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Elipar™ DeepCure LED Curing Lights

Technical Product Profile

Table of Contents

NOTE: All tests referenced throughout this document were conducted using the Elipar™ DeepCure-S LED Curing Light. However, the same test data applies to the Elipar™ DeepCure-L LED Curing Light as the technical performance is identical for both models.

Introduction

Dental professionals want predictability and confidence with their products and procedures, but sometimes the curing step can feel like a leap of faith. In fact, research shows that 69 percent of bulk fill users are not confident of polymerisation deep in the cavity.[1] If you can't see under a restoration, how can you be sure it has cured properly and won't break down prematurely? Now, with the new Elipar™ DeepCure LED Curing Lights from 3M ESPE Dental, dental professionals can be more confident they have achieved a uniform and deep cure, even when they can't get the light in a perfect position.

The Elipar™ DeepCure LED Curing Light is available in two models: stainless steel or lightweight plastic.

Dentists can choose from two models to match their preference: a high-quality, durable stainless steel version, or an equally high-performing lightweight model.

- Elipar™ DeepCure-S LED Curing Light—"S" for the stainless steel version
- Elipar™ DeepCure-L LED Curing Light—"L" for "light on weight" plastic version

It is important to note that both versions offer identical technical performance.
Main differences between the two versions are the housing and how the units are charged.

The following figure highlights the main differences between the two versions of the curing light, as well as the technical performance for both models.

Elipar™ DeepCure-S LED Curing Light

For dentists who enjoy the look, feel and durability of high-quality, stainless steel

Elipar™ DeepCure-L LED Curing Light

For dentists who want high performance in a lightweight model

[1] Clinicians Report, October 2014, Volume 7, Issue 10.

Technical Performance

Technical Performance Data for both models	
Wavelength	430-480 nm
Light intensity	1470 mW/cm² (-10%/+20%)
Power supply	Lithium-ion battery Approx. 120 min. battery runtime (~720 10-sec. cures) with constant light output regardless of battery charge
Operation	Intuitive two-button and single-mode operation Pre-set cure times: 5, 10, 15 and 20 seconds, continuous mode (120 sec.) and tack-cure mode
Curing time	Refer to material instructions; 10 sec. for many composites
Light guide	10 mm; black coated; autoclavable; optimal intraoral reach due to user- and patient-friendly geometry

A Deep, Uniform Cure

Elipar™ DeepCure LED Curing Lights hold true to their name. Due to optimised optics, you can be confident that your restorations will have a deep, uniform cure … from centre to rim—from surface to cavity bottom—and at any clinically relevant distance. Laboratory test results prove why.

Homogeneous Energy Distribution

More homogeneous energy distribution means composite restorations are cured more completely throughout the restoration, especially in deep cavities, providing a greater degree of cure and minimising potential failures (e.g., undercured areas in the restoration).

Figure 1 shows the light penetration of different curing lights in SiO_2 brine. Light scatter and penetration show a more collimated beam profile and deeper transmission of light for Elipar™ DeepCure-S LED Curing Light compared to competitive curing lights.

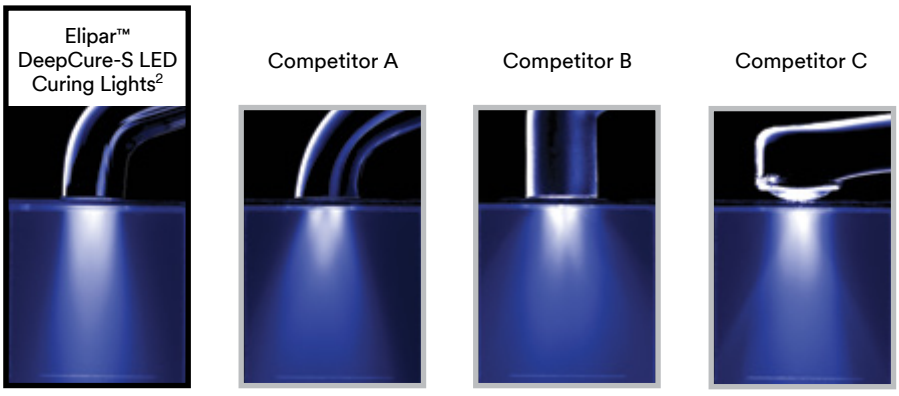


Figure 1: More homogeneous energy distribution throughout the restoration. Images comparing the light penetration of various light curing devices show that the Elipar™ DeepCure-S LED Curing Light produces a more collimated and uniform beam profile—even in deeper areas.

Source: 3M ESPE Dental internal data

[2] The Elipar™ DeepCure-S LED Curing Light and the Elipar™ DeepCure-L LED Curing Light have identical technical performance.

Uniform Beam Profile

To confirm the obtained images from Figure 1, spectroscopic images of the beam profile were taken at clinically relevant distances.

Figure 2 shows the intensity distribution of leading curing lights at 0 mm, 4 mm and 10 mm distances.

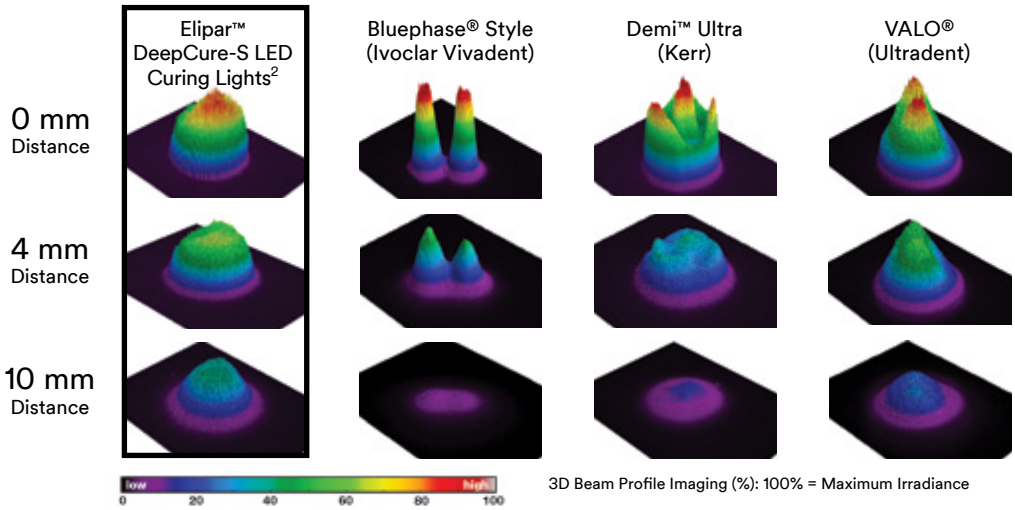


Figure 2: Better light uniformity and intensity distribution at clinically relevant distances. 3D images of beam profiles were used to compare output of the Elipar™ DeepCure-S LED Curing Light to that of various light curing devices. Measured spectrum: 420-540 nm. Most curing lights showed a significant drop of irradiance over clinically relevant distances.

Source: BlueLight Analytics Inc.

A highly uniform beam profile enables the operator to deliver consistent amounts of energy across the tip of the light guide. This enables a significantly better depth of cure, even when perfect light positioning is difficult.

The beam profile of a curing light provides unique insight into its performance characteristics. In particular, the beam profile helps to explain changes in irradiance across the surface of the light tip at given distances from the light tip. Using the beam profile, the clinical performance of a curing light can be predicted and also compared to other curing light devices.

Compared to competitive curing lights, Elipar™ DeepCure-S LED Curing Light offers an extremely homogeneous beam profile and optimal beam collimation.

Method Used

Irradiance distributions across each light tip are measured at the emitting surface using a laser beam analyser. The light of the light curing device is projected onto a diffusive surface of frosted quartz, and the light tip is placed in contact with this diffusive surface. The curing device is then turned on and the resulting image is recorded in the optical analysis software. The software is calibrated according to the pixel scale of the camera and the pixel dimensions to enable precise linear measurement of the light intensities. Lastly, filters are used to differentiate the spectral output for each image. Beam profiles can be produced at different distances from the sensor in order to represent a reasonable range of clinical use.

[2] The Elipar™ DeepCure-S LED Curing Light and the Elipar™ DeepCure-L LED Curing Light have identical technical performance.

Clinical Performance

Having thoroughly cured restorations is key to long-lasting restorations and successful fulfilment of the treatment plan. As mentioned in the previous section, the beam homogeneity can be used to predict the clinical performance of a curing light. To double-check this, established experiments were performed to determine the clinical performance: Depth of Cure and Vickers Hardness.

Depth of Cure

ISO and modified ISO measurements consistently show better depth of cure, even when perfect light positioning is difficult.

Figures 3-7 show depth of cure results with leading composite filling materials and curing lights.

The Elipar™ DeepCure-S LED Curing Light helps to compensate for slight movements during curing, delivering the highest depth of cure, as shown below.

NOTE: While the depth-of-cure measurements with Elipar™ DeepCure LED Curing Lights deliver consistent results (small standard deviation), other curing lights show higher standard deviations. This is especially obvious with multi-wavelength devices because the beam profiles of the other curing lights are inhomogeneous—which is often caused by the use of multiple, different LEDs in multi-wavelength devices. During the clinical curing process, it cannot be controlled whether the best- or worst-fitting (emitted spectrum) LED is placed over the restoration and thus influencing the final curing result.

Filtek™ Bulk Fill Posterior Restorative

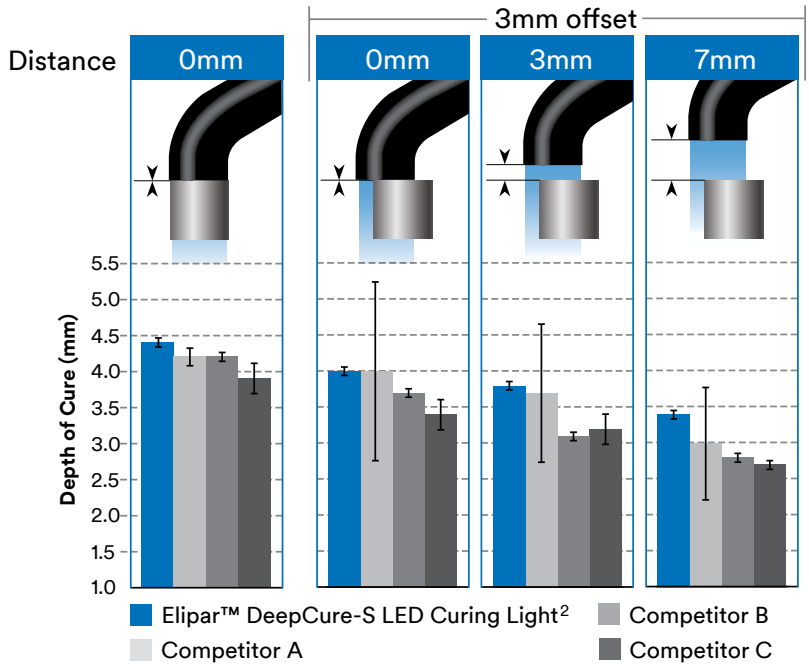


Figure 3: Filtek™ Bulk Fill Posterior Restorative Shade A3, curing time 20 secs. (according to Instructions for Use).

Source: 3M ESPE Dental internal data

[2] The Elipar™ DeepCure-S LED Curing Light and the Elipar™ DeepCure-L LED Curing Light have identical technical performance.

Filtek™ Supreme XTE Universal Restorative

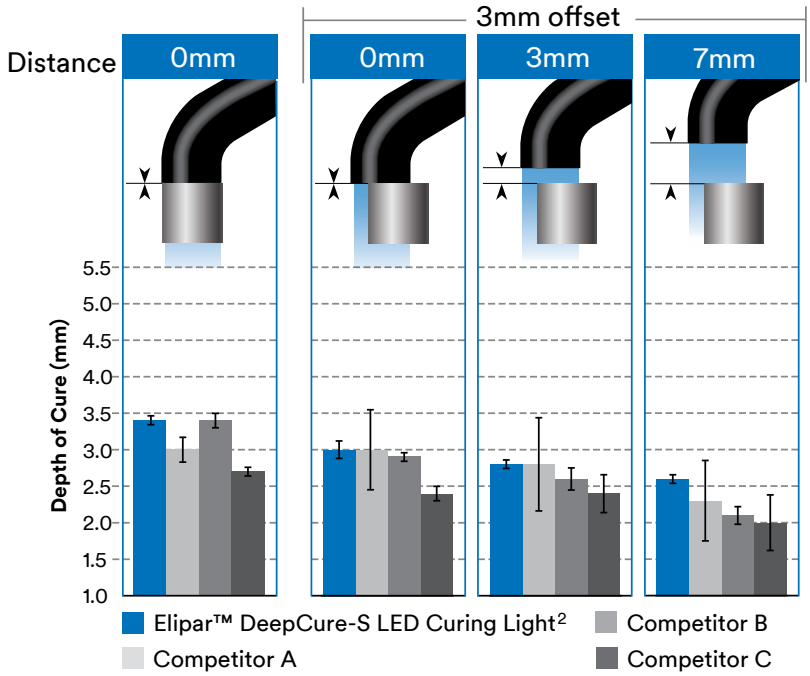


Figure 4: Filtek™ Supreme XTE Universal Restorative Shade A3, curing time 20 secs. (according to Instructions for Use).
Source: 3M ESPE Dental internal data

Tetric EvoCeram® Bulk Fill

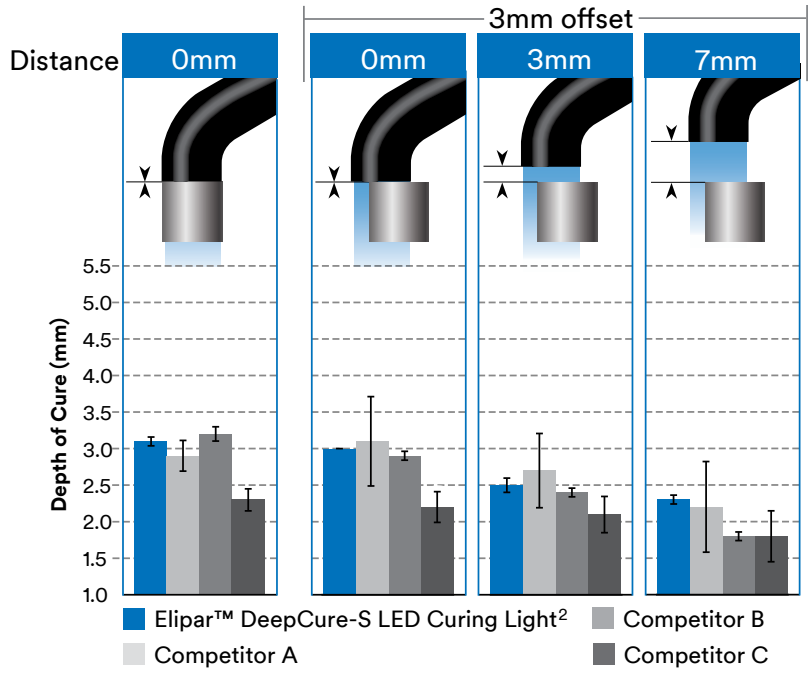


Figure 5: Tetric EvoCeram® Bulk Fill Shade A3, curing time 10 secs. (according to Instructions for Use).

[2] The Elipar™ DeepCure-S LED Curing Light and the Elipar™ DeepCure-L LED Curing Light have identical technical performance.

SonicFill™ Sonic-Activated Bulk Fill Composite

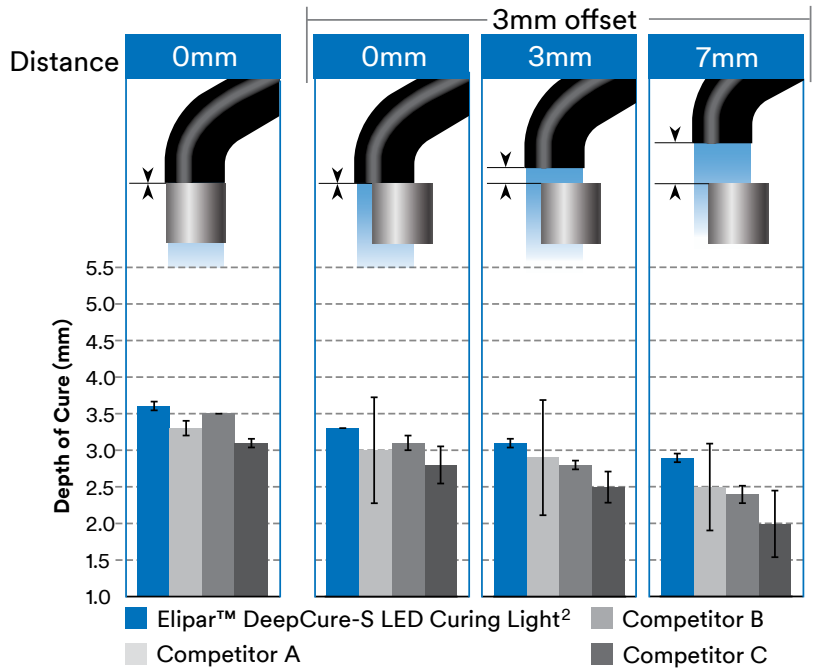


Figure 6: SonicFill Sonic-Activated Bulk Fill Composite Shade A3, curing time 20 secs. (according to Instructions for Use).

SDR™ Bulk Fill

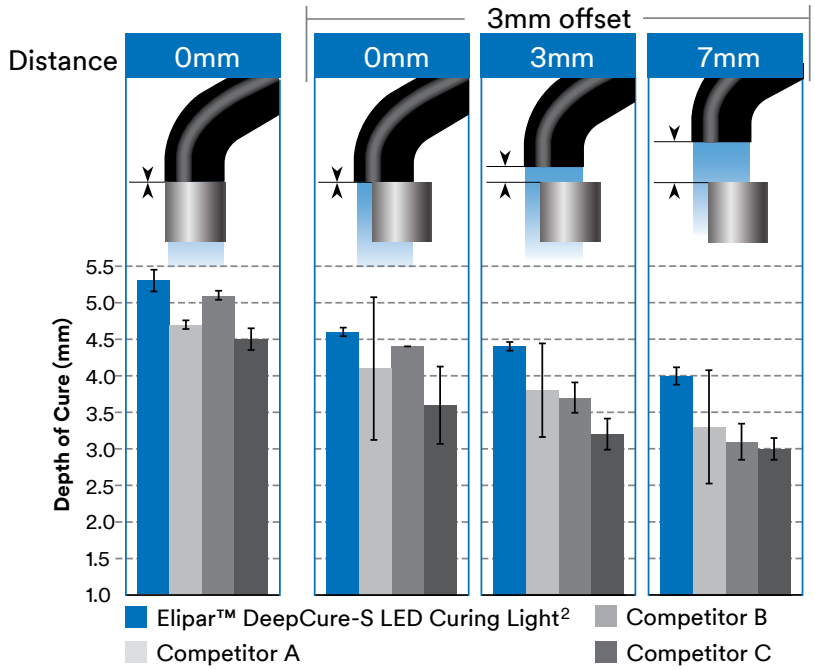


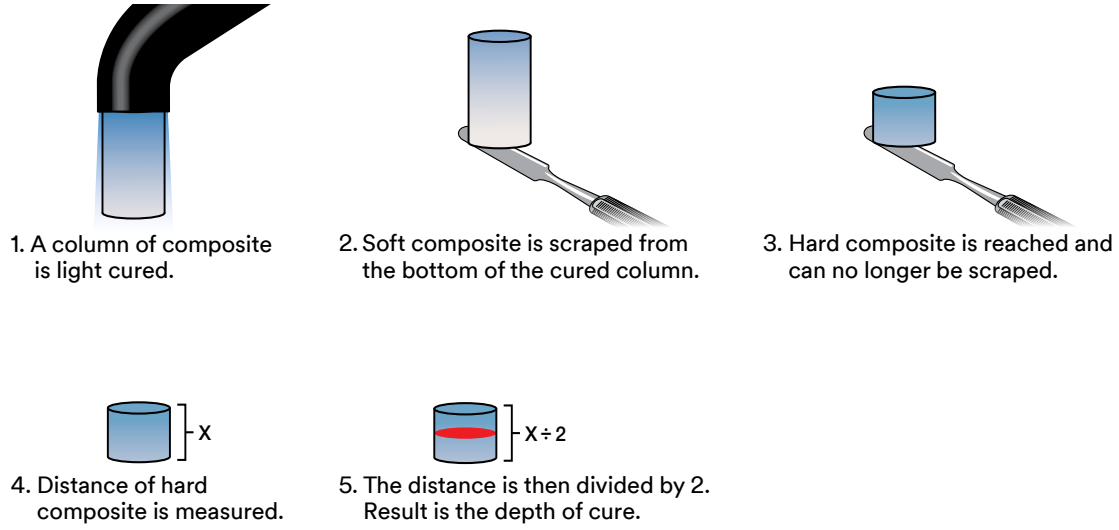
Figure 7: SDR Bulk Fill Shade A3, curing time 20 secs. (according to Instructions for Use).

[2] The Elipar™ DeepCure-S LED Curing Light and the Elipar™ DeepCure-L LED Curing Light have identical technical performance.

Method Used

Method used for 0 mm centred: ISO 4049

Depth of cure is measured according to ISO standards. A composite is placed void-free in a metal cylinder (inner diameter—4 mm) with slight excess over the metal edge. It is compressed by a glass microscope slide until the upper surface of the composite is flat and even with the metal edge. The so formed composite column is then cured according to manufacturer's Instructions for Use and then pressed out of the metal form by applying pressure on the cured surface. The lower, uncured part of the composite body is scraped off by a spatula until the cured hard part of the column is reached. The height of the residual fully cured composite—divided by 2—is the obtained depth-of-cure value.

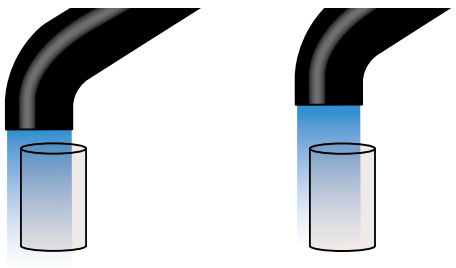


1. A column of composite is light cured.
2. Soft composite is scraped from the bottom of the cured column.
3. Hard composite is reached and can no longer be scraped.
4. Distance of hard composite is measured.
5. The distance is then divided by 2. Result is the depth of cure.

Figure 8: Description of the ISO standard measurement of depth of cure.

Method used for all other conditions: modified ISO 4049 measurement

A modified measurement determines the depth of cure at a non-centered (3 mm offset) light guide positioning with different distances to curable composite. This simulates the clinical situation where optimal positioning of the light guide may be challenged by circumstances.



1. Offset light guide at a 3 mm distance from composite.
2. Offset light guide at a 7 mm distance from composite.

Vickers Hardness

In addition to the depth-of-cure measurement, a second method was picked to prove the performance of the Elipar™ DeepCure LED Curing Lights. Vickers hardness is a measure of the hardness of a material, calculated from the size of an impression produced under load by a pyramid-shaped diamond indenter.

Vickers hardness is known to correlate to the degree of polymerisation within a specimen. The comparison of the obtained value at the surface and within the specimen shows the degree of conversion curve within the composite.

The evaluation of four different composites—with three different curing lights—confirms the results obtained by the depth-of-cure measurements discussed above. It validates statistically that the homogeneous beam profile leads to more consistent curing results (measured values in the center (solid lines) of the specimen are very similar to the values obtained at the edge of the specimen (dotted lines). In addition to that, the curves obtained with the Elipar™ DeepCure-S LED Curing Light do not decrease as much as the curves obtained with the other curing lights when going from the surface (0 mm) to the bottom of the restoration (5.6 mm). Again, the statistics validate the obtained depth-of-cure values.

Figures 9-12 show Vickers hardness of leading composite filling materials in combination with different curing lights.

Filtek™ Bulk Fill Posterior Restorative

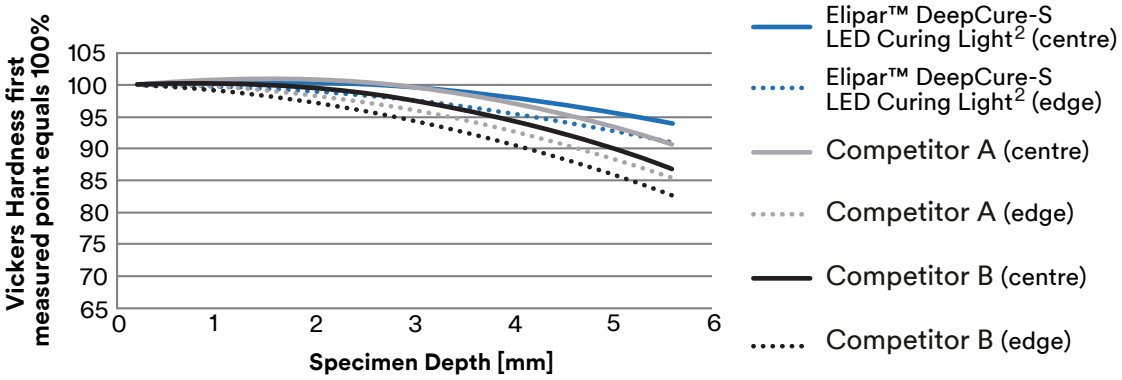


Figure 9: Vickers hardness measured in different depths in the center and at the edge of a Filtek™ Bulk Fill Posterior Restorative specimen. Shade A3, curing time 20 seconds (according to Instructions for Use).

Filtek™ Supreme XTE Universal Restorative

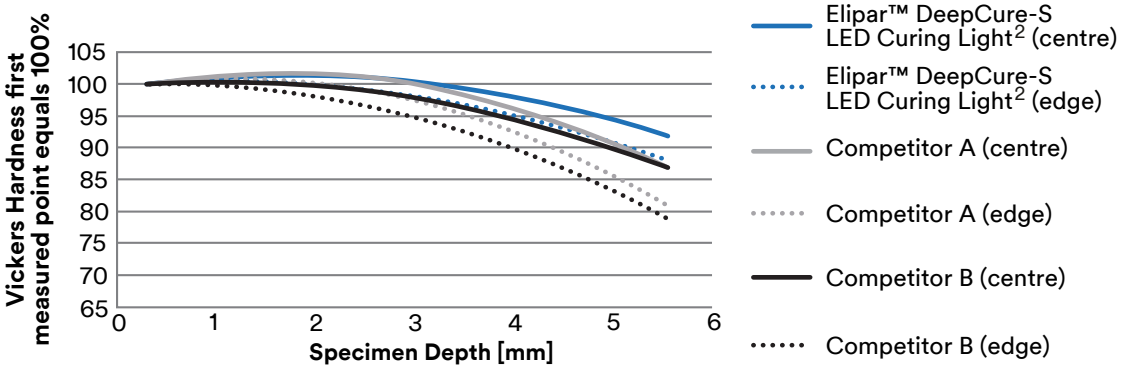


Figure 10: Vickers hardness measured in different depths in the centre and at the edge of a Filtek™ Supreme XTE Universal Restorative specimen. Shade A3, curing time 20 seconds (according to Instructions for Use).

[2]The Elipar™ DeepCure-S LED Curing Light and the Elipar™ DeepCure-L LED Curing Light have identical technical performance.

Tetric EvoCeram® Bulk Fill

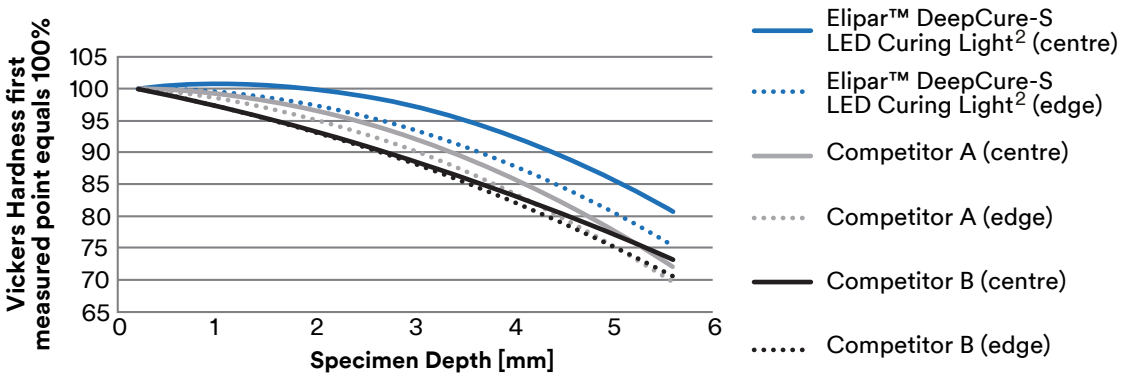


Figure 11: Vickers hardness measured in different depths in the center and at the edge of a Tetric EvoCeram Bulk Fill specimen. Shade A3, curing time 10 seconds (according to Instructions for Use).

SonicFill™ Sonic-Activated Bulk Fill Composite

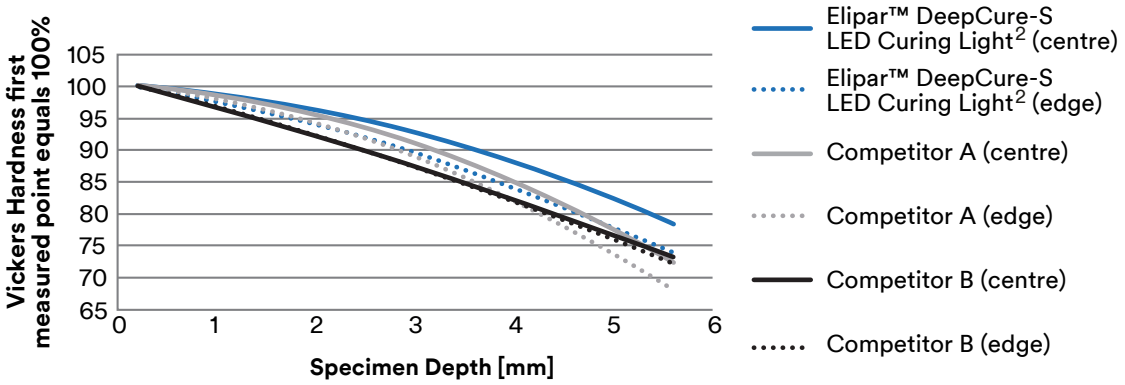


Figure 12: Vickers hardness measured in different depths in the center and at the edge of a SonicFill Sonic-Activated Bulk Fill Composite specimen. Shade A3, curing time 20 seconds (according to Instructions for Use).

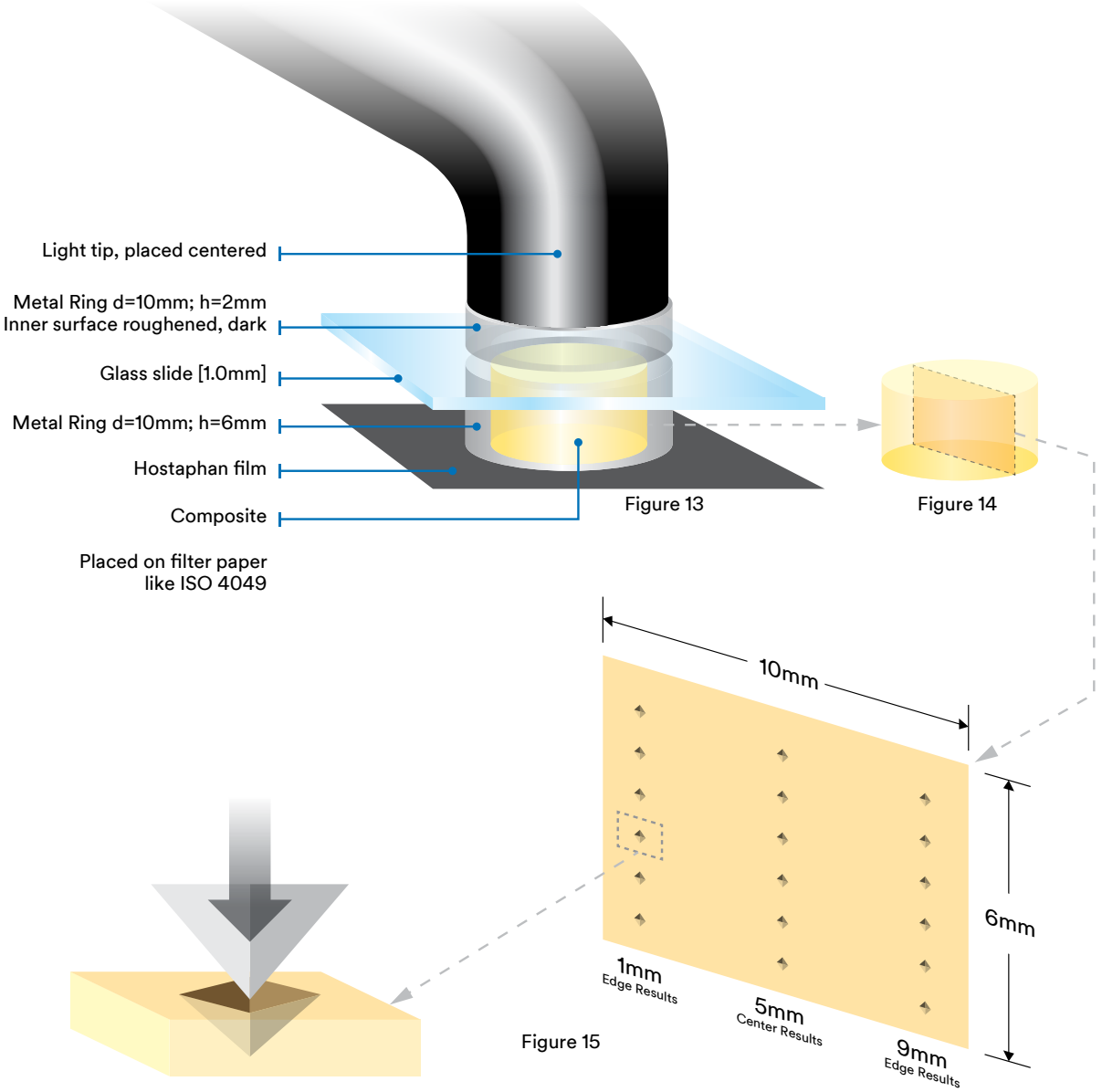
Method Used

Preparation of specimen

Comparisons of hardness profiles of different composite restoratives cured with different light devices were conducted. Cylinder-shaped composite specimens (Figure 14) were prepared by placing the restorative material into a metal ring (height 6 mm, inner diameter 10 mm). Subsequently, a glass plate (thickness 1 mm) was placed on the metal ring and an identical metal ring over it (Figure 13). The composite cylinder was then light cured with the curing tip of the light device placed in the centre of the upper metal ring (Figure 13). To analyse the polymerisation quality within the specimens, Vickers hardness was determined using an automatic micro hardness indenter. Hardness profiles were measured in the centre and on the edge of the cured specimen, and from the top to the bottom of the 6 mm-thick composite layer (Figure 15).

[2] The Elipar™ DeepCure-S LED Curing Light and the Elipar™ DeepCure-L LED Curing Light have identical technical performance.

Set-up



Measurement of Vickers Hardness

The test procedure was carried out with controlled force: the test load increased and decreased with constant speed between 0.4 mN and 500 mN. The load and penetration depth were continuously measured. The material's ability to resist plastic deformation from a standard source was evaluated. The unit of hardness given by the test is known as the **Vickers Pyramid Number (HV)** or **Diamond Pyramid Hardness (DPH)** and is determined by the load over the surface area of the indentation.

Dentist Satisfaction Ratings

Application Test Results

During product development, an application test was conducted using the Elipar™ DeepCure-S LED Curing Light. The same results apply to the Elipar™ DeepCure-L LED Curing Light as the technical performance is identical for both models.

Over 11,000 restorations were cured by 40 dentists from the United States, Germany, Turkey and Denmark using Elipar™ DeepCure-S LED Curing Light in their offices. The dentists then evaluated the in vivo performance of the device after the trial period of nine weeks.

Overall satisfaction

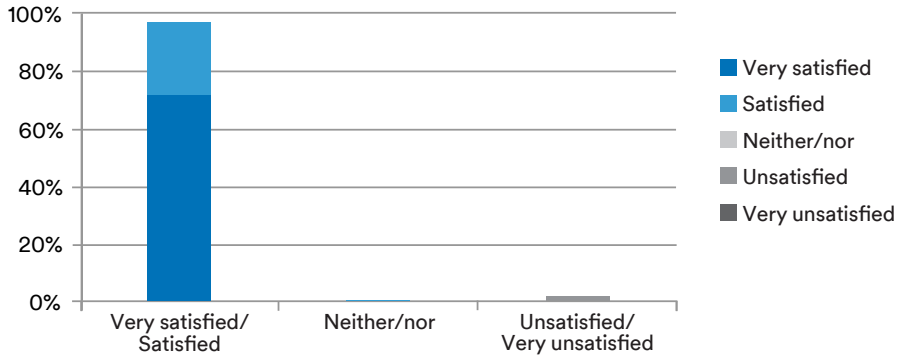


Figure 16: 98% of dentists who used Elipar™ DeepCure-S LED Curing Light clinically were either satisfied or very satisfied with the curing light.

Full-cure confidence

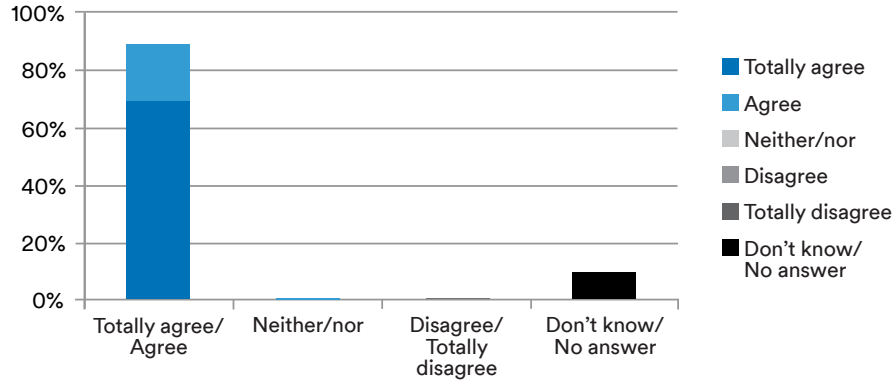


Figure 17: 90% of dentists who used Elipar™ DeepCure-S LED Curing Light clinically agreed or totally agreed that the Elipar™ DeepCure-S LED Curing Light increases their confidence of a full cure to the bottom of the proximal box.

Less sensitive to user variability

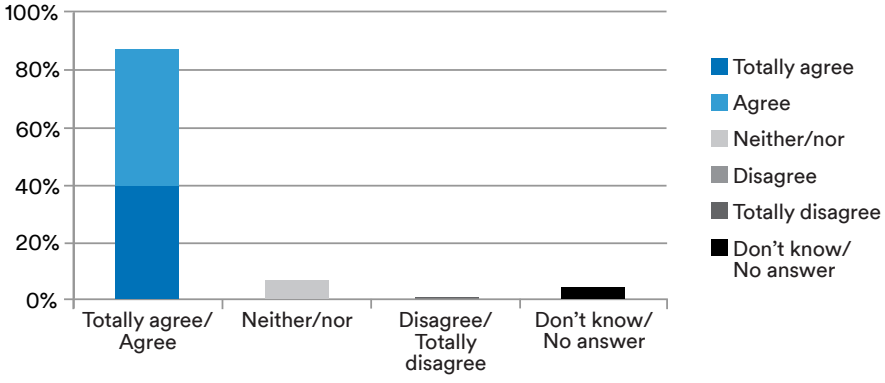


Figure 18: 88% of dentists who used Elipar™ DeepCure-S LED Curing Light clinically agreed or totally agreed that the Elipar™ DeepCure-S LED Curing Light makes the curing process less error-prone (less sensitive to user variability).

Comfortable to use

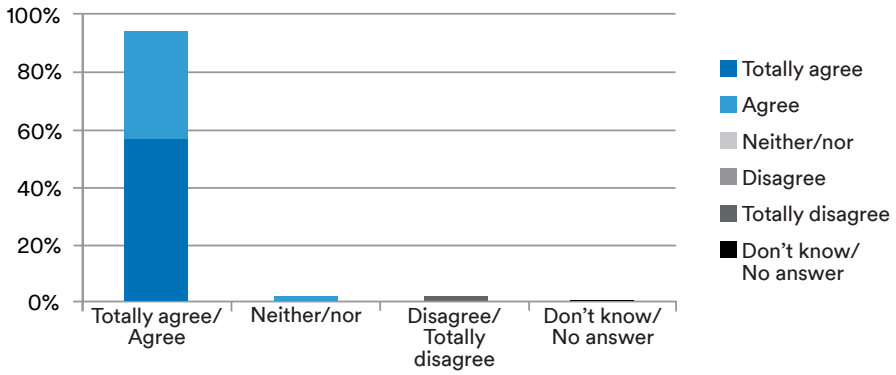


Figure 19: 95% of dentists who used Elipar™ DeepCure-S LED Curing Light clinically agreed or totally agreed that the Elipar™ DeepCure-S LED Curing Light is comfortable for the operator.

Easy light access to tooth surfaces

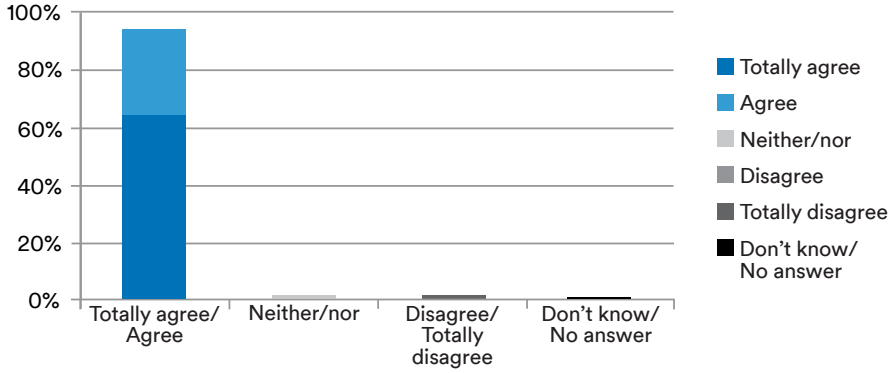


Figure 20: 95% of dentists who used Elipar™ DeepCure-S LED Curing Light clinically agreed or totally agreed that the Elipar™ DeepCure-S LED Curing Light allows easy light access to all (even hard-to-reach) tooth surfaces.

Comfortable for the patient

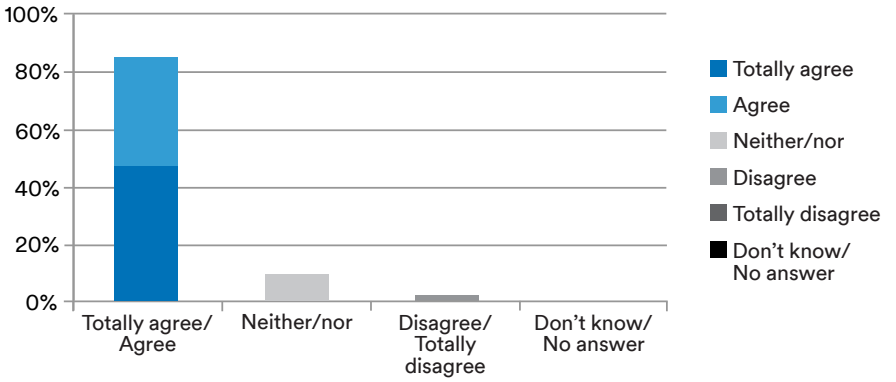


Figure 21: 85% of dentists who used the Elipar™ DeepCure-S LED Curing Light agreed or totally agreed that the Elipar™ DeepCure-S LED Curing Light is comfortable for the patient (even for patients with limited mouth opening capability). (See "Opening Angle of Different Curing Lights" pictured on page 18)

Heat Generation

All LED curing lights produce heat during polymerisation. But it is known that numerous dental restorative treatments are also potential sources of temperature increase in dental tissues, such as:

- Preparation of crown with air-cooled, high-speed instruments up to 8.8°C increase[3]
- Fabrication of direct provisional methacrylate resin crowns up to 19.1°C increase[4]
- Thermoplasticised canal obturation up to 22.1°C[5]
- Post removal with ultrasonic device up to 40.4°C[6]

However, the question is, what temperature will cause irreversible thermal damage to the pulp and other dental tissues?

On the other hand, pulpitis is not only caused by thermal irritation, but also by physical damage during the removal of tooth structure. Therefore, it is rather difficult to judge the cause of pulpal damage.

In the past, numerous in vivo studies have evaluated the response of the pulp and other dental tissues to thermal irritation and the temperature at which thermal damage is initiated and reported different results. This indicates that the range of safe temperatures in dental tissues, particularly the dental pulp, is actually not known:

- In vivo animal study by Zach and Cohen[7] stated that an intrapulpal temperature increase of 5.5°C caused pulpitis or pulp necrosis in 15% of irritated teeth.
- In vivo study by Eriksson and Albrektsson[8] reported that 10°C temperature increase caused bone resorption and tooth ankyloses.
- In vivo study by Baldissara, et al.[9] suggested that an average increase of 11.2°C does not damage the pulp.

Based on current medical complaint history on the predecessor LED curing lights Elipar™ S10 LED Curing Light/Elipar™ LED Curing Light, no adverse events were reported to 3M ESPE Dental for this product. Therefore, thermal irritation can most likely be excluded as an issue during polymerisation.

To evaluate the effect of the higher intensity of Elipar™ DeepCure LED Curing Lights compared to the predecessor LED curing lights on maximum pulp temperature increase, an in vitro evaluation was performed:

Human molars were prepared by removing the pulpal material, cutting the roots, and inserting thermocouples as shown in the radiographs on the next page. Class II and V preparations were made with 1.5 and 0.5 mm of dentin remaining respectively. The tooth was submerged up to the cement-enamel junction in a 35˚C water bath and light cured for 10 seconds.

Source:

[3]P. Baldissara, S. Catapano, R. Scotti, (1997). Clinical and histological evaluation of thermal injury thresholds in human teeth: a preliminary study. Journal of Oral Rehabilitation 24;791-801.

[4]A.H.L. Tjan, B.E. Grant, M.F. Godfrey, (1989). Temperature rise in the pulp chamber during fabrication of provisional crowns. Journal of Prosthetic Dentistry 62;622.

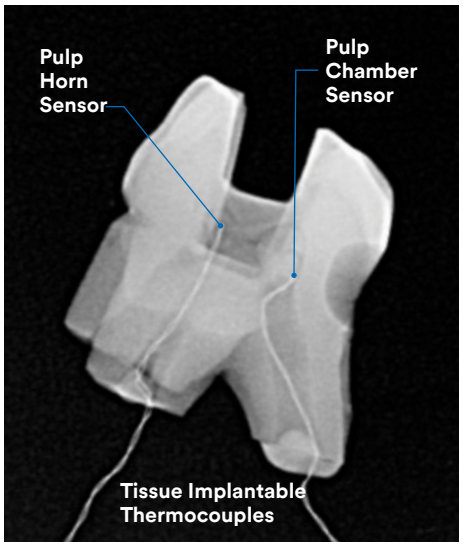
[5]Lipski, M. (2006). In Vitro Infrared Thermographic Assessment of Root Surface Temperatures Generated by High-Temperature Thermoplasticized Injectable Gutta-Percha Obturation Technique. J Endod 32;438-441.

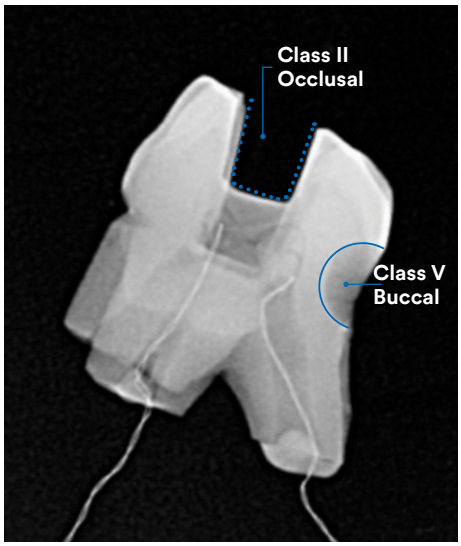
[6]S.J. Kwon, Y.J. Park, S.H. Jun, J.S. Ahn, I.B. Lee, B.H. Cho, H.H. Son, D.G. Seo, (2013). Thermal irritation of teeth during dental treatment procedures. Restor Dent Endod Aug; 38(3);105-12.

[7]L. Zach, G. Cohen. Oral Surgery, Oral Medicine, Oral Pathology;Volume 19, Issue 4;515-530;1965.

[8]A.R. Eriksson, T. Albrektsson. Journal of Prosthetic Dentistry;Volume 50;Issue 1;101-107;1983.

[9]P. Baldissara, S. Catapano, R. Scotti. Journal of Oral Rehabilitation;Volume 24;791-801;1997.

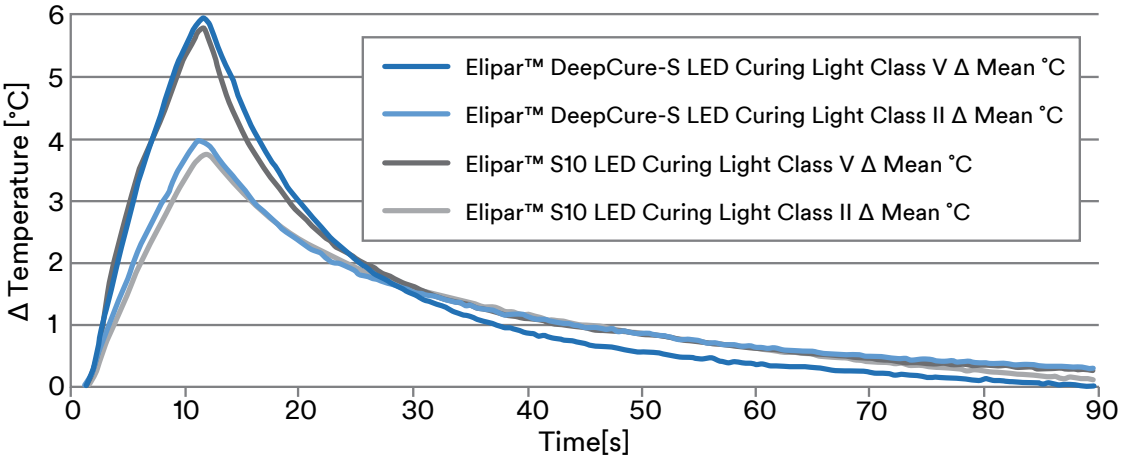




Statistics showed no significant difference in pulp temperature increase for restorations cured with Elipar™ DeepCure-S LED Curing Light and Elipar™ S10 LED Curing Light:

Elipar™ S10 LED Curing Light vs. Elipar™ DeepCure-S LED Curing Light[2]

Comparison of temperature increase with 10 second curing time Class II and Class V cavity



Source: 3M ESPE Dental internal data

How to manage heat development—clinical tips from external experts

Based on a consensus statement at the symposium on light curing in dentistry held at Dalhousie University, Halifax, Canada, in 2014, the following clinical guidelines help to minimise thermal pulp and tissue damage:

1. Polymerisation with external cooling from an air flow
2. Polymerisation at intermittent intervals (e.g., 2 exposures lasting 10 seconds each instead of 1 exposure lasting 20 seconds)

[2]The Elipar™ DeepCure-S LED Curing Light and the Elipar™ DeepCure-L LED Curing Light have identical technical performance.

Frequently Asked Questions

1. What is new: Elipar™ DeepCure LED Curing Lights vs. predecessors Elipar™ S10 LED Curing Light and Elipar™ LED Curing Light?

OPTICS

- The optics have been changed significantly (added lens, changed reflector geometry, additional reflective element between lens and light guide) to achieve the homogeneous and collimated beam.
- The new optics lead to a more efficient usage of the battery resulting in a longer battery runtime.

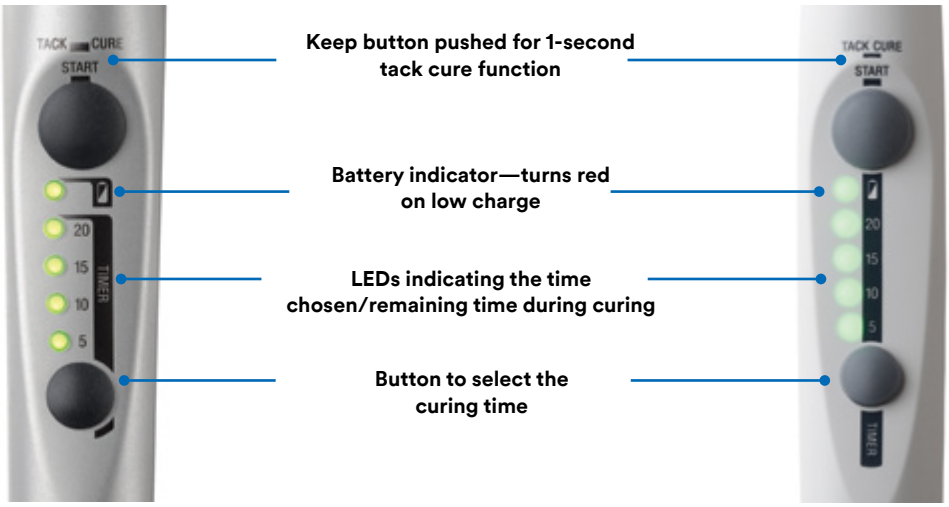
POWER OUTPUT

- 1470 mW/cm² (-10%/+20%) vs. 1200 mW/cm (-10%/+20%)

HANDPIECE

- New printing/guidance symbols for more information, easier usage, e.g., tack curing.

Elipar™ DeepCure-S LED Curing Light



Elipar™ DeepCure-L LED Curing Light

LIGHT GUIDE

- Black coating—to reduce stray light and prevent glare
- Optimised light guide tip angle and tip height—for better intraoral handling

Elipar™ DeepCure LED Curing Lights have a new light guide design that significantly reduces the opening angle required to reach a posterior restoration. This results in improved patient comfort and easier handling for the operator.

Opening angle compared to other curing lights.

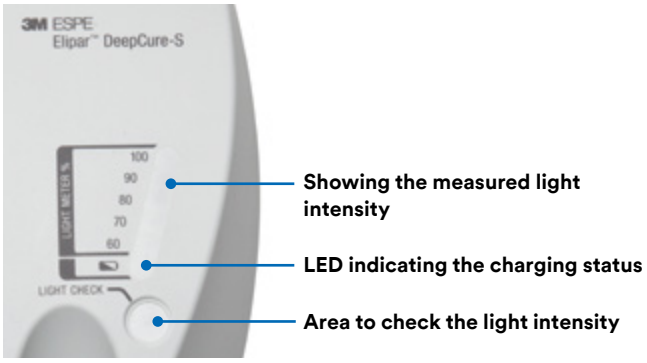
Elipar™ DeepCure-S LED Curing Light, 3M ESPE Dental

Demi™ Ultra LED Ultracapacitor Curing Light System, Kerr

S.P.E.C. 3® LED Curing Light, Coltene

CHARGING BASE

- The top part of the housing is made of a new material which makes it more resistant against disinfecting agents.
- New design/printing to make available functions more visible to the operator.



2. What is the difference between Elipar™ DeepCure-S LED Curing Light vs. Elipar™ DeepCure-L LED Curing Light?

The different curing lights have been made to serve different customers. However, both devices use the same optics and same electronics inside, offering the same performance.

HOUSING

- Elipar™ DeepCure-S LED Curing Light: One-piece stainless steel housing
- Elipar™ DeepCure-L LED Curing Light: Lightweight, robust plastic housing

LIGHT GUIDE

- Elipar™ DeepCure-S LED Curing Light: Magnetic, easy on and off coupling
- Elipar™ DeepCure-L LED Curing Light: Friction-fit interface to curing light

CHARGING

- Elipar™ DeepCure-S LED Curing Light: Charging base with built-in light intensity meter and battery charge indicator
- Elipar™ DeepCure-L LED Curing Light: Charging plug

LIGHT INTENSITY MEASUREMENT

- Elipar™ DeepCure-S LED Curing Light: Light intensity meter built-in charging base
- Elipar™ DeepCure-L LED Curing Light: Provided curing disc

3. How was the collimated and homogeneous beam realised?

The geometrically optimised combination of the three elements leads to the collimated and homogeneous beam profile:

- LED
- lens and
- diamond-turned reflector

Each component was specially designed to work best in combination with the other involved components, and the combination of all elements leads to the technical performance.

Compatibility

4. Can the new, black light guide be used with the Elipar™ S10 LED Curing Light?

- Elipar™ DeepCure-S LED Curing Light: The light guide is not interchangeable with Elipar™ S10 LED Curing Light and vice versa (incompatible due to construction differences).
- Elipar™ DeepCure-L LED Curing Light: The light guide fits geometrically into Elipar™ LED Curing Light, but due to different optical properties (resulting in an increase/decrease of light intensity) the corresponding light guide must be used.

5. Can I use my old Elipar™ S10 LED Curing Light charging station to charge the new Elipar™ DeepCure-S LED Curing Lights?

Yes.

6. Can I use my old Elipar™ LED Curing Light power supply to charge the new Elipar™ DeepCure-L LED Curing Lights?

Yes.

7. Can I use the light intensity meter in my old Elipar™ S10 LED Curing Light charging station to measure the intensity/output of the new Elipar™ DeepCure-S LED Curing Light/ Elipar™ DeepCure-L LED Curing Light?

No. This will result in erroneous readings. Only the light intensity meter in the charging station of the new Elipar™ DeepCure-S LED Curing Light should be used to test the new Elipar™ DeepCure-S LED Curing Light. As the DeepCure-L LED Curing Light has the same performance, it can be measured on a DeepCure-S charging station, too.

8. Can I use the light intensity meter of the new Elipar™ DeepCure-S LED Curing Light charging station to measure the intensity/output of my old Elipar™ S10 LED Curing Light charging station?

No. This would give incorrect test results. The included light intensity meter is specifically calibrated for the Elipar™ DeepCure-S LED Curing Light.

Curing Time/Curing Increments

9. Can I reduce the curing time with the new curing lights?

Research has shown that shorter curing times may lead to very inconsistent results. That's why we always recommend to use the curing times given by the manufacturer of the material.

10. Can I place thicker increments of my existing composite with the new curing lights?

No. While the new light helps assure more even and efficient curing, we do not recommend placing thicker increments. Please follow the incremental thickness recommendations provided by the manufacturer of the restorative.

Heat Development/Heat Management

11. Do I have to be concerned about the increased intensity and resulting heat development when using the new curing lights?

All high-intensity curing lights (over 1100 mW/cm^2) cause a certain amount of heat.

In the past, numerous in vivo studies have evaluated the response of the pulp and other dental tissues to thermal irritation and the temperature at which thermal damage is initiated and reported different results. This indicates that the range of safe temperatures in dental tissues, particularly the dental pulp, is actually not known.

To address concerns of potential thermal irritation of the pulp, the following two techniques will manage heat development during polymerisation:

1. Polymerisation with external cooling from an air flow
2. Polymerisation at intermittent intervals (e.g., 2 exposures lasting 10 seconds each instead of 1 exposure lasting 20 seconds)

For further information on thermal irritation, please refer to pages 16-17.

12. Can I use my fingernail or the back of my hand to assess the heat generation of the curing light?

We clearly do not recommend this test method as a fingernail or the back of a hand does not have the same properties or thickness of a tooth. The dense areas of nerve endings make the fingers extremely sensitive to heat, whereas the pulp is highly vascularised and contains a regulatory system for heat distribution in teeth, capable of dissipating external thermal stimuli.

Battery

13. What battery is included?

Elipar™ DeepCure LED Curing Lights feature a long-life, high-performance Li-ion Battery.

14. How long does it take to (re)charge the battery?

Elipar™ Deepcure-S LED Curing Light: 90 min. (charging station)

Elipar™ DeepCure-L LED Curing Light: 120 min. (charging cable)

The charging station of Elipar™ DeepCure-S LED Curing Light allows a higher charging current than the charging cable of Elipar™ DeepCure-L LED Curing Light, leading to a shorter charging time.

15. How long does a single charge last?

Battery runtime is approximately 120 min. with constant light output regardless of battery charge (720 × 10 sec.).

16. What has allowed the battery runtime to double with the new light?

The longer battery runtime could be realised due to the use of the latest LED generation in combination with the newly developed, highly effective optics. This new optic allows a higher efficacy, although a higher energy output was realised.

17. Can I replace the battery myself?

- Elipar™ DeepCure-S LED Curing Light: Yes.
- Elipar™ DeepCure-L LED Curing Light: No.

However, the Elipar™ DeepCure-L LED Curing Light batteries can be replaced through the authorised service centre.

Light Guide

18. Can the new black light guide be purchased separately?

Yes. The light guide is available as an accessory.

19. Are other light guide sizes available?

No. Currently, Elipar™ DeepCure LED Curing Lights are marketed with a 10 mm light guide only.

Functions

20. What is the tack-cure function?

Quite a few dental procedures require a very short initial cure (or “tack cure”) at some point of the processing before the final curing. Examples are the excess removal of light-curing cements (e.g., RelyX™ Unicem Self-Adhesive Resin Cement) or the pre-cure step of Protemp™ Crown Temporization Material.

Currently, tack curing is done by switching on the curing light and switching it off again after a short period of time (1-5 seconds). This procedure is not very convenient in handling and does not deliver reproducible tack cure times.

With the unique tack-cure function, Elipar™ DeepCure LED Curing Lights produce a reproducible short light pulse by simply keeping the start button pressed. The tack cure function makes excess removal of light curing cements easier and more predictable.

21. I like the fan-free silence. Can the beeps also be switched off?

Yes. Elipar™ DeepCure LED Curing Lights offer a switch-off function for the beeps. This is how it works: Put the handpiece in sleep mode, e.g., by setting it in the charger. Take the device from the charger: press first the TIME button, then the START button. The beeps are now switched off. The acoustical signals can be reactivated by following the same procedure.

Sterilisation/Hygiene

22. How can I clean and disinfect the device?

Clean all components with a soft cloth and, if necessary, a mild cleaning agent (e.g., dish washing detergent). Solvents or abrasive cleaners can damage the components. Cleaning agents must not enter the device.

To disinfect all components, spray the disinfectant on a towel and use it to disinfect the unit. Do NOT spray the disinfectant directly on the device.

For detailed information on cleaning/disinfecting, see Instructions for Use.

23. How can I clean and disinfect the light guide?

The fibre-optic glass light guide is autoclavable. See Instructions for Use for details.

24. Can I use a spray disinfectant on the charging station?

Cleaning agents must not enter the unit! To disinfect all components, spray the disinfectant on a towel and use it to disinfect the unit. Do not spray the disinfectant directly on the device. Disinfectant agents must not enter the unit!

25. May I put the light guide in a combined washer/disinfector machine?

Yes. Details on automised cleaning and disinfection are available from the 3M ESPE Dental Service Centre.

26. What are the dangers of disinfecting the light guide with only a wipe and not sterilising with autoclave and steam?

There is no way to control the variability between individuals using a wipe to disinfect a light guide. The only sure way to disinfect the light guide is sterilising with autoclave and steam.

27. What disinfectants do you recommend for the plastic and stainless steel housing?

We do not recommend a specific disinfectant, as we cannot control potential changes in composition, but our lab tested the most common disinfectants/substances and none of them had a negative impact on the plastic housing.

Also, the grey-coloured part of the plastic housing is coated to make it even more resistant against discolouration potentially caused by disinfectants.

If in doubt, ask the manufacturer of the disinfectant if its constant use will damage plastic surfaces (for details see Instructions for Use).

28. Can I sterilise the orange glare shield?

No. Only wipe disinfection is allowed for the glare shield.

29. Can I use a barrier sleeve with Elipar™ DeepCure LED Curing Lights?

Elipar™ DeepCure LED Curing Lights have no vents that might be blocked by a barrier sleeve. Therefore, they can be used with a barrier sleeve (not offered by 3M ESPE Dental). Make sure the sleeve is not covering the tip of the light guide, as this would diminish the intensity. Furthermore, the sleeve should be removed before placing the light guide in the charger to make sure the pins in the charger are contacting the battery properly.

Materials Used

30. What plastic is used in the Elipar™ DeepCure-L LED Curing Light?

PA 6 (Polyamide 6), per definition is a very robust material, resistant against disinfectants and shatter-proof.

Poly Wave Device

31. Why don't you offer a poly wave device?

Most often used initiator system is camphorquinone, which works best with the wavelength that most devices provide (450 nm). The issue with poly wavelength systems is that the beam profile is very inhomogeneous, leading to very inconsistent/hard-to-predict curing results (leading to large standard deviations). We decided to use a single wavelength LED, as this delivers more consistent/predictable curing results even for materials using other photoinitiators e.g., Tetric EvoCeram Bulk Fill from Ivoclar Vivadent (refer to Clinical Performance section).

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