

LIGHTINGEUROPE position on the review of the Stage 6 Requirements of Commission Regulation (EC) No 244/2009

V1.0/ 12 November 2013

Introduction

LightingEurope, the representation of the European lighting industry representing 17 national lighting associations next to 15 major lighting companies active on the European and global lighting market, takes note of the Working document issued by the European Commission DG ENER on the review of stage 6 requirements of Reg. 244/2009. LightingEurope has a high interest in accompanying a profound stakeholder consultation prior to the Consultation Forum scheduled for 25 November 2013. Such interest is based on the fact that any decision made on the Ecodesign requirements at stake has a direct and immediate impact predominately on the employment situation in the European lighting industry and on European consumers' interest. Whereas the European lighting industry has proven in the past to be a trustful stakeholder in implementing Ecodesign legislation that leads to higher energy efficiency in Europe, any further legislative projects as the one at stake have to take into account the economic, social and technical reality the European lighting industry and its employees face in times of unprecedented changes to the lighting sector. LightingEurope is convinced that the increasing "ledification" of light and the related disruptive changes to the entire lighting sector should be seen as opportunities for the European lighting industry. "Ledification" can help maintain and possibly even increase the industry's competitive situation as a global technology leader without compromising the economic foundation to successfully complete the step into new technologies and new lighting applications (see Annex II, LED production in EU, examples of high quality LED lamps produced by LightingEurope manufacturers in Belgium, Germany, Hungary, Italy and Poland).

Context

As the Commission points out in its working paper, the revision of stage 6 requirements is part of a larger process of revising lighting related Ecodesign legislation. Art. 7 of Reg. 244/2009 obliges Commission to carry out a revision in the light of technological progress after five years of entering into force. LightingEurope welcomes this decision to carry out the revision of stage 6 requirements outside the more general omnibus revision. In so far the Commission has chosen a practical approach that is covered by the revision requirements of Art. 7, taking into account the particular situation related to stage 6 which required a dedicated analysis of technological process of these specific lamp types.

Against this background, LightingEurope has evaluated the Commission working document and comments on the Recommended Changes to the Regulations as follows:

1. "Changing the entry into force of the stage 6 requirements to 1st September 2018, allowing LED technology to mature further and reach an optimal time point in terms of monetary and energy savings"

LightingEurope welcomes Commission's remark on the fact that, the original predictions concerning Halogen lamps, forecasted in 2009 during the drafting of the 244 Regulation, might need to be adapted in light of technological progress, evaluating the appropriateness before the ban on C-class halogens would come into force in 2016¹.

In fact Halogen lamps were predicted to reach the B-class before 2016 through innovation and technological development. In other words, during the decision making process in 2008-2009, it was not the intention of the stage 6 requirements to phase-out non-directional screw and bayonet-based halogen mains-voltage lamps.

Today, however, recent analyses have shown that currently NO non-directional screw- and bayonet-based halogen mains-voltage lamps on the market can achieve the requirements from stage 6 in Table 1 of 244/2009. Even in the next years it is not realistic to produce such a lamp due to high technical constraints and high investments, resulting in far too high prices for consumers versus LED and current mains-voltage halogen lamps.

¹ Due to the new EU Energy Label classification 874/2012 the stages do not follow the efficiency classes any more, but as the term 'B class' is used by EU COM for lamps that meet stage 6 requirements in Regulation 244/2009 and 'C class' for lamps meeting stage 1-5 we follow this wording.

Stages 1 to 5 have already increased the minimum efficiency for non-directional screw- and bayonet-based halogen mains-voltage lamps to a level that is at 75% of stage 6.

Since at the moment no available replacement solutions can be found in the market, the result of maintaining stage 6 as it is now would be an unexpected and additional banning of another technology on top of the original planned incandescent phase-out. Given this, Commission's approach outlined in the working paper to postpone the entry date of stage 6 requirements is welcomed by LightingEurope. However, based on the following deliberations the proposed date of 2018 is not adequate enough to rule out the negative consequences for European consumers and the European industry. This reasoning is explained by the following:

a) Impact on European Consumers

Each technology produces light with a different distribution pattern. Halogen lamps are omni-directional point sources, CFL lamps are omni-directional diffuse sources, LED chips are directional point sources. Luminaires designed for halogen lamps are generally designed for omni-directional point sources. Other lamp types may or may not function properly in a luminaire in a specific application. It is up to the user to determine whether or not a CFL or LED replacement lamp is acceptable. In many applications they are acceptable, but in many other applications they are not.

It needs to be pointed out in this context that learnings from the phase out of incandescent lamps that started in 2009 should be taken into account when determining stage 6 requirements. Upholding these requirements or even postponing them to only 2018 would lead to a factual and unintended phase out of wellestablished and demanded products on the European lighting market. It is to be expected that the consumer's outrage might be comparable to the one in 2009.

In some applications, a halogen lamp is required for the luminaire to function properly in terms of light emission, quantity of light, light distribution, dimmability, heat management and quality of emission. If no halogen lamp is available anymore, the only other option is to completely replace the luminaire which would have a severe negative economic impact on the consumer.

Reasonable estimations from industry side indicate that more than 200 million luminaires in European households would factually become unusable under implementation of stage 6 requirements. Given this, also a transition period until 2018 would give only five years to European consumers to replace their luminaires.

This is also valid for designer luminaires that often can be qualified as works of artistic value or are integrated in furniture at a higher price or priceless luminaires that can be found in top level lighting installations and in museums. Consequently luminaires of this type and quality that have been put on the market during the last 50 years, mirroring an époque of art history, may not be used anymore if stage 6 requirements enter into force as foreseen.

Table 1 of the Commission working document EU COM, states that keeping stage 6 would save 9 billion EUR for the consumer. In the same table the costs for luminaire replacement are mentioned, but not put into numbers. Following the calculation below, luminaires with a value of ≤ 10.9 bn have to be replaced.

POSSIBLE PROBLEMS											
Direct costs for EU citizens in prematurely replacing lumi	naires:										
200M luminaires (underestimated)	Price	Share									
Average price for one luminaire only – low cost:	20€	35%									
Average price for one luminaire only – normal price:	50€	50%									
Average price for one luminaire only – high rate:	150€	15%									
200M€ x 0.35 x 20€ + 200M€ x 0.5 x 50€ + 200M€ x 0).15 x 150€	€ =									
1400M€ + 5000M€ + 4500M€ = 10900M€ → ne	arly 10.9 k	oillion €									
This estimation is without considering costs related to ele	octriciane' r	orformanco									

This estimation is without considering costs related to electricians' performance, accessories, wiring and new lamps.

In the end (costs minus savings) until 2025 consumer would have costs for replacing luminaires of 1.9bn€!

Together with the additional costs \in 3.1 to \in 4.6bn caused by a ban as calculated in Table 19 of the review study (p. 40) **the overall costs for the keeping stage 6 becomes:** \in 5 to 6.5bn until 2025.

b) Impact on European Jobs and European Industry

Moreover, as the Commission rightly points out, the **negative employment impact** of maintaining Stage 6 requirements should not be forgotten. In total, the VHK VITO study estimated that if the mains-voltage halogens will be **phased out, approximately 7,300 jobs related to halogen production will be jeopardized**. (Trade Unions are talking about 11000 jobs). VHK VITO study sees also a potential positive impact of 500 jobs; this leaves a net (maximum) of 6,800 EU jobs affected.

Not postponing the phase out of the lamps at stake might threaten the competitiveness of the European industry. This is an argument which at first sight might sound paradoxical, but is logical when evaluated more profoundly. Currently the accumulated number of the lamps at stake produced in Europe amounts to 168min unit (VHK study, table 3, p.23). Given the current changes the lighting industry is facing, which re-shapes established business models, accelerates innovation in solid state lighting technology and requires unprecedented investments from European lighting companies to maintain their leading competitive status against global competitors, any legislative measure must be balanced. Unlike other global regions, Europe has refrained from active investment supporting SSL that would accelerate the technology shift and has concentrated on flanking political and legislative measures to accompany the current technology revolution in lighting. The European lighting industry is aware that investments into technology shift need to come from within the industry. Limiting the time to earn the resources to carry out the investments in new technology to only 2018 will severely hamper the competitive situation of the European lighting industry compared to its global competitors. The European legislator should refrain from imposing such measures in order to enable the European industry to conclude the technology shift towards SSL from a point of strength.

Finally, the intention in Reg. 244/2009 was not to ban a lamp technology, like halogen filament, so luminaire manufacturers have been designing products with E14 and E27 sockets until today and intend to continue to do so. Furthermore, following to the preface in Reg. 874/2012 and 1194/2012, luminaire manufacturers are now working in order to provide the necessary information to the end users and to clearly identify the lamp with which the luminaire is compatible (according to Regulation 1194/2012 requirements). It especially counts for SME that investments in web based communication as required under the Regulations cited above leads already today to a high administrative and financial burden.

c) Impact on Energy Savings

The previous steps of 244/2009 regulation have provided the biggest contribution to the energy savings. A ban of mains-voltage halogen lamps could have a negative effect on future savings.

The efficiency and quality of LED lamps is increasing. However, the technology still needs further development and improvements. Therefore, if consumers are forced to use CFLi / LED as early as 2016, sockets will be blocked to further improvements of energy efficiency for the next 10/25 years.

Table 2 (page 16) of the review study is showing the development of the price and the efficiency of a LED lamp with 500lm. Over the next years the lumen you will get per EURO will increase significantly.

incl. VAT (50	ncl. VAT (500 lm lamp) up to 2020 LightingEurope; 2021-2030 prices, extrapolation VHK)													
Year	2012		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025		2030
lm/W	58		93	99	105	112	118	125	130	134	138	142		169
price in f	18.0		10.0	9.0	8.5	8.0	7.5	7.0	6.5	6.0	5.5	5.0	T	2.5

 Table 2. MV LED retrofit lamp, efficacy and price projections EU 2012-2025

 (sources: for efficacy CLASP 2013, based on US DoE MYPP projections; for EU lamp consumer prices

In 2016 you will get 50lm/ \in , in 2020 it is already 66,67lm/ \in and it doubles to 100lm/ \in in 2025.



Table 1: Im/€ based on table 2 of the review study.

One parameter for EcoDesign measures is the significant potential for improvement in terms of its environmental impact without entailing excessive costs.

Therefore it is important to compare the potential savings from stage 6 with the savings coming from the other banning activities in 244/2009, 245/2009 and 1194/2012.

In 2020 the estimated yearly savings from 244/2009 are 39TWh (preamble 13), 38TWh from 245/2009 (preamble 12) and 25TWh from 1194/2012 combined with 874/2012 (preamble 14). This leads to total saving of 102TWh in 2020.

The year with largest difference between yearly savings with and without stage 6 amounts to 9,4TWh in 2020 (see VHK review study, page 28).

The intention of stage 6 was not to increase the minimum efficiency to the level of LED, but to allow a more efficient HAL MV. This would lead to a difference of 4,5TWh in 2020 (see Annex II).

Original planned savings from all regulations in 2020: 102TWh.

Savings from moving to LED instead of class B HAL MV in 2020: 102TWH + 4,5TWh = 106,5TWh.

Savings abolishing stage 6 in 2020: 106,5TWh – 9,4TWh = 97,1TWh.

Following the original approach to increase the HL-MV efficiency from C-class to B-class accumulated only 3,5TWh would be saved until 2060!

Currently EU COM is reviewing all existing measures and further savings can be expected.

d) Unsatisfying Replacement situation for Halogen Lamps at stake

Although LightingEurope recognizes the reasoning of the European Commission to propose a shift to 2018, it appears doubtful if postponing the entry into force by 2018 can actually overcome the challenges that have been identified for 2016. It is to be expected that despite a further decrease of prices for LED within the next five years, the availability and penetration rate for consumer lighting will not have changed as significantly as the assumed scenario in the working paper suggests These assumptions on market transformation as outlined in the working paper are very difficult to verify and positioning the description of the transformation process to one study appears to be challenging. The working paper tends to be based on projections that may be valid for Member States where a price ratio of approximately \in 10 for a good quality LED replacement lamp might be acceptable to domestic consumers. This is not a picture that would count for the EU28 by 2018.

Conclusions

LightingEurope welcomes Commission's proposal to postpone the entry into force of the stage 6 requirements. Nevertheless, the LightingEurope recommends the abolishment of Stage 6 requirements, allowing LED technology to mature further and to grow to a level of market penetration that made it a viably alternative for all EU citizens after having reached an optimal point in terms of monetary and energy savings, without compromising jobs.

2. "Removing the current loophole by extending the stage 6 requirements to halogen lamps with G9 and R7s socket"

LightingEurope does not identify a real loophole in the exception of certain halogen lamps with a G9 and R7s socket from stage 6, nor the assumption that this loophole could significantly undermine the success of the stage 6 requirements in terms of energy savings.

In the view of LightingEurope, the Commission working paper gives too much relevance to so-called adapter-kits for these types of lamp sockets and draws a picture as if these adapters are sold in high volumes. According to the market observations of the European lighting industry, there is only one manufacturer of these adapter-kits and the availability in retail, and subsequently the presence on the market, is limited.

The adapter together with a bulb costs between 8 and 11 Euros, making it a niche product for special applications. It would appear to be doubtful to base the argument of including G9 and R7s into the requirements of stage 6 on the evaluation of a small market segment.

In addition to the huge negative impact which would arise if G9 and R7s socket halogen lamps would not be on the market anymore, no replacement would be available to consumers. The absence of replacement possibilities for many applications where these lamp types are used justifies treating them differently from other MV halogen lamps. It is to be expected that a phase out even at the end of the decade would leave a significant amount of consumers with luminaires in their homes where no replacement at all can be found. It is the understanding of LightingEurope that any potential inclusion of G9 and R7s into stage 6 requirements would follow the overall timeline of the entry in force of the requirements.

Conclusion

As long as no further evidence can be provided that G9 and R7s lamps are used as loopholes in Reg. 244/2009, the European legislator should refrain from including these lamp types into the scope of the revision at stake. However LightingEurope agrees to the notion that G9 and R7s should not be treated differently from the overall strategy agreed by Member States to MV halogens, preferably adopted in alignment with point 1 of this position paper.

3. "Introducing a provision that luminaires sold after 1st September 2015 should be compatible with LED technology to prevent future obstacles to efficient lighting"

LightingEurope has read with high interest the Commission's initiative of amending Regulation 1194/2012 introducing a provision that luminaires should be compatible with LED technology to prevent future obstacles to efficient lighting. From LightingEurope's point of view this is an approach that is to be embedded in the concept of a coherent lighting strategy as also outlined in the working paper. The vision outlined in the working paper on such coherent strategy and also to use the recently launched preparatory study on lighting systems to evaluate the possibility of further supporting the market transition to LED lighting merits very careful consideration. LightingEurope is looking forward to deepening the dialogue with the Commission and all lighting stakeholders to grasp the opportunities related to:

- Addressing lighting at system level
- Translating Ecodesign into Innovation
- Enabling the industry to make use of the available resources to accelerate innovation and research into SSL

It might be too early to judge if the proposed date "1st September 2015" is too ambitious, but the success of such coherent strategy has to be seen as a process rather than a single action.

In the course of this discussion we would like to address the following:

- LED is not the only efficient lighting technology and may not be suited to all applications (especially in the Tertiary sector).
- The development of LED lamps and modules is still very rapid and the availability of new/current products, even in 6 months' time, is unknown. The format of new LED lamps and modules (even Zhaga) that will be available in 2015 is unknown.
- The crossover of LED technology between the Domestic and Tertiary sectors means that even if the proposal is limited to just Domestic there would be an impact on Tertiary.
- Even if the proposal is limited to just retrofit lamps as covered by 244/2009, compatibility would need to be carefully defined as hidden issues such as thermal compatibility can negate any benefits and mean a LED product is not 100% compatible in all luminaires.
- The equivalence of compatible LED lamps need to be fully considered from an installation perspective e.g. LED tubes.
- A deadline of 1 September 2015 is very close in terms of product development cycles and meeting this deadline would be impossible in many cases.



Annex I: LED production in EU

The best quality perfectly presented

Special POS Tools will grab your customers' attention highlighting the OSRAM "Made in Italy" LED lamp offering in an especially appealing manner.



01 Display with wobbler and the main shelf

The "Made in Italy" display is immedi-ately noticeable through the special design yet still integrates perfectly into the existing display series. On shelf simple and flexible blister hook attachments put the products in the spotlight.

02 Flyer for the end-consumer The flyer conveys to your customers in a quick and compact manner the special advantages of the OSRAM "Made in Italy" LED lamps. Individual tear-off sheets on hole-punched blocks with simple fastening to the shelf.

03 Demo Box with dimming switch With the aid of the demo box your customers can see for their own eves the special light effect of the OSRAM LED lamps.

-1	Product reference	Product number (EAN)	Replacement for wallage	Energy savings	3	W	lm	1	V	tn		100
-												
	LED lamps in bulb shape, wa	arm white light,	dimn	nable								
	LED lamps in bulb shape, wa LED SUPERSTAR CLASSIC A40 advanced	arm white light, 4052899913790	dimn 40	85%	E27	6	470	A+	dear sparkling	20,000	110	60
) 	LED SUPERSTAR CLASSIC A40 advanced LED SUPERSTAR CLASSIC A40 advanced LED SUPERSTAR CLASSIC A40 advanced	4052899913790 4052899911185	40 40	85% 85%	E27 E27	6	470 470	A+ A+	clear sparkling frosted	20,000	110 110	60 60
	LED lamps in bulb shape, we LED SUPERSTAR CLASSIC A40 advanced LED SUPERSTAR CLASSIC A40 advanced LED SUPERSTAR CLASSIC A60 advanced	arm white light, 4052899913790 4052899911185 4052899913813	40 40 60	85% 85% 85% 83%	E27 E27 E27	6 6 10	470 470 810	A+ A+ A+	dear sparkling frosted dear sparkling	20,000 20,000 20,000	110 110 110	60 60 60

*Compared to accrimentional leandeacent lamp *Unspace LT0950 - reactional luminous flux of T0%compared tostarting luminous flux with 50% of the lastalled lamps *ECD lamps can be periaded with a wide variety of commercially-available dimmars; datalis and results of compatibility tests can be seen a twww.caram.com/dim and it the additional technics product information shareds that are in linked than.

OSRAM GmbH	Marcel-Breuer-Strasse 6	Phone	+49 (0)89-6213-0		12	Papar Irun Pagis Alfile autores
Head Office	80807 Munich, Germany	Fax	+49 (0)89-6213-20 20	www.osram.com		FSC*C008812

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DATA :

LED Directional

Product information

This product range enables substantial energy savings and is a direct replacement for 50W halogen in an IEC Standard dimension, consuming only 6W of power as well as providing high quality dimming performance.

Features

- IEC-size
- Dimming (20-100%)
- Available in 2700K, 3000K and 4000K
- Total Lumens 320-340-360im
- 25 degree and 35 degree beam angles
- Long life for reduced maintenance costs
- R/UV-radiation free, Mercury free, Low heat emission

Application areas

LED GU10 dimmable lamps offer significant energy savings versus traditional lamps. Coupled with long life, they are superb replacements where standard incandescent or halogen lamps are in use such as: accent, display and general lighting applications in a commercial, industrial or residential environments.

Standards

- IEC60357: Tungsten halogen lamps (non-vehicle) Performance specifications.
- IEC62560: Self-ballasted LED lamp for general lighting services voltage 50–250V-safety specification.
- IEC62471: Photobiological safety of lamps and lamp systems.





- EN55015: Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment.
- EN61547: Equipment for general lighting purposed EMC immunity requirements.
- EN61000-3-2: Limits for harmonic current emissions.
- EN61000-3-3: Limitation of voltage fluctuations and flicker in low voltage supply systems for equipment with rated current ≤16A.

6W GU10 LED lamps have the following common features

- 220-240V with power factor of 0.7
- Complete range with CRI>80 and 5-step MacAdam colour consistency
- Efficiency up to 60lm/W
- Input current: 40mA
- Operating temperature: -20°C to +40°C

Specification summary

Wattage (W)	Energy consumption (kWh/1000h)	Bose	ProductDescription	Condelo (cd)	Total Lumens (Im)	Roted Lumen in 90* cone (Im)	Beom Angle	CCT K)	Ufe hours L70/850	Power factor	CRI	Minimum Switch Cycles	Padk Qty	Product Code	BEC	Place of menufacturing
6	600	GUID	LEDED/GU10/827/220-240V/AL	1250	320	300	25	2700	45,000	0.7	80	25000	1/10	98720	A	MH*
6	600	GULD	LEDED/GU10/827/220-240V/WPL	700	320	300	35	2700	45,000	0.7	80	25000	1/10	98721	A	MH+
6	600	GULO	LEDED/GU10/830/2204240V/FL	1280	340	320	25	3000	45,000	0.7	80	25000	1/10	98722	A	MH*
6	600	GUID	LE060/GU10/830/220-240V/WFL	720	340	320	35	3000	45,000	0.7	80	25000	1/10	98723	A	MH+
6	600	GUID	LEDED/GU10/840/220-240V/FL	1400	360	345	25	4000	45,000	0.7	80	25000	1/10	98724	A	MH*
6	600	GUID	LEDED/GU10/840/220-240V/W FL	780	360	340	35	4000	45,000	0.7	80	25000	1/10	98725	A	MH*

*MIH - Made in Hungary

Dimensions

50.2 mm

Maximum T_{hs} recommended





Lumen maintenance at rated life

>70% lumen maintenance by 90% of lamps at 25,000 hours

Operation and maintenance

- Not for use in totally enclosed fixtures.
- Suitable for voltage fluctuations of +/- 10%
- · Switch off mains supply before installing/removing lamp.
- . LED GU10 lamps are dimmable on most common leading edge dimmers, please contact local Sales agent for compatibility.
- · Safe to use on Photo- & Timer-circuits, please contact local Sales agent for compatibility
- Ambient temperature range -20° C to 40°C

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GE Lighting is constantly developing and improving its products. For this reason, all product descriptions in this brachure are intended as a general guide, and we may change geofications in an intensit time in the intensit of product development, without prior natification are util and an advantament. All descriptions in this judication present any general particulars of the goods to which they afer and what not form parts for y contract. Out in this guide has been ablanded in controlled experimental conditions. However, GE Lighting const to accept any liably writing form the relations on work data to the extent permitted by law. LEO Cinectional GU106W Coto Sheet – September 2015



November 2013





Fortimo LED Line systems - surpassing fluorescent efficiency at lowest total cost of ownership

The second generation of Fortimo LED Line systems is the ideal solution for new luminaires which traditionally would have been equipped with fluorescent tubes. The wide range offers a solution for all the different types of fluorescent luminaires from recessed and surface mounted office luminaires to trunking and profile luminaires in retail to waterproof and high bay luminaires in industrial applications. This second generation offers: Increased energy efficiency up to 150 Im/W, improved luminaire manufacturability by reduced mounting time of the modules, by usage of less modules, and cables and by enabling automatic wiring, increased flexibility in cabling and extended range with the Square and High Flux.

High quality of white light

enable office compliant luminaires. The homogeneity is even further family there will be a linear range of Xitanium drivers available, improved for typical office luminaires with the new Fortimo LED all capable of driving different multiples of LED Line modules, Line Square range All Fortimo LED Line systems are min CRI 80 to rising up to 12. For ultimate flexibility and choice these driver meet the indoor requirements and have a colour consistency as we types will be available in fixed output, 1-10V and Touch & DALI know from the traditional fluorescent tubes, 3,5 SCDM.

Smart Systems

The linear driver portfolio developed for the Fortimo LED Line family consists of state of the art.advanced Xitanium drivers. The adjustable output current can be either programmed or set

of the Xitanium driver family, as well as its ability to cope with The Fortimo LED Line systems offer high quality of white light that multiple LED effcacy module upgrades. For the Fortimo LED Line versions. Non isolated drivers will have the same linear dimensions as typcial mainstream T5 drivers. Isolated versions will have a slightly larger dimension.

On top of the different amount of modules driver by one driver, the offering the flexibility to set your own specification of LED system. Xitanium drivers enable the luminaire manufacturer to differentiate on lumen output, efficiency, lifetime per luminaire by just changing with a resistor. High energy efficiency, up to 92 % is a characteristic the current setting This high level of flexibility is unique in the market

2 Fortimo LED Line systems

of LED systems and give the luminaire manufacturer unique chances Fortimo LED Line 2R and 3R systems to differentiate their luminaire while still using Zhaga modules.

The Fortimo LED Line family offers a choice of isolated (low voltage) or non-isolated (high voltage) systems. With non-isolated for general lighting applications where diffuse lighting on the LED Line systems a Class I luminaire must be made, whereby there horizontal plane is key. This range is ideal for incorporating into A non-isolated system has the advantage of being more efficient. cheaper and the driver has shorter dimensions. An isolated system affords the opportunity to make open-louvred Class II luminaires.

Future-proof system

The Fortimo LED Line family falls under the Philips future-proof promise, whereby future LED energy efficiency upgrades do not change the LED Line modules dimensions, lumen output or colour temperature. The design of the Xitanium driver is built around operating windows, which ensure the future proofness of the system. See the Philips LED Line Design-In guide for further information on this on www.philips.com/technology

The Fortimo LED Line range consists of linear, light LED modules and Xitanium linear drivers, with high energy efficiency and high quality of white light. They are intended for luminaire manufacturers who want to replace linear fluorescent as the light source in many different types of luminaires for general lighting.

Fortimo LED Line portfolio

The Fortimo LED Line portfolio consists of 4 main ranges of products, which have been differentiated by the number of rows of LEDs contained on the module. The range with 1 row of LEDs is indentified with 1R; the range with 2 rows of LEDs is identified with 2R; the range with 3 rows of LEDs is identified with 3R and the square range is identified with SQ. All ranges feature a variety of different length modules, lumen packages and colour temperatures. The associated linear Xitanium driver portfolio will include isolated and non isolated drivers, in fixed light output, 1-10 V and DALL versions

Fortimo LED Line 1R system

The Fortimo LED Line 1R system, with 1 row of LEDs on the module, has been designed with high lumen output, up to 2000 lm/ft, which make the 1R range the ideal solution for high application heights. The 1 row of LEDs enables a wide variety of optics and beams from batwing light distribution to tight beams. This makes the 1R range a better choice for the illumination of vertical surfaces or areas where high lighting levels are desired. Typical applications would be luminaires for industry halls, warehousing, supermarkets or indirect lighting in offices.

The Fortimo LED Line 2R system with 2 rows of LEDs on the module and the Fortimo LED Line 3R with 3 rows of LEDs on the module, have been designed to produce high efficiency pure white light. is no possibility of accidentally touching the live parts in the system. Iuminaires for use in general office lighting where energy efficiency and glane control are of utmost importance.

Fortimo LED Line SQ system

The Fortimo LED Line SO system with the square outer dimensions is designed to produce high efficiency pure white and very homogeneous light for recessed, surface mounted and suspended office luminaires.

Composition of LED Line systems

- A typical Fortimo LED Line system consists of:
- A number of LED Line modules
- 1 Xitanium driver
- · Wires from driver to module, between modules and return end wires. Standard bulk wire can be used so no special cables are provided by Philips

What is new in the Fortimo LED Line Gen 2?

- Increased energy efficiency up to 150 lm/W
- · Improved luminaire manufacturability by reduced mounting time of the modules, by usage of less modules, and cables and by enabling automatic wiring
- Increased flexibility in cabling
- Extended range with the Square and High Flux to enable replacement of truly all traditional fluorescent luminaire





Fortimo LED Line systems 3



RefLED Coolfit ES50 345lm



Sylvania has extended its range of high fixtures and, owed to the improved low quality GU10 LED lamps to replace 50W operating temperature, will also deliver halogen GU10 with the introduction of its RefLED Coolfit GU10 5.5W 345Im. The fixtures. Furthermore, when operated in lamp has been designed to operate at a open fixtures, the lamp will maintain over cooler temperature allowing it to be used 90% lumen maintenance. Manufactured at in enclosed luminaires such as fire-rated Sylvania's state-of-the-art facility in Tienen, downlights, IP65 downlights and small Belgium, this lamp cements the company's

25,000 hours life when used in enclosed spotlights. The lamp is capable of delivering commitment to delivering the very best 50,000 hours life when operated in open quality LED lamps to customers.



SYLVANIA

ART

RefLED Coolfit ES50 345lm

FEATURES

- Direct replacement of 50W halogen lamp
- 5,5W Save up to 85% energy
- 50,000 hours life with 90% lumen maintenance when operated in open fixtures
- Coolfit technology ensures lifetime of 25,000 hours even in enclosed fixtures
- High Luminous Efficacy: Up to 63 Im/W
- IEC standard dimensions true retrofit size
- High power factor 0.8
- 5 year warranty

Code	General description	EAN code	Voltage (V)	Colour name	Colour	Colour in (Kelvin)	Watt (W)	Base	Useful Luminous Flux (Ø90° cone)	Candela (Cd)	Beam (*)	Life (hours)	Equivalent wattage (DIM2)	Ener Clas
0026538	RefLED Coolfit ES50 345LM 827 40° SL	5410288265384	2.20-240V	Homelight	827	2700	5.5	GU10	3.45	600	40	50,000	50	A+
0026539	RefLED Coolfit ES50 345LM 830 40° SL	5410288265391	2 20-240V	Warm White	830	3000	5.5	GU10	345	600	40	50,000	50	A+
0026541	RefLED Coolfit ES50 345LM 830 25° SL	5410288265414	2 20-240V	Warm White	830	3000	5.5	GU10	345	1 200	25	50,000	50	A+
0026540	RefLED Coolfit ES50 345LM 840 40° SL	5410288265407	2 20-240V	Cool White	840	4000	5.5	GU10	345	600	40	50,000	50	A+

BEAM DISTRIBUTION

Beam Cone Diagram

Dimensions (MM)

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RefLED Coolfit ES50 25° Seam Cone D -RefLED Coolfit ES50 40*



SPECTRAL DATA



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RefLED Superia ES63 435lm The only LED ES63 version on the market



The new RefLED Superia ES63 435Lm, is the perfect low energy LED alternative to existing 60W Halogen ES63 lamps. This latest addition to Sylvania's extensive product portfolio reaffirms the brand's commitment to providing LED alternatives for all halogen lamps, maximising the potential for lower operating costs that LED Technology can offer. The new lamp is ideal for use in the typical ES63 applications including downlights, display spotlights and hospitality lighting. The **RefLED Superia ES63 435Lm** uses just 7W of power equaling an 85% energy saving over a halogen equivalent. The lamp also offers 25,000 hours of operation and so helps reduce lamp replacement costs dramatically. The lamp delivers an 435Lm output and is available in 3000K with a beam angle of 25° and 40° degrees.



SYLVANIA

RefLED Superia ES63 435lm

FEATURES

- High light output of 435 lumens = 60W ES63 Halogen
- 7W- save over 85% energy
- Long lifetime 25,000 hours
- High Luminous Efficacy: Up to 62 Im/W
- IEC standard dimensions true retrofit size
- High Power Factor 0.8
- 5 Year warranty



Code	General description	BAN code	Voltage (V)	Colour	Colour in (Kelvin)	Watt (W)	Base	Useful Luminous Flux (Ø90° cone)	Candela (Cd)	Beam (?)	Life (hours)	Equivalent wattage (DIM2)	Energy Class
0026415	RefLED Superia ES63 7W 435Im 830 25°	5410288264158	230	830	3000	7	GU10	435	1800	25	25,000	60	A+
0026416	RefLED Superia ES63 7W 435Im 830 40°	5410288264165	230	830	3000	7	GU10	435	900	40	25,000	60	A+

BEAM DISTRIBUTION

RefLED Superia IS63 7W 25*

RefLED Superia ES63 7W 40°



Dimensions (MM)



To discover for yourself how much your business can save on its energy bills, simply visit our online Savings Calculator at: www.havells-sylvania.com

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SPECTRAL DATA





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Year	MV-HL	LED	LED	LED		LED	MV-HL	LED retro	Total
	stock	retro	retro	retro	effi-	power at	stock	stock	
		stock	sales	ciency		(at	energy	energy	
						500lm)	use (at	Use	
						sales	36W,		
			.,	1 0.47		147	500lm)	T 14// /	
	m units	m units	m units	Im/VV		VV	TVVh/yr	TWn/yr	TWh/yr
2016	1350				93	5.4	24.3	0.0	24.3
2017	1300	103	50		99	5.1	23.4	0.1	23.5
2018	1230	120	70		105	4.7	22.1	0.3	22.4
2019	1125	225	105		112	4.5	20.3	0.5	20.8
2020	985	365	140		118	4.2	17.7	0.8	18.6
2021	815	535	170		125	4.0	14.7	1.2	15.8
2022	615	735	200		130	3.9	11.1	1.5	12.6
2023	397	953	218		134	3.7	7.1	2.0	9.1
2024	207	1143	190		138	3.7	3.7	2.3	6.0
2025	90	1260	117		142	3.5	1.6	2.5	4.1
2026	0	1350	90		148	3.4	0.0	2.7	2.7
2026- 2060		1350			128	3.9		93.0	93.0
Total 201	16- <u>2060,</u> ir	n TWh acc	umulative)			146.1	106.9	252.9

VHK Table 11. Energy Scenario 2017-2025 Abolishing Stage 6

VHK Table 12. Energy Scenario 2017-2025, Keeping Stage 6

Year	MV-	Other	LED	LED	LED	MV-HL	Other	LED	Total
	HL	retro	retro	retro	power at	stock	retro	retro	
	stock	stock	stock	sales	(at	energy	stock	stock	
					500lm)	use (at	energy	energy	
					sales	36W,	use (at	Use	
						500lm)	27W)		
	т	т	т	т	W	TWh/yr	TWh/yr	TWh/yr	TWh/yr
	units	units	units	units					
2016	1350	0	0	0	0	24.3	0.0	0.0	24.3
2017	1013	135	203	203	5.1	18.2	1.8	0.5	20.6
2018	675	270	405	203	4.7	12.2	3.6	1.0	16.8
2019	338	404	608	203	4.5	6.1	5.5	1.4	13.0
2020	0	540	540	203	4.2	0.0	7.3	1.9	9.2
2021		450	450	90	4.0		6.1	2.1	8.1
2022		360	360	90	3.9		4.9	2.2	7.1
2023		270	270	90	3.7		3.6	2.4	6.0
2024		180	180	90	3.6		2.4	2.6	5.0
2025		90	90	90	3.5		1.2	2.6	3.9
2026		0	0	0	3.4		0.0	2.7	2.7
2026-					4.0			101 0	404.0
2060					4.3			101.8	101.8
Total 2016-20	60, in TV	Vh accu	ımulativ	e		60.8	36.4	121.3	218.4

Energy use based on the original assumption that MV-HL will achieve stage 6 in 2016 and a MV-HL lamp with 36W will be replaced by MV-HL with 27W

Year	MV-HL	LED	LED	LED		LED	MV-HL	LED retro	Total
	stock	retro	retro	retro	effi-	power at	stock	stock	
		stock	sales	ciency		(at	energy	energy	
						500lm)	use (at	Use	
						sales	27W,		
							500lm)		
	m units	m units	m units	lm/W		W	TWh/yr	TWh/yr	TWh/yr
2016	1350				93	5.4	24.3	0.0	24.3
2017	1300	103	50		99	5.1	17.6	0.1	17.7
2018	1230	120	70		105	4.7	16.6	0.3	16.9
2019	1125	225	105		112	4.5	15.2	0.5	15.7
2020	985	365	140		118	4.2	13.3	0.8	14.1
2021	815	535	170		125	4.0	11.0	1.2	12.2
2022	615	735	200		130	3.9	8.3	1.5	9.8
2023	397	953	218		134	3.7	5.3	2.0	7.3
2024	207	1143	190		138	3.7	2.8	2.3	5.1
2025	90	1260	117		142	3.5	1.2	2.5	3.7
2026	0	1350	90		148	3.4	0.0	2.7	2.7
2026- 2060		1350			128	3.9		93.0	93.0
Total 201	16-2060, ir	n TWh acc	umulative	;			115.6	106.9	221.9

-> energy use 75% of stage 1-5

Savings in 2020 Abolishing stage 6 vs keeping stage 6 and moving to LED: 18.6-9.2= 9,4TWh

Savings in 2020 Abolishing stage 6 vs keeping stage 6 and moving to stage 6 MV-HL:

18.6-14.1= 4,5TWh

Savings until 2060 abolishing stage 6 vs keeping stage 6 and moving to LED: 252,9-218,4= 34,5TWh

Savings until 2060 Abolishing stage 6 vs keeping stage 6 and moving to stage 6 MV-HL: 221,9-218,4= 3,5TWh