LED EVENEMENT 2013

LED applicaties voor designers, engineers en lichtarchitecten

1931 CONGRESCENTRUM
BRABANTHALLEN DEN BOSCH

WOENSDAG 27 NOVEMBER 2013

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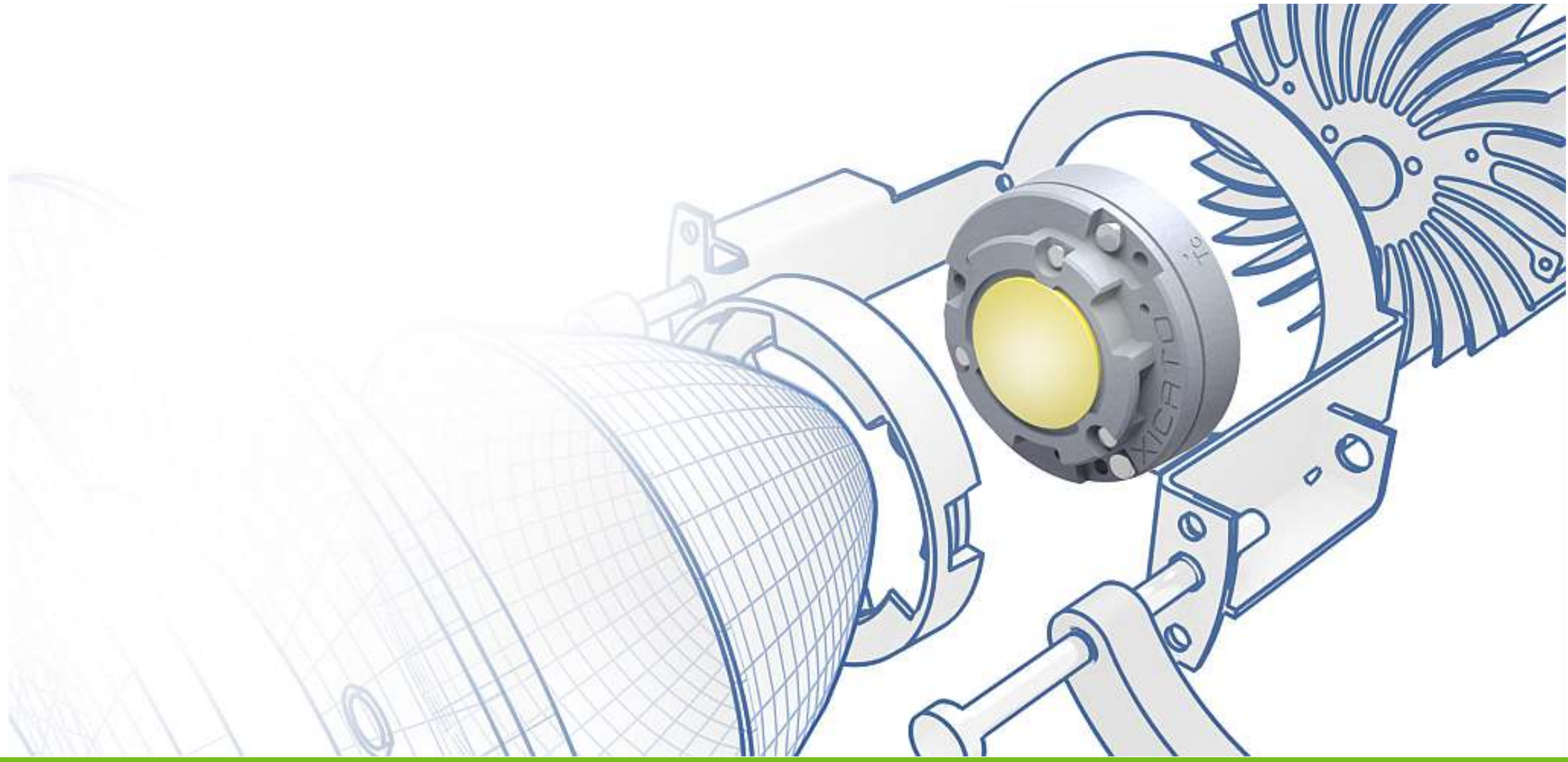

Uitwisselbaarheid, interoperabiliteit en de toekomstbestendigheid van LED-gebaseerde verlichtingsoplossingen

Patrick van der Meulen
Application Support Manager, Europe

XICATO

Abstract (for ref.)

With extended usable lifetimes of lighting solutions and higher initial solution costs, it's critical that specifiers, facility managers, and owner/operators understand what issues they may have to face in order to repair an installed luminaire or replace installed lighting in the next ten to twenty years. In this presentation we will address what it means to be interchangeable, interoperable, replaceable, maintainable, serviceable and future-proof given what is known today about the likely direction of development in the lighting industry. The entire system will be reviewed so that it's understood how changes in LED technology impact the thermal and optical performance of solutions that are intended to be future-proof. Participants will leave with a better understanding of how to evaluate and consider options that require significant capital investments.

Overview

1. “Interchangeability”

2. Modules/Engines + Drivers + Reflectors

Interchangeability, Interoperability, and Serviceability

3. What happens to the luminaire after the warranty expires.

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"source can be **replaced** in the field"

"**Interchangeable** Light Source"

"modular, scalable, field-**upgradeable**"

"**Replaceable** light source"

"**Interchangeable** Module"

"**Interchangeable** Light Engine"

"light source is **easily serviceable** through aperture"

"easily **upgradeable**"

"**Replaceable** module with quick disconnects"

"**Interchangeable** light source"

"light source/ heat sink module **field replaceable**"

"**Exchangeable** light source"


Interchangeable
Light Source!

“Interchangeable” (Wikipedia)

The American System involved semi-skilled labor using machine tools and jigs to make sta e ass known as ent of Wa g co unique to the it was str d how the panies. Wit the

Sin mbly, and ass division of l ools.

Inte imp for ma nd jigs (in bot and blocks and gauges to check the accuracy of the finished parts.

Electrical

Luminaire Purchase: Jan 1, 2013

“Interchangeable” LED Module light source matched with *driver*

+

=

STOP!

Interchangeable

≠

Interoperable

Luminaire Requiring Service: Jan 2, 2018

“Interchangeable” light source by another manufacturer

+

=

Photometric

Luminaire Purchase: Jan 1, 2013

“Interchangeable” LED Module light source matched with *reflector*

Aperture“19” = 19mm

+

Aperture“19”

=

STOP!

Interchangeable

≠

Interoperable

Luminaire Requiring Service: Jan 2, 2018

“Interchangeable” light source by another manufacturer

+

=

Aperture “19”= 19mm to >13.5mm

Photometric

Luminaire Purchase: Jan 1, 2013

"Interchangeable" LED Module light source matched with *driver*

+

=

4000 lumens (lm)
"Typical"

STOP!

Interchangeable

≠

Interoperable

Luminaire Requiring Service: Jan 2, 2018

"Interchangeable" light source by another manufacturer

+

=

4000lm "Typical"= 5000lm to 3600lm
(+25%/-10%)

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LED “Engine”

“LED Engine”

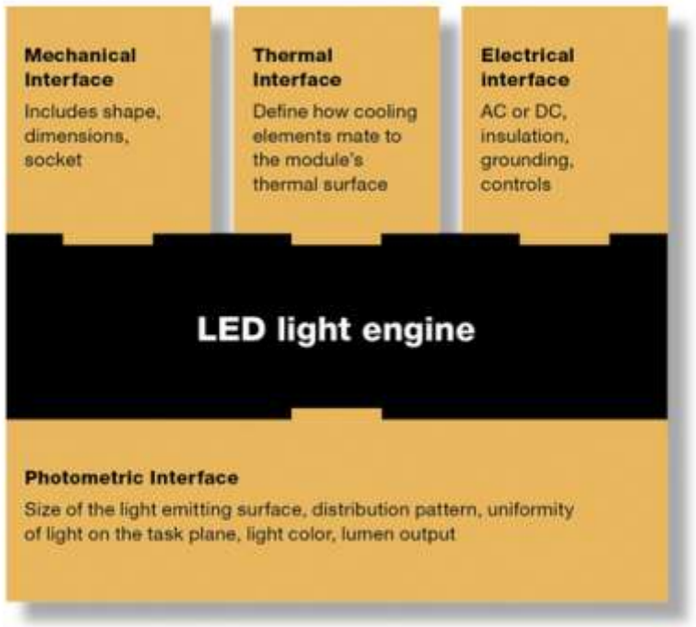
Definition from RP-16-10, IES (Illuminating Engineering Society)
(an Independent Standard Setting Organization)

“An integrated assembly comprised of LED packages (components) or LED arrays (modules), LED driver, and other optical, thermal, mechanical, and electrical components.

The device is intended to connect directly to the branch circuit through a custom connector compatible with the LED luminaire for which it was designed and does not use an ANSI standard base.”

Additional Definitions of LED “Engine”

1.



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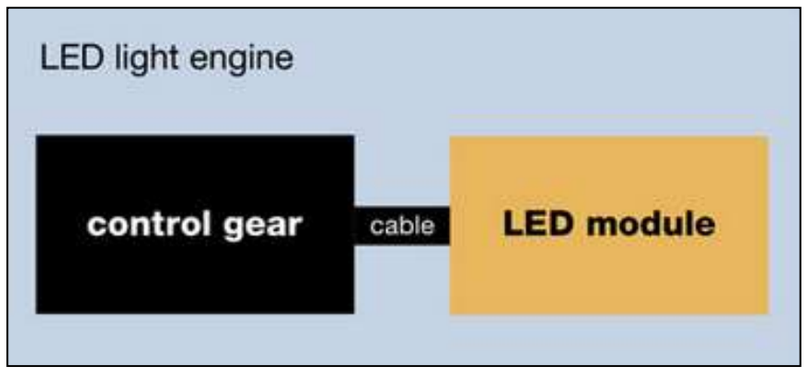

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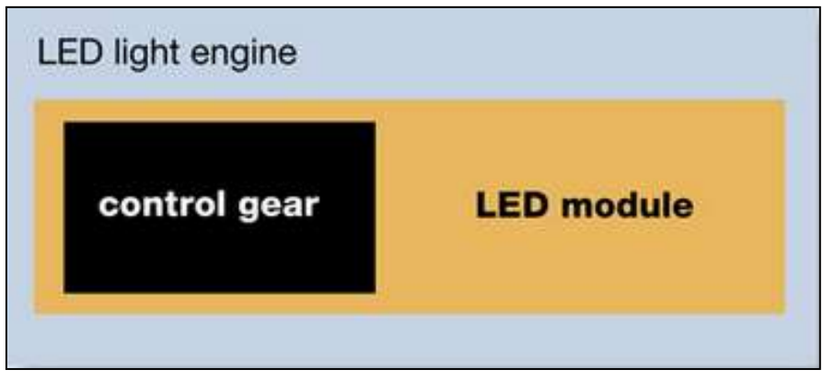

IES

“An integrated assembly comprised of LED packages (components) or LED arrays (modules), LED driver, and other optical, thermal, mechanical, and electrical components”

Zhaga

*“An **LED light engine** is the combination of an LED module and the associated control gear.”*

And More!

'light source' : *"means a surface or object designed to emit mainly visible optical radiation..."**

'lamp' : *"means a unit whose performance can be assessed independently..."**

'light emitting diode' : *"means a light source which consists of a solid state lighting device embodying a p-n junction..."**

'LED package' : *"means an assembly having one or more LED (s)."**

'LED module' : *"means an assembly having no cap and incorporating one or more LED packages on a printed circuit board"**

'LED lamp' : *"means a lamp incorporating one or more LED modules...."**

'semi-ballasted LED module' : *"module which carries the control unit of the control gear and is operated by the separated power supply of the control gear"***

"LED module": *"This is the LED together with mechanical and optical components making a replaceable item for use in a luminaire"****

LED modules : *8 different types and definitions of LED modules*****

"LED module" : *"A light source that is supplied as a single unit. In addition to one or more LEDs, their mechanical support and their electrical connection, it may contain components to improve its photometric, thermal, mechanical and electrical properties, but it does not include the Electronic Control Gear"******

*From the "Official Journal of the European Union", Article 2, "Definitions"(1194/2012)
**IEC62717
***LIA Liason Group Guide
****IEC62031
*****Zhaga

And More!

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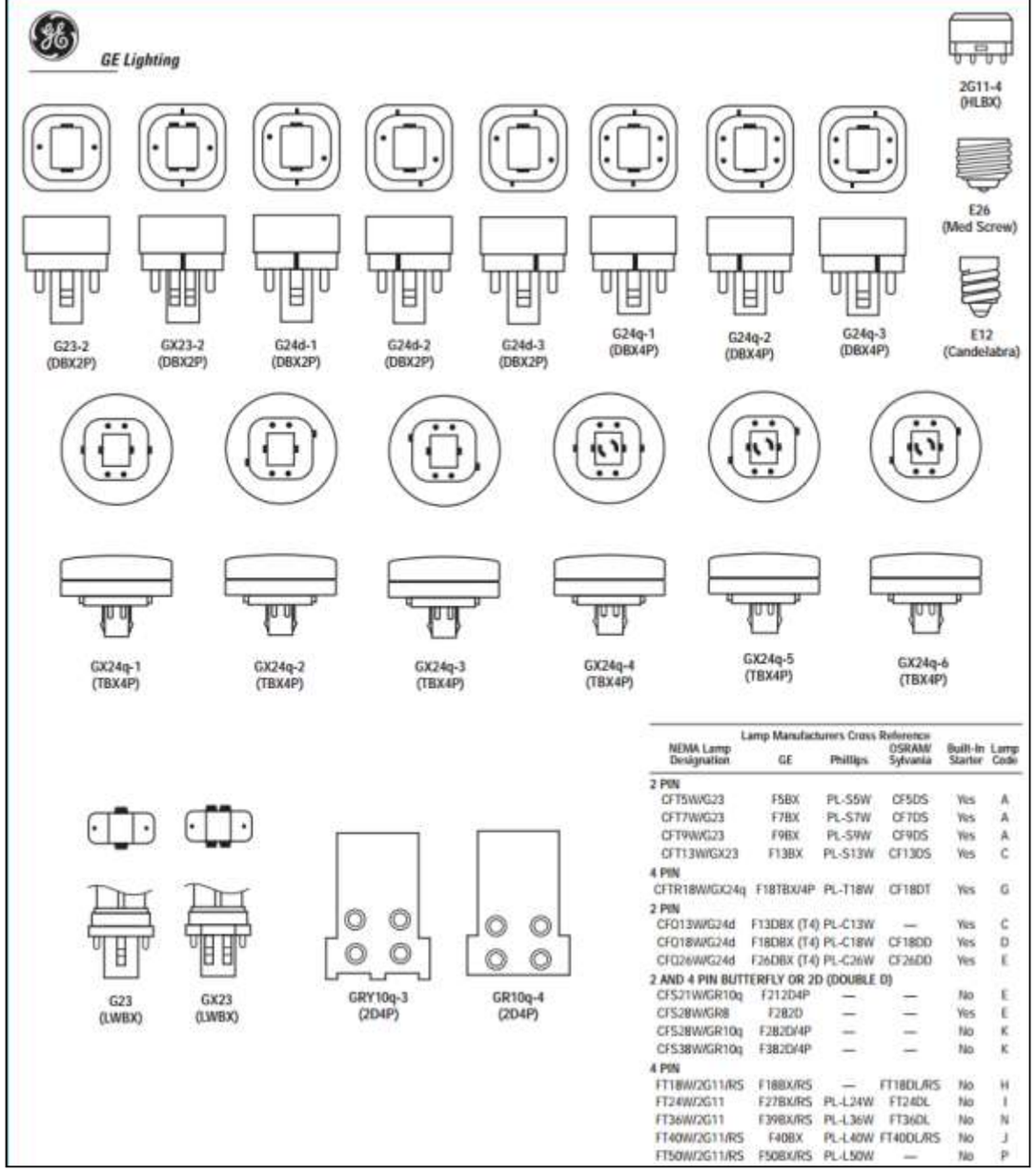
Compact Fluorescent Lamp Base Identification and Cross Reference

GE Lighting



Lamp Manufacturers Cross Reference

NEMA Lamp Designation	GE	Phillips	OSRAM/ Sylvania	Built-In Starter	Lamp Code
2 PIN					
CFT5W/G23	F5BX	PL-S5W	CF5DS	Yes	A
CFT7W/G23	F7BX	PL-S7W	CF7DS	Yes	A
CFT9W/G23	F9BX	PL-S9W	CF9DS	Yes	A
CFT13W/GX23	F13BX	PL-S13W	CF13DS	Yes	C
4 PIN					
CFTR18W/GX24q	F18TBX/4P	PL-T18W	CF18DT	Yes	G
2 PIN					
CFQ13W/G24d	F13DBX (T4)	PL-C13W	—	Yes	C
CFQ18W/G24d	F18DBX (T4)	PL-C18W	CF18DD	Yes	D
CFQ26W/G24d	F26DBX (T4)	PL-C26W	CF26DD	Yes	E
2 AND 4 PIN BUTTERFLY OR 2D (DOUBLE D)					
CFS21W/GR10q	F21D4P	—	—	No	E
CFS28W/GR8	F28D	—	—	Yes	E
CFS28W/GR10q	F28D/4P	—	—	No	K
CFS38W/GR10q	F38D/4P	—	—	No	K
4 PIN					
FT18W/2G11/RS	F18BX/RS	—	FT18DL/RS	No	H
FT24W/2G11	F27BX/RS	PL-L24W	FT24DL	No	I
FT36W/2G11	F39BX/RS	PL-L36W	FT36DL	No	N
FT40W/2G11/RS	F40BX	PL-L40W	FT40DL/RS	No	J
FT50W/2G11/RS	F50BX/RS	PL-L50W	—	No	P

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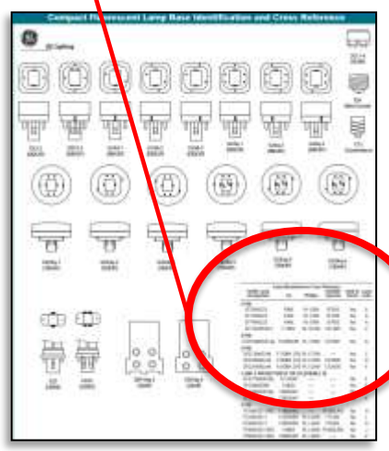
CFT7W/G23	F7BX	PL-S7W	CF7DS	Yes	A
CFT9W/G23	F9BX	PL-S9W	CF9DS	Yes	A
CFT13W/GX23	F13BX	PL-S13W	CF13DS	Yes	C
4 PIN					
CFTR18W/GX24q	F18TBX/4P	PL-T18W	CF18DT	Yes	G
2 PIN					



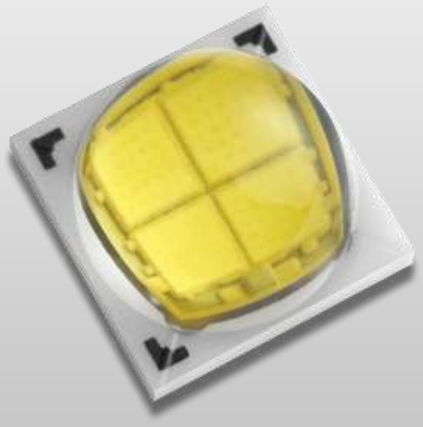


Table 2-2. LED metrics roadmap

Source: DOE 2012 MYPP

Metric	Unit	2011	2012	2013	2015	2020
LED Package Efficacy (warm white)	lm/W	97	113	129	162	224

Innovation and Standards:

When is the best time?

?

2007

2013

6 yrs

1983

1989

6 yrs

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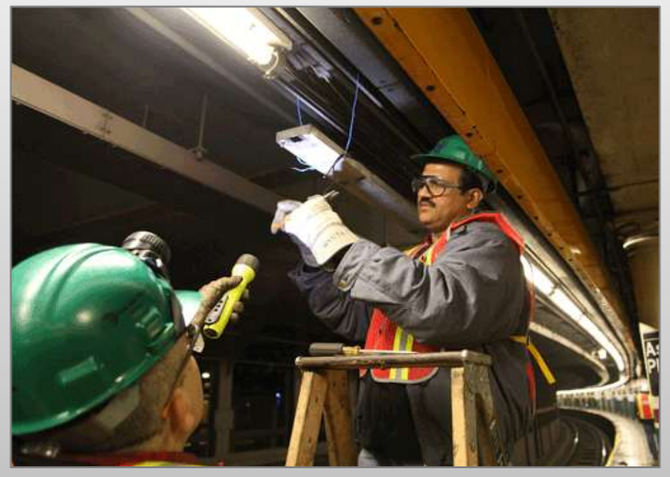
What is the <u>customer's</u> expectation?

1.

Ability to achieve lower operating costs through an upgrade of the luminaire (e.g. *reduce wattage or add dimming*).

2.

Fix a luminaire that is not working.



~~Maintain~~
~~Upgrade~~
~~Exchange~~
"Upgrade"
"Service"
~~Interchange~~
~~Replace~~

Customer's Expectation

Is luminaire *<u>field</u>-serviceable* or not?

<u>Yes?</u>

- Which components?
- *Power Supply? Reflector? Light Source?*
- Photometric performance matched (flux and beam)?
- Tool-less?
- "Matched" replacement components maintained?
- For how long?

<u>No?</u>

- Will manufacturer "take-back" luminaire?
- What do they do with luminaire?

Service or Replace?

Service or Replace?

Luminaire Type		Component-Based Luminaire Architecture (module/array/light source+ heat sink+ power supply)
Street/Area		Depends *Luminaires are relatively low cost and qualified technical labor expensive.* *May be less costly to simply replace.*

Service or Replace?

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Recessed downlight/troffer		Depends *Luminaires may have been designed to facilitate servicing.* *Caveat Emptor!*

Best Practices For the Lighting Specifier

Require luminaire manufacturer to publish a policy that addresses serviceability and upgrade of luminaire and/or its key components.

- *Decide whether that policy is consistent with client's needs.*

Best Practices: Luminaire Manufacturer

Clear Communication and Product Labeling

Is luminaire *field-serviceable* or not?

Yes?

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- *Power Supply? Reflector? Light Source?*
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No?

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Best Practices: Luminaire Manufacturer

Clear Communication and Product Labeling

Is luminaire *upgradeable* or not?

Yes?

- Which components
- *Power Supply? Light Source?*
- Photometric performance matched?
- Tool-less?
- “Matched” replacement components maintained?
- For how long?

No?

Summary

Best Practices: Industry

Lighting *Standards* (not proprietary manufacturer “specifications”)

Lighting Standards that focus first, on consumers:

- Safety
- Performance
- Quality *

Established by Standard Setting Organizations

- IESNA
- ANSI
- ISO/IEC

*CLTC: *“RELIGHTING AMERICAN HOMES WITH LEDS: Are we destined to repeat past mistakes or move forward with a plan that addresses consumer preferences”*

BEDANKT

Patrick van der Meulen
Application Support Manager, Europe