

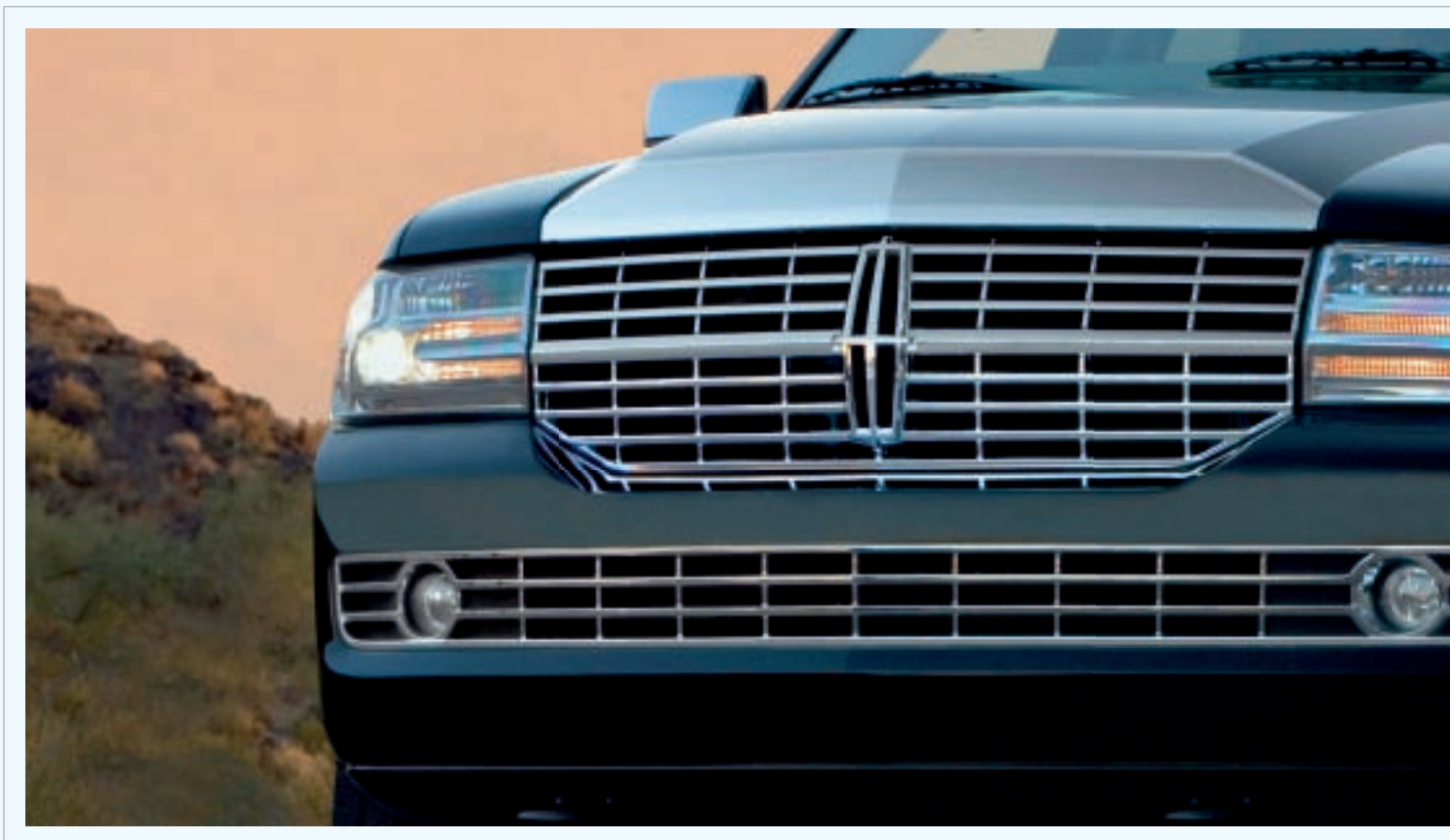


OSRAM AUTOMOTIVE LIGHTING XENARC® HEADLIGHT LAMPS

High Intensity Discharge Lamps (HID)
Information for professionals

SEE THE WORLD IN A NEW LIGHT





Dear OEM Partner,

As the world's leading supplier in the automotive lighting sector we have been manufacturing lamps for headlights since 1919 and today we supply all the major international vehicle manufacturers directly or indirectly. Approx. 50% of all automobiles manufactured around the world are nowadays fitted with OSRAM lamp systems.

Given that we undertake a great deal of research, we play a decisive role in driving development in this sector forward. In 1991 OSRAM launched the first gas discharge lamp (xenon) – the XENARC® D1 – on the market. XENARC® lamps provide twice as much light as conventional lamps, yet consume up to a third less energy and emit significantly less heat.

The demands of our customers grow from year to year – in particular with regards to design. Innovative developments enable us to provide flexible, customer-specific solutions. Thus, for example, space-saving separation of electronic

ballast unit and lamp in XENARC® D1 and D3 (mercury-free) systems provides new latitude in headlight and vehicle design.

This brochure is designed to give you an overview of and essential technical information about our products. You can obtain detailed data sheets, prices and further information at any time from your partner at OSRAM.

Your OSRAM XENARC® Automotive Team



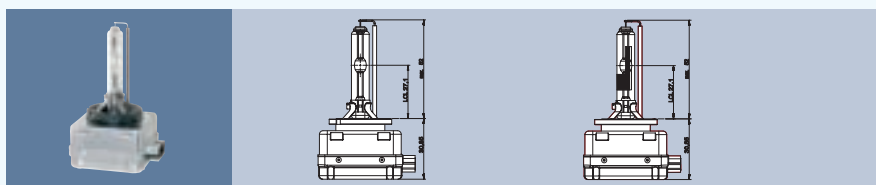
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OSRAM D1S, D1R

The advantages of XENARC® at a glance:

- Light characteristics similar to daylight
- XENARC® lighting systems are highly compact
- Provide the basis for progressive headlight design and technology
- Enhance the aesthetic character of vehicle design and promote brand recognition
- Consume up to 30% less energy than standard halogen lamps



| Product name | D1S | D1R |
|-------------------------|--|--|
| Product reference | 66144 | 66154 |
| Application | Projection headlight systems | Reflection headlight systems |
| Light source wattage | 35 +/- 3 W | 35 +/- 3 W |
| Lamp voltage | 85 +/- 17 V | 85 +/- 17 V |
| Luminous flux after 1s. | 800 lm | 700 lm |
| after 60s. | 3200 lm +/- 450 lm | 2800 lm +/- 450 lm |
| Service life | B ₃ = 2000 h T _c = 3000 h | B ₃ = 2000 h T _c = 3000 h |
| Color temperature | 4150 K | 4150 K |
| Base | PK32d-2 | PK32d-3 |

PRODUCT FEATURES / YOUR BENEFITS

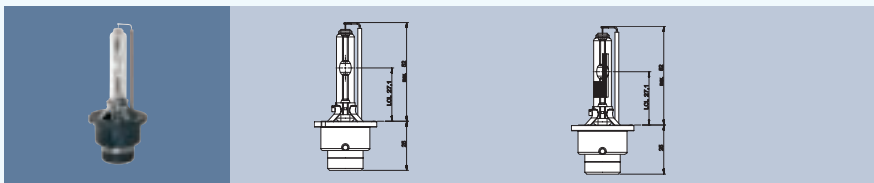
- High luminous flux at lower power consumption
- High product reliability and lifetime
- High color temperature for less strain on the driver's eyes during long night drives
- Brighter, white light, similar to natural daylight



OSRAM D2S, D2R

The advantages of XENARC® at a glance:

- High color temperature, similar to natural daylight
- Lamp engineered for lifetime of the vehicle
- Offer much greater scope for distinctive headlight design
- Headlights have intelligent leveling



| Product name | D2S | D2R |
|----------------------|------------------------------|------------------------------|
| Product reference | 66240 | 66250 |
| Application | Projection headlight systems | Reflection headlight systems |
| Light source wattage | 35 +/- 3 W | 35 +/- 3 W |
| Lamp voltage | 85 +/- 17 V | 85 +/- 17 V |
| Luminous flux | | |
| after 1s. | 800 lm | 700 lm |
| after 60s. | 3200 lm +/- 450 lm | 2800 lm +/- 450 lm |
| Service life | | |
| | B ₃ = 2000 h | B ₃ = 2000 h |
| | T _c = 3000 h | T _c = 3000 h |
| Color temperature | 4150 K | 4150 K |
| Base | P32d-2 | P32d-3 |

PRODUCT FEATURES / YOUR BENEFITS

- White light for higher safety
- Improved visibility thanks to better roadway illumination
- High efficacy
- Long lifetime

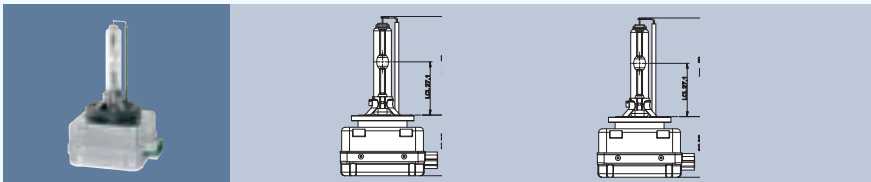




OSRAM D3S, D3R

Green light for mercury-free XENARC®!

With the D3 HID headlight system OSRAM Automotive Lighting is the world's first supplier of an entirely mercury-free HID system comprised of lamp and control gear.



| Product name | D3S | D3R |
|----------------------|--|--|
| Product reference | 66340 | 66350 |
| Application | Projection headlight systems | Reflection headlight systems |
| Light source wattage | 35 +/- 2 W | 35 +/- 2 W |
| Lamp voltage | 42 +/- 9 V | 42 +/- 9 V |
| Luminous flux | 3200 lm +/- 450 lm | 2800 lm +/- 450 lm |
| Service life | B ₃ = 1500 h T _c = 2500 h | B ₃ = 1500 h T _c = 2500 h |
| Color temperature | 4150 K | 4150 K |
| Base | PK32d-5 | PK32d-6 |

PRODUCT FEATURES / YOUR BENEFITS

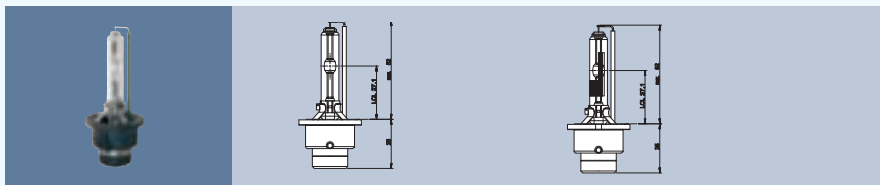
- Environmentally friendly
- Excellent color maintenance
- XENARC® light systems are extremely compact for more headlight design flexibility
- High efficacy





OSRAM D4S, D4R

Green light for mercury-free XENARC®!



| Product name | D4S | D4R |
|----------------------|--|--|
| Product reference | 66440 | 66450 |
| Application | Projection headlight systems | Reflection headlight systems |
| Light source wattage | 35 +/- 2 W | 35 +/- 2 W |
| Lamp voltage | 42 +/- 9 V | 42 +/- 9 V |
| Luminous flux | 3200 lm +/- 450lm | 2800 lm +/- 450 lm |
| Service life | B ₅ = 1500 h T _c = 2500 h | B ₅ = 1500 h T _c = 2500 h |
| Color temperature | 4150 K | 4150 K |
| Base | P32d-5 | P32d-6 |

PRODUCT FEATURES / YOUR BENEFITS

- Environmentally friendly
- No significant change in color temperature over the long lifetime of the lamps
- High lumen output



The perfect system solution – made by OSRAM

The brilliant match for superior performance =
XENARC® lamp + XENAELECTRON® + cable

- Perfectly matched to OEM automotive requirements.
- Compact design of the XENAELECTRON® control gear.
- 95% reduction in high voltage on the connecting cable compared to a D2-/D4-system.
- Highly flexible connector cables in any length between control gear and lamp.
- Elimination of the costly and critical high-voltage plug connections on lamp.
- Optimized and integrated high-voltage igniter in the protected lamp base.
- Reliable and tested lamp technology based on D2/D4 lamps.



PRODUCT FEATURES / YOUR BENEFITS

- Compact design
- Excellent EMI values
- Full flexibility
- HID-system competence



The D1- and D3-system consist of the electronic ballast unit XENAELECTRON®, XENARC® lamps, and flexible connector cables of different lengths.



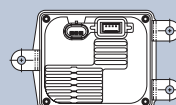
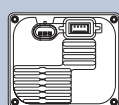
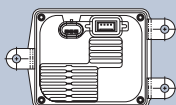
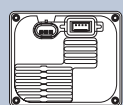
XENAELECTRON®: the professional ballast unit

XENAELECTRON® ballast units provide optimal operation of D1/D3 HID lamps in 12V as well as in 24V-systems.

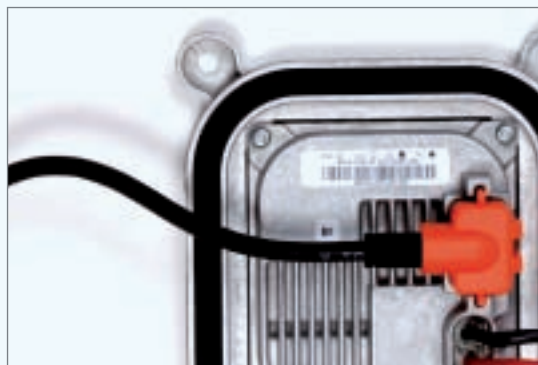
The complete and flexible design facilitates use in nearly all conceivable HID headlight applications.

OSRAM lamps are used in millions of automobiles and benefit from the many years of experience gathered from everyday use in construction and forestry vehicles, for example.

OSRAM is driving research into environmentally friendly products for use in automobiles and is the world's first supplier of a mercury-free HID system.



| Product name | XENAELECTRON® 35W XT5-1-D1/12 V | XENAELECTRON® 35W XT5-3-D1/12 V TAB | XENAELECTRON® XT5-1-D1/24 V | XENAELECTRON® XT5-3-D1/24 V TAB | XENAELECTRON® XT5-2-D3/12 V |
|------------------------|------------------------------------|--|--------------------------------|------------------------------------|--------------------------------|
| For lamp type | D1S & D1R | D1S & D1R | D1S & D1R | D1S & D1R | D3S & D3R |
| Voltage | 12 V | 12 V | 24 V | 24 V | 12 V |
| Frequency | 500 Hz | 500 Hz | 500 Hz | 500 Hz | 500 Hz |
| Dimensions (L x W x H) | 82 x 73 x 25 mm | 125 x 74 x 25 mm | 82 x 73 x 25 mm | 125 x 74 x 25 mm | 124 x 112 x 25 mm |
| Temperature | - 40...105 °C | - 40...105 °C | - 40...105 °C | - 40...105 °C | - 40...105 °C |

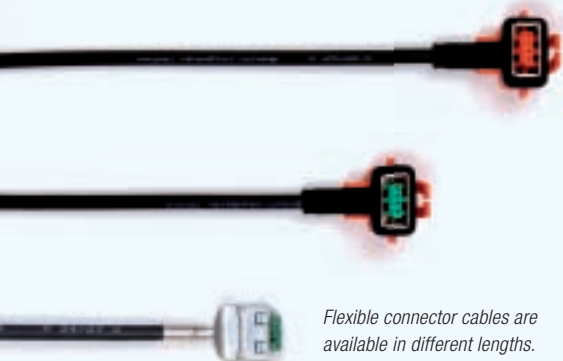


The flexible connector cable fits perfectly into the XENAELECTRON® ballast unit.

The perfect connector

Made to complete the OSRAM XENARC® system

OSRAM's flexible connector cables provide the optimum connection between XENAELECTRON® electronic ballast units and XENARC® lamps. They are available in all required lengths and with all matching plugs for XENARC® lamps. The use of OSRAM XENARC® lamps, OSRAM connector cables and OSRAM XENAELECTRON® electronic ballast units ensures optimum light system operation with excellent EMI performance.



Flexible connector cables are available in different lengths.



| | J1A | J1B | J1C | J1D | J2A | J2B | J2A | J2B | |
|---------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Product name | 32340 | 32342 | 32344 | 32346 | 32350 | 32356 | 32358 | 32360 | 32362 |
| Product reference | 942704 | 942711 | 942728 | 942735 | 942742 | 942759 | 942766 | 942773 | 942780 |
| Length | 390mm | 540mm | 390mm | 150mm | 280mm | 170mm | 300mm | 240mm | 800mm |
| Connection to lamp | J1A | J1A | J1A | J1A | J1B | J1C | J1C | J1D | J1D |
| Connection to ECG | J2A | J2A | J2B | J2B | J2B | J2B | J2B | J2A | J2B |

Green light for mercury-free XENARC® D3-systems and D4 lamps

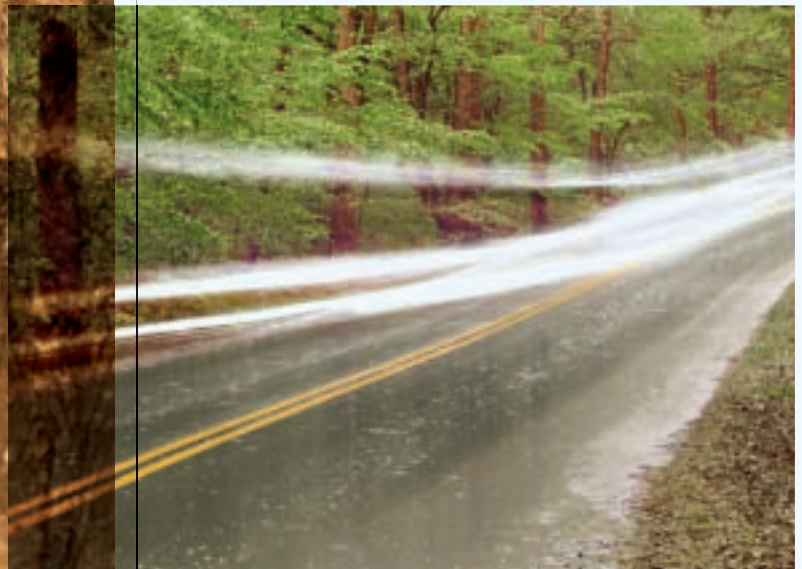


OSRAM XENARC® lamps are famous for their outstanding performance. Now this innovative automotive lamp is making a name by itself for being kind to the environment. The D3 and D4 products are mercury-free but still have the same output.

OSRAM XENARC® D3 and D4 HID light sources introduce an innovative range of environmentally friendly, mercury-free products that still offer all the advantages of OSRAM's existing XENARC® lamps.

Comparison of mercury-free HID and traditional HID light sources

- D3 and D4 light output and color temperature are comparable to mercury-containing D1 and D2 types.
- Chemistry and geometry had to be changed to accommodate the removal of mercury, resulting in different arc bending and arc diffusion characteristics.
- Mercury-free types are not interchangeable with mercury-containing types.
- Base coding is unique to each light source type to prevent interchangeability.
- D3 and D4 light sources have different electrical properties than D1 and D2 types; therefore, mercury-free types require different ballasts than mercury-containing types.



New base design

OSRAM introduced a new base design for D-lamps. The burner and its photometrical and electrical parameters remain unchanged.

The main advantages of the new base design are:

- Increased temperature specification
- Reduced weight



New D1S 66144:
new base design
and new igniter

New D2S 66240:
new base design

New D2 COOL BLUE®

XENARC® D2S and D2R COOL BLUE®

With the specific product types D2S 66240 CB and D2R 66250 CB we are able to offer COOL BLUE® HID-lamps in base redesign with COOL BLUE® effect (5000 K) for design-conscious drivers and individualists.

The lamps are produced – with ECE-approval and DOT-marked – according to the same high quality standards of the conventional D2 gas discharge lamps, only the outer sleeve is blue-coated.

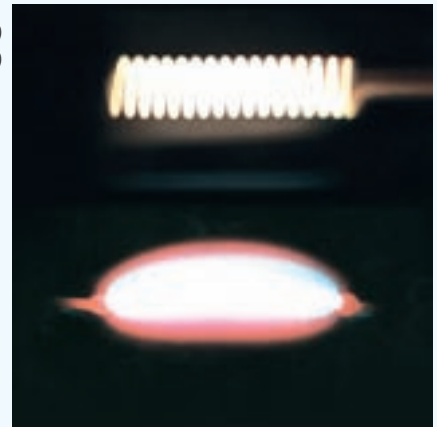
The products feature the following specific properties:

- Higher color temperature (5000 K)
- Approved for ECE/SAE
- Blue-white light effect
- High-contrast and precise light illumination on the road
- High lifetime, especially in comparison to conventional halogen headlamps
- Stylish, modern appearance at road traffic



The new D2S and D2R COOL BLUE
aimed at tuning specialists and sportive drivers with a strong leaning towards individual style and attention effect.

Wire element of a halogen lamp (above)
Light arc of a XENARC® lamp (below)



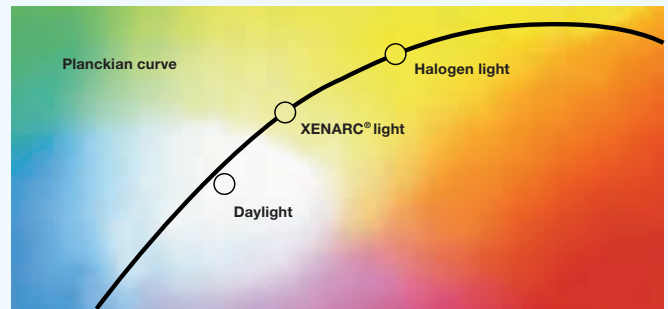
The XENARC® principle

Greater visibility, more safety, new design freedom

The XENARC® gas discharge lamp does not have a filament. Instead an arc is created between two electrodes in a quartz bulb, which is filled with xenon gas and metallic salts. The lamp ignites when high voltage is applied. Igniting, heating and stabilizing the arc of a XENARC® lamp requires electronic control gear. The system consists of an electronic igniter and an electronic ballast unit.

OSRAM XENARC® lamps offer a number of advantages, such as higher luminous efficacy, reduced heat output and much longer lamp life. A XENARC® lamp generates twice as much light as a modern halogen lamp and still requires less energy. The light efficiency is 300% higher than conventional halogen lights and it provides a remarkable improvement in driving safety. Since XENARC® lamps operate in the range of 4100°-4500° Kelvin, in comparison to 3200° Kelvin (halogen light), the color temperature of the light is much closer to that

of natural daylight; it is whiter and is perceived as being brighter. Xenon light can help drivers see hazards on both sides of the road. The failure risk with XENARC® lamps is extremely low. XENARC® lamps have an average lifetime of 3000 operating hours, which normally covers the usual lifetime of a car.



Because of its higher color temperature (4100-4500 compared to 3200 Kelvin of halogen lamps) the light from XENARC® lamps is "whiter" and closer to natural daylight. This gives drivers more visibility and safety.



Light distribution with XENARC® lights



Light distribution with halogen lights

XENARC® S- and R-type

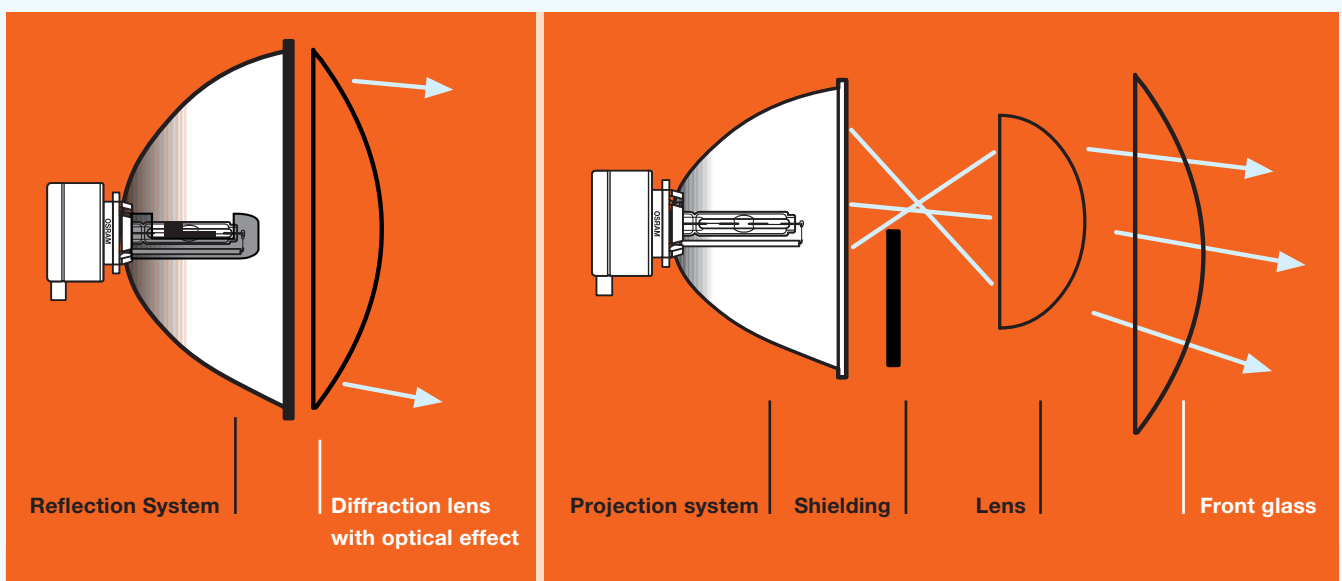
These types are right for all modern Xenon headlight systems

XENARC® lamps are available for both reflection shape (R-type) and projection headlight systems (S-type). In reflection shape systems there is a black top material applied directly on the lamp's glass jacket which assists in creating a cut-off line between light and dark areas. These lamps are easily identified by the 'R' after the product name.

The S-type lamps are optimized for projection headlight systems. These headlights make use of an ellipsoidal reflector with projection lenses that are the basis for today's modern curve and bending light system. Compared with parabolic headlights of the same size they offer much better distribution of light and improved efficiency.



S-type: The cut-off line is created by a shield (left).
R-type: To generate the cut-off line in the light distribution a black coating is applied directly on the outer bulb of the lamp (right).



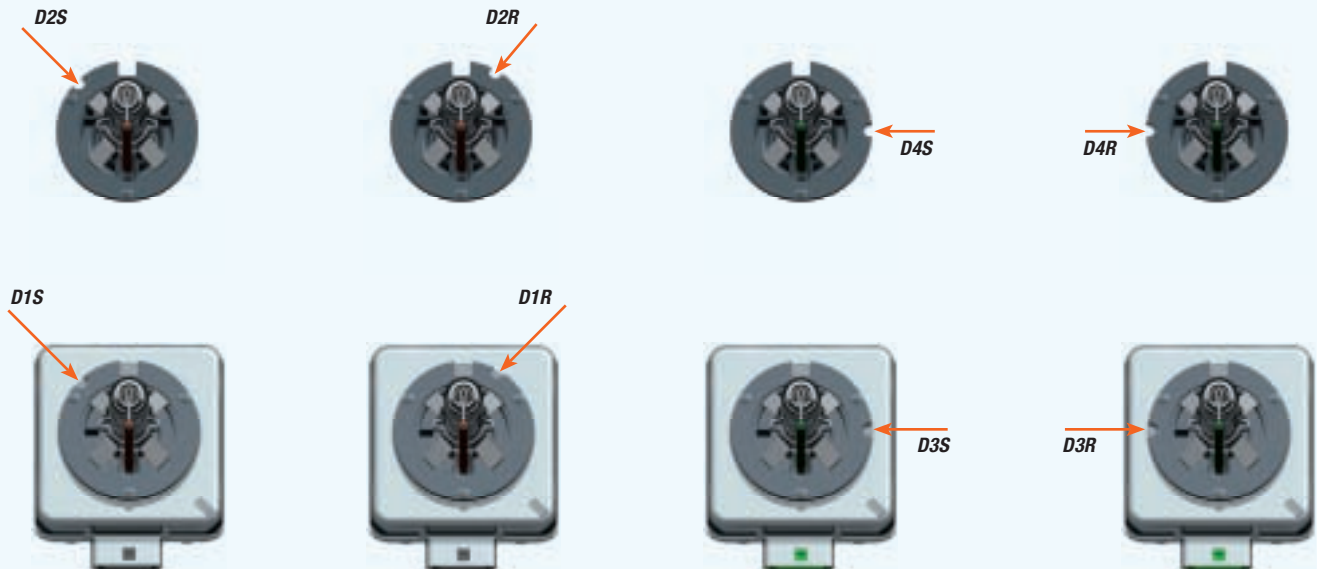
Conventional parabolic headlights with XENARC® R-type

Ellipsoidal headlights with XENARC® S-type



Base Coding

The Base coding is unique to each light source type to prevent interchangeability with electronics and other lamp types.

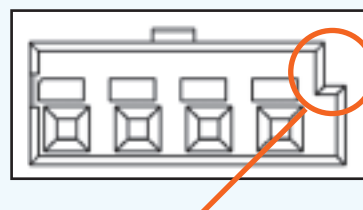


Connector Coding

D3 and D4 light sources have different electrical properties than D1 and D2 types; therefore, Hg-free types will require different ballasts than Hg-containing types. To avoid any interchangeability between various Hg-free and Hg-containing light sources, the coding of the connectors differ in M-Coding (Gold-plated) and V-coding (Tin-plated) for the D1 and D3 System interface.



D3-Connector: M-Coding – contact pins Gold-plated



D1-Connector: V-Coding – contact pins Tin-plated

Global presence.

OSRAM supplies customers in around 150 countries.

- 65 companies and sales offices for 100 countries
- 48 countries served by local agents or OSRAM GmbH, Munich

OSRAM associated companies and support centres.

| | |
|--------------------|----------------------|
| Argentina | Kazakhstan |
| Australia | Kenya |
| Austria | Latvia |
| Benelux | Lithuania |
| Bosnia-Herzegovina | Malaysia |
| Brazil | Mexico |
| Bulgaria | Norway |
| Canada | Philippines |
| Chile | Poland |
| China | Portugal |
| Columbia | Rumania |
| Croatia | Russia |
| Czech Republic | Serbia-Montenegro |
| Denmark | Singapore |
| Ecuador | Slovakia |
| Egypt | South Africa |
| Estonia | South Korea |
| Finland | Spain |
| France | Sweden |
| Germany | Switzerland |
| Great Britain | Taiwan |
| Greece | Thailand |
| Hungary | Turkey |
| India | Ukraine |
| Indonesia | United Arab Emirates |
| Iran | USA |
| Italy | Vietnam |
| Japan | |

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