

IT'S TIME TO CHANGE

NEW LED AND HID PRODUCTS
COMPARED TO STANDARD LAMPS



right attitude/right approach/right alongside
www.goodrich.com

**GOODRICH**

LED AND HID PRODUCTS COMPARED TO STANDARD LAMPS

With our new innovative LED and HID (High Intensity Discharge Lamp) light systems we offer high potential savings of maintenance costs by means of:

- Highest efficiency
- Up to 8000 % lamp life time (HID Xenon lamp compared to conventional sealed beam lamp)
- Lowest power consumption (energy savings from 40 % up to 80 %)

These advantages are available not only for new aircraft but also as a retrofit for existing conventional light systems.

This is why we say:

“IT’S TIME TO CHANGE.”



LED Array

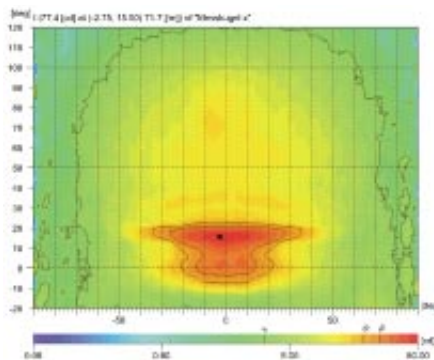


Incandescent Lamp

Advantages

- 3,300 % Lamp life
- 25 % Wattage
- Fully qualified acc. to FAR 23, 25, 27 & 29
- NVIS friendly
- Full light output from 22 V to 32 V

In order to fulfil all light technical requirements according to FAR Part 23, 25, 27, 29 and also MIL-L-6503H, Goodrich designed a system of several LEDs which are different in performance and size and the corresponding micro optical systems. Each one provides light for certain angles which was measured in horizontal and vertical scans in steps of 1°. Goodrich guarantees also that the products are resistant against some of the toughest environmental conditions such as High Temperature (>120°C), EMI (RTCA-DO160D, section 17 to 22) and Vibration and Shock Levels (33.2 g rms resp. 20 g/11ms saw tooth).



Customers are welcome to ask Goodrich for system responsibility including the transparent covers. Goodrich is able to calculate the final light intensity and distribution with the unique simulation tool HELIOS, depending on different transmission values, geometries and refractive indices of the covers.

Glass lenses and transparent covers are no longer required for commercial aircraft.

The LED versions are mechanically and electrically compatible with the incandescent versions.



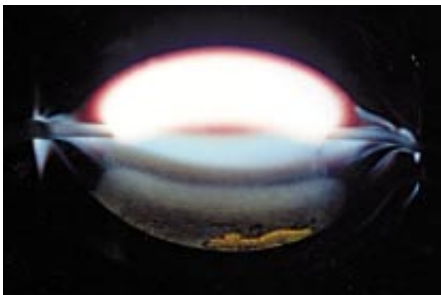
HID Xenon Lamp



Sealed Beam Lamp

Advantages

- 8,000 % Lamp life
- 20 % Wattage
- Light color similar to daylight
- Shortest start-up time
- Hot restart capability
- Full light output from 22 V to 29.5 V
- Electronic protection (short circuit, lamp failure)
- Beam adjustment possible
- Lower heat dissipation allows plastic transparencies



Goodrich's HID products are based on Hella KG's experience of more than 10 years in the design and production of more than 6 million floodlights (25 patents) for the automotive industry. In the field of aviation HID floodlights have been in series production since 1998.

As a gas discharge process emits the light instead of a glowing filament, the floodlights are less sensitive to shock and vibration.



LED Array



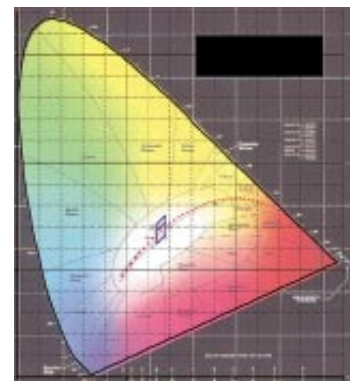
Halogen Lamp

Advantages

- 600 % Lamp life
- 60 % Wattage
- Patent pending optical system with a customized LED Array which is a virtual single light source
- Extremely sharp borderline from light to dark
- Uniform brightness and color over the whole spot
- Cold front cover
- Customized appearance of the light source

Goodrich is using a customized LED module instead of several discrete LEDs. The very uniform light emission (Lambertian) of these modules allows Goodrich to design special optics which guarantee a sharp edged illuminated spot with a uniform light color and brightness. Goodrich can adjust the design of the customized module due to the rapid improvements of the LED-dies without altering the basic design of the light and thus its appearance.

The Goodrich design uses a small portion of the light to illuminate the background of the reading light with a customized colored filter which is patent pending. This feature gives the reading light a special customized appearance.



Our highly efficient optical lens system led to the smallest mounting diameter for a reading light with an adjustment angle of +/- 40°.



**Goodrich Lighting
Systems GmbH**
Bertramstrasse 8
59557 Lippstadt/Germany
Tel.: +49 2941 7676-0
Fax: +49 2941 7676-8432
Sita: PADHECR

**Goodrich Lighting
Systems, Inc.**
129 Fairfield Street
Oldsmar, FL 34677
Tel.: +1 813 891-7100
Fax: +1 813 855-5572
Sita: TOAHAXD

<http://www.lighting.goodrich.com>
lighting@goodrich.com

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