

WHITE PAPER

POP Display & Store Fixture Lighting

Choosing the Right Lighting Fixture to Impact the In-Store Environment, Customer Experience, and Product Sales



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SOURCE: LEDCONN



Introduction

ACCORDING TO THE INTERNATIONAL ASSOCIATION OF LIGHTING DESIGNERS (IALD), lighting is essential for achieving an optimum balance among human needs, architectural considerations, and energy efficiency. To help achieve balance in retail, there are four types of lighting in a retail setting: **ambient lighting** is the store's main light source; **task lighting** illuminates workplace areas; accent lighting highlights specific areas, displays, and decors to create a sense of importance; and decorative **lighting** is used to enhance brands. This white paper will focus on the latter two in relationship to lighting for point-of-purchase (POP) displays and store fixtures within the retail environment.

POP Displays are product merchandisers used for a specific advertising campaign promotion, new product line release, or branding a specific product line. They are often used to create impulse purchases in store. Depending on length of time in-store, the display may be made from corrugated material, plastic, or wood.

Store Fixtures are designed to stay permanently in the store. They are used to promote and sell merchandise, and are made in a variety of materials, colors, and styles.



Just as there are a multitude of applications for lighting within the retail environment, there are just as many light alternatives from which to choose. From the original incandescent bulbs, to halogens, to light-emitting diodes (LEDs), each has had its place, purpose, and time in the retail world. While fluorescent lighting was widely being used for home center displays, there was a growing concern of fire liability due to the bulb's proclivity to overheat. Marketers and store designers rejoiced when LED lights came to market.

LED lights have proven to be the longest lasting and most efficient lights with respect to their small size and ability to emit light without producing heat. LEDs tend to be an ideal light choice for POP displays and store fixtures because of their cost efficiency, cool surface, low voltage, lower instance of electrocution, and compact design – especially when compared to other lighting options. These benefits are strongly desired to help keep energy costs low, surfaces cool, surrounding products safe, and solve most retail lighting problems. With the right supplier, these lights can be applied in a variety of shapes, sizes, and colors and be fabricated to complete a design. The appropriate LED lighting solution can change the complete look and feel of a display or entire retail space.

LED lights can fit into tiny spaces (i.e., signs, casework, POP displays) and offer the unique ability to control light brightness and generate different color schemes. Retailers can use them to establish different

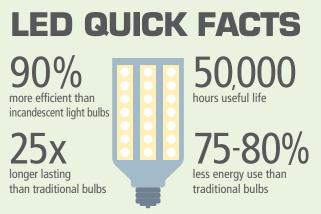
themes through various areas of a store – going from dark and mysterious to sunny and bright as a reflection of the brand or promotional season. The ability to develop a brand atmosphere through complete creative control results in a strategic lighting solution which can guide shoppers through a store or highlight a certain display of goods.

According to the Shop! 2016 Industry Size & Composition Study, lighting has become an essential element to shelving fixtures across all retail channels by serving to highlight and draw attention to products. Primarily, LED lighting is installed in shelving, showcases, and kiosks. Appropriate (without shadows or not overly bright) LED lighting at the shelf level has been shown to create a significant increase in product sales by positively influencing the customer experience.

The POPAI UK and Rocket Production report, How Light, Motion and Sound Influence Shopper Behavior, found that lights increased shopper dwell time by 215 percent and that respondents in the study were 23 percent more likely to purchase the product after experiencing the display with lights than those experiencing the display unlit.

To measure the impact of a display on shoppers, POPAI UK developed the **Impact Ratio**. Impact Ratio is a measure of the number of shoppers who look at a display against the total number of shoppers who have an opportunity to pass and see it. For the POPAI UK report, the Impact Ratio of the display with lights was 7.8 percent – more than double the impact of the unlit display.

This white paper will educate readers on the fundamentals of retail lighting and explain how to assess various lighting systems to ensure the purchase of quality products that will deliver the desired results. The paper will also discuss best practices for developing and evaluating illuminated POP displays and store fixtures.



Unlike incandescent bulbs – which release 90 percent of their energy as heat – LEDs use energy far more efficiently with little wasted heat.

Lighting 101

CHOOSING QUALITY LIGHTING TO enhance the effectiveness of POP displays and store fixtures takes collaboration and trust. Brands and retailers need to work together with their lighting and store fixture designers and suppliers with the confidence that they will provide the best solution. Guiding a client to the perfect lighting system depends on what the client intends to accomplish with the light.

APPLICATION

Successful lighting projects start with developing a deep understanding of what the client hopes to achieve with the light. What is the purpose of the lighting? Is the light going to be used for general ambient lighting, product illumination, logo/signage illumination, or other marketing attraction purposes? Knowing how the light will be positioned – up, down, backlit, side-lit – will determine which lighting product is best to suit a client's needs.

BRIGHTNESS

Knowing the desired effect of the light will determine how bright the lighting application needs to be. Extreme levels of brightness or darkness can affect not only the retail environment, but also how the shopper feels within that environment, in turn affecting brand impression. For overall brightness levels of the product display or work surface, such as a check-out counter, lighting designers will use a spectrometer to measure Illuminance (unit: lux or footcandle). Designers are able to detect how bright the lighting is and how much lighting is needed. In retail spaces, designers often work with conflicting amounts and different types of lighting. Ambient lighting, lighting from signage, other fixtures and other displays, as well as the natural light through doors and/or windows, must all be taken into consideration when determining brightness levels.

As for the individual lighting fixture, its brightness is measured as Lumen (unit: lm), which represents Luminous Flux, or the total measurable energy of visible light emitted by a light source.

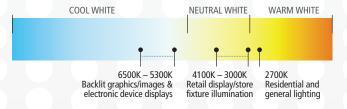
Understanding brightness at both the lighting fixture level and the application level is critical to the success of any lighting project.

COLOR

Visible light is a spectrum of wavelengths emitting at different energy levels, which are perceived as different "colors" from red, blue, and green to varying hues of white.

Color temperature is measured in degrees Kelvin, which indicates the hue of the color white. Higher temperatures indicate whiter, "cooler" colors, while lower temperatures indicate yellower, "warmer" colors. The chart below shows the standard color temperatures and their common applications.

COLOR TEMPERATURES



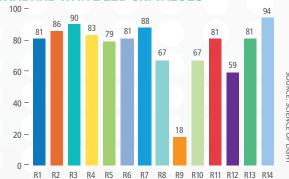
Color Appearance—In her chapter on color in the 2017 Shop! MaRC Exam Prep Book, Montaha Hidefi with TIGER Drylac Canada Inc., discussed how the perception of color is influenced by various parameters, many of which are out of retailers' control. Parameters such as light source, background or surrounding color, object size, and material all have an effect on how people perceive color.

The Color Rendering Index (CRI) is used to represent how well a light source renders the colors of objects that it illuminates. According to Allen Wang, President at LEDCONN, LED lights have improved their CRI from 75 - 80 to 85 - 90. A measure of CRI 100 is the maximum measurable value, which is equivalent to daylight. For best performance, the minimum recommended CRI for general and direct lighting applications is typically 90+, whereas backlit and indirect lighting will require CRI 80+. CRI can also give marketers an idea of the characteristics of how merchandise will be perceived. According to Lighting for Impact, the majority of shoppers think lighting helps products look "fresher" and the stores "brighter." The example below from Westinghouse shows how the perceived color of an apple changes with the CRI rating.



CRI is an average of individual **Color Rendering Values**, which measure color quality. CRI can only represent colors R1 – R8 (see chart below) and does not include R9 (red) and R13 (skin tone). Red is the hardest color to render properly, so a high R9 value is often sought out by designers when an application requires a higher sensitivity to color accuracy. For instance, when raw meat in grocery stores looks blue, this mishap is likely attributed to poorly designed lighting. Although lights featuring a R9 > 50 will render the color red very well, sometimes this comes at the expense of the light's **luminous efficacy**, which measures how well a light source produces visible light. When selecting a light for its color rendering value, the importance of efficacy will also need to be considered in addition to the visual impact of color rendering.

STANDARD WHITE LED CRI VALUES



Besides the above parameters, color consistency should not be neglected in the design and execution process. Color consistency is defined by how close in color appearance random samples of a lamp or source tend to be. In stores, multiple kinds of light sources are often used to achieve either layered or focused lighting. Creating the desired output and maintaining consistency across multiple light sources can be challenging at times. The selection of the type or brand of lighting

is a critical step in design. Then, during execution, assurance of consistency among the same kind of lighting relies on the expertise of the lighting manufacturer. For LED products, the key to color consistency is the selection of LED bins and its binning process. LED diodes are sorted by bin codes, and the best quality LED products only populate one bin code in one circuit. LEDs with different bins can appear as different shades or brightness, which affects the way the products or store environments are perceived by the consumers.

Great installations feature really smooth, even illumination; when there are too many dark spots in a lighting installation it typically indicates poor lighting quality. The image to the right compares the noticeable differences in illumination quality between fluorescent lighting, pictured on the left, and LED panel lighting, pictured on the right. The image of fluorescent lighting (left) shows gray shadows,

which indicate poor quality illumination and uneven lighting distribution. In contrast, the image of the LED light panel (right) illustrates nearly perfect illumination and even light distribution with little to no dark spots. LED lighting allows for this type of even illumination whereas other traditional forms of lighting can create dark spots that look less clean and professional. Thus, LED lighting is much more reliable in terms of evenness.





Developing and Evaluating Effective Illuminated POP Displays

AS SHOWN IN THE 2017 Shop! ROI Standards: In-Store Marketing Materials standards document, developing and implementing a successful shopper marketing program is a seven-phased process:

- 1. Information Exchange
- 2. Research & Fact Finding
- 3. Retail Strategy Development
- 4. Creative Development
- 5. Merchandising Recommendations
- 6. Fulfillment & Distribution
- 7. ROI Success & Evaluation

It is critical that the research and planning phases are completed before design and merchandising recommendations begin. Knowing the client's goals will help determine not only what type of POP display to build, but also what type of lighting will be needed to enhance the shopper experience to help drive sales.

STRONG GOALS DRIVE GOOD DESIGN

In this example, Phillips Lighting wanted a display for Best Buy with five goals in mind:

- 1. Help inform and educate the consumer about the range and capability of the Phillips Hue line of products
- 2. Help consumers understand the value of connecting the lighting to the home automation system
- 3. Demonstrate the variety of "scenes" and "moods" that can be created using the Hue family of products
- 4. Increase sales and brand awareness for the Hue product line
- 5. Create a unique retail experience placing the consumer in the "home"

Based on the goals, objectives, and quantity desired, custom retail display manufacturer, Rapid Displays, went through initial ideation and then refined the design to fit within the specs provided by the retailer. They quickly settled on the "house" as the icon to draw consumers in, determining that a contemporary home best reflected the Hue brand's promise and resonated best with targeted customers.

The cutaway home was a beacon of attraction, while the subtle motion of the video screen in the bedroom and cycling lighting scenes throughout the house demonstrated, in a concrete way, what Hue products do in the home. The use of RGB LED lights from LEDCONN to simulate the Hue lights in the rooms combined with Hue bulbs in the top and in-line portions of the display completed the experience.

The product sold very well and the displays were seen as an overall success. Both the Phillips and Best Buy teams were extremely happy with the design and outcome. Locations where the product sold-out were largely successful due to the stronger level of attraction and consumer interest garnered by the illuminated displays.

DEVELOPMENT

Clients may have an idea of the lighting they want, but the display producer should review the proposed design and recommend the ideal illumination type for the display. The collaborative synergy that develops among clients, project managers, display designers, and engineers working together ensures development of the best design and lighting solution.

Display type is a key determining factor in product selection. Peter Kornhaber, Vice President of Sales and Marketing at Rapid Displays West, shared that 50 to 60 percent of displays have some type of lighting in them. Lighting is done more often in permanent displays than in temporary and semi-permanent displays. This is because the permanent display will be in the stores longer and thus clients are willing to spend the extra money for lighting.

There are other factors that influence the type of light fixture used in a display. The size of the overall display, the size of the area being lit, and the importance of even light and consistent coloring, will influence the decision. Lighting is used in a display to illuminate graphics and logos, highlight the products, and help demonstrate products.

In terms of the specific type of lighting fixtures used in the displays, LED light panels, light strips, and light tubes are most commonly used in permanent displays. Temporary displays primarily use LED light strips since they tend to be budget friendly while LED light panels provide more even illumination.

APPLICATION

Lighting usage varies among the different display types and goals of the display. Displays for certain product categories are almost always illuminated. Consumer electronics, liquor, and cosmetics are among those that are commonly illuminated. For consumer electronics, lighting is used not only to draw attention to the product but also can be used to show the customer how to use the product by utilizing a 1-2-3 step process. Lighting helps enhance this communication with illumination in sequential order of the instructions. Rocket Productions found that 34 percent of study participants called out lights as the most eye-catching element of their displays, while an additional 7 percent highlighted the illuminated numbered steps.

In cosmetics it is essential that the color of the products is as true to life as can be. This will not only show better in the store but also help ensure customer satisfaction when the product is used at home.

Liquor displays, on the other hand, tend to feature flashing lights and light strips. Brand logos are frequently illuminated to help familiarize the customer with the brand, attract them to the display, and thus to the product.

ATTRACTION IN ACTION

A great example of disrupting the store flow and catching the eye of the shopper is the Benefit Cosmetics fabric light box depicting a Gorilla giving a brow job. Benefit worked with LEDCONN to create this one of a kind attention grabber for Macy's. This 7-by-8 foot LED illuminated fabric light box was placed adjacent to its cosmetics bay. The result — hard to miss! The burst of color stood out in an otherwise dull environment.



CASE STUDY:

Collaboration to Create Effective Illuminated Displays

TECHNOLOGY COMPANY OCULUS partnered with Rapid Displays to create a display at Best Buy that communicated the Oculus brand and product, while offering a full interactive demo experience for potential customers.

The Objective In launching the brand and a first-of-its-kind virtual reality product to a broad consumer market, Oculus needed to quickly establish a significant presence at Best Buy. The display needed to be compatible with the retailer's mounting system that enabled product demos, displayed sample product, educated and excited the customer, and contained saleable merchandise, while remaining true to the stated guidelines of the client's visual brand.

The Strategy Utilizing the Best Buy core fixture guideline, Rapid worked within the space parameters to create an interactive display that could be utilized for merchandising, product education, as well as full product demonstrations. A unique feature to this program was the negotiated header extension that exceeded Best Buy's original guideline spec. This 36" extension provides a beacon logo presence that can be seen from all angles of the store.



Creative Oculus desired a very premium display in regards to its look and finish, as well overall customer experience. The combination of matte black, ash wood, and warm lighting subtly defined an aggressive yet refined aesthetic that couldn't be missed.

Engineering The end-cap section of this display was designed as a freestanding floor unit (4-sided stand alone, non-4 sided), hanging table measuring (ft.) 4W x 1.8D x 8H with header. By removing the existing Best Buy base deck, this display backed right into place and locked into the gondola standards. The inline section of this display sat on the existing base deck. The two components were engineered to ship mostly assembled, each on their own pallet.

Manufacturing The core system was constructed of steel, ash wood, LEDs, and monitor. Core metal and wood parts were manufactured domestically as well as overseas. The program (550 units) had an extensive rollout schedule allowing for this manufacturing breakup. All finishing, assembly, and pack-out was completed in house at Rapid.

Compliance In working directly with Best Buy's Black Shirt installation team, Rapid executed multiple in-store shakedowns prior to the launch of this program. Rapid worked diligently to dial in a comprehensive instruction sheet with video option that inevitably led to a 100% compliance rate for installations.

Sales Results This project has been extremely successful. Oculus hosted hundreds of thousands of demos during 2016 and 2017. The retailer has been very pleased with the quality of the fixture — its performance and durability have exceeded their expectations. Oculus frequently receives compliments on the fixture's visual design.

2017 OMA Awards Competition: Gold Winner!

Developing and Evaluating Effective Illuminated Store Fixtures

THE PROCESS USED TO DEVELOP illuminated store fixtures is similar to that of illuminated POP displays with the main differences being project size and longevity. Once again, collaboration with the brand, retailer, lighting designer, lighting supplier, and store fixture manufacturer is key. Goals for the project need to be agreed upon upfront before any designing begins.

DEVELOPMENT

While many retailers have a project manager for store design and renovation projects, they tend to hire consultants for the store and lighting design functions. The consultants in turn hire store fixture and lighting suppliers. Once the goals are agreed upon for the program and both the design brief and retailer specifications are in hand, the lighting team can determine the appropriate lighting product(s) for the fixture. The client may have an idea of the lighting they want, but the store fixture manufacturer and lighting designer will review the proposed design and recommend the best lighting fixture(s) for the project.

MANAGING THE PROJECT: START TO FINISH

As a supplier, being a part of the project from the beginning makes the design, development, and implementation processes smooth and seamless. Knowing the retailer specifications and the building codes gives that added value not seen in all suppliers. In this case, LEDCONN worked with a luxury cosmetic brand, not only as a lighting supplier, but also as an expert project manager. They managed the design, oversaw prototyping in China, and then spearheaded the



project management in the U.S. Their communication with a fixture manufacturer in China was integral to the success of this project. Their priority was to honor the specific requests of the lighting designer, which included ensuring compliance with the stringent requirements for energy efficiency (Energy Code Title 24) and earning the UL 65 Fixture certification. In order to see this

project to fruition, LEDCONN also worked directly with all involved parties (fixture manufacturers and designers), which included a trip to the fixture manufacturing facility in China.

There are many factors that influence the type of lighting to be used in a store fixture and in-store environment. Vicent V., President of NicoNat, explains, "you must first understand the look the retailer is trying to accomplish with the retail space and know which products will be illuminated." Every project is different, from the lighting requirements for the store environment to the products on display. Mid- to high-end retailers look for that perfect lighting that creates a welcoming environment.

APPLICATION

As Brice Evans, Director of Store Design for Benefit Cosmetics, notes, lighting can make or break the inviting feeling of a store. It can either be cold and forbidding or warm and cheery. Benefit prefers a warm daylight atmosphere, which is achieved with a specific color rendering that can make it feel like a sunny day. Benefit accomplishes this by adjusting the brightness and hue of the LED products used in their displays to emit a "4 p.m. light," which best provides the warm, welcoming feeling.

Lighting can enrich the shopper experience by illuminating and/or demonstrating products while enhancing a brand's presence in the store. An overarching goal is always to put the product in a positive light to augment it. The wrong color lighting can ruin the look of the product. When using lighting to display or demonstrate a product, it's important to keep in mind the product's location (i.e., display case, back wall shelf, display table) and which direction is desired for the light to come from (i.e., down on the product, up from the bottom or a side). When properly chosen to enhance a brand or illuminate product graphics, lighting helps attract and draw shoppers towards the product area or shop-in-shop.

Shop-in-Shop is a single branded shop or department within a department store (e.g., Benefit Cosmetics within Macys, Chanel Cosmetics within Saks Fifth Avenue or Timberland PRO within Ritz Safety.)

Lighting is also used to make certain areas of the store stand out. Graphics can be illuminated with direct backlight or indirect lighting. Logos and brand elements are commonly illuminated in these ways.

CREATIVITY IN ACTION

Benefit Cosmetics suspended flowers from the ceiling at Macy's to help their shop-in-shop stand out. The flowers were made by applying vinyl to LED panels, which were attached to a plywood substrate, and complete with polished stainless-steel trim. The flowers were hung above the Benefit shop in the lower level of



Herald Square. While the objective was to reinforce brand identity and help with general lighting, the pieces helped the brand stand out and attract the attention of the shoppers.

MAINTENANCE

While maintenance for illuminated POP displays should not be overlooked, it is extremely important for illuminated store fixtures due to the longevity of the fixture. It is critical when designing an illuminated store fixture to plan ahead for the maintenance and repair of the lighting fixture. LED diodes can last up to ten years, while transformers can last between two and five years, depending on the usage, product types, and installation. Try to be consistent with design and supplier for each store within the program to better manage consistency in performance. Plug-and-play and easy replacement are key.

EVALUATION

One of the hardest metrics to determine is the ROI of store design and store fixtures, let alone the lighting that goes in them. There are many variables both inside and outside of the store, online and offline, that affect ROI. One method is to look at sales before and after a redesign or a special install. Evans pointed out that while fabric light boxes may not have directly affected sales, the light boxes influenced the brand perception. He went on to say that ROI based on hard sales is generally more challenging to measure. But energy savings from using LEDs versus traditional lighting can be measured and is generally proven to be lower than traditional lighting products. The hot topic of the past few years is understanding and enhancing customer experience in-store and seeing how shoppers and employees interact with the store environment.

Key Takeaways

EVALUATING LIGHTING NEEDS

When determining and evaluating the lighting needs for a retail project, remember three A's: **Application, Apparatus, and Assessment**. Successful lighting projects start with understanding what the client goals are for using light from brand impression to product marketing. To create depth in-store, consider creating layers of lighting while avoiding competing light sources and unwanted glares. To create focus in store, creatively utilize lights and shadows in the displays, fixtures, or even store furniture. For functional use, such as directing consumer attention or emphasizing instructions for product use, motion types of lighting (flashing sequences or color variation) and battery operated systems can often be the solution. Let lighting take your consumers on an experiential design journey and be the magic that attracts them to your brand!

CHOOSING THE BEST PRODUCT FOR THE JOB

The most common and best-suited lighting fixtures for POP displays and store fixtures are LED light panels, LED light strips, and LED light tubes.

LED Light Panels are an ultra-slim, innovative light source measuring as thin as 1/4" in thickness. Light panels are designed for even light distribution and may be customized for any design. Their many benefits include: bright and even illumination, easy installation, energy-savings, long lifetime, minimal maintenance, and best of all, custom shapes and sizes.



LED Light Strips are a cost-effective and versatile lighting solution designed for implementation in small and compact areas. They are best suited for indirect lighting applications, which prevent consumers from being directly exposed to the LED strips and diodes or blinded by them. Choose a flexible ribbon



type for custom shapes or curves to create your desired effect.

LED Light Tubes are an ideal lighting solution when a clean and sophisticated look is desired for your architectural and retail environments. Light tubes can be used to illuminate both narrow and wide spaces, adding a modern touch to applications spanning from cove to shelf lighting. Compared to lights



strips, which emit light at a wider angle, light tubes emit a single pure beam of light. They are also available with various diffuser lens options and profiles.

OTHER CONSIDERATIONS WHEN CHOOSING LIGHTING FIXTURES

Future Maintenance Once a display or fixture has fabricated with the appropriate lighting, it will need to be maintained. Simplicity is always better — less wire harnesses, less connecting points, consistent use of products throughout locations, etc. Think about who will be responsible for the maintenance and remember to keep it simple; store associates prefer plug-and-play systems.

Power Management Key questions to consider regarding power management are:

- How many lighting components are being powered and how close are they to each other?
- Will the display/fixture be near a power source or will it be battery powered?
- What kind of power supplies should be selected based on the life time of the store fixtures or displays?
- Is there an energy consumption requirement from the retailers, landlord, or municipality?

Keep in mind, permanent displays will use either a battery or plug-in fixture depending on the purpose, yet temporary displays generally use battery-powered lighting due to their cost and flexible nature.

Standards: UL The UL Listed and UL Recognized Marks indicate that a product has been tested and has passed the specific requirement in one or more categories for product safety by Underwriters Laboratories (UL). Keep in mind that UL Marks may not always be mandatory but are often required for certain specific applications, installations, and inspections. Most projects for retailers require all lighting products used within their stores be UL Listed. In addition, UL65 further regulates the safety standard at the store fixture level, which incorporates how the lighting and electrical components are being installed.

Wire Management Since space is generally limited within POP displays or store fixtures, the designer will have to consider a place for a wire harness or electrical wiring for the lighting components. The amount of space will determine the type of wire harness used.

Voltage Remember, there is a reduction in voltage as the POP display or store fixture gets farther away from a power source. The farther away the power source is, the less power the lighting system receives. Starting at 10 feet, the voltage drops can start affecting the lighting output depending on the system design. While brightness may not be as obvious to consumers, colors can also be affected. Poor lighting quality can come from inadequate power or poor wire management. A best practice is to have no more than a three percent drop in voltage by choosing the right size of wire gauge.

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About LEDCONN

With all the technologic advancement in LED lighting, LEDCONN (www.ledconn.com) stands as one of the few companies that can provide lighting in a material art form. LEDCONN incorporates lighting expertise with numerous custom LED lighting solutions to give a new meaning to back-lit, edge-lit, and linear illumination. The company's custom LED lighting solutions can be used to enhance retail environments for branding, design, architecture, promotion, signage, and more.



About Shop!

Shop! (www.shopassociation.org) is the global trade association dedicated to enhancing retail environments and experiences. Shop! represents more than 1,500 member companies worldwide from 30 countries. The association brings value to the global retail marketplace through its industry leadership, research programs, industry certification, education, and networking events. Shop! produces the award-winning magazine, *Retail Environments*, offering business-focused content to retailers, brands, designers, and suppliers throughout the industry.



SOURCE: BENEFIT COSMETICS

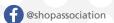
For additional questions about the information contained in this white paper, please contact us at: mbaumgartner@shopassociation.org or call us at 312-863-2917.



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