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**TELEREX**



**Invloed van de ERP wetgeving op led armaturen – hoe voldoen  
aan de wetgeving, wat met oudere ontwerpen?**

Dr. Wen Wu

LED EVENEMENT 2014, 2 Dec 2014

- ❑ Required features for driver in luminaires
- ❑ LED driver safety regulation(update)
- ❑ Ecodesign(Erp) requirement
- ❑ How to meet Erp on old design?
- ❑ Conclusion



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## LED Driver has wide range applications

Type	Indoor / outdoor	Power Range	Area of use
Street / Area Light	Outdoor	70~600W	Freeway, street, parking lot
Low / High-Bay Light	Outdoor	60~400W	Warehouses, convention center
Spot / Track light	Indoor	20~100W	Commercial retail store / supermarket
Troffers / Pendants Light	Indoor	20~60W	Offices, meeting rooms,
Specialty Light	Indoor / Outdoor	100 ~ 600W	Mining Lighting, Marine lighting, Classified Location Lighting



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# Required Features

- **High reliability / long lifetime (long period of warranty)**
- **CC for direct driving & CV with additional D/D driver**
- **High power factor, low THD**
- **High efficiency**
- **Io & Vo adjustment**
- **Special input range (277VAC/380VAC)**
- **Specific safety approvals (different demands for countries)**
- **Class 2, Class II**
- **Fanless design**
- **Complete protections**
- **Dimming ability (Analog & Digital)**
- **Water-proof and dust proof**
- **Acceptable inrush current**
- **No load power consumption**

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# LED Safety update

## ◆ Version Update

- ◆ Latest LED safety:
- ◆ EN 61347-1:2008/A1:2011 DOP 2012/2/1 ; DOW 2014/2/1
- ◆ EN 61347-1:2008/A2:2013 DOP 2013/10/1 ; DOW 2016/1/1
- ◆ EN 61347-2-13:2006 DOP 2007/4/1 ; DOW 2009/7/1
- ◆ EN 61347-2-13:2014 DOP 2015/7/8 ; DOW 2017/10/8
  
- ◆ IEC61347-1:2007+A1:2010 (ed2.1) DOP 2011/11/29
- ◆ IEC61347-1:2007+A2:2012 (ed2.2) DOP 2012/11/27
- ◆ IEC61347-1 (ed 3.0) (drafting)(Group TC/SC 34C)
- ◆ IEC61347-2-13:2006 (ed 1.0) DOP 2006/5/5
- ◆ IEC61347-2-13:2014 (ed 2.0) DOP 2014/9/3
  
- ◆ ENEC (EN 61347 + EN 62384)

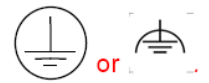
# LED Safety update

## ◆ IEC61347-1 A2 version requirement

- ◆ Stricter safety distance and withstand voltage
- ◆ Transformer DTI refer to 61558-1
- ◆ Ground trace test
- ◆ AC discharge refer to 60598-1 :  $< 60\text{Vpk}$  after 1sec.
- ◆ Touch current at SELV  $< 0.7\text{mA}$  peak
- ◆ Cross capacitor can be Y2 x 2 or Y1 x 1

### ◆ Symbol:

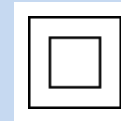
- ◆ Protective Earth



- ◆ Double insulation : Built-in:



- Independent :



# LED Safety update

Item	Insulation Level	IEC61347-1:2007	IEC61347-1:2007+A2:2012	
---	---	Built-in		
---	---	---	Non-SELV	SELV
Cr	Basic	2.5mm	2.5mm	2.6mm
	Supp.	2.5mm	2.5mm	2.6mm
	Reinforced	5.0mm	5.0mm	5.0mm
Cl	Basic	2.0mm	1.5mm	2.5mm
	Supp.	2.0mm	1.5mm	2.5mm
	Reinforced	4.0mm	3.0mm	4.7mm
Hi-pot test	Basic	2U+1000	2U+1000	1500
	Supp.	2U+1750	2U+1000	1500
	Reinforced	4U+2750	4U+2000	3000





**34C/992/CD**

COMMITTEE DRAFT (CD)

IEC/TC or SC: 34C	Project number <b>IEC 61347-1 Amend 3. Ed 2</b>	
Title of TC/SC: Auxiliaries for lamps	Date of circulation 2011-08-19	Closing date for comments 2011-11-25
Also of interest to the following committees	Supersedes document 34C/991/RR	
Proposed horizontal standard <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CD to the TC/SC secretary		
Functions concerned: <input type="checkbox"/> Safety <input type="checkbox"/> EMC <input type="checkbox"/> Environment <input type="checkbox"/> Quality assurance		

- Define DALI design:
- ✓ LV(namely 230Vmains) keeps basic insulation
- ✓ SELV should keep supplementary insulation

# LED Safety update

## ◆ Mean Well Action

- ◆ All LED update to A2 version
- ◆ New design follow latest IEC requirements
- ◆ Expanding ENEC models
- ◆ Actively checking IEC 3<sup>rd</sup> edition development status

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## No load power consumption:

Each ecodesign requirement shall apply in accordance with the following stages:

Stage 1: 1 September 2013

Stage 2: 1 September 2014

Stage 3: 1 September 2016

### 1.2. **Energy efficiency requirements for lamp control gear**

As from stage 2, the no-load mode input power of a piece of lamp control gear intended for use between the mains and the switch for turning the lamp load on/off shall not exceed 1.0 W.

As from stage 3, the limit shall be 0.50 W. For pieces of lamp control gear with output power (P) over 250W, the no-load mode input power limits shall be multiplied by P/250.

As from stage 3, the standby power of a piece of lamp control gear shall not exceed 0.50 W.

**Table 5 – Functionality requirements for non-directional and directional LED lamps**

Functionality parameter	Requirement as from stage 1, except where indicated otherwise
Lamp survival factor at 6000h	From stage 2: $\geq 0.90$
Lumen Maintenance at 6000h	From stage 2: $\geq 0.80$
Number of switching cycles before failure	$\geq 15000$ if rated lamp life $\geq 30000$ h otherwise: $\geq$ half the rated lamp life expressed in hours
Starting time	$< 0.5$ s
Lamp warm-up time to 95% $\Phi$	$< 2$ s
Premature failure rate	$\leq 5.0\%$ at 1000h
Colour rendering (Ra)	$\geq 80$  $\geq 65$ if the lamp is intended for outdoor or industrial applications in accordance with point 3.1.3(m) of this Annex
Colour consistency	Correlated colour temperature (CCT) spread within a six-step MacAdam ellipse or less.
Lamp power factor (PF)	$P \leq 2$ W : no requirement $2$ W $< P \leq 5$ W : PF $> 0.4$ $5$ W $< P \leq 25$ W : PF $> 0.5$ $P > 25$ W : PF $> 0.9$

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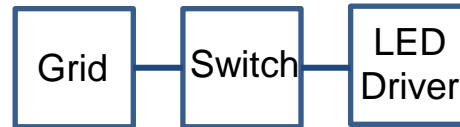
❑ No load power consumption:

Stage 1: 1 September 2013

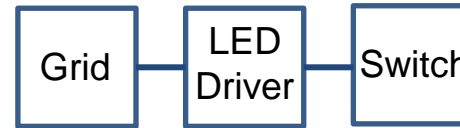
Stage 2: 1 September 2014: No load less than 1 Watt

Stage 3: 1 September 2016: No load less than 0.5 Watt

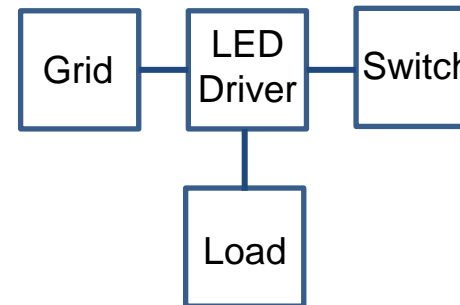
❑ Setup up time:  
<0.5sec



➔ Setup up time:<0.5sec  
Driver with A1 on label



➔ Setup up time:<0.5sec  
No load power required  
NPF, LCM series



➔ May not require Erp





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## MW's Action on ErP

Model	HLG/CLG	LPF	LPV/C	HBG	New series
Setup<0.5Sec	Yes	Yes	Yes	Yes	Yes
Setup<0.5Sec Standby <0.5W	-	-	-	-	Yes
MW Action	New series in 2015	NPF series	N.A	High Bay Application	GSC series LCM series PWM series NPF series



## □ LED driver should have

- ◆ Long life time & high reliability

- ◆ Dimming capability

- ◆ EN 61347-1:2008/A2:2013

- ◆ Erp requirement:

  - Setup time

  - No load power consumption



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# Q&A