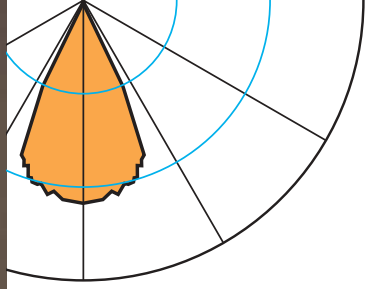


crystal starry sky

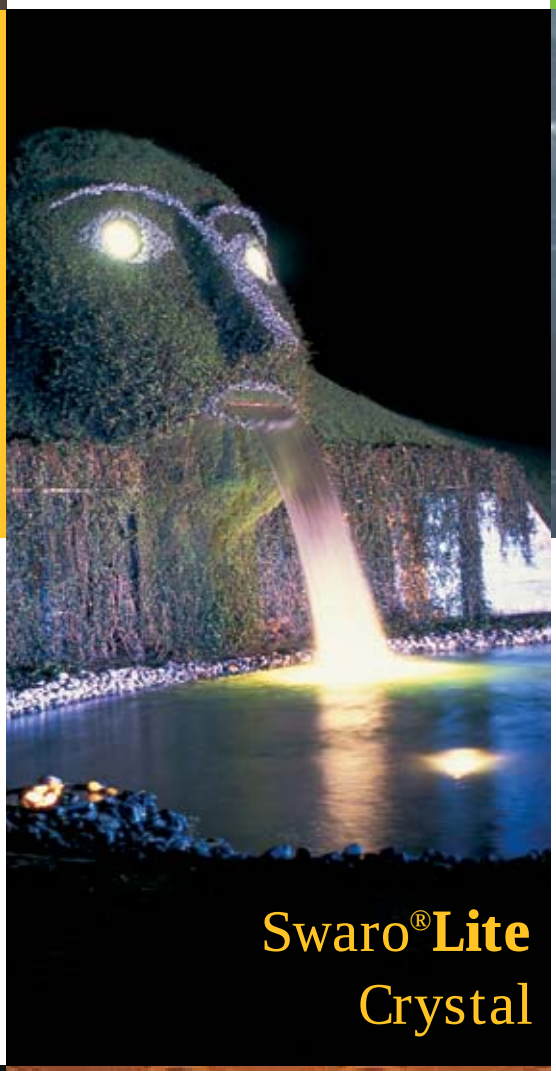
showcase illumination

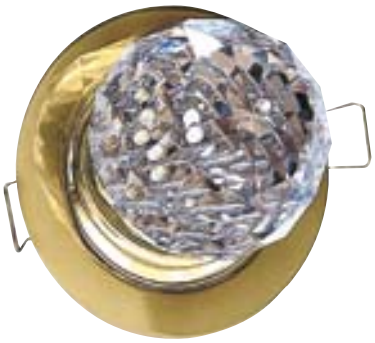
art illumination

interior illumination

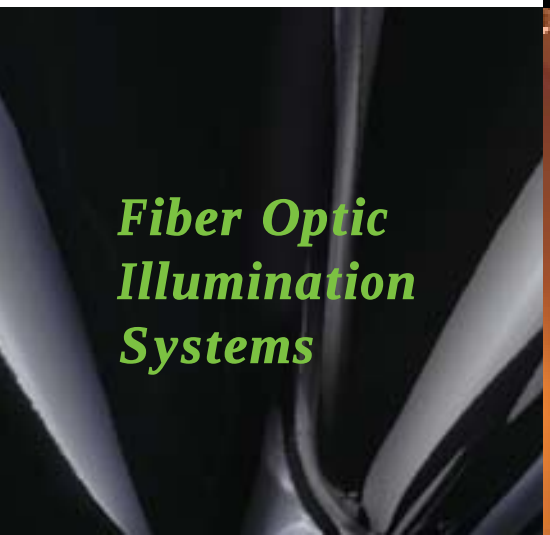
crystal panels

Crystal and Architecture share a common ground. Both rely on precision and geometry to provide a unique means for expressing light…





Swaro®**Lite** Crystal Lighting System *Architecture*



Fiber Optic Illumination Systems

starfire

…The House of Swarovski, world renowned for high-quality Strass® crystal, has developed a lighting system that combines the brilliant clarity of crystal with the fundamental elements of architecture. The result is Swaro®Lite Crystal Architecture.

Swaro®Lite is a remote source illumination system that integrates fiber optic technology with precisely cut crystals to diffuse or concentrate light. For use in decorative and functional applications, the Swaro®Lite system offers a vast selection of genuine Strass® crystal light outlet elements that are unsurpassed in quality and performance.

Starfire Lighting, the exclusive United States supplier of Swaro®Lite Crystal Architecture lighting components, is a fully integrated engineering and manufacturing facility dedicated to state-of-the-art lighting technology.

In keeping with Starfire's commitment to offer specifiers more than standard lighting solutions, Swaro®Lite Crystal Architecture adds a new dimension to fiber optic illumination.

Crystal *Architecture*

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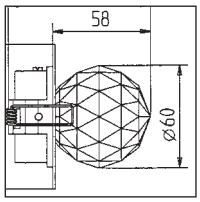

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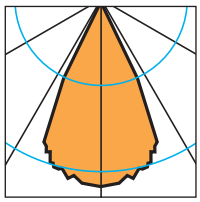

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Swaro®**Lite** Lighting System
Crystal *Architecture*

The Swaro®Lite Fiber Optic System consists of an illuminator, high quality glass fibers, and an assortment of diverse Strass® crystal light outlet elements.*

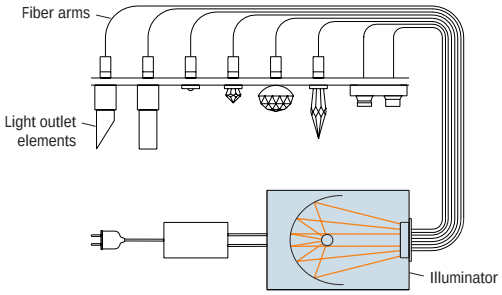


Fig. 1
The Swaro®Lite fiber optic system with light outlet elements mounted in a suspended ceiling.

The Swaro®Lite Crystal Architecture Lighting System offers remote source illumination with an unparallel selection of high-quality functional and decorative crystal light outlet elements.

The illuminator houses the lamp with a reflector that has been designed specifically for the Swaro®Lite system. High quality glass or PMMA fibers carry light that is virtually free of infrared and UV. Absolutely no electricity is associated with the fibers or light outlet elements.

* For PMMA fiber, consult factory.

The system
Crystal *Architecture*

The illuminators

The primary component of the Swaro®Lite illuminator is the cold light reflector. This specially designed glass reflector is constructed to obtain an extremely high surface reflection that is transparent to thermal radiation. Because infrared is not reflected into the fibers, the designed environment is illuminated with a gentle cold light.

Developed specifically for the Swaro®Lite fiber optic system, the CAD designed cold light reflector offers outstanding optical control while maintaining uniform light projection onto the input ends of the fibers. Depending on the brightness levels desired, as many as 350 independent outlets can receive light from one illuminator.* For unique applications, Starfire can engineer custom illuminators usually within a budget comparable to standard equipment.

These include:

- Computer controlled systems utilizing custom software capable of providing a multitude of special effects.
- Convection cooled fanless illuminators for silent operation in noise sensitive environments.
- Light tight illuminators minimizing excessive light leaks from illuminator vents.
- DMX 512 systems for central dimmer system interfacing.

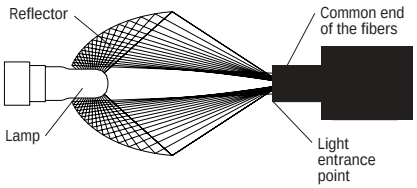
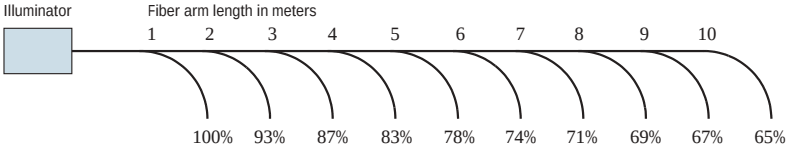


Fig. 2
The Swaro®Lite reflector guides 89% of the light into the optic fibers.

Fig. 3
Attenuation is approximately 3% per meter.
Light values are dependent upon the length of the fiber.



The Fibers

In order to maximize light transmission and color fidelity, the Swaro®Lite system utilizes only high quality optical glass fibers (PMMA fiber available, consult factory).

A high degree of infrared and UV is eliminated before it reaches the illuminated environment.

Overall light values are dependent upon the length of the fibers. Attenuation is approximately 3% per meter.

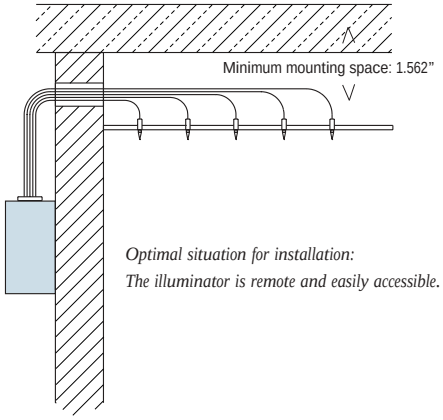
Once the fibers are installed, they require no additional maintenance.

The Light Outlets

- *Faceted, pointed light outlets, half round and fully round spheres of perfectly cut Strass® crystal for decorative light reflections.*
- *Optical lenses, spots, and directional systems for lighting architectural environments, displays, and showcases.*
- *Optical prisms for wallwashing and highlighting.*
- *Crystal panels for constructing decorative components for use in ceilings, walls, and furnishings.*

Starfire maintains a well-stocked selection of Swaro®Lite fiber optic lighting components.

* Fiber size will affect maximum outlet capacity, consult factory.



Optimal situation for installation:
The illuminator is remote and easily accessible.

Radiant star lit skies, formed of finely cut Strass® crystals, convey an ornate, romantic atmosphere.

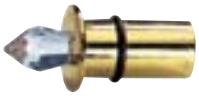
Crystal Starry Sky

Crystal *Architecture*

crystal starry sky

Cat. No. 010 200 (gold-plated)

Cat. No. 010 300 (gold-plated)
Cat. No. 010 301 (SP* gold-plated)
Cat. No. 010 302 (nickel-plated)
Cat. No. 010 303 (SP nickel-plated)



Cat. No. 010 400** (gold-plated)
Cat. No. 010 401 (SP gold-plated)
Cat. No. 010 402 (nickel-plated)
Cat. No. 010 403 (SP nickel-plated)

Cat. No. 010 500 (gold-plated)
Cat. No. 010 501 (SP gold-plated)
Cat. No. 010 502 (nickel-plated)
Cat. No. 010 503 (SP nickel-plated)

Cat. No. 010 600 (gold-plated)

Cat. No. 010 700 (gold-plated)

Cat. No. 010 850 (gold-plated)
Cat. No. 010 852 (nickel-plated)

Cat. No. 010 900** (gold-plated)
Cat. No. 010 901 (SP gold-plated)
Cat. No. 010 902 (nickel-plated)
Cat. No. 010 903 (SP nickel-plated)

Cat. No. 020 120 (gold-plated)

The beauty of the Starry Sky ceiling is created by the unequaled quality of Strass® crystal. The precisely formed crystals reflect clearly defined decorative images in light.

Varying the elements used in the design will provide unique lighting effects as well as a multitude of design possibilities.

A “starry sky” of crystal fiber optic elements is an elegant enhancement which cannot be created by any other lighting median.

Starry Sky complete application systems are available, see pages 23-27.

One illuminator provides light to numerous Swaro®Lite Crystal Architecture outlet elements with current-free light. The illuminator can be supplied with optional special effect disks, through which the color of the emerging light is constantly changing or shimmering. DMX control capabilities are available, consult factory.

An assortment of Strass® crystal light outlet elements are shown to the right.

* SP: Swimming Pool–Chlorine resistant.

** Add suffix MC to Cat. No. for “Multi-color” effect, Ex: 010 403MC. Available in series 010 400's and 010 900's only.

Wall showcase in the Museum of Ethnology, Vienna.
Indirect lighting; mirrors combined with direct illumination.

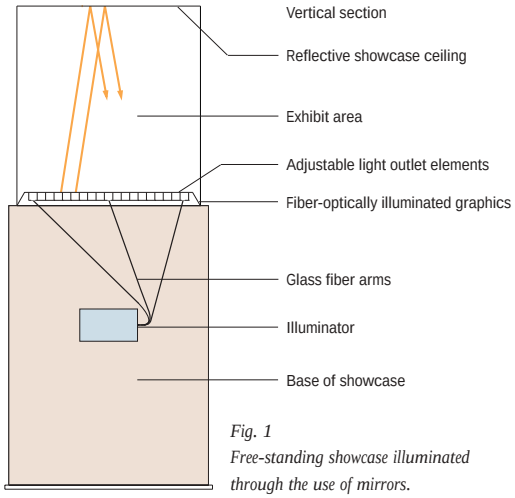


Fig. 1
Free-standing showcase illuminated through the use of mirrors.

Displays are illuminated safely without heat, UV or disturbing reflections.

Free-standing showcase in the Bavarian National Museum, Munich.
Indirect illumination using mirrors (see Fig. 1).

Showcase Illumination
Crystal *Architecture*

Curators of museums and galleries, as well as private owners of valuable collectables are realizing the advantage and design flexibility of fiber optic illumination. Rare documents, priceless artifacts, works of art and other valuable exhibits can be viewed free of shadows and reflections. Nothing disturbs the eye of the viewer because the source of light remains unobtrusive.

Showcases are illuminated with optimal color fidelity without heat or UV. Light in the showcase is strong, but gentle.

Free Standing Showcases

The Swaro®Lite indirect fiber optic system incorporates the use of mirrors reflecting into free-standing showcases. Adjustable lenses in the floor of the showcase guide light to the mirrored showcase ceiling. The light is reflected glare-free into the presentation area. Optimal illumination reaches even the most difficult angles, corners, and edges of the exhibit.

Lectern-type showcase in Mozart's residence in Salzburg. Fiber illumination; linear lenses and mirrors.

Table & Lectern-Type Showcases

Light is distributed uniformly through the fibers into linear lenses and then guided to wall mirrors integrated in the frame of the showcase.

Wall Showcases

Individual lenses and spots, or directional elements mounted in rails, are integrated into the ceiling of the showcase (Rail not shown, see page 8).

The products to the right show focussing single spots and wide or narrow beam optical lens elements.

Wall showcase with direct illumination using fixed and adjustable spots.

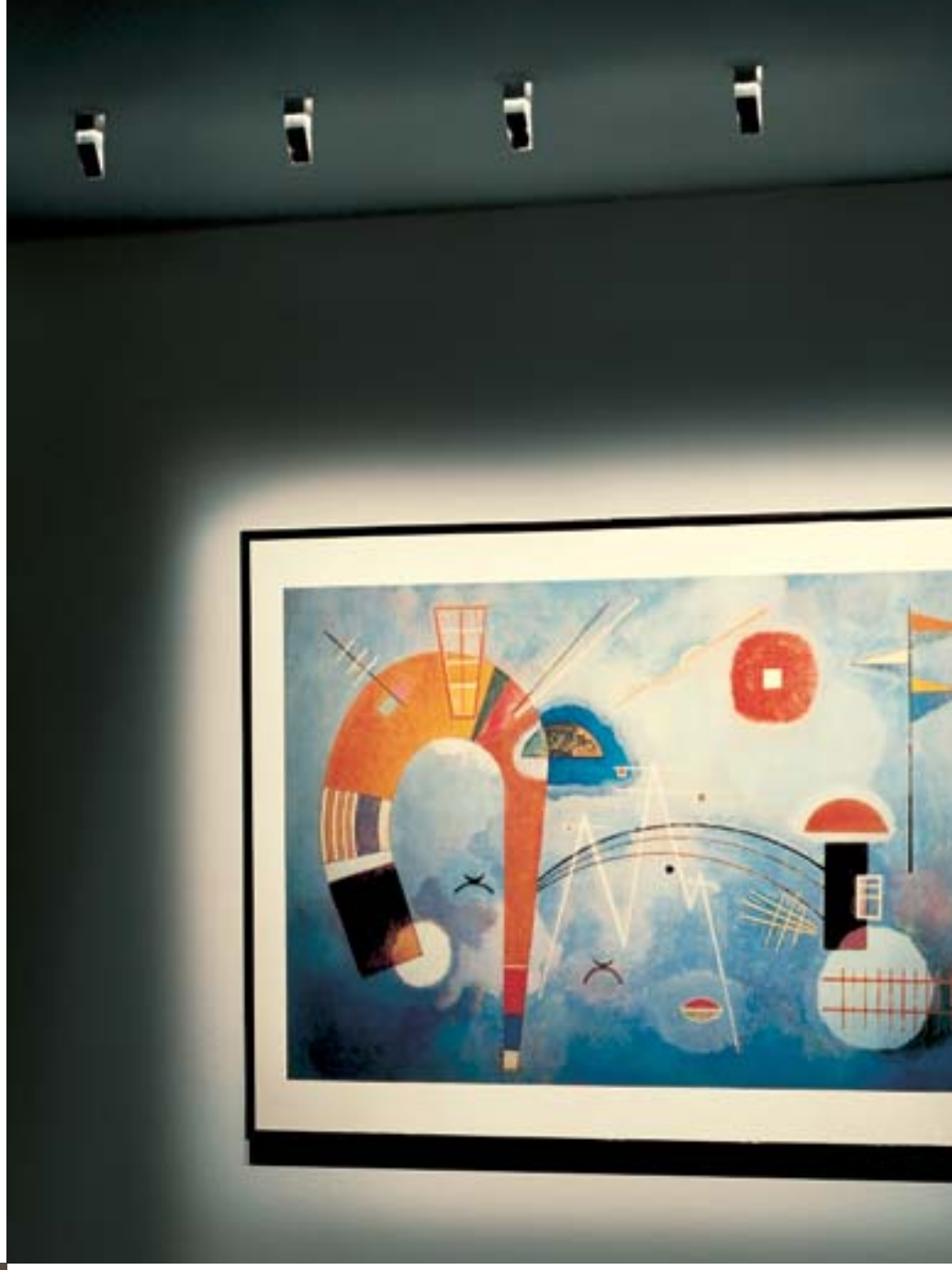
Cat. No. 020 800 (white)
Cat. No. 020 801 (black)
Cat. No. 020 803 (nickel-plated)
Spherical optic spot, swivel

Cat. No. 020 810 (white)
Cat. No. 020 811 (black)
Cat. No. 020 813 (nickel-plated)
Focussing optic spot, swivel

Cat. No. 030 010 (black)
Focussing lens system

Cat. No. 030 110 (black)
Standard lens system

Cat. No. 030 210 (black)
Auxiliary lens system



Art illumination; 32° prisms.

Art illumination; recessed fiber optic light fixture.

Illuminating museum pieces, private collections, and precious objects in an incomparable, non-damaging manner.

Art Illumination
Crystal *Architecture*

The Swaro®Lite product line includes optical ceiling spot lights, cut prisms, and ready-to-install fixtures to illuminate exhibits and sensitive works of art.

The Swaro®Lite fiber optic system eliminates the damaging properties of light. Costly art work, tapestries, photographs, and other valuable display pieces are illuminated with gentle, white light.

A single illuminator provides light to several pieces of art. Illumination is unobtrusive, without glare, and with true color rendition.

Cat. No. 040 100 (white)

The Swaro®Lite focusable optics, prism spots, and the ready-to-install fixture for recessed installation are shown to the right.

Cat. No. 011 300 (nickel-plated)
45° prism

Cat. No. 011 310 (nickel-plated)
45° prism spot, swivel

Cat. No. 011 400 (nickel-plated)
32° prism

Cat. No. 011 410 (nickel-plated)
32° prism spot, swivel

Cat. No. 020 800 (white)
Cat. No. 020 801 (black)
Cat. No. 020 803 (nickel-plated)
Spherical optic spot, swivel

Cat. No. 020 810 (white)
Cat. No. 020 811 (black)
Cat. No. 020 813 (nickel-plated)
Focussing optic spot, swivel

Art illumination; swivelling 32° prism spots.

Conference room task lighting; five illuminators, each utilizing a 100W halogen lamp providing light to 288 lenses.

Architectural environments are illuminated safely, without glare, heat or UV.

Interior Illumination
Crystal *Architecture*

In architectural environments where traditional lamps may be extremely difficult to access and maintain, or in locations where construction precludes large scale luminaires, the Swaro®Lite fiber optic illumination system provides safe, unobtrusive, current-free light that is sensitive to architectural design.

As the main source of illuminating wet environments - or for perfectly controlled task and accent lighting in offices, retail or private residences, the Swaro®Lite fiber optic system offers design flexibility and unique lighting support to the main source of room lighting.

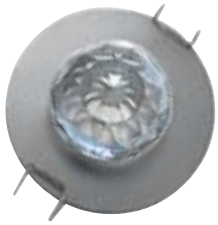
Specifications related to color change and control are easily accommodated. The powerful halogen illuminator is ideally suited for use in many architectural environments. In areas that require increased light values, an illuminator containing an HQI light source is available. The illuminator is always mounted in an easily accessible area.

A selection of Swaro®Lite Crystal Architecture light outlet elements for safe, current-free illumination for interior task and accent lighting are shown to the right.

Sauna lighting; one illuminator, utilizing a 100W halogen lamp providing light to 38 optical lenses.

Cat. No. 010 300* (gold-plated)
Cat. No. 010 302 (nickel-plated)

Cat. No. 010 810 (nickel-plated)



Cat. No. 010 820 (nickel-plated)

Cat. No. 011 200 (nickel-plated)

Cat. No. 011 210 (nickel-plated)

Cat. No. 011 300 (nickel-plated)
45° prism

Cat. No. 011 310 (nickel-plated)
45° prism spot, swivel

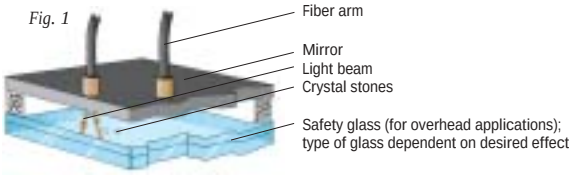
Cat. No. 011 400 (nickel-plated)
32° prism

Cat. No. 011 410 (nickel-plated)
32° prism spot, swivel

* Chlorine resistant gold and nickel plated available, see page 5.

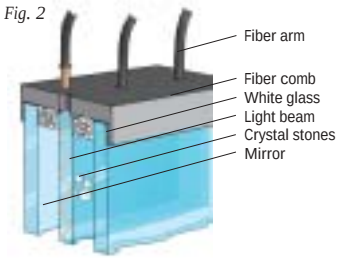
Crystal panel; "Northern Lights," infinity effect and 150 light points (see Fig. 1).

Fig. 1

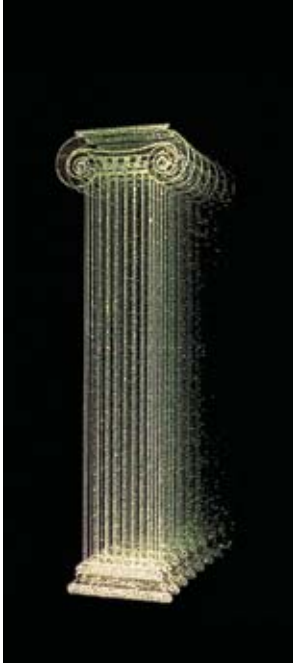


Illuminated Crystal Panels, decorative elements for interior and architectural design.

Fig. 2



Crystal Panels
Crystal *Architecture*

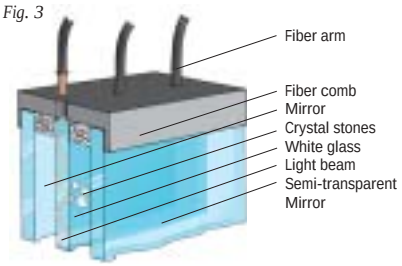


Crystal panel; "Greek column," infinity effect (see Fig. 3).

Crystal Panels are decorative elements with no fixed boundaries in regards to construction, form or design motif.

The panels' construction combines glass panes and mirrors in an insulating composite in which crystal stones are integrated. The crystals shimmer in the colors of the spectrum when edge lit with fiber optics, lighted by spots or exposed to natural incident sunlight.
Sand blasting and silk screening can be incorporated to augment the design.

Fig. 3



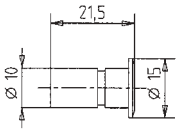
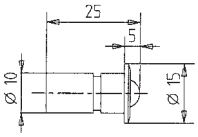
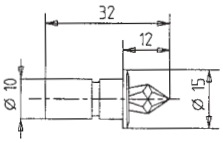
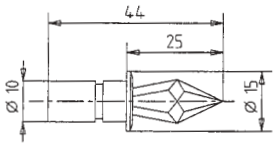
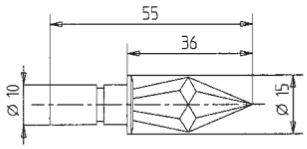
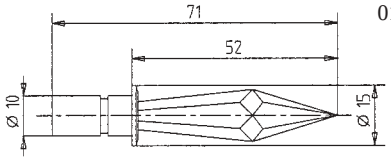
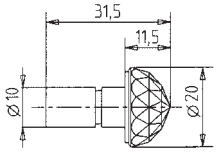
An infinity or depth effect can also be achieved by varying the type and number of panes used in the composite.
The colors of the background mirrors can also be varied making for a valuable design tool for interior or architectural design applications.

Once the panels are installed they are absolutely maintenance-free.

Crystal panel as a door element; illuminated by sunlight.

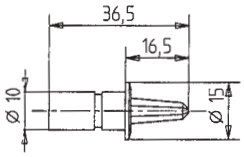
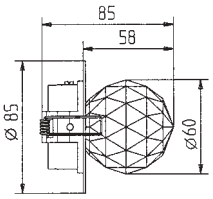
Crystal panel information signage; crystals on glass illuminated with fiber optics.

Decorative Light Outlet Elements

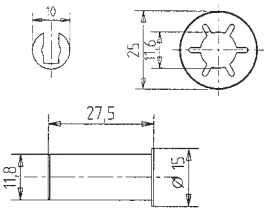
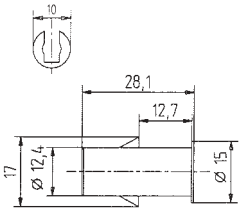
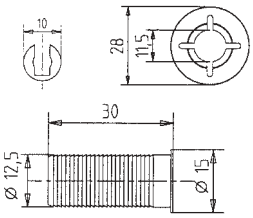
DIMENSIONS	CAT NO	DESCRIPTION	FIBER SIZE	WEIGHT
	010 200 (gold-plated)	Light Element without crystal Use: Decorative lightpoint Mounting: All sleeves	1.5 (Ø1.5mm)	7.4g
	010 300 (gold-plated) 010 301 (swimming pool*, gold) 010 302 (nickel-plated) 010 303 (swimming pool, nickel)	Spherical lens Ø7.4mm Beam angle: 2 x 12° Use: Starry sky application, room, accent, sauna, shower Mounting: All sleeves	1.5 (Ø1.5mm)	10.2g
	010 400 (gold-plated) 010 401 (swimming pool, gold) 010 402 (nickel-plated) 010 403 (swimming pool, nickel) 010 400 MC** (gold-plated) 010 401 MC (swimming pool, gold) 010 402 MC (nickel-plated) 010 403 MC (swimming pool, nickel)	Crystal 12mm Crystal 12mm Crystal 12mm Crystal 12mm Crystal 12mm, Multi-color Crystal 12mm, Multi-color Crystal 12mm, Multi-color Crystal 12mm, Multi-color Use: Starry sky application Mounting: All sleeves	1.5 (Ø1.5mm)	10.5g
	010 500 (gold-plated) 010 501 (swimming pool, gold) 010 502 (nickel-plated) 010 503 (swimming pool, nickel)	Crystal 25mm Use: Starry sky application Mounting: All sleeves	1.5 (Ø1.5mm)	14.0g
	010 600 (gold-plated)	Crystal 36mm Use: Starry sky application Mounting: All sleeves	1.5 (Ø1.5mm)	19.1g
	010 700 (gold-plated)	Crystal 52mm Use: Starry sky application Mounting: All sleeves	1.5 (Ø1.5mm)	19.2g
	010 850 (gold-plated) 010 852 (nickel-plated)	Crystal Ø20mm Beam angle: 2 x 20° Use: Functional and Decorative; Starry sky application, room, accent, sauna, shower Mounting: All sleeves	1.5, 3, 8, 14 (Ø1.5, 2, 3, 4mm)	14.3g

* Swimming pool: Chlorine resistant (gold or nickel plated).

** MC: Multi-color effect.

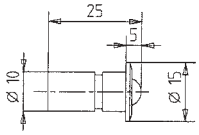
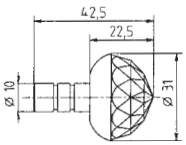
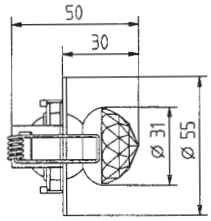
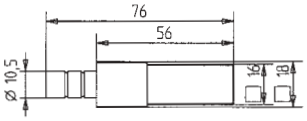
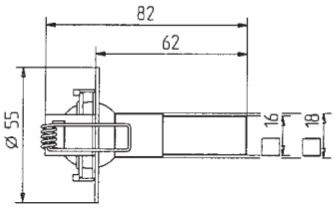
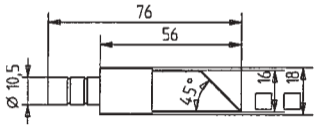
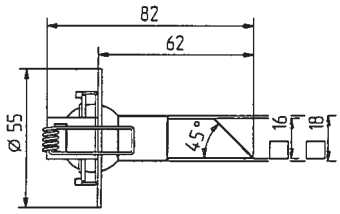
DIMENSIONS	CAT NO	DESCRIPTION	FIBER SIZE	WEIGHT
	010 900 (gold-plated) 010 901 (swimming pool, gold) 010 902 (nickel-plated) 010 903 (swimming pool, nickel) 010 900 MC (gold-plated) 010 901 MC (swimming pool, gold) 010 902 MC (nickel-plated) 010 903 MC (swimming pool, nickel)	Crystal 16.5mm Crystal 16.5mm Crystal 16.5mm Crystal 16.5mm Crystal 16.5mm, Multi-color Crystal 16.5mm, Multi-color Crystal 16.5mm, Multi-color Crystal 16.5mm, Multi-color Use: Starry sky application Mounting: All sleeves	1.5 (Ø1.5mm)	11.0g
	020 120 (gold-plated)	Crystal sphere Ø60mm Use: Decorative crystal ball forming star pattern on ceiling Spring retainer–Bore Ø: 76mm	8 pcs. of 1.5 (Ø1.5mm)	665.5g

Mounting Components

	019 030 (gold-plated metal)	Universal mounting sleeve Suitable for all LE's* and ceilings. Use: Sauna, with all prisms, Cat. No. 010 810 and glass fiber sizes 8 to 36	Bore Ø: 12mm	6.0g
	019 031 (gold plastic)	Mounting sleeve Suitable for all LE's (except Cat. No. 010 810: weight reasons) and plaster board ceilings of 12.5mm Min. thickness. Use: Starry sky application, shower, swimming pool	Bore Ø: 12.5mm	0.9g
	019 034 (transparent plastic)	Universal mounting sleeve Suitable for all LE's (except Cat. No. 010 810: weight reasons) and ceilings. Use: Starry sky application, shower, swimming pool	Bore Ø: 12.5mm	1.5g

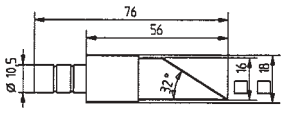
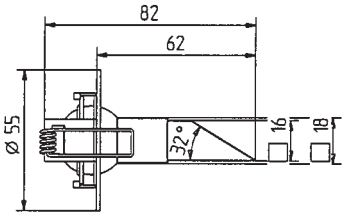
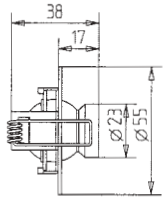
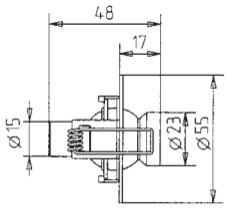
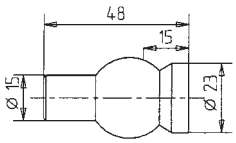
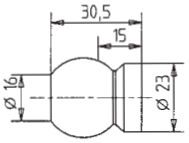
* LE's: Light Outlet Elements.

Functional Light Outlet Elements

DIMENSIONS	CAT NO	DESCRIPTION	FIBER SIZE	WEIGHT
	010 300 (gold-plated) 010 302 (nickel-plated)	Spherical lens Ø7.4mm Beam angle: 2 x 12° – 2 x 22°** Use: Decorative and functional; Room, accent, sauna, shower Mounting: All sleeves	1.5 to 14; (Ø1.5 to 4mm)	10.2g
	010 810 (nickel-plated)	Crystal Ø31mm Beam angle: 2 x 12° – Size 8 2 x 15° – Size 14 Use: Decorative and functional; Room and accent Mounting: Cat. No. 019 030 only	8 or 14 (Ø3 or 4mm)	52.1g
	010 820 (nickel-plated)	Crystal spot Ø31mm, swivel Beam angle: 2 x 12° – Size 8 2 x 15° – Size 14 Swivel range: 2 x 35° Use: Decorative and functional; Room and accent Spring retainer*	8 or 14 (Ø3 or 4mm)	153.4g
	011 200 (nickel-plated)	Prism 0° Beam angle: 2 x 12° adjustable** Use: Decorative and functional; Room, accent and zonal Mounting: Universal sleeve	8 or 14 (Ø3 or 4mm)	38.1g
	011 210 (nickel-plated)	Prism spot 0°, swivel Beam angle: 2 x 12° adjustable** Swivel range: 2 x 35° Use: Decorative and functional; Room, accent and zonal Spring retainer*	8 or 14 (Ø3 or 4mm)	138.5g
	011 300 (nickel-plated)	Deviating prism 45° Beam angle: 2 x 12° adjustable** Use: Decorative and functional; Wall and picture; horizontal downlight Mounting: Universal sleeve	8 or 14 (Ø3 or 4mm)	32.3g
	011 310 (nickel-plated)	Prism spot 45°, swivel Beam angle: 2 x 12° adjustable** Swivel range: 2 x 35° Use: Decorative and functional; Wall and picture Spring retainer*	8 or 14 (Ø3 or 4mm)	132.6g

* Spring retainer: not suitable for mineral fiber ceilings under 4mm thick.
Special springs available, consult factory. Bore Ø: 45mm.

** For detailed light distribution and efficiencies, see page 19.

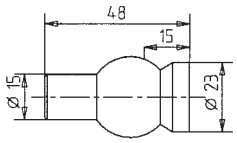
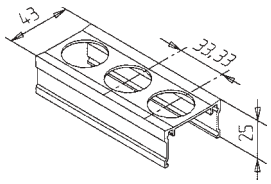
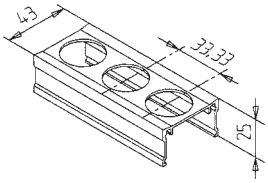
DIMENSIONS	CAT NO	DESCRIPTION	FIBER SIZE	WEIGHT
	011 400 (nickel-plated)	Deviating prism 32° Beam angle: 2 x 12° adjustable** Use: Decorative and functional; Wall and picture Mounting: Universal sleeve	8 or 14 (Ø3 or 4mm)	27.4g
	011 410 (nickel-plated)	Prism spot 32°, swivel Beam angle: 2 x 12° Swivel range: 2 x 35° adjustable** Use: Decorative and functional; Wall, picture, multi-level showcase Spring retainer*	8 or 14 (Ø3 or 4mm)	129.5g
	020 800 (white) 020 801 (black) 020 803 (nickel-plated)	Spherical optic spot, swivel Beam angle: 2 x 6° – 2 x 24°** Swivel range: 2 x 35° Use: Functional; Room; accent, ceiling spot, zonal, showcase Spring retainer*	3, 8, 14, 24, 36 (Ø2, 3, 4, 6, 7.2mm)	65.5g
	020 810 (white) 020 811 (black) 020 813 (nickel-plated)	Focussing optic spot, swivel Beam angle: 2 x 10° – 2 x 29°** Swivel range: 2 x 35° Use: Functional; Room; accent, ceiling spot, picture, zonal, showcase Spring retainer*	3, 8, 14, 24, 36 (Ø2, 3, 4, 6, 7.2mm)	69.6g
	030 010 (black)	Focussing lens system, swivel Beam angle: 2 x 10° – 2 x 29°** Swivel range: 2 x 35° Use: Functional; Showcase, picture Mounting: Aluminum rail	8, 14, 24, 36 (Ø3, 4, 6, 7.2mm)	28.4g
	030 110 (black)	Standard lens system, swivel Beam angle: 2 x 6° – 2 x 24°** Swivel range: 2 x 35° Use: Functional; Showcase, picture Mounting: Aluminum rail	3, 8, 14, 24, 36 (Ø2, 3, 4, 6, 7.2mm)	26.0g

(Functional light outlet elements continued on next page).

* Spring retainer: not suitable for mineral fiber ceilings under 4mm thick.
Special springs available, consult factory. Bore Ø: 45mm.

** For detailed light distribution and efficiencies, see page 19.

Functional Light Outlet Elements (continued)

DIMENSIONS	CAT NO	DESCRIPTION	FIBER SIZE	WEIGHT
	030 210 (black)	Auxiliary lens system, swivel Beam angle: 2 x 4° – 2 x 10°** Swivel range: 2 x 35 Use: Functional; Showcase Mounting: Aluminum rail	8 or 14 (Ø3 or 4mm)	24.0g
	030 300 (black)	Rail for spherical lenses For use with standard, focussing and auxiliary lens systems. Max 30 lenses per running meter. Rail cut to length as required. Adjustment Key: Cat. No. 051 003 available for directing lenses.		
	040 100 (white)	Picture/ display lighting, ready for mounting, w/ 11 pcs. swivel standard lens systems. Beam angle: 2 x 6° – 2 x 24°** Swivel range: 2 x 35° Ceiling opening: 140 x 395mm		1,303.7g

** For detailed light distribution and efficiencies, see page 19.

Functional Light Outlet Elements

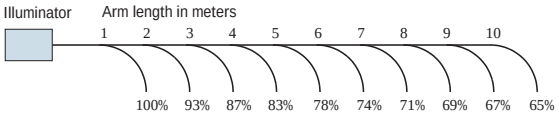
Optical Data Chart

CAT NO	DESCRIPTION	DISPERSION ANGLE (from-to)		FIBER DIMENSION	EFFICIENCY
030 110	Standard lens system	Narrow beam Wide beam	2 x 6° 2 x 19°	3 (Ø2mm)	0.88
020 800 020 801	Spherical optic spot	Narrow beam Wide beam	2 x 13° 2 x 19°	8 (Ø3mm)	0.87
020 803		Narrow beam Wide beam	2 x 9° 2 x 21°	14 (Ø4mm)	0.86
		Narrow beam Wide beam	2 x 17° 2 x 24°	24 (Ø6mm)	0.85
		Narrow beam Wide beam	2 x 15° 2 x 20°	36 (Ø7.2mm)	0.78
030 010	Focussing lens system	Narrow beam Wide beam	2 x 10° 2 x 20°	8 (Ø3mm)	0.83
020 810 020 811	Focussing spot	Narrow beam Wide beam	2 x 11° 2 x 24°	14 (Ø4mm)	0.83
020 813		Narrow beam Wide beam	2 x 18° 2 x 27°	24 (Ø6mm)	0.82
		Narrow beam Wide beam	2 x 20° 2 x 29°	36 (Ø7.2mm)	0.81
030 210	Auxiliary lens system	Narrow beam Wide beam	2 x 4° 2 x 10°	8 (Ø3mm)	0.75
		Narrow beam Wide beam	2 x 4° 2 x 10°	14 (Ø4mm)	0.74
011 200	Prism 0°	Narrow beam (to the stop)	2 x 10° 2 x 13°	8 (Ø3mm)	0.75
011 210	Prism spot 0°	Narrow beam (to the stop)	2 x 11° 2 x 14°	14 (Ø4mm)	0.74
011 400	Prism 32°	Narrow beam (to the stop)	2 x 10° 2 x 13°	8 (Ø3mm)	0.71
011 410	Prism spot 32°	Narrow beam (to the stop)	2 x 11° 2 x 14°	14 (Ø4mm)	0.70
011 300	Prism 45°	Narrow beam (to the stop)	2 x 10° 2 x 13°	8 (Ø3mm)	0.71
011 310	Prism spot 45°	Narrow beam (to the stop)	2 x 11° 2 x 14°	14 (Ø4mm)	0.70
010 300 010 302	Spherical lens Ø7.4mm	Narrow beam (to the stop)	2 x 12°	1.5 (Ø1.5mm)	0.89
		Narrow beam (to the stop)	2 x 15°	3 (Ø2mm)	0.89
		Narrow beam (to the stop)	2 x 18°	8 (Ø3mm)	0.89
		Narrow beam (to the stop)	2 x 22°	14 (Ø4mm)	0.88

Optical Fibers

In order to obtain optimum lighting performance based on the requirements of the individual application, Starfire offers the specifier a selection of high quality optical fibers. Different fibers possess varying light transmitting characteristics and one standard fiber is never appropriate for every application. Starfire matches fiber performance characteristics to the requirements of the lighting design in order to ensure that the fiber selected meets the lighting design objective.

Residual light values vs. Fiber Length



Ex:
A 6 meter fiber will transmit 74% of incident light.

Glass Fibers

Glass fibers are extremely flexible and excel in transmitting “white” light. The fiber bundles are factory manufactured based on the lighting design specifications. High quality glass fibers absorb a substantial amount of ultraviolet often eliminating the need to utilize UV filters in the illuminator. These fibers can be finely randomized to ensure consistent light output and, because they are glass, can generally withstand very high operating temperatures. The sheathing material of the arms is PVC free and self extinguishing “megalon”. Optimum white light transmission and application longevity are two major benefits associated with glass fiber.

PMMA Fibers

PMMA is an acrylic fiber available from Starfire in a variety of diameters. Several hundred fibers may attach to one illuminator thereby providing several hundred points of light. These fibers are durable, flexible and offer excellent “white” light transmission characteristics. Lengths are usually limited to 30 feet, but considerably longer runs can be specified based on the lighting design requirements. Larger optical areas are obtained by grouping many individual fibers together to form bundles. PMMA fibers can be randomized, cut at the job site, and mounted in almost any material. Certain applications will require that PMMA fibers be polished. Polishing can be done in the field or at the factory by Starfire. The maximum operating temperature for PMMA fiber is 70°C.

Comparison of Glass (+) and Plastic (-) Fibers

HARNESS-TRANSMISSION — **glass ±**

For white light the transmission of plastic and glass is comparable.

SPECTRAL TRANSMISSION — **glass ±**

On account of the varying damping characteristic, regarding spectral transmission, plastic has advantages in the blue wave length range, glass in the red.

LONG-TERM / UV STABILITY — **glass +++**

In traffic engineering, glass fibers have been utilized in difficult environmental conditions (climate, exhaust gases, etc.) for over 15 years without any problems. The optical properties of glass fiber are not impaired by the UV radiation of customary light sources. A UV filter is not necessary since glass fibers, in contrast to plastic fibers, filter out a great deal of UV radiation.

HIGH TEMPERATURE STABILITY — **glass +++**

Glass fibers glued to the coupling end can be loaded up to 200°C, and up to 350°C when fused. As such, in contrast to plastic fibers, no heat-absorbing filter is necessary.

FIBER MIXTURE ON THE COMMON END — **glass +++**

Due to the small diameter of the glass fibers, a very fine distribution of the fibers over the area of the common end is possible. This permits color and intensity differences to be compensated for when using halogen metal vapor lamps (HQI lamps).

FLEXIBILITY — **glass ++**

Glass fiber cables are as a rule somewhat more flexible on account of their smaller fiber cross section–with comparable cross sections–less sensitive to bending.

FLAMMABILITY — **glass +++**

Glass itself is not flammable. The cable jacket, Megalon, is self-extinguishing and free of halogens.

HANDLING — **plastic +**

PMMA has the advantage of simple, economical end processing of plastic cables.

NUMERICAL APERTURE — **glass +**

Glass fibers have a somewhat higher numerical aperture, and for this reason light beams of a greater angle can be coupled in and conducted by the harness.

PRICE — **glass ±**

With similar end processing, prices are comparable.

Standard Glass Fibers Bundles

PMMA Fiber Bundles available, consult factory

Glass fiber bundles consist of a common end and single fiber arms in the optical diameters of 1 to 7.2 millimeters.

Further fiber bundles of individual arm lengths and arm diameters are available on request.

When using 150W and 70W HQI illuminators, we recommend bundles with fine randomized fibers in order to balance differences in color and light intensities.

Fiber bundles producing rectangular framing are available on request, (see page 8: picture illumination; 32° prisms.

CAT NO	SIZE	FIBER (mm)	TOTAL ARMS	SINGLE ARMS	ARM LENGTH (mm)
110 100	.75	Ø1.0	35	20 15	2,000 3,500
115 100	1.5	Ø1.5	60		2,000
115 110	1.5	Ø1.5	60		4,000
115 120	1.5	Ø1.5	70		3,000
115 130	1.5	Ø1.5	100		3,000
115 150	1.5	Ø1.5	100	60 40	5,000 3,000
115 151	1.5	Ø1.5	100		8,000
115 140	1.5	Ø1.5	150		5,000
120 110	3	Ø2.0	80		3,000
130 100	8	Ø3.0	40		2,000
140 090	14	Ø4.0	11*		1,500
140 100	14	Ø4.0	20		1,200
140 104	14	Ø4.0	20*	12 8	4,000 2,500
140 112	14	Ø4.0	24*		2,000

* Fine randomized fibers.

Number of Glass Fiber Arms

FIBER SIZE	3/4 Ø 1mm	1 1/2 Ø 1.5mm	3 Ø 2mm	8 Ø 3mm	14 Ø 4mm	24 Ø 6mm	36 Ø 7.2mm
Max. number of arms	350	240	110	60	33	16	
Max. number of arms with fine randomized fibers*	300	200	105	52	30	13	– –
Recommended Min. numbers of arms for functional lighting	– –	– –	49	22	12	5	4

* for HQI Illuminator.

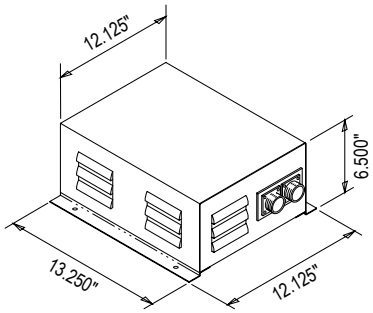
Dimensional Data of Glass Fiber Arms

FIBER SIZE	3/4	1 1/2	3	8	14	24	36
Optical Ø (mm) Single arm	1.0	1.5	2.0	3.0	4.0	6.0	7.2
Outside Ø (mm) Single arm	2.20±0.10	2.70±0.10	3.85±0.15	4.85±0.15	6.35±0.15	8.70±0.30	10.10±0.30
End-Sleeve Ø (mm)* Single arm	3	3.5	5	5	5	8	8
Smallest Bendable radius (mm)**	5	8	15	20	25	50	60

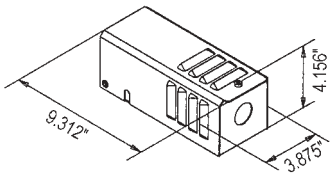
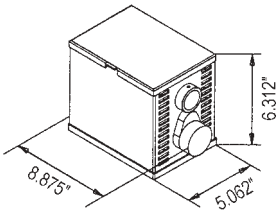
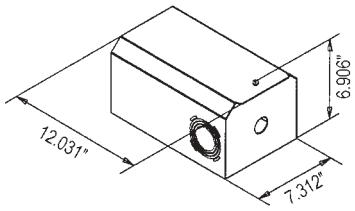
* all decorative and functional light outlet elements are adjusted to these end sleeve-diameters.

** with fiber lengths over 500mm.

Starfire Illuminators

DIMENSIONS	CAT NO	DESCRIPTION	WEIGHT
	FOP-1	Includes 85W Halogen DED lamp: 2800°K Twinkle or Color-effect included (clear, yellow, green, red, blue) UL listed for dry interior locations Power Requirement: 120VAC 60Hz Power Consumption: 100 watts Max. Environmental Temp: 40°C (105°F)	19 lbs.
	FOP-2 (shown)	As above w/ 2- 85W Halogen DED lamps Power Consumption: 200 watts	24 lbs.

Swaro®Lite Illuminators

	040 310	Includes 100W Halogen bi-pin lamp: 2,800°K–3,000°K Transformer (remote) 120V 50-60Hz 105VA Swaro®Lite Cold-light Reflector, Thermostat and Fan Power Requirement: 120VAC 60Hz Power Consumption: 125 watts Max. Environmental Temp: -10°C to +40°C	3 lbs.
	040 400	Color Illuminator w/ Interval Control: 60 sec. up to 10 min. Includes 100W Halogen bi-pin lamp: 2,800°K–3,000°K Transformer (remote) 120V 50-60Hz 105VA Swaro®Lite Cold-light Reflector, Thermostat and Fan Twinkle or Color-effect available (clear, yellow, green, red, blue) Power Requirement: 120VAC 60Hz Power Consumption: 125 watts Max. Environmental Temp: -10°C to +40°C	5 lbs.
	040 401	As above, without Interval Control.	5 lbs.
	040 500	Includes 150W HQI lamp: 4200°K Power Requirement: 120VAC 60Hz Power Consumption: 200 watts Max. Environmental Temp: -10°C to +40°C	7.5 lbs.

Maximum Number of PMMA Fibers

FIBER Ø	FOP 1	FOP 2
30	850	1700
40	475	950
60	210	420
80	100	200
100	37	74
120	37	74

Starfire illuminators accommodate solid core or PMMA optical fibers. The FOP-1 and the FOP-2 may be dimmed and include a color or special effects wheel with a separate on/off switch. When synchronized effects are required, computer and/or DMX custom controls are easily incorporated.

Prefabricated brackets allow for secure and easy mounting to T-bars, joists, shelving or similar support systems. Illuminators may be mounted horizontally, vertically or laterally, 4” clearance on all sides. The location of the illuminator must allow for lamp replacement. Max. environmental temp: 40°C (105°F).

Complete Application Systems, Ready for Installation

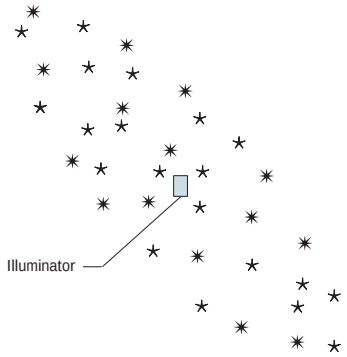
ART ILLUMINATION	CAT NO	DESCRIPTION
 Cat. No. 030 410 (nickel-plated) 32° prism spot, swivel	004 001 (Set 10: nickel-plated) 004 002 (Set 11: nickel-plated)	w/ 100W Halogen Illuminator w/ 150W HQI Illuminator 11 - Functional prism spots 32° Area to be illuminated: 1-5m^2 (1 set sufficient for several pictures) Distance of spots to wall approx. 1m (at headroom of 2.4m) Light Intensity (depending on space): 50 - 350 lx* (Halogen illuminator) 300 - 2000 lx* (HQI illuminator) Color Temperature: Halogen - 2800–3000°K HQI - 4200° (3000°K on request) Sets include: 11 - Prism spots 32°, swivel Version: nickel-plated (Bore diameter 45mm; Spring retainer included) Set 10 1 - 100W Illuminator w/ Transformer Set 11 1 - 150W Illuminator w/ Ballast 1 - Glass fiber bundle (fine randomized) w/ 11 arms Length: 1.5m, Size: 14 (Ø4mm)

SHOWCASE ILLUMINATION		
 Cat. No. 020 811 (black) Focussing optic spot, swivel	005 001 (Set 12: Black anodize)	20 Functional spherical optic spot Area to be illuminated: 0.5-2.5m^2 Light Intensity (depending on space): 50-2000 lx* Color Temperature: Halogen - 2800–3000°K Set includes: 20 - Spherical optic spots, swivel Version: black (Bore diameter 45mm; Spring retainer included) 1 - 100W Illuminator 1 - Transformer 1 - Glass fiber bundle (fine randomized) w/ 20 arms Length: 1.2m, Size: 14 (Ø4mm)

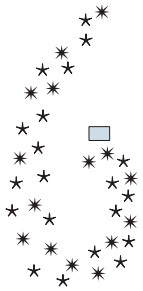
* For light intensity and distribution curve diagrams for the above used light outlet elements, see pages 28 and 29.

Complete Application Systems, Ready for Installation

CRYSTAL STARRY SKY	CAT NO	DESCRIPTION
	000 901 (Set A: gold-plated) 000 902 (Set B: nickel-plated)	35 Decorative crystal-lightpoints Recommended total area: 2-8m^2



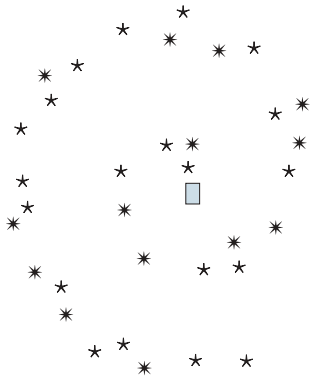
Ellipse



Orion

Sets include:

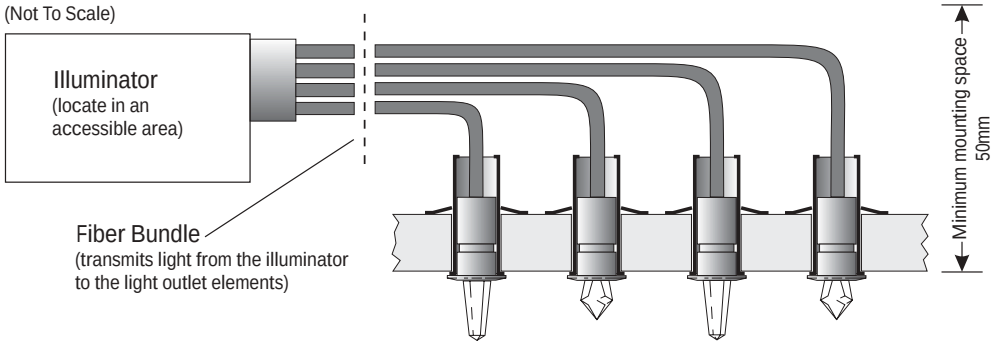
- 20 - 12mm Crystal light outlet elements ★
- 15 - 16.5mm Crystal light outlet elements ✳
- 35 - Universal mounting sleeves, transparent plastic
- 1 - 100W Illuminator
- 1 - Transformer
- 1 - 3/4 (Ø1mm) Glass fiber bundle w/ 35 arms
- 1 - Glass fiber bundle w/ 35 arms, Length: 3.5m
  Size: 3/4 (Ø1mm)

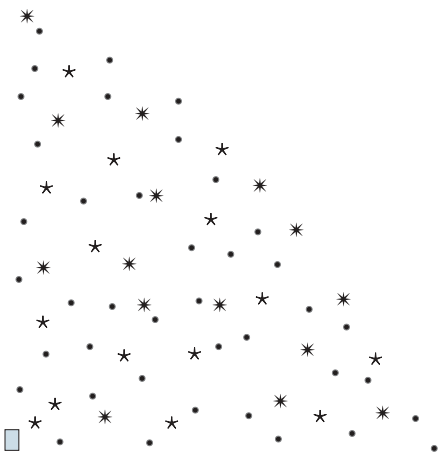
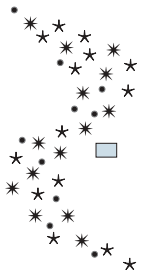
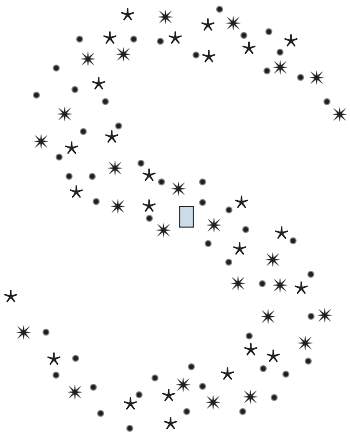


Snail

ELEMENTS USED

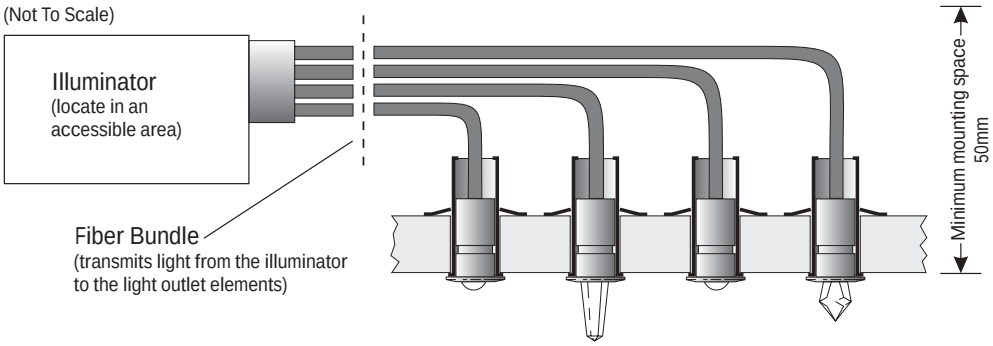
HOW IT WORKS...



CRYSTAL STARRY SKY	CAT NO	DESCRIPTION
 Corner  Boomerang	001 007 (Set 1G: gold-plated) 001 001 (Set 1N: nickel-plated)	70 Decorative crystal-lightpoints Recommended total area: 2-10m^2 Sets include: 40 - Light outlet elements w/ Ø7.4mm spherical lens • 15 - 12mm Crystal light outlet elements ★ 15 - 16.5mm Crystal light outlet elements ✳ 70 - Universal mounting sleeves, transparent plastic 1 - 100W Illuminator 1 - Transformer 1 - Glass fiber bundle w/ 70 arms, Length: 3m Size: 1.5 (Ø1.5mm)
 Double Swing	001 002 (Set 2G: gold-plated) 001 008 (Set 2N: nickel-plated)	100 Decorative crystal-lightpoints Recommended total area: 5-20m^2 Sets include: 50 - Light outlet elements w/ Ø7.4mm spherical lens 25 - 12mm Crystal light outlet elements 25 - 16.5mm Crystal light outlet elements 100 - Universal mounting sleeves, transparent plastic 1 - 100W Illuminator 1 - Transformer 1 - Glass fiber bundle w/ 100 arms, Length: 3m Size: 1.5 (Ø1.5mm)

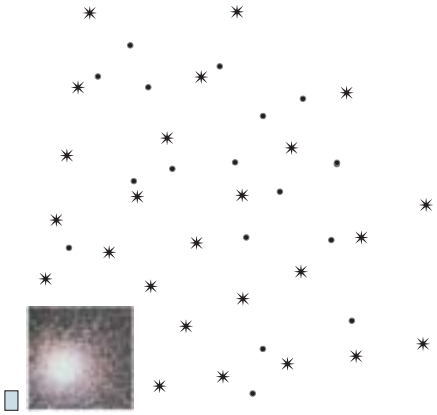
ELEMENTS USED

HOW IT WORKS...



Complete Application Systems, Ready for Installation

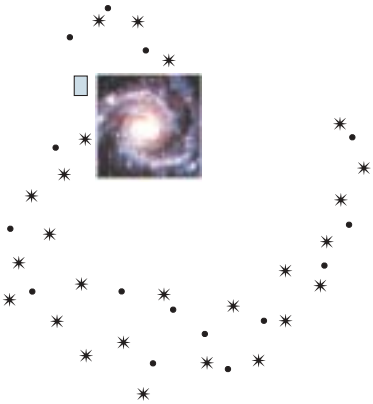
"IMPLOSION" CRYSTAL SKY	CAT NO	DESCRIPTION
	001 003 (Set 3: gold-plated) 001 004 (Set 4: nickel-plated)	Decorative, fiber-illuminated crystal panel with infinity effect,* surrounded by a crystal starry sky with 40 light outlets.



Sets include:

- 1 - Crystal panel: "Implosion" crystal motif, 595 x 595mm: Insulated security glass and mirror, w/ 30 fixed sleeves to slide fibers into.
- 15 - Crystal light outlet elements w/ spherical lens Ø7.4mm Version: gold-plated (Set 3), nickel-plated (Set 4) •
- 25 - 16.5mm Crystal light outlet elements Version: gold-plated (Set 3), nickel-plated (Set 4) ✳
- 40 - Universal mounting sleeves, transparent plastic
- 1 - 100W Illuminator
- 1 - Transformer
- 1 - Glass fiber bundle w/ 70 arms, Length: 3m Size: 1.5 (Ø1.5mm)

"ANDROMEDA" CRYSTAL SKY		
	001 005 (Set 5: gold-plated) 001 006 (Set 6: nickel-plated)	Decorative, fiber-illuminated crystal panel with infinity effect,* surrounded by a crystal starry sky with 40 light outlets.

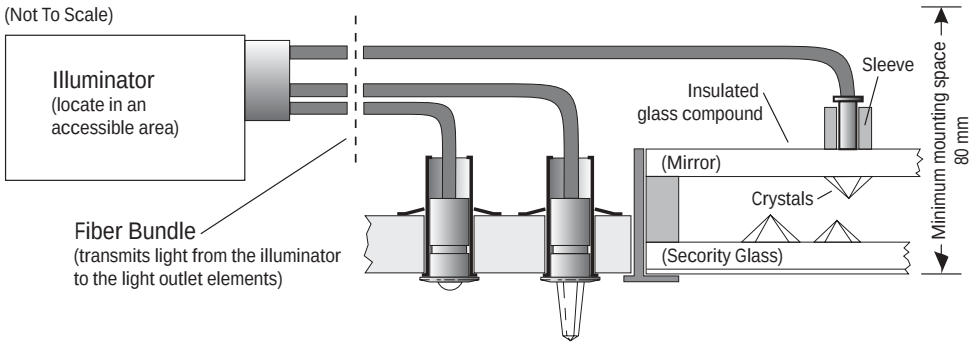


Sets include:

- 1 - Crystal panel: "Andromeda" crystal motif, 595 x 595mm: Insulated security glass and mirror, w/ 30 fixed sleeves to slide fibers into.
- 15 - Crystal light outlet elements w/ spherical lens Ø7.4mm Version: gold-plated (Set 5), nickel-plated (Set 6) •
- 25 - 16.5mm Crystal light outlet elements Version: gold-plated (Set 5), nickel-plated (Set 6) ✳
- 40 - Universal mounting sleeves, transparent plastic
- 1 - 100W Illuminator
- 1 - Transformer
- 1 - Glass fiber bundle w/ 70 arms, Length: 3m Size: 1.5 (Ø1.5mm)

ELEMENTS USED

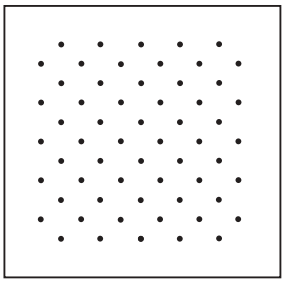
HOW IT WORKS...

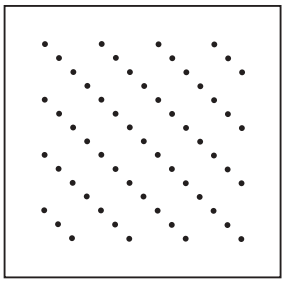


* For construction and effect, see page 12; "Northern Lights".

SHOWER ILLUMINATION

CAT NO	DESCRIPTION
002 001 (Set 7: gold-plated) 002 002 (Set 8: nickel-plated)	60 Decorative/Functional crystal-lightpoints Shower total area: 1-2m^2



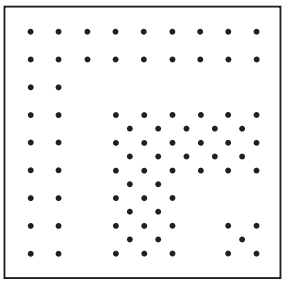


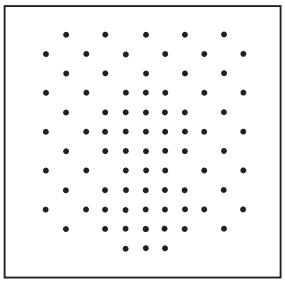
Sets include:

- 60 - Light outlet elements w/ Ø7.4mm spherical lens
  Version: gold-plated (Set 7), nickel-plated (Set 8)
- 60 - Universal mounting sleeves, transparent plastic
- 1 - 100W Illuminator
- 1 - Transformer
- 1 - Glass fiber bundle w/ 60 arms, Length: 2m
  Size: 1.5 (Ø1.5mm)

SAUNA ILLUMINATION

003 001 (Set 9: gold-plated)	80 Decorative/Functional crystal-lightpoints Sauna total area: 2-8m^2



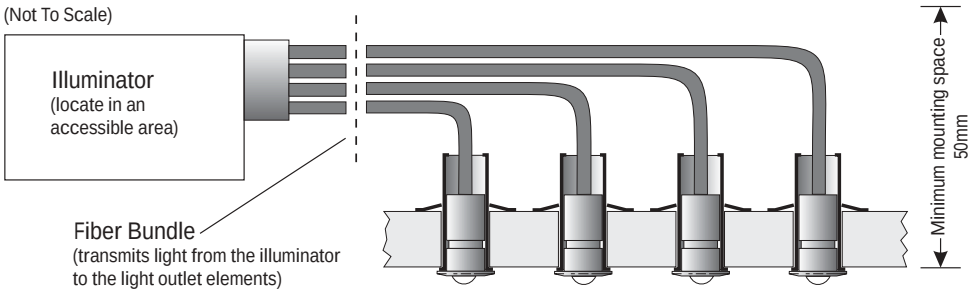


Set includes:

- 80 - Light outlet elements w/ Ø7.4mm spherical lens
  Version: gold-plated (Set 9))
- 80 - Universal mounting sleeves, gold-metal plated
- 1 - 100W Illuminator
- 1 - Transformer
- 1 - Glass fiber bundle w/ 80 arms, Length: 3m
  Size: 1.5 (Ø1.5mm)

ELEMENTS USED

HOW IT WORKS...

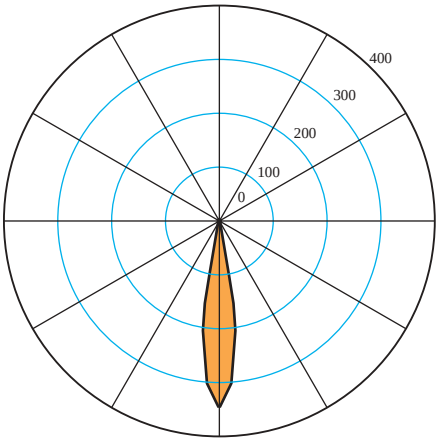


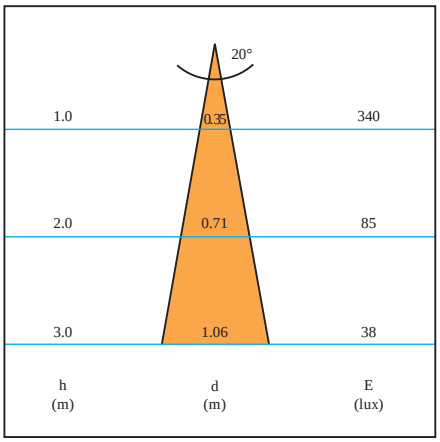
The following light intensity distribution curves indicate the absolute light intensities of a glass fiber arm in Candela (cd).

The technical data listed below is based upon a glass fibre bundle of size 14 with 20 arms (optical diameter of each arm 4mm), length 1.2m and Swaro®Lite Illuminators; 100W Halogen (Cat. No. 040 300) and 150W HQI (Cat. No. 040 500).

The optical components for the modification of the radiated light cone have been taken into account.

Showcase illumination

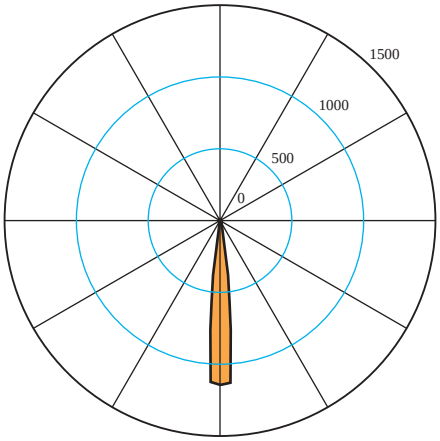


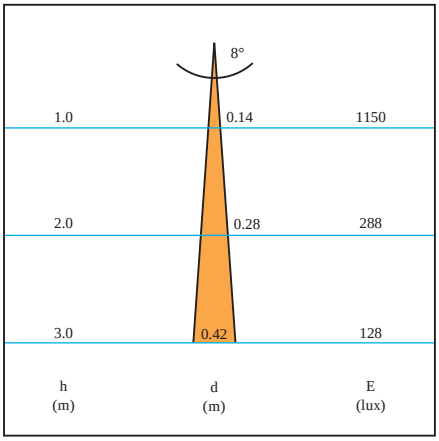


Standard lens system, wide-swivel
Cat. No. 030 110

Spherical optic spot, swivel
Cat. No. 020 800
Cat. No. 020 801
Cat. No. 020 803

Illuminator
100W halogen

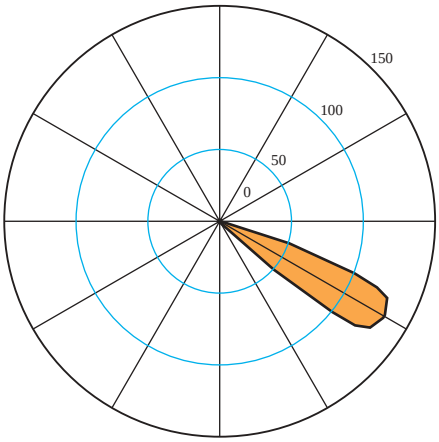


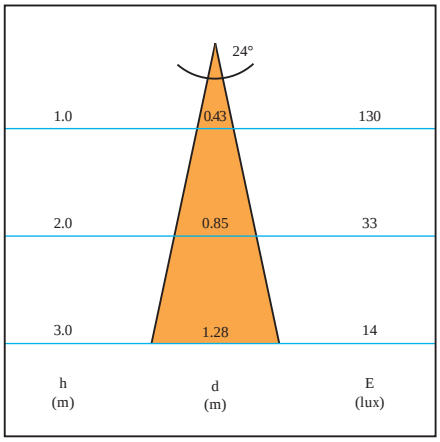


Auxiliary lens system, wide-swivel
Cat. No. 030 210

Illuminator
100W halogen

Art illumination

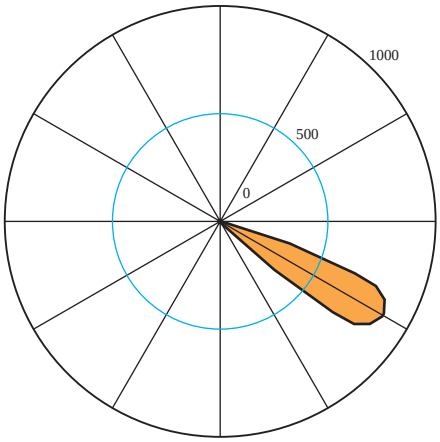


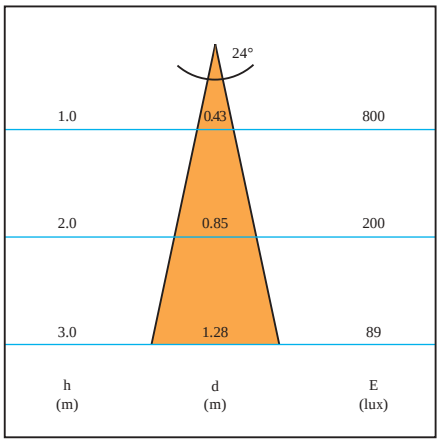


Prism 32°
Cat. No. 011 400

Prism spot 32°, swivel
Cat. No. 011 410

Illuminator
100W halogen



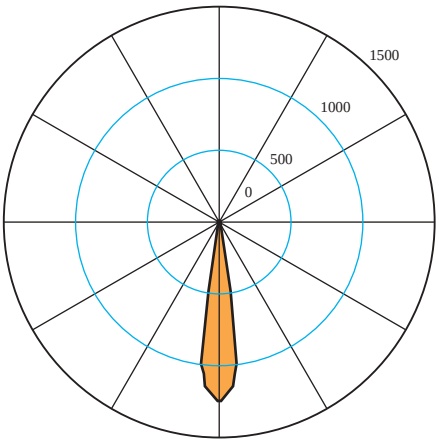


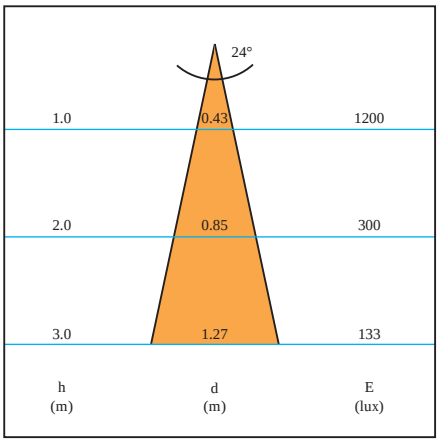
Prism 32°
Cat. No. 011 400

Prism spot 32°, swivel
Cat. No. 011 410

Illuminator
150W HQI

Interior illumination

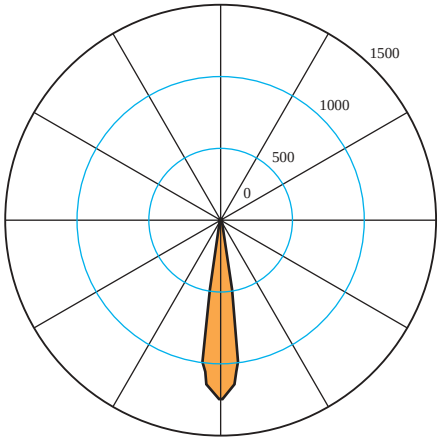


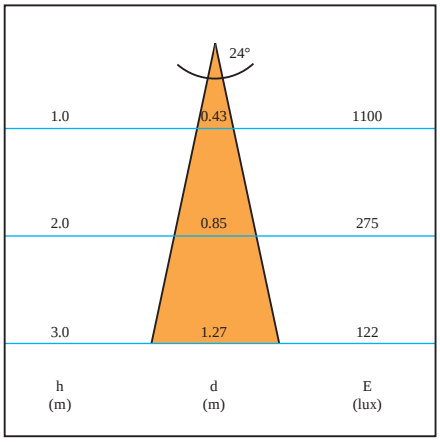


Prism 0°
Cat. No. 011 200

Prism spot 0°, swivel
Cat. No. 011 210

Illuminator
150W HQI

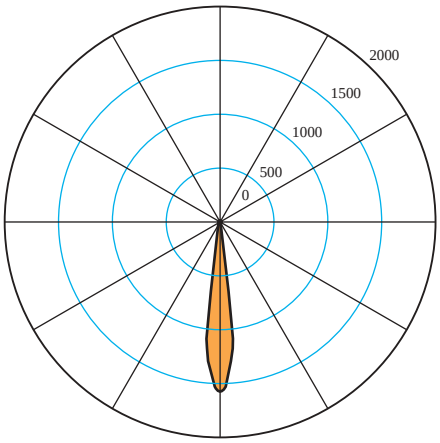


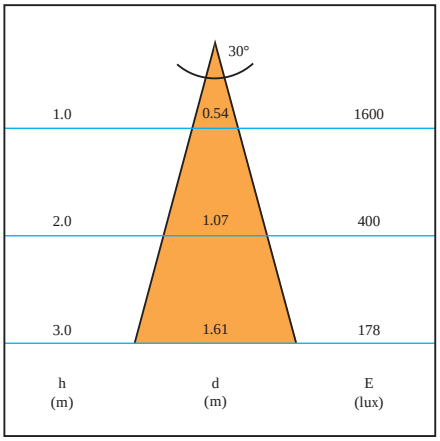


Prism 45°
Cat. No. 011 300

Prism spot 45°, swivel
Cat. No. 011 310

Illuminator
150W HQI

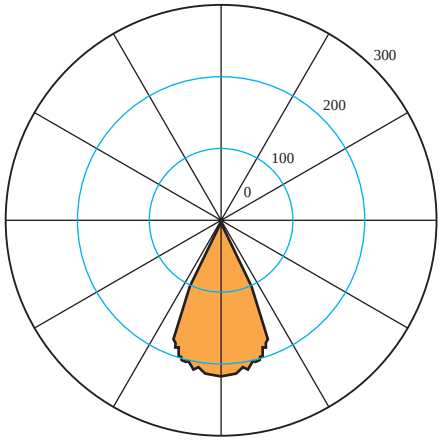


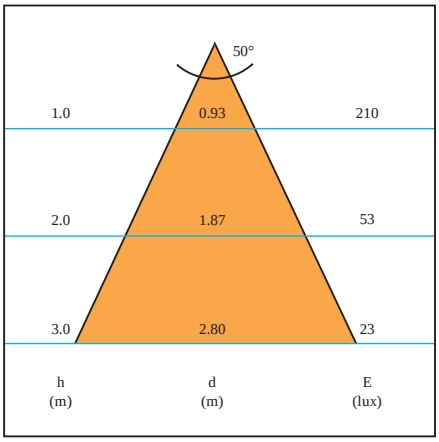


Crystal Ø31mm
Cat. No. 010 810

Crystal spot Ø31mm, swivel
Cat. No. 010 820

Illuminator
150W HQI

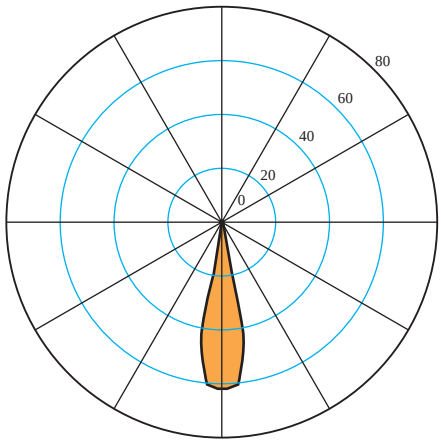


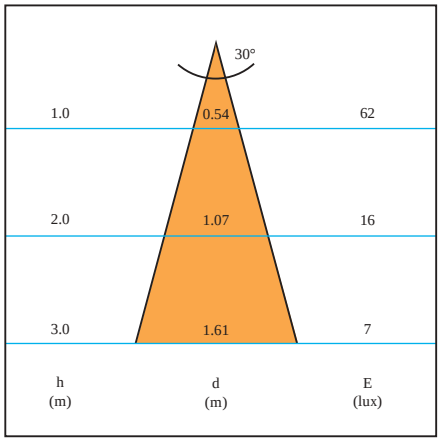


Spherical lens Ø7.4mm
Cat. No. 010 300
Cat. No. 010 301
Cat. No. 010 302
Cat. No. 010 303

Illuminator
150W HQI

The measuring results of the following two diagrams refer to one glass fiber arm of a bundle with 32 arms, Size: 3 (Ø 2 mm), Length: 1.2 m.





Spherical lens Ø7.4mm
Cat. No. 010 300
Cat. No. 010 301
Cat. No. 010 302
Cat. No. 010 303

Illuminator
100W halogen