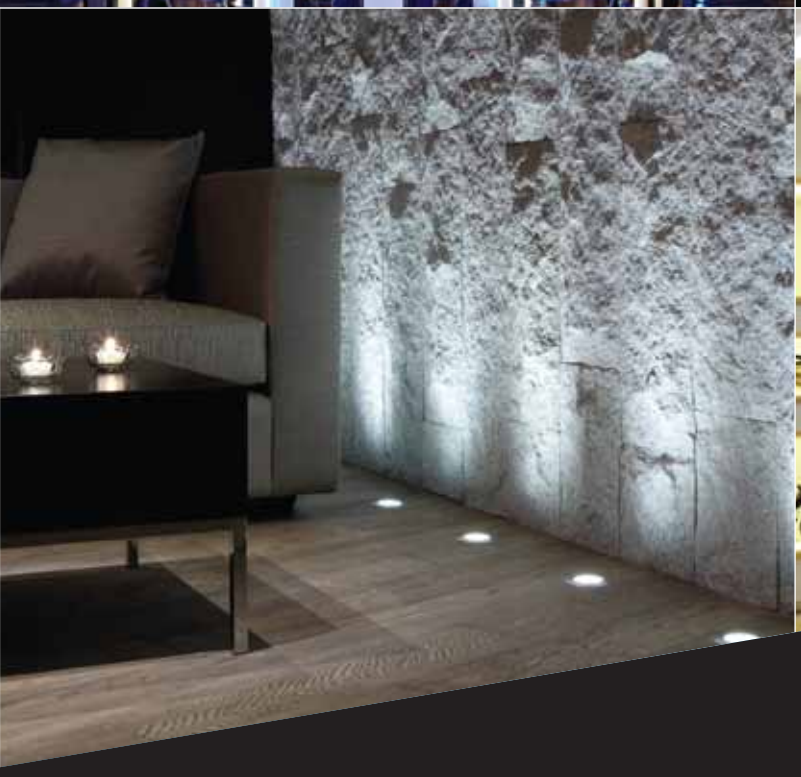
MEGAMAN®

High Performance LED and
Compact Fluorescent Light Sources

Professional Lighting Solutions



2011-2012

MEGAMAN®

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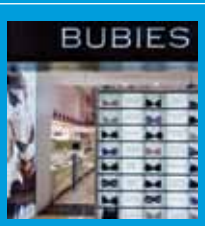

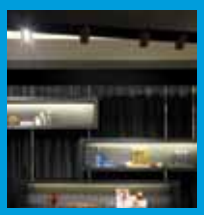

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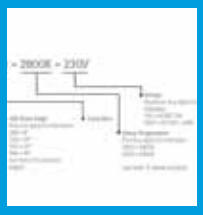

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Leading the World in Energy Saving Light Sources

Specifiers and designers have the latest in high performance LED and Compact Fluorescent light sources for a variety of application, thanks to MEGAMAN®'s continuous commitment to innovation and sustainability.

Artificial light enhances the way we live and work. It brings us safety, comfort and productivity. MEGAMAN® is committed to providing light in a way that is truly sustainable, energy-saving and of such a quality that it brings a positive difference into the lives of all who use the company's innovative LED or Compact Fluorescent light sources.

MEGAMAN®, a global leader in energy saving lamps since 1994, has created an exciting range of high performance LED light sources that offer lighting designers and specifiers a true replacement for halogen and metal halide equivalents.

MEGAMAN®'s Professional Lighting Solutions are ideal for accent and display lighting and are available in a range of beam angles to suit any design scheme.

MEGAMAN®'s unique range of energy-saving light sources are highly popular:

- MEGAMAN® lamps sell in over 90 countries across Europe, Asia-Pacific, the Middle East, Africa, and North and South America
- The MEGAMAN® range now includes over four hundreds of different, high-quality light sources, including MEGAMAN® LED Reflector Series - the world's first true low-energy replacement for halogen lamps
- MEGAMAN® is committed to innovation and the environment
- MEGAMAN®'s advanced research and development facilities ensures a continuous supply of new, exciting, energy-saving light sources come to market every year

MEGAMAN® MILESTONES

2011	R9 technology LED Classic Dimmable feature
2010	LED Non-Directional Lamps LED Reflector Series, a perfect alternative to metal halide
2009	Patented PowerLens technology LED Reflector Series with TCH technology
2008	Industry First Plug-in lamp with integral ballast – PLi Amalgam is employed in full series CFL
2007	DIMMER*ABLE*® technology introduced for linear dimming lamps
2005	DorS technology introduced for step dimming lamps Industry First RoHS compliant CFL
2004	*INGENIUM*® technology introduced
2002	Industry First CFL GU10 Reflector Silicone Protection technology
1999	Patented Cooling-Tube technology
1997	Industry First Candle-shaped CFL
1996	Industry First Classic-shaped CFL
1994	MEGAMAN® incorporated

Case Studies

AR111
GU10
10W

Candle
E14
5W

Sei Unica

Application Retail
Location Zürich, Switzerland
Designer and Architect Wolfang Kucher

The majority of retail lighting installations are refurbishments of existing stores. However, in Alstetten, a suburb of Zürich, Switzerland, a visionary new redevelopment of a former packaging site has allowed the newly opened boutique, Sei Unica, to use the latest in MEGAMAN® LED reflector technology with dramatic results.

Wolfang Kucher, designer and architect for Sei Unica AG, explains further: "The Sei Unica boutique is part of the prestigious CONNECT project in Alstetten. A former packaging plant, the site has been developed based on the vision of combining work, living, sports, leisure and cultural facilities in one place. It centres around a restaurant and retail zone on the ground floor piazza, and the whole complex has been built to the Swiss MINERGIE® sustainability standard*. We wanted to support the ethos of MINERGIE® within Sei Unica, and with this in mind, carefully researched the best lighting technology for use within the store that would support a high-quality look and feel, but be as energy efficient as possible."

The end result is a dramatic combination of the latest in MEGAMAN® LED lamp technology and use of space, to create a boutique that not only looks stylish and sophisticated but saves €2,407 a year in energy consumption and 6,469kg of CO_2 emissions.

The design concept behind the Sei Unica boutique (translated as You're Unique from Italian) was for an exclusive, quitely sophisticated space which displayed the company's carefully created range of handmade, off-the-peg and haute couture, Italian-tailored, clothing. It also needed to have a versatile interior, so that the catwalk, built into the floor of the store, could become the focal point as required.

The clothing concept behind Sei Unica is a select range of 15 of each item from the collection (five in each of three sizes) and these are then displayed along with a range of costume jewellery in the spacious store. Alongside the clothing, the store also plays host to a hairdressing and beauty studio, to offer customers a total style package.

The possibilities of LED technology

Working closely with Jean-Luc Mösch, from M.Schönenberger AG, the possibility of using LED lamp technology within the boutique was explored. Apart from its energy saving potential, LED technology was of interest

AR111
GU10
10W

Candle
E14
5W

Sei Unica

Application Retail
Location Zürich, Switzerland
Designer and Architect Wolfang Kucher

because of its reduced heat output and ability to be positioned near to items on display. In consultation with MEGAMAN®, Mr Kucher chose to use MEGAMAN®'s LED AR111 GU10, 10W and 15W light sources, along with MEGAMAN® LED 5W Candle, to create the right balance of drama and exclusivity within the store, whilst reducing heat and energy consumption.

Part of MEGAMAN®'s LED Reflector Series, MEGAMAN®'s AR111 range of LED low energy replacement for halogen reflectors incorporates the company's patented Thermal Conductive Highway™ (TCH) technology, which has superb heat dissipation, lighting performance and lumen maintenance. As a result the MEGAMAN® LED AR111 range lasts up to 13 times longer and uses 80% less power than halogen equivalents. With the same high quality light intensity and colour rendering of traditional AR111 spotlights (colour rendering of up to Ra92), but with no UV light radiation, negligible IR radiation or residual glare, the LED AR111 range is ideal for use in any retail outlet.

Putting LED into practice

As well as lighting a mix of central display pods, which have been constructed on wheels, to be repositioned during a fashion show, Mr Kucher wanted customer's eyes drawn to the impressive showcases around the sides of the boutique. One of the main challenges faced when lighting Sei Unica was obtaining the correct balance of light within these tall showcases. Mr Mösch, explains: "Compared to halogen and HID, LED lighting is a much newer technology and we are still in a learning process when it comes to making the most of it. Unlike halogen lamps, which produce a yellowish light, the LED light sources required slightly more experimentation to get the correct effect under daylight conditions, due to their more neutral white light."

"However, the end result was well worth the learning curve, as not only does the neutral white light from MEGAMAN® LED AR111's show the creations in their accurate colours, but we have been able to position the lamps close to the exhibited dresses for maximum impact – something that would have been impossible to achieve with halogen sources." Mr Kucher, concludes: "As a professional interior designer and architect, I am quite aware of the thermal situation and of potential difficulties that are traditionally faced when lighting showrooms. However, thanks to MEGAMAN®'s LED solution, we haven't yet had to use the air-conditioning system once, despite experiencing a minor heat-wave here in Zürich. The eco-design of the building and MEGAMAN®'s LED technology complement one another perfectly. I am very impressed!"

* MINERGIE® is a sustainability brand for new and refurbished buildings. It is mutually supported by the Swiss Confederation, the Swiss Cantons along with Trade and Industry and is registered in Switzerland and around the world.

BOUTIQUE
Sei unica

AR111
GU10
15W

PAR16
GU10
7W

Bubies

Application Retail
Location Central, Hong Kong
Interior Designer Wesley Liu, Atelier PplusP Ltd

From a 'Bra Buffet' with dishes such as sweet Chocolate Glory and juicy Pepper Steak displayed on menu's in the window display, to it's gorgeous boudoir interior, the upmarket Hong Kong lingerie store, Bubies, has always looked to do the unconventional. Nowhere is this more obvious than in the flagship store's recent redesign. Thanks to the creative input of architectural interior designers Atelier PplusP Ltd and the lamp technology of MEGAMAN®, the store pushes the boundaries of conventional retail lighting to create the ultimate sensory experience.

Designer Mr Wesley Liu of Atelier PplusP Ltd, explains further: "Bubies has a clientele of affluent young women who expect the best. Not only do they want a sophisticated, exclusive environment in which to shop, but one which challenges their senses on every level. In addition to the aesthetics of the installation, the creative director at Bubies, Nick Chau, was keen to ensure that the products used within the redesign supported the company's ideas on social responsibility. With this in mind, the redesign of the Central store had to include texture, visual impact and highly unique interior touches, all sourced from companies with proven CSR track records.

The end result is a store that challenges on every level. From the bold black birdcage luminaires suspended throughout, which accentuate the stores romantic pink and floral colour scheme, to the subtly lit dining areas adorned with tantalising cupcakes and fine china, customers are treated to a very different lingerie store experience.

Alongside the LEED (Leadership in Energy and Environmental Design) accredited wallpaper and zero toxic emission paints, Bubies chose to use MEGAMAN®'s range of LED reflector and CFL lamps, as the company prioritises environmental management product

development to disposal and recycling. Together with MEGAMAN®'s environmental credentials, the company's lamps also had to create visual drama throughout the store and changing areas, provide excellent colour rendering and minimise any risk of heat and UV damage of the items on display. Mr Liu worked closely with MEGAMAN® to choose the right lamps for each area and the end result is a highly efficient scheme that creates both drama and functionality.

AR111
GU10
15W

PAR16
GU10
7W

Bubies

Application Retail
Location Central, Hong Kong
Interior Designer Wesley Liu, Atelier PplusP Ltd

Seen in their true light

Although Bubies needed a variety of lighting to create the vibrancy that Atelier PplusP wanted for the final scheme, a priority was also placed on the visual clarity of the items on display. In the past, only halogen light sources would have given the high Colour Rendering Index, however, thanks to MEGAMAN®'s latest LED Reflector Series, a halogen alternative is now available. With a Colour Rendering Index of up to Ra92, using MEGAMAN®'s LED PAR16 7W reflectors within the birdcages for narrow-beam spotlighting and MEGAMAN®'s 45° beam angled AR111 15W reflectors to light the hanging display areas, Bubies customers get a true reflection of the colour of any of the merchandise.

Avoiding dark spots and UV damage

In addition to the dramatic use of spotlighting via the birdcage luminaires and 45° beam angled AR111 reflectors, Atelier PplusP also wanted to avoid dark spots and add drama within the rest of the store. To this end, a combination of visually dramatic Leucos Glo lights were included, containing MEGAMAN® CFL lamps, alongside low-level spotlights which featured MEGAMAN®'s compact LED MR16 reflectors and finally the company's Self-Ballasted Linear lighting, which were installed on all of the store's shelving. In addition to achieving visual drama and high luminance levels for minimum energy output, the low heat generation and UV features of MEGAMAN®'s LED reflectors meant that they could be used close to both public access areas and merchandise with no risk to either.

The high performance of MEGAMAN®'s LEDs, combined with the creative flair of Atelier PplusP, has led to a ground-breaking lighting scheme at Bubies, which has also reduced the store's energy consumption from lighting by 80% and supported the company's social responsibility ethos....not bad for a store redesign that had to be taken from paper to finished installation within the space of only three months!

AR111
GU10
15W

PAR16
GU10
7W

Abica

Application Restaurant
Location La Coruña, Spain

abica

AR111
GU10
15W

PAR16
GU10
7W

Abica

Application Restaurant
Location La Coruña, Spain

Throughout the stunning Abica wine bar, in La Coruña, Spain, the latest in LED technology from MEGAMAN® ensures that energy efficient and low-maintenance lighting go hand in hand with a sophisticated ambience, promoting long-term success.

Abica, in La Coruña, is part of the Hostelea Group franchise of Galician wineries. When it opened its doors in June 2009, the winery wanted to do things differently. As well as bringing a wide range of Galician wines to the Spanish public, the Abica franchise wanted to bring a wine experience to its customers that would also combine Galician foods and arts in a sophisticated, yet relaxed setting. Furthermore, The Hostelea Group wanted the Abica franchise template to be easy to replicate, have built in energy efficiencies and be easy to maintain.

With this in mind, Antón Sáez Pérez, manager at Abica, worked closely with Miguel Pérez at MEGAMAN® to maximise energy and maintenance savings. Antón explains further: "We wanted to choose a store design that not only looked good but which, as a franchise template, was sustainable and could be replicated easily. By choosing to light the space with spot lit areas within the restaurant, tapas and delicatessen areas, we have been able to communicate a sophisticated, yet relaxed mood to our Galician winery experience."

By choosing to use lamps from MEGAMAN®'s LED Reflector Series, including 140 of the company's LED AR111 15W GU10 range and 20 of MEGAMAN®'s LED PAR16 7W light sources, Abica in La Coruña has also been able to achieve significant energy and cost efficiencies, compared with the traditional halogen reflectors the lamps replace. These cost savings equate to €31,065 and of 95,250kg CO_2 over the lifetime of the lamps.

In addition to these significant cost savings per outlet, Abica is also very pleased with the light performance and life-span of the lamps. Both MEGAMAN®'s LED AR111 range and the LED PAR16 7W light sources bring together the energy efficient benefits of LED lamps with advanced MEGAMAN® reflector technology. With unrivalled light performance the LED AR111 range combines the ultimate in directional display lighting and energy efficiency with long lamp life. The LED AR111 range has a lamp life of up to 30,000 hours, compared to an average of 3,000 hours of the halogen spotlights it replaces.

The end result at Abica in La Coruña is a lit environment that is warm, welcoming and long-lasting and thanks to the latest in MEGAMAN® LED lamp technology, consumes only a fraction of the energy of its halogen equivalents.

adegas
abica

PAR16
GU10
7W

GX53
5W

Altira Macau

Application Hospitality
Location Macau, China

Heralded as being 'reborn', Altira Macau, formerly Crown Macau, underwent a major refurbishment in 2009 and since this time, the energy efficient measures that were introduced to the hotel's lighting have been monitored – the results speak for themselves. Not only is this hotel a jewel in terms of luxurious accommodation, but in energy efficiency as well. Thanks to innovative lamp technology from MEGAMAN®, Altira Macau's lighting now consumes 81% less energy than previously, produces 81% less CO_2 and, to date, not one lamp has needed replacing. Altira Macau is operated by Melco Crown Entertainment Limited, an entertainment company listed on the NASDAQ Global Select Market (NASDAQ: MPEL) ("Melco Crown Entertainment").

As the first European settlement in the Far East, Macau has always been a vibrant mix of traditional Chinese culture and exotic Portuguese buildings. Today, well known as Asia's entertainment and leisure Mecca, Macau plays host to ever-increasing numbers of foreign tourists. With these tourists comes an increasing expectation for luxury, alongside environmental accountability. Always focused on bringing environmentally responsible initiatives to its hotels, Melco Crown Entertainment saw the refurbishment as an ideal opportunity to renew Altira Macau's lighting as well as its interiors, using the latest in energy saving lamp technology.

Following consultation, it was decided that the incandescent lighting within the hotel's 216 luxury guestrooms be replaced with a MEGAMAN® eco-lighting solution. In addition, it was requested that all the lamps used within these spaces be dimmable, to not only increase the energy saving potential of the lamps still further, but to allow users greater control of their lit environment.

Not only did the replacement of the original lamps with MEGAMAN® DIMMER*ABLE*® energy saving lamp offer guests increased control, but the reduced heat output of the lamps meant savings on air-conditioning costs.

It wasn't only the guestrooms that received the energy saving benefits of MEGAMAN® lamps. Altira Macau also used MEGAMAN®'s latest range of LED Reflector Series lamp throughout the public spaces. The corridors of all the guestroom floors in the 38-storey hotel are now lit using MEGAMAN® LED PAR16 7W lamps and it has been used

PAR16
GU10
7W

GX53
5W

Altira Macau

Application Hospitality
Location Macau, China

wherever directional light is required; with a beam angle of 15° MEGAMAN®'s PAR16 7W lamp offers dramatic accent lighting, whilst using 72% less power than its halogen equivalent.

To date, over two thousand MEGAMAN® lamps have been installed in different areas of the hotel and, with a lamp life of over 10,000 hours for MEGAMAN® DIMMER*ABLE®* energy saving lamps and 25,000 hours for the company's LED lamps the frequency of re-lamping throughout the hotel has been greatly reduced.

Not only has the cost of lighting maintenance been reduced thanks to the introduction of MEGAMAN® lamps, the changeover of the lighting system at the Altira Macau also helps reduce the hotel's electricity costs by almost €18,000 a year as well. Mr. Gerald Cheung, Engineering Services Manager at Altira Macau comments: "Compared to the previous year with a similar occupancy rate, the electricity consumption has been reduced." In kWh's, consumption on lighting alone has dropped from 832,200kWh to 157,680kWh per year, an aggregate saving of 81%. In addition CO_2 emissions have dropped 582,500kg per year to 110,000kg, also an aggregate saving of 81%.*

Although Altira Macau is still committed to further improvements, to make it an even greener hotel, the progress to date shows its guests, and other hoteliers, that it is possible to make minor changes to a hotel's lit environment, yet reap dramatic environmental and cost benefits. Altira Macau is, and will be for many years to come, a jewel in Asia's crown when it comes to promoting sustainability alongside luxury.

*70 trees must be planted to absorb the CO_2 produced by a single 60W incandescent lamp, compared to only 10 trees for an 11W energy saving lamp that delivers the same level of brightness.

38

PAR16
GU10
7W

Candle
E14
5W

Hotel des Indes

Application Hospitality
Location The Hague, Netherlands

PAR16
GU10
7W

Candle
E14
5W

Hotel des Indes

Application Hospitality
Location The Hague, Netherlands

Rich in heritage, the landmark Hotel des Indes, situated in the heart of The Hague, has been a statement in luxury in the Netherlands for over 150 years. After a major refurbishment in 2005, this Starwood group owned hotel has gone from strength to strength; leading the way through its stunning design, impeccable service and, surprisingly for a hotel of this era, its energy saving credentials.

Thanks to innovative lamp technology from MEGAMAN®, and the commitment of Piere Henri, the hotel's general manager, Hotel des Indes' move to energy efficient light sources has led to the hotel saving €643,207 and 658,930kg CO_2 over the lifespan of the installation. These substantial energy savings have been achieved simply by replacing the original light sources in the hotel's presidential suite, executive rooms and corridors with the latest MEGAMAN® LED and CFL lamps.

Piere Henri explains why he chose to update the hotel's lighting: "We wanted to retain the welcoming, quality lighting scheme that we have had since the hotel was renovated back in 2005 by Jacques Garcia, yet make the most of today's energy efficient lighting technology. By working closely with MEGAMAN®, we were able to find replacements for all the lamps in the hotel's guest rooms and corridors, which delivered the same high levels of light quality, lasted many times longer than the original lamps and delivered all this at a fraction of the energy consumption. Not only does the end result offer us a highly energy efficient lighting solution, but the quality of the light throughout is second to none."

Luxury and efficiency in presidential suites

Boasting iconic views of The Hague from the Presidential Suites' rooftop terrace, these have been designed with elegance in mind. The majestic living space features a formal dining and seating area and is lit by a mixture of chandeliers and wall and standard lamps. To ensure that a warm, welcoming environment was maintained within the space, MEGAMAN®'s highly efficient and dimmable, LED and CFL light sources were chosen. The latest in LED reflector technology was used in the wall, desk and pendant fixtures in the bathroom, bar and living areas, including LED 5W and 7W PAR16. In addition, MEGAMAN® CFLs were also used in the standard lamps throughout the suite. The transference from traditional light sources to CFL and LED technology has led to an impressive saving of 7,577 kg of CO_2 and €7,955 in costs over the life of the lamps in the Presidential Suite.

Style and functionality in executive rooms

Hotel des Indes' 90 junior suites and executive rooms were also updated with MEGAMAN®'s LED reflector and CFL lamp technology. A range of MEGAMAN®'s LED reflectors were used throughout the bathrooms and hallways, including the 7W LED PAR16 and 5W LED Candle and, in addition, MEGAMAN®'s Compact Classic CFL lamps were used in the chandeliers in the bed area. By switching from incandescent and halogen lamp technology, to MEGAMAN® LED and CFL energy saving products, the 90 rooms have saved an impressive €400,230 and 417,600 kg CO_2 over the life of the lamps in the junior and executive rooms.

Safe and secure in the corridors

As with any hotel, the public spaces, and in particular the corridors, which are lit for most of the day and night consume significant amounts of electricity. With this in mind, the existing incandescent in the wall lamps throughout Hotel des Indes' corridors were replaced with MEGAMAN® 7W LED PAR16 lamps in a warm colour temperature. The final effect is the same, warm light as with the originals, but with a significant energy saving of €227,067 and 226,176 kg CO_2 over the life of the lamps.

Thanks to the latest in LED and CFL reflector technology from MEGAMAN®, an iconic, historical hotel in The Hague not only looks magnificent, but has energy efficient lighting that will save money and CO_2 emission for many years to come.

PAR16
GU10
8W

Groninger Museum

Application Museum
Location Groningen, Netherlands
Lighting Designer Ralph van den Berg, Deerns
Designers Maarten Baas, Studio Job and Jamie Hayon

Originally built over a century ago, the Groninger Museum in Groningen, Netherlands, has always been known for pushing the boundaries of design. Sixteen years after the museum's total reconstruction in 1994, with stunning structures by Philippe Starck, Alessandro Mendini and Coop Himmelb(l)au, the Groninger's management team felt that the museum's interior, which hosts some of the country's finest exhibitions of modern art, was in need of refreshing.

This time, the museum enlisted the help of top designers Maarten Baas, Studio Job and Jamie Hayon to redevelop various spaces; these included redesigns of the Mendini Restaurant, the Job Lounge and the hyper-modern Info Center computer suite. The refurbishment also gave the museum the opportunity to ask questions about the energy efficiency of the Groninger and to make the most of the latest in energy efficient lighting technology. Now, thanks to companies such as MEGAMAN®, the Groninger is set to shine – highly efficiently - for many more years to come.

Lighting specialist Ralph van den Berg, from the engineering firm Deerns, was enlisted to update the lighting scheme within the museum's main access and exhibition areas, whilst new schemes were created by Maarten Baas in the Mendini Restaurant, Studio Job in the Job Lounge and Jamie Hayon in the Info Center. In the main access areas and exhibition halls, the brief was to keep the existing lighting scheme design, but to have it replaced with the most energy efficient light sources possible. The museum was very specific about the type of light quality it wanted. Mr van den Berg explains further: "The museum had previously been lit largely with halogen lighting. Since then, lighting technology has,

of course, developed enormously. Not only did the Groninger Museum want to make the most of this new technology and have the most energy efficient and long lasting light sources possible, but they also wanted the same high quality light rendition as the existing halogens. Our challenge was to find a suitable mix of lamp technologies with which to refresh the lighting scheme for a contemporary interpretation, which the museum could continue to use for decades to come."

PAR16
GU10
8W

Groninger Museum

Application Museum
Location Groningen, Netherlands
Lighting Designer Ralph van den Berg, Deerns
Designers Maarten Baas, Studio Job and Jamie Hayon

The obvious choice in terms of energy efficiency and long lamp life soon became LED lamp technology. However, very quickly concerns were raised by the museum over the quality of colour rendering and life-time colour consistency of LEDs. Mr van den Berg continues: "Following extensive research, we began to realise the extent of the task of finding a suitable LED replacement lamp technology for this application. The combined light source and fitting needed to have a maximum cross-section of 10 centimetres, deliver the luminosity of a 50 Watt halogen lamp and be dimmable. In addition, the museum wanted the lamp and fitting to be separate entities for ease of lamp replacement and the spotlights to be easily tilted and 100 percent rotating."

Eventually the team from Deerns set up a test of 20 MEGAMAN®'s PAR16 8W LED spot lights to gauge their dimming potential, luminosity and installation depth. Following the success of this test, 550 MEGAMAN® PAR16 8W GU10 2800K LED dimmable lamps were installed throughout the Groninger Museum's oval-shaped access rooms between the exhibition spaces, the entrance area and the new Mendini Restaurant. In addition, Deerns team used a range of T5 fluorescent wall wash lighting solutions in the exhibition spaces and the Starck Pavillion was fitted with a circular power rail, to ensure flexible spotlighting as required. To create a strong focal point within Jaime Hayon's designed Job Lounge, a Venini Murano pendant artwork and wall lamps were created and MEGAMAN®'s DIMMER*ABLE®* Series of Liliput CFL lamps used within them.

With a Colour Rendering Index of Ra80, negligible UV and guaranteed 90% lumen and colour retention over the lamps 25,000 hours of life, MEGAMAN®'s PAR16 8W LED dimmable lamps were the ideal solution within the Groninger Museum's access and restaurant areas. In addition, the significantly reduced wattage of MEGAMAN®'s halogen replacement lamps and long lamp life will mean considerable energy and cost-efficiencies for the Museum.

Mr van den Berg concludes: "The Groninger Museum is a work of art; the spaces are fantastically beautiful." Thanks to the latest in lighting technology, the Groninger Museum looks set to shine as a light in the world of modern art for many years to come.

AR111
GU10
15W

PAR16
GU10
7W

Everard Read Gallery

Application Gallery
Location Johannesburg, South Africa
Lighting Designer Rodney Fittinghoff, Streamlight

AR111
GU10
15W

PAR16
GU10
7W

Everard Read Gallery

Application Gallery
Location Johannesburg, South Africa
Lighting Designer Rodney Fittinghoff, Streamlight

Thanks to the latest in LED lamp technology, the Everard Read Gallery in Johannesburg now has a stunning new lighting scheme, at only a fraction of the energy consumption.

The gallery, which was established in Johannesburg back in 1912, moved to its present location in the prestigious precinct of Rosebank in 1980. As committed environmentalists the Read family wanted to refurbish the lighting within the gallery with an energy efficient solution, which created the drama of the existing scheme, but at significantly lower energy levels. Thanks to the work of lighting design company, Streamlight, and MEGAMAN®'s lamp technology, Southern Africa's most famous commercial art gallery now has a highly efficient lighting scheme, which not only saves on the galleries energy bills, but reduces carbon emissions by over 10,000 kg's per year and daily lighting energy consumption by over 70%.

The Everard Read Gallery has become synonymous with the finest art emanating from Southern Africa. Many of the regions most celebrated painters and sculptors have had their work exhibited within the gallery's walls. With such high profile work on display, the Read family was keen to ensure that any new lighting scheme was not only highly energy efficient, but also delivered high quality colour rendering, whilst safeguarding the exhibits against the damaging effects of UV radiation and contributing towards a comfortable and inspiring atmosphere.

Director at the gallery, Mark Read, worked alongside Rodney Fittinghoff, consultant at lighting design company, Streamlight to find the most suitable solution for the four exhibition areas within the gallery. Originally lit by 50W dichroic lamps on standard track, Fittinghoff was tasked with sourcing a lighting solution that delivered quality light, was environmentally sensitive and cost-effective; LED lamp technology was the obvious solution. After a series of mock-ups, using lamps at different angles to accommodate the various art forms, Streamlight settled on a single make of lamp for the entire installation – MEGAMAN®'s 15W LED AR111 reflector.

Due to the necessity for the gallery to remain open during normal working hours, it was also decided that the lighting refurbishment be phased to minimise disruption and Streamlight looked into the feasibility of reusing the existing track. A bespoke track adaptor was created to house the AR111s, not only minimising disruption to the gallery still further, but maximising cost-efficiencies as well.

The finished lighting schemes in the four exhibition spaces use a mix of MEGAMAN®'s LED AR111 15W lamps with 8° and 24 ° beam angle lamps; the wide angle lamps lighting the artwork and the narrow beam highlighting specific details. In addition MEGAMAN®'s LED PAR16 7W lamps were used in the administrative centre, to increase the energy efficiency of the scheme still further.

With MEGAMAN®'s patented Thermal Conductive Highway™ (TCH) technology which delivers superb heat dissipation, lighting performance and lumen maintenance, and lasting up to 13 times longer and using 80% less power than halogen equivalents, MEGAMAN®'s LED AR111 was the ideal solution for the Everard Read Gallery. With the same high quality light intensity and colour rendering of traditional AR111 spotlights (colour rendering of up to Ra92), but with no UV light radiaion, negligible IR light radiation or residual glare, the LED AR111 range is ideal for use in gallery applications. In addition it offers users significant energy savings, low maintenance costs and powerful luminous intensity (up to 16,000cd at 8° beam angle), making the MEGAMAN® LED AR111 an ideal replacement for 50W halogen equivalents.

The Everard Read Gallery lighting refurbishment was achieved with minimum disruption to clients and the end result is a scheme that brings drama and energy-efficiency to the gallery, ensuring that this beautifully inviting space looks its best for many years to come.

PAR16
GU10
7W

Apto G Ramirez

Application Private Residence
Location Bogota, Columbia
Architect Ricardo Fonseca, Mobil

PAR16
GU10
7W

Apto G Ramirez

Application Private Residence
Location Bogota, Columbia
Architect Ricardo Fonseca, Mobil

Sustainable lighting doesn't have to mean living in a minimalist environment with few of life's luxuries. Thanks to the latest from MEGAMAN® CFL and LED reflectors, a couple in Bogota, Columbia, have re-invented their apartment to create a sustainable, yet warm and welcoming lit environment.

Sustainability and mood creation go hand in hand

When the new owners of an exclusive apartment in Bogota decided to revisit the lighting scheme in the space, they called in the expertise of interior architect, Ricardo Fonseca of Mobil. Their brief to Fonseca was to achieve a light and airy feel to the apartment, whilst lighting it in the most sustainable way possible. After assessing the 200m^2 open-plan living space, Fonseca decided to include a variety of technologies which not only maximised the apartment's energy efficient potential, but ensured it was a warm, friendly environment to live in. He explains: "As well as balancing the impact of the artificial and natural light levels throughout the apartment, and creating a scheme which both added drama and functionality to the space, I wanted to honour the owners' commitment to sustainability and put in simple, yet effective light source and photo sensor solutions which would build energy efficiency into every room."

With these challenges in mind, Fonseca opted to use a selection of MEGAMAN®'s latest CFL and LED light sources to ensure a scheme which maximised drama, yet minimised energy consumption. The results speak for themselves. By replacing the mix of over 80 halogen and incandescent light sources throughout the apartment with a combination of MEGAMAN® CFL and LED light sources, this simple switch has achieved an energy usage saving of 2,797W and has cut the energy bill of the apartment per month in half.

From the ground upwards

Within the entrance way, Fonseca replaced the existing 35W halogen spots within the embedded floor fixtures with MEGAMAN®'s CFL GU10 7W lamps. This simple switch of light sources, not only ensured a more energy efficient solution, but the soft light which this lamp emits now draws out the textured vertical veins within the exposed concrete in blended way, which makes it much easier on the eye when entrancing or exiting the apartment. The choice of warm colour rendering was continued throughout the apartment. Warm colour temperature (2700K) decorative ultra-compact MEGAMAN® CFL 5W Candle light sources were used in all of the table lamps, replacing the existing highly inefficient 40W incandescents. All of the 50W halogen down-lighters throughout the living room, bedrooms and study, were also replaced with MEGAMAN®'s CFL GU10 11W lamps (2700K). However, in the kitchen, a daylight colour temperature of 6500K was chosen, using MEGAMAN®'s CFL AR111 11W directional lamps, to achieve the increased luminance levels required in this working space.

LED colour rendering excellence

Within the dressing room area, MEGAMAN®'s LED PAR16 7W light sources were chosen due to the lamps excellent colour rendering properties (Ra85 for 2800K). These were then linked to an occupancy sensor to maximise efficiencies still further. MEGAMAN®'s LED PAR16 Reflector lamps with the company's patented Thermal Conductive Highway™ (TCH) technology, which has superb heat dissipation, lighting performance and lumen maintenance, meaning that these lamps not only look good, but last up to 25,000 hours.

The end result is a scheme that creates drama and yet is highly functional and energy efficient. Fonseca concludes: "This design is highly replicable – anyone who is serious about sustainability and energy efficiency can have both, and great colour rendering as well. By using a warm palette of light temperatures, I have created a scheme which saves energy and money every month, yet is pleasing to the eye and will last for many years to come."

PAR38
E27
15W

Candle
E14
4W

The Green House

Application Private Residence
Location Soestduinen, Netherlands

Well established in the commercial sector for its highly successful range of LED and CFL lamps, MEGAMAN®, which leads the way in energy-saving lighting, has helped a Dutch deluxe private housing project save thousands of pounds.

Over a process of two years, the Soestduinen home, in Holland, was built integrating the latest energy efficient technologies to create the ultimate in green homes. Finished this month, the home that is aptly nicknamed 'The Green House', because of its energy efficient credentials, uses MEGAMAN® lamps throughout. Thanks to this, is likely to save the homeowner over €150,000 in terms of their lighting bill, and over 240,000 kg's of CO_2, over the lamps minimum 30,000 hours (equivalent to 10 years) of operation.

The homeowners vision for The Green House was to use as much of today's technology as possible to maximise energy efficiency in the home. The Dutch homeowner explains further: "Although I wanted to create the most efficient home possible, I also wanted to ensure it was comfortable and easy to control. I believe that there is a point where a home that is full of the latest technology can begin to alienate the user, and I didn't want that. I wanted to have a space which could be automated as much as possible to adapt to external light and temperatures, without us having to alter the controls manually. At the same time, I wanted to have the option of overriding these settings from my home, or from further away, if our plans changed.

"I not only gave great attention to the type of HVAC systems used, but to lighting as well, as lighting is one of the greatest consumers of electricity in a home. This particular selection of ground breaking technologies which I have chosen to

use in The Green House would not have been possible even two years ago, as the technology just wasn't available then. I have only chosen to use MEGAMAN® LED and CFL technology because of their energy saving capabilities and quality of light output; the results speak for themselves."

Various lamps from MEGAMAN®'s LED Reflector Series have been used within The Green House, as well as a selection of MEGAMAN®'s CFL range. MEGAMAN®'s LED Reflector Series was chosen as the lamps within the range offer all the benefits of light quality and control of their halogen

PAR38
E27
15W

Candle
E14
4W

The Green House

Application Private Residence
Location Soestduinen, Netherlands

counterparts, but are also highly energy efficient, offer excellent colour rendering and minimal heat generation.

To maximise the efficiencies of these already highly efficient light sources, the homeowner also worked closely with Domotica to link all the lamps into a lighting control solution. In addition, GIRA's an Instabus KNX/EIB system was used to create future-proof, electronic nervous system designed according to globally valid standards. The Instabus KNX/EIB system offered the installation team numerous solutions for optimising the use of the home's resources and the visualisation of actual energy consumption.

Not only does the Domotica system have pre-set scenes programmed into each of the keypads and displays, but thanks to GIRA's system daylight, motion, CO_2 and the external weather station have also been integrated, to ensure that light levels within the main areas of the house are automatically adjusted dependent on the amount of daylight available. This level of integration has ensured that The Green House achieves maximum lighting efficiencies, no matter the time of day or night.

The homeowner began this project with the aim of achieving the most energy efficient, yet stylish home possible. This has been achieved using the latest technologies. He concludes: "Thanks to the advances in LED and CFL technology, MEGAMAN®'s lamps offer me a highly cost effective and visually attractive way to light my home, without needing to replace them for many years to come, and I have the knowledge of knowing that I am also helping the environment as well".
Within The Green House a cross section of MEGAMAN® lamps has been used and includes:

- MEGAMAN®'s AR111 15W LED reflectors, which have been used within the home's wine cellar to ensure minimum heat generation for maximum light
- The company's PAR16 5W and 7W LED reflectors, which have been used to highlight works of art and the owner's collection of Delft china. With its minimal UV characteristics protect the art pieces from harm
- MEGAMAN®'s PAR38 15W LED reflectors, which have been used with the corridors and exterior lighting areas
- A wide range of additional MEGAMAN® CFL dimmable and non-dimmable lamps, which have been used within table, standard and pendant lamps. Specifically, MEGAMAN®'s self-ballasted T2 dimmable linear tubes, for sweeping indirect light effects.
- MEGAMAN®'s ultra slim GX53 Series of LEDs and CFLs, which has been used throughout the bedroom and office areas

AR111
G53
14W

Schiphol Airport

Application Airport
Location Amsterdam, Netherlands
Lighting Designer Michiel de Haas, Creative Lighting 3D

AR111
G53
14W

Schiphol Airport

Application Airport
Location Amsterdam, Netherlands
Lighting Designer Michiel de Haas, Creative Lighting 3D

Some lighting design briefs are challenging because of their location, and some because of the type of energy efficiency levels that need to be achieved. When Michiel de Haas, Lighting Designer at Creative Lighting 3D, received the brief to light Schiphol Airport's Holland Boulevard, he had to use the latest in lighting technology from MEGAMAN® to meet the highly challenging brief.

Michiel comments: "When I was asked to create the lighting scheme within the 'At Home' section of Schiphol Airport's Holland Boulevard, I was faced with three main challenges: Creating a homely lit atmosphere in one of Europe's busiest airports, ensuring that the scheme was as energy efficient as possible and, working to very tight design and installation deadlines". One year on, not only is the interior and lighting scheme within 'At Home' popular with visitors and staff alike, but the use of MEGAMAN®'s latest lamp technology has ensured that the scheme saves the airport €30,451 over the 40,000 hours of the lamps' lives."

The 'At Home' interiors were created using a mix of highly talented Dutch designers, including Marcel Wanders, who was commissioned to create bespoke furniture and the Studio Linse design practice, which created the stylised seating areas. A sleek black piano, television sets and digital effect fireplaces are set against a backdrop of cosy lounge areas, with the aim of creating homes away from home for even the most far flung traveller.

Working closely with Schiphol's technical manager, Harm de Jong, Michiel developed a lighting solution which not only worked with the airports daylight control system, but which accentuated key items within each of the 'At Home' rooms. To direct the light exactly where it was needed, Michiel chose to use MEGAMAN®'s AR111 range of LED low energy replacements for 50W halogen reflectors in recessed, directional fittings. He continues: "I needed a light source that gave an excellent light effect, yet had 1-100% dimming capabilities, and could be integrated into the airport's daylight control system. Thanks to the DALI and DSI compatibility of MEGAMAN®'s LED reflectors range, the lamps 24° angle and its Ra92 colour rendering, the end result is not only dramatic but highly energy efficient."

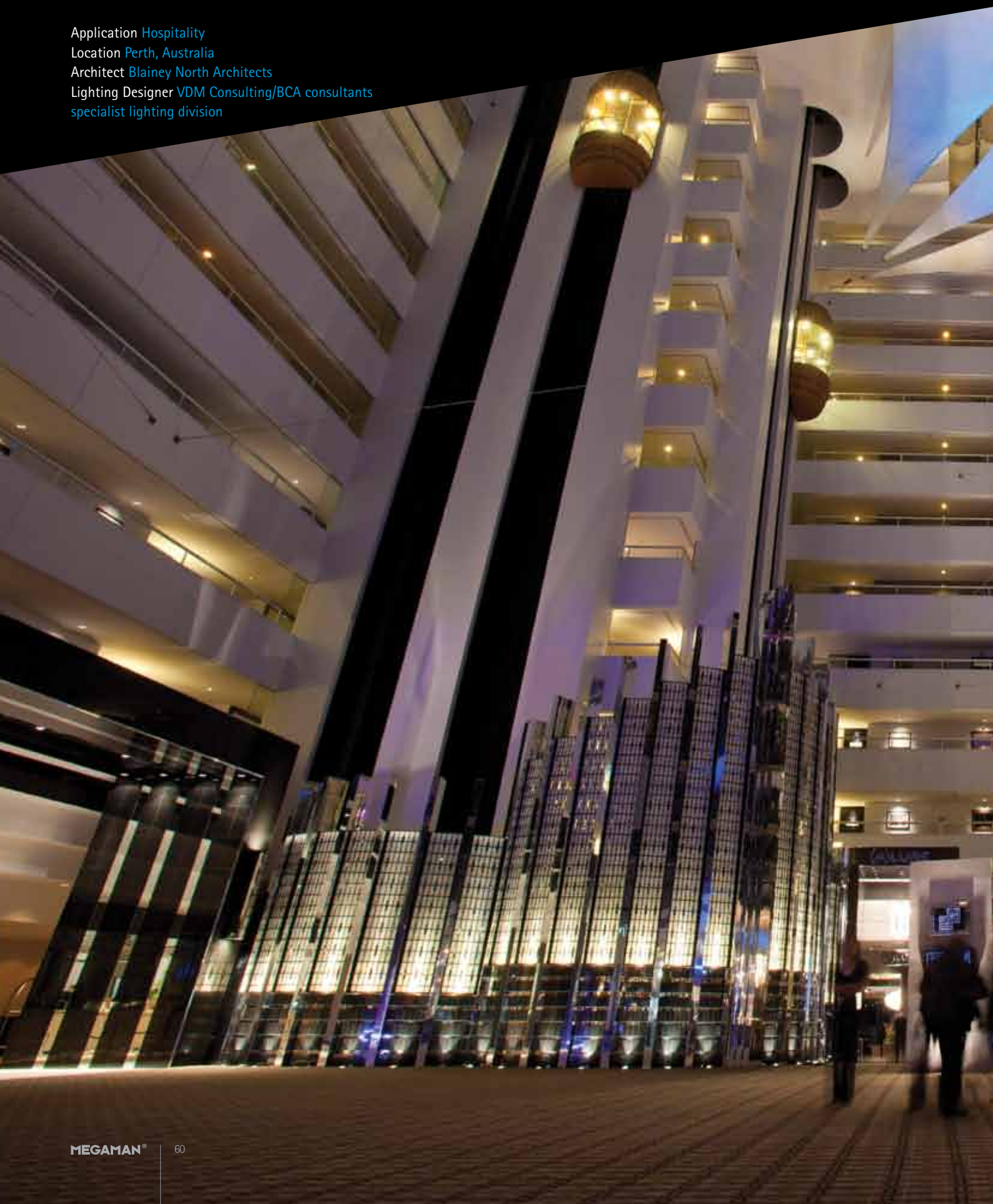
MEGAMAN®'s patented Thermal Conductive Highway™ (TCH) technology ensures the lamps have superb heat dissipation, lighting performance and lumen maintenance and as a result last up to 13 times longer and uses 80% less power than halogen equivalents. In addition, with no UV light radiation, negligible IR light radiation or residual glare, the LED AR111 range is ideal for use in any public space, hotel, restaurant, gallery or residential application. In addition, selected products in the MEGAMAN® LED AR111 range can be used with the majority of AC/DC12V halogen transformers, making them a viable option in most retrofit applications.

Speaking to The Moodie Report, Schiphol Group Managing Director Business Area Consumer, Otto Ambagtsheer said: "We wanted to create a little piece of Holland at Schiphol, and we have achieved that. We've tried to create an area where passengers can relax – transit times are on average five to seven hours – so this is an additional service, and brings an element of the Dutch culture to Schiphol."

AR111
GU10
15W

Burswood Casino

Application Hospitality
Location Perth, Australia
Architect Blainey North Architects
Lighting Designer VDM Consulting/BCA consultants specialist lighting division



AR111
GU10
15W

Burswood Casino

Application Hospitality
Location Perth, Australia
Architect Blainey North Architects
Lighting Designer VDM Consulting/BCA consultants specialist lighting division

Australia's Burswood Entertainment Complex, which is celebrating its 25th birthday this year, is Perth's destination for luxury facilities and accommodation. Located on the Swan River, the Crown Limited owned complex houses the Burswood Casino, whose imposing atrium entices customers into its world of glitz and glamour. Following an AS$10 million refit in 2010, the atrium's restaurant and lobby area was transformed by a stunning granite and mirror clad wall, adding glimmering dimensions to the casino's fascia.

Blainey North Architects, the architect firm tasked with the exterior design, has long been a MEGAMAN® client. North and his colleague Justin Condon were very particular with the atrium's illumination brief, the end result needed to fit in with the glamour and drama of the entire complex. Solely to achieve outstanding visual appeal, the lifts behind the illuminated wall in the lobby seem to emerge from behind 'Emerald City'-like panels. Thanks to MEGAMAN®'s LED Reflector Series and Paviom's directional lighting, the light appears to naturally fade upwards towards the lift shaft.

The project used the latest in LED reflector technology with 27 of MEGAMAN®'s AR111 GU10 dimmable lamps, fitted within Red Dot Design award-winning Paviom Lofoot Projectors to illuminate the 12-metre granite and mirrored panels, which make up the striking lift screens. Uplights were used on the entrance boardwalk and throughout the atrium.

Warren Levisohn from VDM Consulting/ BCA consultants specialist lighting division commented: "LED light sources provided the efficient yet warm lighting that we wanted to create this elegant space. Each mirrored panel was restricted to a width of 240mm so the build up of heat from any conventional light source would have been a concern – with LED technology, this isn't a problem. Furthermore, the MEGAMAN® AR111 lamps emit a warm light, which is comparable to halogens, yet far more efficient."

With the casino open 24 hours a day, the atrium is continually lit, meaning that energy usage for the Burswood complex is high. MEGAMAN®'s AR111 LED reflector technology uses 80% less energy and lasts 13 times longer, an achievement that played a deciding factor in the specification of this project.

Further appeal came from the dimmable capabilities of the AR111; the casino creates ambient appeal during its opening hours, dimming the lights at night. The directional ability of the Lofoot Projectors ensures adjustments to the lighting can be made with ease.

The Burswood Casino is an ideal example of the use of exterior lighting for dramatic effect with additional benefits; not only is the large atrium warm yet spectacular, the use of LED results in lower energy use and maintenance costs.

The Burswood Complex is a fully integrated entertainment precinct that comprises the casino, two hotels, an award-winning range of restaurants, a nightclub, a convention centre, a theatre and a stadium as well as a host of recreational facilities including a golf course, spa and retail outlets.

MEGAMAN®
MEGAMAN®

Technology

MEGAMAN® Serviceable Modules

MEGAMAN®'s 'Building a Better Tomorrow' aims to make eco-friendly products which:

- Offer better energy efficiency
- Create the least environmental impact
- Avoid hazardous substances
- Increase product life expectancy
- Use recycled content and are recyclable

Throughout its product development, both in replacement lamps and modules, MEGAMAN® has chosen to design socketable LED solutions. This decision has multiple benefits. Not only can MEGAMAN® LED light sources be easily serviced and upgraded to the latest LED technology, but by using socketable solutions, existing luminaires can be retained, minimising the environmental impact of progress. This approach overcomes the inflexibility previously experienced by end users, of completely integrated LED light sources and fixtures.

The MEGAMAN® LED product range offers the highest degree of design freedom for lighting designers, both in terms of addressing future advances in LED technology, as well as offering a wide range of colour choices: 2400K, 2800K, 4000K and R9 options.

MEGAMAN®

Reflectors in a New Light

It is well established that energy efficient lighting needs to combine efficient light sources with efficient distribution of the light they produce. For that reason, MEGAMAN® spotlight LEDs use a parabolic reflector to control light distribution, rather than the lenses favoured by some manufacturers.

Superb light sources with precision control

Why reflectors?
There are many reasons for using reflectors in these applications, including:

Efficiency

- The parabolic reflector has been proven over many years to be the most efficient method for directing the light from a point source, so that maximum use is made of the lumen output (optical efficiency up to 98%).
- Lenses absorb light and have an efficiency <90%

Control of light

- With lenses the light is concentrated in the middle, creating high candela levels, but in practice giving dots of lights with too much contrast on the outer diameter of the beam. Beam quality is not measured in candela, such numbers while important can be misleading.
- To give light levels similar to halogen, a lens solution typically uses several lenses in array overlapping the output to try to create an even distribution of light within the beam, however in the process this creates a lot of side glare.
- Single parabolic reflectors using multi-chip LED arrays create a soft but precise beam which gives much more comfort than the high contrast beams created with lenses.
- Lenses over LED arrays create uneven edges with striations, compromising the effect of the lighting.
- Reflectors allow better glare control with a clear cut off angle, compared to lenses, because the source is directly shielded outside of the beam.
- The use of a glare shield in combination with a parabolic reflector reduces direct uncontrolled light and ensures the light is precisely controlled.

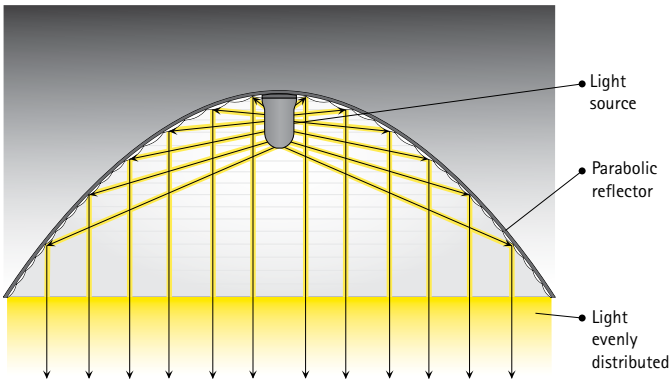


Diagram 1: Illustrates even light distribution using traditional light source and parabolic reflector

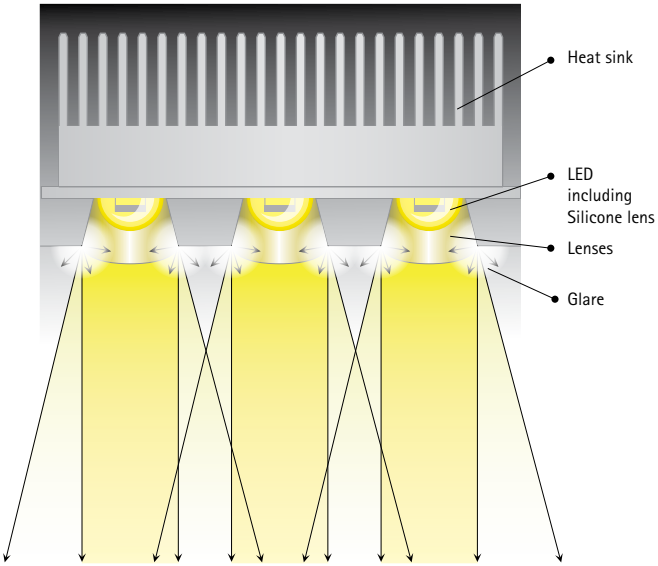


Diagram 2: Illustrates LED light source using lens technology

MEGAMAN®

Reflectors in a New Light

Thermal control

- Lenses need to be quite thick to refract light, and thus trap more heat therefore requiring larger heat sinks.
- MEGAMAN® Reflectors have an open style, allowing more heat to escape so that smaller heat sinks are possible, enabling a smaller fixtures.
- Even when glass covers are used on MEGAMAN® LED reflectors they do not control the light but purely protect them from collecting dust. As such the covers can be very thin and thermally more efficient as they trap less heat compared to lenses.
- Reflectors plus MEGAMAN®'s exclusive TCH technology enable higher power units in smaller modules for direct replacement of higher energy sources.

True replacement for existing halogen lamps

- When replacing halogen spotlights with LED spotlights, the use of a reflector provides the same light distribution, so the lighting does not need to be reconfigured.
- LED spotlights with reflectors are more aesthetically pleasing and conform to the expected appearance of a spotlight.

MEGAMAN®'s unique geometry

In order to reproduce the precise light control you get from parabolic reflectors, MEGAMAN® position their multi-chip LED arrays using a unique axial geometry both replicating the traditional approach and allowing the optimum thermal control with MEGAMAN® TCH technology.

This unique approach facilitates the use of reflectors with all the associated advantages of precise beam control and allows lumens to be where they are wanted with less glare.

Making optimum use of the lumen output through precise optical configuration, MEGAMAN® LED delivers the performance that lighting designers and their clients expect from spotlights. This is particularly important when replacing halogen spotlights with LED alternatives.

Aesthetics are also important as spotlights tend to be very visible. By using the compact-profile reflector design with its innovative LED multi-chip geometry, MEGAMAN® maintains the attractive appeal of traditional reflectors while offering all the advantages of LED technology.

MEGAMAN® goes even further achieving colour tolerances of just 100K and offers linear dimming from 1% - 100% with the designated driver and standard DC1-10V dimmer.

MEGAMAN® 's unique approach with axial LED geometry, parabolic reflector, glare shield and patented TCH thermal control offers the best solution for precise comfortable low energy lighting for accent and display applications.

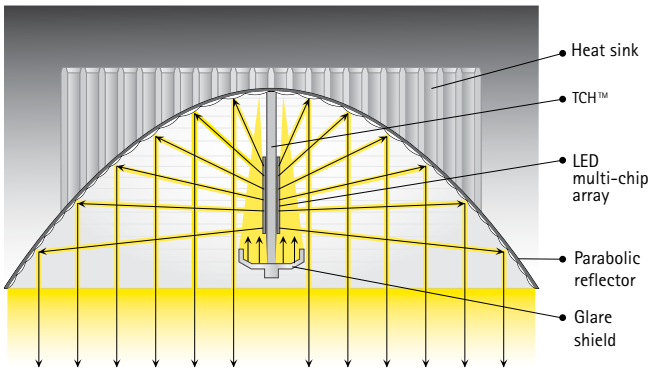


Diagram 3: Illustrates MEGAMAN®'s unique LED reflector technology

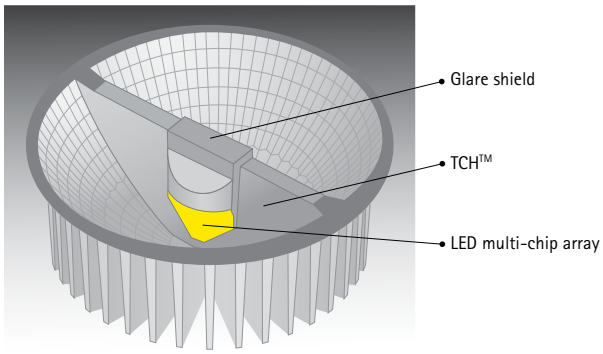


Diagram 4: MEGAMAN®'s unique geometry allowing optimum thermal control with MEGAMAN® TCH Technology

Lumens 'where you want them' per watt

How to compare light sources and their efficiencies:

Non-directional light sources
Since non-directional light sources emit equal light levels in all directions, a good measure for the efficiency of the product is its luminous flux (lm) and overall lamp efficacy (lm/W).

The luminous flux, expressed in lumen (lm), is the total quantity of light emitted from a lamp in all directions. Since the human eye is not equally sensitive to all wavelengths within the visible spectrum, the emitted spectrum is weighted by the eye sensitivity curve and integrated over the visual wavelengths 380 – 760 nm.

Although wavelengths below (UV) and above (IR) the 380 – 760 nm range are not taken into account as they do not contribute to the visual spectrum, they can still have a damaging impact in sensitive applications such as museums, art galleries or food illumination. With this in mind, MEGAMAN®'s LED range of products do not emit any light in the UV and negligible in the IR region and are therefore the preferred choice in UV/IR critical applications.

As overall lamp efficacy (lm/W) of a light source is calculated as the ratio between visible light and the consumed electrical power, the higher the efficacy number, the more efficiently the product converts electrical power into visible light.

Directional light sources
However, the efficacy measurement used for non-directional light sources cannot be transferred to directional ones, as light pollution needs to be taken into account; the glare from the edges of an LED lens, although not useful light, does contribute to a higher efficacy number. So, with directional light sources a new form of measurement is required to show how well a lamp is directing light where it is wanted.

Therefore, the measurement for showing the efficacy of a directional source is luminous intensity (cd). Luminous intensity quantifies the light emitted in a particular direction per solid angle and characterises the output for a directional light source.

Luminous intensities in different directions, measured by means of a goniometer, are plotted in polar diagrams. These show the light distribution of the direction light source and enable the beam angle to be determined.

The beam angle of a directional light source is defined as the angle at which the luminous intensity is half of the maximum luminous intensity. The maximum luminous intensity can also be obtained with the use of a lux diagram, since the maximum luminous intensity equals the lux level at a distance of 1 metre.

MEGAMAN® directional LED light sources
Although the majority of LED products on the market today use lenses to direct light, MEGAMAN® has developed its unique axial geometry reflector technology. MEGAMAN® LED reflector technology allows light to be directed without the need for a lens, resulting in better beam control, excellent efficiency and low glare lighting solution. (see section 'Reflectors in a New Light', page 68)

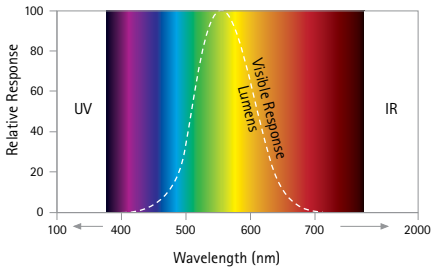


Diagram 1: Spectral Response Curve

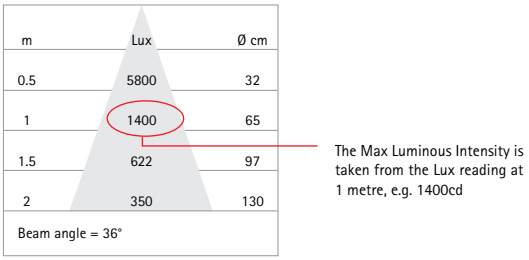


Diagram 2: Lux diagram

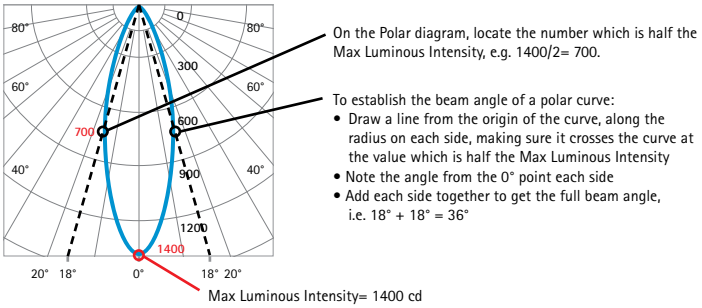


Diagram 3: Polar diagram

Thermal Considerations

Temperature
To maximise the reliability and performance of LEDs, proper thermal management is essential. If the LED's maximum operating temperature is exceeded, light output and lumen maintenance decreases and as such the useful lamp life is shortened. Therefore it is essential that validation of an LED's temperature is undertaken by means of temperature measurements to ensure optimum performance.

In general, manufacturers define an LED's maximum operating temperature at the semiconductor level (Tj = T junction). To ensure this limit is not exceeded, temperature measurements are necessary. Although the critical temperature to measure is the junction temperature Tj, the inaccessibility of this point has led to the creation of an additional measurement – the Tc temperature.

This separate Tc temperature measurement point is chosen as such that it has a direct relation to the Tj junction temperature and must not exceed the specified limit. If the measurement of this Tc temperature is below or equal to the specified limit then the stated life and luminous flux of an LED will be achieved. Exceeding the limits set for Tc will negatively impact the initial product performance as well as its useful product life. All measurements must be performed by means of thermocouples that are correctly fixed to the Tc points.

Thermal Considerations

Thermal management
Temperature and its control have a significant impact on the quality and lifespan of an LED. To ensure LEDs operate at their optimum capabilities, effective thermal management is essential.

The principal role of thermal management is to extract the heat from the LED module and dissipate it into the surrounding air. This can be done through conduction, convection and radiation and different approaches are being taken to this issue across the industry, with varying degrees of success.

Optimum thermal management is achieved when the number of thermal conductive interfaces between the LED and its heat sink are reduced and the thermal resistance between these interfaces is minimised. In addition, careful consideration needs to be given to the heat sink material, its surface area, geometry and roughness as well as the management of airflow around the LED as a whole.

MEGAMAN®'s LED choice
All MEGAMAN® LED light sources are based on multiple chip arrays on ceramic substrate. This choice has multiple benefits in terms of performance, size and thermal management of the product. Compared to Power LED solutions the LED array can be mounted directly, without the need for an additional PCB and the ceramic substrate has a very low thermal resistance. Both of these allow less thermal resistance between LED and heat sink and as such allows better heat conduction away from the LED.

MEGAMAN®'s unique geometry
The majority of LED lamps on the market today incorporate exterior lenses with which to direct light output. However these tend to trap heat, meaning a larger heat sink is required. Thanks to innovative product development from MEGAMAN®, the company's LED directional light sources do not use lenses but reflectors to direct the light output. The open style of MEGAMAN®'s LED reflectors allows more heat to escape from the lamp, enabling smaller heat sinks to be fitted and giving the lamp a smaller profile.

Thermal Conductive Highway™
MEGAMAN®'s patented Thermal Conductive Highway™ technology uses a unique design of 'heat drain' across the reflector to dissipate heat efficiently and prevent deterioration of the LED and other components. The technology also gives the lamps a longer life with lumen maintenance, resulting in 90% of initial lumens being available even at the end of the lamp life. Thanks to careful thermal management, MEGAMAN®'s LED Reflector Series combines the higher efficiency, lifetime, and reliability benefits of LEDs, with the light output levels of many conventional light sources.

New display opportunities
Thanks to MEGAMAN®'s advanced thermal management technology, all of its LEDs can be positioned in areas not traditionally possible with hotter halogen equivalents. MEGAMAN® lamps can be placed close to the objects they are lighting, with no risk of heat, UV or IR degradation. This makes them ideal for sensitive display areas, such as food halls, museums or galleries. MEGAMAN® light sources can also be located in access areas close to the general public, due to their heat dissipation capabilities.

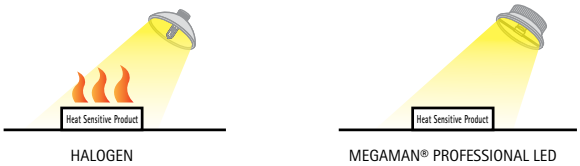


Diagram 1: Heat from Halogen Lamp versus LED in relation to Heat Sensitive Products

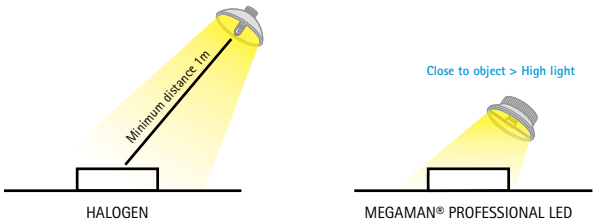


Diagram 2: Heat from Halogen Lamp versus LED in relation to distance from lit product

MEGAMAN

Colour Consistency

MacAdam Ellipses and Colour Temperature

As with more traditional light sources, the colour temperature of an LED will dictate whether it emits a warm or cooler light. The higher the LED's colour temperature, the cooler the resultant light effect. So, a cool white light has a colour temperature of 4000K, whereas a warmer light effect will have a colour temperature of 2800K.

Hot and cold colour temperatures

The colour temperature of a light source is taken from the temperature of a perfect black-body radiator that radiates light of a similar appearance to that of the light source. It is measured in units of absolute temperature; Kelvin (K). Interestingly, although red is associated with being a hot colour and blue a cold one, on the black body curve (also known as the Planckian Locus, see diagram 1), blue occurs at higher temperatures than red. A more visual example of this apparent colour temperature contradiction can be seen in candlelight, which emits a warm red orange glow, but in fact has a low Kelvin temperature of 1850K. Therefore higher colour temperatures (5000K more) are called cool colours (bluish white); lower colour temperatures (2700 – 3000K) are called warm colours (yellowish white to red).

Colour measurement of LEDs

LED and discharge lamps have negligible thermal radiation, so do not follow the form of a traditional black body spectrum. However, as with any colour, they can be represented on a so-called 'colour space' using the CIE 1931 (x,y)-chromaticity diagram (see diagram 2). Every colour is uniquely defined by one (x,y) point in this space. The colour points of thermal radiators lie on one curve in this space, the black body locus. The colour points of LED and discharge lamps for general lighting are located outside, but close to, this curve. Although a colour temperature can only be attributed to points on the black body locus, these light sources are also assigned a colour temperature: correlated colour temperature (CCT). The CCT is the colour temperature of a black body radiator which, to human colour perception, most closely matches the light of the source i.e. the point on the black body locus that lies closest to the colour point of the source.

Colour consistency

The key to creating an LED lighting scheme, that looks good for years to come is in ensuring that, over their lifespan, all of the lamps are performing within an acceptable tolerance in terms of colour deviation. To define 'acceptable tolerance' from lamp to lamp, LED manufacturers have adopted the MacAdam ellipse and SDCM (Standard Deviation of Colour Matching) measurement of colour consistency.

MacAdam ellipse

The MacAdam ellipse is a system of colour measurement. It measures how much colour variation is possible around these axes, before the human eye detects a colour change. A series of ellipses can then be drawn around any target colour, and the closer any given lamp is to the target, the less colour deviation will be experienced when these lamps are placed side by side in an installation.

The distance from the target point in each ellipse is measured in SDCM. An SDCM of 1 step means that there is no colour difference between LED chips, 2-3 SDCM means that there is hardly any visible colour difference. Colour consistency of 7 SDCM is accepted by the market and in line with Energy Star requirements.

MEGAMAN® Performance

Thanks to MEGAMAN®'s control of the phosphor/LED blend and the optimized control, MEGAMAN® LED professional light sources have a colour consistency of < 5 SDCM.

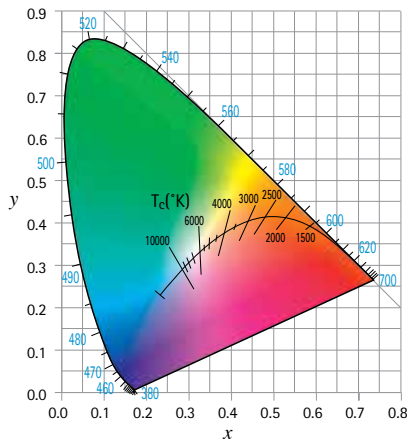


Diagram 1: Planckian Locus

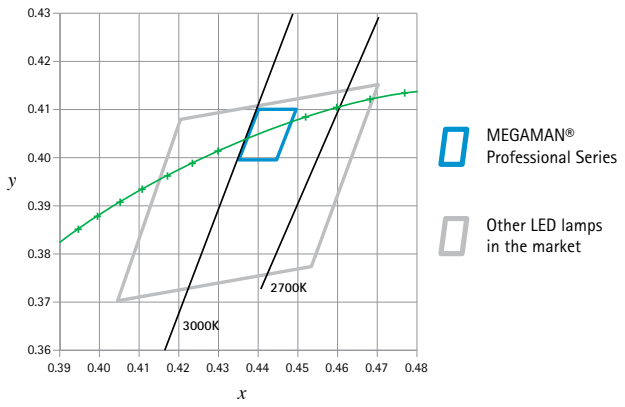


Diagram 2: CIE 1931 x,y Chromaticity Diagram illustrating MEGAMAN® Professional Series against other LED lamps

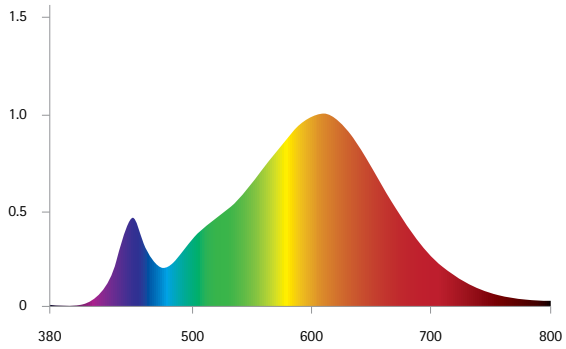


Diagram 3: MEGAMAN® 2800K Spectral Response Curve

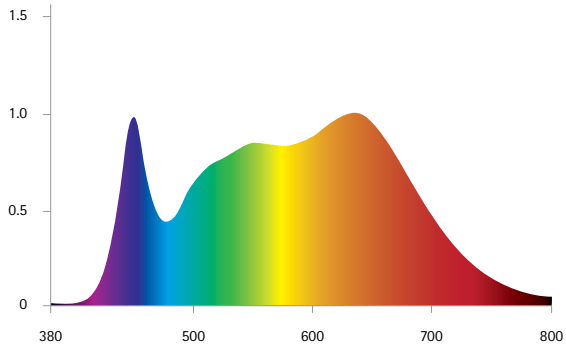


Diagram 4: MEGAMAN® 4000K Spectral Response Curve

Colour Rendering

Since 1931, when the first system of measuring colour rendering was formalised by the CIE (Commission Internationale de l'Eclairage = International Commission on Illumination), the lighting industry has been able to communicate the quality of its light to specifiers and end users alike.

The Color Rendering Index (CRI or Ra) is a quantitative measure, which rates a light source's ability to reproduce the colours of objects faithfully. In order to objectively compare the colour rendering properties of any light source, the CIE's standardised measuring method operates on a scale from 0 to 100 (poor to excellent). The colour change of 14 standard colours is calculated when an object is exposed to a specific light source and then this is compared to a reference illuminant of the same colour temperature (a black body* is used for colour temperatures up to 5000K and daylight above that). The CRI for a pair of light sources can only be compared if they have the same colour temperature.

The first eight, non-saturated colours (R_1 – R_8), are used to calculate the general CRI and the remaining 6 saturated colours (R_9 up to R_{14}) supply additional information about the colour rendering properties of the light source.

The CRI scale is chosen so that an ideal black body source, such as incandescent or halogen lamps, is by definition a CRI rating of 100. For light sources emitting a discrete spectrum, like LED and discharge lamps, the CRI can be anywhere between 0 - 100. As a rule of thumb, the more the spectrum is filled at all wavelengths (380 – 760nm), the better the colour rendering properties of the source, however a high CRI measurement intrinsically means lower efficacy (as less efficient wavelengths are also represented in the spectrum).

Colour Rendering Index (CR) Table

R1	Light greyish red	
R2	Dark greyish yellow	
R3	Strong yellow green	
R4	Moderate yellowish green	
R5	Light bluish green	
R6	Light blue	
R7	Light violet	
R8	Light reddish purple	
R9	Strong red	
R10	Strong yellow	
R11	Strong green	
R12	Strong blue	
R13	Light yellowish pink	
R14	Moderate olive green	

* A black body is a theoretical object that absorbs all incident electromagnetic radiation and due to its ability to absorb at all wavelengths, is the best possible emitter of thermal radiation. It radiates a continuous spectrum that depends on the body's temperature.

meringues

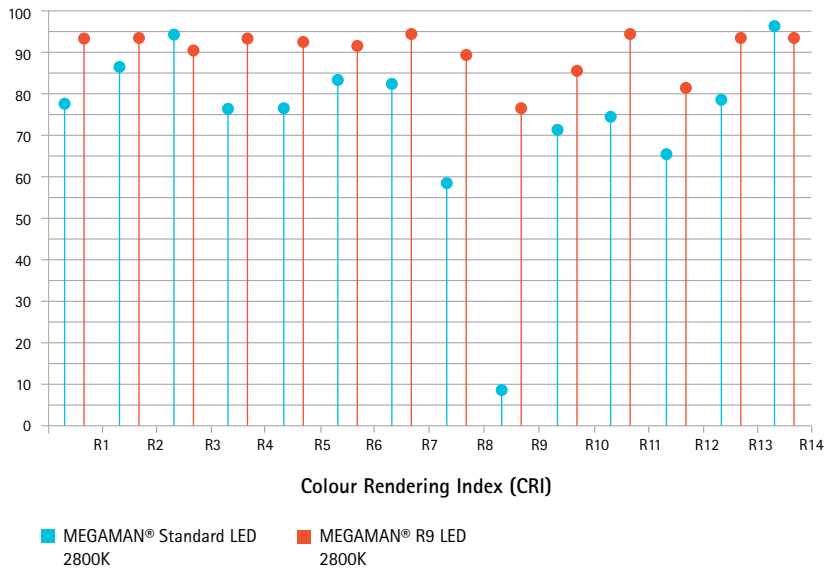
R9 Technology

The MEGAMAN® LED R9 Series maximises the visual impact of meat, fresh fruit and vegetables by increasing the product's red colour rendition. Thanks to MEGAMAN®'s innovative design and patented technology, the R9 series offer retailers a high quality lighting intensity and superb performance. Easier to control than their high CRI high-pressure sodium equivalents, The MEGAMAN® LED R9 Series of lamps are the best alternative to traditional halogen in this type of application.

The LED R9 Series outperforms metal halide products, which are traditionally weak in red rendition. Furthermore they are quick and simple to turn on and off, providing instantaneous, colour-perfect luminance, not having the long warm-up or restart time associated with existing metal halide and high pressure sodium technology.

MEGAMAN® R9 LED light sources not only have a high red colour rendition value of R9 of ≥ 76, but also have high values for regular CRI (CRI=94) and the other "saturated" colours R10 to R14. This means that the MEGAMAN® LED R9 Series creates well-balanced and high quality light, making it the perfect light source for food and other display lighting applications, where a sense of the freshness and richness of the product's red colours are needed.

CRI table for MEGAMAN® Standard LED and MEGAMAN® R9 LED



Life and Lumen Maintenance

Traditionally the rated lamp life of light sources is defined as an average rating, in hours, for the time it takes 50% of a large group of the lamps to fail (B50). However, this rating is purely based on lamp survival and does not take into account lumen depreciation. An additional way of measuring lamp life is therefore required for LEDs, which can have extremely long lives.

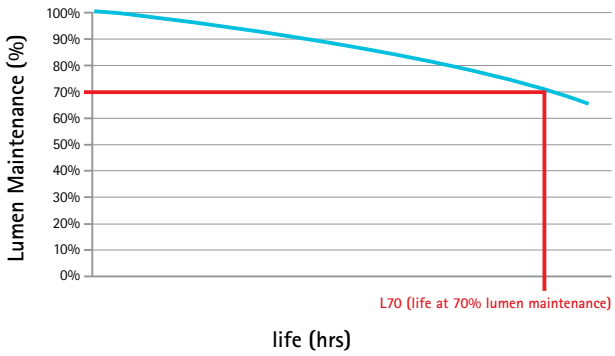
To measure the lumen depreciation, an LED is tested under normal operating conditions and the lumen output of the lamp is measured at 6,000 hours. This measurement is then compared to the initial output of the lamp and the depreciation of lumen output calculated- see Energy Star table. This is then extrapolated on a lumen maintenance curve- see graph.

The resultant curve shows the amount of remaining luminous flux output- expressed as a percentage of the initial output- at any selected elapsed operating time. This data then makes it possible for manufacturers to provide a relative lumen output calculation over a lamps' life and, importantly, to be able to indicate the point at which an LED will be operating at an output level that is not considered viable in terms of light quality. This point is called the rated lumen maintenance life (Lxx) and shows the elapsed operating time at which a specified percentage of lumen maintenance is reached - this is expressed in hours. To illustrate this, if an LED has a rated lumen maintenance life of L70 at 40,000 hours, then it will operate for 40,000 hours before falling below 70% of its initial light output level.

MEGAMAN® quotes this L70 number for all LED products which is the expected time when used in normal open conditions for the unit to reach 70% lumen maintenance and the end of useful life. MEGAMAN® also tests all LEDs in the most onerous conditions, for example to simulate use in enclosed fixtures, and calculate a minimum rated life. Both rated life and L70 life are quoted on the product pages.

MEGAMAN® has an ongoing program for long term life test of professional LED's. Test measurements of lumen output are taken regularly to verify the projections of lumen maintenance and life. For this reason life claims may change and the website should be referenced for the latest information. (www.megamanlighting.com)

Rated life for LED products based on 70% lumen maintenance



6,000-Hour Lumen Maintenance Thresholds Table from Energy Star

Minimum lumen maintenance at end of 6,000 hours (% of initial lumens; -3% tolerance)	Maximum L70 Life Claim (hours)
86.7%	15,000
89.9%	20,000
91.8%	25,000
93.1%	30,000
94.1%	35,000
94.8%	40,000
95.4%	45,000
95.8%	50,000

MEGAMAN®

Controlling an LED

MEGAMAN® offers a range of tailor made LED converters to optimise the performance of its LED reflector products.

The current/voltage characteristic of an LED is similar to other diodes, in that the current is dependent exponentially on the voltage; a small change in voltage can cause a large change in current. If the maximum voltage rating is exceeded by a small amount, the current rating may be exceeded by a large amount, potentially damaging or destroying the LED.

To avoid this scenario, MEGAMAN® uses constant current drivers within all of its LED lamps, to ensure their stable operation. By controlling the current through the LED in this way, the light output of the LED is equally regulated and no differences in light output are observed.

Additionally, MEGAMAN® offers LED reflectors for operation on AC/DC12V. These products have an integrated constant current driver which allows operation directly on 12V AC/DC transformers. When halogen transformers are used to drive LED products care should be taken that the transformers can cope running on low load - that means one lamp on one transformer may not provide enough load to keep it running.

All MEGAMAN® converters have a long service life of 50,000 hours and offer multiple benefits :

- Flicker free operation with stable output even with fluctuations of the supply voltage
- Automatic restart capability when short-circuit or overload is absent
- Equipped with harmonics filter to reduce main harmonics
- Ambient temperature range -30°C to + 40°C
- Power factor >0.9
- Protection class II
- Compliant with international standards with respect to electromagnetic interference

Additionally the constant current converters allow linear dimming (100%-1%) with any DC1-10V dimmer.

Total dimming solution

The MEGAMAN® LED dimming series comes in three forms:

- Linear dimming
  (for LED using conventional* Dimmer Switches)
- DorS dimming - 4-step dimming
  (for LED Dimming Series, with integrated driver)
- Linear dimming (DC1-10V)
  (for LED with external drivers DC1-10V dimming)

Linear dimming for LED using conventional* Dimmer Switches

This provides a smooth dimming experience similar to that obtained with traditional incandescent and halogen lamps connected to a leading edge dimmer.
To dim, turn the knob to achieve the required brightness level from 100% to 10%.

DorS dimming for LED using conventional ON/OFF Light Switches (4-step dimming technology)

This 4-step dimming concept provides convenient, hassle-free instant dimming using a standard on/off light switch. You can easily and economically create an assortment of stunning ambient lighting schemes with DorS dimming technology. Switch the lamp on. To dim, switch the lamp off and then on again within 3 seconds. Repeat to dim the lamp to the desired level (100%, 50% 20%, 5% and back to 100%).

Linear dimming for LED with External Drivers

Linear dimming facilitates a smooth dimming experience comparable to traditional lamp sources.

The brightness level can be seamlessly dimmed from 100% down to 1% when the lamp is connected to a DC1-10V dimming driver and DC1-10V dimmer.

Please visit www.megamanlighting.com/LEDdimmers for the list of compatible dimmers and general guidelines.

* There is no standard for dimmer switches therefore we can not guarantee performance on every dimmer switch.

Sustainability

MEGAMAN® – Building a Better Tomorrow
As the world's leading manufacturer of energy saving lamps, sustainability not only means designing and producing environmentally friendly products to MEGAMAN®, but also includes its commitment to minimising the environmental impact arising from all aspects of its business.

Sustainable product innovation
From product development to disposal and recycling, MEGAMAN® prioritises environmental management and strives to:

- Implement pollution-free processes in the entire product life cycle
- Use renewable or recyclable materials to minimise the use of resources
- Comply with environmental legislation and industry codes of practice
- Promote environmental protection awareness among staff and business partners

MEGAMAN®'s environmental policy 'Building a Better Tomorrow' guides the company to produce eco-friendly products which offer better energy-efficiency with low environmental impact, increased product life expectancy and utilising recycled content.

Among its product ranges is *True Green*; these energy saving lamps are completely free of hazardous liquid mercury. MEGAMAN® uses amalgam instead, which contains a small amount of chemically bound mercury and is safer, as well as being more environmentally friendly. In addition, a number of MEGAMAN®'s energy saving lamps have a layer of silicone on the glass bulb which acts as a protection as well as eliminating the use of toxic acids that are usually used to produce traditional frosted finishing. This layer of silicone also helps to prevent the leakage of any possible mercury vapors as it minimises the occurrence of shattered glass, which is most dangerous during disposal. It also makes recycling of the amalgam mercury and glass much easier as well as providing a better light tone combined with the energy efficiency expect from these light sources. MEGAMAN®'s lamps are the first in the world to include this safety feature.

Environmental education
MEGAMAN® established the first LED lighting showroom in its head office in Hong Kong in September 2010. The 600 m^2 showroom comprises five business and retail environments where the overall design and idea is to show low-carbon, eco-friendly concepts through the demonstration of the versatility and energy efficiency of LED lamps. Visits to the showroom can be arranged for business partners, schools, NGOs and other stakeholders, to show how innovative LED lighting can best be maximised to save energy.

The future of the environment is in our hands
The focus of MEGAMAN®'s sustainability initiatives is to reduce resources consumption and environmental impact and have a harmonious relationship with stakeholders, while running a profitable business.

MEGAMAN® completed its first carbon audit in 2010, quantifying its emissions and carbon footprint, including emissions related to the fuel and electricity usage, transportation and refrigeration usage in production plants in mainland China. Its target for 2011 is to reduce carbon emissions by 3%.

Sustainability Report 2009-2010
MEGAMAN® has recently launched its first Sustainability Report, showing the company's commitment to sustainability development. The report also serves as a platform to promote and facilitate dialogue with the company's stakeholders on sustainability performance in economic, environmental and social aspects.

To view the Sustainability Report, please visit www.megamanlighting.com/sustainability-report.

Rigorous Quality and Management

All of MEGAMAN®'s LED and CFL lamps are designed, tested and produced in its state of the art factories in Xiamen, China. Standards have been implemented factory-wide to ensure MEGAMAN®'s manufacturing processes deliver innovative, reliable and safe products now and in the future.

To ensure that MEGAMAN® products comply with the highest quality standards, the company's manufacturing plants are equipped with state of the art assembly lines. The in-house laboratory is ISO 17025 certified by CNAS and NVLAP, and is also eligible to perform on-site testing for UL, SEMKO and TUV marks.

MEGAMAN®'s business is run under the most stringent management and quality systems, so that the green elements of the production process are maxmised, that employee welfare is prioritised and that the company is socially responsible to the local community. To continually develop these areas, MEGAMAN® has undertaken a range of international accreditations. These include:

Quality Management System
MEGAMAN® lamps are manufactured in ISO 9001:2000, ISO 14001:2004, ISO 14064-1:2006, OHSAS 18001:1999, SA 8000:2001 and QC 080000:2005 certified manufacturing plants.

Corporate Social Responsibility
MEGAMAN® has received OHSAS 18001:1999 and SA 8000:2001, confirming the level of care for employees and reinforcing the company's pledge to being socially responsible.

Controlling use of hazardous substances
MEGAMAN® plants are QC 080000 certified. Underlining the fact that the company's manufacturing processes are closely monitored to ensure ultimate control of hazardous substances.

MEGAMAN® lamps are made using premium quality materials and innovative technologies within stringent control measures, to deliver maximum performance and energy efficiencies.

Member of Zhaga

Zhaga is an industry-wide co-operation, aimed at the development of standard specifications for the interfaces of LED light engines*, with the ultimate goal of making LED light sources, manufactured by different companies, interchangeable. As a committed member of the Zhaga Consortium, MEGAMAN® is working, alongside other manufacturers, to ensure that the Zhaga vision for standardisation becomes a reality.

Interchangeability is achieved by defining interfaces for a variety of application-specific light engines. Zhaga's standard specifications will cover the physical dimensions, as well as the photometric, electrical and thermal behavior of LED light engines. The Consortium is focused on interoperability through standardisation, not on performance specifications.

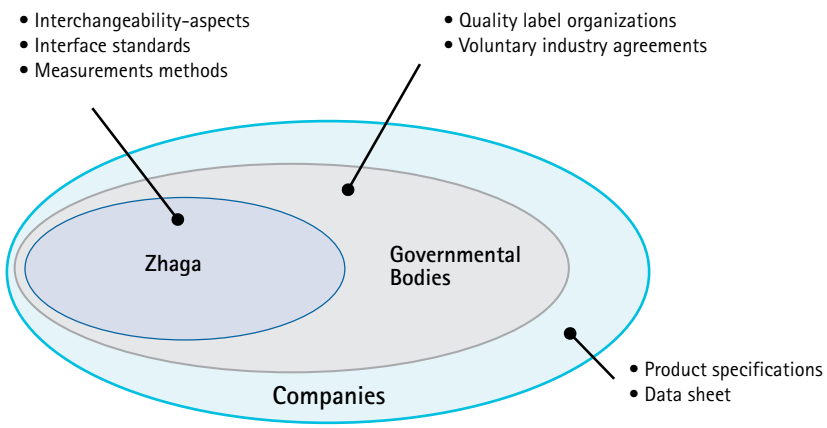
Zhaga

Zhaga is

- A consortium of industry players that creates
  - Standardised interfaces for LED Light Engines (LLEs), to secure a stable design platform for luminaire designers and manufacturers
- An industry-wide co-operation
  - LED light engine manufacturers
  - LED luminaire manufacturers
  - Additional components manufactures (heat sinks, optics, etc)
- An open co-operation
  - Open to any company that subscribes to the vision/mission and is willing to contribute to the success
- A global co-operation
  - Zhaga is a co-operation of companies from all regions
  - Zhaga will set global standards

The Zhaga Consortium was established in February 2010. More than 100 companies have joined the Zhaga Consortium.

Zhaga will focus on interoperability through interface standardization, not on perfomance specification



* An LED light engine is the combination of an LED module and the associated control gear. Zhaga treats the LED light engine as a black box, with defined interfaces that do not depend on the type of LED technology used inside the light engine. The Zhaga specifications only define the outside of LED light engines.

Zhaga

TECOH™ – the New Technology

The creation of a comfortable, yet attractive environment is key to the success of any retail scheme. Light plays a major role in the display and promotion of products and the quality of this light can make or break any scheme.

MEGAMAN® understands that highly efficient, eco-friendly solutions are required and has as a result, created a unique LED solution – the TECOH™ product range. TECOH™ is an LED 'capsule' with dimensions similar to G12 based ceramic metal halide lamps. The current product range comprises of a 35W LED capsule as a viable alternative to a 39W ceramic metal halide product.

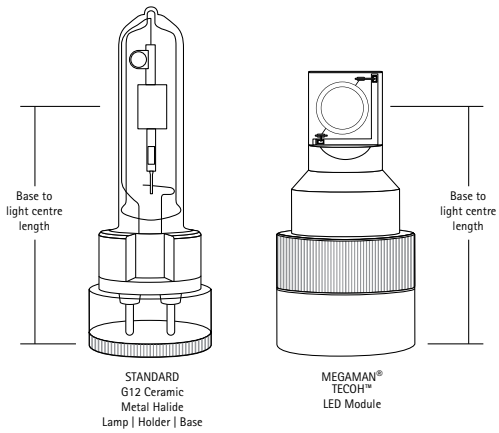
The unique patented thermally conductive base and head design used within TECOH™ offer superb heat dissipation, resulting in excellent lighting performance and lumen maintenance. The two highly efficient, axial positioned LED arrays also allow fixture manufacturers to use reflectors to effectively control the beam and create powerful accent lighting.

Adaptable and long-lasting

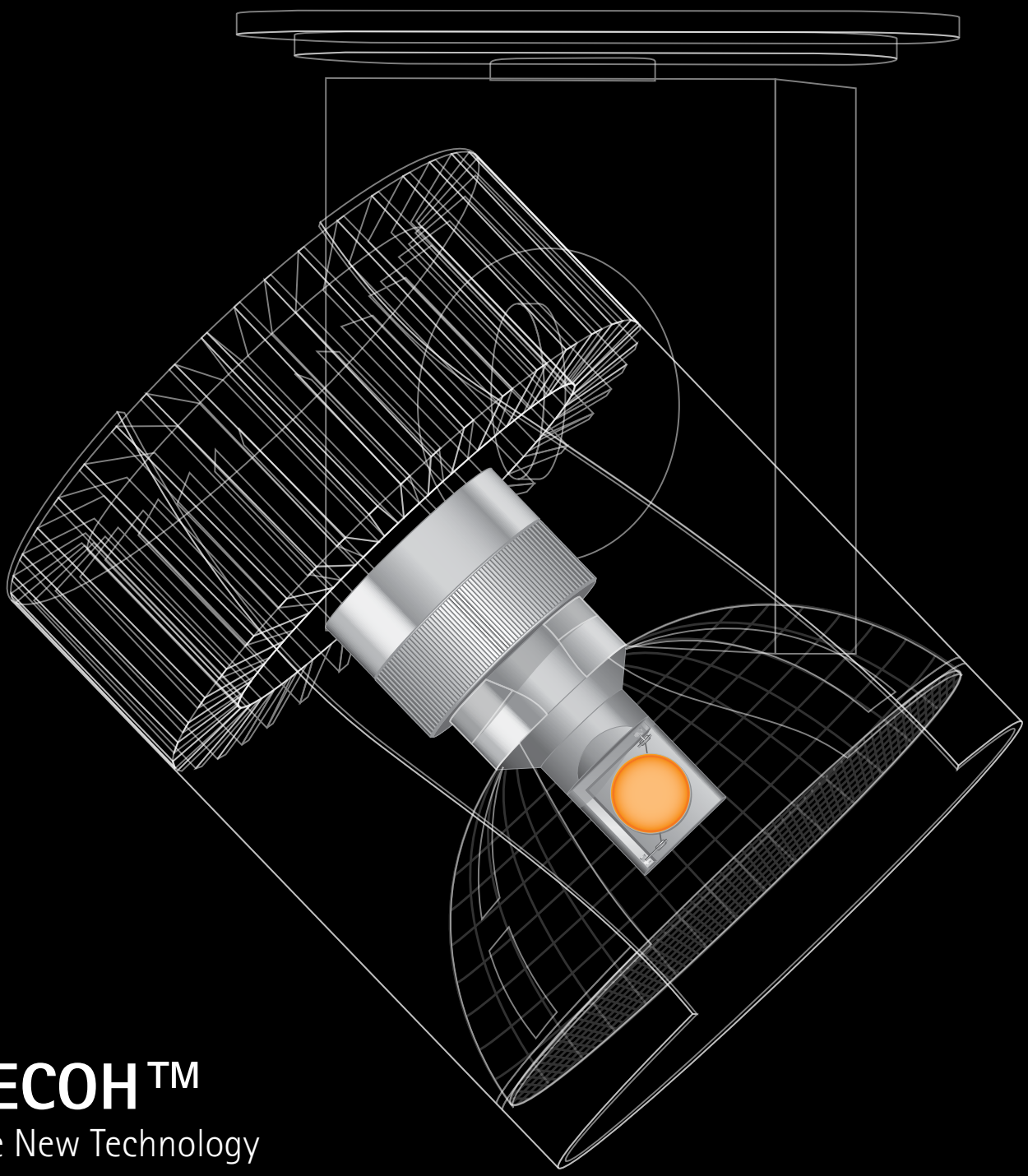
With dimensions similar to G12 based metal halide lamps, only simple adaptations are required to existing fixtures to accommodate the TECOH™ product range. The lamps have also been designed with future-proofing in mind: the capsule heads are exchangeable and upgradeable to accommodate technological advances. In addition, the lamp's design ensures consistent luminous flux over its lifespan and, after 40,000 operating hours, 70% of the initial luminous flux still remains.

In comparison to ceramic metal halide products the TECOH™ range offers additional ecological, as well as performance, advantages:

- Life time up to 40,000 hours with a 70% lumen maintenance throughout the entire lamp life resulting in low maintenance costs
- Instant start and hot restrike capable
- Dimmable
- High colour consistency (< 5 SDCM) throughout life and independent of the burning position
- Variety of choice to match application requirements – R9 options available
- No UV radiation, no special UV-filters are required for safe operation
- Negligible IR radiation
- No hazardous substances, eliminating the risk of potential exposure to radioactive Kr85 in case of lamp breakage
- No safety glass required since explosion risk is eliminated as TECOH™ is not operating at high pressures unlike metal halide alternatives.



With its unique design TECOH™ is the ideal lighting solution for a variety of shop lighting applications such as boutiques, food outlets and shopping malls. Due to the absence of UV radiation and negligible IR radiation TECOH™ also successfully meets all the requirements for museum and gallery lighting. TECOH™ is not a retrofit solution and requires design and engineering to be integrated into a fixture.



TECOH™

the New Technology

High Performance LED

PAR16

Employing Thermal Conductive Highway™ (TCH) technology, these lamps deliver powerful light output of up to 900cd with power consumption of only 8W and a 35° beam angle.

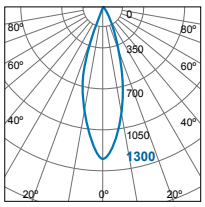
- True replacement for 35W and 50W halogen PAR16 by 6W, 7W and 8W versions
- Linear dimming and DorS dimming versions available
- High colour rendering of up to Ra92
- Long rated life of 25,000 hours
- Energy savings of up to 84%
- 70% lumen maintenance (L70) at 50,000 hours
- Save more energy consumption when lamp is dimmed

PAR16

PAR16 Line Voltage Standard

wattage	*halogen equivalent*	beam	colour temperature	item no.	24°	35°	36°	E14	GU10
6W	*(35W)*	**24°**	2800K Ra82	**LR1506-35H24D-GU10-2800K-230V**					
6W	*(35W)*	**24°**	4000K Ra85	**LR1506-35H24D-GU10-4000K-230V**					

Voltage **220-240V**
Rated life **25,000hrs** | L70 life **35,000hrs**
Max. Luminous Intensity **1300cd**
Luminous Flux **240lm**
Operating Temp. **-30°C to +40°C**
Length **60mm** Diameter **50mm Ø** Weight **89g**
Cap **GU10**

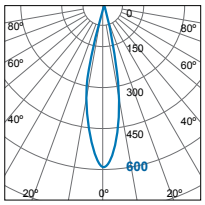


m	Lux	Ø cm
0.5	5200	21
1	1300	43
1.5	578	64
2	325	85

Beam angle = 24°

wattage	*halogen equivalent*	beam	colour temperature	item no.
6W	*(35W)*	**36°**	2800K Ra82	**LR1506-35H36D-GU10-2800K-230V**
6W	*(35W)*	**36°**	4000K Ra85	**LR1506-35H36D-GU10-4000K-230V**

Voltage **220-240V**
Rated life **25,000hrs** | L70 life **35,000hrs**
Max. Luminous Intensity **600cd**
Luminous Flux **240lm**
Operating Temp. **-30°C to +40°C**
Length **60mm** Diameter **50mm Ø** Weight **89g**
Cap **GU10**

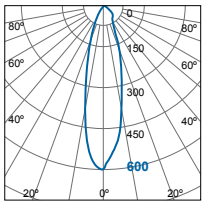


m	Lux	Ø cm
0.5	2400	32
1	600	65
1.5	267	97
2	150	130

Beam angle = 36°

wattage	*halogen equivalent*	beam	colour temperature	item no.
7W	*(35W)*	**35°**	2800K Ra85	**LR0407-35H35D-E14-2800K-230V**
7W	*(35W)*	**35°**	4000K Ra92	**LR0407-35H35D-E14-4000K-230V**

Voltage **220-240V**
Rated life **25,000hrs** | L70 life **35,000hrs**
Max. Luminous Intensity **600cd**
Luminous Flux **270lm**
Operating Temp. **-30°C to +40°C**
Length **87mm** Diameter **50mm Ø** Weight **94g**
Cap **E14**

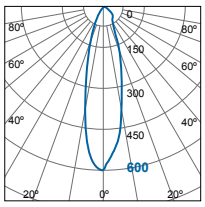


m	Lux	Ø cm
0.5	2400	32
1	600	65
1.5	267	97
2	150	130

Beam angle = 35°

wattage	*halogen equivalent*	beam	colour temperature	item no.
7W	*(35W)*	**35°**	2800K Ra85	**LR0407-35H35D-GU10-2800K-230V**
7W	*(35W)*	**35°**	4000K Ra92	**LR0407-35H35D-GU10-4000K-230V**

Voltage **220-240V**
Rated life **25,000hrs** | L70 life **35,000hrs**
Max. Luminous Intensity **600cd**
Luminous Flux **270lm**
Operating Temp. **-30°C to +40°C**
Length **74mm** Diameter **50mm Ø** Weight **83g**
Cap **GU10**

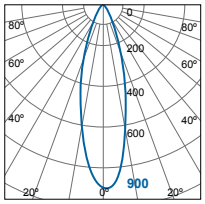


m	Lux	Ø cm
0.5	2400	32
1	600	65
1.5	267	97
2	150	130

Beam angle = 35°

wattage	*halogen equivalent*	beam	colour temperature	item no.
8W	*(50W)*	**35°**	2800K Ra80	**LR0408-50H35D-GU10-2800K-230V**
8W	*(50W)*	**35°**	4000K Ra82	**LR0408-50H35D-GU10-4000K-230V**

Voltage **220-240V**
Rated life **25,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **900cd**
Luminous Flux **330lm**
Operating Temp. **-30°C to +40°C**
Length **74mm** Diameter **50mm Ø** Weight **106g**
Cap **GU10**



m	Lux	Ø cm
0.5	3600	32
1	900	65
1.5	400	97
2	225	130

Beam angle = 35°

Please contact your MEGAMAN®'s representative for the extended range of PAR16 Line Voltage, Standard light sources which provide a true retrofit solutions in size and shape.

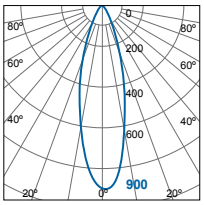
PAR16

PAR16 Line Voltage Dimmable (Linear)

10 + | 35° | GU10

wattage	*halogen equivalent*	beam	colour temperature	item no.
8W	*(50W)*	**35°**	2800K Ra80	**LR1108d-50H35D-GU10-2800K-230V**
8W	*(50W)*	**35°**	4000K Ra82	**LR1108d-50H35D-GU10-4000K-230V**

Voltage **220-240V**
Rated life **25,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **900cd**
Luminous Flux **380lm**
Operating Temp. **-30°C to +40°C**
Length **79mm** Diameter **50mm Ø** Weight **120g**
Dimming format **100-10%**
Cap **GU10**



m	Lux	Ø cm
0.5	3600	32
1	900	65
1.5	400	97
2	225	130

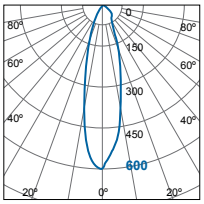
Beam angle = 35°

PAR16 Line Voltage Dimmable (DorS)

– + | 35° | GU10

wattage	*halogen equivalent*	beam	colour temperature	item no.
7W	*(35W)*	**35°**	2800K Ra85	**LR1107s-35H35D-GU10-2800K-230V**
7W	*(35W)*	**35°**	4000K Ra92	**LR1107s-35H35D-GU10-4000K-230V**

Voltage **220-240V**
Rated life **25,000hrs** | L70 life **40,000hrs**
Max. Luminous Intensity **600cd**
Luminous Flux **270lm**
Operating Temp. **-30°C to +40°C**
Length **79mm** Diameter **50mm Ø** Weight **89g**
Dimming format **4-step**
Cap **GU10**



m	Lux	Ø cm
0.5	2400	32
1	600	65
1.5	267	97
2	150	130

Beam angle = 35°

PAR20

The LED PAR20 Series delivers superb lighting performance with low heat output, making it a flawless replacement for a 50W halogen PAR20.

- Eco-friendly replacement for 50W halogen PAR20
- Linear dimming and DorS dimming versions available
- High colour rendering of up to Ra85
- Long rated life of 25,000 hours
- Energy savings of 84%
- 70% lumen maintenance (L70) at 50,000 hours
- Greatly save energy when lamp is dimmed

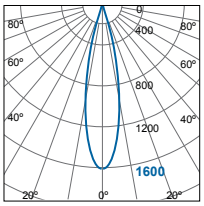
PAR20

PAR20 Line Voltage Standard

30° E27

wattage	halogen equivalent	beam	colour temperature	item no.
8W	*(50W)*	**30°**	2800K Ra82	**LR0308-50H30D-E27-2800K-230V**
8W	*(50W)*	**30°**	4000K Ra85	**LR0308-50H30D-E27-4000K-230V**

Voltage **220-240V**
Rated life **25,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **1600cd**
Luminous Flux **430lm**
Operating Temp. **-30°C to +40°C**
Length **95mm** Diameter **65mm Ø** Weight **140g**
Cap **E27**



m	Lux	Ø cm
0.5	6400	27
1	1600	54
1.5	711	80
2	400	107

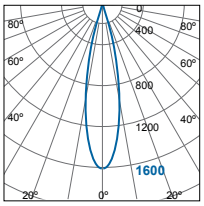
Beam angle = 30°

PAR20 Line Voltage Dimmable (Linear)

10 + 30° E27

wattage	halogen equivalent	beam	colour temperature	item no.
8W	*(50W)*	**30°**	2800K Ra82	**LR0308d-50H30D-E27-2800K-230V**
8W	*(50W)*	**30°**	4000K Ra85	**LR0308d-50H30D-E27-4000K-230V**

Voltage **220-240V**
Rated life **25,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **1600cd**
Luminous Flux **430lm**
Operating Temp. **-30°C to +40°C**
Length **95mm** Diameter **65mm Ø** Weight **143g**
Dimming format **100-10%**
Cap **E27**



m	Lux	Ø cm
0.5	6400	27
1	1600	54
1.5	711	80
2	400	107

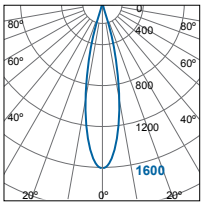
Beam angle = 30°

PAR20 Line Voltage Dimmable (DorS)

- + 30° E27

wattage	halogen equivalent	beam	colour temperature	item no.
8W	*(50W)*	**30°**	2800K Ra82	**LR0308s-50H30D-E27-2800K-230V**
8W	*(50W)*	**30°**	4000K Ra85	**LR0308s-50H30D-E27-4000K-230V**

Voltage **220-240V**
Rated life **25,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **1600cd**
Luminous Flux **430lm**
Operating Temp. **-30°C to +40°C**
Length **95mm** Diameter **65mm Ø** Weight **143g**
Dimming format **4-step**
Cap **E27**



m	Lux	Ø cm
0.5	6400	27
1	1600	54
1.5	711	80
2	400	107

Beam angle = 30°

PAR30

The LED PAR30 Reflector Series offers an eco-solution with superb lighting performance to replace the 100W halogen PAR30. The series also offers up to 85% energy savings and high lumen maintenance, greatly reducing your maintenance costs and electricity bill.

- Best replacement for 100W halogen PAR30
- Linear dimming and DorS dimming versions available
- High colour rendering of up to Ra92
- Long rated life of 30,000 hours
- Significant energy savings of 85% and low maintenance costs
- 70% lumen maintenance (L70) at 50,000 hours

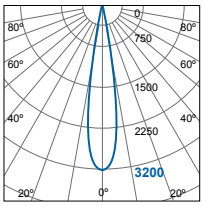
PAR30

PAR30 Line Voltage Standard

24° E27

wattage	halogen equivalent	beam	colour temperature	item no.
15W	*(100W)*	**24°**	2800K Ra85	**LR0215-100H24D-E27-2800K-230V**
15W	*(100W)*	**24°**	4000K Ra92	**LR0215-100H24D-E27-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **3200cd**
Luminous Flux **530lm**
Operating Temp. **-30°C to +40°C**
Length **102mm** Diameter **96mm Ø** Weight **239g**
Cap **E27**



m	Lux	Ø cm
0.5	12800	21
1	3200	43
1.5	1422	64
2	800	85

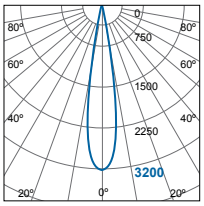
Beam angle = 24°

PAR30 Line Voltage Dimmable (Linear)

10 + 24° E27

wattage	halogen equivalent	beam	colour temperature	item no.
15W	*(100W)*	**24°**	2800K Ra85	**LR0215d-100H24D-E27-2800K-230V**
15W	*(100W)*	**24°**	4000K Ra92	**LR0215d-100H24D-E27-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **3200cd**
Luminous Flux **530lm**
Operating Temp. **-30°C to +40°C**
Length **102mm** Diameter **96mm Ø** Weight **241g**
Dimming format **100-10%**
Cap **E27**



m	Lux	Ø cm
0.5	12800	21
1	3200	43
1.5	1422	64
2	800	85

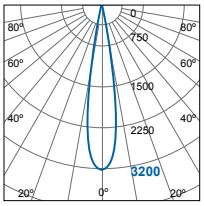
Beam angle = 24°

PAR30 Line Voltage Dimmable (DorS)

- + 24° E27

wattage	halogen equivalent	beam	colour temperature	item no.
15W	*(100W)*	**24°**	2800K Ra85	**LR0215s-100H24D-E27-2800K-230V**
15W	*(100W)*	**24°**	4000K Ra92	**LR0215s-100H24D-E27-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **3200cd**
Luminous Flux **530lm**
Operating Temp. **-30°C to +40°C**
Length **102mm** Diameter **96mm Ø** Weight **241g**
Dimming format **4-step**
Cap **E27**



m	Lux	Ø cm
0.5	12800	21
1	3200	43
1.5	1422	64
2	800	85

Beam angle = 24°

MARNI

PAR30L

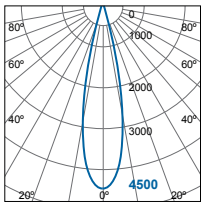
The LED PAR30L Reflector Series is optimised for a long lifetime of 40,000 hours to lower maintenance costs and provides the highest luminance comparable to its metal halide counterparts. It delivers desirable lighting performance of up to 4500cd with only 15W power consumption, which is the best replacement for 20W metal halide.

- Instant start capable – reaches the declared colour temperature at the time of switching on, while metal halides deliver greenish colour when starting up
- Hot re-strike capable
- Eliminates the risk of potential exposure to UV and radioactive Kr85 in case of lamp breakage
- Capable for linear dimming from 100% to 1%
- Lifetime 40,000 hours which is more than 3 times longer than equivalent metal halides
- High colour rendering of up to Ra85
- 70% lumen maintenance (L70) at 50,000 hours
- LED constant current converter is required

PAR30L requiring
LED Converter
Dimmable (Linear)

wattage	*halogen equivalent*	beam	colour temperature	item no.
15W	*(20W)*	**25°**	2800K Ra80	**ER0815-20M25D-E27-2800K**
15W	*(20W)*	**25°**	4000K Ra85	**ER0815-20M25D-E27-4000K**

Voltage **DC40V**
Rated life **40,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **4500cd**
Luminous Flux **860lm**
Operating Temp. **-30°C to +40°C**
Length **116mm** Diameter **95mm Ø** Weight **353g**
Dimming format **100-1%**
Cap **E27**



m	Lux	Ø cm
0.5	18000	22
1	4500	44
1.5	2000	67
2	1125	89

Beam angle = 25°

LED Converter Options (DC1-10V dimming)

LD0115x1v-C380

Main Input Voltage **AC220-240V**
Input Voltage Range **120-240V**
Output Voltage **DC40V**
Lamp Wattage **15W**
Output Current **380mA**
Lifetime **50,000hrs**

Operating Temp. **-30°C to +40°C**
Power Factor **>0.9**
Max. System Wattage **20W**
Length/Width/Height **147x50x32mm**
Weight **133g**

PAR30S

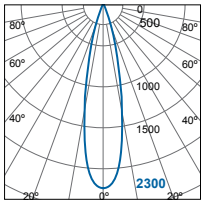
The LED PAR30S Reflector Series has been specifically designed as a direct retrofit in size and shape to its popular Halogen equivalent. The series delivers a supreme light output of up to 2300cd with only 12W power consumption at a 30° beam angle.

- Long rated life of 30,000 hours
- High colour rendering up to Ra85
- Best energy efficient replacement for 75W Halogen PAR30S
- Linear dimming 100% to 10%
- 70% lumen maintenance (L70) at 50,000 hours
- Significant energy saving of 84% and low maintenance costs

PAR30S Line Voltage Dimmable (Linear)

wattage	*halogen equivalent*	beam	colour temperature	item no.
12W	*(75W)*	**30°**	2800K Ra82	**LR1412d-75H30D-E27-2800K-230V**
12W	*(75W)*	**30°**	4000K Ra85	**LR1412d-75H30D-E27-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **2300cd**
Luminous Flux **600lm**
Operating Temp. **-30°C to +40°C**
Length **95mm** Diameter **88mm Ø** Weight **276g**
Dimming format **100-10%**
Cap **E27**



m	Lux	Ø cm
0.5	6400	27
1	2300	54
1.5	711	80
2	400	107

Beam angle = 30°

PAR38

With a powerful luminous intensity, LED PAR38 15W and 20W reflectors are the perfect replacements for 75W halogen and 25W metal halides to illuminate extensive areas.

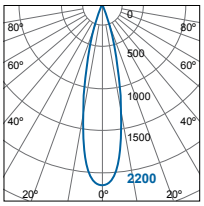
- Powerful luminous intensity of up to 6800cd; provides a true replacement for 75W halogen PAR38 and 25W metal halide PAR38 by 15W and 20W versions
- Linear dimming and DorS dimming versions available
- Lifetime of 30,000 hours, which is 3 times longer than equivalent metal halides
- Instant start capable – reaches the declared colour temperature at the time of switching on, while metal halides deliver greenish colour when starting up
- Hot restrike capable
- 70% lumen maintenance (L70) at 50,000 hours
- Eliminates the risk of potential exposure to UV and radioactive Kr85 in case of lamp breakage

PAR38 Line Voltage Standard

30° E27

wattage	halogen equivalent	beam	colour temperature	item no.
15W	*(75W)*	**30°**	2800K Ra82	**LR0915-75H30D-E27-2800K-230V**
15W	*(75W)*	**30°**	4000K Ra85	**LR0915-75H30D-E27-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **2200cd**
Luminous Flux **630lm**
Operating Temp. **-30°C to +40°C**
Length **133mm** Diameter **121mm Ø** Weight **458g**
Cap **E27**



m	Lux	Ø cm
0.5	8800	27
1	2200	54
1.5	978	80
2	550	107

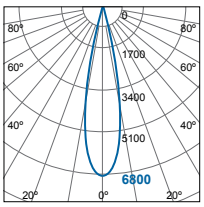
Beam angle = 30°

PAR38 Line Voltage Standard

25° 45° E27

wattage	metal halide equivalent	beam	colour temperature	item no.
20W	*(25W)*	**25°**	2800K Ra85	**LR0920-25M25D-E27-2800K-230V**
20W	*(25W)*	**25°**	4000K Ra92	**LR0920-25M25D-E27-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **6800cd**
Luminous Flux **1200lm**
Operating Temp. **-30°C to +40°C**
Length **133mm** Diameter **121mm Ø** Weight **485g**
Cap **E27**

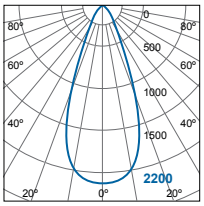


m	Lux	Ø cm
0.5	27200	22
1	6800	44
1.5	3022	67
2	1700	89

Beam angle = 25°

wattage	metal halide equivalent	beam	colour temperature	item no.
20W	*(25W)*	**45°**	2800K Ra85	**LR0920-25M45D-E27-2800K-230V**
20W	*(25W)*	**45°**	4000K Ra92	**LR0920-25M45D-E27-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **2200cd**
Luminous Flux **1200lm**
Operating Temp. **-30°C to +40°C**
Length **133mm** Diameter **121mm Ø** Weight **485g**
Cap **E27**



m	Lux	Ø cm
0.5	8800	41
1	2200	83
1.5	978	124
2	550	166

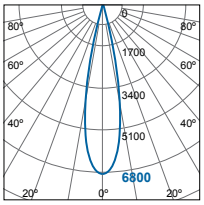
Beam angle = 45°

PAR38 Line Voltage Dimmable (Linear)

10 + 25° E27

wattage	metal halide equivalent	beam	colour temperature	item no.
20W	*(25W)*	**25°**	2800K Ra85	**LR0920d-25M25D-E27-2800K-230V**
20W	*(25W)*	**25°**	4000K Ra92	**LR0920d-25M25D-E27-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **6800cd**
Luminous Flux **1200lm**
Operating Temp. **-30°C to +40°C**
Length **133mm** Diameter **121mm Ø** Weight **485g**
Dimming format **100-10%**
Cap **E27**



m	Lux	Ø cm
0.5	27200	22
1	6800	44
1.5	3022	67
2	1700	89

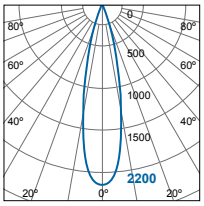
Beam angle = 25°

PAR38 Line Voltage Dimmable (DorS)

- + 30° E27

wattage	halogen equivalent	beam	colour temperature	item no.
15W	*(75W)*	**30°**	2800K Ra85	**LR0915s-75H30D-E27-2800K-230V**
15W	*(75W)*	**30°**	4000K Ra92	**LR0915s-75H30D-E27-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **2200cd**
Luminous Flux **630lm**
Operating Temp. **-30°C to +40°C**
Length **133mm** Diameter **121mm Ø** Weight **464g**
Dimming format **4-step**
Cap **E27**



m	Lux	Ø cm
0.5	8800	27
1	2200	54
1.5	978	80
2	550	107

Beam angle = 30°

GX53

The LED GX53 Reflector Series has an ultra slim profile, which provides an innovative solution for slim surface mounted luminaires and recessed fittings that have long been haunted by blazing-heat halogens, causing overheating, discoloration and deformation to furniture and display items.

- Integral LED cabinet lighting with GX53 lamp base
- Ultra slim profile: lamp length is only 25mm
- High luminous efficacy: 70lm/W
- Long rated life of 30,000 hours
- High colour rendering of up to Ra85
- 70% lumen maintenance (L70) at 50,000 hours

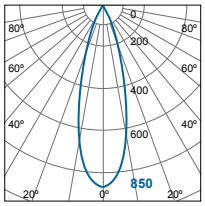
Pringles

GX53

GX53 Line Voltage
Standard

wattage	beam	colour temperature	item no.
5W	**30°**	2800K Ra82	**LR1305-30D-GX53-2800K-230V**
5W	**30°**	4000K Ra85	**LR1305-30D-GX53-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **850cd**
Luminous Flux **350lm**
Operating Temp. **-30°C to +40°C**
Length **25mm** Diameter **75mm Ø** Weight **82g**
Cap **GX53**

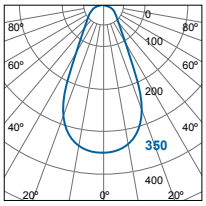


m	Lux	Ø cm
0.5	3400	58
1	850	115
1.5	378	173
2	213	231

Beam angle = 30°

wattage	beam	colour temperature	item no.
5W	**60°**	2800K Ra82	**LR1305-60D-GX53-2800K-230V**
5W	**60°**	4000K Ra85	**LR1305-60D-GX53-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **350cd**
Luminous Flux **350lm**
Operating Temp. **-30°C to +40°C**
Length **25mm** Diameter **75mm Ø** Weight **82g**
Cap **GX53**



m	Lux	Ø cm
0.5	1400	58
1	350	115
1.5	156	173
2	88	231

Beam angle = 60°

AR111

With the same high quality light intensity and colour rendering of traditional AR111 spotlights (colour rendering of up to Ra92), but with no UV and negligible IR light radiation or residual glare, the LED AR111 range is ideal for use in any retail outlet, reception area, hotel, restaurant, gallery or residential application.

In addition, selected products in the MEGAMAN® LED AR111 range can be used with the majority of AC/DC12V halogen transformers, making them a viable option in most retrofit applications.

- Perfect replacement for 35W and 50W halogen AR111 by 10W and 15W versions
- Linear dimming from 100% to 1% and DorS dimming versions available
- High colour rendering of up to Ra92
- Impressive 40,000 hours rated life reduces re-lamping costs
- Instant start capable – reaches the declared colour temperature at the time of switching on, while metal halides deliver greenish colour when starting up
- Hot re-strike capable
- Eliminates the risk of potential exposure to UV and radioactive Kr85 in case of lamp breakage

Please visit www.megamanligting.com/RHT for the list of recommended halogen transformers

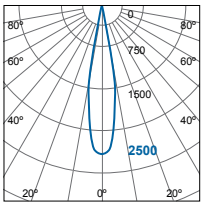
e Cons

AR111

AR111 Line Voltage Standard

wattage	*halogen equivalent*	beam	colour temperature	item no.
10W	*(35W)*	**24°**	2800K Ra85	**LR0110-35H24D-GU10-2800K-230V**
10W	*(35W)*	**24°**	4000K Ra92	**LR0110-35H24D-GU10-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **30,000hrs**
Max. Luminous Intensity **2500cd**
Luminous Flux **300lm**
Operating Temp. **-30°C to +40°C**
Length **94mm** Diameter **111mm Ø** Weight **245g**
Cap **GU10**

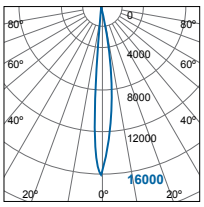


m	Lux	Ø cm
0.5	10000	21
1	2500	43
1.5	1111	64
2	625	85

Beam angle = 24°

wattage	*halogen equivalent*	beam	colour temperature	item no.
15W	*(50W)*	**8°**	2800K Ra82	**LR0815-50H08D-GU10-2800K-230V**
15W	*(50W)*	**8°**	4000K Ra85	**LR0815-50H08D-GU10-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **16000cd**
Luminous Flux **450lm**
Operating Temp. **-30°C to +40°C**
Length **94mm** Diameter **111mm Ø** Weight **264g**
Cap **GU10**

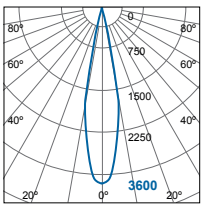


m	Lux	Ø cm
0.5	64000	7
1	16000	14
1.5	7111	21
2	4000	28

Beam angle = 8°

wattage	*halogen equivalent*	beam	colour temperature	item no.
15W	*(50W)*	**24°**	2800K Ra82	**LR0115-50H24D-GU10-2800K-230V**
15W	*(50W)*	**24°**	4000K Ra85	**LR0115-50H24D-GU10-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **3600cd**
Luminous Flux **530lm**
Operating Temp. **-30°C to +40°C**
Length **94mm** Diameter **111mm Ø** Weight **245g**
Cap **GU10**

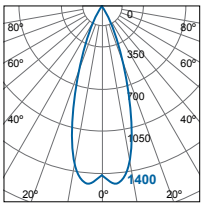


m	Lux	Ø cm
0.5	14400	21
1	3600	43
1.5	1600	64
2	900	85

Beam angle = 24°

wattage	*halogen equivalent*	beam	colour temperature	item no.
15W	*(50W)*	**45°**	2800K Ra82	**LR0615-50H45D-GU10-2800K-230V**
15W	*(50W)*	**45°**	4000K Ra85	**LR0615-50H45D-GU10-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **1400cd**
Luminous Flux **570lm**
Operating Temp. **-30°C to +40°C**
Length **94mm** Diameter **111mm Ø** Weight **236g**
Cap **GU10**



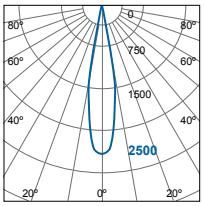
m	Lux	Ø cm
0.5	5600	41
1	1400	83
1.5	622	124
2	350	166

Beam angle = 45°

AR111 Line Voltage Dimmable (DorS)

wattage	*halogen equivalent*	beam	colour temperature	item no.
10W	*(35W)*	**24°**	2800K Ra82	**LR0110s-35H24D-GU10-2800K-230V**
10W	*(35W)*	**24°**	4000K Ra85	**LR0110s-35H24D-GU10-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **30,000hrs**
Max. Luminous Intensity **2500cd**
Luminous Flux **300lm**
Operating Temp. **-30°C to +40°C**
Length **94mm** Diameter **111mm Ø** Weight **245g**
Dimming format **4-Step**
Cap **GU10**

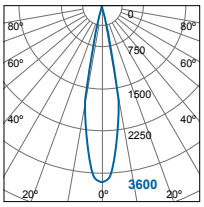


m	Lux	Ø cm
0.5	10000	21
1	2500	43
1.5	1111	64
2	625	85

Beam angle = 24°

wattage	*halogen equivalent*	beam	colour temperature	item no.
15W	*(50W)*	**24°**	2800K Ra82	**LR0115s-50H24D-GU10-2800K-230V**
15W	*(50W)*	**24°**	4000K Ra85	**LR0115s-50H24D-GU10-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **3600cd**
Luminous Flux **530lm**
Operating Temp. **-30°C to +40°C**
Length **94mm** Diameter **111mm Ø** Weight **249g**
Dimming format **4-Step**
Cap **GU10**



m	Lux	Ø cm
0.5	14400	21
1	3600	43
1.5	1600	64
2	900	85

Beam angle = 24°

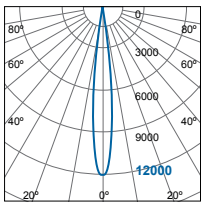
AR111

AR111 requiring Halogen Transformer*
Standard

wattage	*halogen equivalent*	beam	colour temperature	item no.
11W	*(50W)*	**8°**	2800K Ra82	**ER1211-50H08D-G53-2800K-12V**
11W	*(50W)*	**8°**	4000K Ra85	**ER1211-50H08D-G53-4000K-12V**

8° 24° 45° G53

Voltage **12V**
Rated life **40,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **12000cd**
Luminous Flux **450lm**
Operating Temp. **-30°C to +40°C**
Length **83mm** Diameter **111mm Ø** Weight **267g**
Cap **G53**

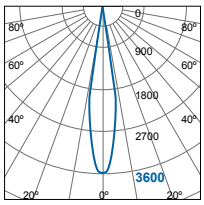


m	Lux	Ø cm
0.5	48000	7
1	12000	14
1.5	5333	21
2	3000	28

Beam angle = 8°

wattage	*halogen equivalent*	beam	colour temperature	item no.
11W	*(50W)*	**24°**	2800K Ra82	**ER1111-50H24D-G53-2800K-12V**
11W	*(50W)*	**24°**	4000K Ra85	**ER1111-50H24D-G53-4000K-12V**

Voltage **12V**
Rated life **40,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **3600cd**
Luminous Flux **530lm**
Operating Temp. **-30°C to +40°C**
Length **83mm** Diameter **111mm Ø** Weight **282g**
Cap **G53**

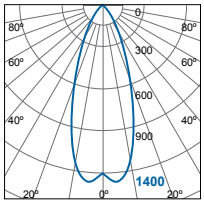


m	Lux	Ø cm
0.5	14400	21
1	3600	43
1.5	1600	64
2	900	85

Beam angle = 24°

wattage	*halogen equivalent*	beam	colour temperature	item no.
11W	*(50W)*	**45°**	2800K Ra82	**ER1311-50H45D-G53-2800K-12V**
11W	*(50W)*	**45°**	4000K Ra85	**ER1311-50H45D-G53-4000K-12V**

Voltage **12V**
Rated life **40000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **1400cd**
Luminous Flux **570lm**
Operating Temp. **-30°C to +40°C**
Length **83mm** Diameter **111mm Ø** Weight **265g**
Cap **G53**



m	Lux	Ø cm
0.5	5600	41
1	1400	83
1.5	622	124
2	350	166

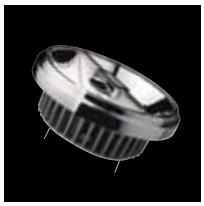
Beam angle = 45°

* Please visit www.megamanlighting.com/RHT for the list of recommended halogen transformer.

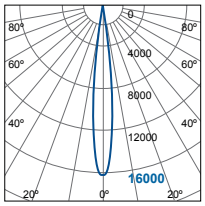
AR111

AR111 requiring
LED Converter
Dimmable (Linear)

wattage	*halogen equivalent*	beam	colour temperature	item no.
10W	*(50W)*	**8°**	2800K Ra82	**ER0210-50H08D-G53-2800K**
10W	*(50W)*	**8°**	4000K Ra85	**ER0210-50H08D-G53-4000K**



Voltage **DC20V**
Rated life **40,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **16000cd**
Luminous Flux **450lm**
Operating Temp. **-30°C to +40°C**
Length **63mm** Diameter **111mm Ø** Weight **189g**
Dimming format **100-1%**
Cap **G53**

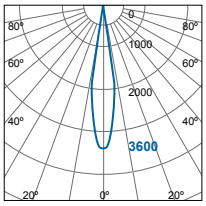


m	Lux	Ø cm
0.5	64000	7
1	16000	14
1.5	7111	21
2	4000	28

Beam angle = 8°

wattage	*halogen equivalent*	beam	colour temperature	item no.
10W	*(50W)*	**24°**	2800K Ra82	**ER0110-50H24D-G53-2800K**
10W	*(50W)*	**24°**	4000K Ra85	**ER0110-50H24D-G53-4000K**

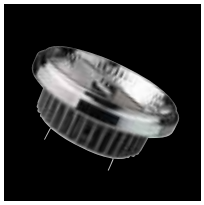
Voltage **DC20V**
Rated life **40,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **3600cd**
Luminous Flux **530lm**
Operating Temp. **-30°C to +40°C**
Length **63mm** Diameter **111mm Ø** Weight **180g**
Dimming format **100-1%**
Cap **G53**



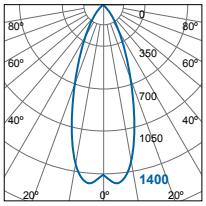
m	Lux	Ø cm
0.5	14400	21
1	3600	43
1.5	1600	64
2	900	85

Beam angle = 24°

wattage	*halogen equivalent*	beam	colour temperature	item no.
10W	*(50W)*	**45°**	2800K Ra82	**ER0310-50H45D-G53-2800K**
10W	*(50W)*	**45°**	4000K Ra85	**ER0310-50H45D-G53-4000K**



Voltage **DC20V**
Rated life **40,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **1400cd**
Luminous Flux **570lm**
Operating Temp. **-30°C to +40°C**
Length **63mm** Diameter **111mm Ø** Weight **165g**
Dimming format **100-1%**
Cap **G53**



m	Lux	Ø cm
0.5	5600	41
1	1400	83
1.5	622	124
2	350	166

Beam angle = 45°

LED Converter Options (DC1-10V dimming)

LD0310x1v-C500

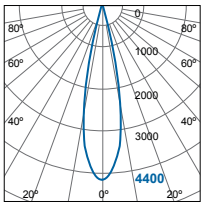
Main Input Voltage **220-240V**
Input Voltage Range **120-240V**
Output Voltage **DC20V**
Lamp Wattage **10W**
Output Current **500mA**
Lifetime **50,000hrs**

Operating Temp. **-30°C to +40°C**
Power Factor **>0.9**
Max. System Wattage **13W**
Length/Width/Height **147x50x32mm**
Weight **133g**

AR111 requiring
LED Converter
Dimmable (Linear)

wattage	*metal halide alternative*	beam	colour temperature	item no.
16W	*(20W)*	**24°**	2800K Ra82	**ER0716-20M24D-GX8.5-2800K**
16W	*(20W)*	**24°**	4000K Ra85	**ER0716-20M24D-GX8.5-4000K**

Voltage **DC20V**
Rated life **40,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **4400cd**
Luminous Flux **800lm**
Operating Temp. **-30°C to +40°C**
Length **79mm** Diameter **111mm Ø** Weight **232g**
Dimming format **100-1%**
Cap **GX8.5**



m	Lux	Ø cm
0.5	17600	21
1	4400	43
1.5	1956	64
2	1100	85

Beam angle = 24°

LED Converter Options (DC1-10V dimming)

LD0116x1v-C770

Main Input Voltage **220-240V**
Input Voltage Range **180-260V**
Output Voltage **DC20V**
Lamp Wattage **16W**
Output Current **770mA**
Lifetime **50,000hrs**

Operating Temp. **-30°C to +40°C**
Power Factor **>0.9**
Max. System Wattage **21W**
Length/Width/Height **147x50x32mm**
Weight **133g**

MR16

The MR16-compatible LED Reflector Series offer excellent lighting performance, heat dissipation and lumen maintenance thanks to the patented Thermal Conductive Highway™ (TCH) technology.

Designed for use in standard MR16 applications, the 6W LED MR16 Reflector Series provides the ideal solution for high quality accent lighting.

The LED MR16 reflectors in 8W and 10W deliver supreme light output of up to 5000cd and are perfect substitutes for the 35W and 50W halogen respectively.

In addition, the 6W and 8W LED MR16 works with most conventional AC/DC12V halogen transformers commonly found on the market, making it the perfect energy efficient spot or down-lighting solution for a variety of new and retrofit retail applications.

- 6W version delivers supreme light output up to 1700cd which is an ideal alternative to the 50W halogen MR16
- Excellent in colour rendering of up to Ra85
- 8W and 10W versions capable of linear dimming from 100% to 1%
- Long rated life of up to 30,000 hours
- Alternative to halogen transformer is LED constant voltage converter, applicable model from MEGAMAN® is LD0106-K12

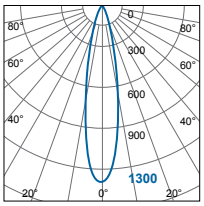
Please visit www.megamanlighting.com/RHT for the list of recommended halogen transformers.

MR16

MR16 requiring Halogen Transformer* Standard

wattage	*halogen equivalent*	beam	colour temperature	item no.	
6W	*(35W)*	**24°**	2800K Ra82	**ER1006-35H24D-GU5.3-2800K-12V**	
6W	*(35W)*	**24°**	4000K Ra85	**ER1006-35H24D-GU5.3-4000K-12V**	

Voltage **12V**
Rated life **25,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **1300cd**
Luminous Flux **240lm**
Operating Temp. **-30°C to +40°C**
Length **50mm** Diameter **51mm Ø** Weight **60g**
Cap **GU5.3**

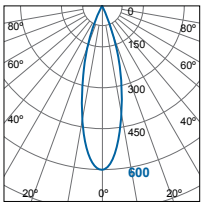


m	Lux	Ø cm
0.5	5200	21
1	1300	43
1.5	578	64
2	325	85

Beam angle = 24°

wattage	*halogen equivalent*	beam	colour temperature	item no.	
6W	*(35W)*	**36°**	2800K Ra82	**ER1006-35H36D-GU5.3-2800K-12V**	
6W	*(35W)*	**36°**	4000K Ra85	**ER1006-35H36D-GU5.3-4000K-12V**	

Voltage **12V**
Rated life **25,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **600cd**
Luminous Flux **240lm**
Operating Temp. **-30°C to +40°C**
Length **50mm** Diameter **51mm Ø** Weight **60g**
Cap **GU5.3**



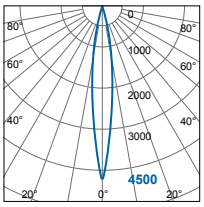
m	Lux	Ø cm
0.5	2400	32
1	600	65
1.5	267	97
2	150	130

Beam angle = 36°

MR16 requiring Halogen Transformer* Dimmable (Linear)

wattage	*halogen equivalent*	beam	colour temperature	item no.	
8W	*(35W)*	**12°**	2800K Ra82	**ER1908d-35H12D-GU5.3-2800K-12V†**	
8W	*(35W)*	**12°**	4000K Ra85	**ER1908d-35H12D-GU5.3-4000K-12V†**	

Voltage **12V**
Rated life **25,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **4500cd**
Luminous Flux **400lm**
Operating Temp. **-30°C to +40°C**
Length **62mm** Diameter **50mm Ø** Weight **102g**
Dimming format **100-10%**
Cap **GU5.3**

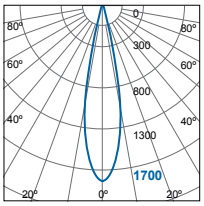


m	Lux	Ø cm
0.5	18000	11
1	4500	21
1.5	2000	32
2	1125	42

Beam angle = 12°

wattage	*halogen equivalent*	beam	colour temperature	item no.	
8W	*(50W)*	**24°**	2800K Ra82	**ER1708d-50H24D-GU5.3-2800K-12V†**	
8W	*(50W)*	**24°**	4000K Ra85	**ER1708d-50H24D-GU5.3-4000K-12V†**	

Voltage **12V**
Rated life **25,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **1700cd**
Luminous Flux **400lm**
Operating Temp. **-30°C to +40°C**
Length **56mm** Diameter **50mm Ø** Weight **92g**
Dimming format **100-10%**
Cap **GU5.3**

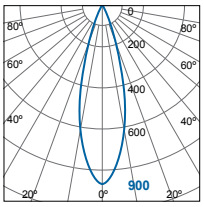


m	Lux	Ø cm
0.5	7200	21
1	1700	43
1.5	800	64
2	450	85

Beam angle = 24°

wattage	*halogen equivalent*	beam	colour temperature	item no.	
8W	*(50W)*	**36°**	2800K Ra82	**ER1708d-50H36D-GU5.3-2800K-12V†**	
8W	*(50W)*	**36°**	4000K Ra85	**ER1708d-50H36D-GU5.3-4000K-12V†**	

Voltage **12V**
Rated life **25,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **900cd**
Luminous Flux **400lm**
Operating Temp. **-30°C to +40°C**
Length **56mm** Diameter **50mm Ø** Weight **60g**
Dimming format **100-10%**
Cap **GU5.3**



m	Lux	Ø cm
0.5	3600	32
1	900	65
1.5	400	97
2	225	130

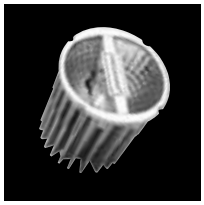
Beam angle = 36°

* Please visit www.megamanlighting.com/RHT for the list of recommended halogen transformer.
† Preliminary data

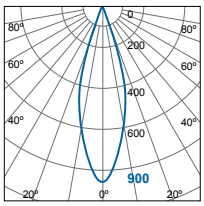
Please contact your MEGAMAN®'s representative for the extended range of MR16 requiring Halogen Transformer, Standard light sources which provide a true retrofit solutions in size and shape.

MR16 requiring
LED Converter
Dimmable (Linear)

wattage	*halogen equivalent*	beam	colour temperature	item no.
8W	*(35W)*	**36°**	2800K Ra82	**ER0408-35H36D-GU5.3-2800K**
8W	*(35W)*	**36°**	4000K Ra85	**ER0408-35H36D-GU5.3-4000K**



Voltage **DC20V**
Rated life **30,000hrs** | L70 life **40,000hrs**
Max. Luminous Intensity **900cd**
Luminous Flux **400lm**
Operating Temp. **-30°C to +40°C**
Length **74mm** Diameter **50mm Ø** Weight **105g**
Dimming format **100-1%**
Cap **GU5.3**



m	Lux	Ø cm
0.5	3600	32
1	900	65
1.5	400	97
2	225	130

Beam angle = 36°

LED Converter Options (DC1-10V dimming)

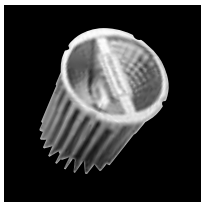
LD0108x1v-C420

Main Input Voltage **AC120-240V**
Input Voltage Range **120-240V**
Output Voltage **DC20V**
Lamp Wattage **8W**
Output Current **420mA**
Lifetime **50,000 hrs**

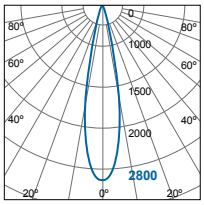
Operating Temp. **-30°C to +40°C**
Power Factor **>0.9**
Max. System Wattage **11W**
Length/Width/Height **147x50x32mm**
Weight **129g**

MR16 requiring
LED Converter
Dimmable (Linear)

wattage	*halogen equivalent*	beam	colour temperature	item no.
10W	*(50W)*	**24°**	2800K Ra82	**ER0510-50H24D-GU5.3-2800K**
10W	*(50W)*	**24°**	4000K Ra85	**ER0510-50H24D-GU5.3-4000K**



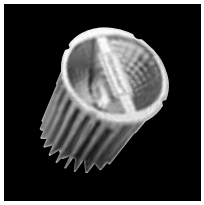
Voltage **DC20V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **2800cd**
Luminous Flux **500lm**
Operating Temp. **-30°C to +40°C**
Length **82mm** Diameter **50mm Ø** Weight **123g**
Dimming format **100-1%**
Cap **GU5.3**



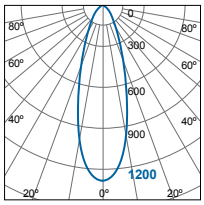
m	Lux	Ø cm
0.5	11200	21
1	2800	43
1.5	1244	64
2	700	85

Beam angle = 24°

wattage	*halogen equivalent*	beam	colour temperature	item no.
10W	*(50W)*	**36°**	2800K Ra82	**ER0510-50H36D-GU5.3-2800K**
10W	*(50W)*	**36°**	4000K Ra85	**ER0510-50H36D-GU5.3-4000K**



Voltage **DC20V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **1200cd**
Luminous Flux **510lm**
Operating Temp. **-30°C to +40°C**
Length **82mm** Diameter **50mm Ø** Weight **123g**
Dimming format **100-1%**
Cap **GU5.3**



m	Lux	Ø cm
0.5	4800	32
1	1200	65
1.5	533	97
2	300	130

Beam angle = 36°

LED Converter Options (DC1-10V dimming)

LD0110x1v-C460

Main Input Voltage **AC120-240V**
Input Voltage Range **120-240V**
Output Voltage **DC20V**
Lamp Wattage **10W**
Output Current **460mA**
Lifetime **50,000 hrs**

Operating Temp. **-30°C to +40°C**
Power Factor **>0.9**
Max. System Wattage **13W**
Length/Width/Height **147x50x32mm**
Weight **129g**

LD0210x1v-C460

Main Input Voltage **AC220-240V**
Input Voltage Range **180-260V**
Output Voltage **DC20V**
Lamp Wattage **10W**
Output Current **460mA**
Lifetime **50,000 hrs**

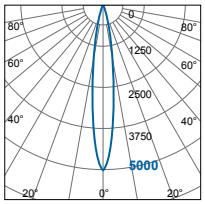
Operating Temp. **-30°C to +40°C**
Power Factor **>0.5**
Max. System Wattage **13W**
Length/Width/Height **116x55x25mm**
Weight **96g**

MR16

MR16 requiring LED Converter Dimmable (Linear)

wattage	*halogen equivalent*	beam	colour temperature	item no.
10W	*(50W)*	**12°**	2800K Ra82	**ER1810-50H12D-GU5.3-2800K-20V†**
10W	*(50W)*	**12°**	4000K Ra85	**ER1810-50H12D-GU5.3-4000K-20V†**

Voltage **DC20V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **5000cd**
Luminous Flux **580lm**
Operating Temp. **-30°C to +40°C**
Length **84mm** Diameter **50mm Ø** Weight **109g**
Dimming format **100-1%**
Cap **GU5.3**



m	Lux	Ø cm
0.5	20000	11
1	5000	21
1.5	2222	32
2	1250	42

Beam angle = 12°

LED Converter Options (DC1-10V dimming)

LD0110x1v-C460

Main Input Voltage **AC120-240V**
Input Voltage Range **120-240V**
Output Voltage **DC20V**
Lamp Wattage **10W**
Output Current **460mA**
Lifetime **50,000 hrs**

Operating Temp. **-30°C to +40°C**
Power Factor **>0.9**
Max. System Wattage **13W**
Length/Width/Height **147x50x32mm**
Weight **129g**

LD0210x1v-C460

Main Input Voltage **AC220-240V**
Input Voltage Range **180-260V**
Output Voltage **DC20V**
Lamp Wattage **10W**
Output Current **460mA**
Lifetime **50,000 hrs**

Operating Temp. **-30°C to +40°C**
Power Factor **>0.5**
Max. System Wattage **13W**
Length/Width/Height **116x55x25mm**
Weight **96g**

† Preliminary data

Candle

Designed as an exact replacement to incandescent candles, the LED Candle Series resembles point-source similar to that of a filament in an incandescent candle lamp which generates a sparkling effect to the surrounding fixture.

The LED Candle in 5W delivers 240 lumen light output and a high CRI of 80, all at a size equivalent to a 24W incandescent candle. Its unique heat sink design allows for heat dissipation as the Candle LED omits considerably less heat than an equivalent incandescent lamp.

- Delivers a long rated life up to 30,000 hours
- Extremely light in weight
- Consumes 1/5 of energy and produces much less heat during operation compared to traditional incandescent alternatives
- Option of finishing available to cater for different applications
- 70% lumen maintenance (L70) at 50,000 hours
- Capable for linear dimming from 100% to 10%

Candle

Candle Standard	wattage	*incandescent equivalent*	colour temperature	item no.	E14	E27
	4W **4W**	*(14W)* *(14W)*	2700K Ra85 4000K Ra88	**LC0104CS-E14-2700K-230V** **LC0104CS-E14-4000K-230V** Voltage **220-240V** Rated life **30,000 hrs** | L70 life **50,000hrs** Luminous Flux **127lm** Operating Temp. **-30 to +40°C** Length **99mm** Diameter **37mm** Weight **52g** Glass Finishing **Smooth glass** Cap **E14** Energy Label **A**		
	4W **4W**	*(14W)* *(14W)*	2700K Ra85 4000K Ra88	**LC0104CS-E27-2700K-230V** **LC0104CS-E27-4000K-230V** Voltage **220-240V** Rated life **30,000 hrs** | L70 life **50,000hrs** Luminous Flux **127lm** Operating Temp. **-30 to +40°C** Length **99mm** Diameter **37mm** Weight **54g** Glass Finishing **Smooth glass** Cap **E27** Energy Label **A**		
	5W **5W**	*(25W)* *(25W)*	2700K Ra80 4000K Ra80	**LC0105CS/SE-E14-2700K-230V** **LC0105CS/SE-E14-4000K-230V** Voltage **220-240V** Rated life **30,000 hrs** | L70 life **50,000hrs** Luminous Flux **210lm** Operating Temp. **-30°C to +40°C** Length **99mm** Diameter **37mm Ø** Weight **53g** Glass Finishing **Smooth glass with silicone protection** Cap **E14** Energy Label **A**		
	5W **5W**	*(25W)* *(25W)*	2700K Ra80 4000K Ra80	**LC0105CS/SE-E27-2700K-230V** **LC0105CS/SE-E27-4000K-230V** Voltage **220-240V** Rated life **30,000 hrs** | L70 life **50,000hrs** Luminous Flux **210lm** Operating Temp. **-30°C to +40°C** Length **99mm** Diameter **37mm Ø** Weight **55g** Glass Finishing **Smooth glass with silicone protection** Cap **E27** Energy Label **A**		

Candle

Candle Dimmable (Linear)	wattage	*incandescent equivalent*	colour temperature	item no.	10 +	E14
	5W	*(24W)*	2700K Ra80	**LC0305dCSv2-E14-2800K-230V^**		
	5W	*(24W)*	4000K Ra80	**LC0305dCSv2-E14-4000K-230V^**		
				Voltage **220-240V** Rated life **25,000 hrs** | L70 life **50,000hrs** Luminous Flux **240lm** Operating Temp. **-30°C to +40°C** Length **113mm** Diameter **41mm Ø** Weight **77g** Dimming format **100-10%** Glass Finishing **Smooth glass** Cap **E14** Energy Label **A**		
	5W	*(24W)*	2700K Ra80	**LC0305dOPv2-E14-2800K-230V^**		
	5W	*(24W)*	4000K Ra80	**LC0305dOPv2-E14-4000K-230V^**		
				Voltage **220-240V** Rated life **25,000 hrs** | L70 life **50,000hrs** Luminous Flux **240lm** Operating Temp. **-30°C to +40°C** Length **117mm** Diameter **40mm Ø** Weight **77g** Dimming format **100-10%** Glass Finishing **Opal** Cap **E14** Energy Label **A**		

^ Housing in chrome version is available.

Classic

Thanks to the unique patented heat sink design, the LED Classic range minimises heat sink material for a glamorous and sleek classic shape with a compact housing. The LED Classic delivers an even light distribution and traditional feel to an incandescent lamps. Ideal for a variety of general lighting applications such as hotels, restaurants, offices, corridors, dining rooms and lounges.

- Ideal alternatives to the 60W incandescent bulbs
- Incredible light output up to 810lm with only 11W power consumption
- Long rated life of 30,000 hours, 30 times longer than incandescent bulbs
- Even light distribution: 330° illumination
- Extremely light in weight
- Allows fitting into almost any lighting fixture
- 70% lumen maintenance (L70) at 50,000 hours
- Capable for linear dimming from 100% to 10%

Classic

Classic – A60
Dimmable (Linear)

10 + E27

wattage	*incandescent equivalent*	colour temperature	item no.
8W	*(38W)*	2800K Ra80	**LG0408dOPv2-E27-2800K-230V**
8W	*(38W)*	4000K Ra80	**LG0408dOPv2-E27-4000K-230V**

Voltage **220-240V**
Rated life **25,000 hrs** | L70 life **50,000hrs**
Luminous Flux **420lm**
Operating Temp. **-30°C to +40°C**
Length **118mm** Diameter **60mm Ø** Weight **101g**
Dimming format **100-10%**
Glass finishing **Opal**
Cap **E27** Energy Label **A**

Classic – A65
Dimmable (Linear)

10 + E27

wattage	*incandescent equivalent*	colour temperature	item no.
11W	*(60W)*	2800K Ra80	**LG0911dOP-E27-2800K-230V**
11W	*(60W)*	4000K Ra80	**LG0911dOP-E27-4000K-230V**

Voltage **220-240V**
Rated life **30,000 hrs** | L70 life **50,000hrs**
Luminous Flux **810lm**
Operating Temp. **-30°C to +40°C**
Length **127mm** Diameter **65mm Ø** Weight **144g**
Dimming format **100-10%**
Glass finishing **Opal**
Cap **E27** Energy Label **A**

Classic

Classic – Globe Dimmable (Linear)	wattage	*incandescent equivalent*	colour temperature	item no.	10 +	E27
	8W	*(38W)*	2800K Ra82	**LG0708dOPv2-E27-2800K-230V**		
	8W	*(38W)*	4000K Ra85	**LG0708dOPv2-E27-4000K-230V**		
				Voltage **220-240V** Rated life **25,000 hrs** | L70 life **50,000hrs** Luminous Flux **420lm** Operating Temp. **-30°C to +40°C** Length **129mm** Diameter **92mm Ø** Weight **210g** Dimming format **100-10%** Glass finishing **Opal** Cap **E27** Energy Label **A**		
	8W	*(38W)*	2800K Ra80	**LG0808dOPv2-E27-2800K-230V**		
	8W	*(38W)*	4000K Ra80	**LG0808dOPv2-E27-4000K-230V**		
				Voltage **220-240V** Rated life **25,000 hrs** | L70 life **50,000hrs** Luminous Flux **420lm** Operating Temp. **-30°C to +40°C** Length **165mm** Diameter **120mm Ø** Weight **215g** Dimming format **100-10%** Glass finishing **Opal** Cap **E27** Energy Label **A**		
	14W	*(60W)*	2800K Ra80	**LG1014dOPv2-E27-2800K-230V**†		
	14W	*(60W)*	4000K Ra80	**LG1014dOPv2-E27-4000K-230V**†		
				Voltage **220-240V** Rated life **25,000 hrs** | L70 life **50,000hrs** Luminous Flux **810lm** Operating Temp. **-30°C to +40°C** Length **129mm** Diameter **92mm Ø** Weight **287g** Dimming format **100-10%** Glass finishing **Opal** Cap **E27** Energy Label **A**		
	14W	*(60W)*	2800K Ra80	**LG1114dOPv2-E27-2800K-230V**		
	14W	*(60W)*	4000K Ra80	**LG1114dOPv2-E27-4000K-230V**		
				Voltage **220-240V** Rated life **25,000 hrs** | L70 life **50,000hrs** Luminous Flux **810lm** Operating Temp. **-30°C to +40°C** Length **165mm** Diameter **120mm Ø** Weight **297g** Dimming format **100-10%** Glass finishing **Opal** Cap **E27** Energy Label **A**		

† Preliminary data

Classic

Classic – P45 Dimmable (Linear)	wattage	*incandescent equivalent*	colour temperature	item no.
	5W	*(24W)*	2800K Ra80	**LG0505dOPv2-E27-2800K-230V**
	5W	*(24W)*	4000K Ra80	**LG0505dOPv2-E27-4000K-230V**

10 +

E27

Voltage **220-240V**
Rated life **25,000 hrs** | L70 life **50,000hrs**
Luminous Flux **240lm**
Operating Temp. **-30°C to +40°C**
Length **92mm** Diameter **45mm Ø** Weight **55g**
Dimming format **100-10%**
Glass finishing **Opal**
Cap **E27** Energy Label **A**

LED Converter

LED Converter – Constant Voltage

- Tailor made for MEGAMAN® reflectors that are driven by halogen transformers
- Offers a service rated life of 50,000 hours
- Flicker-free operation with stable light output even with fluctuation of voltage supply
- Automatic restart capability when short-circuit or overload is absent
- Equipped with main harmonics reduced by an active harmonics filter
- Meets international standards for electromagnetic interference, which prevents disturbance to radio and medical equipment

LED Converter – Constant Current

- Offers a service rated life of 50,000 hours
- 100-1% dimming operation achievable with any common DC1-10V dimmer
- Flicker-free operation with stable light output even with fluctuation of voltage supply
- Automatic restart capability when short-circuit or overload is absent
- Equipped with main harmonics reduced by an active harmonics filter
- Meets international standards for electromagnetic interference, which prevents disturbance to radio and medical equipment

LED Converter Constant Voltage

mains input voltage (V)	input voltage range (V)	output voltage	maximum lamp wattage (W)	output (mA)	power factor (λ)	max. system wattage (W)	length (mm)	width (mm)	height (mm)	weight (g)	led lamps supported^	item no.
220-240	180-260	DC12V	6	500	>0.4	8	100	45	25	64	1	**LD0106-K12**

Ambient Temperature Range (Ta) **-30°C to + 40°C**
Maximum Casing Temperature (Tc) **85°C**
Rated Life **50,000 hrs**
Push in Terminals **0.75mm to 1.5mm**
Wire Preparation **8mm**
Fixing Bracket for Screws **M4**
Luminaire Protection **Class II**
With open circuit, short circuit and overload protection

LED Converter Constant Current

mains input voltage (V)	input voltage range (V)	output voltage	maximum lamp wattage (W)	output (mA)	power factor (λ)	max. system wattage (W)	length (mm)	width (mm)	height (mm)	weight (g)	led lamps supported^	item no.
120-240	120-240	DC20V	8	420	>0.9	11	147	50	32	129	2	**LD0108x1v-C420**
120-240	120-240	DC20V	10	460	>0.9	13	147	50	32	129	3, 4	**LD0110x1v-C460**
220-240	180-260	DC20V	10	460	>0.9	13	116	55	25	96	3, 4	**LD0210x1v-C460**
120-240	120-240	DC20V	10	500	>0.9	13	147	50	32	133	7, 8, 9	**LD0310x1v-C500**
120-240	100-240	DC20V	15	380	>0.9	20	147	50	32	133	5	**LD0115x1v-C380**
220-240	180-260	DC20V	16	770	>0.9	21	147	50	32	133	6	**LD0116x1v-C770**

Ambient Temperature Range (Ta) **-30°C to + 40°C**
Maximum Casing Temperature (Tc) **85°C**
Rated Life **50,000 hrs**
Push in Terminals **0.75mm to 1.5mm**
Wire Preparation **8mm**
Fixing Bracket for Screws **M4**
Luminaire Protection **Class II**
With open circuit, short circuit and overload protection

LED Lamps Supported

1.
ER1006-35H24D-GU5.3-2800K
ER1006-35H24D-GU5.3-4000K
ER1006-35H36D-GU5.3-2800K
ER1006-35H36D-GU5.3-4000K
ER1006-35H24D-GU5.3-2400K
ER1006-35H36D-GU5.3-2400K

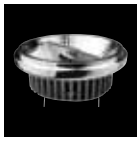
2.
ER0408-35H36D-GU5.3-2800K
ER0408-35H36D-GU5.3-4000K

3.
ER0510-50H24D-GU5.3-2800K
ER0510-50H24D-GU5.3-4000K
ER0510-50H36D-GU5.3-2800K
ER0510-50H36D-GU5.3-4000K

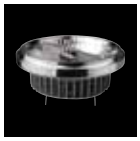
4.
ER1810-50H12D-GU5.3-2800K-20V
ER1810-50H12D-GU5.3-4000K-20V

5.
ER0815-20M25D-E27-2800K
ER0815-20M25D-E27-4000K

6.
ER0716-20M24D-GX8.5-2800K
ER0716-20M24D-GX8.5-4000K

7. 
ER0110-50H24D-G53-2800K
ER0110-50H24D-G53-4000K

8.
ER0210-50H08D-G53-2800K
ER0210-50H08D-G53-4000K

9. 
ER0310-50H45D-G53-2800K
ER0310-50H45D-G53-4000K

Special Application

R9

The R9 series has been specifically designed to maximise the visual impact of meat, fresh fruit and vegetables by increasing the red colour rendition of the product. These lamps offer the same high quality light intensity and colour rendering of traditional halogen and metal halide lamps, but in a safer to control, more energy efficient format. Please refer to page 82 for further details of the R9 technology.

- High red colour rendition (R9) value of ≥75
- Maximum colour rendering of up to Ra94
- Long rated life of up to 30,000 hours
- Instant start capable – reaches the declared colour temperature at the time of switching on, while metal halides deliver a greenish colour when starting up
- Hot re-strike capable
- 70% lumen maintenance (L70) at 50,000 hours
- Eliminates the risk of potential exposure to UV and radioactive Kr85 in case of lamp breakage

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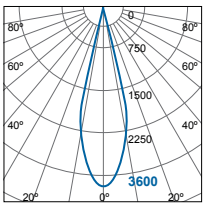
R9

R9 AR111
Special Application

24° 45° GU10

wattage	*halogen equivalent*	beam	colour temperature	item no.
15W	*(50W)*	**24°**	2800K Ra94	**LR0115R9-50H24D-GU10-2800K-230V**
15W	*(50W)*	**24°**	4000K Ra94	**LR0115R9-50H24D-GU10-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **3600cd**
Luminous Flux **530lm**
Operating Temp. **-30°C to +40°C**
Length **94mm** Diameter **111mm Ø** Weight **245g**
Cap **GU10**

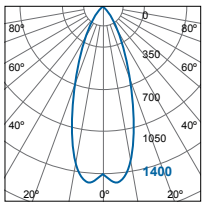


m	Lux	Ø cm
0.5	14400	21
1	3600	43
1.5	1600	64
2	900	85

Beam angle = 24°

wattage	*halogen equivalent*	beam	colour temperature	item no.
15W	*(50W)*	**45°**	2800K Ra94	**LR0615R9-50H45D-GU10-2800K-230V**
15W	*(50W)*	**45°**	4000K Ra94	**LR0615R9-50H45D-GU10-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **1400cd**
Luminous Flux **570lm**
Operating Temp. **-30°C to +40°C**
Length **94mm** Diameter **111mm Ø** Weight **230g**
Cap **GU10**



m	Lux	Ø cm
0.5	5600	41
1	1400	83
1.5	622	124
2	350	166

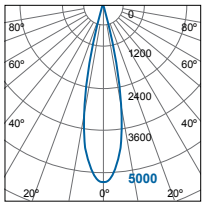
Beam angle = 45°

R9 PAR38
Special Application

25° E27

wattage	*metal halide equivalent*	beam	colour temperature	item no.
20W	*(25W)*	**25°**	2800K Ra94	**LR0920R9-25M25D-E27-2800K-230V**
20W	*(25W)*	**25°**	4000K Ra94	**LR0920R9-25M25D-E27-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **5000cd**
Luminous Flux **900lm**
Operating Temp. **-30°C to +40°C**
Length **133mm** Diameter **121mm Ø** Weight **485g**
Cap **E27**



m	Lux	Ø cm
0.5	20000	22
1	5000	44
1.5	2222	67
2	1250	89

Beam angle = 25°

Mellotone

The Mellotone Series is designed to deliver warm and harmonious illumination that creates the mood and sets the ambience. When these lamps are used in a room with wooden wall panels or furniture, a comfortable and inviting environment is easily achieved. The Mellotone series is also popular for bakery lighting and presents a cosy shopping environment and vibrant pastries and breads.

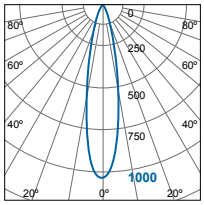
- Deliver cosy and harmonious lighting: 2400K colour temperature
- Excellent colour rendering of up to Ra82
- Long rated life of 25,000 hours
- Different beam angles are available to cater for various applications
- 70% lumen maintenance (L70) at 50,000 hours
- Best for home and commercial applications such as family rooms, bedrooms, hotels, bakeries, restaurants, spas, antique stores and furniture stores

Mellotone MR16
Special Application
Requiring Halogen Transformer

	wattage	*halogen equivalent*	beam	colour temperature	item no.
	6W	*(35W)*	**24°**	2400K Ra82	**ER1006-35H24D-GU5.3-2400K-12V**
	6W	*(35W)*	**36°**	2400K Ra82	**ER1006-35H36D-GU5.3-2400K-12V**

24° 36° GU5.3

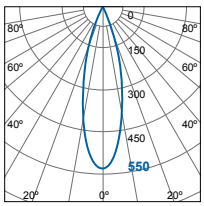
Voltage **12V**
Rated life **25,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **1000cd**
Luminous Flux **200lm**
Operating Temp. **-30°C to +40°C**
Length **50mm** Diameter **51mm Ø** Weight **60g**
Cap **GU5.3**



m	Lux	Ø cm
0.5	4000	21
1	1000	43
1.5	444	64
2	250	85

Beam angle = 24°

Voltage **12V**
Rated life **25,000hrs** | L70 life **50,000hrs**
Max. Luminous Intensity **550cd**
Luminous Flux **200lm**
Operating Temp. **-30°C to +40°C**
Length **50mm** Diameter **51mm Ø** Weight **60g**
Cap **GU5.3**



m	Lux	Ø cm
0.5	2200	32
1	550	65
1.5	244	97
2	138	130

Beam angle = 36°

* Please visit www.megamanlighting.com/RHT for the list of recommended halogen transformer.
- see MR16 for design reference

Crown Silver

With a unique silver-plated design, this A60 shape LED lamp offers flawless lighting and adds an aesthetic touch to mirror lighting with its clear light bulb finishing. In addition, the LED Crown Silver delivers non-glare lighting similar to traditional incandescent lamps with a silver coating, while greatly reducing electricity and maintenance costs.

- Unique silver-plated design in A60 lamp shape with a silvered crown top and clear light bulb finishing
- Best for mirror lighting and decorative lighting
- Offers well controlled light source and non-glare lighting
- Long rated life of 30,000 hours
- High colour rendering of up to Ra92
- 70% lumen maintenance (L70) at 50,000 hours
- Generates much less heat than traditional incandescent alternatives

Crown Silver
Special Application

E27

wattage	*halogen equivalent*	colour temperature	item no.
7W	*(60W)*	2700K Ra85	**LS0107-E27-2700K-230V**
7W	*(60W)*	4000K Ra92	**LS0107-E27-4000K-230V**

Voltage **220-240V**
Rated life **30,000hrs** | L70 life **50,000hrs**
Operating Temp. **-30°C to +40°C**
Length **106mm** Diameter **60mm Ø** Weight **135g**
Cap **E27**

Compact Fluorescent Lamps

Plug-In Tube

The Plug-in Tube Series offers an excellent alternative to fluorescent tube and traditional incandescent bulbs.

The series includes the PLi lampbase, a unique solution designed to remove the need for an external ballast, this retrofits into a universal lampholder which fits all wattages in the range. This lampbase design removes the hassle of matching the tube and the ballast, and simplifies installation and replacements.

Within the Plug-in Tube Series a number of the products encompasses MEGAMAN®'s patented *INGENIUM®* technology which enables improved performance, extended operating life, increased number of switching cycle and enhanced precision on preheating time control whilst allowing a more compact and lightweight lamp due to the technology's components small size. For more information on *INGENIUM®*, please see page 177.

- True Green amalgam technology containing no liquid mercury, unlike traditional high-pressure alternatives. For more information, please see page 176
- Self-ballasted plug-in compact fluorescent lamps
- Replaces conventional plug-in TC-S and TC-D lamps
- No hassles of matching lamp and ballast
- 1 PLi lampbase fits all wattages
- Simplifies installation and relamping
- Up to 15,000 hours rated life

Plug-In Tube

Plug-in Tube
PLi 4P-Tube
Integrated Ballast

wattage	*tungsten equivalent*	cap	colour temperature	luminous flux (lm)	diameter (mm)	length (mm)	weight (g)	operating temperature (°C)	energy label	item no.
11W	*(60W)*	**GY29.3**	2700K	650	40	91	56	-10 to +40	A	**4P311i-GY29.3-2700K-230V**
11W	*(60W)*	**GY29.3**	6500K	585	40	91	56	-10 to +40	A	**4P311i-GY29.3-6500K-230V**
15W	*(75W)*	**GY29.3**	2700K	900	40	103	61	-10 to +40	A	**4P315i-GY29.3-2700K-230V**
15W	*(75W)*	**GY29.3**	6500K	810	40	103	61	-10 to +40	A	**4P315i-GY29.3-6500K-230V**
20W	*(100W)*	**GY29.3**	2700K	1200	40	114	65	-10 to +40	A	**4P320i-GY29.3-2700K-230V**
20W	*(100W)*	**GY29.3**	6500K	1080	40	114	65	-10 to +40	B	**4P320i-GY29.3-6500K-230V**

GY29.3

Voltage **220-240V**
Rated life **15,000hrs**

Plug-in Tube
PLi W-Tube
Integrated Ballast

wattage	*tungsten equivalent*	cap	colour temperature	luminous flux (lm)	diameter (mm)	length (mm)	weight (g)	operating temperature (°C)	energy label	item no.
11W	*(60W)*	**GY29.3**	2700K	600	40	112	57	-10 to +40	A	**W1711i-GY29.3-2700K-230V**
11W	*(60W)*	**GY29.3**	6500K	570	40	112	57	-10 to +40	A	**W1711i-GY29.3-6500K-230V**
15W	*(75W)*	**GY29.3**	2700K	900	40	142	67	-10 to +40	A	**W1715i-GY29.3-2700K-230V**
15W	*(75W)*	**GY29.3**	6500K	850	40	142	67	-10 to +40	A	**W1715i-GY29.3-6500K-230V**
20W	*(100W)*	**GY29.3**	2700K	1200	40	152	69	-10 to +40	A	**W1720i-GY29.3-2700K-230V**
20W	*(100W)*	**GY29.3**	6500K	1140	40	152	69	-10 to +40	B	**W1720i-GY29.3-6500K-230V**
25W	*(150W)*	**GY29.3**	2700K	1519	40	167	71	-10 to +40	A	**W1725i-GY29.3-2700K-230V**
25W	*(150W)*	**GY29.3**	6500K	1440	40	167	71	-10 to +40	B	**W1725i-GY29.3-2700K-230V**

GY29.3

Voltage **220-240V**
Rated life **15,000hrs**

Plug-in Tube
PLi Compact
Integrated Ballast

wattage	*tungsten equivalent*	cap	colour temperature	luminous flux (lm)	diameter (mm)	length (mm)	weight (g)	operating temperature (°C)	energy label	item no.
15W	*(75W)*	**GY29.3**	2700K	720	40	91	58	-10 to +40	B	**4P515i-GY29.3-2700K-230V**
15W	*(75W)*	**GY29.3**	6500K	650	40	91	58	-10 to +40	B	**4P515i-GY29.3-6500K-230V**
18W	*(90W)*	**GY29.3**	2700K	1008	40	103	61	-10 to +40	A	**4P518i-GY29.3-2700K-230V**
18W	*(90W)*	**GY29.3**	6500K	910	40	103	61	-10 to +40	B	**4P518i-GY29.3-6500K-230V**

GY29.3

Voltage **220-240V**
Rated life **15,000hrs**

Plug-In Tube

Plug-in Tube
Compact Pro PL-T2*
requiring Electronic Ballast

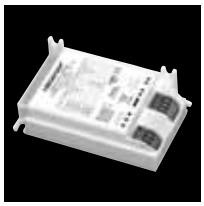
wattage	*tungsten equivalent*	cap	colour temperature	luminous flux (lm)	diameter (mm)	length (mm)	weight (g)	operating temperature (°C)	energy label	item no.
32W	*(160W)*	**GX24q3**	2700K	2400	52	111	69	-10 to +40	B	**T1GX24Q332-GX24q3-2700K-230V**
32W	*(160W)*	**GX24q3**	6500K	2160	52	111	69	-10 to +40	B	**T1GX24Q332-GX24q3-6500K-230V**
42W	*(210W)*	**GX24q4**	2700K	3200	56	124	95	-10 to +40	B	**T1GX24Q442-GX24q4-2700K-230V**
42W	*(210W)*	**GX24q4**	6500K	2880	56	124	95	-10 to +40	B	**T1GX24Q442-GX24q4-6500K-230V**
57W	*(285W)*	**GX24q5**	2700K	4000	56	159	115	-10 to +40	B	**T1GX24Q557-GX24q5-2700K-230V**
57W	*(285W)*	**GX24q5**	6500K	3600	56	159	115	-10 to +40	B	**T1GX24Q557-GX24q5-6500K-230V**

GX24q3 GX24q4 GX24q5

Voltage **220-240V**
Rated life **15,000hrs**

* Operates on any electronic ballasts

Plug-in Tube
Compact Pro PL-T2
External Electronic Ballast



mains input voltage (V)	input voltage range (V)	nominal wattage output (W)	mains current (mA)	power factor (λ)	length (mm)	width (mm)	Height (mm)	weight (g)	Plug-in Tubes supported	item no.
220-240	180-260	GX24q3 32W x 1	160	0.98	103	67	31	168	T1GX24Q332	**B05P0232**
220-240	180-260	GX24q4 42W x 1	200	0.98	103	67	31	168	T1GX24Q442	**B05P0242**
220-240	180-260	GX24q5 57W x 1	280	0.98	103	67	31	177	T1GX24Q557	**B05P0257**

Ambient Temperature Range (Ta) **-40°C to +60°C**
Maximum Casting Temperature (Tc) **85°C**
Life Hours **50,000 hrs**
Push in Terminals **0.75mm to 1.5mm**
Fixing Bracket for Screws **M3**
Luminaire Protection **II**

Plug-In Tube

Plug-in Tube
U-Tube 2 Pin Type
for Magnetic Ballast

wattage	*tungsten equivalent*	cap	colour temperature	luminous flux (lm)	diameter (mm)	length (mm)	weight (g)	operating temperature (°C)	energy label	item no.
5W	*(25W)*	**G23**	2700K	265	32	104	25	-10 to +40	A	**T1G2305-G23-2700K-230V**
5W	*(25W)*	**G23**	6500K	250	32	104	25	-10 to +40	B	**T1G2305-G23-2700K-230V**
7W	*(35W)*	**G23**	2700K	410	32	133	30	-10 to +40	A	**T1G2307-G23-2700K-230V**
7W	*(35W)*	**G23**	6500K	390	32	133	30	-10 to +40	B	**T1G2307-G23-6500K-230V**
9W	*(40W)*	**G23**	2700K	565	32	163	32	-10 to +40	A	**T1G2309-G23-2700K-230V**
9W	*(40W)*	**G23**	6500K	535	32	163	32	-10 to +40	B	**T1G2309-G23-6500K-230V**
11W	*(60W)*	**G23**	2700K	900	32	233	44	-10 to +40	A	**T1G2311-G23-2700K-230V**
11W	*(60W)*	**G23**	6500K	850	32	233	44	-10 to +40	A	**T1G2311-G23-6500K-230V**

G23

Voltage **220-240V**
Rated life **10,000hrs**

Plug-in Tube
2P-Tube 2 Pin Type
for Magnetic Ballast

wattage	*tungsten equivalent*	cap	colour temperature	luminous flux (lm)	diameter (mm)	length (mm)	weight (g)	operating temperature (°C)	energy label	item no.
10W	*(60W)*	**G24d1**	2700K	600	41	109	37	-10 to +40	B	**T4G24D110-G24d1-2700K-230V**
10W	*(60W)*	**G24d1**	6500K	540	41	109	37	-10 to +40	B	**T4G24D110-G24d1-6500K-230V**
13W	*(75W)*	**G24d1**	2700K	900	41	139	42	-10 to +40	A	**T4G24D113-G24d1-2700K-230V**
13W	*(75W)*	**G24d1**	6500K	810	41	139	42	-10 to +40	B	**T4G24D113-G24d1-6500K-230V**
18W	*(100W)*	**G24d2**	2700K	1200	41	149	51	-10 to +40	B	**T4G24D218-G24d2-2700K-230V**
18W	*(100W)*	**G24d2**	6500K	1080	41	149	51	-10 to +40	B	**T4G24D218-G24d2-6500K-230V**
26W	*(125W)*	**G24d3**	2700K	1800	41	164	55	-10 to +40	B	**T4G24D326-G24d3-2700K-230V**
26W	*(125W)*	**G24d3**	6500K	1620	41	164	55	-10 to +40	B	**T4G24D326-G24d3-6500K-230V**
26W	*(100W)*	**G24d3**	2700K	1700	41	164	55	-10 to +40	-	**T4G24D326-G24d3-2700K-230V (CRI:90)**
26W	*(100W)*	**G24d3**	6500K	1530	41	164	55	-10 to +40	B	**T4G24D326-G24d3-6500K-230V (CRI:90)**

G24d1 G24d2 G24d3

Voltage **220-240V**
Rated life **10,000hrs**

Plug-in Tube
2P-Tube 4 Pin Type
for Electronic Ballast

wattage	*tungsten equivalent*	cap	colour temperature	luminous flux (lm)	diameter (mm)	length (mm)	weight (g)	operating temperature (°C)	energy label	item no.
10W	*(60W)*	**G24q1**	2700K	600	41	103	35	-10 to +80	B	**T4G24Q110-G24q1-2700K-230V**
10W	*(60W)*	**G24q1**	6500K	540	41	103	35	-10 to +80	B	**T4G24Q110-G24q1-6500K-230V**
13W	*(75W)*	**G24q1**	2700K	900	41	133	44	-10 to +80	A	**T4G24Q113-G24q1-2700K-230V**
13W	*(75W)*	**G24q1**	6500K	810	41	133	44	-10 to +80	B	**T4G24Q113-G24q1-6500K-230V**
18W	*(100W)*	**G24q2**	2700K	1200	41	143	49	-10 to +80	B	**T4G24Q218-G24q2-2700K-230V**
18W	*(100W)*	**G24q2**	6500K	1080	41	143	49	-10 to +80	B	**T4G24Q218-G24q2-6500K-230V**
26W	*(125W)*	**G24q3**	2700K	1800	41	158	50	-10 to +80	B	**T4G24Q326-G24q3-2700K-230V**
26W	*(125W)*	**G24q3**	6500K	1620	41	158	50	-10 to +80	B	**T4G24Q326-G24q3-6500K-230V**

G24q1 G24q2 G24q3

Voltage **220-240V**
Rated life **10,000hrs**

CLUSTERLITE®

The CLUSTERLITE® Series is specifically designed to replace self-ballasted high pressure mercury and metal halide lamps that are widely used in commercial and industrial applications.

The high-wattage CLUSTERLITE® Series of energy-efficient lamps offer high lumen maintenance, even light distribution, high colour rendering, minimal colour shift along with excellent energy-savings.

Within the CLUSTERLITE® Series a number of the products encompasses MEGAMAN®'s patented *INGENIUM®* technology which enables improved performance, extended operating life, increased number of switching cycle and enhanced precision on preheating time control whilst allowing a more compact and lightweight lamp due to the technology's components small size. For more information on *INGENIUM®*, please see page 177.

- True Green technology containing no liquid mercury, unlike traditional high-pressure alternatives, For more information, please see page 176
- Engineered with patented cooling-tube to guarantee over 75% lumen maintenance throughout rated life
- High Colour Rendering Index of Ra82
- Eliminates the risk of potential exposure to radioactive Kr85 in case of lamp breakage
- Universal burning position for base-up, base-down or horizontal operation
- Instant restart capability with rapid start-up time achieved within 120 seconds
- Rated rated life of 15,000 hours

CLUSTERLITE®

CLUSTERLITE® Integrated Ballast

wattage	*tungsten equivalent*	*cap*	colour temperature	luminous flux (lm)	diameter (mm)	length (mm)	weight (g)	operating temperature (°C)	energy label	item no.	E27	E40
40W	*(120W) / (200W)*[1]	**E27**	2700K	2680	63	166	252	-25 to +60	A	**HC01040i-E27-2700K-230V**		
40W	*(120W) / (200W)*[1]	**E27**	6500K	2450	63	166	252	-25 to +60	B	**HC01040i-E27-6500K-230V**		
60W	*(180W) / (300W)*[1]	**E27**	2700K	4000	63	188	285	-40 to +60	B	**HC01060i-E27-2700K-230V**		
60W	*(180W) / (300W)*[1]	**E27**	6500K	3800	63	188	285	-40 to +60	B	**HC01060i-E27-6500K-230V**		
80W	*(250W)*	**E27**	2700K	5400	80	244	553	-40 to +60	B	**HC01080i-E27-2700K-230V**		
80W	*(250W)*	**E27**	6500K	5130	80	244	553	-40 to +60	B	**HC01080i-E27-6500K-230V**		
80W	*(250W)*	**E40**	2700K	5400	80	256	563	-40 to +60	B	**HC01080i-E40-2700K-230V**		
80W	*(250W)*	**E40**	6500K	5130	80	256	563	-40 to +60	B	**HC01080i-E40-6500K-230V**		
100W	*(300W)*	**E27**	2700K	6700	80	267	578	-40 to +60	-	**HC01100i-E27-2700K-230V**		
100W	*(300W)*	**E27**	6500K	6365	80	267	578	-40 to +60	B	**HC01100i-E27-6500K-230V**		
100W	*(300W)*	**E40**	2700K	6700	80	279	588	-40 to +60	-	**HC01100i-E40-2700K-230V**		
100W	*(300W)*	**E40**	6500K	6365	80	279	588	-40 to +60	B	**HC01100i-E40-6500K-230V**		

Voltage **220-240V**
Rated life **15,000hrs**

[1] Incandescent bulb A80 equivalent

CLUSTERLITE® requiring Power Supply

wattage	*tungsten equivalent*	*cap*	colour temperature	luminous flux (lm)	diameter (mm)	length (mm)	weight (g)	operating temperature (°C)	energy label	item no.	E40
120W	*(150W)*	**E40**	2700K	8640	63	245	326	-40 to +60	-	**HC01120x-E40-2700K-230V**	
120W	*(150W)*	**E40**	6500K	8200	63	245	326	-40 to +60	-	**HC01120x-E40-6500K-230V**	
200W	*(250W)*	**E40**	2700K	14400	90	278	735	-40 to +60	-	**HC01200x-E40-2700K-230V**	
200W	*(250W)*	**E40**	6500K	13680	90	278	735	-40 to +60	-	**HC01200x-E40-6500K-230V**	
320W	*(400W)*	**E40**	2700K	23000	110	297	1041	-40 to +60	-	**HC01320x-E40-2700K-230V**	
320W	*(400W)*	**E40**	6500K	21850	110	297	1041	-40 to +60	-	**HC01320x-E40-6500K-230V**	

Voltage **220-240V**
Rated life **15,000hrs**

CLUSTERLITE® External Power Supply

mains input voltage (V)	input voltage range (V)	nominal wattage output (W)	system wattage output (W)	max. working voltage [U-out] (V)	mains current (mA)	power factor (λ)	length (mm)	width (mm)	weight (g)	CLUSTERLITE® supported	item no.
220-240	180-260	120	142	300	650	0.98	140	57	530	HC01120x	**CP010120**[a]
220-240	180-260	200	220	400	1020	0.98	175	59	710	HC01200x	**CP010200**[b]
220-240	180-260	320	350	400	1560	0.98	175	59	800	HC01320x	**CP010320**[b]

Ambient Temperature Range (Ta) **-40°C to +60°C**
Maximum Casting Temperature (Tc) **85°C**
Life Hours **50,000 hrs**
Push in Terminals **a – 1.0mm to 1.5mm / b – 1.0mm to 2.0mm**
Extension Wire (m) **18AWGX2C**
Fixing Bracket for Screws **M4**
Luminaire Protection **II**

CLUSTERLITE®

CLUSTERLITE® Globe Integrated Ballast

wattage	*incandescent equivalent*	*cap*	colour temperature	luminous flux (lm)	diameter (mm)	length (mm)	weight (g)	operating temperature (°C)	energy label	item no.
50W	*(250W)*[2]	**E27**	2700K	2700	120	202	410	-40 to +60	B	**GHC01050i-E27-2700K-230V**
50W	*(250W)*[2]	**E27**	6500K	2400	120	202	410	-40 to +60	B	**GHC01050i-E27-6500K-230V**

Voltage **220-240V**
Rated life **15,000hrs**

[2] Incandescent bulb G120 equivalent

Clusterlite® Spiral Integrated Ballast

wattage	*incandescent equivalent*	*cap*	colour temperature	luminous flux (lm)	diameter (mm)	length (mm)	weight (g)	operating temperature (°C)	energy label	item no.
60W	*(250W)*[3]	**E27**	2700K	4200	63	235	307	-40 to +60	B	**HC02060i-E27-2700K-230V**

Voltage **220-240V**
Rated life **15,000hrs**

[3] Incandescent bulb A80 equivalent

Self-Ballasted Linear

The ultra-slim Self-Ballasted Linear T2 combines compact fluorescent technology with a high performance integral ballast making this innovative lighting system ideal for both general and indirect applications. With the addition of accessories, the lighting system can be extended up to 30 units, creating a versatile solution for an array of applications.

The Self-Ballasted Linear T2 series utilises MEGAMAN®'s patented *INGENIUM®* Technology which enables prolonged operating life, shortened preheating time and increased number of switching life cycle. Furthermore, as with all MEGAMAN® compact fluorescent lamps, the series employs True Green amalgam technology, making it free from potentially hazardous liquid mercury. For more information on *INGENIUM®* and True Green technology, please see page 177.

- Eliminates dark regions between connection of lamp tubes
- Plug-and-Play: Connects up to 30 units (Maximum loading: 240W)
- Ideal application include concealed lighting, display lighting and feature walls
- Linear dimming versions available

T2 Version
Standard

wattage	colour temperature	luminous flux (lm)	length (mm)	height (mm)	width (mm)	weight (g)	operating temperature (°C)	current (mA)	energy label	item no.
8W	2700K	440	344	32	16	85	-10 to +40	70	A	**SB0308i-2700K-230V**
8W	6500K	396	344	32	16	85	-10 to +40	70	A	**SB0308i-6500K-230V**
16W	2700K	890	644	32	16	138	-10 to +40	130	A	**SB0316i-2700K-230V**
16W	6500K	801	644	32	16	138	-10 to +40	130	B	**SB0316i-6500K-230V**
23W	2700K	1375	800	16	33	344	-10 to +40	200	-	**SB0323i-2700K-230V**
23W	6500K	1238	800	16	33	344	-10 to +40	200	-	**SB0323i-6500K-230V**

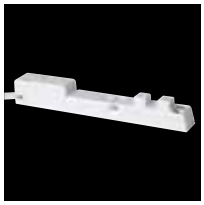
Voltage **220-240V**
Rated life **18,000hrs**

T2 Version
Dimmable (Linear)

wattage	colour temperature	luminous flux (lm)	length (mm)	height (mm)	width (mm)	weight (g)	operating temperature (°C)	current (mA)	energy label	item no.
8W	2700K	440	344	32	16	226	-10 to +40	70	-	**SB0308d-2700K-230V**
8W	6500K	396	344	32	16	226	-10 to +40	70	-	**SB0308d-6500K-230V**

Voltage **220-240V**
Rated life **10,000hrs**
Dimming format **100-10%**

Self-Ballasted Linear
Accessory



LA4001
Electric Switch

LA4002
End Module

LA4003
Connector

LA4006
Flexible Connector
For Angular Connections

The above optional accessories are available to cater extended connections.

Jumbo Lamp

The Jumbo Lamp series is a range of high performance energy-saving lamp capable of producing powerful and reliable illumination. Specially designed for industrial and commercial lighting applications, the lamp is able to replace conventional self-ballasted high pressure mercury lamps, whilst consumes significantly less power.

Furthermore, the unique base adapter design means that four conventional MEGAMAN® plug-in tubes are used to create one Jumbo lamp. This means, if one plug-in tube fails, the other three will continue to work. Therefore, reduces the need and cost for replacing the complete lamp.

- True Green amalgam technology containing no liquid mercury, unlike traditional high-pressure alternatives. For more information, please see page 176
- 52W version replacing 160W (for D652) or 72W version replacing 200W (for D672) self-ballasted high pressure mercury lamps
- Continuous illumination upon failure of one or two lamp tubes
- Applicable in both enclosed and open fixtures
- Offers 30,000 hours service life with integrated ballast

Jumbo Lamp
Integrated Ballast

E27

wattage	*tungsten equivalent*	cap	colour temperature	luminous flux (lm)	diagonal (mm)	length (mm)	weight (g)	operating temperature (°C)	energy label	item no.
52W	**52W**	**E27**	2700K	3460	89	208	480	-10 to +60	B	**D652-E27-2700K-230V**
52W	**52W**	**E27**	6500K	3290	89	208	480	-10 to +60	B	**D652-E27-6500K-230V**
72W	**72W**	**E27**	2700K	4800	89	218	487	-10 to +60	B	**D672-E27-2700K-230V**
72W	**72W**	**E27**	6500K	4560	89	218	487	-10 to +60	B	**D672-E27-6500K-230V**

Voltage **220-240V**
Rated life **30,000hrs** *

4 x 13W G24q1 for D652
4 x 18W G24q2 for D672

* Driven by integrated electronic ballast with an operating life of 30,000 hrs.

R7s

The CFL R7s is a low heat Compact Fluorescent Lamp to substitute extremely hot double-ended halogens that often burn out easily. This lamp fits into most fixtures with a pre-existing R7s lamp holder and delivers 15,000 hours of continuous illumination without the concern of over-heating.

The R7s Series utilises MEGAMAN®'s patented *INGENIUM®* technology which enables prolonged operating life, shortened preheating time and increased number of switching life cycle. Furthermore, as with all MEGAMAN® Compact Fluorescent Lamps, the series employs True Green amalgam technology, making it free from potentially hazardous liquid mercury. For more information on *INGENIUM®* and True Green technology, please see page 176 and 177.

- Energy saving alternative to double-ended halogens
- Allow fitting into most R7s based luminaires
- Generate much less heat and UV
- 15,000 hours rated life

CFL R7s
Integrated Ballast

wattage	*tungsten equivalent*	cap	colour temperature	luminous flux (lm)	diameter (mm)	length (mm)	weight (g)	operating temperature (°C)	energy label	item no.
24W	*(107W)*	**R7s**	2700K	1519	40	118	115	-10 to +40	A	**4P424i-R7s-2700K-230V**
24W	*(96W)*	**R7s**	6500K	1367	40	118	115	-10 to +40	B	**4P424i-R7s-6500K-230V**

Voltage **220-240V**
Rated life **15,000hrs**

R7s

Decoding the MEGAMAN® product code

Nomenclature of **LED Reflector Series**

LR 11 08 d – 50H 35D – GU10 – 2800K – 230V

Voltage
Maximum four digits for indication
12V = AC/DC 12V
230V = AC 220 – 240V

Version
Two digits for indication
From 01-99

Technology
d = DIMMER*ABLE*®
s = DorS Dimming
R9 = R9 technology

Wattage of Suggested Replacement
First two digits for indication:
35 = 35W
50 = 50W
100 = 100W
Last letter stands for suggested replacement
H: Halogen M: Metal Halide

LED Beam Angle
First two digits for indication:
08D = 8°
24D = 24°
35D = 35°
45D = 45°
Last letter 'D' stands for degree

Lamp Base

Colour Temperature
First four digits for indication
2800 = 2800K
4000 = 4000K

Last letter 'K' stands for Kelvin

Category Name
LR = Integral LED reflector
ER = External LED converter reflector

Wattage
Two digits for indication:
08 = 8W
11 = 11W

Nomenclature of **LED Non-Directional Lamps**

LG 09 11 d – E27 – 2800K – 230V

Voltage
Maximum four digits for indication
230V = AC 220 – 240V

Version
Two digits for indication
From 01-99

Technology
d = DIMMER*ABLE*®
s = DorS Dimming

Lamp Base

Colour Temperature
First four digits for indication
2800 = 2800K
4000 = 4000K

Last letter 'K' stands for Kelvin

Category Name
LC = LED Candle
LG = LED Classic
LS = LED Crown Silver

Wattage
Two digits for indication:
08 = 8W
11 = 11W

Nomenclature of **LED Converter**

LD 01 08 x1 v – C420

Version
Two digits for indication
From 01-99

Quantity of LED Lamps
x1 = 1-LED lamp
x2 = 2-LED lamps

Technology
v = DC1-10V

Output Current / Voltage
For constant voltage converter,
Two digits stand for output voltage
12 = 12V

For constant current converter,
three digits stand for output current
420 = 420mA
Version 770 = 770mA

Category Name
LD = LED Converter

Wattage
Two digits for indication:
08 = 8W
11 = 11W

Nomenclature of **CLUSTERLITE®**

HC 01 040 i – E27 – 2700K – 230V

Category Name
HC = CLUSTERLITE®
GHC = CLUSTERLITE® GLOBE
SHC = CLUSTERLITE® SPIRAL

Sequence
Two digits for indication
From 01-99

Wattage
Three digits for indication
040 = 40W
100 = 100W

Technology / Feature
1 small letter stands for the build-in technology and product feature
i = *INGENIUM®*
x = power supply is required
s = DorS Dimming
d = DIMMER*ABLE®*

Lamp Base

Colour Temperature
First four digits for indication
2700 = 2700K
6500 = 6500K

Last letter 'K' stands for Kelvin

Voltage
Maximum four digits for indication
230V = AC 220 – 240V

Nomenclature of **CFL R7s**

4P 4 24 i – R7s – 2700K – 230V

Type of Lamp Tube
4P = 4P tube

Sequence
One digit for indication
From 1-9

Wattage
Two digits for indication
24 = 24W

Technology
1 small letter stands for the build-in technology
i = *INGENIUM®*

Lamp Base

Colour Temperature
First four digits for indication
2700 = 2700K
6500 = 6500K

Last letter 'K' stands for Kelvin

Voltage
Maximum four digits for indication
230V = AC 220 – 240V

Nomenclature of **Plug-in Tube**

T 4 G24Q2 18 – G24q-2 – 2700K – 230V

Category Name
T = Plug-in Tube

Sequence
One digit for indication
From 1-9

Lamp Base
G24Q2 = G24q-2
G24Q3 = G24q-3

Wattage
Two digits for indication
18 = 18W
26 = 26W

Lamp Base

Colour Temperature
First four digits for indication
2700 = 2700K
6500 = 6500K

Last letter 'K' stands for Kelvin

Voltage
Maximum four digits for indication
230V = AC 220 – 240V

MEGAMAN® Symbols

E27 — Lamp cap style

30° — Beam angle

DorS dimming (4-step dimming)

1 + — Linear dimming 100–1%

10 + — Linear dimming 100–10%

RoHS Compliant

true green — True Green logo – True Green technology with no liquid mercury

ingenium® — *INGENIUM®* logo – Encompasses patented *INGENIUM®* technology

DARK ZONE FREE — Dark zone free logo – Seamless lighting without dark zone

Compact Fluorescent Development

RoHS & WEEE Commitment
The European Union has adopted the RoHS (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment) and the WEEE (Waste Electrical and Electronic Equipment) directives.

Effective on 1 July 2006, the RoHS Detective, which complements the WEEE Directive, bans the use of certain hazardous materials, such as lead, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE), and limits the quantity of mercury, in electronics products sold in Europe.

All of MEGAMAN® products are RoHS compliant. In addition, not MEGAMAN®'s lamps have been delicately crafted with lead-free glass tubes and using safer solid amalgam form of mercury to further enhance the green attributes of each product.

The WEEE Directive promotes the reuse and recycling of electrical and electronic equipment. From 13 August 2005, manufacturers became responsible for taking back, treating and/or recycling their used electrical and electronic equipment.

All MEGAMAN® products are fabricated from recyclable materials, such as ABS plastic, a layer of silicone and glass. Furthermore, mechanical snap-in holdings and water-based adhesive are used in assembly to facilitate easy dismantling for recycling components.

For more details about RoHS and WEEE, please visit www.rohs.eu.

If breakage occurs when	Lamp using liquid mercury	Lamp using (solid) amalgam based mercury
Cold – lamp off	**40%** lost as vapour over two weeks	Negligible loss – **almost zero**
Warm – lamp on	**68%** released right away (3 to 6 times the legal limit)	**6%** released right away (within legal limits)

True Green Technology
MEGAMAN® has employed True Green amalgam technology in its manufacturing of Compact Fluorescent Lamps since January 2008, making all its products free from liquid mercury.

Mercury is needed for a fluorescent lamp to work effectively however it does not have to be used in its more dangerous liquid form, it can be used in an inherently more safe solid amalgam form.

By adopting the safer solid amalgam form of mercury, MEGAMAN® is able to minimise the environmental impact at different stages of the product life cycle. This protects not only workers during production and transportation, but also end-users during usage and disposal from exposure to liquid mercury.

Mercury is classified as a hazardous substance however the RoHS exemptions allowing all forms of mercury to be used in CFLs as there is no alterative. MEGAMAN® has formerly applied to the EU Commission to change this regulation to:

- only allow the safe amalgam form
- effectively ban the use of liquid mercury completely

Using amalgam based mercury improves safety and gives commercial benefits by:

- increasing consumer safety
- reducing mercury pollution
- being safer for production workers

The RoHS EU directive states that the limit of mecury allowed within each compact fluorescent lamp is 5mg. MEGAMAN®'s heritage of innovative product development linked with their sustainable credentials has furthered the company to develop all of its Compact Fluorescent Lamps to contain on average of 1.63mg mercury, which is far below the 5mg limit set by the EU environmental regulation. An example of this is the MEGAMAN® 11W GSU111i which contains only 1.3mg of mercury.

ingenium®

INGENIUM® Technology

MEGAMAN®'s patented *INGENIUM®* technology represents one of the most significant Compact Fluorescent Lamp innovations of all time by applying advanced integrated circuit (IC) technology to the lamp, which enables prolonged operating life, shortened preheating time, increased number of switching life cycle and more compact in lamp size.

Longer Operating Life

INGENIUM® technology, allows MEGAMAN®'s Compact Fluorescent Lamps to offer a life expectancy of up to 15,000 hours and switching cycle of up to 600,000 times.

Precise Control of Preheating Time

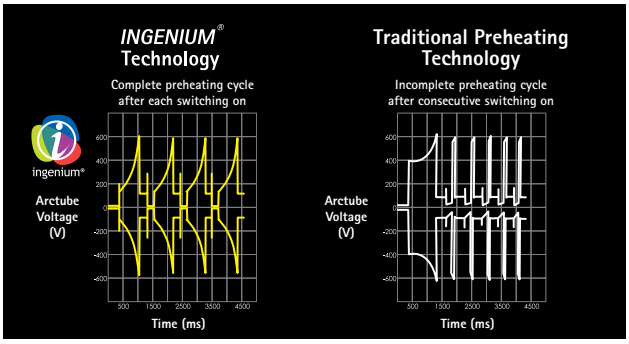
Unlike other Compact Fluorescent Lamps which use conventional preheating mechanisms, the *INGENIUM®* technology employed within MEGAMAN® lamps offers precise control of preheating time within one second. This helps to reduce the deterioration of the filament and prolong the life expectancy of the lamp.

Compact and Lighter Lamps

The components used for *INGENIUM®* technology are extremely small. As a result, a more compact and lighter Compact Fluorescent Lamp is created compared with other energy saving lamps in the market.

High Luminous Efficacy

The *INGENIUM®* technology enables MEGAMAN® Compact Fluorescent Lamps to achieve greater light output while consuming less power. Consequently, they offer 7% more light output when compared with other Compact Florescent Lamps with the same wattage.



Energy Saving Tips

MEGAMAN® light sources are designed to help the end-users conserve energy and save money, which in turn reduces CO_2 emissions.

Compact Fluorescent Lamp

Example: 120W CLUSTERLITE® vs 150W Metal Halide Lamp		
Lamp Type	MEGAMAN® CLUSTERLITE®	Metal Halide Lamp
Wattage	120W	150W
Average Lamp Life	15,000 hrs	15,000 hrs
Relamping Interval	Every 15,000 hrs	Every 5,000 hrs
Lamp Cost in 15,000 hrs	€25 x 1 = €25	€10 x 3 = €30
Control Gear Cost	€46 (Electronic)	€14 (Magnetic Ballast + Ignitor + Capacitor)
System Cost in 15,000 hrs	€71 (Lamp cost + Control gear cost)	€44 (Lamp cost + Control gear cost)
Relamping Cost in 15,000 hrs	€0	€20 x 2 = €40
Energy Cost	132W x 15,000 hrs x €0.14/1000 = €277	170W x 15,000 hrs x € 0.14/1000 = €357
Total Cost of Ownership	€71 + €277 = €348	€44 + €40 + €357 = €441
Total Savings for 1 light point	€93	-----
Total Savings for 100 light points	€9,300	-----
CO_2 reduced after 15,000 hrs for 100 light points	35,112kg	-----

Calculation formulas:
- System Cost = Lamp Cost + Control Gear Cost
- Energy Cost = System Wattage x Operating Hours x Electricity Cost / 1000
- Total Cost of Ownership = System Cost + Relamping Cost + Energy Cost

Assumptions:
- Electricity Cost = €0.14/kWh
- 1kWh Electricity emits 0.616kg of CO_2
- Relamping is required when lumen output drops below 70% of its initial lumen output
- System wattage of CLUSTERLITE® is 132W, where traditional metal halide is 170W
- Average relamping cost is approximately €20, but depending on different areas
- Calculation for maintenance cost and air-conditioning cost have been excluded
- Above costs are based on the prices to wholesalers and for reference only

LED Reflector Light Source

Example: 15W LED AR111 vs 50W Halogen AR111		
Lamp Type	MEGAMAN® LED AR111	Halogen AR111
Wattage	15W	50W
Average Lamp Life	30,000 hrs	3,000 hrs
Relamping Interval	Every 30,000 hrs	Every 3,000 hrs
Lamp Cost in 30,000 hrs	€50 x 1 = €50	€5 x 10 = €50
Relamping Cost in 30,000 hrs	€0	€20 x 9 = €180
Energy Cost	15W x 30,000 hrs x €0.14/1000 = €63	50W x 30,000 hrs x €0.14/1000 = €210
Total Cost of Ownership	€50 + €63 = €113	€50 + €210 + €180 = €440
Total Savings for 1 light point	€327	-----
Total Savings for 100 light points	€32,700	-----
CO_2 reduced after 30,000 hrs for 100 light points	64,680kg	-----

Calculation formulas:
- System Cost = Lamp Cost + Control Gear Cost
- Energy Cost = Wattage x Operating Hours x Electricity Cost / 1000
- Total Cost of Ownership = System Cost + Relamping Cost + Energy Cost

Assumptions:
- Electricity Cost = €0.14/kWh
- 1kWh Electricity emits 0.616kg of CO_2
- Average relamping cost is approximately €20, but depending on different areas
- Calculation for maintenance cost and air-conditioning cost have been excluded
- Above costs are based on the prices to wholesalers and for reference only

Lighting Design Software

MEGAMAN® has developed comprehensive plug-in downloads for a selection of notable lighting design software packages; DIALux, Relux and OxyTech.

The plug-in's include electronic catalogue with data sheets, product search and specifications management for MEGAMAN® Professional LED and Compact Fluorescent light sources.

The latest photometric database (IES Files) can also be found on the MEGAMAN® website.

To download the software plug-in's, please visit www.megamanlighting.com/download-centre

DIALux | RELUX® light simulation tools | OxyTech

index

LED Reflector Series

item no.	product series	voltage (V)	input current (mA)	wattage (W)	rated life (hrs)	maximum luminous intensity (cd)	beam (°)	luminous flux (lm)	CRI (Ra)	dimming format	LED converter*/ halogen transformer	page no.
ER0110-50H24D-G53-2800K	AR111	DC20V	500	10	40000	3600	24	530	82	100-1%	6	126
ER0110-50H24D-G53-4000K	AR111	DC20V	500	10	40000	3600	24	530	85	100-1%	6	126
ER0210-50H08D-G53-2800K	AR111	DC20V	500	10	40000	16000	8	450	82	100-1%	6	126
ER0210-50H08D-G53-4000K	AR111	DC20V	500	10	40000	16000	8	450	85	100-1%	6	126
ER0310-50H45D-G53-2800K	AR111	DC20V	500	10	40000	1400	45	570	82	100-1%	6	126
ER0310-50H45D-G53-4000K	AR111	DC20V	500	10	40000	1400	45	570	85	100-1%	6	126
ER0408-35H36D-GU5.3-2800K	MR16	DC20V	420	8	30000	900	36	400	82	100-1%	1	131
ER0408-35H36D-GU5.3-4000K	MR16	DC20V	420	8	30000	900	36	400	85	100-1%	1	131
ER0510-50H24D-GU5.3-2800K	MR16	DC20V	460	10	30000	2800	24	500	82	100-1%	2, 5	131
ER0510-50H24D-GU5.3-4000K	MR16	DC20V	460	10	30000	2800	24	500	85	100-1%	2, 5	131
ER0510-50H36D-GU5.3-2800K	MR16	DC20V	460	10	30000	1200	36	510	82	100-1%	2, 5	131
ER0510-50H36D-GU5.3-4000K	MR16	DC20V	460	10	30000	1200	36	510	85	100-1%	2, 5	131
ER0716-20M24D-GX8.5-2800K	AR111	DC20V	770	16	40000	4400	24	800	82	100-1%	4	126
ER0716-20M24D-GX8.5-4000K	AR111	DC20V	770	16	40000	4400	24	800	85	100-1%	4	126
ER0815-20M25D-E27-2800K	PAR30L	DC40V	380	15	40000	4500	25	860	80	100-1%	3	111
ER0815-20M25D-E27-4000K	PAR30L	DC40V	380	15	40000	4500	25	860	85	100-1%	3	111
ER1006-35H24D-GU5.3-2400K-12V	Mellotone	12V	N/A	6	25000	1000	24	200	82	N/A	#	153
ER1006-35H24D-GU5.3-2800K-12V	MR16	12V	N/A	6	25000	1300	24	240	82	N/A	#	130
ER1006-35H24D-GU5.3-4000K-12V	MR16	12V	N/A	6	25000	1300	24	240	85	N/A	#	130
ER1006-35H36D-GU5.3-2400K-12V	Mellotone	12V	N/A	6	25000	550	36	200	82	N/A	#	153
ER1006-35H36D-GU5.3-2800K-12V	MR16	12V	N/A	6	25000	600	36	240	82	N/A	#	130
ER1006-35H36D-GU5.3-4000K-12V	MR16	12V	N/A	6	25000	600	36	240	85	N/A	#	130
ER1111-50H24D-G53-2800K-12V	AR111	12V	N/A	11	40000	3600	24	530	82	N/A	#	125
ER1111-50H24D-G53-4000K-12V	AR111	12V	N/A	11	40000	3600	24	530	85	N/A	#	125
ER1211-50H08D-G53-2800K-12V	AR111	12V	N/A	11	40000	12000	8	450	82	N/A	#	125
ER1211-50H08D-G53-4000K-12V	AR111	12V	N/A	11	40000	12000	8	450	85	N/A	#	125
ER1311-50H45D-G53-2800K-12V	AR111	12V	N/A	11	40000	1400	45	570	82	N/A	#	125
ER1311-50H45D-G53-4000K-12V	AR111	12V	N/A	11	40000	1400	45	570	85	N/A	#	125
ER1708d-50H24D-GU5.3-2800K-12V†	MR16	12V	N/A	8	25000	1700	24	400	82	100-10%	#	130
ER1708d-50H24D-GU5.3-4000K-12V†	MR16	12V	N/A	8	25000	1700	24	400	85	100-10%	#	130
ER1708d-50H36D-GU5.3-2800K-12V†	MR16	12V	N/A	8	25000	900	36	400	82	100-10%	#	130
ER1708d-50H36D-GU5.3-4000K-12V†	MR16	12V	N/A	8	25000	900	36	400	85	100-10%	#	130
ER1810-50H12D-GU5.3-2800K-20V†	MR16	DC20V	460	10	30000	5000	12	580	82	100-1%	2, 5	132
ER1810-50H12D-GU5.3-4000K-20V†	MR16	DC20V	460	10	30000	5000	12	580	85	100-1%	2, 5	132
ER1908d-35H12D-GU5.3-2800K-12V†	MR16	12V	N/A	8	25000	4500	12	400	82	100-10%	#	130
ER1908d-35H12D-GU5.3-4000K-12V†	MR16	12V	N/A	8	25000	4500	12	400	85	100-10%	#	130

† Preliminary data

* LED Converter: 1. LD0108x1v-C420 2. LD0110x1v-C460 3. LD0115x1v-C380 4. LD0116x1v-C770 5. LD0210x1v-C460 6. LD0310x1v-C500

Please visit www.megamanlighting.com/RHT for the list of recommended halogen transformer.

LED Reflector Series

item no.	product series	voltage (V)	input current (mA)	wattage (W)	rated life (hrs)	maximum luminous intensity (cd)	beam (°)	luminous flux (lm)	CRI (Ra)	dimming format	page no.
LR0110-35H24D-GU10-2800K-230V	AR111	220-240V	N/A	10	30000	2500	24	300	85	N/A	124
LR0110-35H24D-GU10-4000K-230V	AR111	220-240V	N/A	10	30000	2500	24	300	92	N/A	124
LR0110s-35H24D-GU10-2800K-230V	AR111	220-240V	N/A	10	30000	2500	24	300	82	4-Step	124
LR0110s-35H24D-GU10-4000K-230V	AR111	220-240V	N/A	10	30000	2500	24	300	85	4-Step	124
LR0115-50H24D-GU10-2800K-230V	AR111	220-240V	N/A	15	30000	3600	24	530	82	N/A	124
LR0115-50H24D-GU10-4000K-230V	AR111	220-240V	N/A	15	30000	3600	24	530	85	N/A	124
LR0115R9-50H24D-GU10-2800K-230V	R9	220-240V	N/A	15	30000	3600	24	530	94	N/A	150
LR0115R9-50H24D-GU10-4000K-230V	R9	220-240V	N/A	15	30000	3600	24	530	94	N/A	150
LR0115s-50H24D-GU10-2800K-230V	AR111	220-240V	N/A	15	30000	3600	24	530	82	4-Step	124
LR0115s-50H24D-GU10-4000K-230V	AR111	220-240V	N/A	15	30000	3600	24	530	85	4-Step	124
LR0215-100H24D-E27-2800K-230V	PAR30	220-240V	N/A	15	30000	3200	24	530	85	N/A	108
LR0215-100H24D-E27-4000K-230V	PAR30	220-240V	N/A	15	30000	3200	24	530	92	N/A	108
LR0215d-100H24D-E27-2800K-230V	PAR30	220-240V	N/A	15	30000	3200	24	530	85	100-10%	108
LR0215d-100H24D-E27-4000K-230V	PAR30	220-240V	N/A	15	30000	3200	24	530	92	100-10%	108
LR0215s-100H24D-E27-2800K-230V	PAR30	220-240V	N/A	15	30000	3200	24	530	85	4-Step	108
LR0215s-100H24D-E27-4000K-230V	PAR30	220-240V	N/A	15	30000	3200	24	530	92	4-Step	108
LR0308-50H30D-E27-2800K-230V	PAR20	220-240V	N/A	8	25000	1600	30	430	82	N/A	104
LR0308-50H30D-E27-4000K-230V	PAR20	220-240V	N/A	8	25000	1600	30	430	85	N/A	104
LR0308d-50H30D-E27-2800K-230V	PAR20	220-240V	N/A	8	25000	1600	30	430	82	100-10%	104
LR0308d-50H30D-E27-4000K-230V	PAR20	220-240V	N/A	8	25000	1600	30	430	85	100-10%	104
LR0308s-50H30D-E27-2800K-230V	PAR20	220-240V	N/A	8	25000	1600	30	430	82	4-Step	104
LR0308s-50H30D-E27-4000K-230V	PAR20	220-240V	N/A	8	25000	1600	30	430	85	4-Step	104
LR0407-35H35D-E14-2800K-230V	PAR16	220-240V	N/A	7	25000	600	35	270	85	N/A	100
LR0407-35H35D-E14-4000K-230V	PAR16	220-240V	N/A	7	25000	600	35	270	92	N/A	100
LR0407-35H35D-GU10-2800K-230V	PAR16	220-240V	N/A	7	25000	600	35	270	85	N/A	100
LR0407-35H35D-GU10-4000K-230V	PAR16	220-240V	N/A	7	25000	600	35	270	92	N/A	100
LR0408-50H35D-GU10-2800K-230V	PAR16	220-240V	N/A	8	25000	900	35	330	80	N/A	100
LR0408-50H35D-GU10-4000K-230V	PAR16	220-240V	N/A	8	25000	900	35	330	82	N/A	100
LR0615-50H45D-GU10-2800K-230V	AR111	220-240V	N/A	15	30000	1400	45	570	82	N/A	124
LR0615-50H45D-GU10-4000K-230V	AR111	220-240V	N/A	15	30000	1400	45	570	85	N/A	124
LR0615R9-50H45D-GU10-2800K-230V	R9	220-240V	N/A	15	30000	1400	45	570	94	N/A	150
LR0615R9-50H45D-GU10-4000K-230V	R9	220-240V	N/A	15	30000	1400	45	570	94	N/A	150
LR0815-50H08D-GU10-2800K-230V	AR111	220-240V	N/A	15	30000	16000	8	450	82	N/A	124
LR0815-50H08D-GU10-4000K-230V	AR111	220-240V	N/A	15	30000	16000	8	450	85	N/A	124
LR0915-75H30D-E27-2800K-230V	PAR38	220-240V	N/A	15	30000	2200	30	630	82	N/A	116
LR0915-75H30D-E27-4000K-230V	PAR38	220-240V	N/A	15	30000	2200	30	630	85	N/A	116
LR0915s-75H30D-E27-2800K-230V	PAR38	220-240V	N/A	15	30000	2200	30	630	85	4-Step	116
LR0915s-75H30D-E27-4000K-230V	PAR38	220-240V	N/A	15	30000	2200	30	630	92	4-Step	116
LR0920-25M25D-E27-2800K-230V	PAR38	220-240V	N/A	20	30000	6800	25	1200	85	N/A	116
LR0920-25M25D-E27-4000K-230V	PAR38	220-240V	N/A	20	30000	6800	25	1200	92	N/A	116
LR0920-25M45D-E27-2800K-230V	PAR38	220-240V	N/A	20	30000	2200	45	1200	85	N/A	116
LR0920-25M45D-E27-4000K-230V	PAR38	220-240V	N/A	20	30000	2200	45	1200	92	N/A	116
LR0920d-25M25D-E27-2800K-230V	PAR38	220-240V	N/A	20	30000	6800	25	1200	85	100-10%	116
LR0920d-25M25D-E27-4000K-230V	PAR38	220-240V	N/A	20	30000	6800	25	1200	92	100-10%	116
LR0920R9-25M25D-E27-2800K-230V	R9	220-240V	N/A	20	30000	5000	25	900	94	N/A	150
LR0920R9-25M25D-E27-4000K-230V	R9	220-240V	N/A	20	30000	5000	25	900	94	N/A	150

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LED Reflector Series

item no.	product series	voltage (V)	input current (mA)	wattage (W)	rated life (hrs)	maximum luminous intensity (cd)	beam (°)	luminous flux (lm)	CRI (Ra)	dimming format	page no.
LR1107s-35H35D-GU10-2800K-230V	PAR16	220-240V	N/A	7	25000	600	35	270	85	4-Step	101
LR1107s-35H35D-GU10-4000K-230V	PAR16	220-240V	N/A	7	25000	600	35	270	92	4-Step	101
LR1108d-50H35D-GU10-2800K-230V	PAR16	220-240V	N/A	8	25000	900	35	380	80	100-10%	101
LR1108d-50H35D-GU10-4000K-230V	PAR16	220-240V	N/A	8	25000	900	35	380	82	100-10%	101
LR1305-30D-GX53-2800K-230V	GX53	220-240V	N/A	5	30000	850	30	850	82	N/A	120
LR1305-30D-GX53-4000K-230V	GX53	220-240V	N/A	5	30000	850	30	850	85	N/A	120
LR1305-60D-GX53-2800K-230V	GX53	220-240V	N/A	5	30000	350	60	350	82	N/A	120
LR1305-60D-GX53-4000K-230V	GX53	220-240V	N/A	5	30000	350	60	350	85	N/A	120
LR1412d-75H30D-E27-2800K-230V	PAR30S	220-240V	N/A	12	30000	2300	30	N/A	82	100-10%	113
LR1412d-75H30D-E27-4000K-230V	PAR30S	220-240V	N/A	12	30000	2300	30	N/A	85	100-10%	113
LR1506-35H24D-GU10-2800K-230V	PAR16	220-240V	N/A	6	25000	1300	24	240	82	N/A	100
LR1506-35H24D-GU10-4000K-230V	PAR16	220-240V	N/A	6	25000	1300	24	240	85	N/A	100
LR1506-35H36D-GU10-2800K-230V	PAR16	220-240V	N/A	6	25000	600	36	240	82	N/A	100
LR1506-35H36D-GU10-4000K-230V	PAR16	220-240V	N/A	6	25000	600	36	240	85	N/A	100

LED Converter

item no.	type	mains input voltage (V)	input voltage range (V)	output voltage (V)	lamp wattage (W)	output current (mA)	rated life (hrs)	power factor (λ)	maximum system wattage (W)	LED lamps supported^	page no.
LD0106-K12	Constant Voltage	220-240V	180-260V	DC 12V	6	500	50000	>0.4	8	1	145
LD0108x1v-C420	Constant Current	120-240V	120-240V	DC 20V	8	420	50000	>0.9	11	2	145
LD0110x1v-C460	Constant Current	120-240V	120-240V	DC 20V	10	460	50000	>0.9	13	3, 4	145
LD0210x1v-C460	Constant Current	220-240V	180-260V	DC 20V	10	460	50000	>0.5	13	3, 4	145
LD0310x1v-C500	Constant Current	120-240V	120-240V	DC 20V	10	500	50000	>0.9	13	7, 8, 9	145
LD0115x1v-C380	Constant Current	120-240V	100-240V	DC 40V	15	380	50000	>0.9	20	5	145
LD0116x1v-C770	Constant Current	220-240V	180-260V	DC 20V	16	770	50000	>0.9	21	6	145

^ LED lamps supported:

1.	ER1006-35H24D-GU5.3-2800K ER1006-35H24D-GU5.3-2400K	ER1006-35H24D-GU5.3-4000K ER1006-35H36D-GU5.3-2400K	ER1006-35H36D-GU5.3-2800K	ER1006-35H36D-GU5.3-4000K
2.	ER0408-35H36D-GU5.3-2800K	ER0408-35H36D-GU5.3-4000K		
3.	ER0510-50H24D-GU5.3-2800K	ER0510-50H24D-GU5.3-4000K	ER0510-50H36D-GU5.3-2800K	ER0510-50H36D-GU5.3-4000K
4.	ER1810-50H12D-GU5.3-2800K-20V	ER1810-50H12D-GU5.3-4000K-20V		
5.	ER0815-20M25D-E27-2800K	ER0815-20M25D-E27-4000K		
6.	ER0716-20M24D-GX8.5-2800K	ER0716-20M24D-GX8.5-4000K		
7.	ER0110-50H24D-G53-2800K	ER0110-50H24D-G53-4000K		
8.	ER0210-50H08D-G53-2800K	ER0210-50H08D-G53-4000K		
9.	ER0310-50H45D-G53-2800K	ER0310-50H45D-G53-4000K		

Special Application

item no.	product series	voltage (V)	input current (mA)	wattage (W)	lamp life (hrs)	maximum luminous intensity (cd)	beam (°)	luminous flux (lm)	CRI (Ra)	dimming format	halogen transformer	page no.
ER1006-35H24D-GU5.3-2400K-12V	Mellotone	12V	N/A	6	25000	1000	24	200	82	N/A	#	153
ER1006-35H36D-GU5.3-2400K-12V	Mellotone	12V	N/A	6	25000	550	36	200	82	N/A	#	153
LR0115R9-50H24D-GU10-2800K-230V	R9	220-240V	N/A	15	30000	3600	24	530	94	N/A	150	150
LR0115R9-50H24D-GU10-4000K-230V	R9	220-240V	N/A	15	30000	3600	24	530	94	N/A	150	150
LR0615R9-50H45D-GU10-2800K-230V	R9	220-240V	N/A	15	30000	1400	45	570	94	N/A	150	150
LR0615R9-50H45D-GU10-4000K-230V	R9	220-240V	N/A	15	30000	1400	45	570	94	N/A	150	150
LR0920R9-25M25D-E27-2800K-230V	R9	220-240V	N/A	20	30000	5000	25	900	94	N/A	150	150
LR0920R9-25M25D-E27-4000K-230V	R9	220-240V	N/A	20	30000	5000	25	900	94	N/A	150	150
LS0107-E27-2700K-230V	Crown Silver	220-240V	N/A	7	30000	N/A	N/A	N/A	85	N/A	155	155
LS0107-E27-4000K-230V	Crown Silver	220-240V	N/A	7	30000	N/A	N/A	N/A	92	N/A	155	155

Please visit www.megamanlighting.com/RHT for the list of recommended halogen transformer.

LED Non-Directional Lamp

item no.	product series	voltage (V)	wattage (W)	rated life (hrs)	luminous flux (lm)	CRI (Ra)	dimming format	energy label	page no.
LC0104CS-E14-2700K-230V	Candle	220-240V	4	30000	127	85	N/A	A	136
LC0104CS-E14-4000K-230V	Candle	220-240V	4	30000	127	88	N/A	A	136
LC0104CS-E27-2700K-230V	Candle	220-240V	4	30000	127	85	N/A	A	136
LC0104CS-E27-4000K-230V	Candle	220-240V	4	30000	127	88	N/A	A	136
LC0105CS/SE-E14-2700K-230V	Candle	220-240V	5	30000	210	80	N/A	A	136
LC0105CS/SE-E14-4000K-230V	Candle	220-240V	5	30000	210	80	N/A	A	136
LC0105CS/SE-E27-2700K-230V	Candle	220-240V	5	30000	210	80	N/A	A	136
LC0105CS/SE-E27-4000K-230V	Candle	220-240V	5	30000	210	80	N/A	A	136
LC0305dCSv2-E14-2800K-230V	Candle	220-240V	5	25000	240	80	100-10%	A	137
LC0305dCSv2-E14-4000K-230V	Candle	220-240V	5	25000	240	80	100-10%	A	137
LC0305dOPv2-E14-2800K-230V	Candle	220-240V	5	25000	240	80	100-10%	A	137
LC0305dOPv2-E14-4000K-230V	Candle	220-240V	5	25000	240	80	100-10%	A	137
LG0408dOPv2-E27-2800K-230V	Classic	220-240V	8	25000	420	80	100-10%	A	140
LG0408dOPv2-E27-4000K-230V	Classic	220-240V	8	25000	420	80	100-10%	A	140
LG0505dOPv2-E27-2800-230V	Classic	220-240V	5	25000	240	80	100-10%	A	142
LG0505dOPv2-E27-4000-230V	Classic	220-240V	5	25000	240	80	100-10%	A	142
LG0708dOPv2-E27-2800K-230V	Classic	220-240V	8	25000	420	82	100-10%	A	141
LG0708dOPv2-E27-4000K-230V	Classic	220-240V	8	25000	420	85	100-10%	A	141
LG0808dOPv2-E27-2800K-230V	Classic	220-240V	8	25000	420	80	100-10%	A	141
LG0808dOPv2-E27-4000K-230V	Classic	220-240V	8	25000	420	80	100-10%	A	141
LG0911dOP-E27-2800K-230V	Classic	220-240V	11	30000	820	80	100-10%	A	140
LG0911dOP-E27-4000K-230V	Classic	220-240V	11	30000	820	80	100-10%	A	140
LG1014dOPv2-E27-2800K-230V	Classic	220-240V	14	25000	810	80	100-10%	A	141
LG1014dOPv2-E27-4000K-230V	Classic	220-240V	14	25000	810	80	100-10%	A	141
LG1114dOPv2-E27-2800K-230V†	Classic	220-240V	14	25000	810	80	100-10%	A	141
LG1114dOPv2-E27-4000K-230V†	Classic	220-240V	14	25000	810	80	100-10%	A	141

† Preliminary data

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Compact Fluorescent Lamp										
item no.	product series	voltage (V)	input current (mA)	wattage (W)	rated life (hrs)	luminous flux (lm)	dimming format	external ballast ^	energy label	page no.
4P311i-GY29.3-2700K-230V	Plug-in Tube	220-240V	N/A	11	15000	650	N/A	N/A	A	162
4P311i-GY29.3-6500K-230V	Plug-in Tube	220-240V	N/A	11	15000	585	N/A	N/A	A	162
4P315i-GY29.3-2700K-230V	Plug-in Tube	220-240V	N/A	15	15000	900	N/A	N/A	A	162
4P315i-GY29.3-6500K-230V	Plug-in Tube	220-240V	N/A	15	15000	810	N/A	N/A	A	162
4P320i-GY29.3-2700K-230V	Plug-in Tube	220-240V	N/A	20	15000	1200	N/A	N/A	A	162
4P320i-GY29.3-6500K-230V	Plug-in Tube	220-240V	N/A	20	15000	1080	N/A	N/A	B	162
4P424i-R7s-2700K-230V	R7s	220-240V	N/A	24	15000	1519	N/A	N/A	A	175
4P424i-R7s-6500K-230V	R7s	220-240V	N/A	24	15000	1367	N/A	N/A	B	175
4P515i-GY29.3-2700K-230V	Plug-in Tube	220-240V	N/A	15	15000	720	N/A	N/A	B	162
4P515i-GY29.3-6500K-230V	Plug-in Tube	220-240V	N/A	15	15000	650	N/A	N/A	B	162
4P518i-GY29.3-2700K-230V	Plug-in Tube	220-240V	N/A	18	15000	1008	N/A	N/A	A	162
4P518i-GY29.3-6500K-230V	Plug-in Tube	220-240V	N/A	18	15000	910	N/A	N/A	B	162
D652-E27-2700K-230V	Jumbo Lamp	220-240V	N/A	52	30000	3460	N/A	N/A	B	173
D652-E27-6500K-230V	Jumbo Lamp	220-240V	N/A	52	30000	3290	N/A	N/A	B	173
D672-E27-2700K-230V	Jumbo Lamp	220-240V	N/A	72	30000	4800	N/A	N/A	B	173
D672-E27-6500K-230V	Jumbo Lamp	220-240V	N/A	72	30000	4560	N/A	N/A	B	173
GHC01050i-E27-2700K-230V	CLUSTERLITE®	220-240V	N/A	50	15000	2700	N/A	N/A	B	169
GHC01050i-E27-6500K-230V	CLUSTERLITE®	220-240V	N/A	50	15000	2400	N/A	N/A	B	169
HC01040i-E27-2700K-230V	CLUSTERLITE®	220-240V	N/A	40	15000	2680	N/A	N/A	A	168
HC01040i-E27-6500K-230V	CLUSTERLITE®	220-240V	N/A	40	15000	2450	N/A	N/A	B	168
HC01060i-E27-2700K-230V	CLUSTERLITE®	220-240V	N/A	60	15000	4000	N/A	N/A	B	168
HC01060i-E27-6500K-230V	CLUSTERLITE®	220-240V	N/A	60	15000	3800	N/A	N/A	B	168
HC01080i-E27-2700K-230V	CLUSTERLITE®	220-240V	N/A	80	15000	5400	N/A	N/A	B	168
HC01080i-E27-6500K-230V	CLUSTERLITE®	220-240V	N/A	80	15000	5130	N/A	N/A	B	168
HC01080i-E40-2700K-230V	CLUSTERLITE®	220-240V	N/A	80	15000	5400	N/A	N/A	B	168
HC01080i-E40-6500K-230V	CLUSTERLITE®	220-240V	N/A	80	15000	5130	N/A	N/A	B	168
HC01100i-E27-2700K-230V	CLUSTERLITE®	220-240V	N/A	100	15000	6700	N/A	N/A	N/A	168
HC01100i-E27-6500K-230V	CLUSTERLITE®	220-240V	N/A	100	15000	6365	N/A	N/A	B	168
HC01100i-E40-2700K-230V	CLUSTERLITE®	220-240V	N/A	100	15000	6700	N/A	N/A	N/A	168
HC01100i-E40-6500K-230V	CLUSTERLITE®	220-240V	N/A	100	15000	6365	N/A	N/A	B	168
HC01120x-E40-2700K-230V	CLUSTERLITE®	220-240V	650	120	15000	8640	N/A	1	N/A	168
HC01120x-E40-6500K-230V	CLUSTERLITE®	220-240V	650	120	15000	8200	N/A	1	N/A	168
HC01200x-E40-2700K-230V	CLUSTERLITE®	220-240V	1020	200	15000	14400	N/A	2	N/A	168
HC01200x-E40-6500K-230V	CLUSTERLITE®	220-240V	1020	200	15000	13680	N/A	2	N/A	168
HC01320x-E40-2700K-230V	CLUSTERLITE®	220-240V	1560	320	15000	23000	N/A	3	N/A	168
HC01320x-E40-6500K-230V	CLUSTERLITE®	220-240V	1560	320	15000	21850	N/A	3	N/A	168
HC02060i-E27-2700K-230V	CLUSTERLITE®	220-240V	N/A	60	15000	4200	N/A	N/A	B	169
SB0308d-2700K-230V	Self-Ballasted Linear	220-240V	70	8	10000	440	100-10%	N/A	N/A	171
SB0308d-6500K-230V	Self-Ballasted Linear	220-240V	70	8	10000	396	100-10%	N/A	N/A	171
SB0308i-2700K-230V	Self-Ballasted Linear	220-240V	70	8	18000	440	N/A	N/A	A	171
SB0308i-6500K-230V	Self-Ballasted Linear	220-240V	70	8	18000	396	N/A	N/A	A	171
SB0316i-2700K-230V	Self-Ballasted Linear	220-240V	130	16	18000	890	N/A	N/A	B	171
SB0316i-6500K-230V	Self-Ballasted Linear	220-240V	130	16	18000	801	N/A	N/A	B	171
SB0323i-2700K-230V	Self-Ballasted Linear	220-240V	200	23	18000	1375	N/A	N/A	N/A	171
SB0323i-6500K-230V	Self-Ballasted Linear	220-240V	200	23	18000	1238	N/A	N/A	N/A	171

Compact Fluorescent Lamp

item no.	product series	voltage (V)	input current (mA)	wattage (W)	rated life (hrs)	luminous flux (lm)	dimming format	external ballast ˆ	energy label	page no.
T1G2305-G23-2700K-230V	Plug-in Tube	220-240V	N/A	5	10000	265	N/A	N/A	A	164
T1G2305-G23-6500K-230V	Plug-in Tube	220-240V	N/A	5	10000	250	N/A	N/A	B	164
T1G2307-G23-2700K-230V	Plug-in Tube	220-240V	N/A	7	10000	410	N/A	N/A	A	164
T1G2307-G23-6500K-230V	Plug-in Tube	220-240V	N/A	7	10000	390	N/A	N/A	B	164
T1G2309-G23-2700K-230V	Plug-in Tube	220-240V	N/A	9	10000	565	N/A	N/A	A	164
T1G2309-G23-6500K-230V	Plug-in Tube	220-240V	N/A	9	10000	535	N/A	N/A	B	164
T1G2311-G23-2700K-230V	Plug-in Tube	220-240V	N/A	11	10000	900	N/A	N/A	A	164
T1G2311-G23-6500K-230V	Plug-in Tube	220-240V	N/A	11	10000	850	N/A	N/A	A	164
T1GX24Q332-GX24q3-2700K-230V	Plug-in Tube	220-240V	N/A	32	15000	2400	N/A	4, 5, 6	B	163
T1GX24Q332-GX24q3-6500K-230V	Plug-in Tube	220-240V	N/A	32	15000	2160	N/A	4, 5, 6	B	163
T1GX24Q442-GX24q4-2700K-230V	Plug-in Tube	220-240V	N/A	42	15000	3200	N/A	4, 5, 6	B	163
T1GX24Q442-GX24q4-6500K-230V	Plug-in Tube	220-240V	N/A	42	15000	2880	N/A	4, 5, 6	B	163
T1GX24Q557-GX24q5-2700K-230V	Plug-in Tube	220-240V	N/A	57	15000	4000	N/A	4, 5, 6	B	163
T1GX24Q557-GX24q5-6500K-230V	Plug-in Tube	220-240V	N/A	57	15000	3600	N/A	4, 5, 6	B	163
T4G24D110-G24d1-2700K-230V	Plug-in Tube	220-240V	N/A	10	10000	600	N/A	N/A	B	164
T4G24D110-G24d1-6500K-230V	Plug-in Tube	220-240V	N/A	10	10000	540	N/A	N/A	B	164
T4G24D113-G24d1-2700K-230V	Plug-in Tube	220-240V	N/A	13	10000	900	N/A	N/A	A	164
T4G24D113-G24d1-6500K-230V	Plug-in Tube	220-240V	N/A	13	10000	810	N/A	N/A	B	164
T4G24D218-G24d2-2700K-230V	Plug-in Tube	220-240V	N/A	18	10000	1200	N/A	N/A	B	164
T4G24D218-G24d2-6500K-230V	Plug-in Tube	220-240V	N/A	18	10000	1080	N/A	N/A	B	164
T4G24D326-G24d3-2700K-230V	Plug-in Tube	220-240V	N/A	26	10000	1800	N/A	N/A	B	164
T4G24D326-G24d3-2700K-230V (CRI:90)	Plug-in Tube	220-240V	N/A	26	10000	1700	N/A	N/A	N/A	164
T4G24D326-G24d3-6500K-230V	Plug-in Tube	220-240V	N/A	26	10000	1620	N/A	N/A	B	164
T4G24D326-G24d3-6500K-230V (CRI:90)	Plug-in Tube	220-240V	N/A	26	10000	1530	N/A	N/A	B	164
T4G24Q110-G24q1-2700K-230V	Plug-in Tube	220-240V	N/A	10	10000	600	N/A	N/A	B	164
T4G24Q110-G24q1-6500K-230V	Plug-in Tube	220-240V	N/A	10	10000	540	N/A	N/A	B	164
T4G24Q113-G24q1-2700K-230V	Plug-in Tube	220-240V	N/A	13	10000	900	N/A	N/A	A	164
T4G24Q113-G24q1-6500K-230V	Plug-in Tube	220-240V	N/A	13	10000	810	N/A	N/A	B	164
T4G24Q218-G24q2-2700K-230V	Plug-in Tube	220-240V	N/A	18	10000	1200	N/A	N/A	B	164
T4G24Q218-G24q2-6500K-230V	Plug-in Tube	220-240V	N/A	18	10000	1080	N/A	N/A	B	164
T4G24Q326-G24q3-2700K-230V	Plug-in Tube	220-240V	N/A	26	10000	1800	N/A	N/A	B	164
T4G24Q326-G24q3-6500K-230V	Plug-in Tube	220-240V	N/A	26	10000	1620	N/A	N/A	B	164
W1711i-GY29.3-2700K-230V	Plug-in Tube	220-240V	N/A	11	15000	600	N/A	N/A	A	162
W1711i-GY29.3-6500K-230V	Plug-in Tube	220-240V	N/A	11	15000	570	N/A	N/A	A	162
W1715i-GY29.3-2700K-230V	Plug-in Tube	220-240V	N/A	15	15000	900	N/A	N/A	A	162
W1715i-GY29.3-6500K-230V	Plug-in Tube	220-240V	N/A	15	15000	850	N/A	N/A	A	162
W1720i-GY29.3-2700K-230V	Plug-in Tube	220-240V	N/A	20	15000	1200	N/A	N/A	A	162
W1720i-GY29.3-6500K-230V	Plug-in Tube	220-240V	N/A	20	15000	1140	N/A	N/A	B	162
W1725i-GY29.3-2700K-230V	Plug-in Tube	220-240V	N/A	25	15000	1519	N/A	N/A	A	162
W1725i-GY29.3-6500K-230V	Plug-in Tube	220-240V	N/A	25	15000	1440	N/A	N/A	B	162

ˆ External Ballast	1. CP010121 2. CP010200 3. CP010320 4. B05P0232 5. B05P0242 6. B05P0257

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