Poly Optics Australia Pty. Ltd.

The World's Most Advanced Solid Core Fibre Optic

1/18 Leda Drive,
Burleigh, QLD, 4220
Australia

Email: **sales@fiberopticlight.com** **Ph: +61 7 55 20 2222**
Website: **http://www.fiberopticlight.com** **Fax: +61 7 55 20 2255**

Poly Optic Solid Core Fibre

Poly Optics Australia Pty. Ltd. is pleased to offer its solid core optical fibre to the lighting industry. It is a rugged, non-conductive, water resistant, bendable, monofilament cable; which is able to transmit light from one end to the other with minimal loss of intensity and no heat transfer.

It is available in a variety of diameters (3mm to 14mm) which works with most manufacturers light sources. Solid core optical fibre solves difficult and unusual lighting problems. It offers innovative lighting techniques for a variety of lighting systems.

Solid core optical fibre can be utilized for "*end light*", where point light is desired or "*side light*", where decorative linear effects are desired.

Solid core optical fibre is produced using state-of-the-art production techniques to achieve both high quality and economy of price.

Poly Optics Australia Pty. Ltd. is committed to giving you the very best in innovation, product quality and customer commitment.

Poly Optic Solid Core Fibre is a result of many years of research and development. The core of the fibre is made from a flexible polymerised gel. The gel is clad in an outer layer of Teflon. The optic is powered from a light source and carries only light waves in the visible light spectrum. Light is transmitted along the core/cladding interface due to a phenomena called *total internal reflection.*

Poly Optic Solid Core Fibre is energy efficient. Many fibres can be powered from a single light driver – typically 50 to 150 watts. The Poly Optic Light Driver $_{TM}$ Series can be used to change colour sequences or patterns using a variable speed or stepped change colour wheel.

Before the use of fibre optics in lighting, there were limited traditional lighting techniques and very few choices. Fluorescent fixtures, incandescent lights and a few specialty (low voltage) lights, made up the range of products. This was particularly true in unusual and difficult lighting situations, such as in volatile environments, or for simple tasks, such as – pool and fountain lighting or changing the colour of a light.

Traditional lighting fixtures are installed in the cavities of building structures where heat dissipation and fire are always a concern. Since fibre optic lighting uses electricity only at the point of illumination and not within ceilings, walls or other confined areas, it is exempt from many codes and requirements. Therefore Poly Optic Solid Core Fibre Optic can be placed into areas often difficult to access.

Poly Optic Solid Core Fibre Optic lighting does not emit any kind of magnetic field and does not transmit harmful ultraviolet or infrared light. The light transmitted is completely harmless because harmful wave lengths of light are filtered at a suitable illuminator. Solid Core Fibre Optic presents an effective alternative to the hazards or inconsistencies presented by traditional lighting.

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In situations where traditional lighting is dangerous or difficult to install (eg. lighting the interior of fuel tanks for repair purposes), Poly Optic Solid Core Fibre Optics presents an electricity/spark free work light and is completely safe because the light driver is carefully located outside the volatile area.

Fibre optic lighting may be used to create innovative effects by emphasizing architectural and landscaped features with lines and points of coloured light.

Because of its unique properties, **Poly Optic Solid Core Fibre** can be used for a variety of **applications**:

Safety lighting for:
- Hazardous or explosive areas
- Emergency exits or pathways
- Utility work areas at night
- Danger areas involved with road construction
- Accident and emergency scenes
- Traffic and directional signals
- Marina berths
- Boat lighting
- Industrial areas
- Heliport pads and airport approaches
- Refrigeration and cold rooms
- Step and aisle marking

Decorative lighting for:
- Shopping centre arcades
- Discos and nightclubs
- Casinos
- Building foyers and corridors
- Stairs and escalators
- Automobiles, buses and trucks
- Phone booths and bus shelters
- Signage
- Shop front window displays
- Christmas exhibits
- Ice sculptures and art pieces
- Trade shows and exhibitions
- Landscaping along driveways and gardens
- Aquariums
- Chandeliers
- Cabinets and ornamental furniture
- Precious artifact lighting
- Highlighting building features

Inspection lighting for:
- Medical and dental professionals
- Auto mechanics
- Plumbers
- Refrigeration and air conditioning technicians
- Jewellers and watchmakers
- Hobbyists – such as bird and plant breeders
- Electronics and printed circuit board technicians

Non conductive lighting for spark free or electricity free areas:
- Mine shafts and tunnels
- Swimming pools and spas
- Utility pits and manholes
- Roadside repair sites
- Ammunition bunkers
- Welding and spray painting areas
- Grain elevators

Alternative lighting for:
- Piping sunlight
- Replacing conventional lights

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Benefits:

- **IR and UV light are not transmitted.**
- **Low cost and long life.**
- **Easy to install**
- **The fibre itself needs no maintenance.**
- **Flexible, durable, light weight and portable.**
- **Environmentally friendly.**
- **Multiple fibres can be added to a single light source reducing energy and maintenance costs.**
- **Can be used in water, snow or ice.**
- **Highly visible and attractive.**
- **Can be used for indoor and outdoor applications.**
- **Suitable for temperatures of –40°C (-40°F) to +120°C (+248°F).**

Standard Grade Technical Specifications:

1. Mechanical Characteristics:

- Optical Core Composition: Solid optical gel core made from optically pure case acrylic monomers, including MMA, to ensure flexibility, and superior light transmission.
- Cladding Compositon: The optical core is clad in a sheath of clear Teflon.
- Bend Radius: Less than 6x diameter.
- Spool length: 300 metres (1000 ft.), or cut to order.
- Optic Sizes Available:

Product Code	Size O.D.	Core O.D.	FEP Wall	Tolerance	O.D. with Poly Jacket
Poly 30	3.0 mm	2.7 mm	0.15 mm	+/- 0.2 mm	5.0 mm
Poly 55	5.5 mm	5.1 mm	0.2 mm	+/- 0.3 mm	7.3 mm
Poly 65	6.5 mm	6.1 mm	0.2 mm	+/- 0.4 mm	8.1 mm
Poly 70	7.0 mm	6.6 mm	0.2 mm	+/- 0.4 mm	8.6 mm
Poly 90	9.0 mm	8.6 mm	0.2 mm	+/- 0.5 mm	10.5 mm
Poly 100	10.0 mm	9.6 mm	0.4 mm	+/- 0.5 mm	11.5 mm
Poly 120	12.0 mm	11.4 mm	0.3 mm	+/- 0.5 mm	14.0 mm
Poly 140	14.0 mm	13.2 mm	0.4 mm	+/- 0.5 mm	17.5 mm

2. Optical Characteristics:

- Spectral Range: 370 to 690 nm – visible wavelength range.
- Acceptance Angle: 45°
- Numerical Aperture: 0.68
- Attenuation: Less than 3% per metre
- Tested by NATA: (National Association of Testing Authorities).

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3. Environmental Characteristics:

•Thermal Stability: Core to 120°C (248°F). Cladding to 390°C (734°F).
•Operating Temperature Range: Minimum: -40°C (-104°F)
Maximum: +120°C (+248°F)
•Moisture Absorption: Core compositon is hydroscopic. Optics ends must be sealed to avoid absorption.
•Chemical Resistance: Teflon cladding is chemically resistant and impervious to solvents.
Core is affected by strong solvents.
•Storage: Dark/dry location where temperature is within specifications.
•Warranty: 1 year when installed to manufacturers specifications.

4. Handling Precautions:

- Install the fibre with as few bends as possible and do not exceed the minimum bend radius.
- Do not open packaging material with a sharp knife as the optic material may be damaged during the process.
- Do not kink the fibre.
- Handle the optic with care to avoid scratching.
- Cap all cable ends for sidelight usage to increase light intensity.
- Seal ends that will dangle in water during installation.
- Seal ends that are to be emersed in water.

5. Important Information:

•Specify indoor or outdoor usage: Outdoor fibre should be used for coloured light application, or for short run lengths in white light. It is not recommended for long length white light usage. Please specify outdoor fibre in applications where the product is directly exposed to UV light. Standard fibre may be used outdoors provided it is placed in protective tracking which contains UV inhibitors. For end lighting a UV filter is recommended to cover the cable ends which are exposed to the sun. For outdoor side light use we recommend that Poly Optics solid core fibre be supplied with a clear Poly Jacket.

•Specify side or end light.

•Specify lengths and polishing requirements: The optical fibre ends may be cut and polished at the factory.

•Application Length: This depends on many factors such as: ambient light levels, wattage of the light source, diameter of the optic, or whether both ends are to be illuminated from a light source.

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7. Equivalents of Solid Core Fibre to 0.75mm dia. Strands

Solid Core Fibre Diameter (mm)	Equal Number of 0.75 Strands
5.5	45
6.25	55
7	75
9	120
12	220
14	300

8. Light Carrying Capacity of Solid Core Fibre and 0.75mm dia. Strands

Solid Core Fibre		Stranded Fibre	
Diameter (mm)	Surface Area Square mm	No. of 0.75mm dia. Strands	Surface Area Square mm
3	5.3	25	11
5.5	19.6	30	12.37
6.25	24.6	50	22.09
7	32.2	75	33.14
9	52.8	100	44.18
12	96.8	150	66.3
14	132.7	300	132.5