

Micro-Speaker Assembly

The Challenge

Increase production yields and improve margins through low-heat UV curing processes while minimizing maintenance and operating costs.

The Solution

The OmniCure® AC450 and AC475 are air-cooled LED small area UV curing systems, available in both 365nm and 395nm. With custom optics, a rich and versatile PLC interface and long lifetime, these systems provide ideal solutions for integrating into virtually any micro-speaker production line.

The Benefit

Increased production yields through consistent, high-dose optical delivery and low-temperature curing.



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Introduction

Virtually every consumer electronic product produced today has an audible annunciator of some type, causing a significant demand for low cost and high quality audio components.

Typical devices that utilize these products are:

- Tablets
- Mobile and smartphones
- Netbooks
- Laptops
- Internet TV
- Wearable devices

The variety in electronic products requires a range of component technologies from piezoelectric drivers to typical acoustic micro-speakers. Assembly of these devices include various bonding technologies which benefit from the use of photo-initiated adhesives.

The manufacturing of micro-speakers for consumer electronic products poses a challenge with strong bonding of different materials in a rapid, automated process. Sensitive components must be held together to withstand harsh conditions, yet must maintain flexibility in the acoustic properties demanded by consumers to enjoy the multimedia functions of their devices.

Application Overview

Micro-speakers can range in size from less than 10mm to over 75mm depending upon the product requirement. Both conventional-sized and larger micro-speakers have multiple curing points on each part, resulting in a multitude of bonding applications within this market.

Typical UV curing applications include:

- Voice coil bonding
- Cover and frame bonding

Application Examples

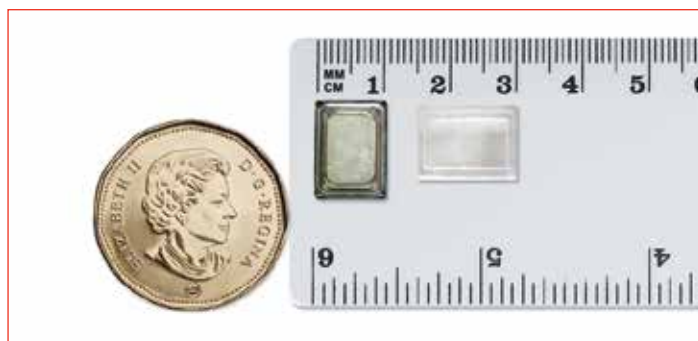


FIGURE 1: Example of a 10mm x 15mm micro-speaker.



FIGURE 2: Four bonding points on a typical cover to frame bond.



FIGURE 3: Bonding of the voice coil to the heat dissipating cover.



FIGURE 4: Wire termination bond.



FIGURE 5: Multiple bonding locations in a larger speaker.

Curing of micro-speakers is typically done in an automated process where the parts are moved quickly along on a conveyor at speeds of 5 to 8cm/sec (10-16 feet per min). A very high dose of UV energy is required to provide a full cure of the adhesive at these speeds in order to achieve the throughput requirements demanded by the manufacturers.

A high dose can be accomplished either through a high output, small area or a low output, large area UV curing system. A compact small area system providing high UV output is the preferred solution due to the space constraints at the cure site making a large area UV curing system more difficult to integrate.

Previous high output curing systems have been limited in their application due to overheating of parts such as the voice coil which are very sensitive. With a narrow spectral output to match the adhesive requirements, the OmniCure® AC450 and AC475 LED small area UV curing systems are able to maintain a temperature below 60°C during the curing process. This is critical for achieving the yields necessary for the process to be profitable.

Typical UV-Curable Adhesive

The choices for UV curable adhesives are seemingly endless. A large selection of these adhesives have been successfully tested with the OmniCure AC450 and AC475 UV LED systems. Please contact for further assistance and adhesive compatibility inquiries at <https://www.excelitas.com/omnicure-x-cite-inquiries>.



Benefits of the OmniCure® AC450 and AC475 in the Manufacturing of Audio Components

Production yields can increase by providing consistent high-dose optical delivery while maintaining low temperature levels.

Intensity control and adjustments allow the optical output to be tailored to the application requirements.

Zero IR content and selective optical emissions ensure low heat generation with zero ozone emissions.

Zero ozone emission eliminates the need for external venting, lowering operating and integration costs.

Operating and maintenance costs can be lowered due to reduced "lamp" replacement frequency.

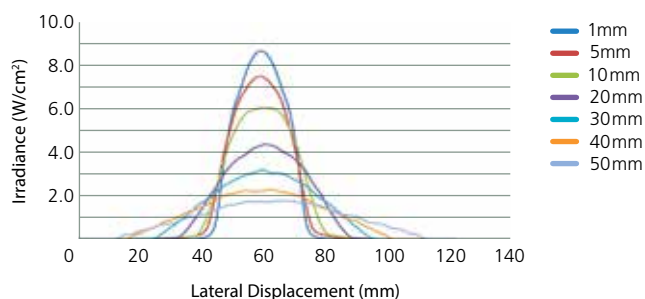
Operating temperature may be monitored and controlled remotely to prevent unscheduled line disruptions.

Specifications Overview

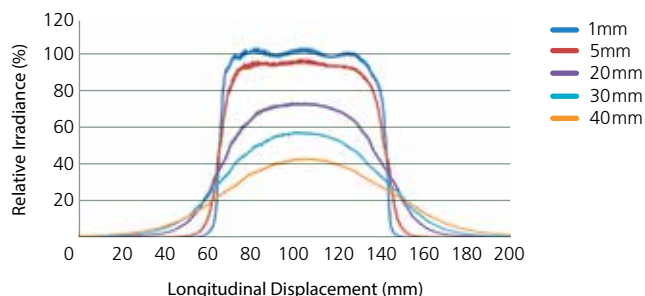
The OmniCure AC475 includes a 75mm x 25mm optical window.

The OmniCure AC450 includes a 50mm x 25mm optical window.

Irradiance vs Working Distance for AC450 and AC475



Uniformity at Working Distances for the AC475



For full specifications please refer to the following link:
<https://www.excelitas.com/product/omnicure-ac4-led-small-area-uv-curing-system>.



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