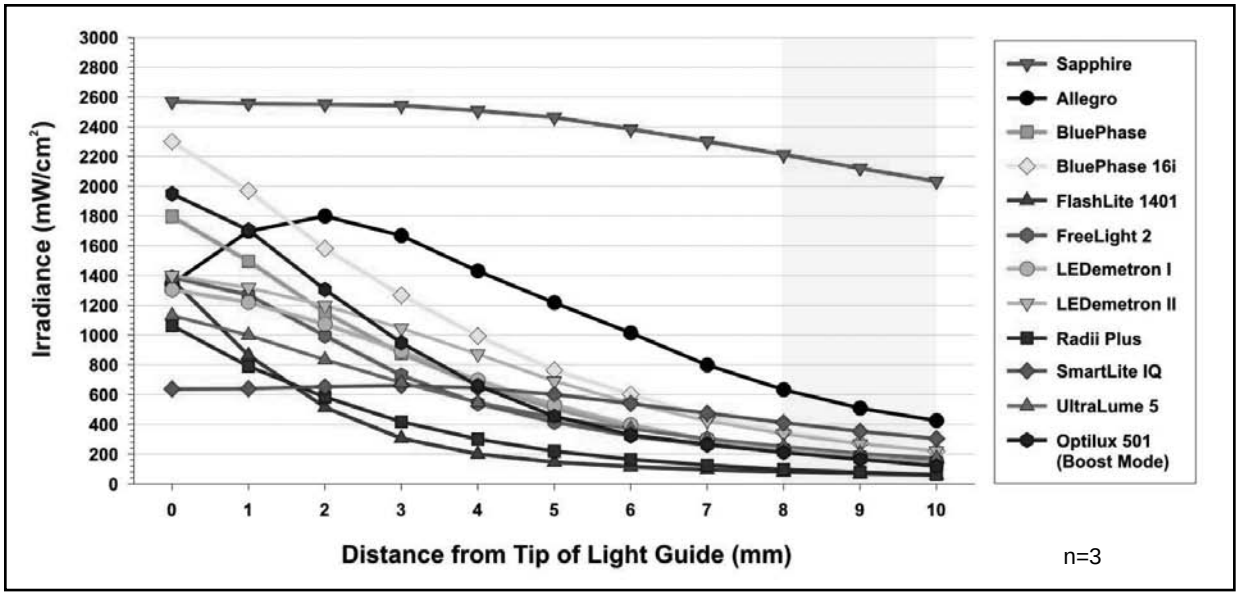
Allegro LED Light
and
Sapphire® Supreme Plasma Arc Curing Light
Research Reference Guide

ALLEGRO LED LIGHT

1. Felix, C.A., R. B. Price, "Effect of Distance on Power Density from Curing Lights", IADR, Abstract No. 2468, 2006.

The speed and quality of resin photo-polymerization is dependent upon wavelength and energy density (power density times duration of the exposure) delivered to the resin. Power density (light intensity) is effected by distance to the target. This study demonstrated the decrease in curing power as distance from the tip of the curing light to the restoration increases. Twelve of the best known curing lights and three examples of each light were used in this study. Power density decreased for all lights as distance increased, but at different rates. The Sapphire Plasma Arc light was the only light tested that was able to maintain over 80% of its maximum intensity at 0 mm and at a distance of 10 mm. Other lights lost over 90% of their curing power at 10 mm, with most falling below the International Organization for Standardization suggested minimum intensity of 300 milliwatts per square centimeter. At all distances, the Sapphire delivered the greatest irradiance. At a distance of 6 mm only Allegro High Intensity LED and Sapphire lights delivered more than 1000 mW/cm^2. The Sapphire and Allegro lights were proven the best at maintaining power density at any distance from the restoration.



2. "LED Light-Curing Units", The Dental Advisor, Vol. 23, No. 5, June 2006.

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General information on LED curing lights and a discussion of important features are given. Also, laboratory test data and evaluations by clinicians are presented. The Allegro light includes virtually all of the important features that are described in the general discussion of LED lights. The test data indicates that the Allegro light has the highest light intensity (at the clinically relevant distances of 3mm and 6mm) of all 21 lights that were tested. The wavelength range for the Allegro light is 415 to 490nm. This range activates both camphorquinone and PPD-based photo-initiators. Also, it is pointed out that the Allegro light includes curing test rings. This is a very important feature because it provides a clinician with a convenient means for establishing the proper curing parameters for the particular composite resins being used. The following are among the comments from the clinical evaluators:

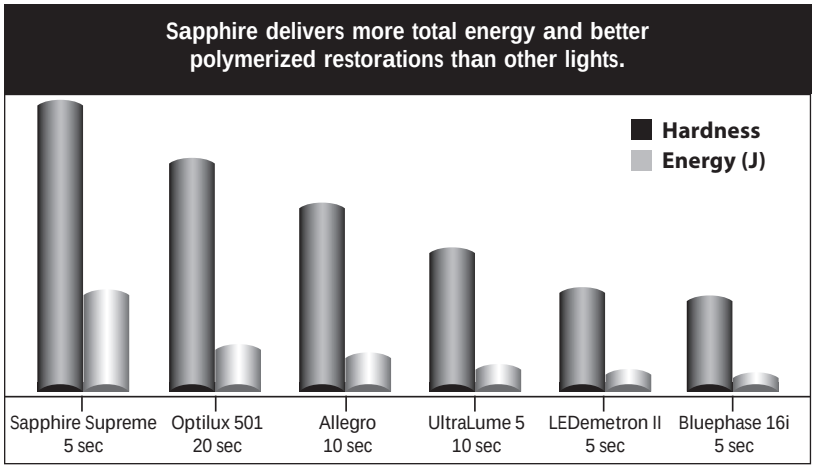
"The unit is easy to use with a clear display."
"It is ergonomic."
"The handpiece is stable."
"The charger is easy to load."
"The built-in radiometer is convenient."

3. Strassler, H.E., "Cure Depths Compared with LED and Other Curing Lights", University of Maryland, Baltimore, AADR Abstract No. 0894, San Antonio 2003.

This study was done to compare curing depth of LED lights to other curing lights with 3 types of composites. The Sapphire Plasma Arc Curing Light was compared to LED and halogen lights. The results showed that the Sapphire PAC light produced the deepest cure in the shortest amount of time.

SAPPHIRE® SUPREME PLASMA ARC CURING LIGHT

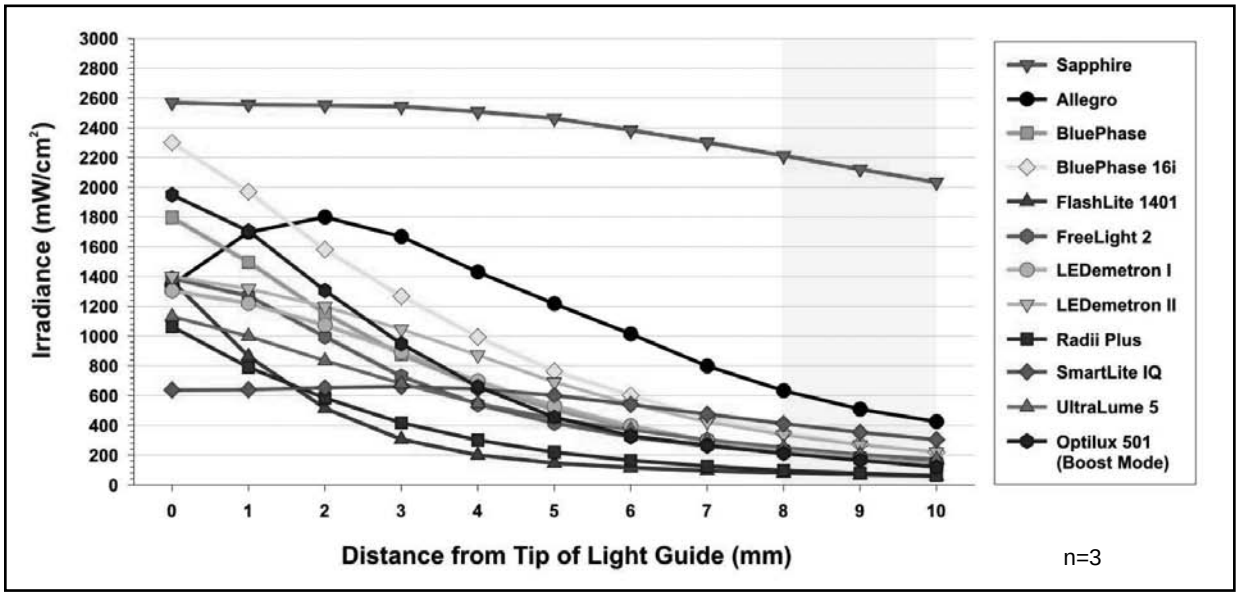
1. Price, R.B., Felix, C.A., Fahey, T.J., and Andreou, P., "Effects of Seven Curing Lights on Microhardness of Five Composites", IADR Abstract No. 1612, March 2007.



Testing of the effectiveness of seven curing lights when used with five different composite resin restorative materials is presented. Curing effectiveness was measured in terms of Knoop microhardness. The abstract states: "The Sapphire Plasma Arc light produced hardness values that were at least 4.7KHN higher than all other lights and up to 18.1KHN harder than the worst light tested." Based on overall results, the Sapphire Plasma Arc light was considered to be the best light.

2. Price, R.B., Felix, C.A., "Effect of Distance on Power Density from Curing Lights", IADR Abstract No. 2468, 2006.

The speed and quality of resin photo-polymerization is dependent upon wavelength and energy density (power density times duration of the exposure) delivered to the resin. Power density (light intensity) is effected by distance to the target. This study demonstrated the decrease in curing power as distance from the tip of the curing light to the restoration increases. Twelve of the best known curing lights and three examples of each light were used in this study. Power density decreased for all lights as distance increased, but at different rates. The Sapphire Plasma Arc light was the only light tested that was able to maintain over 80% of its maximum intensity at 0 mm and at a distance of 10 mm. Other lights lost over 90% of their curing power at 10 mm, with most falling below the International Organization for Standardization suggested minimum intensity of 300 milliwatts per square centimeter. At all distances, the Sapphire delivered the greatest irradiance. At a distance of 6 mm only Allegro High Intensity LED and Sapphire lights delivered more than 1000 mW/cm^2. The Sapphire and Allegro lights were proven the best at maintaining power density at any distance from the restoration.



3. Ciancio, S.G., "Sapphire Light: White Lightening", Biological Therapies in Dentistry, Vol. 21, Supplement 2, April/May 2006.

   The Sapphire Plasma Arc Curing and Whitening light was proven to increase the whitening power of many popular gels when compared to whitening without the use of a light source. The study focused on Rembrandt, Zoom, Luma White and Opalesence chairside whitening gels. Whitening with the Sapphire was up to 86% better when the whitening gels were exposed to light when compared to whitening without a light source. This study showed the Sapphire can enhance the bleaching effect by more than 7 shades. Gingival health and tooth sensitivity were evaluated and no adverse effects were observed with any of the gels. Upon patient recall after 1 week, it was found the whitening effect was maintained more with the patients where the light was utilized.

4. Li, Y., Munoz, C., Lee, S., and Wilson, A., Loma Linda University, June 2003.

   Testing of the bleaching effectiveness of 30- and 60-minute use of the Sapphire PAC light in conjunction with the Rembrandt Virtuoso Lightning Chairside Bleaching Gel is presented. Tooth shades were measured with the Bioform Color Ordered Shade Guide. Statistically significant post treatment whitening of 8.75 and 10.07 shades was produced by the 30-minute and 60-minute treatments respectively. The difference in whitening between the two treatment times was not statistically significant. Also, there was no statistically significant loss of whitening seven days after treatment. Some tooth sensitivity and gingival irritation occurred, but in all cases it was mild and transitory.

5. Strassler, H.E., "Cure Depths Compared with LED and Other Curing Lights", University of Maryland, AADR Abstract No. 0894, San Antonio 2003.

   This study was done to compare curing depth of LED lights to other curing lights with 3 types of composites. The Sapphire Plasma Arc Curing Light was compared to LED and halogen lights. The results showed that the Sapphire PAC light produced the deepest cure in the shortest amount of time.

6. Matthews, A.B., "Barcol Hardness Testing for Restorative Composites Cured with the Sapphire PAC Light,", IADR, Abstract No. 0504, 2002.

   The purpose of this study was to determine the effectiveness of exposures of the Sapphire Plasma Arc Curing Light on light curable restorative materials of various shades. Each sample of restorative material was cured for 3 seconds. The results of this study illustrated the Sapphire light cures all light cured composites. It was found that 8 of 20 composites were fully cured with only a 3 second exposure and 17 of the 20 composites tested were cured in 5 seconds.

7. “Sapphire”, The Dental Advisor, Vol. 19, No. 10, June 2002.

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The Sapphire was evaluated and given a 96% and 5+ rating. It received very good ratings for ease of use, pistol grip hand piece, lightweight design and ability to change the time on the hand piece.

8. Le, Y., Cartwright, S., Lezama, M, Zhang, W., and Feller, R., “Effect of Light Application on an In-Office Bleaching Gel”, Loma Linda University, California, Journal of Dental Research, Abstract No. 895, Vol. 80, January 2001.

This study was conducted with the Sapphire Plasma Arc Curing and Whitening light to determine the efficacy and safety of light application in an in-office whitening procedure. Half of each arch was treated with the gel and light treatment, while the other half received only gel treatment. The average shade reduction for the teeth without the light treatment was 6.13 while those that received the light treatment showed a shade change of 8.80 on maxillary teeth. Mandibular teeth showed shade reduction of 6.97 without the light and 11.12 with the light. It was concluded that the use of the Sapphire PAC light significantly enhances the efficacy of the bleaching gel with no significant adverse effects.