

3M ESPE
Elipar™ 2500
Halogen Curing Light

Technical Product Profile



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Product Description

The 3M™ ESPE™ Elipar™ 2500 Halogen Curing Light produces high intensity visible blue light in the 400 to 500 nm waveband.

The Elipar 2500 light will cure all dental restoratives activated by light around the 470 nanometer wavelength. The radiation from the tungsten halogen bulb (75 watt) is selectively reflected and filtered within the light to reduce the ultraviolet, infrared radiation and unneeded visible light. Therefore, only the blue light band is available to be absorbed.

The rotating nose cone and continuous cure capability offer flexibility to the dental practitioner. The high intensity curing light also has the benefit of a quiet and efficient fan which keeps the handpiece comfortably cool, even during extended light curing.

The two light guides available are the 8mm and 13mm outer diameters. The inner diameters are 7mm and 12mm.

*Elipar™ 2500 Halogen
Curing Light*



Operation

Upon activating the power switch on the base and depressing the on/off switch of the handpiece, the unit will beep once to indicate the light is on. The unit then beeps every 10 seconds during the curing cycle. The fan will start immediately upon depressing the on/off switch of the handpiece and continue to run after the curing cycle is complete, only long enough to assure the unit is cooled. To turn off the light, depress the on/off switch of the handpiece and two beeps will indicate the light is off.

After initiating the light, it can be used for a total of 5 minutes. At the end of 5 minutes, the light will shut off, but can be immediately reactivated for another 5 minute curing cycle.

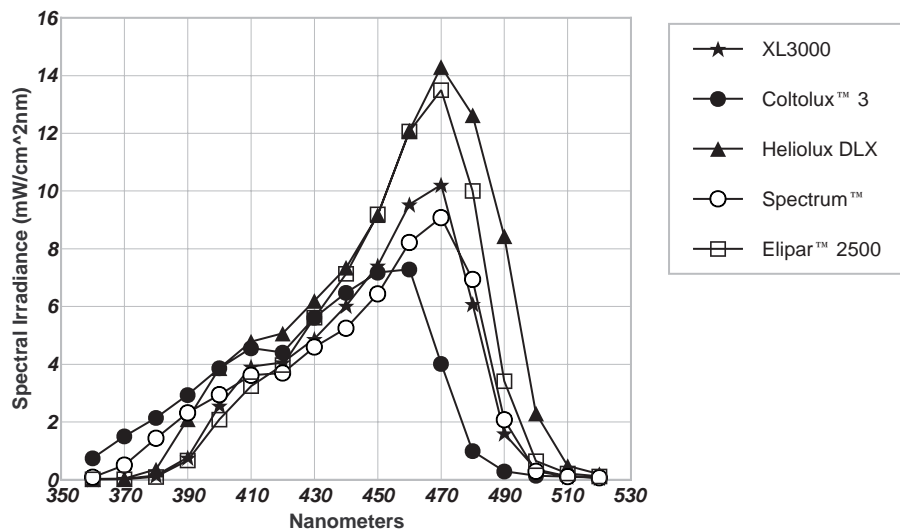
Features

High Intensity

The Elipar™ 2500 light is a high intensity curing light. There are two important factors associated with dental curing lights: the intensity and the shape/location of the peak on the curve.

Since most dental materials contain a photoinitiator that absorbs light in the 400-500 nanometer range, it is important that the radiation from the tungsten halogen lamp is selectively reflected and filtered to leave the blue light band to be absorbed. Therefore the wavelength output of the curing light matches the absorbance of the photoinitiator.

A number of curing lights were evaluated by spectrophotometry between 360-520 nanometers and are graphed below. Note that the peak (mW/cm²) for the Coltolux™ 3 is considerably lower than the other units. Furthermore, the Coltolux 3 peak is also outside the optimum 470-480 nanometer range which is optimal for most photoinitiator chemistries.



Rotating Nose Cone and Light Guide

Both the nose cone and light guide rotate through 360° independently of each other. This allows for very easy positioning of the light guide. The light guide housing is designed to give positive retention and secure positioning of the light guide in its socket, coupled with ease of removal and reseating.

Optical Filter and Bulb

The Elipar™ 2500 light has an optical filter which reduces radiation above 520 nm. A 75 watt bulb is supplied with the unit. The bulb has a minimum average life of 4000 cycles at 20 seconds each cycle (average lifetime of approximately 23 hours).

The bulb has a dichroic reflector which consists of a concave surface built up of multiple coatings. It is a technologically exacting process to produce a high quality reflector, as a precise angle of curvature must be achieved so that as much light as possible can be reflected and focused onto the filter and through the light guide. The bulb itself produces light in the entire visible light spectrum as well as some non-visible radiation. Two optical filters, a blue pass filter and a heat (IR) filter, are included in the light path to substantially block unwanted non-visible radiation and visible light other than that in the range of 400-500 nm.

Each bulb is subjected to a quality assurance check before it is released for sale. Purchase of a competitive bulb may give reduced light intensity when used in the light.

Fan

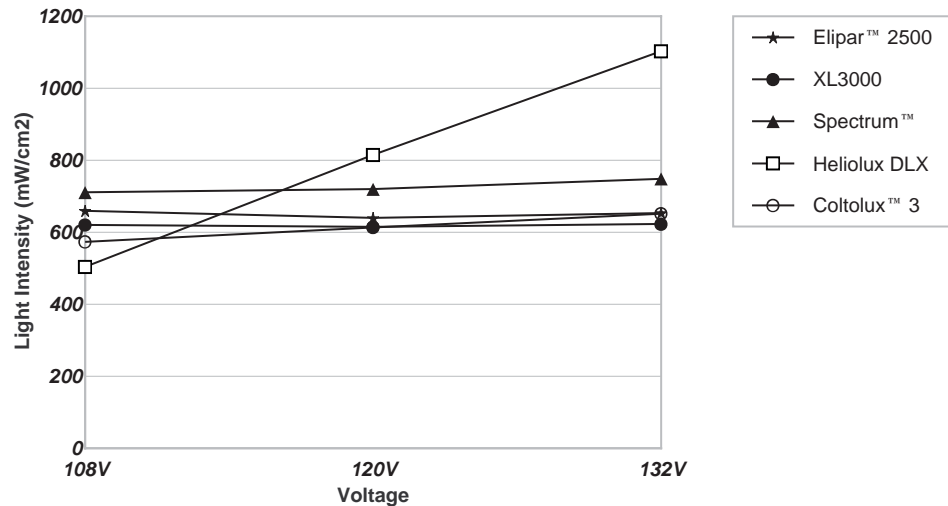
The cooling fan is quiet in operation and comes on with activation of the light. After 1.5 minutes it slowly increases in speed to maintain effective cooling of all external areas of the handpiece. Additionally, a built-in thermistor in the handpiece allows the fan to shut off as soon as the handpiece has cooled. This results in a benefit to the patient and dentist of less noise.

Voltage Regulation

The electronics of the Elipar 2500 light provide voltage regulation so that if the supply voltage should vary, even as much as +/-10% from the nominal, at a 75 watt load, the bulb voltage will be automatically regulated to within 95 to 100% of its intended design voltage. The bulb voltage regulation is virtually instantaneous.

Because line voltage can fluctuate, voltage regulation is considered an advantageous feature. It will sense peaks and valleys and will adjust the voltage to the bulb accordingly, so the output remains fairly constant. The 3M ESPE light regulates the bulb voltage for each version's rated supply voltage +/-10%.

Intensity readings of the light (model M5560AA) were run at a nominal 120 volts and +/-10%. (Readings were performed at 108V, 120V, and 132V.) The intensity was measured using the Cure Rite™ Model 8000 hand held radiometer. Notice that the bulb output of the 3M lights remains steady throughout the voltage ranges.



Continuous Duty

The light cycle will run continuously for a total of 5 minutes. For safety purposes we have built in an automatic shut off after 5 minutes. It can be reactivated to run additional 5 minute cycles by depressing the handpiece button.

Ergonomic Design

The pistol grip handpiece has been designed to be cool and comfortable in use. The thermoplastic casing has a smooth, glossy surface and the efficient cooling fan keeps the handpiece comfortably cool for the operator, both for short term and extended curing procedures.

Wall Mounting Kit

The light can be fixed to a wall or equipment panel with the wall mounting kit. The kit will adapt to various surfaces.

Light Guides

The light guide is sheathed in a thin coating of amber-colored glass that has a very special characteristic. The refractive index of the amber glass is such that light trying to escape the light guide is reflected internally back into the light guide. Therefore, loss of light intensity through the sides of the light guide is minimal.

The light guide should be handled with care to avoid damaging the polished ends, and the tips kept clear of debris to ensure maximum light transmission. Any composite or resin adhering to the light guide should always be removed, e.g. with

the thumbnail or blunt instrument, taking care not to scratch the fiber-optic surface. Cracks or scratches on the ends of the light guide will diminish light transmission.

The light guide is very efficient in the transmission of light because it is virtually all glass fibers. The light guide bundle consists of fibers fused very tightly together. In fact, they are packed so tightly that they may not be perfectly round, thus the honeycomb effect. No resin is used to glue the fibers together as some other manufacturers may do.

The light guides can be autoclaved or cold sterilized. Refer to the Disinfecting and Cleaning section.

The Elipar™ 2500 light has 2 light guides available. The outer diameters of the light guides are 8 and 13 mm. The inner diameters or the actual diameter of light transmission is 7 and 12 mm respectively.

Disinfecting and Cleaning

Cleaning of Base and Handpiece

Turn off the main power (green) switch and unplug the unit before cleaning. The base unit and handpiece may be cleaned by wiping with a soft cloth moistened slightly with alcohol or disinfectant. Be careful to prevent entry of liquid into the components. Remove nose cone and carefully wipe any excess alcohol or disinfectant from mating surfaces of the nose cone and handpiece. Alcohol should be less than 30% concentration. Avoid using any disinfectant with basic glutaraldehyde as the active ingredient.

Light Guide

Remove debris from the light guide using a thumbnail or a blunt instrument. Take care not to scratch the light guides. Periodically examine both ends of the light guide. If they are dull or white, check the cure performance by following the Curing Performance Test instructions described on page 11.

Autoclave

Follow manufacturer's instructions regarding exposure times. Generally speaking, a minimum of 15 minutes at 121° C (250°F), 1000 hPa/15psi is recommended. Do not autoclave the light guide at temperatures above 136° C. Allow the lightguide to cool to room temperature before reinserting it into the handpiece receptacle.

Cold Sterilization

Soak the light guide in an alkaline glutaraldehyde type of cold sterilizing solution. Follow manufacturer's instructions regarding dilution and recommended exposure times. Use of other types of solutions (e.g., phenolics) may cause decreased output intensity.

Eyeshield

Disassemble the rubber O-ring from the shield. Clean any debris off the surface with a dull instrument. Soak the shield in an alkaline glutaraldehyde type of cold sterilizing solution for the minimum amount of time recommended per manufacturer.

Light Testers

Light Meter Use

Light meters should be used to monitor output of each light in a dental office. A base line is established with a new light curing unit, a reconditioned unit or one with a new bulb. Meter readings should also be taken with clean, clear light guide tips and light filters should be in good condition. Weekly tests, utilizing the same diameter light guide as the base line can indicate intensity loss before it affects the curing ability of the light.

Light Meter Contraindications

Light meters should not be used to select a curing light for purchase. The commercially available curing light meters do not have the capability to adequately distinguish between outputs from lights of different manufacturers. These meters have fixed apertures which may not be able to detect difference in outputs from lights of different manufacturers. Some lights emit more power in the center of the light guide than around the periphery. Radiometers (light meters) with more sophisticated electronics to monitor not only the intensity but the shape of the light output curve and spectral location are used by researchers to properly characterize light output. This characterization is essential to determine and understand curing light effectiveness. Studies comparing meter readings to depth of cure and Knoop hardness have documented this shortfall of currently available dental light meters.¹ Light meters should not be solely relied upon to determine curing light output as the long term reliability has not been documented.

*Curing Light Requirements
for 3M ESPE Composite
Cure*

Model	Interpretation	Reading
Demetron Model 100	Acceptable light output	>400
Curing Radiometer	Double cure time	200-400
	Unacceptable light output	<200
Caulk/Dentsply	Acceptable light output	>300
Cure Rite™ Visible Light Meter	Double cure time	150-300
	Unacceptable light output	<150

¹ Reality Now, March 1991, No. 22

Curing Performance Test

Lay a clean polyester matrix band on white paper and place a clear or white plastic form on the band. The form should be a cylindrical hole 3-6 mm in diameter through material 2.0-2.5 mm thick. Pack restorative material into the form, cover with polyester strip and press flat. Direct the curing light at the top surface (from less than 2 mm) of the sample and cure for the recommended time. Remove the polyester strips and examine the condition of cure. The bottom surface should appear glassy and resist scratching by a sharp explorer, indicating adequate cure. (Consult manufacturer's instructions for other criteria relating to correct cure.)

If the surface is soft or dull, repeat the test procedure using incrementally longer curing times until adequate cure is attained and adjust curing time accordingly. If the adjusted time exceeds 200% of normal, verify that the restorative material has not degenerated, or correct curing light problems as directed in the Troubleshooting table located in the user instructions.

Curing Light Maintenance

Curing lights are not a maintenance-free item.^{2,3,4} In order to ensure maximum light output and efficiency, a few regular maintenance steps must be done.

Bulb

It was initially thought that a bulb stayed at a maximum output then died suddenly. It has now been established that a bulb actually fades slightly over the course of its lifetime. The speed with which this occurs depends on the number of uses and length of use time. Many lights are overpowered, i.e., a low wattage bulb is supplied with too much power, forcing it to emit more light than intended. This overpowering will substantially shorten bulb life. The glass bulb may collect white or black deposits on the surface which can reduce light output.

Lamp Reflector

The lamp reflector may lose its reflective properties due to loss of the reflective material or deposition of an impurity on the surface. Loss of these properties may result in decreased light intensity. If the reflector has been damaged, the bulb should be replaced.

² Friedman, J: Care and Maintenance of Dental Curing Lights, *Dentistry Today*, 1991:10(1).

³ Shortall, A. and E. Harrington: Guidelines for the Selection, Use and Maintenance of Visible Light Activation Units, *British Dental Journal*, 1996:180(10): 383-7.

⁴ Instructions from dental light meters.

Fan

Curing light fans were designed to keep the internal electronics cool. Fans coated with dust and other debris, or blockage of the air input areas may cause a unit to overheat, severely damaging the electronics. However, the Elipar™ 2500 light has a built-in safety feature which prevents the unit from over heating. The light unit will beep 5 times and then shut off if blockage of air or debris is present. If the fan is prevented from rotating, either mechanically or electrically, the unit will attempt to turn on, but immediately shut off again. Have unit serviced by an authorized 3M Service Center.

Filters

Filters used to remove infrared radiation (heat) and UV light before the light exits the light guide can be damaged during normal use. The coating on these filters may become pitted, chipped or flaky. The filters themselves may be cracked or broken. Damaged filters should be replaced at an authorized 3M Service Center.

Light Guides

Light guides may become broken or cracked. The light entrance and exit tips may become debris-ridden. The debris might be composite or disinfectant/sterilant residue. Light guide tips must be kept debris-free to ensure maximum light intensity. Composite residue should be removed before sterilizing or disinfecting the light guide to ensure procedure effectiveness. If the tips have become cloudy, a thorough cleaning and rinsing is needed. If this process does not eliminate the cloudiness, the tips might be permanently degraded and should be replaced.

Warranty

Limited Warranty—U.S. Only

3M ESPE warrants your Elipar 2500 Halogen Curing Light against defects in material and workmanship for two years from date of purchase. During the warranty period, 3M ESPE will repair defects or replace a defective unit free if the unit was new when it was purchased and it is promptly returned to the following address:

3M Health Care Service Center
Suite 200 Bldg. 502
3350 Granada Ave. North
Oakdale, MN 55128

Damage caused by misuse, neglect, accident, or abuse are not covered by this warranty.

This warranty does not cover lamps and fiber optic light guides.

THIS WARRANTY IS EXPRESSLY IN LIEU OF AND EXCLUDES WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. 3M SHALL HAVE NO LIABILITY OF ANY KIND FOR INCIDENTAL OR

CONSEQUENTIAL DAMAGES OR EXPENSES THAT ARISE DIRECTLY OR INDIRECTLY FROM THE USE OF THIS PRODUCT, OTHER THAN TO REPLACE OR REPAIR THE DEVICE. THIS LIMITED WARRANTY SHALL BE THE EXCLUSIVE REMEDY AVAILABLE TO ANY PERSON. THE FOREGOING LIMITATIONS OF REMEDIES AND LIABILITY MAY NOT BE CHANGED EXCEPT BY WRITTEN AGREEMENT SIGNED BY AN AUTHORIZED OFFICER OF 3M.

Limited Warranty—Outside U.S.

Contact local 3M ESPE subsidiary for details.

Precautionary Statement

Although the Elipar™ 2500 Halogen Curing Light output is filtered to reduce ultraviolet radiation and reduce unneeded visible light, prolonged exposure may cause retinal damage to eyes and oral tissue overheating.

Limit exposure to prevent eye discomfort, after-image and tissue heating sensation. Do not look directly at the light guide and do not stare at light reflected from tooth surfaces. Do not expose light to persons with extreme brightness sensitivity caused by cataract surgery, photosensitizing drugs, etc. Avoid close or prolonged viewing of the curing process. The use of an eyeshield or protective glasses that effectively block light below 500 nm wavelength is recommended.

This curing light is not safe for use with flammable anesthetics or in other explosive environments.

Safety and Efficacy

The Elipar™ 2500 model 5560 meets all safety and efficacy standards recognized as applicable in every country in which it is sold, and is certified or listed by approval agencies where appropriate or required.

Electrical Safety

IEC Standard 601-1, EN60601-1

North America Standard for Safety UL2601-1/CSA C22.2

EMC:IEC 601-1-2 Draft 2

Specifications - Elipar™ 2500 Halogen Curing Light

Light Source

- 75 Watt tungsten/halogen lamp
- Average lamp life 4000 cycles (20 seconds/cycle)
- Optical filter passes 420-500nm band

Lightguide

- 8mm illuminated diameter 3" long (from nosecone)
- 13mm illuminated diameter 3" long (from nosecone)

Dimensions

Handpiece:

- 167 mm × 53 mm × 139 mm (0.30kg)
- 6.6 in. × 2.1 in. × 5.5 in. (0.7 lb.)

Base Unit:

- 69 mm × 173 mm × 141 mm (2.7kg)
- 2.7 in. × 6.8 in. × 5.5 in. (6.0 lb.)

Electrical

- 100 volts 50/60Hz
- 110 volts 50/60Hz
- 120 volts 50/60Hz
- 220 volts 50/60Hz
- 230 volts 50/60Hz
- 240 volts 50/60Hz

5560 Kit Contents

- Power module with handpiece
- Light Guide
- Eyeshield
- User Instructions

Competitive Comparisons

	Elipar™ 2500	Coltolux™ 3	Spectrum™	Heliolux DLX
Bulb Wattage	75	75	49	75
Voltage Regulation	y	y	y	n
Light Guides	2	4	5	4
Warranty	2 Year	1 Year	1 Year	1 Year
Shield Provided	y	cones	y	y
UL/CSA/VDE	UL/CSA	UL/CSA	CSA	VDE
Fan (dBa)	53	61	49	57
Rotating Nose Cone	y	n	n	n
Spare Bulb	n	n	n	n
Battery Operated	n	n	n	n
Light Intensity Tester	n	n	y	y
Continuous Run	5 min.	10 min.	15 min.	10 min.

y=yes n=no

Questions and Answers

The old fiber-optic units are still in some offices. How can I check for fiber-optic cable damage in a dentist's office?

Hold the end that connects to the unit so a bright light (desk lamp) shines in the end. Look at the other end. Damage of fibers results in dark spots when you look at the tip end.

Which bulbs are interchangeable?

The Visilux™ 2, 3M Curing Light XL3000, and Elipar™ 2500 all use a 75 watt bulb. Therefore, the bulbs are interchangeable between units. However, the XL1500 uses a 52 watt bulb. Replacement of bulbs should be with 3M ESPE replacement parts only. In the past, we have experienced inexpensive bulbs causing low intensity, and thus inadequately cured restorations.

Why is voltage regulation important?

It compensates for the peaks and valleys in the supply voltage so the light will give off a constant intensity, thus assuring the operator of properly cured restorations.

Why is the light guide an amber, or dark color?

The glass sheath has a special characteristic of internally reflecting any stray light back into the fiber bundle.

What does the honeycomb effect in the light guide mean?

The honeycomb effect means the fiber-optic fibers are not attached to each other with a resin. Instead there are only fiber-optic fibers packed as tightly as possible together.

Under the caution section of the instructions, it mentions that the unit is not safe to be used with flammable anesthetics or in other explosive environments. Could you explain this?

Curing lights, like most other electronic devices, do not have hermetically sealed electrical circuitry. Any electrical fault could be dangerous in a flammable environment.

Can the light guides of the 3M Curing Light XL3000 and the Elipar™ 2500 be interchanged?

Yes

Will the Visilux™ 2 light guide fit the Elipar 2500 and/or the 3M Curing Light XL3000?

No.

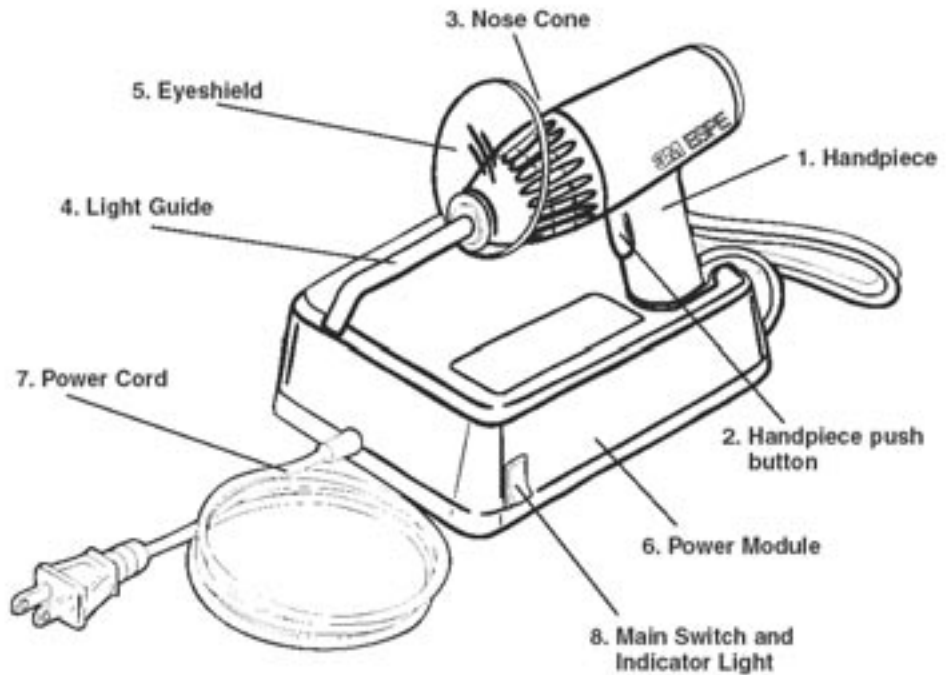
Why is high intensity in a curing light important?

Light curing materials cure exclusively by a reaction with the blue light from a dental curing unit. High intensity light is needed to cure deeper areas. Inadequate light intensity will result in an inadequate cure which can lead to clinical problems such as a reduction in compressive and bond strengths, poor color stability, and other undesirable results. Light curing materials cure only during light activation.

Are the eye shields interchangeable?

The eyeshields of the XL3000 and the 2500 are interchangeable.

Instructions



Intended Use:

The Elipar™ 2500, manufactured for 3M ESPE, is a high intensity source of blue light (400-500 nm) designed and tested for polymerizing visible light-cure dental materials such as Z100™ Restorative, Adper™ Single Bond Adhesive and Vitremer™ Core Buildup/Restorative, manufactured by 3M ESPE. It consists of a power module with handpiece holder, a handpiece that contains the light source, and a fused glass fiber optic light guide. It has been designed for table top use or wall mount. Consult any restorative manufacturer's instructions for proper technique and curing times. If not using 3M ESPE products, perform a curing performance test as outlined on page 7 of this instruction booklet. (*Note:* For mounting, follow the instructions included with the mounting kit.)

CAUTION

- The fiber optic light guide is provided in a nonsterile condition and must be sterilized prior to use. Refer to Cleaning Instructions.
- Do not immerse unit in water. Refer to Cleaning Instructions.
- Prolonged exposure may cause retinal damage.
- Prolonged exposure to an area may cause oral tissue trauma.
- The use of an eyeshield or protective glasses that effectively block light below 500 nm wavelength is recommended for dental staff.
- Do not look directly at the light guide and do not stare at light reflected from tooth surface.
- Do not expose light to persons with extreme brightness sensitivity caused by cataract surgery or photosensitizing drugs.

-
- Avoid close or prolonged viewing of the curing process.
 - This product has not been designed for use with flammable anesthetics or in other explosive environments.
 - If it is necessary to change the line plug to fit your outlet type, contact a qualified service person in your area.
 - Handpiece bulb, fuse, light guide and eyeshield are the only user serviceable components.
 - The power module has dangerous internal voltage. It can only be serviced by an authorized service center.
 - Do not turn off the main power switch until the fan has stopped in order to allow the unit to cool down.
 - Allow the light guide to cool to room temperature before handling to avoid risk of burn.
 - Before attempting bulb replacement, make sure the cooling fan has completed the cooling cycle and has stopped rotating to avoid risk of burn from bulb. Turn off the main switch. Disconnect the power cord from the wall outlet.
 - Do not attempt to replace any cracked or scratched optical filter or heat filter. It is important that the heat filter be properly placed to avoid any tissue trauma. Send curing light to a qualified service center.
 - Do not operate the unit without the optical filter and heat filter.

Assembly

1. Slide the eyeshield onto the light guide.
2. Insert the straight end of the light guide into the chuck mechanism in the front cover of the handpiece until it stops solidly. The light guide may be rotated to any convenient position by rotating the nose cone.
3. Connect the power cord into the correct supply outlet; refer to the specification label on the power module.
4. Place the handpiece in the handpiece holder.

Operating Instructions

CAUTION

Consult the restorative manufacturer's instructions for proper technique and curing times.

Operation

1. Press the power (green) switch on the side of the base unit to the "I" position. The green indicator light will glow, and the unit is now ready for use.
2. Rotate the nose cone to optimize the position of the light guide and hold the light guide no further than 2 mm from the dental material.

Note: When a colorless transparent matrix is used to provide anatomical form, the light guide may be placed directly against the matrix a few seconds after polymerization has begun to avoid movement of material.

3. Depress the handpiece push-button to activate the bulb. A single audible tone will be heard every 10 seconds. Depressing the handpiece push-button a second time will immediately deactivate the bulb.

Note: The handpiece cooling fan will automatically start at the beginning of, and continue throughout, the curing time cycle. It will continue running until the unit has cooled sufficiently.

4. When the curing operation is complete, return the handpiece to the holder.
5. To turn the base unit off, depress the power (green) switch on the side of the base unit to the “0” position. The green indicator light will turn off.

Routine Care

CAUTION

Allow the light guide to cool to room temperature before handling to avoid risk of burn.

Plastic

Cleaning/Disinfecting - Turn off the main power (green) switch and unplug the unit before cleaning. The base unit and handpiece may be cleaned by wiping with a soft cloth moistened slightly with alcohol or disinfectant. Be careful to prevent entry of liquid into components. Always wipe off any excess alcohol or disinfectant.

Note: Disinfectants with basic glutaraldehyde as an active ingredient are not recommended.

Alcohol should be less than 30% concentration.

Light Guide

1. Carefully handle the light guide to avoid damaging the polished ends.
2. Periodically examine both ends of the light guide. If they are dull or white, check the cure performance using the Curing Performance Test described in this manual.
3. Do not contaminate the light guide with unpolymerized restorative material to avoid diminished light transmission.
4. The light guide and eyeshield should be disinfected after each use to prevent transfer of microorganisms between patients.

Cold Sterilization - Soak the light guide in an alkaline glutaraldehyde type of cold sterilizing solution. Follow manufacturer’s instructions regarding dilution and recommended exposure times. Use of other types of solutions (e.g., phenolics) may cause decreased output intensity.

Autoclave - Follow manufacturer's instructions regarding exposure times. Generally a minimum of 15 minutes at 121° C (252° F). 15 psi (1000hPa) is recommended. Do not autoclave the light guide at temperatures above 136° C.

Eyeshield - Disassemble the rubber O-ring from the shield. Clean any debris off the surface with a dull instrument. Soak shield in an alkaline glutaraldehyde type of cold sterilizing solution for the minimum amount of time recommended per manufacturer.

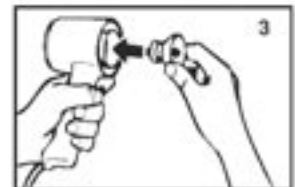
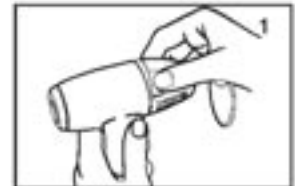
Bulb Replacement

CAUTION

To avoid risk of burn, make sure the cooling fan has completed the cooling cycle and has stopped rotating. Turn off the main switch. Disconnect the power cord from the wall outlet.

Do not attempt to replace any filters. Improper placement or missing a heat filter could lead to tissue burn. Send curing light to an authorized service center.

1. Remove the nose cone by placing the thumb on a textured snap-in tab located between two slits and the forefinger on the other textured snap-in tab located between two slits. Gently squeeze the tabs while pulling downward at an angle to separate the nose cone from the handpiece.
2. Grasp the outside rim of the reflector and pull it forward, separating the bulb pins from the socket. The bulb and integral reflector are changed as a unit.



Note: Inspect the optical filter in the nose cone. Remove dust or other contaminants with a soft cotton swab. A chipped or cracked filter should be replaced immediately by an authorized service center.

3. Hold the new bulb/reflector unit by the reflector rim. Align the bulb pins and push the unit securely into the socket. To ensure expected performance and safety, replace bulb with 3M ESPE part number 78-8131-1662-7 only.

Note: Fingerprints on the inside of the reflector or the bulb can adversely affect performance. Remove fingerprints with a cotton swab moistened slightly with alcohol.

4. Replace the nose cone by holding it at a slight angle to the handpiece. Insert the side opposite the snap-in tabs into the groove of the handpiece. While gently squeezing the tabs, rotate the nose cone to align it into the handpiece until it is fully seated and snaps into position.
5. Release the snap-in tabs and rotate the nose cone on the handpiece to assure it is correctly positioned and rotates freely.

Light Guide Replacement

CAUTION

Allow unit to cool sufficiently before replacing the light guide. The metal sleeve of light guide could still be very hot.

1. Hold the handpiece by placing one hand firmly around the nose cone area.
2. Grasp the light guide firmly with the other hand.
3. Pull light guide straight out of nose cone receptacle.
4. Push replacement light guide firmly into nose cone receptacle.

Troubleshooting

Condition	Remedy
Main indicator light inoperative	<ol style="list-style-type: none">1. Check electrical supply.2. Send unit to an authorized service center.
Curing bulb inoperative	<ol style="list-style-type: none">1. Replace bulb.2. Send unit to an authorized service center.
No time signal tone	<ol style="list-style-type: none">1. Send unit to an authorized service center.
Reduced curing performance	<ol style="list-style-type: none">1. Check intensity with hand held radiometer.2. Clean light guide exit tip. Consult cleaning instructions.3. Clean optical filter in nose cone with a soft cotton swab.4. Check intensity output.5. Check optical filter in nose cone for chips or cracks. If chips or cracks are present on optical filter, send unit to an authorized service center.6. Replace light guide.7. Replace bulb.8. Check intensity output.9. Send unit to an authorized service center
Handpiece turns on, immediately hear 5 beeps and handpiece shuts off	<ol style="list-style-type: none">1. Fan possibly blocked, therefore send unit to an authorized service center.
Unit overheats. Five consecutive beeps, bulb shuts off during curing cycle	<ol style="list-style-type: none">1. Let unit cool down for 10 minutes. Restart bulb. If, after a few minutes the bulb shuts off again after 5-beep signal, or if the bulb will not restart, send the unit to an authorized service center.

Curing Performance Test

Lay a clean polyester matrix band on white paper and place a clear or white plastic form on the band. The form should be a cylindrical hole 3-6 mm diameter through material 2.0-2.5 mm thick. Pack restorative material into the form, cover with polyester and press flat. Direct the curing light at the top surface (from less than 2 mm) of the sample and cure for the recommended time. Remove the polyester strips and examine the condition of cure. The bottom surface should appear glassy and resist scratching by a sharp explorer, indicating adequate cure. (Consult manufacturer's instructions for other criteria for correct cure).

If the surface is soft or dull, repeat the test procedure using incrementally longer curing times until adequate cure is attained, and adjust curing time accordingly. If the adjusted time exceeds 200% of normal, verify that the restorative material has not degenerated, or correct curing light problems as directed in the Troubleshooting table.

Repair

Obtain qualified repair service only from 3M ESPE authorized service facilities.

Contact:

3M Health Care Service Center
Suite 200 Bldg. 502
3350 Granada Ave. North
Oakdale, MN 55128
(800) 292-6298

Replacement Parts and Accessories -

Can be purchased from authorized dealer

Item	3M ESPE Stock Number
Bulb/12V, 75W	78-8131-1662-7
Light guide - 8 mm diameter	78-8131-1657-7
Light guide - 13 mm diameter	78-8131-1658-5
Mounting Kit	78-8131-1663-5
Eyeshield - 8 mm	78-8131-1660-1
Eyeshield - 13mm	78-8131-1661-9

Specifications

Note : This manual is used for all versions of the 3M ESPE Elipar™ 2500, M5560.

Operation of equipment - Continuous Duty

- Unit will operate continuously for 5 minutes before automatic shutoff, at which time the unit may be restarted immediately

Light Source:

- 75 watt tungsten/halogen bulb. Average life 4000 cycles at 20 seconds each.
- Optically filtered light output for peak power in 400-500 nm band.
- Fused fiber-optic light guide.
- 13 mm and 8 mm diameter optional light guide aperture

Electrical:

- Electronically regulated bulb voltage
- 106 VA input power
- Fuse: See product name plate for correct rating.
- Model versions for worldwide electrical supply characteristics. See product nameplate for correct supply voltage.

Electrical versions available: 50/60 Hz
240V; 230V; 220V; 120V; 110V; 100V

Note: Be sure your unit is correctly rated for your specific electrical supply

- Unit is double insulated and uses plug configurations according to individual primary country specifications.

Protective features:

- Thermal overload protector in handpiece.
- Optical filter blocks light outside peak curing band.
- Protection against electrical shock (Type BF)
- Double insulated power supply
- Low voltage handpiece circuit.
- Protection against ingress of water: ordinary

Transport and Storage Conditions:

- Ambient temperature range -40° C to +70° C
- Relative humidity range of 10% to 80%, excluding condensation
- Atmospheric pressure of 500 hPa to 1060 hPa

Dimensions:

- Power module: 2.7 in. × 6.8 in. × 5.5 in. (69 mm × 173 mm × 141 mm)
(2.7kg)
- Handpiece: 6.6 in. × 2.1 in. × 5.5 in. (167 mm × 53 mm × 139 mm) (0.3kg)

Safety Regulations:

M5560 fulfills the following standards:

- UL Standard 2601-1 /CSA C22.2 No. 601.1/EN60601-1
- Other country specific deviations to IEC601-1 through CB certification.

Electro Magnetical Compatibility

M5560 complies with IEC 601-1-2 Draft 2

No person is authorized to provide any information which deviates from the information provided in this instruction sheet.

Warranty

3M ESPE warrants this product will be free from defects in material and manufacture for a period of two years from date of purchase. 3M ESPE MAKES NO OTHER WARRANTIES INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. User is responsible for determining the suitability of the product for user's application. If this product is defective within the warranty period, your exclusive remedy and 3M ESPE's sole obligation shall be repair or replacement of the unit if the unit was new when it was purchased and it is promptly returned to the following address:

3M Health Care Service Center
Suite 200, Bldg. 502
3350 Granada Ave. North
Oakdale, MN 55128
800 292 -6298

This warranty does not cover lamps and fiber optic light guides.

Limitation of Liability

Except where prohibited by law, 3M ESPE will not be liable for any loss or damage arising from this product, whether direct, indirect, special, incidental or consequential, regardless of the theory asserted, including warranty, contract, negligence or strict liability.

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