



Chair of Lighting, University of Naples Federico II

International Conference

LED LIGHTING TODAY: TALES OR FACTS?

Direct Replacement of Incandescent Lamps Using 3D LED Light Source

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University of Naples Federico II
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About CAO Group, Inc.

- Engage business in Medical, Dental, Forensic, Opto Components, Signage, and Lighting
- EN 13485 and TS 16949 manufacturing and RD facilities in both USA and China
- Voting Member of Solid State Lighting Alliance of Department of Energy in USA



Outline

- Requirements for Retrofit
- LED lamps using 3D LED as light source
- Energy/Money Savings by 3D LEDs
- Future outlook

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Requirements for Direct Replacement of Incandescent and CFL Light Bulbs

- Same shape and look (Form factor)
- Quantity of the light (Light output)
- Quality of the light—similar to incandescent (CCT, CRI and etc)
- Standard socket
- 110 or 220VAC input
- Overall high efficiency and long life time per EnergyStar® standards

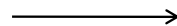
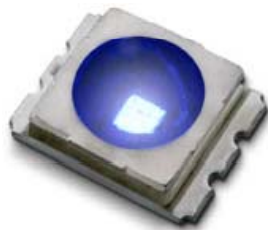
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Directional Focus vs Non-Directional Light Sources



Directional LEDs

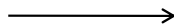


LED for Space Lighting

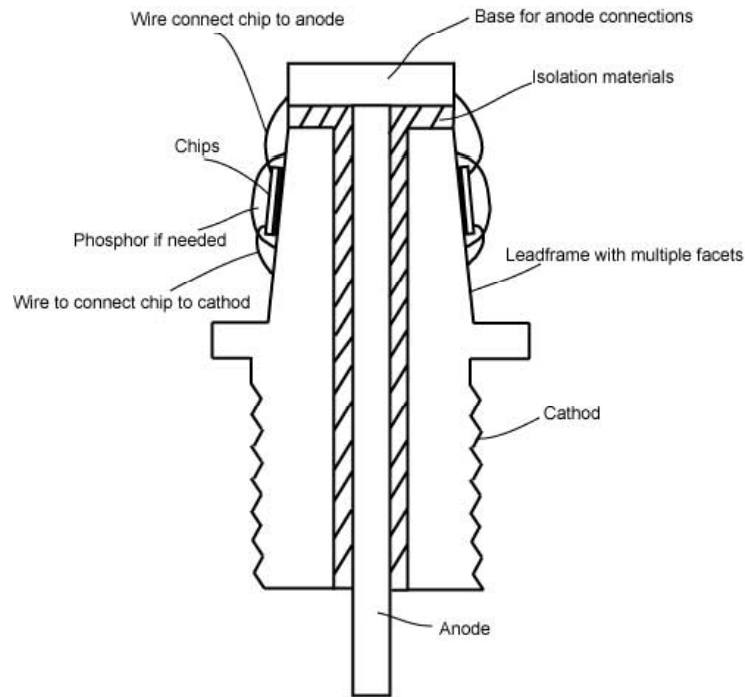


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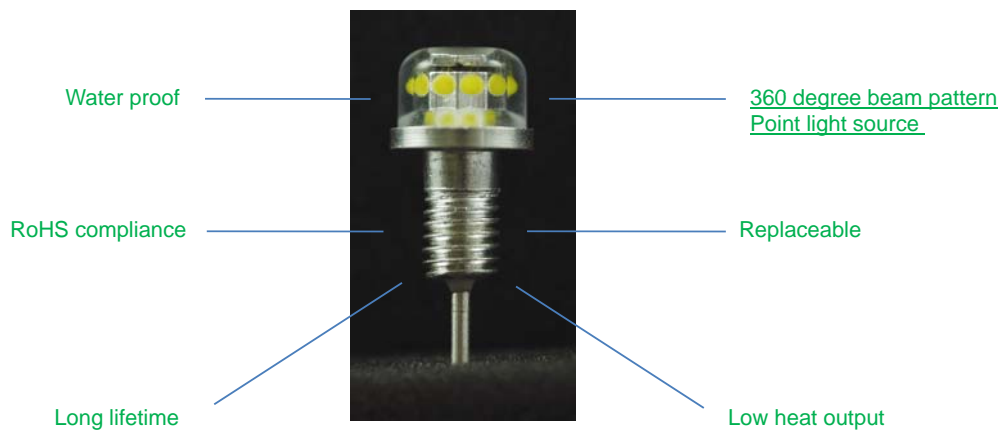
Introducing 3D LED light source – Dynasty[®]



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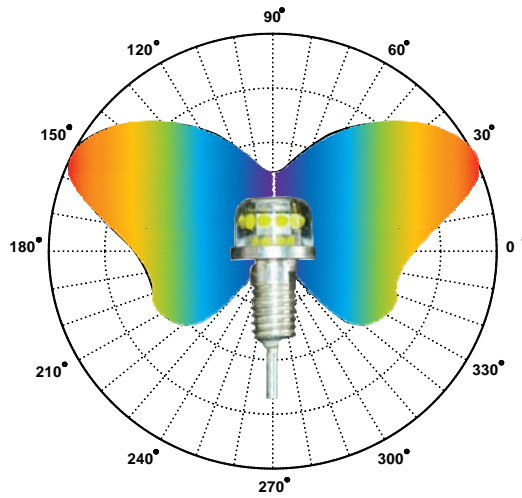


Introducing 3D LED light source



Patented technology

Beam Pattern of Dynasty[®] LED Light Source



Patented technology

Lamps Using Dynasty[®] LED



Patented and Patent Pending



Dynasty® BA10 Candelabra

- ❑ Exact shape and look match as a standard incandescent for decorative chandeliers
- ❑ Clear or frost
- ❑ 110 VAC input for direct replacement
- ❑ 1.7 Watt power consumption per bulb
- ❑ >75 lumen output
- ❑ 3000K color temperature
- ❑ >70 CRI
- ❑ 35,000 hours LM 70 rating
- ❑ Dimmable with special dimmer switch
- ❑ UL Listed



Dynasty® B10 Installation Samples

Marriott



Before: 2500 Watts
After: 170 Watts



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Dynasty® B10 Installation Samples

Broadmore Hotel



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Dynasty® B10 Installation Samples

Showboat Hotel



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Dynasty® S14

- ❑ Exact shape and look as S14 lamps with medium base
- ❑ Direct replacement for 10-15 watt incandescent lamps
- ❑ 110 – 220 VAC input
- ❑ 1.7 watt power input
- ❑ 3000K color temperature
- ❑ >75 lumen or higher output
- ❑ >70 CRI
- ❑ 35,000 hours LM70 rating
- ❑ Indoor and outdoor use
- ❑ Not dimmable
- ❑ UL listed

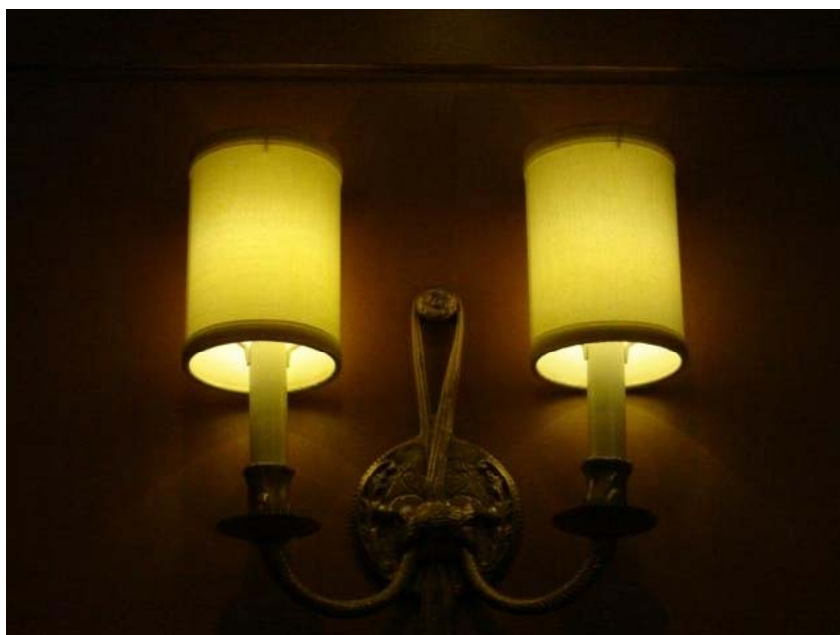


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Dynasty® S14 Installation Samples



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Dynasty® S14 Installation Samples



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Dynasty® S14 Installation Samples



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Dynasty® 1156

- Exact shape as incandescent 1156 lamp
- Retro fit immediately
- 12VDC input
- >75 lumen output
- 3000 – 7000K color temperature
- Color choice for white, red, amber, green and blue
- 35,000 hours rating
- Indoor and outdoor use
- Instant on



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Applications of Dynasty® 1156

Cabinet Lighting



Boat Lighting



Pathway Lighting



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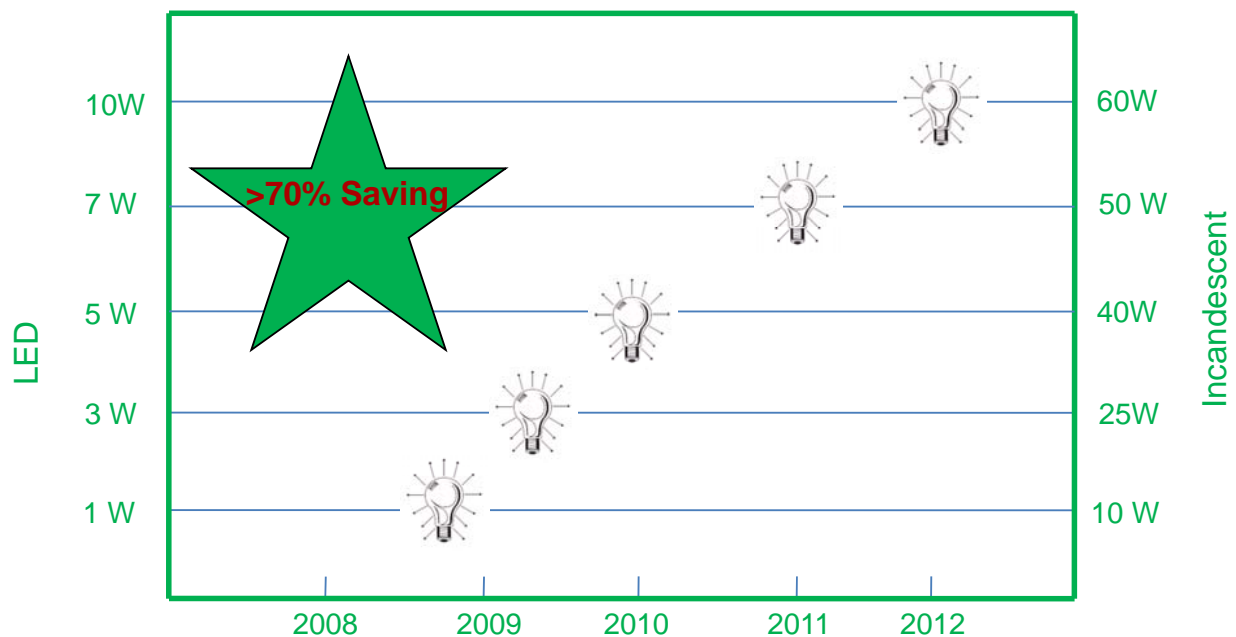


Savings by Retrofit

Categories	10 Watt Incandescent	Dynasty B10 or S14
Power consumption	10 Watt	1.7 Watt
Lifetime (LM70)	1,200 hours	35,000 hours
Operation hours/year (7/24)	8,670 hours	8,670 hours
Total electrical cost/year (\$0.15/KW)	\$13.14	\$2.23
Lamp unit cost	\$1.0	\$19.85
Lamp usage per year	7.30	0.25
Labor cost (\$5.00 per change)	\$36.50	\$1.25
Annual cost/year	\$56.94	\$8.45
Annual saving		\$46.15
Payback (month)		5.16
Life time saving		\$184.0
Return on investment		929%



Future Outlook



Preview of 40 – 60 Watt Replacement by 3D Light Source

13 Watt CFL
Or
60 Watt Incandescent



9 Watt 3D LED

Summary

- 3D LED light source provides solutions for direct replacement of incandescent bulbs with the same look and configurations
- Great energy savings and quick payback
- Direct replacements for majority of bulbs (40 and 60 Watts) are within 2 years



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Thank you

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