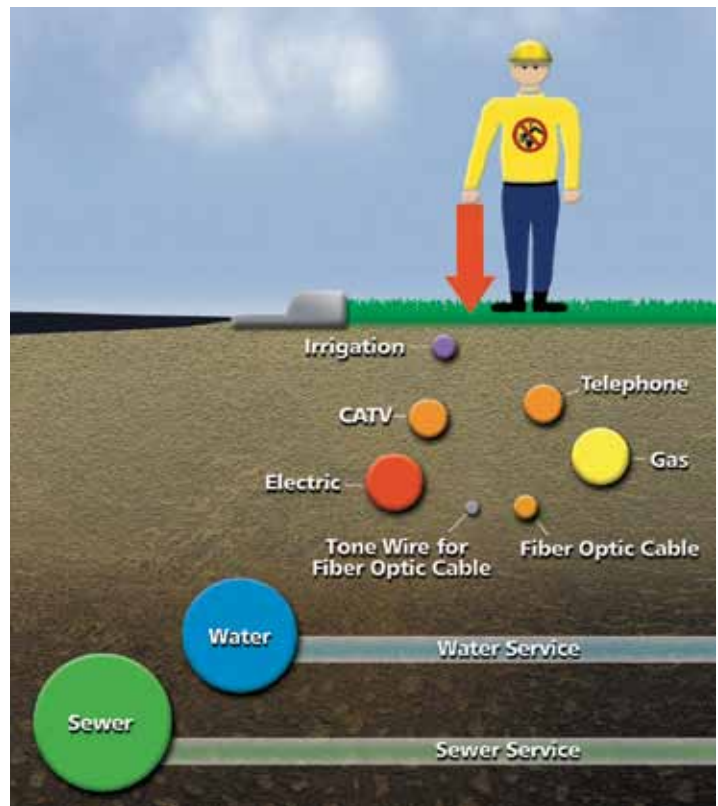
Conduit and Tracer Colors

CommScope manufactures conduit and tracers in a variety of colors to meet your specific requirements. However, please note that the most common colors are black, orange or terra cotta. Orange/terra cotta conduit is recommended for telecommunication conduit in buried applications. Black is recommend for applications where the conduit is exposed to direct sunlight. For other colors see the chart at right.

Note: Colors other than black do not tolerate direct sunlight for extended periods of time and are not recommended for aerial or above ground installations.

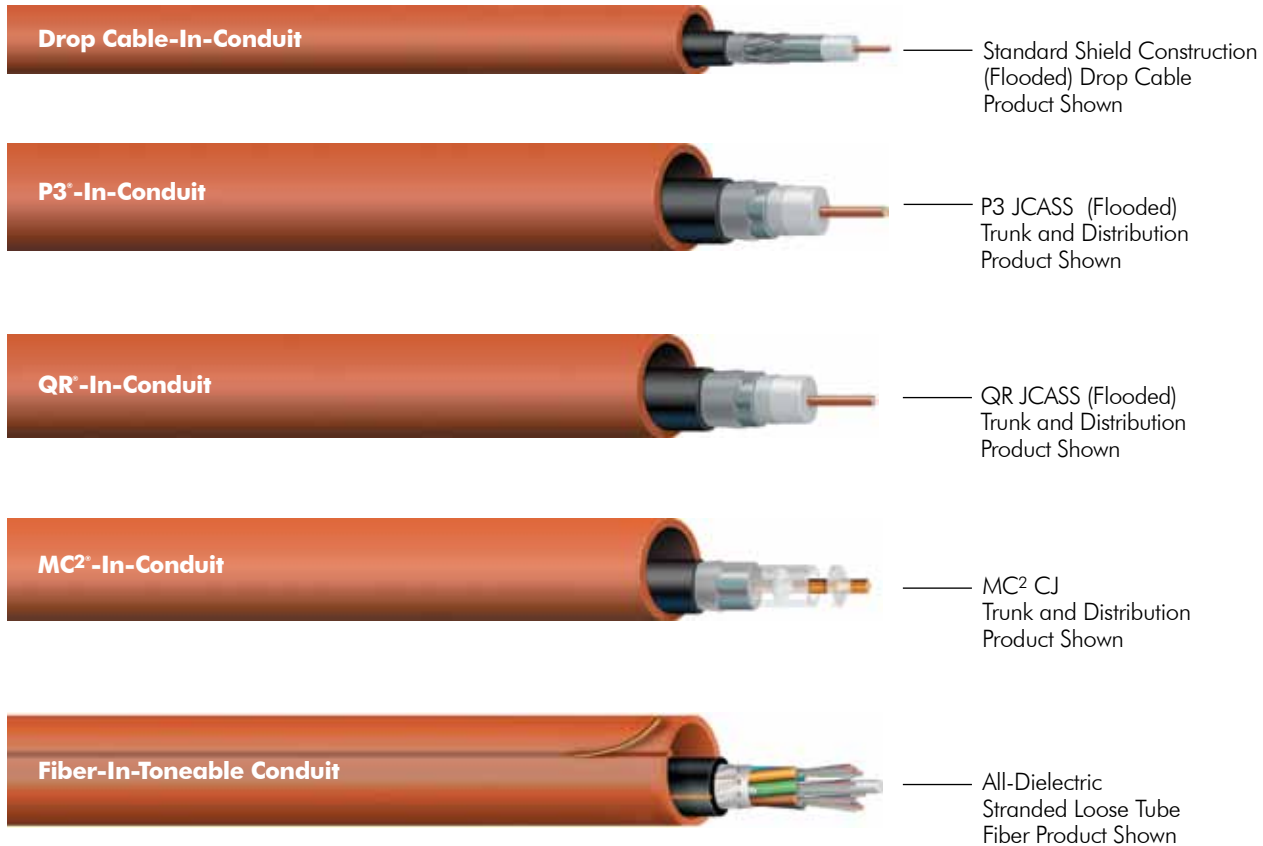
For more information on custom colors and tracers, please contact our Broadband Customer Service Center at 800-982-1708.

Typical Colors Used In Underground Applications

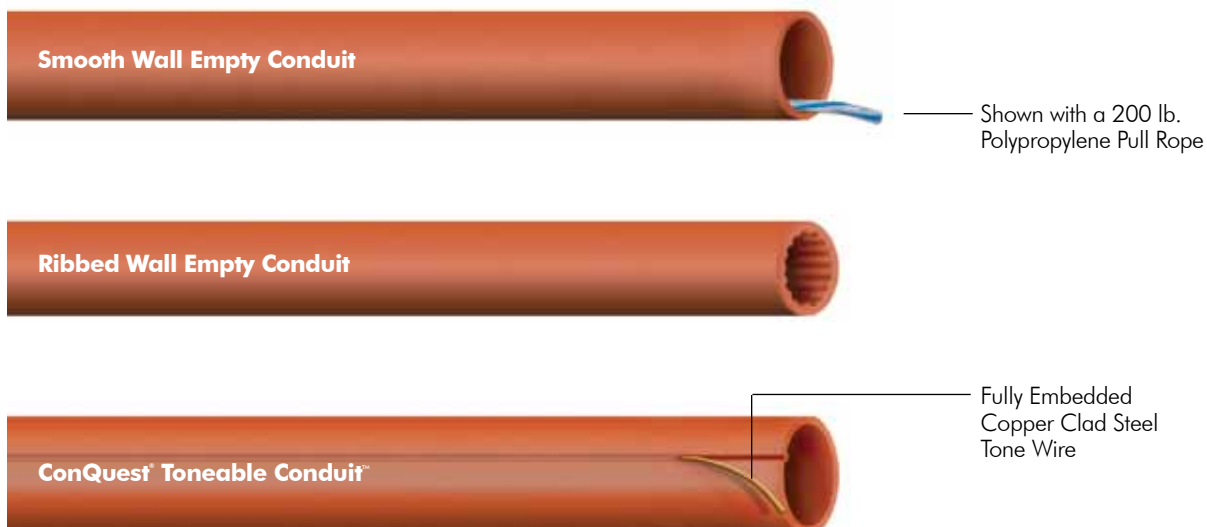


CommScope manufactures conduit in a variety of sizes and configurations (empty or with pre-installed cable or pull lines). Below is just a small sampling of the configurations available. For more information, please contact your CommScope sales representative.

ConQuest® Cable-In-Conduit (CIC) Products



ConQuest® Empty Conduit Products



The material meets or exceeds the standards in ASTM D 3350-05 for Type III, Class PE334480E (colors with UV stabilizers) or Class C (black), high density polyethylene.

Material Specifications

| Property | Test Method (ASTM) | Value |
|--------------------------------|--------------------|----------------|
| Density (g/cm ³) | D792A or D1505 | 0.941 - 0.955 |
| Melt Index (g/10 min) | D1238 | 0.39 max. |
| Flexural Modulus (psi) | D790 | 80,000 min. |
| Tensile Strength @ yield (psi) | D638 | 3,000 min. |
| ESCR, Condition B | D1693 | F 10 > 96 hrs. |
| Hydrostatic Design Basis (psi) | D2837 | NPR* |

*NPR - Not Pressure Rated

Ultraviolet Protection

Non-Black conduit shall contain sufficient protection against UV radiation for a period not less than one year. Black conduit contains sufficient protection against UV radiation in long term above ground applications.

Lubrication

There will be no adhesion of the cable jacket to the conduit wall. In addition, a permanent silicone based lubricant is applied to the cable jacket to aid in cable removal.

Cosmetics

Each reel or length shall be virtually free from voids, welds, or surface defects (inside or outside).

Printing

The standard print height is 1/4" (±1/16") and unless otherwise specified shall conform to the following CommScope example **"(Current Year) COMMSCOPE (Size) (SDR or SCH Size) CONQUEST (Footage) FEET"**. The print will be clearly legible and sequentially marked every two feet ±1% unless otherwise specified.

Ovality

Ovality, when calculated by the following formula: Maximum OD - Minimum OD divided by Average OD multiplied by 100 will be no more than 7% for conduit sizes up to 2" and no more than 10% for 3" conduit.

SDR 11

| Nominal Size | Nominal Outside Diameter (inches) | Minimum Wall Thickness (inches) | Nominal Inner Diameter (inches) | Min. Bend Radius Unsupported (inches) | Max. Pulling Tension (lbs.) | Weight* (lb/ft) |
|--------------|-----------------------------------|---------------------------------|---------------------------------|---------------------------------------|-----------------------------|-----------------|
| 13mm | 0.625 | 0.055 | 0.500 | 8 | 210 | 46 |
| 1/2" | 0.840 | 0.076 | 0.668 | 10 | 390 | 85 |
| 3/4" | 1.050 | 0.095 | 0.840 | 12 | 605 | 130 |
| 1" | 1.315 | 0.120 | 1.055 | 14 | 950 | 204 |
| 1 1/4" | 1.660 | 0.151 | 1.338 | 18 | 1,520 | 320 |
| 1 1/2" | 1.900 | 0.173 | 1.533 | 20 | 1,760 | 416 |
| 2" | 2.375 | 0.216 | 1.917 | 26 | 3,105 | 640 |
| 3" | 3.500 | 0.318 | 2.826 | 48 | 6,740 | 1,386 |
| 4" | 4.500 | 0.409 | 3.633 | 60 | 11,145 | 2,295 |

SDR 13.5

| Nominal Size | Nominal Outside Diameter (inches) | Minimum Wall Thickness (inches) | Nominal Inner Diameter (inches) | Min. Bend Radius Unsupported (inches) | Max. Pulling Tension (lbs.) | Weight* (lb/ft) |
|--------------|-----------------------------------|---------------------------------|---------------------------------|---------------------------------------|-----------------------------|-----------------|
| 1/2" | 0.840 | 0.062 | 0.696 | 10 | 320 | 71 |
| 3/4" | 1.050 | 0.078 | 0.874 | 12 | 505 | 111 |
| 1" | 1.315 | 0.097 | 1.101 | 14 | 790 | 169 |
| 1 1/4" | 1.660 | 0.123 | 1.394 | 18 | 1,260 | 265 |
| 1 1/2" | 1.900 | 0.141 | 1.598 | 20 | 1,455 | 344 |
| 2" | 2.375 | 0.176 | 2.002 | 26 | 2,580 | 532 |
| 3" | 3.500 | 0.259 | 2.951 | 48 | 5,590 | 1,154 |
| 4" | 4.500 | 0.333 | 3.794 | 60 | 9,250 | 1,905 |

SCH 40

| Nominal Size | Nominal Outside Diameter (inches) | Minimum Wall Thickness (inches) | Nominal Inner Diameter (inches) | Min. Bend Radius Unsupported (inches) | Max. Pulling Tension (lbs.) | Weight* (lb/ft) |
|--------------|-----------------------------------|---------------------------------|---------------------------------|---------------------------------------|-----------------------------|-----------------|
| 3/4" | 1.050 | 0.113 | 0.804 | 12 | 705 | 149 |
| 1" | 1.315 | 0.133 | 1.029 | 14 | 1,050 | 219 |
| 1 1/4" | 1.660 | 0.140 | 1.360 | 18 | 1,420 | 295 |
| 1 1/2" | 1.900 | 0.145 | 1.590 | 20 | 1,700 | 353 |
| 2" | 2.375 | 0.154 | 2.047 | 26 | 2,300 | 472 |

SCH 80

| Nominal Size | Nominal Outside Diameter (inches) | Minimum Wall Thickness (inches) | Nominal Inner Diameter (inches) | Min. Bend Radius Unsupported (inches) | Max. Pulling Tension (lbs.) | Weight* (lb/ft) |
|--------------|-----------------------------------|---------------------------------|---------------------------------|---------------------------------------|-----------------------------|-----------------|
| 3/4" | 1.050 | 0.154 | 0.722 | 12 | 920 | 189 |
| 1" | 1.315 | 0.179 | 0.936 | 14 | 1,360 | 276 |
| 1 1/4" | 1.660 | 0.191 | 1.255 | 18 | 1,875 | 383 |
| 1 1/2" | 1.900 | 0.200 | 1.476 | 20 | 2,270 | 465 |
| 2" | 2.375 | 0.218 | 1.913 | 26 | 3,140 | 645 |
| 3" | 3.500 | 0.300 | 2.864 | 48 | 6,395 | 975 |
| 4" | 4.500 | 0.337 | 3.786 | 60 | 9,345 | 1,950 |

NOTES

Standard Dimension Ratio (SDR) is the ratio between the wall thickness and the outside diameter of a specific conduit. Schedule 40 & Schedule 80 dimensions are a specific wall thickness to each conduit diameter. Other wall thicknesses are available upon request.

Specifications are subject to change without notice.

*Weight does not include the reel.
Reel weights listed on page 24.

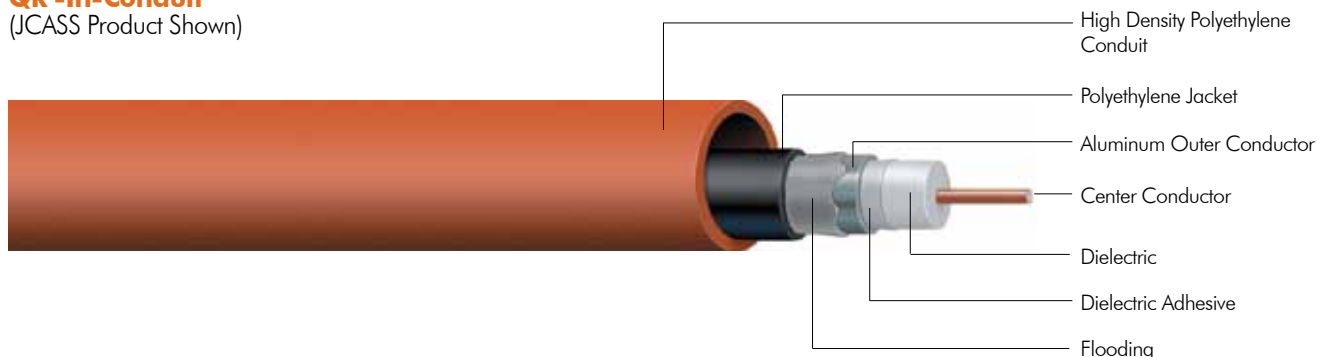
For more information, call Customer Service at 800.982.1708 or 828.324.2200 • Fax 828.328.3400 • custserv@commscope.com

ConQuest® Conduit

Pre-Installed with QR® Trunk and Distribution Cable



QR®-In-Conduit (JCASS Product Shown)



CommScope’s patented QR® coaxial cable was developed to meet the increasing demands of tomorrow’s broadband networks. QR has the highest reliability and flexibility of any coaxial cable, low RF attenuation and an unprecedented 10 year warranty.

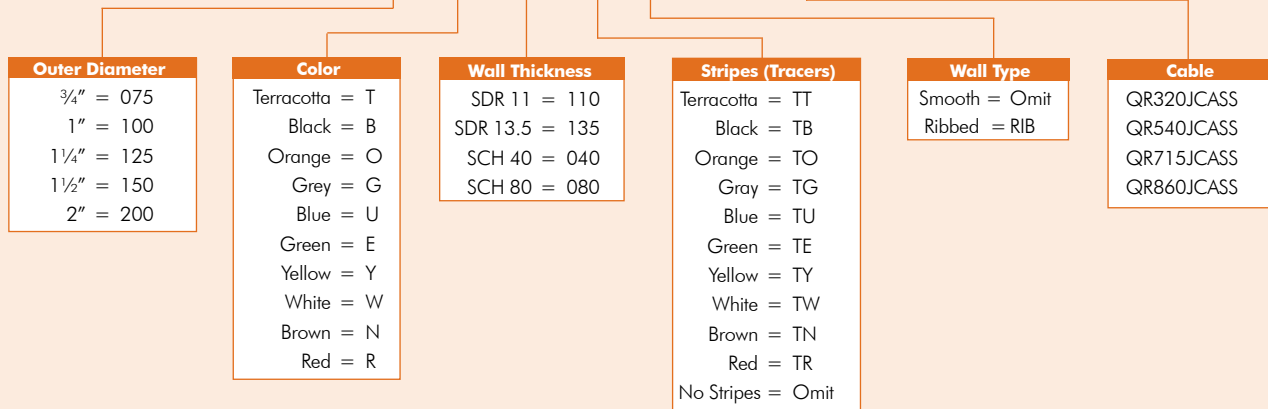
QR coaxial cable offers lower attenuation than larger traditional products, with unmatched flexibility, reliability and cost effectiveness. CommScope offers four standard sizes (320, 540, 715 and 860) of QR Cable-In-Conduit, each optimized for a specific use. For more information or specifications on QR products, please visit our website at www.commscope.com.

| Size | Wall Thickness | Wall Rating | QR 320 JCASS | | | QR 540 JCASS | | |
|--------|----------------|-------------|---------------------|----------------------|-----------------|---------------------|----------------------|-----------------|
| | | | Nominal Length (ft) | Reel Size (FDT) (in) | Weight* lbs/kft | Nominal Length (ft) | Reel Size (FDT) (in) | Weight* lbs/kft |
| 3/4" | SDR 13.5 | Medium | 1,000 | 42 x 24 x 24 | 156 | NA | NA | NA |
| | SDR 11 | Heavy | 1,000 | 42 x 24 x 24 | 177 | NA | NA | NA |
| | SCH 40 | Extra-Heavy | 1,000 | 42 x 24 x 24 | 196 | NA | NA | NA |
| 1" | SDR 13.5 | Medium | NA | NA | NA | 3,700 | 63 x 28 x 43 | 261 |
| | SDR 11 | Heavy | NA | NA | NA | 3,700 | 63 x 28 x 43 | 296 |
| | SCH 40 | Extra-Heavy | NA | NA | NA | 3,700 | 63 x 28 x 43 | 311 |
| 1 1/4" | SDR 13.5 | Medium | NA | NA | NA | 3,700 | 80 x 43 x 43 | 357 |
| | SCH 40 | Heavy | NA | NA | NA | 3,700 | 80 x 43 x 43 | 387 |
| | SDR 11 | Extra-Heavy | NA | NA | NA | 3,700 | 80 x 43 x 43 | 412 |
| 1 1/2" | SDR 13.5 | Medium | NA | NA | NA | 3,700 | 90 x 43 x 43 | 436 |
| | SCH 40 | Heavy | NA | NA | NA | 3,700 | 90 x 43 x 43 | 445 |
| | SDR 11 | Extra-Heavy | NA | NA | NA | 3,700 | 90 x 43 x 43 | 508 |
| 2" | SCH 40 | Medium | NA | NA | NA | 3,700 | 102 x 48 x 43 | 564 |
| | SDR 13.5 | Heavy | NA | NA | NA | 3,700 | 102 x 43 x 43 | 624 |
| | SDR 11 | Extra-Heavy | NA | NA | NA | 3,700 | 102 x 43 x 43 | 732 |

Other cables and wall sizes may be available upon request.

Sample: 1½" Orange SCH 40 Ribbed with Black Stripe & QR 860 JCASS

150 O 040 TB RIB QR860JCASS



Please contact Customer Service if you need assistance in building part numbers.

| QR 715 JCASS | | | QR 860 JCASS | | | Wall Thickness | Wall Rating | Size |
|---------------------|----------------------|-----------------|---------------------|----------------------|-----------------|----------------|-------------|------|
| Nominal Length (ft) | Reel Size (FDT) (in) | Weight* lbs/kft | Nominal Length (ft) | Reel Size (FDT) (in) | Weight* lbs/kft | | | |
| NA | NA | NA | NA | NA | NA | SDR 13.5 | Medium | 3/4" |
| NA | NA | NA | NA | NA | NA | SDR 11 | Heavy | |
| NA | NA | NA | NA | NA | NA | SCH 40 | Extra-Heavy | |
| NA | NA | NA | NA | NA | NA | SDR 13.5 | Medium | 1" |
| NA | NA | NA | NA | NA | NA | SDR 11 | Heavy | |
| NA | NA | NA | NA | NA | NA | SCH 40 | Extra-Heavy | |
| 3,000 | 68 x 28 x 43 | 409 | NA | NA | NA | SDR 13.5 | Medium | 1¼" |
| 3,000 | 68 x 28 x 43 | 439 | NA | NA | NA | SCH 40 | Heavy | |
| 3,000 | 68 x 28 x 43 | 464 | NA | NA | NA | SDR 11 | Extra-Heavy | |
| 3,000 | 90 x 43 x 43 | 488 | 2,700 | 80 x 43 x 43 | 558 | SDR 13.5 | Medium | 1½" |
| 3,000 | 90 x 43 x 43 | 497 | 2,700 | 80 x 43 x 43 | 567 | SCH 40 | Heavy | |
| 3,000 | 90 x 43 x 43 | 560 | 2,700 | 80 x 43 x 43 | 630 | SDR 11 | Extra-Heavy | |
| 3,000 | 102 x 48 x 43 | 616 | 2,700 | 102 x 48 x 43 | 686 | SCH 40 | Medium | 2" |
| 3,000 | 102 x 43 x 43 | 676 | 2,700 | 102 x 43 x 43 | 746 | SDR 13.5 | Heavy | |
| 3,000 | 102 x 43 x 43 | 784 | 2,700 | 102 x 43 x 43 | 854 | SDR 11 | Extra-Heavy | |

Specifications are subject to change without notice.

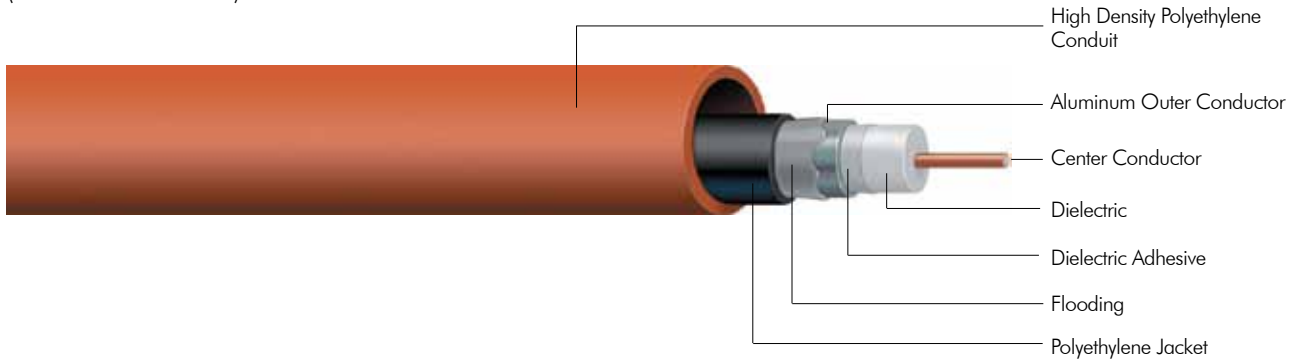
*Weight does not include the reel.
Reel weights listed on page 24.

ConQuest® Conduit

Pre-Installed with P3® Trunk & Distribution Cable



P3®-In-Conduit (JCASS Product Shown)



CommScope's P3® product line is the industry standard by which all coaxial trunk and distribution cables are measured. P3 has been proven robust and reliable by years of successful installations.

CommScope P3 offers low attenuation and inherent strength making it an industry standard. CommScope offers several different sizes of P3 Cable-In-Conduit (500, 565, 625, 700, 750 and 875), each optimized for a specific use. For more information or specifications on our P3 cables, please visit our website at www.commscope.com.

| Size | Wall Thickness | Wall Rating | P3 500 JCASS | | | P3 565 JCASS | | | P3 625 JCASS | | |
|--------|----------------|-------------|---------------------|----------------------|-----------------|---------------------|----------------------|----------------|---------------------|----------------------|----------------|
| | | | Nominal Length (ft) | Reel Size (FDT) (in) | Weight* lbs/kft | Nominal Length (ft) | Reel Size (FDT) (in) | Weight* lb/kft | Nominal Length (ft) | Reel Size (FDT) (in) | Weight* lb/kft |
| 1" | SDR 13.5 | Medium | 2,400 | 54 x 28 x 43 | 266 | 2,400 | 54 x 28 x 43 | 285 | NA | NA | NA |
| | SDR 11 | Heavy | 2,400 | 54 x 28 x 43 | 301 | 2,400 | 54 x 28 x 43 | 320 | NA | NA | NA |
| | SCH 40 | Extra-Heavy | 2,400 | 54 x 28 x 43 | 316 | 2,400 | 54 x 28 x 43 | 335 | NA | NA | NA |
| 1 1/4" | SDR 13.5 | Medium | 2,400 | 63 x 28 x 43 | 362 | 2,400 | 63 x 28 x 43 | 381 | 2,400 | 63 x 28 x 43 | 410 |
| | SCH 40 | Heavy | 2,400 | 63 x 28 x 43 | 392 | 2,400 | 63 x 28 x 43 | 411 | 2,400 | 63 x 28 x 43 | 440 |
| | SDR 11 | Extra-Heavy | 2,400 | 63 x 28 x 43 | 417 | 2,400 | 63 x 28 x 43 | 436 | 2,400 | 63 x 28 x 43 | 465 |
| 1 1/2" | SDR 13.5 | Medium | 2,400 | 80 x 43 x 43 | 441 | 2,400 | 80 x 43 x 43 | 460 | 2,400 | 80 x 43 x 43 | 489 |
| | SCH 40 | Heavy | 2,400 | 80 x 43 x 43 | 450 | 2,400 | 80 x 43 x 43 | 469 | 2,400 | 80 x 43 x 43 | 498 |
| | SDR 11 | Extra-Heavy | 2,400 | 80 x 43 x 43 | 513 | 2,400 | 80 x 43 x 43 | 532 | 2,400 | 80 x 43 x 43 | 561 |
| 2" | SCH 40 | Medium | 2,400 | 90 x 48 x 43 | 569 | 2,400 | 90 x 48 x 43 | 588 | 2,400 | 90 x 48 x 43 | 617 |
| | SDR 13.5 | Heavy | 2,400 | 90 x 43 x 43 | 629 | 2,400 | 90 x 43 x 43 | 648 | 2,400 | 90 x 43 x 43 | 677 |
| | SDR 11 | Extra-Heavy | 2,400 | 90 x 43 x 43 | 737 | 2,400 | 90 x 43 x 43 | 756 | 2,400 | 90 x 43 x 43 | 785 |

Other cables and wall sizes may be available upon request.

Sample: 1 1/4" Blue SDR 13.5 Ribbed with Yellow Stripe & P3 625 JCASS

125 U 135 TY RIB P3625JCASS

| Outer Diameter |
|----------------|
| 1" = 100 |
| 1 1/4" = 125 |
| 1 1/2" = 150 |
| 2" = 200 |

| Color |
|----------------|
| Terracotta = T |
| Black = B |
| Orange = O |
| Grey = G |
| Blue = U |
| Green = E |
| Yellow = Y |
| White = W |
| Brown = N |
| Red = R |

| Wall Thickness |
|----------------|
| SDR 11 = 110 |
| SDR 13.5 = 135 |
| SCH 40 = 040 |
| SCH 80 = 080 |

| Stripes (Tracers) |
|-------------------|
| Terracotta = TT |
| Black = TB |
| Orange = TO |
| Gray = TG |
| Blue = TU |
| Green = TE |
| Yellow = TY |
| White = TW |
| Brown = TN |
| Red = TR |
| No Stripes = Omit |

| Wall |
|---------------|
| Smooth = Omit |
| Ribbed = RIB |

| Cable |
|------------|
| P3500JCASS |
| P3565JCASS |
| P3625JCASS |
| P3700JCASS |
| P3750JCASS |
| P3875JCASS |

Please contact Customer Service if you need assistance in building part numbers.

| P3 700 JCASS | | | P3 750 JCASS | | | P3 875 JCASS | | | Size |
|---------------------|----------------------|----------------|---------------------|----------------------|----------------|---------------------|----------------------|-----------------|------|
| Nominal Length (ft) | Reel Size (FDT) (in) | Weight* lb/kft | Nominal Length (ft) | Reel Size (FDT) (in) | Weight* lb/kft | Nominal Length (ft) | Reel Size (FDT) (in) | Weight* lbs/kft | |
| NA | NA | NA | NA | NA | NA | NA | NA | NA | 1" |
| NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| NA | NA | NA | NA | NA | NA | NA | NA | NA | |

| | | | | | | | | | |
|-------|--------------|-----|-------|--------------|-----|----|----|----|--------|
| 2,500 | 63 x 28 x 43 | 430 | 2,500 | 68 x 28 x 43 | 467 | NA | NA | NA | 1 1/4" |
| 2,500 | 63 x 28 x 43 | 460 | 2,500 | 68 x 28 x 43 | 497 | NA | NA | NA | |
| 2,500 | 63 x 28 x 43 | 485 | 2,500 | 68 x 28 x 43 | 522 | NA | NA | NA | |

| | | | | | | | | | |
|-------|--------------|-----|-------|--------------|-----|-------|--------------|-----|--------|
| 2,500 | 80 x 43 x 43 | 509 | 2,500 | 80 x 43 x 43 | 546 | 2,500 | 80 x 43 x 43 | 606 | 1 1/2" |
| 2,500 | 80 x 43 x 43 | 518 | 2,500 | 80 x 43 x 43 | 555 | 2,500 | 80 x 43 x 43 | 615 | |
| 2,500 | 80 x 43 x 43 | 581 | 2,500 | 80 x 43 x 43 | 618 | 2,500 | 80 x 43 x 43 | 678 | |

| | | | | | | | | | |
|-------|--------------|-----|-------|--------------|-----|-------|--------------|-----|----|
| 2,500 | 90 x 48 x 43 | 637 | 2,500 | 90 x 48 x 43 | 674 | 2,500 | 90 x 48 x 43 | 734 | 2" |
| 2,500 | 90 x 43 x 43 | 697 | 2,500 | 90 x 43 x 43 | 734 | 2,500 | 90 x 43 x 43 | 794 | |
| 2,500 | 90 x 43 x 43 | 805 | 2,500 | 90 x 43 x 43 | 842 | 2,500 | 90 x 43 x 43 | 902 | |

Specifications are subject to change without notice.

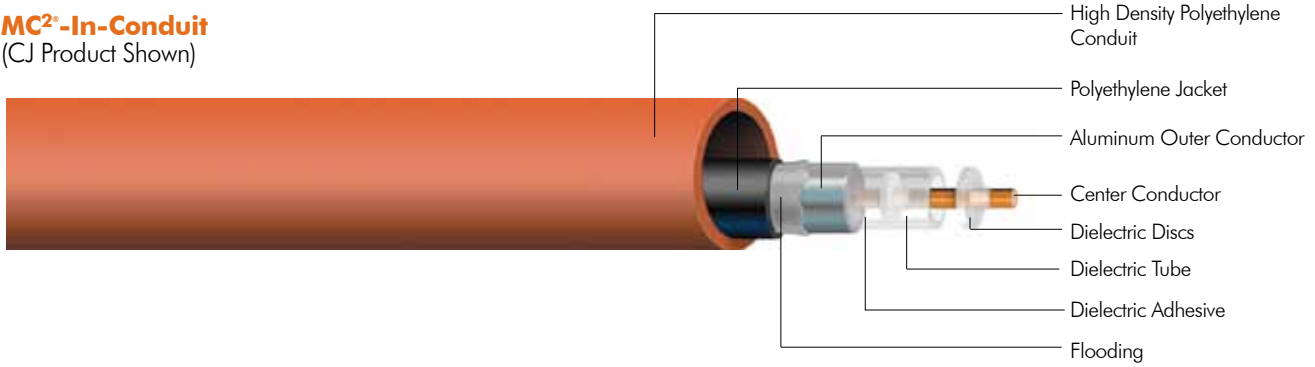
*Weight does not include the reel.
Reel weights listed on page 24.

ConQuest® Conduit

Pre-Installed with MC²® Trunk and Distribution Cable



MC²-In-Conduit (CJ Product Shown)



CommScope's MC² product line supports system operators that have an established network design based on the MC² platform.

Standard MC² Construction

Disc and air dielectric with an aluminum strip formed and continuously RF welded.

| Size | Wall Thickness | Wall Rating | MC ² 500 CJ | | | MC ² 650 CJ | | | MC ² 750 CJ | | |
|--------|----------------|-------------|------------------------|----------------------|-----------------|------------------------|----------------------|-----------------|------------------------|----------------------|-----------------|
| | | | Nominal Length (ft) | Reel Size (FDT) (in) | Weight* lbs/kft | Nominal Length (ft) | Reel Size (FDT) (in) | Weight* lbs/kft | Nominal Length (ft) | Reel Size (FDT) (in) | Weight* lbs/kft |
| 1" | SDR 13.5 | Medium | 4,600 | 68 x 28 x 43 | 277 | NA | NA | NA | NA | NA | NA |
| | SDR 11 | Heavy | 4,600 | 68 x 28 x 43 | 312 | NA | NA | NA | NA | NA | NA |
| | SCH 40 | Extra-Heavy | 4,600 | 68 x 28 x 43 | 327 | NA | NA | NA | NA | NA | NA |
| 1 1/4" | SDR 13.5 | Medium | 4,600 | 80 x 28 x 43 | 372 | 4,000 | 80 x 28 x 43 | 415 | 2,700 | 68 x 28 x 43 | 471 |
| | SCH 40 | Heavy | 4,600 | 80 x 28 x 43 | 403 | 4,000 | 80 x 28 x 43 | 445 | 2,700 | 68 x 28 x 43 | 502 |
| | SDR 11 | Extra-Heavy | 4,600 | 80 x 28 x 43 | 428 | 4,000 | 80 x 28 x 43 | 470 | 2,700 | 68 x 28 x 43 | 527 |
| 1 1/2" | SDR 13.5 | Medium | 4,600 | 102 x 43 x 43 | 452 | 4,000 | 90 x 43 x 43 | 495 | 2,700 | 80 x 43 x 43 | 551 |
| | SCH 40 | Heavy | 4,600 | 102 x 43 x 43 | 462 | 4,000 | 90 x 43 x 43 | 504 | 2,700 | 80 x 43 x 43 | 560 |
| | SDR 11 | Extra-Heavy | 4,600 | 102 x 43 x 43 | 525 | 4,000 | 90 x 43 x 43 | 567 | 2,700 | 80 x 43 x 43 | 623 |
| 2" | SCH 40 | Medium | NA | NA | NA | NA | NA | NA | 2,700 | 102 x 48 x 43 | 679 |
| | SDR 13.5 | Heavy | NA | NA | NA | NA | NA | NA | 2,700 | 102 x 48 x 43 | 739 |
| | SDR 11 | Extra-Heavy | NA | NA | NA | NA | NA | NA | 2,700 | 102 x 48 x 43 | 847 |

Other cables and wall sizes may be available upon request.

ConQuest® Conduit Catalog Numbering Key

Pre-Installed with MC²® Trunk & Distribution Cable

Sample: 1" Black SDR 13.5 Ribbed with Red Stripe & MC² 500 Flooded

100 B 13.5 TR RIB MO500CJ

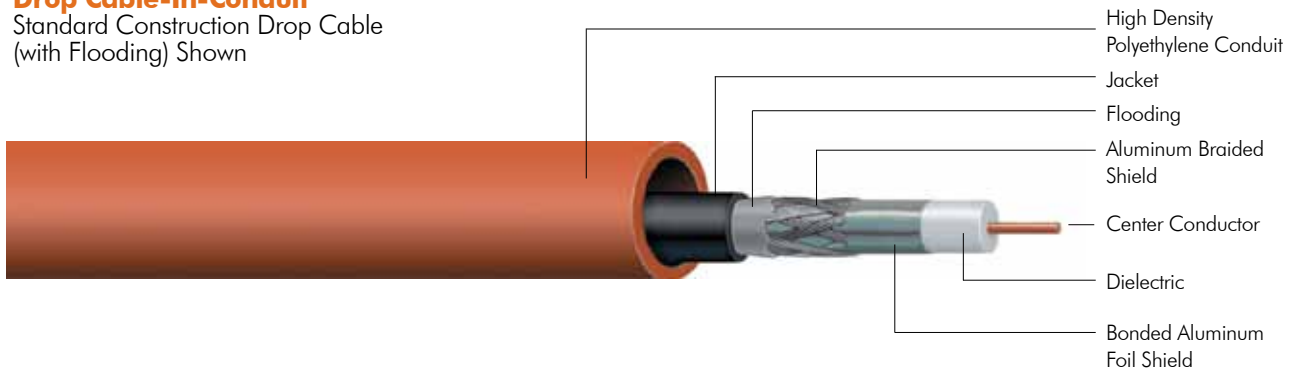
| | | | | | |
|---|---|---|--|---|---|
| Outer Diameter 1" = 100 1 1/4" = 125 1 1/2" = 150 2" = 200 | Color Terracotta = T Black = B Orange = O Grey = G Blue = U Green = E Yellow = Y White = W Brown = N Red = R | Wall Thickness SDR 11 = 110 SDR 13.5 = 135 SCH 40 = 040 SCH 80 = 080 | Stripes (Tracers) Terracotta = TT Black = TB Orange = TO Grey = TG Blue = TU Green = TE Yellow = TY White = TW Brown = TN Red = TR No Stripes = Omit | Wall Type Smooth = Omit Ribbed = RIB | Cable MO500CJ MO650CJ MO750CJ |
|---|---|---|--|---|---|

Please contact Customer Service if you need assistance in building part numbers.

For more information, call Customer Service at 800.982.1708 or 828.324.2200 • Fax 828.328.3400 • custserv@commscope.com

Drop Cable-In-Conduit

Standard Construction Drop Cable
(with Flooding) Shown



CommScope Drop-In-Conduit is a complete family of products serving a number of applications. All drop cable products are available in two sizes (6 and 11) and configurations (standard, tri-shield and super-shield). For more information or specifications on drop cables, please visit our website at www.commscope.com.

| Size | Wall Thickness | Wall Rating | Maximum Number of Cables | | Standard Length (ft) | Reel Size (FDT) (in) |
|-------------|----------------|-------------|--------------------------|------------|----------------------|----------------------|
| | | | F6 Series | F11 Series | | |
| 13mm | SDR 11 | Heavy | 1 | 0 | 1,000 | 24 x 12 x 18 |
| 1/2" | SDR 13.5 | Medium | 1 | 0 | 1,000 | 35 x 16½ x 18 |
| | SDR 11 | Heavy | 1 | 0 | 1,000 | 35 x 16½ x 18 |
| 3/4" | SDR 13.5 | Medium | 2 | 1 | 1,000 | 42 x 24 x 24 |
| | SDR 11 | Heavy | 2 | 1 | 1,000 | 42 x 24 x 24 |
| | SCH 40 | Extra Heavy | 2 | 1 | 1,000 | 42 x 24 x 24 |
| 1" | SDR 13.5 | Medium | 3 | 2 | 1,000 | 50 x 24 x 24 |
| | SDR 11 | Heavy | 3 | 2 | 1,000 | 50 x 24 x 24 |
| | SCH 40 | Extra Heavy | 3 | 2 | 1,000 | 50 x 24 x 24 |

Other cables and wall sizes may be available upon request.

Specifications are subject to change without notice.

ConQuest® Conduit Catalog Numbering Key
Pre-Installed with CommScope Drop Cable

Sample: ¾" White SDR 11 Ribbed with Brown Stripe & F6 Quad Shield

075 W 110 TN RIB F6SSEF

| | | | | | |
|---|---|---|---|---|---|
| <p>Outer Diameter</p> <p>13mm = 13M ½" = 050 ¾" = 075 1" = 100</p> | <p>Color</p> <p>Terracotta = T Black = B Orange = O Grey = G Blue = U Green = E Yellow = Y White = W Brown = N Red = R</p> | <p>Wall Thickness</p> <p>SDR 11 = 110 SDR 13.5 = 135 SCH 40 = 040 SCH 80 = 080</p> | <p>Stripes (Tracers)</p> <p>Terracotta = TT Black = TB Orange = TO Gray = TG Blue = TU Green = TE Yellow = TY White = TW Brown = TN Red = TR No Stripes = Omit</p> | <p>Wall</p> <p>Smooth = Omit *Ribbed = RIB</p> | <p>Cable</p> <p>F660BEF F690BEF F6TSEF F677TSEF F6SSEF F1160BEF F1190BEF F11TSEF F1177TSEF F11SSEF</p> |
|---|---|---|---|---|---|

Please contact Customer Service if you need assistance in building part numbers.

*NOTE: Ribbed not available in 13mm and ½" conduit.

For more information, call Customer Service at 800.982.1708 or 828.324.2200 • Fax 828.328.3400 • custserv@commscope.com

ConQuest® Conduit

Pre-Installed with CommScope Dry Loose Tube Fiber Optic Cable



Fiber-In-Conduit

All of CommScope's fiber cables can be pre-installed in conduit, including the gel free, Dry Loose Tube cable. Available in five different diameters - 3/4", 1", 1 1/4", 1 1/2" and 2" and three different wall thicknesses - SDR 11, SDR 13.5 and SCH 40. For more information or specifications on Fiber Optic cables, please visit our website at www.commscope.com.

| Cable Type/ Count | Fiber Part Number & Conduit Description | Cable OD & Weight (kft) | Available Conduit OD | Available Wall Thicknesses | Weight (lb/kft)* | | |
|---|--|----------------------------|---|--|-------------------|----------|-----------------|
| | | | | | SDR 11 | SDR 13.5 | Fiber SCH 40 |
| Dry (gel free) Loose Tube Dielectric 2 - 60 Fibers | D- XXX -LN- XY -F12NS Specify Conduit OD, Wall Thickness and Color | 0.41" 47 lbs. | 3/4" | SDR 11 or 13.5 | 177 | 158 | |
| | | | 1" | SDR 11 or 13.5 | 251 | 216 | |
| | | | 1 1/4" | SDR 11 or 13.5 | 357 | 266 | |
| | | | 1 1/2" | SDR 11 or 13.5 | 463 | 391 | |
| | | | 2" | SDR 13.5 or SCH 40 | 579 | 519 | |
| Dry (gel free) Loose Tube Dielectric 62 - 72 Fibers | D- XXX -LN- XY -F12NS Specify Conduit OD, Wall Thickness and Color | 0.43" 52 lbs. | 3/4" | SDR 11 or 13.5 | 182 | 163 | |
| | | | 1" | SDR 11 or 13.5 | 256 | 221 | |
| | | | 1 1/4" | SDR 11 or 13.5 | 372 | 317 | |
| | | | 1 1/2" | SDR 11 or 13.5 | 468 | 396 | |
| | | | 2" | SDR 13.5 or SCH 40 | 584 | 524 | |
| Dry (gel free) Loose Tube Dielectric 74 - 96 Fibers | D- XXX -LN- XY -F12NS Specify Conduit OD, Wall Thickness and Color | 0.49" 69 lbs. | 3/4" | SDR 11 or 13.5 | 199 | 180 | |
| | | | 1" | SDR 11 or 13.5 | 273 | 238 | |
| | | | 1 1/4" | SDR 11 or 13.5 | 389 | 334 | |
| | | | 1 1/2" | SDR 11 or 13.5 | 485 | 413 | |
| | | | 2" | SDR 13.5 or SCH 40 | 601 | 541 | |
| Dry (gel free) Loose Tube Dielectric 98 - 120 Fibers | D- XXX -LN- XY -F12NS Specify Conduit OD, Wall Thickness and Color | 0.55" 87 lbs. | 1" | SDR 11 or 13.5 | 291 | 256 | |
| | | | 1 1/4" | SDR 11 or 13.5 | 407 | 352 | |
| | | | 1 1/2" | SDR 11 or 13.5 | 503 | 431 | |
| | | | 2" | SDR 13.5 or SCH 40 | 619 | 559 | |
| | | | Dry (gel free) Loose Tube Dielectric 122 - 144 Fibers | D- XXX -LN- XY -F12NS Specify Conduit OD, Wall Thickness and Color | 0.62" 104 lbs. | 1" | SDR 11 or 13.5 |
| 1 1/4" | SDR 11 or 13.5 | 424 | | | | 369 | |
| 1 1/2" | SDR 11 or 13.5 | 520 | | | | 448 | |
| 2" | SDR 13.5 or SCH 40 | 636 | | | | 576 | |
| Dry (gel free) Loose Tube Dielectric 146 - 216 Fibers | D- XXX -LN- XY -F12NS Specify Conduit OD, Wall Thickness and Color | 0.63" 93 lbs. | | | | 1" | SDR 11 or 13.5 |
| | | | 1 1/4" | SDR 11 or 13.5 | 413 | 358 | |
| | | | 1 1/2" | SDR 11 or 13.5 | 509 | 437 | |
| | | | 2" | SDR 13.5 or SCH 40 | 625 | 565 | |
| | | | Dry (gel free) Loose Tube Dielectric 218 - 288 Fibers | D- XXX -LN- XY -F12NS Specify Conduit OD, Wall Thickness and Color | 0.73" 127 lbs. | 1 1/4" | SDR 11 or 13.5 |
| 1 1/2" | SDR 11 or 13.5 | 543 | | | | 471 | |
| 2" | SDR 13.5 or SCH 40 | 659 | | | | 599 | |

Other cables and wall sizes may be available upon request.

* Weight does not include reel.

Variables in the Catalog Number:

XXX = Total Fiber Count

XY = Fiber Grade

8W LightScope ZWP™ Dispersion-Unshifted,
Matched-Clad Singlemode Fiber

6F OptiSPEED® 62.5µm, FDDI Grade Multimode Fiber

5M LazrSPEED™ 150, 50µm, Multimode Fiber

5L LazrSPEED™ 300, 50µm, Multimode Fiber

5K LazrSPEED™ 500, 50µm, Multimode Fiber

For Composites Only:

aaa is replaced with singlemode fiber count

AA is replaced with singlemode type

bbb is replaced by multimode fiber count

BB is replaced by multimode type

Buffer Tubes/Fiber Identification colors: 1/Blue, 2/Orange, 3/Green, 4/Brown, 5/Slate, 6/White, 7/Red, 8/Black, 9/Yellow, 10/Violet, 11/Rose, 12/Aqua

Dry Loose Tube Fiber-In-Conduit

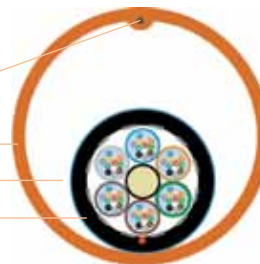
(72 Fiber Construction in
Toneable Conduit Shown)

Copper Clad Steel Tone Wire

High-Grade Polyethylene Conduit

Silicon-Based Lubricant

Dry Loose Tube Cable



Specifications are subject to change without notice.

* Weight does not include reel.

Other cables and wall sizes may be available upon request.

Fiber-In-Conduit

All of CommScope's fiber cables can be pre-installed in conduit, including the Arid-Core Loose Tube cable. Available in five different diameters - 3/4", 1", 1 1/4", 1 1/2" and 2" and three different wall thicknesses - SDR 11, SDR 13.5 and SCH 40. For more information or specifications on Fiber Optic cables, please visit our website at www.commscope.com.

| Cable Type/ Count | Fiber Part Number & Conduit Description | Cable OD & Weight (lbf) | Available Conduit OD | Available Wall Thicknesses | Weight (lb/kft)* | | |
|--|--|----------------------------|--------------------------------------|--|------------------|----------|-----------------|
| | | | | | SDR 11 | SDR 13.5 | Fiber SCH 40 |
| Arid-Core Loose Tube Dielectric 2 - 60 Fibers | O- XXX -LN- XY -F12NS Specify Conduit OD, Wall Thickness and Color | 0.46" 64 lbs. | 3/4" 1" 1 1/4" 1 1/2" 2" | SDR 11 or 13.5 SDR 11 or 13.5 SDR 11 or 13.5 SDR 11 or 13.5 SDR 13.5 or SCH 40 | 194 | 175 | |
| | | | | | 268 | 233 | |
| | | | | | 384 | 329 | |
| | | | | | 480 | 408 | |
| | | | | | | 596 | 536 |
| Arid-Core Loose Tube Dielectric 62 - 72 Fibers | O- XXX -LN- XY -F12NS Specify Conduit OD, Wall Thickness and Color | 0.49" 78 lbs. | 3/4" 1" 1 1/4" 1 1/2" 2" | SDR 11 or 13.5 SDR 11 or 13.5 SDR 11 or 13.5 SDR 11 or 13.5 SDR 13.5 or SCH 40 | 208 | 189 | |
| | | | | | 282 | 247 | |
| | | | | | 398 | 343 | |
| | | | | | 494 | 422 | |
| | | | | | | 610 | 550 |
| Arid-Core Loose Tube Dielectric 74 - 96 Fibers | O- XXX -LN- XY -F12NS Specify Conduit OD, Wall Thickness and Color | 0.57" 101 lbs. | 1" 1 1/4" 1 1/2" 2" | SDR 11 or 13.5 SDR 11 or 13.5 SDR 11 or 13.5 SDR 13.5 or SCH 40 | 305 | 300 | |
| | | | | | 421 | 366 | |
| | | | | | 517 | 445 | |
| | | | | | | 610 | 550 |
| | | | | | | | |
| Arid-Core Loose Tube Dielectric 98 - 120 Fibers | O- XXX -LN- XY -F12NS Specify Conduit OD, Wall Thickness and Color | 0.66" 125 lbs. | 1 1/4" 1 1/2" 2" | SDR 11 or 13.5 SDR 11 or 13.5 SDR 13.5 or SCH 40 | 445 | 418 | |
| | | | | | 541 | 497 | |
| | | | | | | 685 | 597 |
| | | | | | | | |
| | | | | | | | |
| Arid-Core Loose Tube Dielectric 122 - 144 Fibers | O- XXX -LN- XY -F12NS Specify Conduit OD, Wall Thickness and Color | 0.74" 153 lbs. | 1 1/4" 1 1/2" 2" | SDR 11 or 13.5 SDR 11 or 13.5 SDR 13.5 or SCH 40 | 473 | 418 | |
| | | | | | 569 | 497 | |
| | | | | | | 685 | 625 |
| | | | | | | | |
| | | | | | | | |
| Arid-Core Loose Tube Dielectric 146 - 216 Fibers | O- XXX -LN- XY -F12NS Specify Conduit OD, Wall Thickness and Color | 0.74" 150 lbs. | 1 1/4" 1 1/2" 2" | SDR 11 or 13.5 SDR 11 or 13.5 SDR 13.5 or SCH 40 | 470 | 415 | |
| | | | | | 566 | 494 | |
| | | | | | | 682 | 622 |
| | | | | | | | |
| | | | | | | | |
| Arid-Core Loose Tube Dielectric 218 - 288 Fibers | O- XXX -LN- XY -F12NS Specify Conduit OD, Wall Thickness and Color | 0.86" 197 lbs. | 1 1/2" 2" | SDR 11 or 13.5 SDR 13.5 or SCH 40 | 613 | 541 | |
| | | | | | | 729 | 669 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Other cables and wall sizes may be available upon request.

* Weight does not include reel.

Variables in the Catalog Number:

XXX = Total Fiber Count

XY = Fiber Grade

8W LightScope ZWP™ Dispersion-Unshifted,
Matched-Clad Singlemode Fiber

6F OptiSPEED® 62.5µm, FDDI Grade Multimode Fiber

5M LazrSPEED™ 150, 50µm, Multimode Fiber

5L LazrSPEED™ 300, 50µm, Multimode Fiber

5K LazrSPEED™ 500, 50µm, Multimode Fiber

For Composites Only:

aaa is replaced with singlemode fiber count

AA is replaced with singlemode type

bbb is replaced by multimode fiber count

BB is replaced by multimode type

Buffer Tubes/Fiber Identification colors: 1/Blue, 2/Orange, 3/Green, 4/Brown, 5/Slate, 6/White, 7/Red, 8/Black, 9/Yellow, 10/Violet, 11/Rose, 12/Aqua

Arid-Core Loose Tube Fiber-In-Conduit

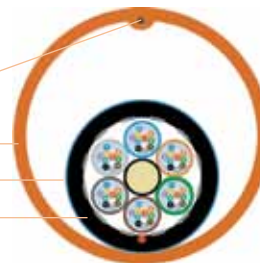
(72 Fiber Construction in
Toneable Conduit Shown)

Copper Clad Steel
Tone Wire

High-Grade Polyethylene Conduit

Silicon-Based Lubricant

Arid-Core Loose Tube Cable



Specifications are subject to change without notice.

* Weight does not include reel.
Other cables and wall sizes may be available upon request.

For more information, call Customer Service at 800.982.1708 or 828.324.2200 • Fax 828.328.3400 • custserv@commscope.com

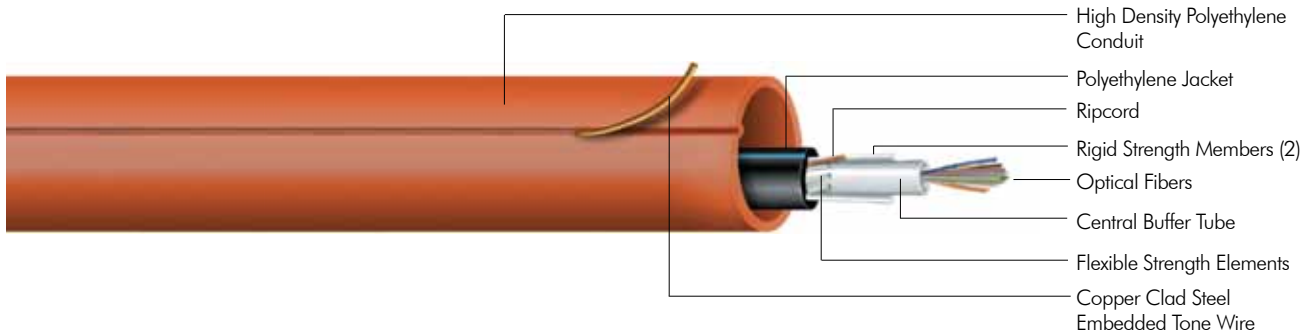
ConQuest® Conduit

Pre-Installed with CommScope Central Tube Fiber Optic Cable



Fiber Optic Cable

All-Dielectric Central Tube Fiber Cable
Shown in ConQuest® Toneable Conduit™



| Cable Type/ Count | Fiber Part Number & Conduit Description | Cable OD & Weight (kft) | Available Conduit OD | Available Wall Thicknesses | Weight (lb/kft)* | | |
|--|--|----------------------------|-------------------------|-------------------------------|------------------|----------|-----------------|
| | | | | | SDR 11 | SDR 13.5 | Fiber SCH 40 |
| Central Tube Dielectric 2 - 24 Fibers | O- XXX -CN- XY -F12NS Specify Conduit OD, Wall Thickness and Color | 0.40" 63 lbs. | 1" | SDR 11 or 13.5 | 265 | 230 | |
| | | | 1¼" | SDR 11 or 13.5 | 381 | 326 | |
| | | | 1½" | SDR 11 or 13.5 | 477 | 405 | |
| | | | 2" | SDR 13.5 or SCH 40 | | 593 | 533 |
| Central Tube Dielectric 26 - 48 Fibers | O- XXX -CN- XY -F12NS Specify Conduit OD, Wall Thickness and Color | 0.47" 86 lbs. | 1" | SDR 11 or 13.5 | 273 | 238 | |
| | | | 1¼" | SDR 11 or 13.5 | 389 | 334 | |
| | | | 1½" | SDR 11 or 13.5 | 485 | 413 | |
| | | | 2" | SDR 13.5 or SCH 40 | | 601 | 541 |

Other cables and wall sizes may be available upon request.

* Weight does not include reel.

Variables in the Catalog Number:

XXX = Total Fiber Count
XY = Fiber Grade

8W LightScope ZWP™ Dispersion-Unshifted,
Matched-Clad Singlemode Fiber
6F OptiSPEED® 62.5µm, FDDI Grade Multimode Fiber

5M LazrSPEED® 150, 50µm, Multimode Fiber
5L LazrSPEED® 300, 50µm, Multimode Fiber
5K LazrSPEED® 500, 50µm, Multimode Fiber

For Composites Only: **aaa** is replaced with singlemode fiber count
AA is replaced with singlemode type

bbb is replaced by multimode fiber count
BB is replaced by multimode type

Buffer Tubes/Fiber Identification colors: 1/Blue, 2/Orange, 3/Green, 4/Brown, 5/Slate, 6/White, 7/Red, 8/Black, 9/Yellow, 10/Violet, 11/Rose, 12/Aqua

Central Tube Fiber-In-Conduit

(24 Fiber Construction in
Toneable Conduit Shown)



Specifications are subject to change without notice.

Fiber-In-Conduit

All of CommScope’s fiber cables can be pre-installed in conduit, including the Fiber Drop cables. Available in 1/2” or 3/4” and two different wall thicknesses - SDR 11 or SDR 13.5. For more information or specifications on Fiber Optic cables, please visit our website at www.commscope.com.

Figure-8 Fiber Drop Cable In Conduit

| Cable Type/ Fiber Count | Catalog Number (Description) | Cable OD & Weight (kft) | Available Conduit OD | Available Wall Thickness | Weight (lb/kft)* | |
|---|--|----------------------------|-------------------------|-----------------------------|------------------|----------|
| | | | | | SDR 11 | SDR 13.5 |
| Fiber Drop Messengered 1 - 6 Fibers | M- XXX -MN- XY -FZZNS/CCS (Solid Steel Construction) Specify Conduit OD, Wall Thickness and Color | 0.16” x 0.31” 27 lbs. | 1/2” 3/4” | SDR 11 or 13.5 | 112 | 98 |
| | | | | | 157 | 138 |

NOTE: The solid or stranded steel messengers can be used to pull the cable during installation, and for locating after burial.

All-Dielectric Flat Drop Cable In Conduit

| Cable Type/ Fiber Count | Catalog Number (Description) | Cable OD & Weight (kft) | Available Conduit OD | Available Wall Thickness | Weight (lb/kft)* | |
|-----------------------------------|--|----------------------------|-------------------------|-----------------------------|------------------|----------|
| | | | | | SDR 11 | SDR 13.5 |
| Flat Drop 1 - 12 Fibers | O- XXX -DF- XY -FZZNS Specify Conduit OD, Wall Thickness and Color | 0.18” x 0.32” 30 lbs. | 1/2” 3/4” | SDR 11 or 13.5 | 115 | 101 |
| | | | | | 160 | 141 |

*Other size conduits may be available upon request.

* Weight does not include reel.

Toneable Flat Drop Cable In Conduit

| Cable Type/ Fiber Count | Catalog Number (Description) | Cable OD & Weight (kft) | Available Conduit OD | Available Wall Thickness | Weight (lb/kft)* | |
|--|--|----------------------------|-------------------------|----------------------------------|------------------|----------|
| | | | | | SDR 11 | SDR 13.5 |
| Toneable Flat Drop 1 - 12 Fibers | O- XXX -DF-HY-FZZNS/ XYZZZ / 1X12AWG Specify Conduit OD, Wall Thickness and Color | 0.18” x 0.40” 38 lbs. | 3/4” 1” | SDR 11 or 13.5 SDR 11 or 13.6 | 168 | 149 |
| | | | | | 242 | 207 |

*Other size conduits may be available upon request.

* Weight does not include reel.

Variables in the Catalog Number:

XXX = Total Fiber Count

XY = Fiber Grade **8W** LightScope ZWP® Dispersion-Unshifted, Matched-Clad Singlemode Fiber

For Composites Only: **aaa** is replaced with singlemode fiber count
 AA is replaced with singlemode type

6F 62.5µm, FDDI Grade Multimode Fiber

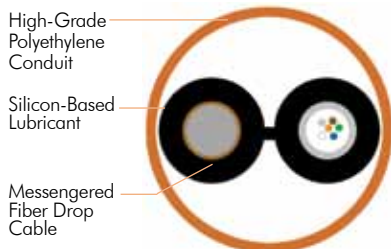
5M LaserCore® 150, 50µm, Multimode Fiber

bbb is replaced by multimode fiber count

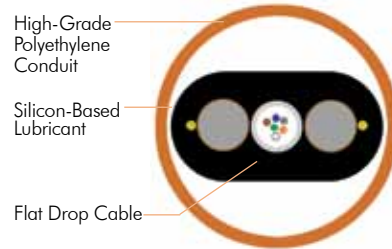
BB is replaced by multimode type

Buffer Tubes/Fiber identification colors: 1/Blue, 2/Orange, 3/Green, 4/Brown, 5/Slate, 6/White, 7/Red, 8/Black, 9/Yellow, 10/Violet, 11/Rose, 12/Aqua

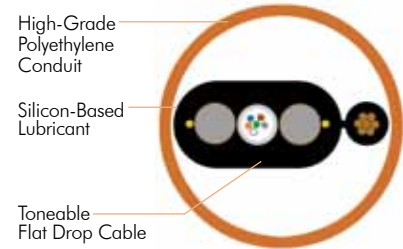
**Solid Steel Messengered
Fiber Drop In ConQuest Conduit**
(6 Fiber Construction Shown)



**All-Dielectric Flat Drop
Cable in ConQuest Conduit**
(6 Fiber Construction Shown)



**Toneable Flat Drop
Cable in ConQuest Conduit**
(6 Fiber Construction Shown)



Drawings are not to scale
Specifications are subject to change without notice

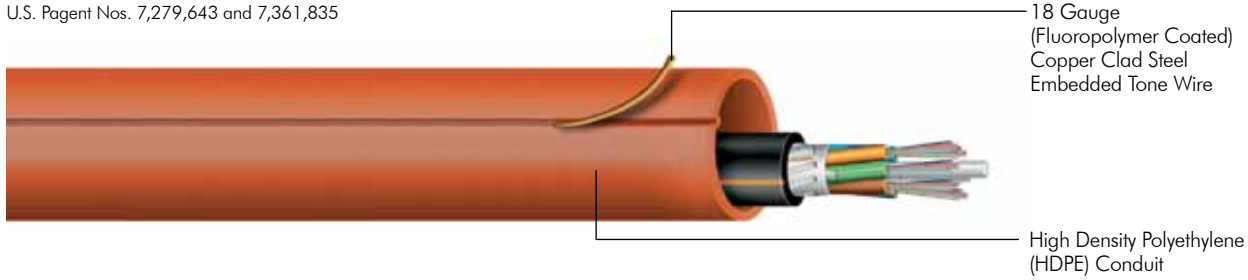
ConQuest® Toneable Conduit™

For Locating and Protecting Underground Infrastructure



Shown with All-Dielectric Stranded Loose Tube Fiber Cable

U.S. Patent Nos. 7,279,643 and 7,361,835



What's Most Important In Broadband Real Estate?

LOCATION...LOCATION...LOCATION!

Buried cable assets need to be found by broadband network owners and not by backhoe operators. CommScope rises to the challenge with ConQuest Toneable Conduit—a select grade high density polyethylene conduit with an integrated 18 gauge copper clad steel (CCS) tone wire.

This unique, patented conduit, offers a large gauge fluoropolymer-coated tone wire fully embedded within a reinforced conduit wall. This design provides easy access to the tone wire at termination points by means of simply “ripping out” the wire with common hand tools.

Even better news—ConQuest Toneable Conduit **SAVES LABOR DOLLARS!** Install conduit, cable and tone wire all in one motion, with one product ConQuest Toneable Cable-In-Conduit.

| Features | Benefits |
|--|---|
| <ul style="list-style-type: none"> Fully embedded tone wire | <ul style="list-style-type: none"> Precision locating of the conduit, with no special coupling requirements, and no field worries of wire and conduit separation |
| <ul style="list-style-type: none"> High strength 18 gauge copper clad steel tone wire | <ul style="list-style-type: none"> Easily extracted from the conduit wall without damaging the wire Able to transmit a toneable signal over extended distances and depths |
| <ul style="list-style-type: none"> Fluoropolymer coating on the tone wire | <ul style="list-style-type: none"> Facilitates extraction from the wall and acts as moisture barrier where exposed |

Spliced ConQuest Toneable Conduit

(Shown at right with a T-Loc coupling). See the conduit accessories section for alternative couplers.



Insulation Data

| | |
|---------------------|----------------------|
| Type | Fluoropolymer |
| Thickness | 0.008 inches nominal |
| Dielectric Strength | 3200 volts/mil |
| Tensile Strength | 3000 psi |
| Elongation | 250% |

Conductor Data

| | |
|------------------|----------------------------|
| AWG | 18 gauge copper clad steel |
| Diameter | 0.0403 inches |
| Resistivity | 26.7 Ohms/1000 ft |
| Tensile Strength | 120,000 psi |
| Max. Elongation | 1% |

SDR 11

| Nominal Size | Nominal Outside Diameter (inches) | Minimum Wall Thickness (inches) | Nominal Inner Diameter (inches) | Min. Bend Radius Unsupported (inches) | Max. Pulling Tension (lbs.) | Weight* (lb/kft) |
|--------------|-----------------------------------|---------------------------------|---------------------------------|---------------------------------------|-----------------------------|------------------|
| 3/4" | 1.050 | 0.095 | 0.840 | 12 | 485 | 130 |
| 1" | 1.315 | 0.120 | 1.055 | 14 | 760 | 210 |
| 1 1/4" | 1.660 | 0.151 | 1.338 | 18 | 1,215 | 326 |
| 1 1/2" | 1.900 | 0.173 | 1.533 | 20 | 1,410 | 422 |
| 2" | 2.375 | 0.216 | 1.917 | 26 | 2,485 | 646 |

SDR 13.5

| Nominal Size | Nominal Outside Diameter (inches) | Minimum Wall Thickness (inches) | Nominal Inner Diameter (inches) | Min. Bend Radius Unsupported (inches) | Max. Pulling Tension (lbs.) | Weight* (lb/kft) |
|--------------|-----------------------------------|---------------------------------|---------------------------------|---------------------------------------|-----------------------------|------------------|
| 3/4" | 1.050 | 0.078 | 0.874 | 12 | 405 | 111 |
| 1" | 1.315 | 0.097 | 1.101 | 14 | 630 | 175 |
| 1 1/4" | 1.660 | 0.123 | 1.394 | 18 | 1,010 | 281 |
| 1 1/2" | 1.900 | 0.141 | 1.598 | 20 | 1,165 | 350 |
| 2" | 2.375 | 0.176 | 2.002 | 26 | 2,065 | 538 |

SCH 40

| Nominal Size | Nominal Outside Diameter (inches) | Minimum Wall Thickness (inches) | Nominal Inner Diameter (inches) | Min. Bend Radius Unsupported (inches) | Max. Pulling Tension (lbs.) | Weight* (lb/kft) |
|--------------|-----------------------------------|---------------------------------|---------------------------------|---------------------------------------|-----------------------------|------------------|
| 3/4" | 1.050 | 0.113 | 0.804 | 12 | 565 | 149 |
| 1" | 1.315 | 0.133 | 1.029 | 14 | 840 | 225 |
| 1 1/4" | 1.660 | 0.140 | 1.360 | 18 | 1,135 | 301 |
| 1 1/2" | 1.900 | 0.145 | 1.590 | 20 | 1,360 | 359 |
| 2" | 2.375 | 0.154 | 2.047 | 26 | 1,840 | 478 |

Other wall thicknesses may be available upon request. Specifications are subject to change without notice.

**Weight does not include the reel.
Reel weights listed on page 24.

***Attention:** Pulling tensions can be influenced by temperature and soil conditions. Please refer to the ConQuest Installation Manual for proper installation techniques.

ConQuest® Toneable Conduit Catalog Numbering Key

Sample: Toneable 1 1/4" Black SDR 13.5 Ribbed with Orange Stripe & 1100 lb. Rope

125 B (TD) 135 TO RIB PP1100ROPE



Please contact Customer Service if you need assistance in building part numbers.



Ribbed Wall Empty Conduit

CommScope manufactures smooth wall or ribbed (internal surface finish) conduit in a variety of wall thicknesses, and with a selection of pull lines available. ConQuest Empty Conduit (CEC) provides superior protection and easy low friction placement of your valuable communications cable. CEC products are the same high quality as CommScope's Cable-In-Conduit (CIC) products.

| Conduit Size | Internal Surface | | Wall Sizes | | | | Pull Ropes | | | Pull Tapes | | |
|--------------|------------------|--------|------------|----------|--------|--------|------------|----------|---------------|------------|----------|----------|
| | Smooth | Ribbed | SDR 11 | SDR 13.5 | SCH 40 | SCH 80 | 200 lb. | 1100 lb. | 1200-1800 lb. | 1100 lb. | 1250 lb. | 1800 lb. |
| 13mm | • | | H | | | | • | | | | | |
| 1/2" | • | | H | M | | | • | | | | | |
| 3/4" | • | • | H | M | X | XX | • | • | | | | |
| 1" | • | • | H | M | X | XX | • | • | • | • | • | • |
| 1 1/4" | • | • | X | M | H | XX | • | • | • | • | • | • |
| 1 1/2" | • | • | X | M | H | XX | • | • | • | • | • | • |
| 2" | • | • | X | H | M | XX | • | • | • | • | • | • |
| 3" | • | • | XX | H | | X | | • | • | • | • | • |
| 4" | • | • | XX | H | | X | | • | • | • | • | • |

• = Available M = Medium H = Heavy X = Extra Heavy XX = Heaviest = Standard Product Offering

Specifications are subject to change without notice.

Other wall sizes may be available upon request.

Available Pull Ropes and Pull Tapes



Polypropylene Pull Rope (200 lb. shown)



Polyester Pull Tape (Available in 1100, 1250 and 1800 lb.)



Polypropylene Pull Rope (1100 lb. shown)



Interlaced Polyester Pull Rope (1800 lb. tensile strength)

ConQuest® Conduit Catalog Numbering Key

Sample: 2" Terracotta SCH 40 Ribbed with Green Stripe & 1800 lb. Tape

200 T 040 TE RIB WP1800TAPE

| Outer Diameter |
|----------------|
| 13mm = 13M |
| 1/2" = 050 |
| 3/4" = 075 |
| 1" = 100 |
| 1 1/4" = 125 |
| 1 1/2" = 150 |
| 2" = 200 |
| 3" = 300 |
| 4" = 400 |

| Color |
|----------------|
| Terracotta = T |
| Black = B |
| Orange = O |
| Grey = G |
| Blue = U |
| Green = E |
| Yellow = Y |
| White = W |
| Brown = N |
| Red = R |

| Wall Thickness |
|----------------|
| SDR 11 = 110 |
| SDR 13.5 = 135 |
| SCH 40 = 040 |
| SCH 80 = 080 |

| Stripes (Tracers) |
|-------------------|
| Terracotta = TT |
| Black = TB |
| Orange = TO |
| Grey = TG |
| Blue = TU |
| Green = TE |
| Yellow = TY |
| White = TW |
| Brown = TN |
| Red = TR |
| No Stripes = Omit |

| Wall |
|---------------|
| Smooth = Omit |
| *Ribbed = RIB |

| Pull Line |
|-----------------|
| EMPTY DUCT |
| PP200ROPE |
| PP1100ROPE |
| IP1200-1800ROPE |
| WP1100TAPE |
| WP1250TAPE |
| WP1800TAPE |

Please contact Customer Service if you need assistance in building part numbers.

*NOTE: Ribbed not available in 13mm and 1/2" conduit.

CommScope offers a full line of accessories for use with our ConQuest Conduit Products, including cutters, couplings and lubricants. Please contact your CommScope sales representative for availability and pricing.

WHUPP!® Cable Pulling Lubricant

WHUPP is uniquely designed to address all the cable pulling requirements that customers demand in a lubricant.

Friction Reduction

WHUPP’s unique formula contains microspheres that reduce surface contact and allow the cable to ROLL on thousands of tiny “ball bearings”. This excellent friction-reduction feature, along with its slow-drying, superior-wetting and cling properties; enables cable pulls through multiple bends and over long distances.

Safety Concerns



Personal Safety:

WHUPP is non-flammable, non-toxic, non-irritating to skin, and easy to clean up with soap and water.

Environmental Safety:

WHUPP is environmentally safe, made from INERT ingredients, and presents no air or water pollution concerns.

Cable Safety: WHUPP is recommended for use in all types of pulling operations. WHUPP is recommended for use with all types of polyethylene, vinyl, semi-conductive, and rubber cable jackets.

Installation Savings

WHUPP is designed to limit the cost burden of pulling cable. The recommended application rate for WHUPP is less than or equal to the following:

Q = 0.0015 x L x D

- Q = Quantity needed in gallons
- L = Length of the cable pull in feet
- D = Nominal inside diameter of the conduit

For example...When pulling a cable through a 1” conduit over a distance of 1,000 feet:

Q = 0.0015 x 1000 ft x 1 in = 1.5 gallons

NOTE: Double the calculation for corrugated conduit



Quart Size Bottle of WHUPP!

Packaging

WHUPP is conveniently packaged in the following sizes:

| Container Size | WHUPP Packs | WHUPP Pallets |
|----------------|-------------|---------------|
| 1 Quart size | 24 per case | 720 units |
| 1 Gallon size | 6 per case | 162 units |
| 5 Gallon size | NA | 32 units |

Typical Specifications

| | |
|-------------------------|---------------------------|
| Appearance | Viscous, white liquid |
| Odor | Slight, non-objectionable |
| Ph | Neutral |
| Flash Point | No flash point to boiling |
| Freezing Point | 30° F (-1° C) |
| Coefficient of Friction | 0.14 per ASTM D 4172 |

ConQuest® Conduit Accessories

Cutting Tools and End Caps

Scissor Shears

| Description | Manufacturers Part Number | Product Code |
|-----------------|---------------------------|--------------|
| Scissor Shear | CQASC125 | 1160300 |
| Blade for SC125 | CQASC1268 | 1160400 |

NOTE: This tool is recommended for conduit sizes 13mm - 1¼"



Ratchet Shears

| Description | Manufacturers Part Number | Product Code |
|---------------|---------------------------|--------------|
| Ratchet Shear | CQARS1 | 1160100 |
| Blade for RS1 | CQARS18 | 1160200 |

NOTE: This tool is recommended for conduit sizes 13mm - 1¼"



Conduit Finger End Caps

| Description | Manufacturers Part Number | Product Code |
|--------------------------|---------------------------|--------------|
| 13mm Finger Cap | CQACC7325 | 1160600 |
| ½" Finger Cap | CQACC7322 | 1160700 |
| ¾" Finger Cap | CQACC7318 | 1160800 |
| 1" Finger Cap | CQACC7311 | 1160900 |
| 1¼" Finger Cap | CQACC7313 | 1161000 |
| 1½" Finger Cap | CQACC7315 | 1161100 |
| 1" Finger Cap (2 Cables) | CQACC7314 | 1162000 |
| 2" Finger Cap (2 Cables) | CQACC7320 | 1161200 |



Aluminum Conduit Couplings

| Description | Manufacturers Part Number | Product Code |
|--------------------------------|---------------------------|--------------|
| 1" Aluminum Threaded Coupling | BT-100 | 1162100 |
| 1¼" Aluminum Threaded Coupling | BT-125 | 1162200 |
| 1½" Aluminum Threaded Coupling | BT-150 | 1162300 |
| 2" Aluminum Threaded Coupling | BT-200 | 1162400 |



E-Loc® Couplings

| Description | Manufacturers Part Number | Product Code |
|--------------------|---------------------------|--------------|
| ½" E-Loc Coupling | CQELOC050 | 1165300 |
| ¾" E-Loc Coupling | CQELOC075 | 1164200 |
| 1" E-Loc Coupling | CQELOC100 | 1165200 |
| 1¼" E-Loc Coupling | CQELOC125 | 1163600 |
| 1½" E-Loc Coupling | CQELOC150 | 1163700 |
| 2" E-Loc Coupling | CQELOC200 | 1163800 |
| 3" E-Loc Coupling | CQELOC300 | 1163900 |
| 4" E-Loc Coupling | CQELOC400 | 1164000 |



*Contains center stop

Split-Loc Couplings

| Description | Part Number | Product Code |
|-------------------------|-------------|--------------|
| 1¼" Split-Loc Couplings | CQSLOC125 | 1165500 |
| 1½" Split-Loc Couplings | CQSLOC150 | 1165600 |
| 2" Split-Loc Couplings | CQSLOC200 | 1165700 |
| 3" Split-Loc Couplings | CQSLOC300 | 1165800 |
| 4" Split-Loc Couplings | CQSLOC400 | 1165900 |



Repair-Sleeve Couplings

| Description | Part Number | Product Code |
|-----------------------------|-------------|--------------|
| ½" Repair-Sleeve Couplings | CQELR050 | 1166000 |
| ¾" Repair-Sleeve Couplings | CQELR075 | 1166100 |
| 1" Repair-Sleeve Couplings | CQELR100 | 1166200 |
| 1¼" Repair-Sleeve Couplings | CQELR125 | 1166300 |
| 1½" Repair-Sleeve Couplings | CQELR150 | 1166400 |
| 2" Repair-Sleeve Couplings | CQELR200 | 1166500 |
| 3" Repair-Sleeve Couplings | CQELR300 | 1166600 |
| 4" Repair-Sleeve Couplings | CQELR400 | 1166700 |



ConQuest® Conduit Accessories

Couplings

Conduit Compression Couplings

| Description | Manufacturers Part Number | Product Code |
|-----------------------------|---------------------------|--------------|
| 13mm Compression Coupling | CQACCOUP13MM | 1161300 |
| 1/2" Compression Coupling | CQACCOUP050 | 1161400 |
| 3/4" Compression Coupling | CQACCOUP075 | 1161500 |
| 1" Compression Coupling | CQACCOUP100 | 1161600 |
| 1 1/4" Compression Coupling | CQACCOUP125 | 1161700 |
| 1 1/2" Compression Coupling | CQACCOUP150 | 1161800 |
| 2" Compression Coupling | CQACCOUP200 | 1161900 |



Double E-Loc® Couplings

| Description | Manufacturers Part Number | Product Code |
|------------------------------|---------------------------|--------------|
| 1" Double E-Loc Coupling | CQDELOC100 | 1164700 |
| 1 1/4" Double E-Loc Coupling | CQDELOC125 | 1164800 |
| 1 1/2" Double E-Loc Coupling | CQDELOC150 | 1164900 |
| 2" Double E-Loc Coupling | CQDELOC200 | 1165000 |



Toneable Conduit T-Loc® Couplings

| Description | Manufacturers Part Number | Product Code |
|-----------------------|---------------------------|--------------|
| 1" T-Loc Coupling | CQATCOUP100 | 1162800 |
| 1 1/4" T-Loc Coupling | CQATCOUP125 | 1162900 |
| 1 1/2" T-Loc Coupling | CQATCOUP150 | 1163000 |
| 2" T-Loc Coupling | CQATCOUP200 | 1163100 |
| T-Loc Cap | CQATCAP | 1163200 |



®E-Loc and T-Loc are registered trademarks of ETCO Speciality.



ConQuest products can be packaged and shipped on either wooden reels (A), ReelSmart® Composite Reels (B), or lightweight steel reels (C).

Drop conduit products can be packaged on “reel-less” coils (D), making them light weight and easier to handle.

ConQuest Reel Dimensions and Weight Chart (Standards in Bold)

| Lengths* | 13mm | ½" | ¾" | 1" | 1¼" | 1½" | 2" | 3" | 4" |
|--------------|-----------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|-------------------------------------|-------------------------------------|
| 500 | | | | | | | | | 102x74x43 217 lbs. |
| 1,000 | 24x12x18 16 lbs. | 35x16½x18 60 lbs. | 42x24x24 130 lbs. | 50 x 24 x 24 182 lbs. | 54 x 28 x 43 106 lbs. | | | 102x64x43 217 lbs. | |
| 2,500 | | | | | | | 90x43x43 195 lbs. | | |
| 3,000 | | | 54 x 28 x 43 106 lbs. | 63x28x43 121 lbs. | 68x43x43 132 lbs. | 80x43x43 174 lbs. | | | |
| 4,000 | | | | | | | 102 x 43 x 43 217 lbs. | | |
| 5,000 | | | 63 x 28 x 43 121 lbs. | 68 x 28 x 43 121 lbs. | 80 x 28 x 43 174 lbs. | 102 x 43 x 43 217 lbs. | | | |

(Flange x Drum x Traverse)

*Longer lengths may be available upon request.

Reel Stenciling

All wood reel heads are to be stenciled “COMMSCOPE” and “MADE IN THE USA” (in black letters). All reel heads will be stenciled to identify reel size and date of reel manufacture, in ¾" - 1" letters located below the arbor hole with diagram R-2 red roller system stencil ink or approved equivalent. All flanges (except 35" or smaller) cut with a start hole, must be stenciled with the warning “THIS SIDE UP” in 1½" to 2" letters.

Reel Recycling

CommScope is equipped to serve cable companies like yours with Reel Recycling Centers on both sides of the country. Whether your load consists of reusable CommScope knocked down or assembled reels, wooden flanges, metal reels or a truckload of ReelSmart® composite reels, our Reel Recycling Coordinator can customize a program to fit your needs. Call the CommScope Reel Recycling Coordinator at 1.800.982.1708 for assistance in establishing a customized recycling program.

Palletizing

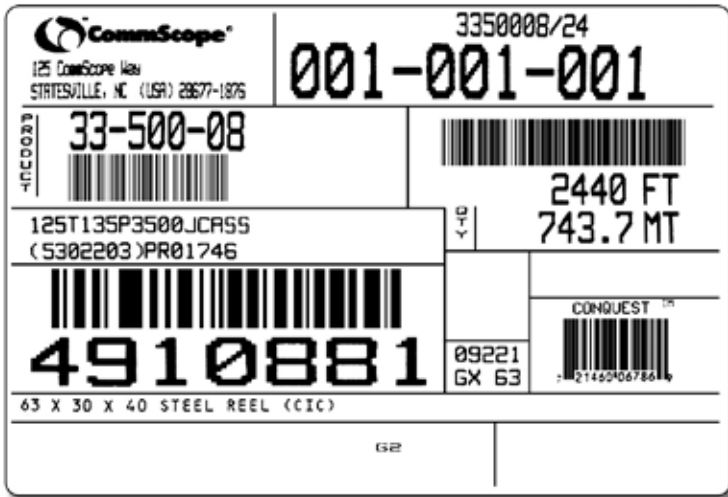
24" reels are palletized (standard 8 reels per pallet) and stretched wrapped. For substandard palletizing: 4 reels per pallet, 2 reels per pallet, or 1 reel per pallet, shall be used.

End Preparation

The cable ends are secured to the conduit by a nylon cord, or CommScope approved equivalent, to ensure that the cable does not draw back into the conduit prior to installation. Each end shall be tightly sealed by a conduit end cap to prevent contamination ingress. For wooden reels, the bottom end shall be secured into the start hole by a chess board "stayback" or a CommScope approved equivalent. The top end of the conduit shall be secured to the flange by a metal pipe band or sufficient cable ties.

Reel Identification

Each reel tag for CIC (as shown below) shall provide the following information and instructions:



- CommScope’s Shipping Address
- CommScope’s Product Code
- Length of the Cable inside the Conduit
- Product Description
- Reel Number and Bar Code
- Spectrum, Reel Size, and Manufacturing Date
- Special Comments (if needed)

Typical reel tag for CIC with P3 500 JCASS Product.

Cable Withdrawal

ConQuest® CIC conduit is slightly longer than the coaxial cable it contains. Allow an average of 1.5% of cable withdrawal back toward the reel during unspooling (example: 2000' of conduit will yield 1970' of cable). Cable withdrawal will be greater as you approach the end of the reel.

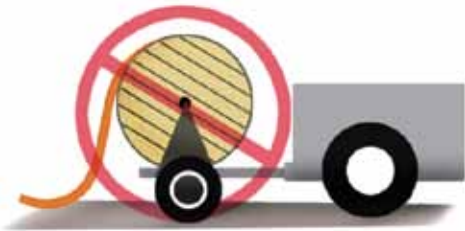
Cut the Restraint

Prior to installation of coaxial CIC, remove the conduit end cap and cut the cable restraint. This relaxes the cable and transfers all of the pulling tension to the conduit. When deploying fiber optic CIC, **DO NOT remove the conduit end cap or cut the cable restraint** prior to installation.

Payoff

When installing ConQuest, pay-off the reel from underneath and in as direct a line as possible to the trench to avoid unnecessary bending of the conduit or rubbing of the conduit against the reel flange.

INCORRECT METHOD



CORRECT METHOD



conduit pay-off under reel drum

Bending Technique

ConQuest Coaxial CIC can be easily shaped by rolling a bend into it. Take 10 - 12 feet (3 - 3.5 meters) of conduit and pull the free end of it towards you forming a "horizontal U". Push into the bend lightly and roll the entire radius of the conduit forward.

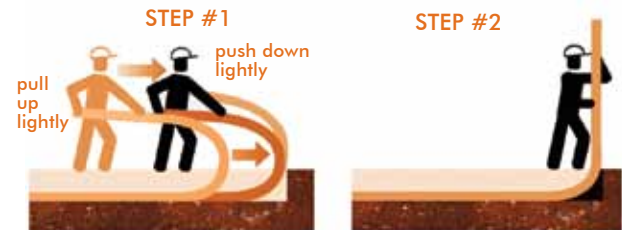
DO NOT bend the conduit any further once it begins to show signs of ovality, i.e. begins to bulge. **DO NOT** press down on the conduit with your foot as you bend it.

INCORRECT METHOD

do NOT press down with your foot



CORRECT METHOD



do not exceed minimum bend radius

backfill to support under the bend

Padding

Utilizing sand for "padding", the conduit provides protection during future excavation near your facilities. The apparent change in soil condition provides warning that there is a utility buried there. This should not replace the practice of placing warning tape, but rather should serve as a supplement.

Wait One Hour

The effects of stress caused from pulling conduit through existing duct will cause the conduit to elongate (or stretch) in proportion to the amount of stress but less than 2% of the total length placed. Due to this effect, it is important to pull past the duct slightly. An allowance of at least one hour needs to be given for the conduit to "relax" before cutting and trimming it.

See our ConQuest Conduit Products Applications & Construction Manual for more installation instructions and product information.

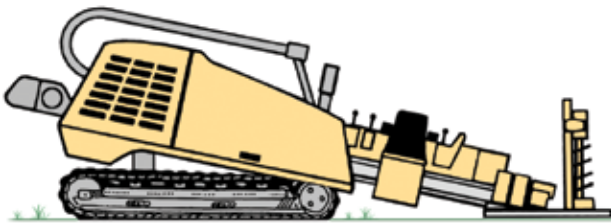
○ Elongation of Conduit and Wire

CommScope toneable conduit is comprised of a sturdy 18 AWG copper clad steel tone wire embedded in a high-density polyethylene (HDPE) wall. During a normal installation, the conduit will elongate (normally 3 to 3.5%) and the steel wire will move within the HDPE wall freely. Elongation of the steel wire is approximately 1%, much less than the conduit. However, once the conduit reaches maximum elongation, the steel wire and the conduit can couple and begin to elongate together. At installation tensions beyond those recommended, the conduit can be elongated beyond the ability of the steel to compensate, and the steel wire may break. It is also possible for the steel wire to break free from the conduit wall as the conduit relaxes from extreme installation tensions, since plastic will recover (shrink) faster than the steel wire can compensate. Monitoring pulling tension, ensures maximum pulling tension is not exceeded, will avoid these conditions.

NOTE: The steel wire must not come in contact with the pulling eye. The steel wire should always be free at both ends to avoid a tensile break during installation.

CommScope's toneable conduit tone wire is coated with fluoropolymer which is a novel design feature that enables easy "rip out" of the tone wire from the conduit wall with only simple hand tools. The fluoropolymer allows the wire to move independently and eliminates potential stress on the combination of tone wire and conduit. However, tension and elongation on the conduit should remain within specifications.

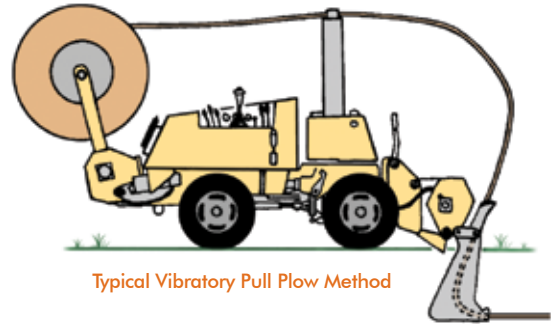
For successful installation of toneable conduit, environmental concerns and proper installation methods must be addressed. While open trench installation does not present a concern because of its inherent low tension, two other installation methods, horizontal directional drilling (HDD),



Typical Horizontal Directional Drilling (HDD) Method

and static/vibratory pull plowing present unique challenges. Each of these methods has specific guidelines for successful installations and among other considerations, installation crews need to be mindful of factors such as soil type, temperature, pulling speed, equipment used and slurry mix.

HDD can result in higher tensile loads due to the hole not being straight or level and the type of slurry mix used. When drilling, the drill head is capable of being moved in any direction which may be required to avoid objects encountered. During pull back, the drill operator can control tension on the pipe through speed, type and amount of slurry used. The tension monitoring gauge on the drill machine should be calibrated once a year.



Typical Vibratory Pull Plow Method

The Pull Plowing method requires the most attention of all in certain soil types and conditions. This method can create excess tension on the conduit due to the plow blade following the tractor over the terrain.

- The plow blade must have a cone or bullet of sufficient diameter to create a hole for the conduit either on the end of the blade or pulled behind.
- And ideal installation would be on flat terrain.
- Wet clay soil is very sticky and will create excessive tension.
- Sandy soil will collapse behind the cone creating additional tension.

Each of these situations may limit the installation to a short distance before the conduit and wire will elongate (stretch) to the point of breaking.

ALL PRECAUTIONS must be taken not to exceed maximum recommended pulling tension. Please refer to the CommScope ConQuest Conduit Catalog for specifications or visit our web site www.commscope.com

ConQuest® vs. Traditional PVC Stick Pipe

ConQuest Cable-in-Conduit Outperforms Traditional PVC Stick Pipe

ConQuest high-density polyethylene conduit with factory pre-assembled CommScope cables (CIC) outperforms traditional PVC stick pipe installations.

In Field Trials,

- A two-man installation crew was unable to install 600 feet of 2" PVC stick pipe in a trench, glue joints, install sweeps, blow pull line, and pull cable in **less than one hour.**
- A two-man installation crew was able to install 600 feet of 2" ConQuest Cable-in-Conduit in **less than ten minutes.**

NOTE: Time required to open and close the trench not included

In Product Comparisons,

- PVC stick pipe is traditionally manufactured in ten or twenty foot lengths that can be difficult to transport or handle.
- PVC stick pipe requires substantially more warehouse/yard space than HDPE on reels.
- Warehouse personnel must stock an assortment of PVC stick pipe components, such as sweeps, glues, preparation solvents, and pull lines to ensure that projects can be completed.

| Criteria | Traditional PVC | ConQuest CIC |
|---|-----------------|--------------|
| Requires sweeps and bends | Yes | No |
| Requires joints to be glued | Yes | No |
| Ground movement can cause separation | Yes | No |
| Installation can cause stress on cable | Yes | No |
| Susceptible to shattering at low temperatures | Yes | No |
| Low coefficient of friction | No | Yes |
| Internal lubrication | No | Yes |
| Continuous lengths | No | Yes |
| Can be plowed over extended distances | No | Yes |
| Faster more efficient installation | No | Yes |

Direct Burial vs. ConQuest®

Direct Burial vs. ConQuest Empty Conduit or Cable-in-Conduit

Maximizing return on investment (ROI) is the number one goal of today's investor. That makes sense. But, what about tomorrow's investment?...And the day after?... And the day after that? Lowest initial investment does not guarantee the biggest return.

Today, broadband providers choose one or more of the following manners to address ROI in buried plant.

- Carefully limiting the cost of their initial investment
- Reducing or eliminating the cost and frequency of re-investments that are associated with system maintenance and upgrades
- Installing high quality or value-added products that minimize the cost of their initial investment, and reduce or eliminate the future re-investment cost of system maintenance and upgrades.

DIRECT BURIAL of your cable certainly reduces your initial investment cost, but fails to address future costs.

- Initial investment...**Reduced**
- Material and labor costs associated with repairs and upgrades...**Increased**
- Lost revenue due to system downtime resulting from cable repairs or upgrades...**Increased**
- Lost customers due to system downtime...**Increased**
- Poor customer relations resulting from damaged landscape due to repairs or upgrades...**Increased**
- Inflationary material and labor costs...**Increased**

EMPTY HDPE CONDUIT adds to your initial investment cost, but addresses your need to reduce future costs.

- Initial investment due to materials...**Increased**
- Material and labor costs associated with repairs and upgrades...**Reduced**
- Lost revenue due to system downtime resulting from cable repairs or upgrades...**Reduced**
- Lost customers due to system downtime...**Reduced**
- Poor customer relations resulting from damaged landscape due to repairs or upgrades...**Generally Eliminated**
- Inflationary material and labor costs...**Reduced**

CABLE-IN-CONDUIT addresses the same future costs savings as Empty HDPE conduit, while reducing initial costs versus other conduit options. Other advantages of CIC include:

- Installation time...**Reduced**
- Labor costs associated with pulling cable...**Reduced**
- Potential for cable stress and damaged due to improper field handling...**Reduced**
- Space required for storage of both conduit and cable...**Reduced**

Introduction

Traditional approaches to making underground facilities locatable required extra material and labor costs. Many system operators have even cited that sometimes the wire or tape was “forgotten” or they were “out of the material” during construction, making an expensive solution even more costly. Additionally these methods are not always reliable, subject to damage and degradation.

Now the solution is simple, reliable and most of all, affordable. CommScope’s revolutionary Toneable Conduit can provide you with confidence in knowing the location can easily be found.

CommScope’s Toneable Conduit is a unique product that combines a polyethylene conduit with an integrated toning wire. Buried toneable conduit is easily located using tone detection locating equipment. The toning wire has a novel feature that enables it to be ‘ripped’ or pulled out of the conduit wall with simple hand tools, enabling easy access for toning and/or splicing to subsequent lengths.

Product Discussion

CommScope toneable conduit is made from high quality high-density polyethylene (HDPE). The conduit meets industry standard wall thickness in ¾, 1, 1¼, 1½, and 2 inch diameters. The polyethylene is blended with a premium UV stabilization and protection package. Color concentrate chips can be added to produce the conduit in an array of colors.

Our unique toning wire is 18-gauge copper clad steel (CCS) coated with a fluoropolymer jacket. The wire is embedded in the wall of the conduit. An 18-gauge wire was selected to maintain wall thickness and provide optimal tone carrying characteristics. CCS provides the necessary amount of copper to carry a tone over long distances and a steel core that is more durable than a solid copper wire. CCS is easily ripped out of the wall without the wire breaking. The wire meets the specifications listed on page C19 of this catalog.

The fluoropolymer-coated wire is designed to be ‘ripped’ out of the conduit wall using simple hand tools. The fluoropolymer allows the wire to move independently of the conduit eliminating stresses on the wire and conduit, and eases the separation of the wire from the wall of the conduit. The fluoropolymer coating also provides critical insulative and corrosion protection to the ‘exposed’ wire.

Fluoropolymer, the polymer group that includes Teflon®, was ultimately selected because it offers higher resistance to chemicals, water, and abrasion relative to plastics.

Other composite materials, such as polyurethane/nylon, fail to offer the necessary resistance. Nylon, in particular, is subject to attack by strong mineral acids and has a high rate of water absorption.

The Function of Toning

Toning is a method of using a generated signal, or ‘tone’, that is transmitted over a conductor so that the portion of the conductor buried below the earth’s surface can be located without digging.

The tone is produced at a very low frequency with a transmitter tuned to a particular frequency. The frequency range available on the transmitter varies between manufacturers but often ranges from 400Hz to about 80KHz. Transmission power is often variable and is usually controlled in a range of 0.033 watts up to 5.0 watts. A ‘radio’ receiver tuned to the transmit frequency is then used to precisely locate the energized wire.

The set-up requires that a transmitter be attached to the conductive material that will act as an ‘antenna’ and that a ground plane be established at the end of the antenna to close the circuit.



ConQuest® Toneable Conduit™
(Patented)

Installation Notes

Typical installations will consist of direct burial in an open trench, directional bores, static plowing or vibratory plowing. The design of this revolutionary conduit with the tone wire embedded within the conduit wall lends itself to all applications. The sturdy 18 AWG copper clad steel wire is protected by both the HDPE wall and the fluoropolymer insulation around the wire.

During a normal installation, the conduit may have several splice points either in the trench, pull box or in above ground enclosures. The tone wire can be

spliced together at these locations for a longer tone length, possibly beyond 5 miles (depending on burial conditions and the toning equipment used).

Splicing the wire together can be accomplished in a variety of ways. As with any insulated wire some of the fluoropolymer jacket must be removed before crimping on the connector. A minimal amount of fluoropolymer jacket should be removed to make the connection, leaving the remainder of the jacket intact to protect the wire from corrosion.

- Simple wire splices for 18 AWG copper clad steel wire can be used and environmentally protected with a self-healing waterproof tape.
- All splices below grade must be environmentally sealed against the elements.
- Splices above grade such as inside an enclosure should have the ends sealed with tape.
- At each end of the conduit, the wire should be ripped from the conduit to a length long enough for splicing or grounding.
- Using pliers and tubing cutter, ripping the wire from the conduit is simple and easy.
- Do not ground the 18 AWG copper clad steel wire within the system. Grounding of the tone wire should only be done for toning.

Note: Installations where the conduit is used as a riser to the strand and the wire is exposed may be subject to local authority.

Field Trial

| | |
|------------------|---|
| Location | Catawba, NC (CommScope Test Site) |
| Date | February 15, 2002 |
| Product | Two inch Schedule 40, Terra cotta with insulated 18 AWG copper clad steel |
| Length | 2,200 feet |
| Equipment | DitchWitch® 950R/T 3M-753 Dynatel® |

This trial was conducted to measure the performance abilities of the toneable conduit. The conduit was installed into an open trench at depths of one to three feet.



For toning, CommScope recommends equipment such as the DitchWitch 950R/T (shown above).

In the first test, a DitchWitch 950R/T was set at its lowest power settings (1 KHz at 0.033 watts) with only the transmitter end grounded. The 2,200 feet of conduit was easily located and the depth measured was accurate within three inches.

In the second test, approximately 2,000 feet of tone wire was attached to one end of the conduit above ground. Again, the DitchWitch 950R/T with the same settings (1 KHz at 0.033 watts) located and toned the 4,200 feet length.



ConQuest Toneable Conduit undergoes rigorous field testing to ensure the same quality as our other products.

The same results were achieved with the 3M® Dynatel unit.

There are ten power settings on each frequency on the DitchWitch 950R/T, 1 being the lowest at 0.033 watts and 10 being the highest at 3.0 watts. It is possible that a tone would be obtainable over 5 miles using higher levels.

Summary

Constructing networks that require provisioning for toneable locating can now be achieved using CommScope's Toneable Conduit. The conduit is designed to the same high standards used in all of CommScope's ConQuest conduit family. The unique design of the toneable conduit makes it easy to install and easy to locate.

DitchWitch® is a registered trademark of Charles Machine Works, Inc.
 Dynatel® is a registered trademark of 3M Corporation.



○ **Big Money is Lost When Locating Loses Priority**

Someone recently asked me, “What is the fastest way to find a buried telecommunications cable?” Being a little too spirited, I jested, “With a backhoe.” You’re probably thinking this cannot be for real. Unfortunately, I could not be any more real.

Suburban sprawl has prompted community builders to create an aesthetically pleasing environment and to remove unsightly utility poles from landscapes. Although this placement of utilities has been common practice in new-build constructions for some time, it is starting to get noticed by older or urban communities that had long been used to the presence of utility poles. Over the past few years, in fact, a growing number of communities had proposed legislation for the removal of utility poles. This, of course, requires that utility operators relocate their facilities. Where? You got it – underground.

The advantages of underground installation are proven time and again. Of course, public safety is improved by eliminating the hazards of automobile collisions with utility poles and downed lines during severe weather conditions. Utility operators and their customers then benefit from the reduction in outages created by these events. What’s more, maintenance requirements and expense for underground plant are significantly lower than aerial plant that is constantly exposed to a harsh environment.

The disadvantages are less obvious. There is a lot of digging going on around communities, and utility easements are becoming more and more congested. And when excavation for the buried utilities begins, the problems accumulate quickly if effective locating is not done. Here, we will discuss the consequences of not properly locating utilities, and we’ll discuss best practices for building an accurately locatable underground plant.

○ **Is Your Locating System Booby Trapped?**

As a result of many early excavation fatalities, the federal government passed legislation 29 CFR 1926.651* as a measure to protect workers from the hazards of excavating in areas where buried utilities are located.

Thankfully, today 49 states (not Hawaii) have passed legislation to mitigate excavation damage. These state laws require that the location of buried utilities be marked to both protect workers and prevent utility service disruption. In most states, the law will not afford utility operators the right to recover damages if they failed to properly locate their subsurface plant when a locate was properly requested. Despite this legislation, underground utilities continue to be damaged at alarmingly high rates, and the severity of the damage has increased as the underground continues to get more and more congested.

A recent study conducted by the U.S. Department of Agriculture found that 25% of hits on located facilities were due to mislocates. In the past five years, there has been a nation-wide annual average of 21 major underground fiber optic cables cut, and 39 underground copper trunk cables cut where locates were off the mark and underground excavations found them.

The service disruptions from these events affect 911 services, local telephone service, long-distance service, and nationwide data networks. Service disruption is of particular concern when it comes to fiber optic cables. With each optical fiber capable of carrying as many as 30,000 circuits, the revenue loss from service disruption on a single optical fiber can be as high as \$175,000 per minute or more.

Location Options

Most providers understand the need for a locatable system, but building it can be more challenging. While there are nearly two dozen geophysical methods for locating buried facilities, they can be categorized into three types of systems commonly used today: passive magnetic systems, electronic marking systems and radio detection systems.

Type A: Passive magnetic systems work on the principle of placing a magnet, or more often a strip of magnets, in close proximity to the utility lines to create a magnetic disturbance that can be detected using a magnetometer. These are best suited for areas where no other utilities are located and away from large mineral deposits.

- **Advantages:** Least expensive to deploy.
- **Limitations:** Magnetic anomalies can occur, and are often created by other ferrous objects in the ground such as water or gas pipelines and some types of mineral deposits. Creating conflicting detections and a mislocation of the intended target utility.

Type B: Electronic marking systems (EMS) use a technology that is considered a passive circuit, which is usually contained in a plastic ball or disc that is placed in the trench with the utility. To locate the passive circuit, a marker locator is used to excite the tuned circuit in the marker. This causes the passive circuit to produce a spherical RF field that can then be detected by the marker locator.

- **Advantages:** These devices provide a higher degree of accuracy attributed to each utility using an assigned frequency for their EMS system.
- **Limitations:** Most systems require a specific orientation of the marker so that the RF field is aligned for surface detection and this technology can be efficiently deployed only in open trench construction. Due to the cost, markers are usually spaced to optimize the RF field's footprint from one marker to the next. This may result in the locator hunting for the next marker, particularly when the utility changes direction.

Type C: Radio detection systems, more commonly known as tone location or tone detection, operate on the principle of inducing a tone on a conductor (metallic material) that acts as an antenna. This transmits the signal through the ground that can be intercepted by a radio receiver tuned to the transmitter's frequency.

- **Advantages:** The ability to discern the intended target more accurately by seeking a specific frequency transmitted over wire that is continuous and follows the changes in utilities direction and can tolerate greater depth capabilities.
- The key to the use of tone locating technology is the metallic conductor used. A fiber optic cable may contain a steel armor, which can be toned, or may have an all-dielectric construction (no metal). Steel armor is not a very good conductor for radio frequency signals as it is a highly resistive metal, greatly limiting the range of accuracy using tone location. **Essentially, this makes it imperative to use a tone wire not only with an all-dielectric cable but also with an armored cable.**

- **Limitations:** Copper wires are commonly used for the tone wire, since copper provides the best path for the radio frequency (tone) to travel on. The downside to a solid copper wire as a conductor is that the malleability of the material is too great; this limits its tensile strength. This limited tensile strength can present problems if the wire is being pulled in during boring installations or when backfilling an open trench. These activities can easily result in excessive tension, breaking the wire and losing continuity.
- To avoid concerns of tensile strength issues, a copper clad steel (CCS) wire may be used. The CCS wire increases the tensile strength significantly. This thin layer of copper is equally capable of carrying the tone signal across distances at a fraction of the cost of solid copper wire.
- Most systems use a wire size ranging from 22 AWG to 10 AWG. But, an 18 AWG wire size will suffice, since smaller sizes attenuate signals at a greater rate and affect the range of accuracy. Larger wire sizes are overkill, wasting material and money.

“In the past five years, there has been a nation-wide annual average of 21 major underground fiber optic cables cut, and 39 underground copper trunk cables cut where locates were off the mark and underground excavations found them.”

○ Going the Distance

Most providers want to deploy technologies and systems that will go the distance and stand the test of time. Placing cables underground is a big investment in initial labor and a minimal investment in material. Therefore, the providers' goal should be to establish a locate system that is as reliable as the network itself.

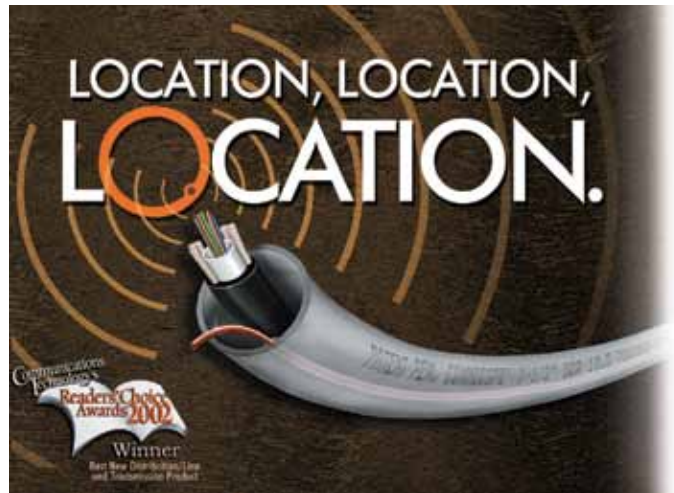
One method used in the field to improve on locating accuracy is to place an external tone wire with cable or conduit during the installation process. This can result in breaking the wire or damaging the jacket and contributes to wire corrosion or potential failure.

To remedy this situation, some suggest installing the wire inside a conduit with the fiber or even in a separate conduit placed alongside the fiber cable's conduit. With this, however, they risk the fiber wrapping around the wire during installation, increasing the pulling tension and restricting cable movement.

Alternatively, cable pulling tapes have been produced with a wire woven into their construction. While these products tend to lie flat in the conduit, they also present unique challenges. One common problem is that construction crews may use the tape to pull a cable into the conduit, not realizing that they are removing the only possible way of locating that fiber in the future.

To overcome these issues, CommScope has developed specialized conduits that incorporate a tone wire into the construction of the conduit itself. These toneable conduits create a one-step, one-material installation while providing additional protection to the wire with the surrounding polyethylene. Our embedded wall design is ConQuest® Toneable Conduit™.

Proper installation of a tone wire is guaranteed with this kind of system. In addition, pinpoint accuracy is achievable. Some plant and construction managers have cited reduced installation costs as a result of the integrated installation process that toneable conduit products offer.



CommScope's ConQuest® Toneable Conduit™

The ability to consistently locate underground facilities with accuracy can best be achieved by using the "Type C" option discussed in this article. By establishing a reliable detecting system, workers, utility owners, and customers can have confidence in quality locates that will protect buried utilities for years to come.

Introduction

This comparative test was conducted by a major multiple system operator (MSO) to determine the impact on reliability of placing drops in conduit. A drop not requiring a truck roll during its lifespan reduces operating expenses while promoting greater customer satisfaction. The comparison of drop-in-conduit to direct buried drops was conducted in two areas chosen for having similar numbers of trouble calls reported. The first area, Test Area A, had its drops installed exclusively in conduit. The second area, Test Area B, had its drops installed exclusively as direct buried. The number of truck roll trouble calls for cut or damaged drops in each area was then recorded over a 1-year period. The drop-in-conduit installation produced a 70% reduction in truck rolls, saving \$9,600 over the first year.

Test Areas

Test Area "A": 3 subdivisions in metropolitan Florida built exclusively with drop cable preinstalled in conduit.

Test Area "B": 3 subdivisions in metropolitan Florida built exclusively with direct buried drop cable.

Results

| Test Area | Total Calls | Drop Related Calls | Percentage |
|-----------|-------------|--------------------|------------|
| A | 3114 | 56 | .8% |
| B | 3120 | 184 | 5.9% |

At the end of one year, it was found that there were 128 less truck roll trouble calls for cut or damaged drops in Test Area A where all the drop cables had been installed exclusively in conduit. This resulted in 70% less total truck roll trouble calls for Test Area A as compared to Test Area B with its directly buried drops.

Cost Savings Comparison

Using \$75.00 for the estimated cost of each truck roll and multiplying that number by 128, which is the number of avoided truck rolls, a savings of \$9,600 is recognized in one year alone. This cost savings would continue to improve over time and an additional cost savings for labor would be realized should the drops ever need to be upgraded, since new cable could be pulled directly through the existing installed conduit.

Costs Associated with Drop-Related Truck Roll Trouble Calls in One Year



Deploying drop-in-conduit does involve additional material and labor costs initially. A drop-in-conduit can cost approximately 12 cents more per foot than flooded cable alone. In addition, the extra labor cost for installation of drop-in-conduit averages about \$15.00 per job for installations involving less than 200 feet. The cost can vary depending upon regional soil conditions. 100 feet of direct buried drop from the tap averages about \$40.00 per installation. 100 feet of drop-in-conduit from the tap averages about \$27.00 more per installation or \$67.00 per job. The figure \$27.00 is based on \$12.00 more in material plus \$15.00 more in labor as compared to the cost of installing a direct buried drop.

Conclusions

This case study shows that within one year there is 70% less trouble calls for damaged or cut drops when conduit is used. Each drop-in-conduit installation costs \$27.00 more than direct buried installations, but \$9,600 is saved in reduced truck rolls each year. The cost savings is anticipated to improve even more over time and additional labor cost savings realized with any plant upgrades involving new cable directly pulled through the existing conduit. Additionally, one of the primary benefits of drop-in-conduit versus direct buried is a corresponding increase in customer satisfaction with the 70% reduction in trouble calls. Satisfaction is directly associated with the customer's perceived better reliability for video, high speed and digital voice services. Customer satisfaction means customer retention and customer retention means profitability.