Environmental NGOs Feedback on draft Delegated Directive for RoHS Exemption Categories 4b, 4bI-III, High-Pressure Sodium Lamps With a High Colour Rendering Index (>80) for General Lighting Purposes

26 July 2021

The European Environmental Bureau, the Mercury Policy Project, and the Responsible Purchasing Network[1] welcome the draft proposals from the European Commission to finally revise the annex of the RoHS directive concerning lighting, despite coming with a 5-year delay.

As per our letters sent in December 2019 and January 2020[2], February 2020[3] and February 2021,[4] we strongly urge the European Commission and DG Environment to review and remove exemptions for virtually all fluorescent and most high-intensity discharge (HID) lamps under the Restriction of Hazardous Substances for Electric and Electronic Products (RoHS) Directive, which based on the evidence, we conclude are no longer needed or justified. Phase-outs should take place at the earliest possible date, mainly for the larger categories including compact fluorescent lamps (CFLs), linear fluorescent lamps (LFLs), and low-wattage HID lamps used for general lighting applications.

Although the validity of the existing exemptions expired in July 2016, the delay in an actual decision by the Commission has led to these lamps still being allowed on the EU market, contributing to mercury pollution as well as much more expensive lighting. while more energy efficient mercury-free alternatives are available.

Mercury and its compounds are highly toxic to the developing nervous system as well as harmful to ecosystems and wildlife. Methylmercury, its most toxic form, has the capacity to bioaccumulate and bioconcentrate, especially in the aquatic food chain.

The EU via its 2005 mercury strategy, accompanied measures and as Party to the Minamata Convention on Mercury has as its objective to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds.

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[1] NGOs include the **European Environmental Bureau, (EEB)**, www.eeb.org, is a federation of more than 170 environmental citizens' organisations based in over 35 countries in Europe. These organisations range from local and national, to European and international. The aim of the EEB is to protect and improve the environment of Europe and to enable the citizens of Europe to play their part in achieving that goal.
The **Mercury Policy Project (MPP),** a project of the Tides Center, www.mercurypolicy.org, works to promote policies to eliminate mercury uses, reduce the export and trafficking of mercury, and significantly reduce mercury exposures at the local, national, and international levels. We strive to work harmoniously with other groups and individuals who have similar goals and interests.
The **Responsible Purchasing Network,** www.responsiblepurchasing.org, is a non-profit organization based in the United States that helps government agencies, institutions, and businesses to specify, evaluate and purchase environmentally preferable goods and services.
[2] https://eeb.org/library/making-the-case-for-a-ban-on-mercury-lamps/
[3] https://eeb.org/library/mercury-containing-lamp-exemptions-to-rohs-directive/
[4] https://eeb.org/library/why-hasnt-the-european-commission-banned-wasteful-lamps/

Furthermore, most recently, under the European Green Deal, the EC has pledged '*to ensure a toxic-free environment*', to '*help to protect citizens and the environment better against hazardous chemicals and encourage innovation for the development of safe and sustainable alternatives*'.

Given the global implications of the RoHS directive, making definitive decisions without further delay to end the exemptions for compact and linear fluorescent lamps, will confirm and demonstrate the EU's commitment to the health and environmental objectives described above.

1. Introduction

As explained in our comments below, equivalent products with no mercury are widely available in the European marketplace and around the globe as lamp makers often advertise. They are listed in the online catalogues of multiple large and small lighting manufacturers such as Osram, Tungsram and Philips. Most importantly, drop-in replacement light-emitting diode (LED) *mercury-free* lamps, retrofit kits and fixtures are not only widely available but are also more energy-efficient and have a longer rated life than most types of fluorescent and HID lamps used for general lighting applications. In addition, LEDs are now cost competitive, giving consumers the opportunity to save money when cut energy, replacement, and waste disposal costs are considered.

It is clear that the lighting sector is a fast improving one in term of availability, performance, and price of LED lamps; therefore, policy decisions can and should go beyond of the current market as relevant.

Moreover, LEDs are more acceptable to consumers than CFLs and other types of mercury-added lamps because they are more easily dimmable, give off a higher quality of light, do not flicker, and come on instantly. They also last longer, which benefits consumers' pocketbooks because LEDs don't have to be replaced as often. In addition, they don't break as easily. According to *Business Matters Magazine*[5], there are many benefits to using LEDs, including:

1. LED lights last far longer than incandescent or halogen bulbs.
2. They are highly energy-efficient, converting most of their energy into light, rather than heat.
3. They are ecologically sound because they are mercury-free and have a long life, reducing the user's carbon footprint.
4. LEDs are very tough and durable, making them able to "stand up to harsh weather, vibrations, shocks, and abrasions."
5. LEDs are a safe light source, that can offer excellent colour rendering and great quality light; they have almost no UV emissions, making them good options for museums and food pantries,
6. LEDs offer great design flexibility: "LED light arrays can be placed and combined in an infinite number of ways to produce efficient – but also controllable – illumination. The colour, shade, brightness and distribution of light can be controlled to perfection, which makes for not only technically-useful lighting, but also soothing, uplifting, or energising mood lighting."
7. They work well in extreme temperatures, including freezers, unlike most fluorescent lamps.
8. They work instantly with no warm-up time and can be turned on an off many times without reducing their performance.
9. They work on low-voltage power, so they can be used outside.

[5] "The Top Nine Benefits of Using LED Bulbs," *Business Matters Magazine*, 10 November 2016, https://www.bmmagazine.co.uk/in-business/top-nine-benefits-using-led-bulbs/

2. Analysis and recommendation

Our comments below refer to draft delegated acts concerning the following lamp categories:

***Categories 4b, 4bI-III*: Exemption for Mercury in High Pressure Sodium (HPS) (Vapour) Lamps With Improved Colour Rendering Index for General Lighting Purposes as detailed below.**

COM proposals for Exemption as per Directive 2011/65		COM proposals	EEB/ RPN/MPP Recommendation
Category 4b: "Mercury in high-pressure sodium (vapour) lamps with improved colour rendering index for general lighting purposes:			
4b	*Ra >80: P ≤105W, not exceeding per burner: 16 mg*	*Expires on [PO: five years after the adoption of the Delegated Directive]*	We support the Commission's proposal to limit this Exemption to only HPS lamps with a CRI above 80 and to lower the mercury content. **However, due to the availability of LED products that can replace some of these products already now, and the rapid improvements in LED technology that have occurred and are expected to continue in the future, we urge the Commission to limit this Exemption to three years, at which point the need for it should be re-examined.**
4(b)-I	*Ra >60: P ≤155W, not exceeding per burner: 30 mg*	*Expires on [PO: 12 months after the adoption of the Delegated Directive]*	**We strongly support the Commission's proposal to revoke RoHS Directive Exemptions for these categories of HPS lamps with a 12-month expiry date on the basis that more energy-efficient and long-lasting compact LED lamps are widely available for all of these categories of lamps.**
4(b)-II	*Ra >60: 155W < P ≤405W, not exceeding per burner: 40 mg*	*Expires on [PO: 12 months after the adoption of the Delegated Directive]*	
4(b)-III	*Ra >60: P >405W, not exceeding per burner: 40 mg*	*Expires on [PO: 12 months after the adoption of the Delegated Directive]]*	**We strongly support the Commission's proposal to revoke RoHS Directive Exemptions for this category of HPS lamps with a 12-month expiry date on the basis that they are no longer offered on the market.**

Summary – 4000 characters text

The European Environmental Bureau, Responsible Purchasing Network, and Mercury Policy Project strongly support the Commission's proposal to revoke RoHS Directive exemptions for most high-pressure sodium (HPS) lamps with a high colour rendering index (CRI) because more energy-efficient, long-lasting and mercury-free LED lamps are available for many of these lamps and because the high-wattage models (>400 watts) are no longer offered in the marketplace.

We strongly support the Commission's proposal to phase out in 12 months HPS lamps with a CRI >60 by revoking Exemptions 4b(I-III).

Regarding the Commission's proposal to create a new category 4b: high-pressure sodium (HPS) (vapour) lamps with improved colour rendering index (>80) for general lighting purposes, we appreciate that it is narrowly carved out to include only HPS lamps with a CRI >80 and with wattages only up to 105W. **However, we urge the Commission to limit this Exemption to three years – not five – recognizing that LED technology is rapidly improving and could be widely available to replace this category of lamps within three years. Moreover, we found that LED replacements for models up to 50W are currently already available on the market.**

Below is an assessment of the availability of LED replacements on the market for these lamps today.

HPS lamps with a CRI >80 is a very small category of lamps. High-CRI HPS lamps has pin bases (e.g., PG-12 or GX12) for which LED retrofit lamps are starting to come onto the market. A decision by the Commission to revoke their RoHS Directive exemption would very likely spur further development of LED replacements.

Below are examples of high-CRI HPS lamps that have LED replacements.

-**Philips SDW-T Lamps** have a PG-12 base, an energy efficiency rating of B, a rated life of 15.000 hours, efficacies around 50 lumens/watt, lumens from 1320-5100, and mercury content from 3,8 mg-11,4 mg.

There are LED retrofit lamps available in the EU marketplace for high-CRI HPS lamps with a PG-12 base.
-For example, Luminhome offers similarly sized LED lamps with a PG-12 base that can replace the Philips' high-CRI HPS lamp described above.
-A similar LED lamp is available from BoyLighting.com; it can replace the 35W and 50W high-CRI HPS lamps.

Another type of high-CRI HPS lamp that would be covered under this Exemption is the **Philips Master SDW-TG Mini.** It has a GX12 base and available in 50W and 100W models, which emit 2400 and 5200 lumens, respectively, and have a rated life of only 10.000 hours.

There are LED lamps with a GX12 (G12) base. Several models are listed on Amazon EU/UK. Note: They emit 1500-2500 lumens, which can replace the low-wattage (50W) HPS lamps and should improve in lumen output as other types of LEDs have done already.

These LED retrofit lamps have:

-An energy-efficiency rating of A++ compared to the B rating for HPS lamps;
-An efficiency of ~100 lumens/watt, ~twice that of high-CRI HPS lamps;
-A rated life of 30.000 hours or more, at least three times that of high-CRI HPS lamps;
-Various color temperatures (e.g., warm and cool white).

Benefits include higher efficiency, longer life, no mercury, instant on, and no flickering.

Examples include Yakaiyal 15-watt G12 LED Bulb , XFSMAO 25-watt G12 LED Corn Light, and Yongjia 16W G12 Warm White LED Bulb.

Because LED lamps can replace high-CRI HPS lamps – at least for models ≤50W – and should improve in the near future, we urge the Commission to grant a shorter 3-year exemption for this category (4b).

With a small market share, the impact of phasing it out, with available lamps, retrofit kits and luminaires would be minimal. Meanwhile, the benefits would offset negative impacts. Acting now will keep mercury out of the environment, prevent CO2 from be emitted into the atmosphere, and save consumers money in electricity and lamp replacement costs.

Please see attached for more details.

The European Environmental Bureau, the Responsible Purchasing Network and the Mercury Policy Project, strongly support the Commission's proposal to revoke RoHS Directive exemptions for most of this category of high-pressure sodium lamps with a high colour rendering index on the basis that more energy-efficient, long-lasting and mercury-free LED lamps are widely available for many of these lamps and because the high-wattage models >400 watts are no longer offered in the marketplace.

We strongly support the Commission's proposal to phase out in 12 months high-pressure sodium (HPS) (vapour) lamps with a CRI >60 by revoking Exemptions 4b(I-III).

We concur with the Commission's conclusions in its *Draft Delegated Directive* that:

- *There are suitable alternatives for HPS (vapour) lamps with improved colour rendering index Ra > 60: P≤155W, which effectively means that exemptions entry 4(b) – I is partly no longer needed, while entry 4 (b) – II can be fully revoked as those lamps were being replaced by mercury-free LED lamps.*

- *Entry 4 b) – III should be revoked as manufacturers no longer place these lamps on the market; hence the exemption has become obsolete.*

Regarding the Commission's proposal to create a new category 4b: high-pressure sodium (HPS) (vapour) lamps with improved colour rendering index (>80) for general lighting purposes, we appreciate that it is narrowly carved out to include only HPS lamps with a CRI >80 and with wattages only up to 105W. **However, we urge the Commission to limit this Exemption to three years – not five in recognition that LED technology is rapidly improving and could be widely available to replace this category of lamps within three years. Moreover, our more recent market assessment revealed that LED models that can replace low-wattage high-CRI HPS lamps up to 50 watts are already now available in the market.** Below, is an assessment of the availability of LED replacements on the market for these lamps today.

High-pressure sodium (HPS) (vapour) lamps with a CRI >80 is a very small category of lamps. For conventional (i.e., low-CRI) HPS lamps, which typically have a screw base, LED retrofit lamps are widely available that can serve as replacements without needing re-wiring or replacement of the luminaire. Meanwhile, this category of high-CRI HPS lamps has different (less-common) pin bases (e.g., PG-12 and GX12) for which LED retrofit lamps are starting to come onto the market, and are currently available as replacements for high-CRI HPS lamps up to 50 watts. A decision by the Commission to revoke their RoHS Directive exemption would very likely spur further development of LED replacements for these products, which have a relatively high mercury content, low efficiency, and short life.

Below are examples of high-CRI HPS lamps that have LED replacements.

- **Philips SDW-T Lamps**. This family of high-CRI high-pressure sodium (HPS) lamps have a PG-12 base (see photo below), an energy efficiency rating of B, and a rated life of 15.000 hours. Below is a table showing attributes of the three lamp models in this family including their wattage, lumen output, efficacy (in lumens/watt) and mercury content.

Lamp	Wattage	Lumen Output	Efficacy (lumens/watt)	Mercury Content
Master SDW-T 35W/825 PG12	35	1320	38	3,8 mg
Master SDW-T 50W/825 PG12	50	2500	50	7,6 mg
Master SDW-T 100W/825 PG12	100	5100	51	11,4 mg

PHILIPS

Lighting

Incredible colors, amazing atmosphere

MASTER SDW-T

Range of high-efficiency, discharge lamps with warm color to be used in open luminairs

Benefits

- Exceptional brightness and color rendering especially of warm colors, e.g. red and gold
- High lamp efficacy results in low operating costs and low heat generation
- Long lamp life compared with incandescent and halogen lamps

Features

- Unique warm color quality
- Lamp design is well-suited to be used in luminairs for power-spots (high intensity) and high-bay general lighting

Application

- Shop lighting (create cosy atmosphere e.g. in furniture shops), excellent display of fresh goods (at butchers, bakeries, flower-shops) and decorative outdoor lighting (gas-lantern imitation)

Warnings and Safety

- Use only with dedicated Philips control gear
- A lamp breaking is extremely unlikely to have any impact on your health. If a lamp breaks, ventilate the room for 30 minutes and remove the parts, preferably with gloves. Put them in a sealed plastic bag and take it to your local waste facilities for recycling. Do not use a vacuum cleaner.

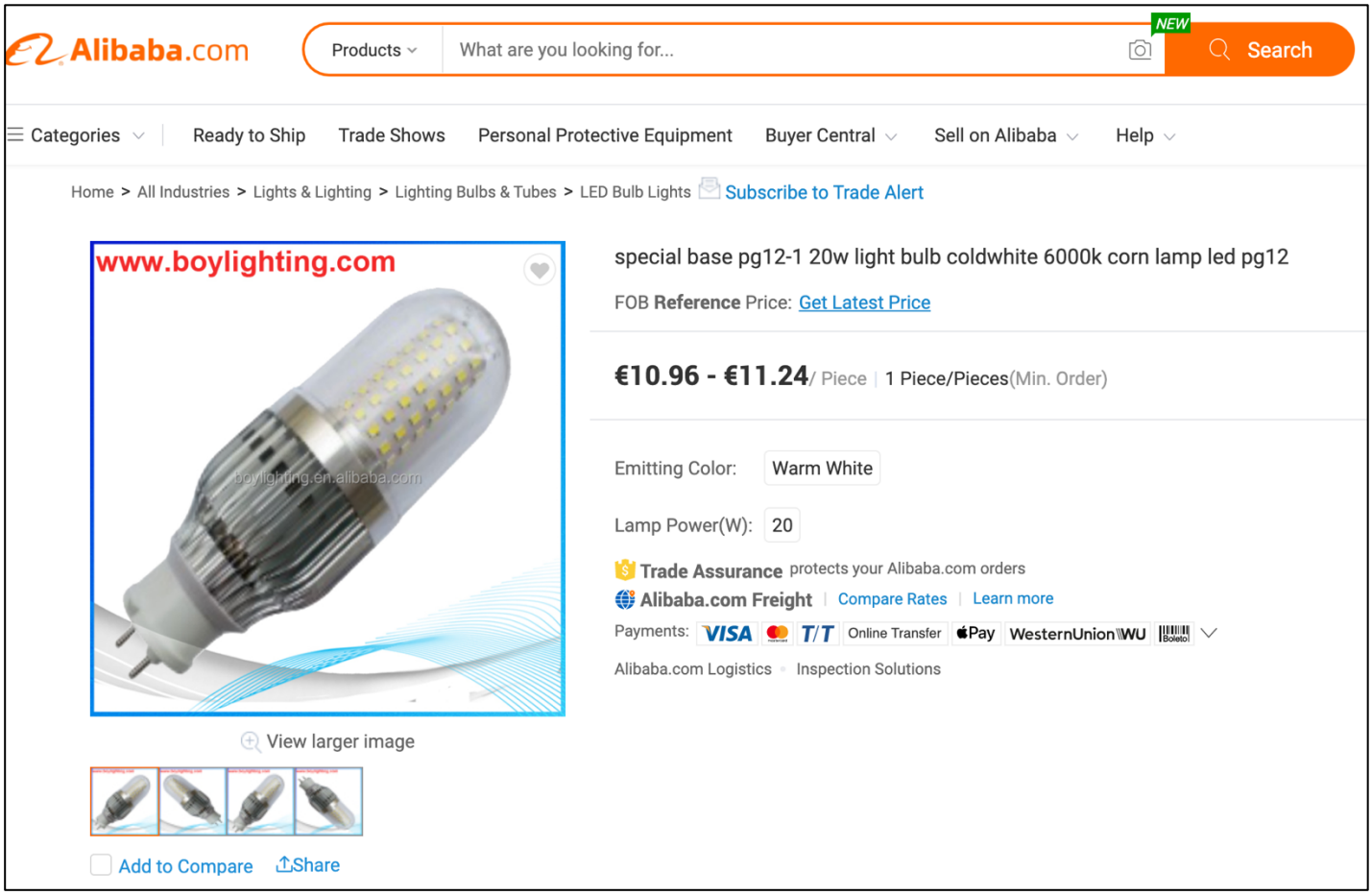
Available LED Replacement Lamps: There are already drop-in LED retrofit lamps available in the marketplace for high-CRI HPS lamp with a PG-12 base. For example, a company called Luminhome offers a family of LED lamps with the same PG-12 base and a similarly sized bulb that can directly replace some of the Philips' Master SDW-T high-CRI HPS lamps. These LED retrofit lamps are available in 10W and 20W models, which can replace the low-wattage HPS lamps (35W and 50W models) listed above. The LED replacement lamps have a CRI of 80; an energy-efficiency of 100-110 lumens/watt, which is more than twice as high as the mercury-containing HPS lamps they replace; and a rated life that is more than three times as long (50.000 hours), according to the technical data sheet for this family of products. See photo of this product, right.

PG12-1 Base LED Bulb Light

In its argument for the exemption, the applicant claimed that LED replacements for this type of lamp are either unavailable or unable to provide the correct spectrum of light (including reds, which are responsible for warm color temperatures.) This conflicts with information available from Luminhome and other manufacturers, which list LED replacement lamps in a variety of color temperatures,

including warm white (3000K-3500K), neutral white (4000K-4500K), and white (6000K-6500K).

Below is a screenshot showing another similar LED lamp from a company called BoyLighting.com that can replace the 35W and 50W HPS lamps and is available in warm white (which would include the red spectrum of light).



Another type of high-CRI HPS lamp that is available in the market (and that would be covered under this exemption) is the **Philips Master SDW-TG Mini**. See screenshot describing this product, right. It has a different (GX12-1) base and is available in 50W and 100W models, which emit approximately 2400 and 5200 lumens, respectively. These lamps have:

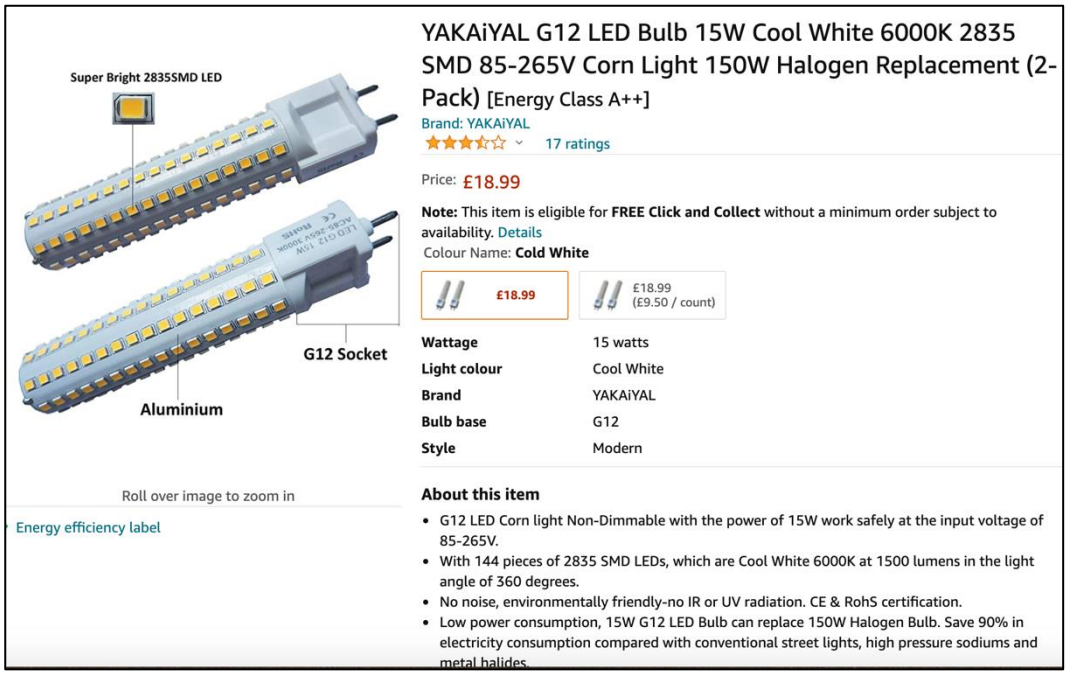
- A B energy efficiency rating;
- An efficacy of about 50 lumens/watt;
- A rated life of 10.000 hours;
- A mercury content of 5,7 mg and 15,2 mg, respectively; and
- A start-up time of 1-1,5 minutes.

There are LED replacement lamps with the GX12 (or G12) base, which:

- Have an energy-efficiency rating of A++ compared to the B rating for HPS lamps;
- Have an efficiency of approximately 100 lumens per watt, which is about twice that of high-CRI HPS lamps;
- Have a rated life of approximately 30.000 hours, which is three times the rated life of high-CRI HPS lamps; and
- Come in various color temperatures, including both warm and cool white colors.

In addition to higher efficiency, longer life and no mercury content, other benefits of these lamps over HPS lamps include that they are instant on with no warm-up or flickering.

See examples below, which are primarily from Amazon EU/UK. Note: Most of the LED retrofit lamp models emit 1500-2500 lumens. These can replace the low-wattage (≤50W) models and are expected to increase in availability and improve in lumen output over time as other types of LEDs have done already.



Roll over image to zoom in

G12 led Bulb 25W 2500LM is Equivalent to Replacing 200W Metal halide Bulb, Suitable for Home Lighting Corn lamp (Warm White)

Brand: XFSMAO

Price: £25.88

Colour Name: **Warm White**

£25.88 | £25.88 | **£25.88**

Wattage	25 watts
Brand	XFSMAO
Voltage	220 Volts (AC)
Average life	30000 Hours
Colour-rendering index	80.00

About this item

- 1. 25W low power consumption, high efficiency, LED light source with high lumen, equivalent to 200 W halogen lamp

Click to open expanded view

LED G12 Bulb Light 16W G12 Double Needle Base Bulb, 150W G12 Metal halide Bulb Equivalent Bulb (Warm White)

Brand: YongJia

★★★★★ 2 ratings

Price: £18.88

Colour Name: **Warm White**

£18.88 | £18.88 | **£18.88**

Wattage	16.00
Light colour	Warm White
Brand	Yongjia
Bulb base	G12
Light source wattage	16 Watts

About this item

- 1. Easy to install: G12 standard base, easy to install.Working voltage: AC 95-265V, size: ?30 * 103mm
- 2. Long service life: G12 bulbs exceed 50,000 hours, effectively reducing the frequency of replacing bulbs.
- 3. Energy saving: 144 high-quality SMD 2835 LEDs, 1500LM, 360 ° beam angle, can perfectly replace 150w metal halide bulbs, and can save more than 80% of electricity costs compared with fluorescent tubes.
- 4.G12 LED bulbs are used for spotlights, cabinet lights, wall lights and various types of G12 LED lamps. Suitable for homes, cafes, restaurants, art galleries, hotels and most lighting locations.

Given the availability of LED lamps that can replace HPS lamps with a high colour rendering index – at least for the low-wattage models – and the likelihood of improvement of these products in the near future, we urge the Commission to grant a shorter 3-year exemption for this category of lamps. With the small market share of this type of lamp, the impact of phasing it out, with available lamps, retrofit kits and luminaires would be minimal. At the same time, the benefit of speeding up the phase-out of this family of lamps, which has a relatively high mercury content, low efficiency and short life, would offset negative impacts. It is imperative that no more delays occur in the decision-making process; otherwise mercury will keep being added to the environment, additional CO2 will be emitted into the atmosphere, and consumers will unnecessarily pay for avoidable electricity and lamp replacement costs.

For more information please contact:

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