PROCEDURAL GUIDE
FOR FIBER OPTICS ESTIMATION

DESIRED FOOTCANDLES	10fc	5fc	2.5fc	1.25fc
APPLICATION	OIL PAINTINGS	WATER COLORS	TEXTILES, DOCUMENTS	FLOORS, CARPETS
FIBER COVERAGE	1.5 ft²/fiber (16" DIA. BEAM)	3 ft²/fiber (24" DIA. BEAM)	6 ft²/fiber (32" DIA. BEAM)	24 ft²/fiber (64" DIA. BEAM)
LUMINAIRE TYPES	ZDSL ZDSA FOL's ZDPL	ZDSL ZDSA ZDPL	ZDSL ZDSA	LBRL LBRA

PROCEDURE:

1) Estimate total area for each application. Look at OBJECTS, not the size of the space.
2) Calculate total fibers required for each application.
3) Add up total fibers for all applications.
4) Assumes standard reflectances: Ceiling: 80%, Walls: 50%, Floor: 20%, Combined: 150% (Different totals will require adjustments.)
5) Assumes 10 foot fiber lengths. See chart below for longer lengths.
6) Divide total fibers by 32 to determine number of fiber optic systems. Specify one CLDN-SYS projector with its power supply system for every 32 fibers.

FOOTCANDLE LOSS PER FOOT OF FIBER

A standard fiber can light 50 feet or more from the projector. Transmission losses of NoUVIR Acrylic fiber are only 0.7%/foot.

At 10 feet, a luminaire will produce	**100%** of what is in the photometry section.
At 20 feet	**93%**
At 30 feet	**86%**
At 40 feet	**79%**
At 50 feet	**72%**

Even at just $1.00 a foot, fiber costs do add up when multiplied by a number of fibers. Balance fiber cost against projector costs. Running 16 of the 32 fibers in a projector more than 35 feet to a second case or exhibit is usually more expensive than using two projectors with 16 shorter fibers in each unit.

REMEMBER THE ABCs

A. Light Artifacts, Not Areas. How many items will you light? What lighting levels do they require? From how far away will you be lighting the objects? Use the photometry charts to calculate how many luminaires and which kinds of luminaires to use. Use DIMMER-SPLICE connectors to lower light levels. Cross light or "tile" several luminaires for brighter light levels. Use CLOSE-UP or ULTRA-FOL PINSPOT luminaires to highlight objects.

B Keep Backgrounds Subdued. Light graphics at 1/2 the light level of the brightest artifacts. Light floors and walls 1/2 of that. Give eyes time to acclimate by putting the most sensitive artifacts several galleries into the museum. Lower light levels gradually as you move further from doors and windows.

C. Control Glare and Case Reflections. Watch lighting angles. Keep lights inside cases. Conceal lighting wherever possible to avoid reflections in case windows.

NEED AN AIR-SAFE SYSTEM?

For a case or cases, an AIR-SAFE MICRO-CLIMATE Control System is better than a desiccant chamber and often cheaper to either build or maintain. It cleans the air inside a case, maintains a set humidity level without using electricity and keeps cases from exchanging air with a gallery.

PARA-FOL™ PARABOLIC FLOOD LUMINAIRES

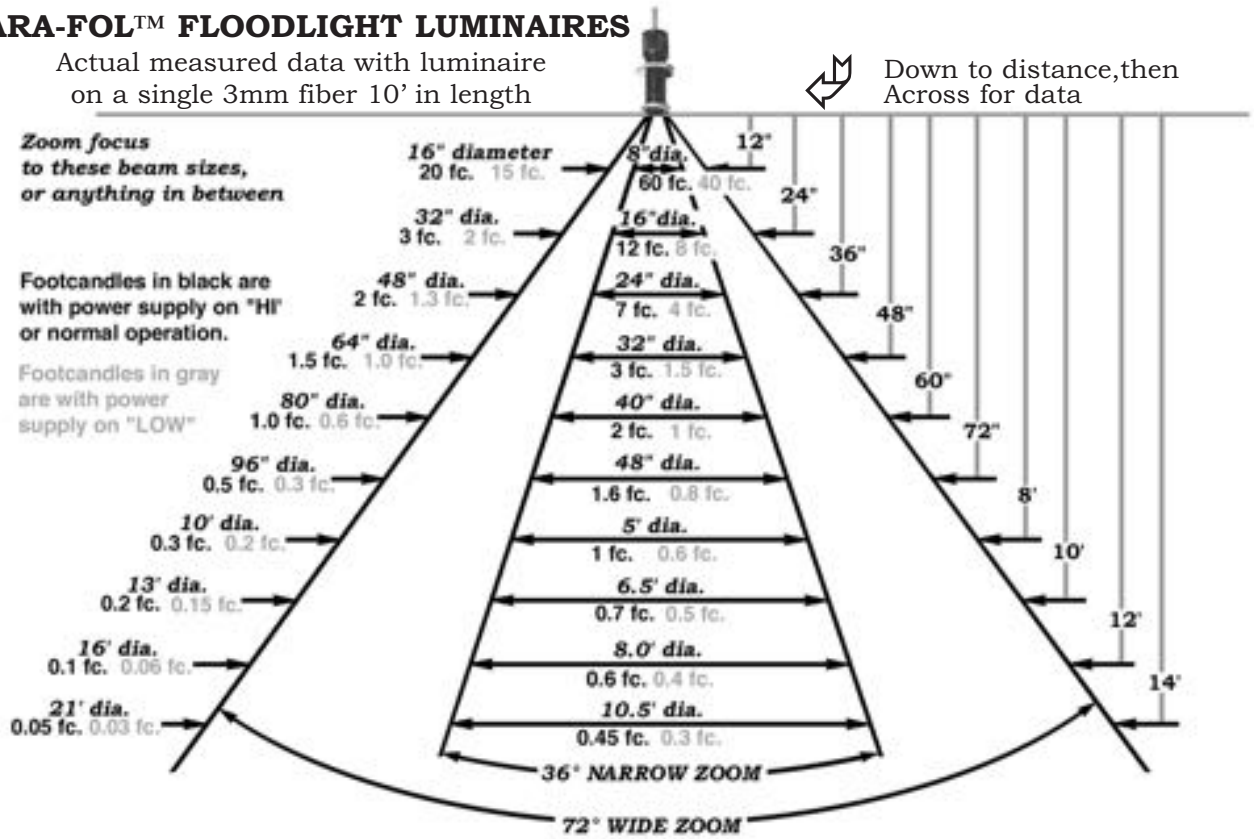
Nearly Invisible, Low-Brightness, Black Parabolic Reflector Luminaires

LBRL • PARA-FOL™ - Low Brightness parabolic Reflector Luminaire
LBBL • PARA-FOL™ - Low Brightness parabolic reflector with Bracket Luminaire
LBRP • FIBER-STEM™ PARA-FOL™ - Low Brightness parabolic Reflector Pendant
LBRA • AZ-EL PARA-FOL™ - Low Brightness parabolic Reflector luminaire with Az-el mirror
LBBA • AZ-EL PARA-FOL™ - Low Brightness parabolic reflector with Bracket and Az-el mirror
LRAP • FIBER-STEM™ PARA-FOL™ - Low brightness parabolic Reflector Az-El mirror Pendant
LBRT • FIBER-TRACK™ PARA-FOL™ - Low Brightness Reflector for fiber/corner-Track
LBFT • FLAT-TRACK™ PARA-FOL™ - Low Brightness reflector for Flat-Track and bannister

All Para-fol flood luminaires share the same optical elements and provide the photometric performance characteristics shown below. The photometry below is actual measured data from a NoUVIR system operating a Para-fol Flood Luminaire on a single 3mm (1/8") fiber 10' in length. Shorter fibers will produce more intensity. Fiber length does not affect beam patterns or zoom diameters.

PARA-FOL™ FLOODLIGHT LUMINAIRES

Actual measured data with luminaire on a single 3mm fiber 10' in length



IDEAS

A polished bare fiber produces the same beam and intensity as a flood adjusted to its widest 72° beam. The difference is that without the luminaire body, aim is more difficult and there is no zoom control. In small enclosures or at close lighting distances, bare fiber can provide spectacular lighting at minimum cost. Several fibers with overlapping 72° beams give a wide, gentle wash.

Bare fiber can be polished and mounted through an 1/8" hole like the fibers in the top of this case. Adding luminaires lets you highlight important artifacts. Fiber cut at a 45° angle can be also run flat against a surface or behind a lip. Light will project about 60° off axis. These cubby hole boxes are lit with bare fiber.

Using floods only where bare fiber will not work, spots only where floods won't give enough control and pinspots only when spots won't give sufficient throw or focus will save hardware costs. But it can limit future changes and possibilities!

MICRO-FOL™ MICRO-MINIATURE SPOT LUMINAIRES

Zoom-and-Dim Micro-Miniature Spotlights with Pure-White, Stone-Cold Light

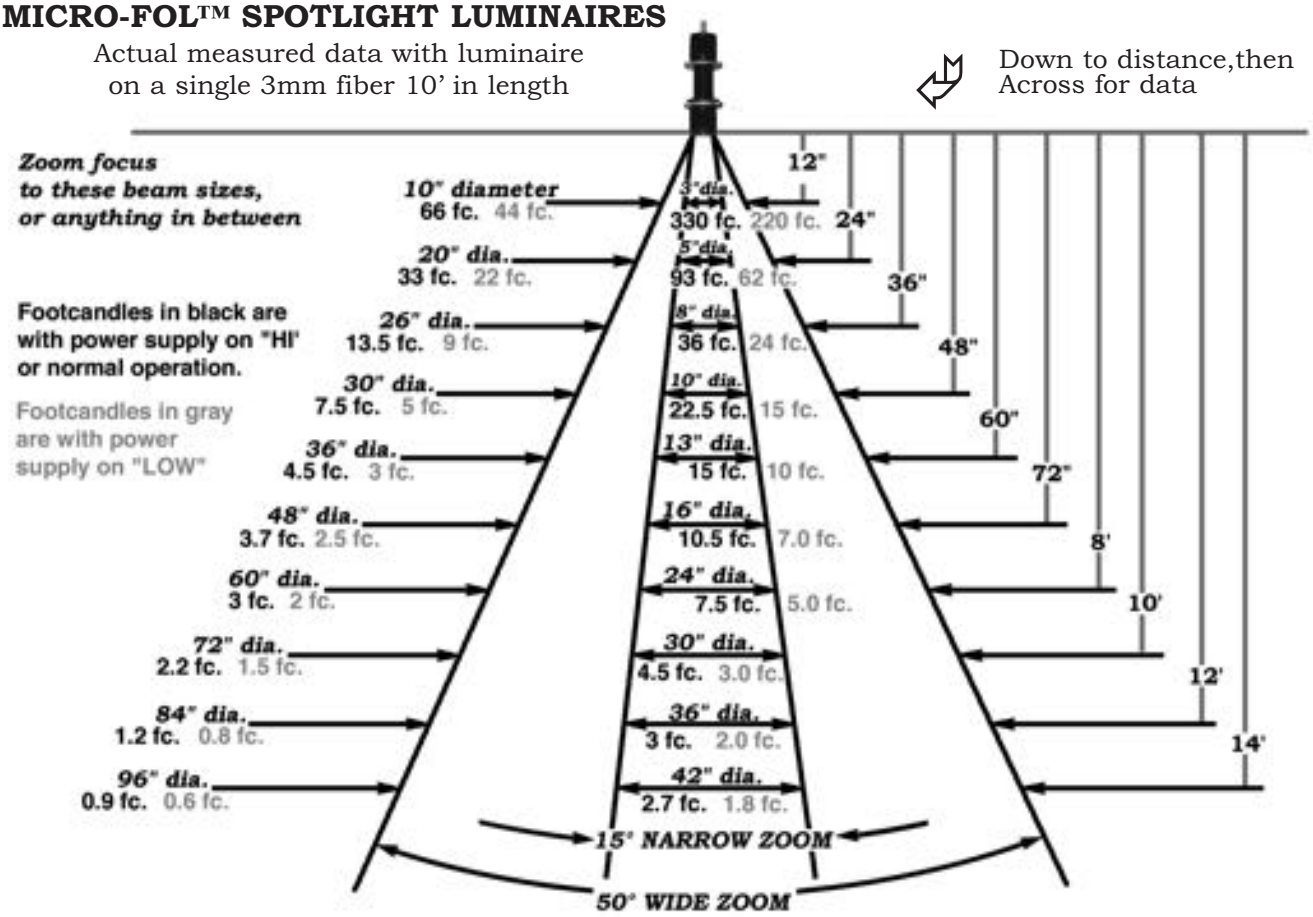
ZDSL • MICRO-FOL™ - Zoom-and-Dim Spotlight Luminaire
ZSBL • MICRO-FOL™ - Zoom-and-dim Spotlight with Bracket Luminaire (was #ZDBL)
ZDSP • FIBER-STEM™ - MICRO-FOL™ Zoom-and-Dim Spotlight Pendant
ZDSA • AZ-EL MICRO-FOL™ - Zoom-and-Dim Spotlight with Az-el mirror
ZSBA • AZ-EL MICRO-FOL™ - Zoom-and-dim Spotlight with Bracket & Az-el mirror
ZSAP • AZ-EL FIBER-STEM™ - Zoom-and-dim Spotlight with Az-el mirror Pendant
ZDST • FIBER-TRACK™ MICRO-FOL™ - Zoom-and-Dim Spot for fiber/corner-Track
ZSFT • FLAT-TRACK™ MICRO-FOL™ Zoom-and-dim Spot for Flat-Track and bannister
ZDEL • SPHERI-FOL™ - Zoom-and-Dim Eyeball Luminaire
ZDER • REFLEX SPHERI-FOL™ - Zoom-and-Dim Eyeball Reflex luminaire
LNSA • SPHERI-FOL™ - Long Neck Spotlight with Az-el mirror

All Micro-fol spot luminaires share the same optical elements and provide the photometric performance characteristics shown below. The photometry below is actual measured data from a NoUVIR system operating a Micro-fol Spot Luminaire on a single 3mm (1/8") fiber 10' in length. Shorter fibers will produce more intensity. Fiber length does not affect beam patterns or zoom diameters.

MICRO-FOL™ SPOTLIGHT LUMINAIRES

Actual measured data with luminaire on a single 3mm fiber 10' in length

Down to distance,then Across for data



Need a tighter beam? Turn one page to the pinspot on page 9-5. Beam isn't wide enough? Use a flood on page 9-3.
Need more footcandles? Overlap beams or mix floods in with spots for more fill.

ULTRA-FOL™ ULTRA-WIDE-ZOOM PINSPOT LUMINAIRES

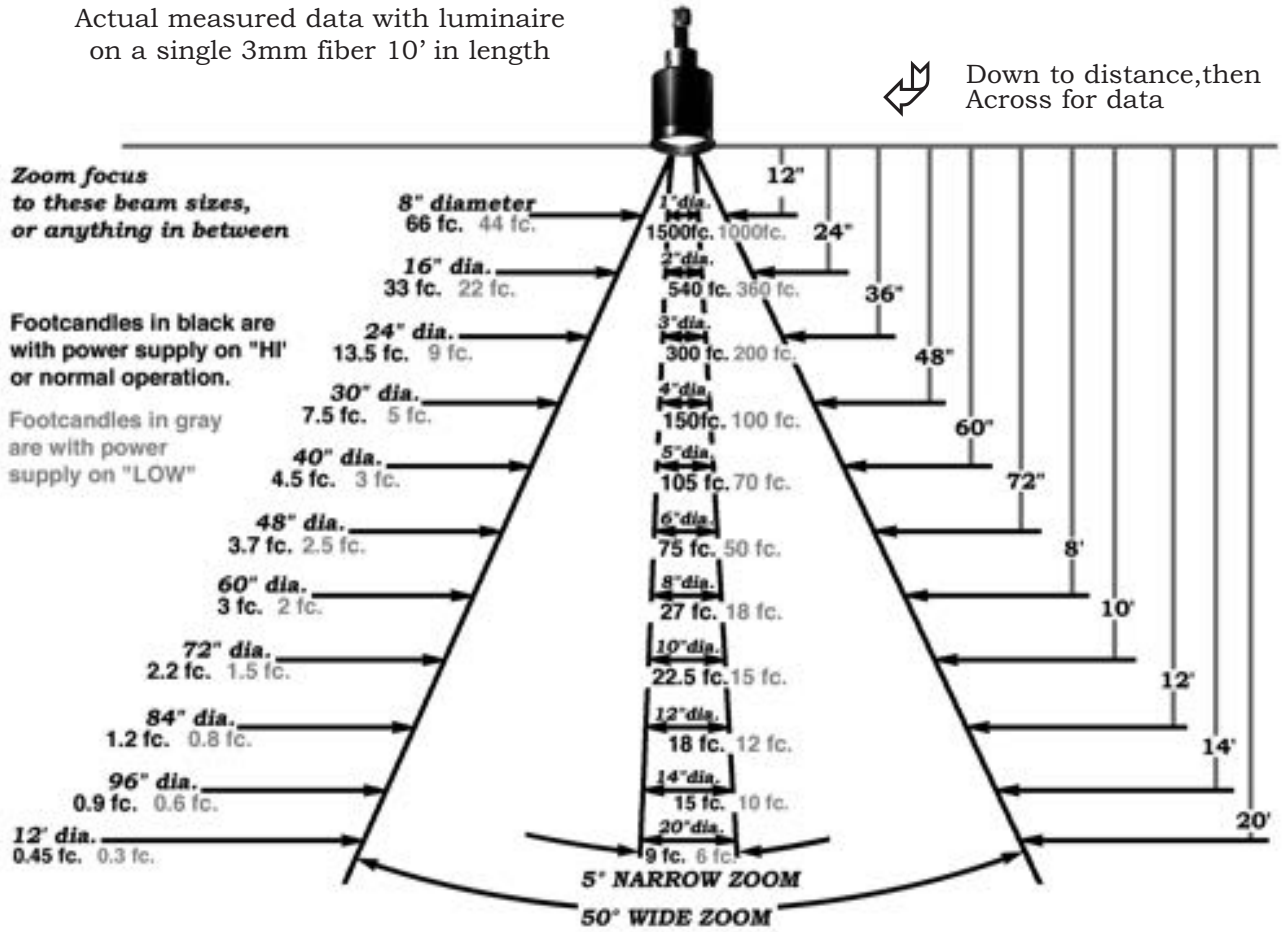
A True Pinspot with Pin-Point Accuracy and an Amazing 10:1 Zoom Range

ZDPL • ULTRA-FOL™ - ultra-wide Zoom-and-Dim Pinspot Luminaire
ZPBL • ULTRA-FOL™ - Zoom-and-dim Pinspot with Bracket Luminaire
ZDPP • FIBER-STEM™ ULTRA-FOL™ - Zoom-and-Dim Pinspot Pendant
ZDPA • AZ-EL ULTRA-FOL™ - Zoom-and-Dim Pinspot luminaire with Az-el mirror
ZPBA • AZ-EL ULTRA-FOL™ - Zoom-and-dim Pinspot with Bracket and Az-el mirror
ZPAP • FIBER-STEM™ - Zoom-and-dim Pinspot with Az-el mirror Pendant
ZPFT • FLAT-TRACK™ ULTRA-FOL™ - Zoom-and-dim Pin for Flat-Track & 4" bannister
LNPL • SPHERI-FOL™ - Long-Neck eyeball Pinspot Luminaire
LNPA • SPHERI-FOL™ - Long-Neck eyeball Pinspot luminaire with Az-el mirror
ZDPO • ULTRA-FOL™ - Zoom-and-Dim Pinspot with 0-15° Off-axis aim

All Ultra-fol Pinspot luminaires share the same optical elements and provide the photometric performance characteristics shown below. The photometry below is actual measured data from a NoUVIR system operating an Ultra-fol Pinspot Luminaire on a single 3mm (1/8") fibers 10' in length. Shorter fibers will produce more intensity. Fiber length does not affect beam patterns or zoom diameters.

ULTRA-FOL™ PINSPOT LUMINAIRES

Actual measured data with luminaire on a single 3mm fiber 10' in length



The pinspot duplicates a spot from 50° to 15°, but also zooms down to 5° for a tight, bright beam or the ability to reach across a space. Don't need that much control? Pick a spot on page 9-4. Too much light? Add a DMSP Dimmer-splice Connector on page 6-7.