

## Table of Contents

1.0 Product Applications.....	Page 1
2.0 Safety.....	Page 1
3.0 General Installation Considerations.....	Page 1
4.0 Tools and Materials Needed.....	Page 2
5.0 Reference Drawing.....	Page 2
6.0 End Cable Access Procedure.....	Page 2
7.0 Cable End Access Procedure.....	Page 3-5
8.0 Aerial Applications.....	Page 6
9.0 Bonding and Grounding.....	Page 7
10.0 Trenching Considerations.....	Page 7
11.0 Material Data Safety Sheet.....	Page 8-9



Dielectric Flat Drop



Toneable Flat Drop

## 1.0 Product Applications

The instructions in this document explain how to prepare end openings of the Draka Flat Drop fiber optic cable for termination. The document also contains coupling coils and hardware recommendations. Instructions for the application of other Draka fiber optic products, such as splice closures, distribution cabinets, etc., are included in the installation instructions for the product in question.

Questions? Call 1-800-879-9862

## 2.0 Safety

**2.1** Draka strongly recommends the use of approved personal protective equipment in the performance of this procedure. Wear safety glasses and gloves, and use solvents in well-ventilated areas.

**2.2** Never look directly into the end of a fiber that may be carrying laser light. Laser light may be invisible and can damage your eyes. Viewing it directly does not cause pain. The iris of the eye will not close involuntarily as when viewing a bright light. Consequently, serious damage to the retina of the eye is possible. Should accidental eye exposure to laser light be suspected, arrange for an eye examination immediately.

**2.3** **DO NOT** use magnifiers in the presence of laser radiation. Diffused laser light can cause eye damage if focused with optical instruments. Should accidental eye exposure be suspected, arrange for an eye examination immediately.

**2.4** A Material Safety Data Sheet (MSDS) is included in this document.

**2.5** The optional toning wire is not designed to support any load and should not be used as metallic messenger.

## 3.0 General Installation Considerations:

**3.1** Aerial application: Aerial applications require the use of coupling coils.

**3.2** Recommended hardware: Aerial drop clamps should be all-metallic with a dimpled shim and have a minimum tensile strength of at least 550 lbs. Draka recommends the end user check with the clamp supplier for specific clamp installation instructions and to ensure proper load ratings.

**3.3** Maximum Tensile Load: Maximum Installation Load for 1-6 fibers is 300lbf and 600lbf for 7-12 fibers. Maximum operation load for 1-6 fibers is 90lb. and 180lbf for 7-12 fibers.

**3.4** Minimum Bend radius: Do not bend the buffer tube at sharp angles while removing the jacket, armor, yarns, or strength members. Maximum bend radius for cables with Load is 4.6" for 1-6 fibers, and 6.0" for 7-12 fibers. Maximum bend radius for cables with No Load is 3.1" for 1-6 fibers and 4.0" for 7-12 fibers.

**3.5** Buffer tube removal: Do not remove more than 48" of tube at a time. When accessing the buffer tube always pull the buffer tube & the RSM's out of the ripcord slot together to prevent kinking the tube.

**3.6** Bonding grounding: Tone wire must be bonded and grounded in accordance with customer requirements. Draka recommends all metallic components be bonded and grounded at each cable end.

## 4.0 Tools and Materials Needed

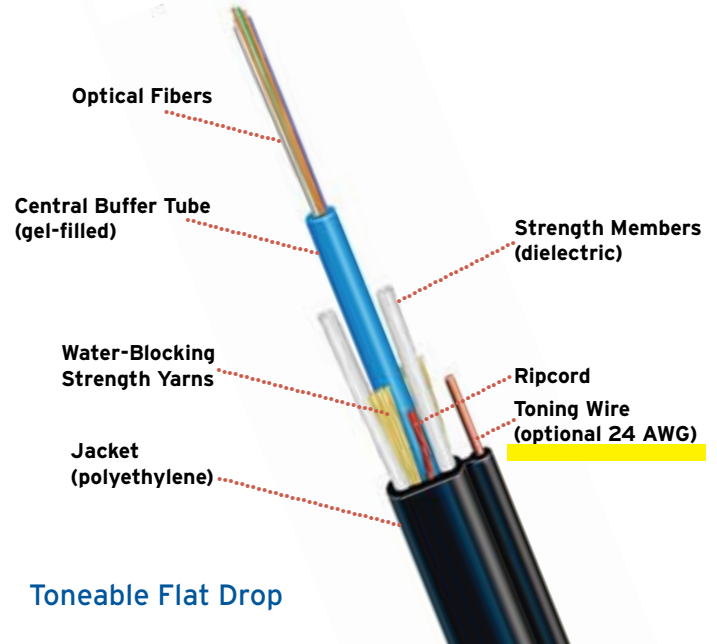


- [+] Protective gloves
- [+] Diagonal cutting pliers
- [+] Needle nose pliers
- [+] Scissors or aramid shears
- [+] Buffer tube ring cutters or buffer tube access tool
- [+] Utility knife or sheath knife

### Not pictured:

- [+] Cable ties
- [+] Lint-free wipes
- [+] Isopropyl alcohol
- [+] Wire strippers (to strip optional toning wire)

## 5.0 Reference Drawing



### Toneable Flat Drop

## 6.0 End of Cable Access Procedure Quick Reference Checklist

1. If the cable has the optional toning wire, it must first be separated from the cable (if there is no tone wire continue to step 2).
2. Determine length of cable to be stripped, make Ring Cut #1 that distance from the end of the cable.
3. Shave off the jacket/sheath over each radial strength member (RSM), starting 6 inches from end of cable and cutting towards the end of the cable.
4. Peel back the jacket in this 6-inch area. Expose the ripcord.
5. Notch jacket/sheath near the ripcord. Pull the red ripcord to Ring Cut #1.
6. Remove jacket. (Grasp RSM's, buffer tube, and strength yarns firmly and pull the jacket longitudinally with core).
7. Separate the buffer tube from yarns and strength members.
8. Cut and discard the yarns and strength members at appropriate length.
9. Determine the length of fibers to be accessed and open the buffer tube. Use Ideal® ring cutter to score the buffer tube. Flex the tube and pull off tube (maximum increments of 48").
10. Clean fibers

## 7.0 Cable End Access Procedure

### 7.1 Optional Toning Wire

If the cable has the optional toning wire, it must first be separated from the cable.

**NOTE:**

If there is no toning wire, skip to Step 7.4.



### 7.2 Notch The Web

At the end of the cable, notch the web between the cable and the toning wire using a knife or shears.



### 7.3 Separate Toning Wire

Separate the toning wire by pulling it away from the cable perpendicular to the flat face. This will shear the web and form a clean separation. The amount of toning wire to be separated will depend on the specific application. The sheath over the toning wire can be removed with wire strippers or using a knife.

**NOTE:**

Pull the toning wire in a shearing motion. Make sure to leave enough toning wire for your specific application.



### 7.4 Score The Jacket

Determine the length of cable to be accessed. At the end of the access length, use a knife to score the cable sheath.



### 7.5 Shave Along Radial Strength Members (RSMs)

Grab the cable approximately 8 inches from the end. Hold the cable such that the radial strength members (RSMs) are oriented vertically and shave 6 inches along both RSMs to the end of the cable.



**CAUTION:**  
Always shave away from your body.

### 7.6 Peel The Jacket Strips

Grab the remaining two strips of jacket and peel apart. Make sure to separate the strength yarns from the jacket strips when first starting the peel.

**CAUTION:**  
Take care to keep the red ripcord on top of the kevlar. This prevents the ripcord from trying to cut through the kevlar.



### 7.7 Use Ripcord To Open Cable

Locate the red ripcord and notch the jacket above it. Insert the ripcord in the jacket notch. Wrap the red ripcord through and around the needle nose pliers. With one hand holding the cable end, pull the ripcord through the jacket notch and down the length of cable to be accessed.



### 7.8 Peel Jacket Away In One Piece

While holding the buffer tube and strength elements (yarns & RSMs) in one hand, peel the sheath away from core through the ripcord cut. Remove the sheath all of the way to the score location and discard. It may be necessary to re-grip more than once, depending on the length of the access window.

**NOTE:**  
Holding the RSMs, yarns and tube together will prevent kinking of the buffer tube.



### 7.9 Separate The Tube

At the end of the access window, locate the buffer tube. Separate and pull the entire tube away from the strength yarns and RSMs at this location.



### 7.10 Cut The Yarns

Separate the strength yarns from the RSMs. Cut and discard the strength yarns.



### 7.11 Cut The RSMs

Determine the appropriate length of RSMs to keep, based on instructions from the closure manufacturer. Cut the remaining length of RSMs off and discard.



### 7.12 Score The Buffer Tubes

Determine the length of fibers to be accessed and score the buffer tube, remove the tube at a maximum of 48 inch increments until the desired length of fiber is exposed. Note that the small buffer tube can be routed in most splice trays eliminating the need for transportation tubing. Snap the buffer tube at the score location and slide it off the fibers. Clean fibers and prepare for splicing.



#### NOTE:

Use an appropriate buffer tube access tool to score the buffer tube (1 revolution). The tool should not cut all the way through the buffer tube. Once the tube has been scored, bend and snap the tube at the score location and slide it off the fibers.

## 8.0 Aerial Applications

### 8.1 Coupling Coils

Coupling coils are necessary to prevent an undesirable phenomenon commonly referred to as “fiber retraction” at splice closures or other termination points. When installed aerially, a cable can be subjected to weather loading as a result of wind and ice. This weather loading can cause a significant elongation of the cable. In typical stranded loose tube cables, the fibers, buffer tube, and cable are coupled together by design, and will elongate or strain in equal amounts. However, in central-tube-type cables, there is insufficient coupling between the fibers and the buffer tube. Because of this lack of coupling, as the cable elongates due to weather loading, the fibers will retract at both ends of the cable. This fiber retraction at closures can lead to high optical loss at the termination points, or in a worst-case scenario, break the fiber in the splice case.

The use of coupling coils is a necessary applications solution to prevent fiber retraction in the Flat Drop Cable. In self support aerial applications coupling coils are a means to couple the fibers to the buffer tube and the cable, such that they all behave together, similar to a stranded loose tube cable.

Draka has conducted extensive testing and has found coupling coils to be the best solution to prevent fiber retraction. A coupling coil consists of four 8-inch loops of cable at each end of the cable. Details of preparing a coupling coil are included in Section 8.1.

**NOTE:**

A coupling coil must be placed at both ends of the cable to be effective. Failure to place a coupling coil at each end of the cable can lead to fiber retraction from the closure or termination box.

#### 8.1.1 Cable Coupling Coil Procedure

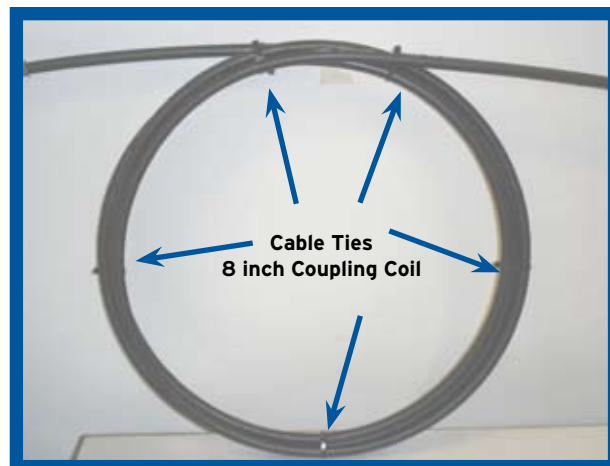
Determine a suitable location to place the coupling coil that is non-intrusive and does not cross into other rights-of-way.

**NOTE:**

The cable-coupling coil should be placed at both ends of the cable between the clamp and the splice closure or termination box.

**8.1.2** Make a cable coil with at least 4 loops of cable, with a loop diameter of at least 8 inches. The coil should be no smaller than 8 inches, but it may be larger.

**8.1.3** Secure the coil together by applying cable ties at 4 locations of the coupling coil, 90 degrees apart. Using less than 4 cable ties may result in the coil unraveling.



### 8.2 Vibration Dampening (AERIAL INSTALLATION ONLY)

When installed aerially, the Flat Drop Cable and the Flat Drop Cable with Optional Toning Wire may be subjected to wind, which can cause the cable to vibrate. Low frequency, high amplitude vibration, often called galloping or dancing, may result under certain circumstances.

In order to minimize galloping, Draka recommends applying one complete twist for every 20 to 40 ft of cable.

### 8.3 Recommended Cable Clamping Hardware

Draka’s Flat Drop Cable is designed for use with standard drop wire clamps in aerial applications. The clamps should be all-metallic with a dimpled shim and have a minimum tensile strength of at least 550 lbs. Clamps with plastic shims should not be used because they do not sufficiently engage the cable.

The drop clamp can be ordered directly from Draka.

#### Drop wire clamp

Draka Part Number 20023112 Stainless Steel Flat Drop Clamp

These parts are also available through various distribution outlets.

The following is a partial list of drop wire clamp manufacturers:

## Thomas & Betts (Diamond / Sachs)

2-Pair Stainless Steel: Part # 23-88881

2-Pair Aluminum: Part #23-44441

6-Pair Aluminum: Part #23-82351

<http://catv-cat.tnb.com>

## Senior Industries

2-Pair Stainless: Part # SI0956

6-Pair Stainless Steel:

Part # SI0966

<http://www.seniorindustries.com>



### NOTE:

Draka recommends the end user check with the clamp supplier for specific clamp installation instructions to ensure proper load ratings. During initial installation, it is important to pull firmly on the installed clamp to secure it to the cable.

## 9.0 Bonding and Grounding (Flat Drop with Toning Wire Option Only)

Cables with metallic elements, when installed aerially in the vicinity of power lines, are susceptible to an induced voltage. If it is desired to install the Flat Drop Cable with Toning Wire Option in an aerial configuration in the vicinity of power lines, Draka strongly recommends the proper bonding and grounding of the metallic components according to National Electric Code (NEC) and the National Electrical Safety Code (NESC).

Article 770 of NESC states that all non-current carrying metallic elements of an optical fiber cable must be bonded and grounded at the point of entrance into a building or residence.

There may also be local and state regulations that supersede the NEC and NESC recommendations. Draka strongly recommends installation according to the proper local and state regulations.

National Electrical Code, ANSI/NFPA 770, 1999 Ed  
National Electrical Safety Code, ANSI C2-1997

## 10.0 Trenching Considerations

When installing cable in open trench applications, the following requirements must be considered:

### Bend radius

Care must be taken to avoid bending the cable smaller than the static bend radius specification (3-inches bend radius or 6-inch bend diameter for the 1-6 fiber design; 4-inch bend radius or 8-inch bend diameter for the 7-12 fiber design).

While in the trench, the cable tends to have large sweeping bends; care must be taken where the cable exits from the ground.

### Typical points of concern include:

- [+] where the cable meets the house/business
- [+] where the cable enters the pedestal

### Bending the cable to a smaller radius can cause several problems:

- [+] the cable can kink which can break fibers or increase the fiber attenuation
- [+] the strength elements can break which destroys the cable integrity
- [+] the strength elements can be placed under excess stress which can lead to a short lifetime.

### Crush

While drop cable is durable, care should be taken to avoid crushing the cable beyond its crush specification of 125 lb/in. While this is typically not a concern with trench applications, care should be taken to avoid placing the cable over or between narrow or sharp objects where compression forces are focused on a small portion of the cable.

## 11.0 Material Safety Data Sheet

### I. Company/Product Identification

DATE: April 3, 2000  
 PRODUCT: Fiber Optic Telecommunications Cable  
 MANUFACTURER: Draka USA, Inc.  
 Optical Cable Plant  
 2512 Penny Road  
 Claremont, North Carolina USA 28610-0039

INFORMATION PHONE: (800)-729-3737 within United States; Outside U.S.A. (828)-459-9821  
 REVISION DATE: April 3, 2000

### II. Composition/Information on Ingredients

COMPONENT	CAS#	OSHA PEL	ACGIH/OSHA TLV
UV Acrylate	N/A	N/A	N/A
Amorphous polyolefin	009010-79-1	N/A	N/A
	09002-88-4	N/A	N/A
Polybutene	9003-29-6	N/A	N/A
Buffer tube gel	N/A	N/A	N/A
Thermoplastic PVC	N/A	N/A	N/A
Epoxy/fiberglass rod	N/A	N/A	N/A
Optical fiber	N/A	N/A	N/A
Thermoplastic polyethylene	25087-34-7	3.5 mg/m <sup>3</sup>	3.5 mg/m <sup>3</sup>
Steel tape	N/A	N/A	N/A

### III. Hazards Identification

By nature of the product, no known immediate or chronic health hazards are expected. All industrial products containing chemicals should be handled with caution to avoid unnecessary exposure.

### IV. First Aid Measures

- [+] Eye contact with glass fiber or filling gel/flooding compound: Immediately flush eye(s) with water and seek medical attention.
- [+] Skin penetration with glass fiber: Remove fiber by mechanical means or seek medical attention.
- [+] Skin contact with filling gel/flooding compound: Wash thoroughly with soap and water.

### V. Fire Fighting Measures

This material will burn if exposed to flame. Fire fighters should protect themselves from combustion products that may include carbon dioxide, carbon monoxide, or other toxic gases. Wear self-contained breathing apparatus and complete personal protective equipment. Fire extinguishing media include water, carbon dioxide, foam or dry chemical.

### VI. Accidental Release Measures

By nature of the product, release is not to be expected.

### VII. Handling and Storage

No special precautions required.

### VIII. Exposure Controls/Personal Protection

Use leather gloves when handling reels to prevent splinters, cuts and abrasions. Filling gel or flooding compound may cause skin irritation, use latex or nitrile gloves. Filling gel or flooding compound may cause eye irritation; always wear approved safety glasses, flush with plenty of water and seek medical attention if irritation persists. Cables contain glass fibers, always wear approved safety glasses. Seek medical attention if glass fiber enters eye. Cables may contain steel armor tape and steel wire which could cut or puncture skin, wear leather or other cut resistant gloves.

## IX. Physical and Chemical Properties

Boiling Point: N/A	Evaporation Rate: N/A
Melting Point: N/A	Specific Gravity: N/A
Vapor Pressure: N/A	Water Solubility: N/A
Vapor Density: N/A	pH: N/A

## X. Stability and Reactivity

Chemical Incompatibilities: Unknown  
Chemical Instabilities: Unknown  
Hazardous Polymerization: Will not occur

## XI. Toxicological Information

No known toxicity.

## XII. Ecological Information

No known adverse ecological effects.

## XIII. Disposal Considerations

Dispose in compliance with Federal, State and local laws and regulations.

## XIV. Transport Information

Non-hazardous.

## XV. Regulatory Information

None.

## XVI. Disclaimer

The information contained herein is believed to be accurate but is not warranted to be so. Draka makes no warranty of any kind, expressed or implied, concerning the safe use of this material in your process or end use. User has the sole responsibility to determine the suitability for any use. User must meet all applicable safety and health standards.