

FIBER OPTIC LIGHTING

By Diane Long - Del Lighting

Fiber Optic Lighting offers a unique method of lighting virtually anything you can think of without the heat or harmful UV rays normally associated with other lighting products.

Versatile

General purpose lighting is now possible using the newer illuminators that can distribute light to areas that are hard to get to or maintain. It is designed for indoor and outdoor usage and can be used for such things as perimeter lighting of decks, steps, docks, soffits, entranceways or walkways. It can also be used for the downlighting and spot lighting for bars, ceilings, or used for starfields as well as landscaping accent lighting of trees and shrubs. The illuminator and cable are removable and reusable as well.

The illuminator can be located up to 100 feet from your project and can be used to illuminate multiple applications.

The cable is flexible and can be bent into almost any shape (*see picture*)

Ease of Maintenance

Periodically replacing a single light bulb at a single source is all that is required. The cable is made of durable, UV protected PMMA plastic. There is nothing to break or burn out. There is no heat transmitted by the cable so it can be used to light combustible materials.

Safe

Because it carries no electricity, it can be used near, or even in, water and there are no glass tubes or lamps to break. The cable is unbreakable, shockproof and waterproof.

A beautiful room made lovelier by a starfield!

Economical

With the use of side emitting cable, a neon light look can be achieved over long distances at a fraction of the cost. Fiber optic lighting can have the look of neon lighting but it can change color, dim or even mimic movement while using far fewer components and much less maintenance. This can be done from illuminators that have an operating draw of only .75 amps (about what a 60W bulb uses) for the 75 watt quartz halogen unit or 1.8 amps for the 150 watt metal halide unit. Also, there is only one bulb to replace, and this has a life span of 10,000 hours!

User friendly

Fiber optic systems are designed for the do-it-yourselfer homeowner or business owner. Just lay the cable, screw the port with the cable end installed into the illuminator and plug the illuminator into a 110V outlet. That's it!

Elegant

A constantly rotating color wheel produces 5 to 8 spectacular colors. These "mood" lights may also be set at one color depending on the occasion (green for St. Patrick's Day or red for Christmas). With the use of a DMX controller, you can program light shows or pick which colors you wish to view in any sequence of your choosing.

For more information please visit our website: <http://www.del-lighting.com>



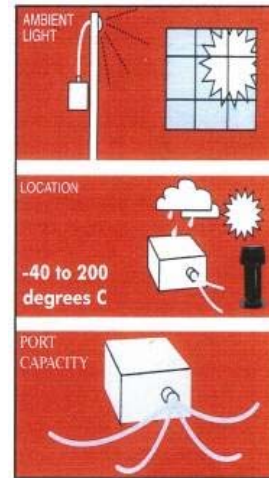
The Fundamentals of Fiber Optic Lighting

When selecting fiber optics for a lighting project, you must carefully consider the end result you are trying to achieve. Although fiber optic lighting offers unique flexibility compared to conventional lighting, it does have its limitations. Areas of high ambient light should be avoided as they tend to “wash out” the color. However, you will find in many cases, that fiber optics can be installed in areas not accessible to conventional lighting.

Brightness: Brightness perception is dependent upon several factors such as color, background, contrast ratio, viewing angle and ambient light conditions. If brightness is critical, then the illuminator model and strand count in the cable are important. The 150-watt metal halide illuminator is approximately 10 times brighter than the 75-watt model and the 575-watt illuminator is 3.5 times brighter than that. Also, the greater the number of cable strands, the brighter the end result.

Location: Most illuminators are approved for indoor or outdoor use. Some models, however, are indoor only. Adequate ventilation is important for all models. The fiber optic cable is UV protected so it may be installed almost anywhere.

Port Capacity: The harness holds the fibers in place at the light box. The maximum number of fibers varies according to the light box model. Always take into account the port capacity when choosing an illuminator. Remember, perimeter fiber works best when looped in and out of the light box. Therefore, you must double up the strand count on perimeter cable.

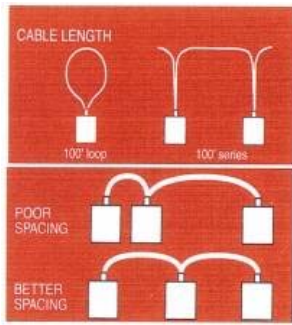


Sidelight Cable: Optical fibers glow like neon along their length. However, unlike neon, the cable is virtually unbreakable and is extremely energy efficient. Safety, maintenance and operation cost should also be taken into consideration when making a comparison between fiber optics and neon

This chart will give a general idea of the benefits of sidelight fiber optic cable compared to neon. It does not take into account the electrical utility cost of neon over fiber. On average, neon will cost 3 times as much as fiber on a monthly basis.

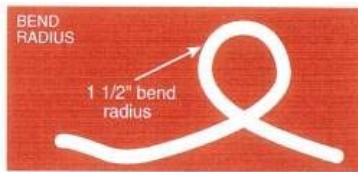
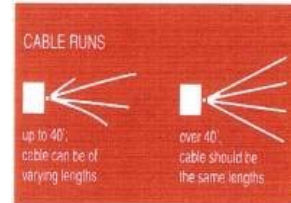
Feature comparison chart between neon and fiber

| <u>Feature</u> | <u>Neon</u> | <u>Fiber</u> | <u>SAVINGS</u> | <u>Feature</u> | <u>Neon</u> | <u>Fiber</u> |
|--------------------|---------------|---------------|----------------|-------------------------|-------------|--------------|
| Cost/100 ft | \$2000 | \$2000 | ----- | Color changeability | NO | YES |
| Installation | \$1000 | \$250 | \$750 | Re-useable | NO | YES |
| 5 yrs. Maintenance | \$1250 | \$250 | \$1000 | Use in or around water | NO | YES |
| Total: | \$4250 | \$2500 | \$1750 | Heat/electricity in run | Yes | NO |
| | | | | Liability for breakage | Yes | NO |
| | | | | High voltage in run | Yes | NO |
| | | | | U.L./C.S.A. approved | NO | YES |



Sidelight Cable Runs: Up to 100 foot runs are ideal, a longer run of up to 150 feet is acceptable depending on the application and illuminator model. Wherever possible, sidelight cable should always be looped in and out of the light source. Not looping is acceptable up to a maximum approximately 40 feet or so. On long runs, multiple illuminators in series are the norm. They may or may not be synchronized depending on the color effect desired. When using multiple illuminators, always try to keep each cable run as close to the same length as possible. This will ensure the cables uniform brightness.

End Light Cable Runs: Maximum run is approximately 40 feet. However, it should be noted that the shorter the run and/or the more strands, the brighter the end result. If multiple end light fixtures are used, the cable lengths should be uniform on lengths over 40 feet.



If bending the sidelight cable is necessary, a minimum bend of 1 1/2" radius is recommended. Anything less may create a bright spot at the bend.

Design and Installation Considerations:

Good ventilation in necessary for all illuminators

Light colored reflective surfaces are preferable for end light or sidelight applications. Dark surfaces absorb light and should only be used to provide contrast. When estimating fiber length, be as accurate as possible. Always allow a few extra feet for a service loop. Remember, you cannot add to the cable once it is cut.



Design Guide

If you have checked the pricing on fiber optic cable, you know how expensive it is. If you spend a little time designing your project, you will find that you can save hundreds - even thousands of dollars!

Here are a few things to keep in mind:

- 1) Where you place the illuminator is very important. The closer to your project, the better. Remember, however, if you place the illuminator in a space that is not air conditioned, you may reduce the lamp life from 10,000 hours to 8,000 hours or even less. In all cases you must have **AT LEAST** 50 cubic feet of free air per minute for each illuminator. A dust free area is recommended as well. Wherever you place the illuminator, allow room to work on the illuminator. If you need more than one illuminator, don't place the illuminators close together, two feet between them is fine. Take into consideration that the illuminator can get hot!
- 2) When you measure the length of cable that you will need, add 18 inches as a "service loop". In many cases, it's cheaper to buy a second (or third) illuminator rather than buy enough cable to reach all corners of your project from only one illuminator. If you want a starfield that changes color and twinkles at the same time, it can be done with the purchase of a special color wheel. If you want more than 750 "stars" in your starfield, use a double port illuminator that will handle up to 1,500 strands of cable. If your project is an exterior one, the largest port available (ST150) will handle 750 strands. The 75 watt exterior unit will handle 350 strands of cable at this time.
- 3) It's covered in the Fiber Guide, but it's worth going over again. The perceived "brightness" of your project is a subjective one. However, there are a few guidelines. A 75 watt illuminator is fine where the ambient lighting is low, such as a garden at night or a darkened home theater. But if you want to make an impact with your project in a mall or you have very long cable runs, then you will have to use the 150 watt illuminator. And don't forget to "loop" the cable for side emitting projects - that will double your light output! Also, the size of the cable directly correlates to the amount of light that is seen at your project. Think of the cable as a water pipe and you have the right idea. Solid core cable carries more light than stranded cable but is stiffer and harder to work with. So if you have some tight curves you have to negotiate, you might stick with the stranded cable.
- 4) Light can bring two spaces together and make spaces look bigger. Windows can become black mirrors at night. To balance outside light levels with those inside the home, illuminate features off the patio and surrounding areas. Uplight trees and shrubs by placing the fixture close to the trunk. Fixtures placed farther back from the tree or shrub can create dramatic shadows on surfaces behind the object. Use the light beam to create shadows, mark pathways, and driveways. Sconces light up walls to highlight textures.
- 5) When you plan your project, try to centrally locate the illuminator. Try to make the cables equal in length. If possible, keep runs to under 40 feet. If runs of over 40 feet are unavoidable, be aware that the fixtures on the shorter runs may appear brighter. To overcome this, plan on adding extra fibers on the longer run (example: for garden fixtures using 10 strands on the shorter runs, increase the cable to two runs of 10 strand or even one run of 30 strand for the longest run) You can adjust the light level by simply removing single fibers until the desired light level is achieved.

We hope this guide has helped you. Please feel free to call us if you have any questions about any of this or if something isn't covered. Thank you for coming to our site! We hope we can supply you with our fine products and be of service on this and any future projects you have.

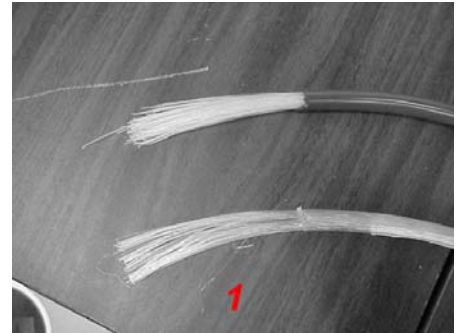


Del Lighting Installation & Fiber Guide

Installation Guide

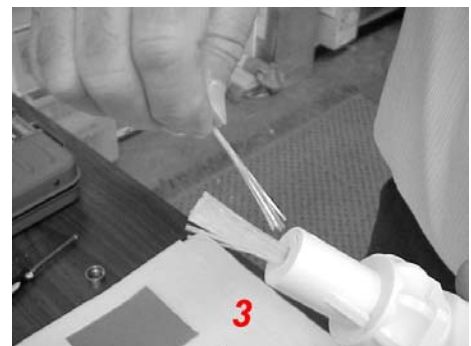
There are some things you need to do to make sure your project performs as you expect it to. You must polish the cable end that goes into the illuminator. If you don't, the light output will be weak and you could actually melt the cable (one good reason to have a service loop in the cable!). **Also, if the cable ends are not trimmed before you insert the harness you could damage or destroy the color/twinkle wheel.** Cut the cable with an anvil type garden sheers or, for larger cable, PVC cutter.

To prepare the cable: Trim the cable jacket from the fiber strands (be careful not to cut or damage the Teflon coating on the outside of the fiber strands. Leave approximately 4" of exposed fiber strands. If you nick the strands you WILL reduce the fibers ability to transmit light. (Picture 1)



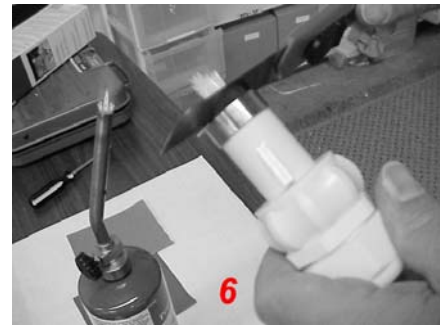
Unscrew the large nut from the fiber port and place it on the cable. Place the exposed fiber strands into the fiber port, extending the fibers about 1/2" beyond the port and screw the nut back onto the port face. Tighten carefully, this will determine the light intensity, the tighter the cluster of fibers before the final cut, the more light will be transmitted. (Picture 2)

If the fiber ends are still loose you will have to use the reducers or extra fibers to "fill in" the empty space. The reducers, in order of fiber capacity, are: 500 strands, 300 strands, 200 strands and 100 strands. To use the reducers, just place one inside the other until you get a tight fit on the cable. If it's still loose, place 4" lengths of fiber into the fiber ends sticking out of the fiber port until it is as tight as you can make it. (Picture 3)



Heat the blade of a utility knife or other sharp knife (we provide one for this purpose). Make sure the blade is quite hot before cutting the exposed fiber. Carefully trim the excess fiber in front of the port end (use the metal ring to make sure you don't melt the port). (Picture 4&5)

Do not use a sawing action; rocking back and forth is OK. Press down on the fiber and allow the hot blade to do all the cutting. (Picture 6) A smooth cut (like ice smooth) will increase the light transmitted dramatically. Now remove the ring.



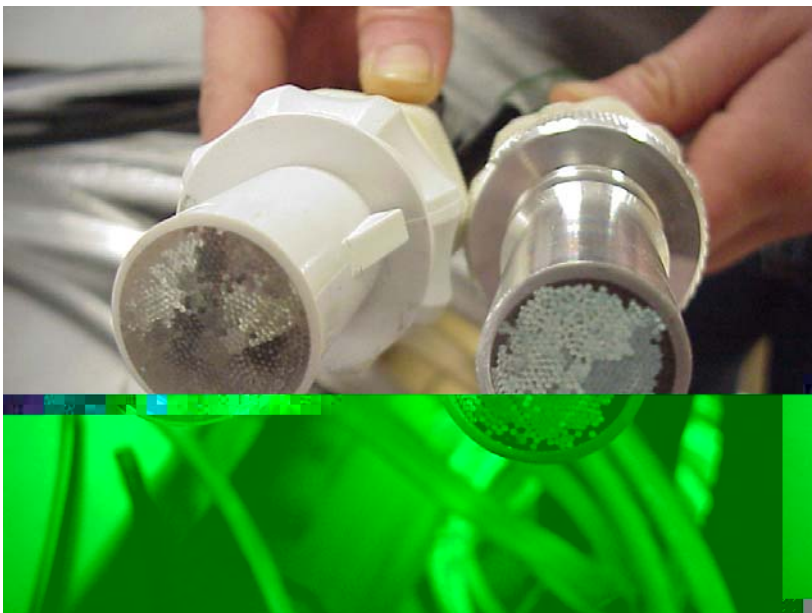
(Picture 7) After you cut your cable, it's very important that you prepare the end of the cable that will go into the illuminator port. You can do this quite easily by using 150 grit sandpaper to remove the rough edges of the cable. Sand the strands until they're fairly smooth. Finish

the cable by using 600 grit wet/dry sandpaper. Sand until the cable is mirror smooth - this will give you the maximum light output for your project! (Picture 8)



PLEASE REMEMBER TO PUT THE ILLUMINATOR WHERE IT CAN GET COOL AIR!

Note: You **CAN NOT** place fiber optic illuminators on dimmer switches.



These are polished correctly



This one was not

Installation Guide

This manual was designed to assist in the installation and operation of our fiber optic illuminators. Please read and understand this manual before beginning installation. If you have any questions, please contact us at (210) 590-5196 – Monday to Friday – 8am to 5pm CST.

WARNING!!!!

Before starting the installation process disconnect all power supply service. Failure to do so may lead to severe electrical shock, which can result in death or severe personal injury.

Electrical connections must be made by a certified electrician in accordance with local codes. There is a risk of electric shock or electrocution if unit is not wired properly.

Lamp and lamp shield may be hot. Exercise caution when working with or near these items. Failure to do so may lead to fire or personal injury.

GENERAL INFORMATION

Voltage used must match voltage rating of unit.

Electrical circuit used should be a GFI (Ground Fault Interrupt) circuit.

Install unit a minimum distance from water, according to local codes.

Unit must be installed in accordance with either NEC 680-31 Standards or CEC 68-068 Standards.

Do not install unit in an enclosed area or near flammable liquids or material.

Do not operate without lamp in place. Allow lamp to cool before removing.

Replace lamps supplied by DEL Lighting, Inc.

For servicing purposes, install in an area that is readily accessible. The unit may be mounted on a wall, floor or ceiling. Good air circulation is a must. Avoid areas where debris (leaves etc.) might clog the fans. Also, avoid dusty areas as dust could be drawn into the unit and dim the bulb over time. If the unit is installed outdoors (outdoor units), it should be mounted on a fence or post 18” – 20” above ground level. In this case, make sure the fiber port is on the bottom (S150 series).

Fiber installed underground outdoors should be installed in a conduit. Use sweep elbows only. Do not use 90 degree plumbing fitting. After the cable is set, seal the opening with RTV silicon caulking or similar. This will prevent water or debris from entering the conduit.

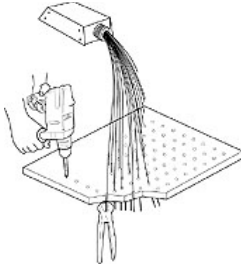
Del Lighting, Inc.

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Starfield Installation Guide



Installing a starfield is very easy but it can be time consuming. You will need the following: an illuminator, the cable, a drill with .75mm, 1mm and 1.5mm drill bits and any type of glue that will give you about 20 minutes of “work time”. You also **MUST** have access to the ceiling from the top and bottom to install the cable. The first thing you will have to do is measure how large the starfield will be and where the illuminator will be located; you will have to service the illuminator eventually. These two things are critical for a successful project! An average starfield will have 4 or so “stars” per square foot. You can go higher or lower than this, but remember that you will probably want to double, or even triple, some of the strands to create a true night sky effect. If you have any trouble with how many stars (how much cable) you want, just contact us and we’ll be happy to help you.

After it’s been determined how many stars you want, you can figure out how long the cable needs to be. Remember that the cable is the most expensive part of a starfield and try to keep the runs to a minimum. Example: For a 10-foot by 10-foot square starfield we would want about 300 stars. We can go with six runs of cable, four 8-foot pieces of 50-strand, one 6-foot piece and one 4-foot piece. You have to add a service loop to the illuminator for each length of cable.

Working with two people, one below the ceiling and one above, you can now start the installation. You will have to strip the cable jacket from the strands of cable near where you will want to install the stars. You don’t have to strip the entire run of cable. The person below the ceiling will drill a hole where he/she feels a star should go, the person above will shove one, two or three strands (depending on the size hole drilled) of cable through the ceiling – about 3 inches is fine. Put a small amount of glue (Elmers is ok, but **NOT** Tite Bond) on the cable to hold it in place. Do not snip the cable at this time. Go to the next one and repeat. Try to leave a few strands from each cable free so that you can fill in any bare spots. Also, try and leave a path for you to work from and start from the furthest point of your starfield – leaving an exit for yourself. The illuminator may be placed in a ventilated attic but it will reduce the lamp life and the illuminator could get hot.

After you have completed the starfield, you may now paint the ceiling or prepare it in any way you wish. After this has been done, snip the strands with a scissors about ¼ inch from the ceiling. This will allow you to paint the ceiling again at a later date.

If you have a drop down ceiling, remove one of the ceiling tiles and work on an adjacent one. If you are working with sheetrock that hasn’t been installed yet, place the strands in the sheetrock like you would a regular ceiling, leaving a place for the mud to go. Leave strands for later when you can fill in these empty places.

IMPORTANT Leave an 18 Inch loop of cable at the end of the illuminator in case you need to service it.

IMPORTANT You must polish the cable end that goes into the illuminator. If you don’t, the light output will be weak and you could actually melt the cable (one good reason to have a service loop in the cable!). Also, if the cable ends are not trimmed before you insert the harness you could damage or destroy the twinkle wheel!

For a professional system you will need an [X20-75 illuminator](#). It will do a ceiling of between 175 and 200 square feet. The [DEL75W-2LC](#) can handle up to 300 square feet and it can dim as well. You will need [end emitting fiber optic cable](#) of various lengths to cover your ceiling. Just give us a call and we’ll help design your system.

For a smaller system (like a child’s room), you can use the [LED 594-2M](#) LED system. It doesn’t twinkle like the professional system, but it has a very calming effect.

