

**POLSKIE CENTRUM AKREDYTACJI**  
**POLISH CENTRE FOR ACCREDITATION**



Sygnatariusz EA MLA  
EA MLA Signatory

**CERTYFIKAT AKREDYTACJI**  
**JEDNOSTKI CERTYFIKUJĄCEJ WYROBY**  
**ACCREDITATION CERTIFICATE FOR PRODUCT CERTIFICATION BODY**  
**Nr AC 005**

Potwierdza się, że: / This is to confirm that:

**ZAKŁADY BADAŃ I ATESTACJI „ZETOM”**  
**im. Prof. F. Stauba w Katowicach Sp. z o.o.**

**ZAKŁAD CERTYFIKACJI**

ul. Ks. Bpa H. Bednorza 17, 40-384 Katowice

spełnia wymagania normy PN-EN 45011:2000  
meets requirements of the PN-EN 45011:2000 standard

Akredytowana działalność jest określona w Zakresie Akredytacji Nr AC 005  
Accredited activity is defined in the Scope of Accreditation No AC 005

Akredytacja pozostaje w mocy pod warunkiem przestrzegania  
wymagań jednostki akredytującej określonych w kontrakcie Nr AC 005  
This accreditation remains in force provided the Body observes  
the requirements of Accreditation Body defined in the Contract No AC 005

Certyfikat akredytacji ważny do dnia 21.12.2018 r.  
The certificate of accreditation is valid until 21.12.2018

Akredytacji udzielono dnia 22.12.1993 r.  
Accreditation was granted on 22.12.1993



DYREKTOR  
POLSKIEGO CENTRUM AKREDYTACJI

  
EUGENIUSZ W. ROGUSKI

Warszawa, 16 grudnia 2014 roku



# ZAKRES AKREDYTACJI JEDNOSTKI CERTYFIKUJĄCEJ WYROBY Nr AC 005

wydany przez  
**POLSKIE CENTRUM AKREDYTACJI**  
01-382 Warszawa, ul. Szczotkarska 42

Wydanie nr 16 Data wydania: 11 sierpnia 2015 r.



AC 005

Nazwa i adres jednostki certyfikującej

**ZAKŁADY BADAŃ I ATESTACJI „ZETOM”**  
**im. Prof. F. Stauba w Katowicach Sp. z o.o.**  
**ZAKŁAD CERTYFIKACJI**  
**ul. Ks. Bpa H. Bednorza 17**  
**40-384 Katowice**

Certyfikacja :

- zgodności wyrobów, kod ICS: **13.220, 23.040, 25.120, 25.140, 25.160, 29.020, 29.140, 29.180, 33.100, 35.020, 53.040, 70.140, 75.200, 77.140, 77.150, 79.060, 83.200, 91.060, 91.140, 97.030, 97.040, 97.100, 97.200**

- wyrobów budowlanych na certyfikat zgodności, decyzje KE: **97/597/WE, 99/472/WE, 2002/359/WE**

- zakładowej kontroli produkcji, decyzje KE: **98/214/WE**

Ocena zgodności w obszarze rozporządzenia Parlamentu Europejskiego i Rady (UE) nr 305/2011 (CPR), decyzje KE: **96/579/WE, 98/214/WE, 99/472/WE**

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**KIEROWNIK  
DZIAŁU AKREDYTACJI  
JEDNOSTEK CERTYFIKUJĄCYCH  
I INSPEKCYJNYCH**

**KRZYSZTOF WOŹNIAK**

Niniejszy dokument jest załącznikiem do Certyfikatu Akredytacji Nr AC 005 z dnia 11.08.2015 r.  
Status akredytacji oraz aktualność zakresu akredytacji można potwierdzić na stronie internetowej PCA [www.pca.gov.pl](http://www.pca.gov.pl)

Rodzaj działalności:

**CERTYFIKACJA ZGODNOŚCI WYROBÓW**

Nazwa wyrobu / grupy wyrobów	Program certyfikacji	Norma / dokument normatywny	ICS
Urządzenia transportu bliskiego ciągłego (taśmy przenośnikowe, części składowe)	PDCWC	PN-EN 12882:2012	13.220 53.040
Rury stalowe i żeliwne	PDCWH	PN-EN 10216-1:2014-02 PN-EN 10216-2:2014-02 PN-EN 10216-3:2014-02 PN-EN 10216-4:2014-02 PN-EN 10216-5:2014-02 PN-EN 10217-1:2004 PN-EN 10217-1:2004/A1:2006 PN-EN 10217-2:2004 PN-EN 10217-2:2004/A1:2006 PN-EN 10217-3:2004 PN-EN 10217-3:2004/A1:2006 PN-EN 10217-4:2004 PN-EN 10217-4:2004/A1:2006 PN-EN 10217-5:2004 PN-EN 10217-5:2004/A1:2006 PN-EN 10217-6:2004 PN-EN 10217-6:2004/A1:2006 PN-EN 10217-7:2014-12	23.040
Rury z metali nieżelaznych (wyroby z miedzi)		PN-EN 12449:2012 PN-EN 12451:2012	23.040 77.150
Rury z tworzyw sztucznych (systemy odwadniające)	PDCWC	PN-EN 1453-1:2002 PN-EN 1453-1:2002/Ap1:2003	23.040 91.140
Przewody giętkie		PN-EN 854:2002 PN-EN 855:2002 PN-EN 856:2002 PN-EN 857:2002 PN-EN 12115:2011 PN-EN ISO 8029:2010 PN-EN ISO 1403:2009 PN-EN ISO 2398:2009 PN-EN ISO 3994:2011 PN-EN ISO 4641:2011 PN-EN ISO 5774:2008 PN-EN ISO 6134:2006 PN-EN ISO 6224:2011	23.040
Urządzenia do obróbki bezwiórowej (kuźnicze, prasy, nożyce)	PCMBT	PN-EN 693+A2:2012 PN-EN 12622+A1:2014-02 PN-EN 13736+A1:2012	25.120

Wersja strony: A

Nazwa wyrobu / grupy wyrobów	Program certyfikacji	Norma / dokument normatywny	ICS
Narzędzia z napędem elektrycznym	PDCWEEIM	PN-EN 50580:2012 PN-EN 50580:2012/A1:2014-04 PN-EN 50144-2-9:2001 PN-EN 60335-2-45:2007 PN-EN 60335-2-45:2007/A1:2008 PN-EN 60335-2-45:2007/A2:2012 PN-EN 60745-1:2009 PN-EN 60745-1:2009/AC:2010 PN-EN 60745-1:2009/A11:2011 PN-EN 60745-2-1:2010 PN-EN 60745-2-2:2010 PN-EN 60745-2-3:2011 PN-EN 60745-2-3:2011/A2:2014-01 PN-EN 60745-2-4:2010 PN-EN 60745-2-4:2010/A11:2012 PN-EN 60745-2-5:2011 PN-EN 60745-2-6:2010 PN-EN 60745-2-8:2009 PN-EN 60745-2-11:2010 PN-EN 60745-2-14:2009 PN-EN 60745-2-14:2009/A2:2010 PN-EN 60745-2-15:2009 PN-EN 60745-2-15:2009/A1:2010 PN-EN 60745-2-17:2010	25.140
Urządzenia do spawania, zgrzewania i lutowania (węże)	PDCWC	PN-EN 1327:1999 PN-EN ISO 3821:2010 PN-EN ISO 14113:2014-02	25.160
Wyposażenie ochronne (bezpieczeństwo) maszyn	PDCWEEIM	PN-EN 60204-1:2010 PN-EN 60204-1:2010/AC:2011	29.020
Lampy i ich wyposażenie (zakres EMC – emisja)		PN-EN 55015:2013-10	29.140 33.100
Lampy i ich wyposażenie (oprawy oświetleniowe)		PN-EN 60598-1:2011 PN-EN 60598-2-2:2012 PN-EN 60598-2-3:2006 PN-EN 60598-2-3:2006/A1:2012 PN-EN 60598-2-4:2002 PN-EN 60598-2-5:2000 PN-EN 60598-2-6:2000 PN-EN 60598-2-7:2000 PN-EN 60598-2-8:2013-12 PN-EN 60598-2-9:2002	29.140

Wersja strony: A

Nazwa wyrobu / grupy wyrobów	Program certyfikacji	Norma / dokument normatywny	ICS
Lampy i ich wyposażenie (oprawy oświetleniowe)	PDCWEEIM	PN-EN 60598-2-10:2005 PN-EN 60598-2-10:2005/AC:2006 PN-EN 60598-2-11:2014-01 PN-EN 60598-2-12:2013-12 PN-EN 60598-2-13:2007 PN-EN 60598-2-13:2007/A1:2012 PN-EN 60598-2-14:2009 PN-EN 60598-2-17:2002 PN-EN 60598-2-18:2002 PN-EN 60598-2-18:2002/A1:2012 PN-EN 60598-2-19:2002 PN-EN 60598-2-19:2002/AC:2006 PN-EN 60598-2-20:2010 PN-EN 60598-2-20:2010/AC:2010 PN-EN 60598-2-22:2004 PN-EN 60598-2-22:2004/AC:2006 PN-EN 60598-2-22:2004/A2:2010 PN-EN 60598-2-23:2005 PN-EN 60598-2-24:2014-02 PN-EN 60598-2-25:2000 PN-EN 60598-2-25:2000/A1:2005 PN-IEC 598-2-1:1994 PN-IEC 598-2-1:1994/Ap1:2000	29.140
Lampy i ich wyposażenie (urządzenia do lamp)		PN-EN 61347-1:2010 PN-EN 61347-1:2010/A1:2011 PN-EN 61347-1:2010/A2:2013-06 PN-EN 61347-2-2:2012 PN-EN 61347-2-11:2005 PN-EN 61347-2-11:2005/AC:2011 PN-EN 61347-2-13:2008 PN-EN 61347-2-13:2008/AC 2011	
Transformatory. Dławiki		PN-EN 61558-1:2009 PN-EN 61558-1:2009/A1:2009 PN-EN 61558-2-1:2010	29.180
Odbiorniki energii elektrycznej (zakres EMC – emisja)		PN-EN 55014-1:2012	33.100
Urządzenia techniki informatycznej (urządzenia biurowe)		PN-EN 60950-1:2007 PN-EN 60950-1:2007/A11:2009 PN-EN 60950-1:2007/A1:2011 PN-EN 60950-1:2007/A12:2011 PN-EN 60950-1:2007/A2:2014-05	35.020

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Nazwa wyrobu / grupy wyrobów	Program certyfikacji	Norma / dokument normatywny	ICS
Urządzenia transportu bliskiego ciągłego (taśmy przenośnikowe, części składowe)	PDCWC	PN-EN ISO 14890:2013-06 PN-EN ISO 22721:2009 PN-EN ISO 15236-1:2006	53.040
Urządzenia do transportu ropy naftowej, produktów naftowych i gazu ziemnego (węże)		PN-EN 1360:2013-11 PN-EN ISO 6808:2014-09	75.200
Wyroby z żeliwa i stali	PDCWH	PN-EN 10272:2009	77.140
Stale wysokojakościowe		PN-EN 10088-2:2014-12 PN-EN 10088-3:2015-01	
Stale sprężynowe		PN-EN 10089:2005 PN-EN 10270-1:2011 PN-EN 10270-2:2011 PN-EN 10270-3:2011 PN-H-93005:1996	
Stale sprężynowe. Wyroby i półwyroby płaskie stalowe		PN-EN 10132-4:2004	77.140 70.140
Stale na zbiorniki ciśnieniowe		PN-EN 10028-1+A1:2010 PN-EN 10028-1+A1:2010/AC:2010 PN-EN 10028-2:2010 PN-EN 10028-3:2010 PN-EN 10273:2009	77.140
Wyroby i półwyroby płaskie stalowe		PN-EN 10025-2:2007 PN-EN 10025-3:2007 PN-EN 10025-4:2007 PN-EN 10025-5:2007 PN-EN 10025-6+A1:2009 PN-EN 10120:2011 PN-EN 10130:2009 PN-EN 10132-1:2004 PN-EN 10132-2:2004 PN-EN 10132-3:2004 PN-EN 10139:2001 PN-EN 10268+A1:2014-02 PN-EN 10346:2011	
Pręty i walcówka stalowa	PN-EN ISO 16120-1:2011 PN-EN ISO 16120-2:2012 PN-EN ISO 16120-3:2012 PN-EN ISO 16120-4:2012 PN-EN 10277-1:2009 PN-EN 10277-2:2009 PN-H-93000:1984 PN-H-93027:1984	77.140	

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Nazwa wyrobu / grupy wyrobów	Program certyfikacji	Norma / dokument normatywny	ICS	
Drut stalowy, liny stalowe i łańcuchy ogniwo	PDCWH	PN-ISO 8369:2000 PN-ISO 10092:2000 PN-EN 10223-4:2013-05 PN-EN 10223-5:2013-05 PN-EN 10264-1:2012 PN-EN 10264-2:2012 PN-EN 10264-3:2012 PN-EN 10264-4:2012 PN-EN 12385-1+A1:2009	77.140	
Kształtowniki stalowe		PN-EN 10248-1:1999 PN-EN 10249-1:2000 PN-H-93441-1:2013-12		
Rurociągi i rury stalowe specjalnego stosowania		PN-EN 39:2003 PN-EN 10305-1:2011 PN-EN 10305-2:2011 PN-EN 10305-3:2011 PN-EN 10305-5:2011 PN-H-74247:1996		
Wyroby z metali nieżelaznych (z aluminium)		PN-EN 754-1:2009 PN-EN 755-1:2009		77.150
Wyroby z metali nieżelaznych (z miedzi)		PN-EN 1172:2012 PN-EN 1652:1999 PN-EN 1652:1999/AC:2004 PN-EN 1653:1999 PN-EN 1653:1999/A1:2004 PN-EN 12163:2011 PN-EN 12166:2011 PN-EN 12167:2011		
Płyty z materiałów drewnopochodnych (wiórowe i pilśniowe)	PDCWC	PN-EN 300:2007 PN-EN 312:2011 PN-EN 622-1:2005 PN-EN 622-2:2006 PN-EN 622-2:2006/AC:2006 PN-EN 622-3:2006 PN-EN 622-4:2010 PN-EN 622-5:2010	79.060	
Maszyny dla przemysłu gumowego i tworzyw sztucznych	PCMBT	PN-EN 201:2011 PN-EN 289:2014-11 PN-EN 422:2010 PN-EN 1114-1:2011 PN-EN 1114-3+A1:2008	83.200	

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Nazwa wyrobu / grupy wyrobów	Program certyfikacji	Norma / dokument normatywny	ICS
Maszyny dla przemysłu gumowego i tworzyw sztucznych	PCMBT	PN-EN 1417+A1:2008 PN-EN 1417+A1:2008/AC:2009 PN-EN 1612-1+A1:2008 PN-EN 12012-1+A1:2009 PN-EN 12012-3+A1:2008 PN-EN 12013+A1:2008 PN-EN 12301+A1:2008 PN-EN 12409+A1:2012	83.200
Elementy budynków (drzwi i okna)	PDCWEEIM	PN-EN 60335-2-103:2005 PN-EN 60335-2-103:2005/A11:2009	91.060
Małe urządzenia kuchenne		PN-EN 60335-2-9:2007 PN-EN 60335-2-9:2007/A12:2008 PN-EN 60335-2-9:2007/A13:2011 PN-EN 60335-2-12:2004 PN-EN 60335-2-12:2004/A1:2008 PN-EN 60335-2-13:2010 PN-EN 60335-2-13:2010/A11:2012 PN-EN 60335-2-14:2009 PN-EN 60335-2-14:2009/A1:2009 PN-EN 60335-2-14:2009/A11:2012 PN-EN 60335-2-15:2007 PN-EN 60335-2-15:2007/A2:2009 PN-EN 60335-2-15:2007/AC:2007 PN-EN 60335-2-15:2007/A11:2012 PN-EN 60335-2-16:2004 PN-EN 60335-2-16:2004/A1:2008 PN-EN 60335-2-16:2004/A2:2012 PN-EN 60335-2-63:2002 PN-EN 60335-2-64:2002 PN-EN 60335-2-64:2002/A1:2005 PN-EN 60335-2-64:2002/AC:2008 PN-EN 60335-2-74:2008 PN-EN 60335-2-74:2008/A2:2010	97.040
Ogrzewacze elektryczne		PN-EN 60335-2-30:2010 PN-EN 60335-2-30:2010/A11:2012 PN-EN 60335-2-53:2012 PN-EN 60335-2-61:2008 PN-EN 60335-2-61:2008/A2:2009 PN-EN 60335-2-96:2005 PN-EN 60335-2-96:2005/Ap1:2005 PN-EN 60335-2-96:2005/A2:2009	97.100

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Nazwa wyrobu / grupy wyrobów	Program certyfikacji	Norma / dokument normatywny	ICS
Inny sprzęt rekreacyjny	PDCWEEIM	PN-EN 60335-2-82:2004 PN-EN 60335-2-82:2004/A1:2008	97.200

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ICS – International Classification for Standards (Międzynarodowa Klasyfikacja Norm).

Zastosowane oznaczenia:

PDCWH – Program dobrowolnej certyfikacji wyrobów hutniczych – program typ 4 wyd. 17 z 06.2015 r.

PDCWEEIM – Program dobrowolnej certyfikacji wyrobów elektrotechnicznych, elektronicznych i maszyn – program typ 4 wyd. 15 z 06.2015 r.

PCMBT – Program certyfikacji maszyn – program typ 1a wyd. 11 z 06.2015 r.

PDCWC – Program dobrowolnej certyfikacji wyrobów chemicznych – program typ 4 wyd. 18 z 06.2015 r.

Rodzaj działalności:	Dokument odniesienia:
<b>CERTYFIKACJA WYROBÓW BUDOWLANYCH NA CERTYFIKAT ZGODNOŚCI</b> (System 1+, 1)  <b>CERTYFIKACJA ZKP</b> (System 2+)	Rozporządzenie Ministra Infrastruktury z dnia 11 sierpnia 2004 r. w sprawie sposobów deklarowania zgodności wyrobów budowlanych oraz sposobu znakowania ich znakiem budowlanym (Dz. U. 2004 Nr 198, poz. 2041 z późn. zm.)

Numer decyzji Komisji	Wyrób(y)	System oceny zgodności	Dokument kryterialny (specyfikacja techniczna)
97/597/WE	Stal zbrojeniowa i sprzężająca do betonu	1+	PN-ISO 6935-1:1998 PN-ISO 6935-1/AK:1998 PN-ISO 6935-2:1998 PN-ISO 6935-2/AK:1998 PN-ISO 6935-2:1998/Ap1:1999 PN-H-93220:2006 PN-H 93247-1:2008 PN-H-93247-2:2008 PN-EN 10080:2007 Aprobaty Techniczne, IBDiM Aprobaty Techniczne, ITB
98/214/WE	Metalowe wyroby konstrukcyjne i elementy pomocnicze	2+	PN-EN 10111:2009 PN-EN 10130:2009 PN-EN 10149-1:2014-02 PN-EN 10149-2:2014-02 PN-EN 10149-3:2014-02 PN-EN 10248-1:1999 PN-EN 10249-1:2000 PN-EN 10277-1:2009 PN-EN 10277-2:2009 PN-EN 13674-1:2011
99/472/WE	Rury, zbiorniki i elementy pomocnicze nieprzeznaczone do kontaktu z wodą do spożycia przez ludzi	1	PN-EN 1555-1:2012 PN-EN 1555-2:2012 PN-EN 1555-3+A1:2013-05 PN-EN 1555-5:2012 PN-EN ISO 3183:2013-05 PN-EN 10216-1:2014-02 PN-EN 10216-2:2014-02 PN-EN 10216-3:2014-02 PN-EN 10216-4:2014-02 PN-EN 10216-5:2014-02 PN-EN 10217-1:2004 PN-EN 10217-1:2004/A1:2006

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Numer decyzji Komisji	Wyrób(y)	System oceny zgodności	Dokument kryterialny (specyfikacja techniczna)
99/472/WE	Rury, zbiorniki i elementy pomocnicze nieprzeznaczone do kontaktu z wodą do spożycia przez ludzi	1	PN-EN 10217-2:2004 PN-EN 10217-2:2004/A1:2006 PN-EN 10217-3:2004 PN-EN 10217-3:2004/A1:2006 PN-EN 10217-4:2004 PN-EN 10217-4:2004/A1:2006 PN-EN 10217-5:2004 PN-EN 10217-5:2004/A1:2006 PN-EN 10217-6:2004 PN-EN 10217-6:2004/A1:2006 PN-EN 10217-7:2014-12 PN-EN 10296-1:2006 PN-EN 10296-2:2007 PN-EN 10297-1:2005 PN-EN 10297-2:2007 PN-EN ISO 11299-1:2013-06 PN-EN ISO 11299-3:2013-07 PN-H-74200:1998 PN-H-74220:1984
2002/359/WE	Wyroby kontaktujące się z wodą przeznaczoną do spożycia przez ludzi	1+	PN-EN 12201-2:+A1:2013-12 PN-EN 12201-3+A1:2013-05

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Rodzaj działalności:	Dokument odniesienia:
<b>CERTYFIKACJA STAŁOŚCI WŁAŚCIWOŚCI UŻYTKOWYCH WYROBU BUDOWLANEGO (System 1)</b>  <b>CERTYFIKACJA ZGODNOŚCI ZAKŁADOWEJ KONTROLI PRODUKCJI (System 2+)</b>	Rozporządzenie Parlamentu Europejskiego i Rady (UE) Nr 305/2011 z dnia 9 marca 2011 r. ustanawiające zharmonizowane warunki wprowadzania do obrotu wyrobów budowlanych i uchylające dyrektywę Rady 89/106/EWG (Dz. Urz. UE L 88 z 4.4.2011 z późn.zm.)

Numer decyzji Komisji	Wyrób(y)	System oceny i weryfikacji stałości właściwości użytkowych	Zharmonizowane specyfikacje techniczne
96/579/WE	Urządzenia bezpieczeństwa ruchu drogowego	1	PN-EN 40-5:2004 PN-EN 40-6:2004
98/214/WE	Metalowe wyroby konstrukcyjne i elementy pomocnicze	2+	PN-EN 1090-1+A1:2012 PN-EN 10025-1:2007 PN-EN 10210-1:2007 PN-EN 10219-1:2007 PN-EN 15088:2006
99/472/WE	Rury, zbiorniki i elementy pomocnicze nieprzeznaczone do kontaktu z wodą do spożycia przez ludzi	1	PN-EN 1057+A1:2010

Wersja strony: A

Aktualna „Lista podwykonawców” jest dostępna na każde żądanie w akredytowanym podmiocie.

Aktualna „Lista badań wykonywanych w laboratoriach producenta” jest dostępna na każde żądanie w akredytowanym podmiocie.

Jednostka certyfikująca spełnia wymagania określone w Rozporządzeniu Nr 305/2011 z dnia 9 marca 2011 r. w powyższym zakresie.

# Wykaz zmian Zakresu Akredytacji Nr AC 005

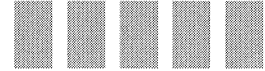
Status zmian: wersja pierwotna – A

Zatwierdzam status zmian  
KIEROWNIK  
DZIAŁU AKREDYTACJI  
JEDNOSTEK CERTYFIKUJĄCYCH  
I INSPEKCYJNYCH

KRZYSZTOF WOŹNIAK  
dnia: 11.08.2015 r.



LUG Light Factory Ltd.  
Producer of Professional Lighting Fittings



Zielona Góra, 26.07.2013

## EC Declaration of Conformity

### RoHS2 Directive 2011/65/EU

LUG Light Factory Ltd. hereby declare that our all products are in full compliance with EU Directive 2011/65/EC (the RoHS2 Directive) that restricts the use of the hazardous substances in electrical and electronic equipment.

We have confirmed our suppliers' statements regarding the absence of the restricted substances.

Compiled by :

LUG Light Factory Sp. z o.o.  
Inżynier Laboratorium  
Laboratory Engineer  
mgr inż. Marcin Białas

Approved by:

LUG Light Factory Sp. z o.o.  
DYREKTOR DS. TECHNICZNYCH  
mgr inż. Mariusz Ejsmont

**LUG LIGHT FACTORY** Sp. z o.o.  
65-127 Zielona Góra, ul. Gorzowska 11  
tel. (068) 45 33 200, fax (068) 45 33 201  
NIP 929-17-85-452 (1)



Polska

# CERTIFICATE OF LABORATORY APPROVAL

No. TSP-17025-LB-001.00

Laboratory for Photometric, Thermal, Leak,  
Colorimetric and Electrical Tests

**LUG LIGHT FACTORY Sp. z o.o.**

ul. Gorzowska 11

65-127 Zielona Góra, Polska

Branch: **ul. Nowa 7, 66-002 Nowy Kisielin**

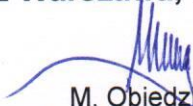
having met the criteria regarding technical requirements specified in point 5 of the standard PN-EN ISO/IEC 17025:2005 has been approved by TÜV SÜD Polska for performing of photometric, thermal, leak, colorimetric and electrical tests.

The scope of approved test methods is specified in the attachment to this certificate.

This certificate is valid from 04.04.2018 to 04.04.2021.

**TÜV SÜD Polska Sp. z o.o.**  
**00-252 Warszawa, ul. Podwale 17**



  
M. Obiedziński  
Head of Industry Service Department

Warszawa, on the 23<sup>rd</sup> of May 2018







Poland

No.	Tested object, object group	Tested features/Method	Standard
1.	Luminaires - general requirements	<ul style="list-style-type: none"> <li>• CLASSIFICATION OF LUMINAIRES</li> <li>• MARKING</li> <li>• STRUCTURE</li> <li>• INTERNAL AND EXTERNAL WIRING</li> <li>• ADJUSTMENT TO EARTHING</li> <li>• PROTECTION AGAINST ELECTRIC SHOCK</li> <li>• RESISTANCE TO DUST, SOLIDS AND MOISTURE</li> <li>• RESISTANCE AND ELECTRICAL STRENGTH OF INSULATION</li> <li>• TOUCH CURRENT AND PROTECTIVE CONDUCTOR CURRENT</li> <li>• CLEARANCES AND CREEPAGE DISTANCES</li> <li>• DURABILITY TEST AND THERMAL TEST</li> <li>• RESISTANCE TO HEAT, FIRE AND CREEPING CURRENT</li> <li>• SCREW CLAMPS</li> <li>• SCREWLESS CLAMPS AND ELECTRICAL CONNECTORS</li> </ul>	PN-EN 60598-1:2015- 04
2.	Surface-mounted luminaires	<ul style="list-style-type: none"> <li>• CLASSIFICATION OF LUMINAIRES</li> <li>• MARKING</li> <li>• STRUCTURE</li> <li>• INTERNAL AND EXTERNAL WIRING</li> <li>• ADJUSTMENT TO EARTHING</li> <li>• PROTECTION AGAINST ELECTRIC SHOCK</li> <li>• RESISTANCE TO DUST, SOLIDS AND MOISTURE</li> <li>• RESISTANCE AND ELECTRICAL STRENGTH OF INSULATION</li> <li>• TOUCH CURRENT AND PROTECTIVE CONDUCTOR CURRENT</li> <li>• CLEARANCES AND CREEPAGE DISTANCES</li> <li>• DURABILITY TEST AND THERMAL TEST</li> <li>• RESISTANCE TO HEAT, FIRE AND CREEPING CURRENT</li> <li>• SCREW CLAMPS</li> <li>• SCREWLESS CLAMPS AND ELECTRICAL CONNECTORS</li> </ul>	EN 60598-2-1:1989

3.	Flush-mounted luminaires	<ul style="list-style-type: none"> <li>• CLASSIFICATION OF LUMINAIRES</li> <li>• STAMPING</li> <li>• STRUCTURE</li> <li>• CLEARANCES AND CREEPAGE DISTANCES</li> <li>• INTERNAL AND EXTERNAL WIRING</li> <li>• ADJUSTMENT TO EARTHING</li> <li>• PROTECTION AGAINST ELECTRIC SHOCK</li> <li>• RESISTANCE TO DUST, SOLIDS AND MOISTURE</li> <li>• RESISTANCE AND ELECTRICAL STRENGTH OF INSULATION</li> <li>• TOUCH CURRENT AND PROTECTIVE CONDUCTOR CURRENT</li> <li>• CLEARANCES AND CREEPAGE DISTANCES</li> <li>• DURABILITY TEST AND THERMAL TEST</li> <li>• RESISTANCE TO HEAT, FIRE AND CREEPING CURRENT</li> <li>• CLAMPS</li> </ul>	PN-EN 60598-2-2:2012
4.	Road and street luminaires	<ul style="list-style-type: none"> <li>• CLASSIFICATION OF LUMINAIRES</li> <li>• STAMPING</li> <li>• STRUCTURE</li> <li>• INTERNAL AND EXTERNAL WIRING</li> <li>• ADJUSTMENT TO EARTHING</li> <li>• PROTECTION AGAINST ELECTRIC SHOCK</li> <li>• RESISTANCE TO DUST, SOLIDS AND MOISTURE</li> <li>• RESISTANCE AND ELECTRICAL STRENGTH OF INSULATION</li> <li>• TOUCH CURRENT AND PROTECTIVE CONDUCTOR CURRENT</li> <li>• CLEARANCES AND CREEPAGE DISTANCES</li> <li>• DURABILITY TEST AND THERMAL TEST</li> <li>• RESISTANCE TO HEAT, FIRE AND CREEPING CURRENT</li> <li>• SCREW CLAMPS</li> <li>• SCREWLESS CLAMPS AND ELECTRICAL CONNECTORS</li> </ul>	PN-EN 60598-2-3:2016/A1:2012
5.	Portable luminaires	<ul style="list-style-type: none"> <li>• CLASSIFICATION OF LUMINAIRES</li> <li>• STAMPING</li> <li>• STRUCTURE</li> <li>• INTERNAL AND EXTERNAL WIRING</li> <li>• ADJUSTMENT TO EARTHING</li> <li>• PROTECTION AGAINST ELECTRIC SHOCK</li> <li>• RESISTANCE TO DUST, SOLIDS AND MOISTURE</li> <li>• RESISTANCE AND ELECTRICAL STRENGTH OF INSULATION</li> <li>• TOUCH CURRENT AND PROTECTIVE CONDUCTOR CURRENT</li> <li>• CLEARANCES AND CREEPAGE DISTANCES</li> <li>• DURABILITY TEST AND THERMAL TEST</li> <li>• RESISTANCE TO HEAT, FIRE AND CREEPING CURRENT</li> <li>• CLAMPS</li> </ul>	PN-EN 60598-2-4:2002

6.	Floodlights	<ul style="list-style-type: none"> <li>• CLASSIFICATION OF LUMINAIRES</li> <li>• STAMPING</li> <li>• STRUCTURE</li> <li>• INTERNAL AND EXTERNAL WIRING</li> <li>• ADJUSTMENT TO EARTHING</li> <li>• PROTECTION AGAINST ELECTRIC SHOCK</li> <li>• RESISTANCE TO DUST, SOLIDS AND MOISTURE</li> <li>• RESISTANCE AND ELECTRICAL STRENGTH OF INSULATION</li> <li>• TOUCH CURRENT AND PROTECTIVE CONDUCTOR CURRENT</li> <li>• CLEARANCES AND CREEPAGE DISTANCES</li> <li>• DURABILITY TEST AND THERMAL TEST</li> <li>• RESISTANCE TO HEAT, FIRE AND CREEPING CURRENT</li> <li>• SCREW CLAMPS</li> <li>• SCREWLESS CLAMPS AND ELECTRICAL CONNECTORS</li> </ul>	PN-EN 60598-2-5:2016-02
7.	Luminaires for hospital clinical zones	<ul style="list-style-type: none"> <li>• CLASSIFICATION OF LUMINAIRES</li> <li>• STAMPING</li> <li>• STRUCTURE</li> <li>• INTERNAL AND EXTERNAL WIRING</li> <li>• ADJUSTMENT TO EARTHING</li> <li>• PROTECTION AGAINST ELECTRIC SHOCK</li> <li>• RESISTANCE TO DUST, SOLIDS AND MOISTURE</li> <li>• RESISTANCE AND ELECTRICAL STRENGTH OF INSULATION</li> <li>• TOUCH CURRENT AND PROTECTIVE CONDUCTOR CURRENT</li> <li>• CLEARANCES AND CREEPAGE DISTANCES</li> <li>• DURABILITY TEST AND THERMAL TEST</li> <li>• RESISTANCE TO HEAT, FIRE AND CREEPING CURRENT</li> <li>• SCREW CLAMPS</li> <li>• SCREWLESS CLAMPS AND ELECTRICAL CONNECTORS</li> </ul>	PN-EN 60598-2- 25:2000 +A1:2005
8.	Ground recessed luminaires	<ul style="list-style-type: none"> <li>• CLASSIFICATION OF LUMINAIRES</li> <li>• STAMPING</li> <li>• STRUCTURE</li> <li>• INTERNAL AND EXTERNAL WIRING</li> <li>• ADJUSTMENT TO EARTHING</li> <li>• PROTECTION AGAINST ELECTRIC SHOCK</li> <li>• RESISTANCE TO DUST, SOLIDS AND MOISTURE</li> <li>• RESISTANCE AND ELECTRICAL STRENGTH OF INSULATION</li> <li>• TOUCH CURRENT AND PROTECTIVE CONDUCTOR CURRENT</li> <li>• CLEARANCES AND CREEPAGE DISTANCES</li> <li>• DURABILITY TEST AND THERMAL TEST</li> <li>• RESISTANCE TO HEAT, FIRE AND CREEPING CURRENT</li> <li>• SCREW CLAMPS</li> <li>• SCREWLESS CLAMPS AND ELECTRICAL CONNECTORS</li> </ul>	PN-EN 60598-2-13:2017+A1:2012

9.	Luminaires for swimming pools	<ul style="list-style-type: none"> <li>• CLASSIFICATION OF LUMINAIRES</li> <li>• STAMPING</li> <li>• STRUCTURE</li> <li>• INTERNAL AND EXTERNAL WIRING</li> <li>• ADJUSTMENT TO EARTHING</li> <li>• PROTECTION AGAINST ELECTRIC SHOCK</li> <li>• RESISTANCE TO DUST, SOLIDS AND MOISTURE</li> <li>• RESISTANCE AND ELECTRICAL STRENGTH OF INSULATION</li> <li>• TOUCH CURRENT AND PROTECTIVE CONDUCTOR CURRENT</li> <li>• CLEARANCES AND CREEPAGE DISTANCES</li> <li>• DURABILITY TEST AND THERMAL TEST</li> <li>• RESISTANCE TO HEAT, FIRE AND CREEPING CURRENT</li> <li>• SCREW CLAMPS</li> <li>• SCREWLESS CLAMPS AND ELECTRICAL CONNECTORS</li> </ul>	PN-EN 60598-2-18:2002+A1:2012
10.	Luminaires with limited surface temperatures	<ul style="list-style-type: none"> <li>• CLASSIFICATION OF LUMINAIRES</li> <li>• STAMPING</li> <li>• STRUCTURE</li> <li>• INTERNAL AND EXTERNAL WIRING</li> <li>• ADJUSTMENT TO EARTHING</li> <li>• PROTECTION AGAINST ELECTRIC SHOCK</li> <li>• RESISTANCE TO DUST, SOLIDS AND MOISTURE</li> <li>• RESISTANCE AND ELECTRICAL STRENGTH OF INSULATION</li> <li>• TOUCH CURRENT AND PROTECTIVE CONDUCTOR CURRENT</li> <li>• CLEARANCES AND CREEPAGE DISTANCES</li> <li>• DURABILITY TEST AND THERMAL TEST</li> <li>• RESISTANCE TO HEAT, FIRE AND CREEPING CURRENT</li> <li>• SCREW CLAMPS</li> <li>• SCREWLESS CLAMPS AND ELECTRICAL CONNECTORS</li> </ul>	PN-EN 60598-2- 24:2014-02

11.	Emergency luminaires	<ul style="list-style-type: none"> <li>• CLASSIFICATION OF LUMINAIRES</li> <li>• STAMPING</li> <li>• STRUCTURE</li> <li>• INTERNAL AND EXTERNAL WIRING</li> <li>• ADJUSTMENT TO EARTHING</li> <li>• PROTECTION AGAINST ELECTRIC SHOCK</li> <li>• RESISTANCE TO DUST, SOLIDS AND MOISTURE</li> <li>• RESISTANCE AND ELECTRICAL STRENGTH OF INSULATION</li> <li>• TOUCH CURRENT AND PROTECTIVE CONDUCTOR CURRENT</li> <li>• CLEARANCES AND CREEPAGE DISTANCES</li> <li>• DURABILITY TEST AND THERMAL TEST</li> <li>• RESISTANCE TO HEAT, FIRE AND CREEPING CURRENT</li> <li>• SCREW CLAMPS</li> <li>• SCREWLESS CLAMPS AND ELECTRICAL CONNECTORS</li> <li>• PHOTOMETRIC DATA</li> <li>• SWITCHING OPERATION</li> <li>• WORK AT A HIGH TEMPERATURE</li> </ul>	PN-EN 60598-2- 22:2015-01+AC:2016- 11
12.	Luminaires - light and lighting, measurement and presentation of lamps and luminaires photometric data: LED lamps, modules and luminaires	<ul style="list-style-type: none"> <li>• LABORATORY REQUIREMENTS</li> <li>• PREPARATION, ASSEMBLY AND WORKING CONDITIONS</li> <li>• PHOTOMETRIC VALUE MEASUREMENT</li> <li>• COLORIMETRIC VALUE MEASUREMENT                             <ul style="list-style-type: none"> <li>• TEST RESULTS PRESENTATION</li> </ul> </li> </ul>	PN-EN 13032-4:2015- 09
13.	Luminaires – Electrical and photometric tests of LED luminaires and modules	<ul style="list-style-type: none"> <li>• LABORATORY REQUIREMENTS</li> <li>• TESTED OBJECTS POWER PARAMETERS</li> <li>• SEASONING OF TEST SAMPLES</li> <li>• STABILIZATION OF TEST SAMPLES</li> <li>• ELECTRICAL MEASUREMENTS</li> <li>• PREPARATION, ASSEMBLY AND WORKING CONDITIONS</li> <li>• METHODS OF PHOTOMETRIC VALUE MEASUREMENT</li> <li>• METHODS OF COLORIMETRIC VALUE MEASUREMENT</li> <li>• PRESENTATION OF TEST RESULTS</li> <li>• PERFORMANCE MEASUREMENT</li> </ul>	IES LM-79-08
14.	Luminaires	<ul style="list-style-type: none"> <li>• EVALUATION OF RISK TO RETINA DUE TO BLUE LIGHT EXPOSURE, RISK GROUP RG0, RG1, RG2, RG3</li> <li>• Lb ENERGY LUMINANCE MEASUREMENT</li> <li>• Eb RADIATION INTENSITY MEASUREMENT</li> <li>• Es ACTINIC DOSE MEASUREMENT</li> </ul>	PN-EN 62471:2010 & IEC/TR 62778:2104

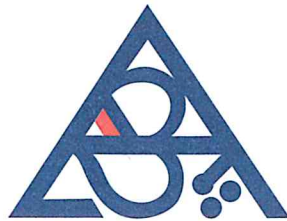
15	Luminaires	<ul style="list-style-type: none"> <li>• DEFINING THE LEVEL OF PROTECTION AGAINST EXTERNAL MECHANICAL IMPACT PROVIDED BY ELECTRICAL APPLIANCES HOUSINGS (CODE IK)</li> </ul>	PN-EN 62262.2003 REPLACES PN-EN 50102:2001
16	Luminaires	<ul style="list-style-type: none"> <li>• DEFINING THE LEVEL OF PROTECTION PROVIDED BY ELECTRICAL APPLIANCES HOUSINGS (CODE IP), (IP2X-IP6X, IPX3-IPX7)</li> </ul>	PN-EN 60529:2003+AC:2017-12
17.	Devices for lamps – general requirements	<ul style="list-style-type: none"> <li>• CLASSIFICATION</li> <li>• MARKING</li> <li>• CLAMPS</li> <li>• PROTECTIVE EARTHING</li> <li>• PROTECTION AGAINST INCIDENTAL TOUCH OF ACTIVE PARTS</li> <li>• RESISTANCE TO MOISTURE AND INSULATION</li> <li>• ELECTRIC STRENGTH</li> <li>• FAULT CONDITIONS</li> <li>• STRUCTURE</li> <li>• CLEARANCES AND CREEPAGE DISTANCES</li> <li>• SCREWS, POWER LEADING PARTS AND CONNECTIONS</li> <li>• RESISTANCE TO HEAT, FIRE AND CREEPING CURRENT</li> <li>• RESISTANCE TO CORROSION</li> <li>• OUTPUT VOLTAGE WITHOUT LOAD</li> </ul>	PN-EN 61347-1:2015- 09
18.	Devices for lamps – LED drivers	<ul style="list-style-type: none"> <li>• CLASSIFICATION</li> <li>• MARKING</li> <li>• CLAMPS</li> <li>• PROTECTIVE EARTHING</li> <li>• PROTECTION AGAINST INCIDENTAL TOUCH OF ACTIVE PARTS</li> <li>• RESISTANCE TO MOISTURE AND INSULATION</li> <li>• ELECTRIC STRENGTH</li> <li>• FAULT CONDITIONS</li> <li>• STRUCTURE</li> <li>• CLEARANCES AND CREEPAGE DISTANCES</li> <li>• SCREWS, POWER LEADING PARTS AND CONNECTIONS</li> <li>• RESISTANCE TO HEAT, FIRE AND CREEPING CURRENT</li> <li>• RESISTANCE TO CORROSION</li> </ul>	PN-EN 61347-2- 13:2015-04

19.	Devices for lamps – Emergency modules	<ul style="list-style-type: none"> <li>• CLASSIFICATION</li> <li>• MARKING</li> <li>• CLAMPS</li> <li>• PROTECTIVE EARTHING</li> <li>• PROTECTION AGAINST INCIDENTAL TOUCH OF ACTIVE PARTS</li> <li>• RESISTANCE TO MOISTURE AND INSULATION</li> <li>• ELECTRIC STRENGTH</li> <li>• FAULT CONDITIONS</li> <li>• STARTING CONDITIONS</li> <li>• LAMP CURRENT</li> <li>• INPUT CURRENT</li> <li>• EBLF FUNCTIONAL SAFETY</li> <li>• SWITCHING FUNCTION</li> <li>• RELOADING DEVICE</li> <li>• PROTECTION AGAINST EXCESSIVE DISCHARGING</li> <li>• INDICATOR</li> <li>• REMOTE CONTROL, SLEEP MODE, LOCK MODE</li> <li>• REGULAR THERMAL TESTS AND DURABILITY TESTS</li> <li>• STRUCTURE</li> <li>• POLARITY REVERSAL</li> <li>• CLEARANCES AND CREEPAGE DISTANCES</li> <li>• SCREWS, POWER LEADING PARTS AND CONNECTIONS</li> <li>• RESISTANCE TO HEAT, FIRE AND CREEPING CURRENT</li> <li>• RESISTANCE TO CORROSION</li> <li>• ABNORMAL LAMP CONDITIONS</li> <li>• PROTECTION OF ASSOCIATED SUBASSEMBLIES</li> </ul>	PN-EN 61347-2-7:2012
20.	LED modules for general lighting purposes – safety requirements	<ul style="list-style-type: none"> <li>• CLASSIFICATION</li> <li>• MARKING</li> <li>• CLAMPS</li> <li>• PROTECTIVE EARTHING</li> <li>• PROTECTION AGAINST INCIDENTAL TOUCH OF ACTIVE PARTS</li> <li>• RESISTANCE TO MOISTURE AND INSULATION</li> <li>• ELECTRIC STRENGTH</li> <li>• FAULT CONDITIONS</li> <li>• STRUCTURE</li> <li>• CLEARANCES AND CREEPAGE DISTANCES</li> <li>• SCREWS, POWER LEADING PARTS AND CONNECTIONS</li> <li>• RESISTANCE TO HEAT, FIRE AND CREEPING CURRENT</li> <li>• RESISTANCE TO CORROSION</li> </ul>	PN-EN 62031:2010+A1:2013-06

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TUV SUD Polska Sp. z o.o.  
TUV SUD  
Industrie Service

*/signature illegible/*  
P. Kukuła  
Head of Industrie Service Department





NÁRODNÍ AKREDITAČNÍ ORGÁN

EA MLA Signatory  
Český institut pro akreditaci, o.p.s.  
Olšanská 54/3, 130 00 Praha 3

issues

according to section 16 of Act No. 22/1997 Coll., on technical requirements for products, as amended

## CERTIFICATE OF ACCREDITATION

No. 42/2017

**Elektrotechnický zkušební ústav, s.p.**  
with registered office Pod Lisem 129, 171 02 Praha 8 - Troja, Company Registration No. 00001481

to the Certification Body No. **3018**  
Product Certification Body

Scope of accreditation:

Certification of products in the field of electrical engineering industry and in the field of medical devices, certification of information systems and software including certification according to the National standard of electronic document management systems (NSESSS), certification of electronic tools according to the Regulation No. 9/2011 Coll., verification of Environmental Product Declaration (EPD), trust service certification according to the Regulation (EU) No. 910/2014 of the EP and of the Council (eIDAS) to the extent as specified in the appendix to this Certificate.

This Certificate of Accreditation is a proof of Accreditation issued on the basis of assessment of fulfillment of the accreditation criteria in accordance with

ČSN EN ISO/IEC 17065:2013

In its activities performed within the scope and for the period of validity of this Certificate, the Body is entitled to refer to this Certificate, provided that the accreditation is not suspended and the Body meets the specified accreditation requirements in accordance with the relevant regulations applicable to the activity of an accredited Conformity Assessment Body.

This Certificate of Accreditation replaces, to the full extent, Certificate No.: 620/2015 of 3 September 2015, or any administrative acts building upon it.

This Certificate is valid until: **8. 11. 2018**

Prague: 20. 1. 2017



Jiří Růžička  
Director  
Czech Accreditation Institute  
Public Service Company



**The Appendix is an integral part of  
Certificate of Accreditation No. 42/2017 of 20/01/2017**

**Accredited entity according to ČSN EN ISO/IEC 17065:2013:**

**Elektrotechnický zkušební ústav, s.p.**  
Product Certification Body  
Pod Lisem 129, 171 02 Praha 8 – Troja

**Certification of products** (including material products, processes, services)

Ordinal number <sup>1)</sup>	Product name	Certification scheme	Specification of standards (normative documents)
1*	Other rubber products (limited to technical rubber for electrical engineering)	EZÚ Certificate	ČSN EN 60903 ed. 2
2*	Radiators and boilers, including repair and maintenance (limited to heat exchangers, water heaters and heat exchange stations of central heating and hot water systems)	EZÚ Certificate	ČSN EN 60335-1 ed. 3 ČSN EN 60335-1 ed. 2 ČSN EN 60335-1 ČSN EN 60335-2-21 ed. 2 ČSN EN 60335-2-35 ed. 2
3*	Furnaces and furnace burners, including their parts, installation, repair and maintenance (limited to electric laboratory furnaces and ovens)	EZÚ Certificate	ČSN EN 60335-1 ed. 3 ČSN EN 60335-1 ed. 2 ČSN EN 60335-1 ČSN EN 61010-1 ed. 2 ČSN EN 61010-2-010 ed. 2
4*	Cooling, ventilation and air-conditioning machines /except household appliances/, including their parts, installation, repair and maintenance	EZÚ Certificate	ČSN EN 60204-1 ed. 2 ČSN EN 60335-1 ed. 3 ČSN EN 60335-1 ed. 2 ČSN EN 60335-1 ČSN EN 60335-2-24 ed. 5 ČSN EN 60335-2-30 ed. 3 ČSN EN 60335-2-40 ed. 2 ČSN EN 60335-2-65 ed. 2 ČSN EN 60335-2-80 ed. 2 ČSN EN 60335-2-88 ed. 2
5*	Electro-mechanical hand tools with self-contained electric motor	EZÚ Certificate	ČSN 361559-1  ČSN 361559-2-15 ČSN EN 61029-1ed. 2 ČSN EN 61029-1ed. 3 ČSN EN 1870-10 ČSN EN 1870-11 ČSN EN 1870-12 ČSN EN 60745-1 ed. 2 ČSN EN 60745-1 ed. 3 ČSN EN 60745-2-1 ed. 2 ČSN EN 60745-2-2 ed. 2 ČSN EN 60745-2-3 ed. 2 ČSN EN 60745-2-4 ed. 2 ČSN EN 60745-2-5 ed. 3 ČSN EN 60745-2-6 ed. 2 ČSN EN 60745-2-8 ed. 2 ČSN EN 60745-2-9 ed. 2 ČSN EN 60745-2-11 ed. 2 ČSN EN 60745-2-12 ed. 2 ČSN EN 60745-2-13 ČSN EN 60745-2-14 ČSN EN 60745-2-15



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Product Certification Body  
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Ordinal number <sup>1)</sup>	Product name	Certification scheme	Specification of standards (normative documents)
			ČSN EN 60745-2-17 ed. 2 ČSN EN 60745-2-18 ed. 2 ČSN EN 60745-2-19 ČSN EN 60745-2-20 ed. 2 ČSN EN 60745-2-21 ČSN EN 61029-2-8 ČSN EN 61029-2-11 ed. 3
6*	Machinery for food and tobacco processing, including their parts, installation, repair and maintenance (limited to machines and devices for public catering and sale)	EZÚ Certificate	ČSN EN 60335-1 ed. 2 ČSN EN 60335-1 ed. 3 ČSN EN 60335-1 ČSN EN 60335-2-36 ed. 3 ČSN EN 60335-2-37 ed. 3 ČSN EN 60335-2-38 ed. 3 ČSN EN 60335-2-39 ed. 3 ČSN EN 60335-2-42 ed. 3 ČSN EN 60335-2-47 ed. 3 ČSN EN 60335-2-48 ed. 3 ČSN EN 60335-2-49 ed. 3 ČSN EN 60335-2-50 ed. 3 ČSN EN 60335-2-58 ed. 2 ČSN EN 60335-2-62 ed. 2 ČSN EN 60335-2-64 ed. 2 ČSN EN 60335-2-70 ed. 2 ČSN EN 60335-2-71 ed. 2 ČSN EN 60335-2-90 ed. 3 ČSN EN 60204-1 ed. 2
7*	Machinery for textile, apparel and leather production, including their parts, installation, repair and maintenance (limited to machines and devices for cleaning, washing, ironing and hairdressing)	EZÚ Certificate	ČSN EN 60335-1 ed. 2 ČSN EN 60335-1 ed. 3 ČSN EN 60335-1 ČSN EN 60335-2-67 ed. 4 ČSN EN 60335-2-68 ed. 4 ČSN EN 60335-2-69 ed. 4 ČSN EN 60335-2-72 ed. 2 ČSN EN 60335-2-79 ed. 4 ČSN EN ISO 10472-1 ČSN EN ISO 10472-2 ČSN EN ISO 10472-3 ČSN EN ISO 10472-4 ČSN EN ISO 10472-5 ČSN EN ISO 10472-6 ČSN EN 60204-1 ed. 2 ČSN EN ISO 8230-1
8*	Electric household appliances, their parts	EZÚ Certificate	ČSN EN 60335-1 ed. 2 ČSN EN 60335-1 ed. 3 ČSN EN 60335-1 ČSN EN 60335-2-2 ed. 3 ČSN EN 60335-2-3 ed. 2 ČSN EN 60335-2-4 ed. 3 ČSN EN 60335-2-5 ed. 2 ČSN EN 60335-2-6 ed. 2 ČSN EN 60335-2-7 ed. 4



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Product Certification Body  
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Ordinal number <sup>1)</sup>	Product name	Certification scheme	Specification of standards (normative documents)
			ČSN EN 60335-2-8 ed. 2 ČSN EN 60335-2-9 ed. 2 ČSN EN 60335-2-10 ed. 2 ČSN EN 60335-2-11 ed. 4 ČSN EN 60335-2-12 ed. 2 ČSN EN 60335-2-13 ed. 3 ČSN EN 60335-2-14 ed. 3 ČSN EN 60335-2-15 ed. 2 ČSN EN 60335-2-16 ed. 2 ČSN EN 60335-2-17 ed. 3 ČSN EN 60335-2-21 ed. 2 ČSN EN 60335-2-23 ed. 2 ČSN EN 60335-2-24 ed. 5 ČSN EN 60335-2-25 ed. 5 ČSN EN 60335-2-26 ed. 2 ČSN EN 60335-2-27 ed. 4 ČSN EN 60335-2-28 ed. 2 ČSN EN 60335-2-29 ed. 2 ČSN EN 60335-2-30 ed. 3 ČSN EN 60335-2-31 ed. 2 ČSN EN 60335-2-32 ed. 2 ČSN EN 60335-2-34 ed. 4 ČSN EN 60335-2-35 ed. 2 ČSN EN 60335-2-36 ed. 3 ČSN EN 60335-2-37 ed. 3 ČSN EN 60335-2-38 ed. 3 ČSN EN 60335-2-39 ed. 3 ČSN EN 60335-2-40 ed. 2 ČSN EN 60335-2-41 ed. 2 ČSN EN 60335-2-42 ed. 3 ČSN EN 60335-2-43 ed. 2 ČSN EN 60335-2-44 ed. 2 ČSN EN 60335-2-45 ed. 2 ČSN EN 60335-2-47 ed. 3 ČSN EN 60335-2-48 ed. 3 ČSN EN 60335-2-49 ed. 3 ČSN EN 60335-2-50 ed. 3 ČSN EN 60335-2-51 ed. 2 ČSN EN 60335-2-52 ed. 2 ČSN EN 60335-2-53 ed. 3 ČSN EN 60335-2-54 ed. 3 ČSN EN 60335-2-55 ed. 2 ČSN EN 60335-2-56 ed. 2 ČSN EN 60335-2-58 ed. 2 ČSN EN 60335-2-59 ed. 2 ČSN EN 60335-2-60 ed. 2 ČSN EN 60335-2-61 ed. 2 ČSN EN 60335-2-62 ed. 2 ČSN EN 60335-2-64 ed. 2



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Pod Lisem 129, 171 02 Praha 8 – Troja

Ordinal number <sup>1)</sup>	Product name	Certification scheme	Specification of standards (normative documents)
			ČSN EN 60335-2-65 ed. 2 ČSN EN 60335-2-66 ed. 2 ČSN EN 60335-2-67 ed. 4 ČSN EN 60335-2-68 ed. 4 ČSN EN 60335-2-69 ed. 4 ČSN EN 60335-2-70 ed. 2 ČSN EN 60335-2-71 ed. 2 ČSN EN 60335-2-72 ed. 2 ČSN EN 60335-2-73 ed. 2 ČSN EN 60335-2-74 ed. 2 ČSN EN 60335-2-75 ed. 2 ČSN EN 60335-2-76 ed. 2 ČSN EN 60335-2-77 ed. 3 ČSN EN 60335-2-78 ed. 2 ČSN EN 60335-2-79 ed. 4 ČSN EN 60335-2-80 ed. 2 ČSN EN 60335-2-81 ed. 2 ČSN EN 60335-2-82 ed. 2 ČSN EN 60335-2-83 ČSN EN 60335-2-84 ed. 2 ČSN EN 60335-2-85 ed. 2 ČSN EN 60335-2-86 ed. 2 ČSN EN 60335-2-87 ed. 2 ČSN EN 60335-2-88 ed. 2 ČSN EN 60335-2-89 ed. 2 ČSN EN 60335-2-90 ed. 3 ČSN EN 60335-2-91 ČSN EN 60335-2-92 ČSN EN 60335-2-95 ed. 2 ČSN EN 60335-2-96 ČSN EN 60335-2-97 ed. 2 ČSN EN 60335-2-98 ed. 2 ČSN EN 60335-2-99 ČSN EN 60335-2-101 ČSN EN 60335-2-103 ČSN EN 60335-2-105 ČSN EN 60204-1 ed. 2 ČSN EN 60065 ČSN EN 60519-1 ed. 3 ČSN EN 62233
9*	Office machinery and computers	EZU Certificate	ČSN EN 62040-1 ČSN EN 60065 ČSN EN 60950-1 ed. 2 ČSN EN 61010-1 ed. 2
10*	Electric motors, generators and transformers, including their parts, installation, repair and maintenance (limited)	EZU Certificate	ČSN 350000-1-1 ČSN EN 60034-1 ed. 2 ČSN EN 60034-5 ed. 2



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Ordinal number <sup>1)</sup>	Product name	Certification scheme	Specification of standards (normative documents)
	to electric motors, power transformers and ballasts, generating sets and electric drive systems)		ČSN EN 60034-7 + A1 ČSN EN 60034-8 ed. 2  ČSN EN 60034-12 ČSN EN 60034-14 ed. 2 ČSN EN 60065 ČSN EN 60950-1 ed. 2 ČSN EN 61558-1 ČSN EN 61558-1 ed. 2 ČSN EN 61558-2-1 ed. 2 ČSN EN 61558-2-2 ed. 2 ČSN EN 61558-2-3 ed. 2 ČSN EN 61558-2-4 ed. 2 ČSN EN 61558-2-5 ed. 2 ČSN EN 61558-2-6 ed. 2 ČSN EN 61558-2-7 ed. 2 ČSN EN 61558-2-8 ed. 2 ČSN EN 61558-2-12 ed. 2 ČSN EN 61558-2-13 ed. 2 ČSN EN 61558-2-15 ed. 2 ČSN EN 61558-2-20 ed. 2 ČSN EN 61558-2-23 ed. 2
11*	Electricity distribution and control apparatus, including their parts, installation, repair and maintenance	EZÚ Certificate	ČSN 34 0350 ed. 2 ČSN 35 4516 ČSN 35 4701-2 ed. 2 ČSN 35 4701-3 ed. 2 ČSN EN 50085-1 ed. 2 ČSN EN 50085-2-1 ČSN EN 50085-2-3 ed. 2 ČSN EN 50262 ČSN EN 60269-1 ed. 3 ČSN EN 60309-1 ed. 3 ČSN EN 60309-2 ed. 3 ČSN EN 60400 ed. 3 ČSN EN 60669-1 ed. 2 ČSN EN 60669-2-1 ed. 3 ČSN EN 60669-2-2 ed. 2 ČSN EN 60669-2-3 ed. 2 ČSN EN 60670-1 ČSN EN 60730-1 ed. 3 ČSN EN 60730-2-1 ČSN EN 60730-2-2 ed. 2 ČSN EN 60730-2-3 ed. 2 ČSN EN 60730-2-4 ed. 2 ČSN EN 60730-2-5 ed. 2 ČSN EN 60730-2-6 ed. 2 ČSN EN 60730-2-7 ed. 2 ČSN EN 60730-2-8 ed. 2 ČSN EN 60730-2-9 ed. 3



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Ordinal number <sup>1)</sup>	Product name	Certification scheme	Specification of standards (normative documents)
			ČSN EN 60730-2-10 ed. 2 ČSN EN 60730-2-11 ed. 2 ČSN EN 60730-2-12 ed. 2 ČSN EN 60730-2-13 ed. 2 ČSN EN 60730-2-14 ČSN EN 60730-2-15 ed. 2 ČSN EN 60730-2-19 ČSN EN 60898-1 ČSN EN 60898-2 ed. 2 ČSN EN 60947-1 ed. 4 ČSN EN 60947-2 ed. 3 ČSN EN 60947-3 ed. 3 ČSN EN 60947-4-1 ed. 3 ČSN EN 60947-4-2 ed. 3 ČSN EN 60947-4-3 ČSN EN 60947-5-1 ed. 2 ČSN EN 60947-5-2 ed. 3 ČSN EN 60947-5-3 ČSN EN 60947-5-4 ed. 2 ČSN EN 60947-5-5 ČSN EN 60947-5-7 ČSN EN 60947-6-1 ed. 2 ČSN EN 60947-6-2 ed. 2 ČSN EN 60947-7-1 ed. 3 ČSN EN 60947-7-2 ed. 3 ČSN EN 60947-7-3 ed. 2 ČSN EN 60947-8 ČSN EN 60998-1 ed. 2 ČSN EN 60998-2-1 ed. 2 ČSN EN 60998-2-2 ed. 2 ČSN EN 60998-2-3 ed. 2 ČSN EN 60998-2-4 ed. 2 ČSN EN 61008-1 ed. 3 ČSN EN 61008-2-1 ČSN EN 61009-1 ed. 3 ČSN EN 61009-2-1 ČSN EN 61010-1 ed. 2 ČSN EN 61010-2-010 ed. 2 ČSN EN 61010-2-032 ed. 3 ČSN EN 61010-2-040 ČSN EN 61010-2-051 ed.2 ČSN EN 61010-2-061 ed. 2 ČSN EN 61010-031 ČSN EN 61058-1 ČSN EN 61058-2-1 ed. 2 ČSN EN 61058-2-5 ed. 2 ČSN EN 61242 ČSN EN 61537 ed.2 ČSN IEC 60884-1





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Ordinal number <sup>1)</sup>	Product name	Certification scheme	Specification of standards (normative documents)
			ČSN IEC 884-2-5 ČSN EN 12675 ČSN EN 50075 ČSN EN 61386-1 ed. 2 ČSN EN 61386-21 ČSN EN 61386-22 ČSN EN 61386-23 ČSN EN 61386-24 ČSN EN 61386-25 ČSN EN 61439-1 ed. 2 ČSN EN 61439-2 ed. 2 ČSN EN 61439-3 ČSN EN 61439-4 ČSN EN 61439-5 ČSN EN 61914 ČSN EN 62208 ed. 2 ČSN EN 62275
12*	Cables and wires	EZÚ Certificate	ČSN EN 60228 ČSN 34 7402 ČSN 34 7614 -1 ČSN 34 7614 -3A ČSN 34 7614 -3C ČSN 34 7614 -3I ČSN 34 7614 -3L ČSN 34 7614 -4B ČSN 34 7614 -4E ČSN 34 7614 -4F ČSN 34 7614 -4G ČSN 34 7614 -4J ČSN 34 7614 -4K ČSN 34 7614 -4M ČSN 34 7614 -4N ČSN 34 7614 -5D ČSN 34 7614 -5I ČSN 34 7614 -6B ČSN 34 7614 -6D ČSN 34 7614 -6E ČSN 34 7614 -6J ČSN 34 7614 -6K ČSN 34 7614 -6N ČSN 34 7614 -7H ČSN 34 7614 -8H ČSN 34 7614 -9F ČSN 34 7614 -9G ČSN 34 7614 -9I ČSN 34 7614 -9N ČSN 34 7614 -10N ČSN 34 7659-1 ČSN 34 7659-3A



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			ČSN 34 7659-3B ČSN 34 7659-3D ČSN 34 7659-3E ČSN 34 7659-3F ČSN 34 7659-3G ČSN 34 7659-3H ČSN 34 7659-3L ČSN 34 7659-3M ČSN 34 7659-4A ČSN 34 7659-4C ČSN 34 7659-5A ČSN 34 7659-5B ČSN 34 7659-5C ČSN 34 7659-5D ČSN 34 7659-5E ČSN 34 7659-5F ČSN 34 7659-5G ČSN 34 7659-5H ČSN 34 7659-5N ČSN 34 7659-5O ČSN 34 7659-5P ČSN 34 7659-5U ČSN 34 7659-7A ČSN 34 7659-7B ČSN 34 7659-7C ČSN 34 7660-1 ed. 2 ČSN 34 7660-3A ČSN 34 7660-3B ČSN 34 7660-3C ČSN 34 7660-3D ed.2 ČSN 34 7660-3F ČSN 34 7660-4A ČSN 34 7660-4B ČSN 34 7660-4C ČSN 34 7660-4D ČSN 34 7660-4F ČSN 34 7660-5B ČSN 34 7660-5C ČSN 34 7660-5D ČSN 34 7660-5F ČSN 34 7660-5G ČSN 34 7660-5H ed.2 ČSN 34 7660-5I ed.2 ČSN 34 7660-5J ČSN EN 50200 ed. 2 ČSN EN 50267-2-1 ČSN EN 50267-2-2 ČSN EN 50267-2-3 ČSN EN 50290-2-21



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Ordinal number <sup>1)</sup>	Product name	Certification scheme	Specification of standards (normative documents)
			ČSN EN 50290-2-22 ČSN EN 50290-2-23 ČSN IEC 60331-21 ČSN IEC 60331-23 ČSN IEC 60331-25 ČSN EN 60332-1-2 ČSN EN 60332-2-2 ČSN EN 60332-2-1 ČSN EN 60332-3-21 ČSN EN 60332-3-22 ČSN EN 60332-3-23 ČSN EN 60332-3-24 ČSN EN 60332-3-25 ČSN EN 50363-1 ČSN EN 50363-2-1 ČSN EN 50363-2-2 ČSN EN 50363-3 ČSN EN 50363-4-1 ČSN EN 50363-4-2 ČSN EN 50363-5 ČSN EN 50363-6 ČSN EN 50363-7 ČSN EN 50363-8 ČSN EN 50363-9-1 ČSN EN 50363-10-1 ČSN EN 50363-10-2 ČSN EN 50399 ČSN EN 50395 ČSN EN 50396 ČSN EN 50525-1 ČSN EN 50525-2-11 ČSN EN 50525-2-12 ČSN EN 50525-2-21 ČSN EN 50525-2-22 ČSN EN 50525-2-31 ČSN EN 50525-2-41 ČSN EN 50525-2-42 ČSN EN 50525-2-51 ČSN EN 50525-2-71 ČSN EN 50525-2-72 ČSN EN 50525-2-81 ČSN EN 50525-2-82 ČSN EN 50525-2-83 ČSN EN 50525-3-11 ČSN EN 50525-3-21 ČSN EN 50525-3-31 ČSN EN 50525-3-41 ČSN EN 61034-1



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Ordinal number <sup>1)</sup>	Product name	Certification scheme	Specification of standards (normative documents)
			ČSN EN 61034-2
13*	Accumulators, primary cells and primary batteries, including their parts	EZÚ Certificate	ČSN EN 50342-1 ČSN EN 60086-1 ed. 4 ČSN EN 60086-2 ed. 4 ČSN EN 60086-3 ed. 3 ČSN EN 60086-4 ed. 2 ČSN EN 60086-5 ed. 3 ČSN EN 60254-1 ed. 2 ČSN EN 60254-2 ed. 2 ČSN EN 60623 ed. 2 ČSN EN 61960 ed. 2 ČSN EN 60896-21 ČSN EN 61951-1 ed. 3 ČSN EN 61951-2 ed. 3 ČSN EN 62133 ed. 2 ČSN EN 62259
14*	Lighting equipment and electric lamps, including their parts	EZÚ Certificate	ČSN EN 12352 ČSN EN 12368 ČSN EN 60598-1 ed. 5 ČSN EN 60598-2-1 ČSN EN 60598-2-2 ed.2 ČSN EN 60598-2-3 ed. 2 ČSN EN 60598-2-4 ČSN EN 60598-2-5 ČSN EN 60598-2-6 ČSN EN 60598-2-7 ČSN EN 60598-2-8 ČSN EN 60598-2-8 ed. 2 ČSN EN 60598-2-9 ČSN EN 60598-2-10 ed. 2 ČSN EN 60598-2-11 ČSN EN 60598-2-11 ed. 2 ČSN EN 60598-2-12 ČSN EN 60598-2-12 ed. 2 ČSN EN 60598-2-14 ČSN EN 60598-2-17 ČSN EN 60598-2-18 ČSN EN 60598-2-19 ČSN EN 60598-2-20 ed. 2 ČSN EN 60598-2-22 ed. 2 ČSN EN 60598-2-23 ČSN EN 60598-2-24 ČSN EN 60598-2-24 ed. 2 ČSN EN 60598-2-25 ČSN EN 61347-1 ed. 2 ČSN EN 61347-2-1

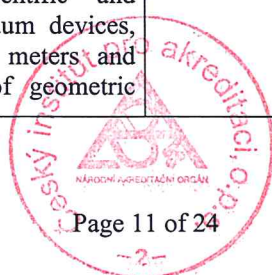


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			ČSN EN 61347-2-2 ed. 2 ČSN EN 61347-2-3 ed. 2 ČSN EN 61347-2-7 ed. 3 ČSN EN 61347-2-8 ČSN EN 61347-2-9 ed. 2 ČSN EN 61347-2-10 ČSN EN 61347-2-11 ČSN EN 61549 ed. 2 L-14 – ICAO - Aerodromes Annex 14 FAA - AC 150/5345-43E ČSN ISO 6742-1 ČSN EN 12899-1 ČSN EN 60432-1 ed. 2 ČSN EN 60432-2 ed. 2 ČSN EN 60432-3 ed. 2 ČSN EN 60570 ed. 2 ČSN EN 61167 ČSN EN 62493 ČSN EN 12966-1+A1 ČSN EN 61347-2-13 ČSN EN 60598-2-13 ČSN EN 62031 ČSN EN 62471
15*	reserved	---	---
16*	Television and radio transmitters; apparatus for line telephony and telegraphy, including their parts, installation, repair and maintenance	EZÚ Certificate	ČSN EN 60065
17*	Television and radio receivers; sound or video recording or reproducing apparatus and associated goods, including their parts	EZÚ Certificate	ČSN EN 60065 ČSN EN 60335-1 ed. 2 ČSN EN 60335-1 ed. 3 ČSN EN 60335-1 ČSN EN 60950-1 ed. 2 ČSN EN 61010-1 ed. 2 ČSN EN 60950-21
18*	reserved	---	---
19*	Instruments and appliances for measuring, checking, testing, navigating and other purposes, including their parts, installation, repair and maintenance (limited to electric measuring devices, electronic measuring devices and electron microscopes, machines and instruments for the determination of properties and defects of materials, scientific and laboratory instruments, vacuum devices, automatic control systems, meters and devices for measurement of geometric	EZÚ Certificate	ČSN EN 60065 ČSN EN 60825-1 ed. 2 ČSN EN 60825-2 ed. 2 ČSN EN 60825-4 ed. 2 ČSN EN 60950-1 ed. 2 ČSN EN 61010-1 ed. 2 ČSN EN 61010-2-091 ČSN EN 61243-3 ed. 2 ČSN EN 61010-031 ČSN EN 61010-2-032 ed. 3 ČSN EN 61010-2-033 ČSN EN 60730-1



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Ordinal number <sup>1)</sup>	Product name	Certification scheme	Specification of standards (normative documents)
	quantities / with supply voltage from 50V to 380 V only/)		ČSN EN 60730-1 ed. 2 ČSN EN 60730-1 ed. 3 ČSN EN 60730-2-1 ČSN EN 60730-2-2 ed. 2 ČSN EN 60730-2-3 ed. 2 ČSN EN 60730-2-4 ed. 2 ČSN EN 60730-2-5 ed. 2 ČSN EN 60730-2-6 ed. 2 ČSN EN 60730-2-7 ed. 2 ČSN EN 60730-2-8 ed. 2 ČSN EN 60730-2-9 ed. 3 ČSN EN 60730-2-10 ed. 2 ČSN EN 60730-2-11 ed. 2 ČSN EN 60730-2-12 ed. 2 ČSN EN 60730-2-13 ed. 2 ČSN EN 60730-2-14 ČSN EN 60730-2-15 ed. 2 ČSN EN 60730-2-19 ČSN EN 60044-8 ČSN EN 62052-11 ČSN EN 62053-11 ČSN EN 62053-21 ČSN EN 62053-22 ČSN EN 62053-23 ČSN EN 62056-21 ČSN EN 62056-62 ed. 2 ČSN EN 50129 ČSN EN 50470-1 ČSN EN 50470-2 ČSN EN 50470-3
20*	reserved	---	---
21*	Games and toys (limited to technical equipment for public entertainment)	EZÚ Certificate	ČSN EN 60335-1 ed. 2 ČSN EN 60335-1 ed. 3 ČSN EN 60335-1 ČSN EN 60065
22*	Miscellaneous manufactured goods n.e.c. (limited to teaching aids)	EZÚ Certificate	ČSN EN 60065 ČSN EN 61010-1 ed. 2 ČSN EN 60950-1 ed. 2
23*	Products containing electric and electronic systems, including equipment and installations – EMC tests	EZÚ Certificate	ČSN EN 61000-3-2 ČSN EN 61000-3-3 ČSN EN 61000-3-11 ČSN EN 61000-6-1 ČSN EN 61000-6-2 ČSN EN 61000-6-3 ČSN EN 61000-6-4 ČSN EN 50130-4 ČSN EN 55014 ČSN EN 55015 ČSN EN 55011



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			ČSN EN 55013 ČSN EN 55020 ČSN EN 55022 ČSN EN 60601-1-2 ČSN EN 55103-1 ČSN EN 55103-2 ČSN EN 12015 ČSN EN 12016 ČSN EN 50148 ČSN EN 55024 ČSN EN 61800-3 ČSN EN 60521 ČSN EN 61326-1 ČSN EN 61547 ČSN EN 60118-13 ČSN EN 60730-1 ČSN EN 60730-2-1 ČSN EN 60730-2-2 ČSN EN 60730-2-3 ČSN EN 60730-2-4 ČSN EN 60730-2-5 ČSN EN 60730-2-6 ČSN EN 60730-2-7 ČSN EN 60730-2-8 ČSN EN 60730-2-9 ČSN EN 60730-2-10 ČSN EN 60730-2-11 ČSN EN 60730-2-12 ČSN EN 60730-2-13 ČSN EN 60730-2-14 ČSN EN 60730-2-15 ČSN EN 60870-2-1 ČSN EN 300339 ČSN ETS 300683 ČSN ETS 300445 ČSN ETS 300342-1 ČSN ETS 300342-2 ČSN ETS 300680-2 ČSN ETSI EN 301489-1 ČSN ETSI EN 301489-3 ČSN ETSI EN 300 220-1 ČSN ETSI EN 300 220-2 ČSN ETSI EN 300 220-3 ČSN ETSI EN 300 330-1 ČSN ETSI EN 300 330-2 ČSN EN 50370-2 ČSN EN 62041 ČSN EN 50293 ČSN EN 50121-3-2



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Ordinal number <sup>1)</sup>	Product name	Certification scheme	Specification of standards (normative documents)
24	reserved	---	---
25	Information systems, software	SW Certification	ISO/IEC 15288 ISO/IEC 12207 ISO/IEC 25051 National standard of electronic document management systems (NSESSS)
26	Electronic tools and electronic operations carried out within the process of public contracts <sup>2)</sup>	Regulation No. 9/2011, part three: Certification of the conformity of electronic tools	Annex to the Regulation No. 9/2011

**Explanations:**

<sup>1)</sup> Asterisk at the ordinal number identifies that within the scope of accreditation, the certification body is allowed to include new/updated/revised normative documents from time to time provided that the product group and certification scheme don't change. Updated list of activities provided within the scope of accreditation is available at the Certification Body from the Quality Manager.

<sup>2)</sup> according to Act No. 137/2006 Coll. on Public Contracts, as amended

Gov. Reg. Government Regulation  
IT Information Technologies  
SW Software  
NSESSS MoI CR Bulletin

**Explanations to Certification Schemes:**

EZÚ Certificate, Regulation No. 9/2011 , GR 336/2004 Coll. Annex 3, 4; GR 154/2004 Coll. Annex 3, 4; corresponding to the Certification System No. 1 and ČSN EN ISO/IEC 17067:2014 standard;

SW Certification - Certification system corresponding to the Certification System No. 6 of ČSN EN ISO/IEC 17067:2014;





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**Verification of Environmental Product Declaration  
Verification of Product Declaration creation process**

Ordinal number	Product name	Certification scheme	Specification of standards <sup>1)</sup> (normative documents)
1	Chemistry and chemical products		<p style="text-align: center;">ČSN ISO 14025 The International EPD® System - General Programme Instruction</p> <p style="text-align: center;">The Norwegian EPD Foundation - General Programme Instruction</p> <p style="text-align: center;">Institute Construction and Environment e.V. - General Programme Instruction</p> <p style="text-align: center;">Instructions INIES - General Programme Instruction</p> <p style="text-align: center;">ČSN EN 15804 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products.</p>
2	Rubber and plastic products		
3	Other non-metallic mineral products		
4	Basic metals and metallurgical products		
5	Metallic products		
6	Office equipment and computers		
7	Electric equipment and apparatuses		
8	Radio, television and communication equipment		
9	Transport equipment		
10	Furniture		
11	Recycling		
12	Generation and distribution of electricity, gas and water		
13	Disposal of waste, sanitation		
14	Construction		

Explanations:

<sup>1)</sup> International EPD system - General programme instruction (Swedish system) – <http://www.environdec.com>  
 Norwegian EPD Foundation - General programme instruction (Norwegian system) - <http://www.epd-norge.no>  
 Institute Construction and Environment - General programme instruction (German system) - <http://bau-umwelt.de>  
 INIES - General programme instruction (French system) - <http://www.inies.fr>

If no PCR are available for a specific product, the Certification Body proceeds in accordance with the General Programme Instructions (GPI, available at [www.environdec.com](http://www.environdec.com)) and Rules set in the National programme of environmental labelling.



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**Trust service certification <sup>2)</sup>**

Ordinal number	Process/service name	Certification scheme	Specification of standards (normative documents)
1.	Trust service certification - Issuing qualified certificates for electronic signatures	ČSN ETSI EN 319 403 V2.2.2 in connection with DKP version 2	Regulation (EU) No. 910/2014 of the European Parliament and of the Council: <ul style="list-style-type: none"> <li>• Clause 5.</li> <li>• Clause 13.</li> <li>• Clause 15.</li> <li>• Clause 19.</li> <li>• Clause 24.</li> <li>• Clause 28.</li> <li>• Annex I.</li> </ul>
2.	Trust service certification – Issuing qualified certificates for electronic seals	ČSN ETSI EN 319 403 V2.2.2 in connection with DKP version 2	Regulation (EU) No. 910/2014 of the European Parliament and of the Council: <ul style="list-style-type: none"> <li>• Clause 5.</li> <li>• Clause 13.</li> <li>• Clause 15.</li> <li>• Clause 19.</li> <li>• Clause 24.</li> <li>• Clause 38.</li> <li>• Annex III.</li> </ul>
3.	Trust service certification - Issuing qualified certificates for website authentication	ČSN ETSI EN 319 403 V2.2.2 in connection with DKP version 2	Regulation (EU) No. 910/2014 of the European Parliament and of the Council: <ul style="list-style-type: none"> <li>• Clause 5.</li> <li>• Clause 13.</li> <li>• Clause 15.</li> <li>• Clause 19.</li> <li>• Clause 24.</li> <li>• Clause 45.</li> <li>• Annex IV.</li> </ul>
4.	Trust service certification – Issuing qualified electronic stamps	ČSN ETSI EN 319 403 V2.2.2 in connection with DKP version 2	Regulation (EU) No. 910/2014 of the European Parliament and of the Council: <ul style="list-style-type: none"> <li>• Clause 5.</li> <li>• Clause 13.</li> <li>• Clause 15.</li> <li>• Clause 19.</li> <li>• Clause 24.</li> <li>• Clause 42.</li> </ul>
5.	Trust service certification – qualified service for the verification of qualified	ČSN ETSI EN 319 403 V2.2.2 in connection with	Regulation (EU) No. 910/2014 of the European Parliament and of the Council:

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Ordinal number	Process/service name	Certification scheme	Specification of standards (normative documents)
	electronic signatures or qualified electronic seals	DKP version 2	<ul style="list-style-type: none"> <li>• Clause 5.</li> <li>• Clause 13.</li> <li>• Clause 15.</li> <li>• Clause 19.</li> <li>• Clause 24.</li> <li>• Clause 32.</li> <li>• Clause 33.</li> <li>• Clause 40 (verification of qualified electronic seals)</li> </ul>
6.	Trust service certification – Qualified service for keeping qualified electronic signatures or qualified electronic seals	ČSN ETSI EN 319 403 V2.2.2 in connection with DKP version 2	Regulation (EU) No. 910/2014 of the European Parliament and of the Council: <ul style="list-style-type: none"> <li>• Clause 5.</li> <li>• Clause 13.</li> <li>• Clause 15.</li> <li>• Clause 19.</li> <li>• Clause 24.</li> <li>• Clause 34.</li> <li>• Clause 40 (keeping qualified electronic seals)</li> </ul>

Explanations:

- 2) – acc. to the Regulation (EU) No 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC.

DKP - Document specifying the requirements for qualified trust service providers and the qualified trust services provided by them. The document is available at <http://www.mvcr.cz/informace-pro-odborniky.aspx>



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**Assessment of conformity for notification purposes**

Ordinal number <sup>1)</sup>	Product/Product group name	Conformity assessment procedure/module	Standards/normative documents
1 <sup>x</sup>	Medical devices (MDD)	Gov. Reg. No. 54/2015 Coll. Annex 2, 3, 4, 5, 6 <sup>2)</sup>	ČSN EN 1060-3 ČSN EN 1060-4 ČSN EN 45502-1 ČSN EN 45502-2-1 ČSN EN 50077 ČSN EN 60601-1 ČSN EN 60601-1 ed. 2 ČSN EN 60601-1-1 ed. 2 ČSN EN 60601-1-2 ed. 2 ČSN EN 60601-1-3 ed. 2 ČSN EN 60601-1-4 ČSN EN 60601-1-6 ed. 3 ČSN EN 60601-1-8 ed. 2 ČSN EN 60601-1-10 ČSN EN 60601-1-11 ČSN EN 60601-2-1 ČSN EN 60601-2-2 ed. 3 ČSN EN 60601-2-3 ČSN EN 60601-2-4 ČSN EN 60601-2-5 ČSN EN 60601-2-8 ČSN EN 60601-2-10 ČSN EN 60601-2-11 ČSN EN 60601-2-12 ČSN EN 60601-2-13 ČSN EN 60601-2-16 ČSN EN 60601-2-17 ČSN EN 60601-2-18 ČSN EN 60601-2-19 ČSN EN 60601-2-2 ČSN EN 60601-2-20 ed. 2 ČSN EN 60601-2-21 ed. 2 ČSN EN 60601-2-22 ČSN EN 60601-2-23 ČSN EN 60601-2-24 ČSN EN 60601-2-25 ČSN EN 60601-2-26 ed. 2 ČSN EN 60601-2-27 ed. 2 ČSN EN 60601-2-28 ed. 2 ČSN EN ISO 19054 ČSN EN 60601-2-29 ed. 2 ČSN EN 60601-2-3 ČSN EN 60601-2-31 ČSN EN 60601-2-32 ČSN EN 60601-2-33 ed. 3 ČSN EN 60601-2-34 ed. 2 ČSN EN 60601-2-36 ČSN EN 60601-2-37 ed. 2



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Ordinal number <sup>1)</sup>	Product/Product group name	Conformity assessment procedure/module	Standards/normative documents
			ČSN EN 60601-2-39 ed. 2 ČSN EN 60601-2-4 ČSN EN 60601-2-40 ČSN EN 60601-2-41 ed. 2 ČSN EN 60601-2-43 ed. 2 ČSN EN 60601-2-44 ed. 3 ČSN EN 60601-2-45 ed. 2 ČSN EN 60601-2-46 ČSN EN 60601-2-47 ČSN EN 60601-2-49 ČSN EN 60601-2-50 ed.2 ČSN EN 60601-2-51 ČSN EN 60601-2-52 ČSN EN 60601-2-54 ČSN EN 60601-2-5 ČSN EN 60601-2-7 ČSN EN 60601-2-8 ČSN EN 60601-2-9 ČSN EN 60601-3-1 ČSN EN 80601-2-30 ČSN EN 80601-2-35 ČSN EN 80601-2-58 ČSN EN 80601-2-59 ČSN EN 60645-1 ČSN EN 60645-2 ČSN EN 60645-3 ed. 2 ČSN EN 60645-4 ČSN EN 60118-13 ed. 2 ČSN EN 60825-1 ČSN EN 60825-2 ČSN EN 60825-4 ČSN EN 61262-1 ČSN EN 61262-2 ČSN EN 61262-3 ČSN EN 61262-4 ČSN EN 61262-5 ČSN EN 61262-6 ČSN EN 61262-7 ČSN EN 61846 ČSN EN 61010-1 ČSN EN 61010-2-010 ČSN EN 61010-2-020 ČSN EN 61010-2-031 ČSN EN 61010-2-032 ČSN EN 61010-2-040 ČSN EN 61010-2-051 ČSN EN 61010-2-061 ČSN EN 61010-2-081 ČSN EN 62304



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Ordinal number <sup>1)</sup>	Product/Product group name	Conformity assessment procedure/module	Standards/normative documents
			ČSN EN 62366 ČSN EN 737-1 ČSN EN 737-2 ČSN EN 737-3 ČSN EN 737-4 ČSN EN 794-1 ČSN EN 794-3 ČSN EN ISO 8185 ČSN EN ISO 10079-1 ČSN EN ISO 10079-2 ČSN EN ISO 10079-3 ČSN EN ISO 21647 ČSN EN ISO 11197 ČSN EN ISO 7494-1 ČSN EN ISO 9680 ČSN EN 285 ČSN EN 12342 ČSN EN 1282-2 ČSN EN 1820 ČSN EN ISO 14408 ČSN EN ISO 4135 ČSN EN ISO 5356-1 ČSN EN ISO 5356-2 ČSN EN ISO 5360 ČSN EN ISO 5366-1 ČSN EN 1041 ČSN EN 13867 ČSN EN 1707 ČSN EN 20594-1 ČSN EN ISO 10555-1 ČSN EN ISO 15747 ČSN EN ISO 21649 ČSN EN ISO 3826-2 ČSN EN ISO 3826-3 ČSN EN ISO 7886-3 ČSN EN ISO 7886-4 ČSN EN 1985 ČSN EN ISO 14155 ČSN EN ISO 14971 ČSN EN ISO 10328 ČSN EN ISO 22523 ČSN EN ISO 22675 ČSN EN 12470-1 ČSN EN 12470-2 ČSN EN ISO 81060-1 ČSN EN 14139 ČSN EN ISO 12870



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Ordinal number <sup>1)</sup>	Product/Product group name	Conformity assessment procedure/module	Standards/normative documents
			ČSN EN ISO 14889 ČSN EN ISO 15798 ČSN EN ISO 21987 ČSN EN 14683 ČSN EN 1618 ČSN EN 27740 ČSN EN 455-1 ČSN EN 455-3 ČSN EN 455-4 ČSN EN ISO 11810-1 ČSN EN ISO 11810-2 ČSN EN ISO 16061 ČSN EN ISO 21171 ČSN EN ISO 22610 ČSN EN ISO 22612 ČSN EN ISO 4074 ČSN EN 13624 ČSN EN 13727 ČSN EN 14348 ČSN EN 14561 ČSN EN 14562 ČSN EN 14563 ČSN EN 12006-2 ČSN EN ISO 25539-1 ČSN EN ISO 25539-2 ČSN EN ISO 5840 ČSN EN ISO 14602 ČSN EN ISO 21534 ČSN EN ISO 21535 ČSN EN ISO 21536 ČSN ENN ISO 14630 ČSN EN ISO 7197 ČSN EN ISO 9713 ČSN EN ISO 11979-8 ČSN EN ISO 14607 ČSN EN 13726-1 ČSN EN 13726-2 ČSN EN 14079 ČSN EN 1639 ČSN EN 15986 ČSN EN 1641 ČSN EN 1642 ČSN EN 13544-1 ČSN EN 13544-2 ČSN EN 13544-3 ČSN EN 14931 ČSN EN ISO 10651-2 ČSN EN ISO 10651-4 ČSN EN ISO 10651-6



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			ČSN EN ISO 15001 ČSN EN ISO 18778 ČSN EN ISO 23328-1 ČSN EN ISO 23328-2 ČSN EN ISO 23747 ČSN EN ISO 26782 ČSN EN ISO 7376 ČSN EN ISO 8835-2 ČSN EN ISO 8835-3 ČSN EN ISO 8835-4 ČSN EN ISO 8835-5 ČSN EN ISO 9360-1 ČSN EN ISO 9360-2 ČSN EN 1640 ČSN EN 13060 ČSN EN 14180 ČSN EN 1422 ČSN EN ISO 15883-1 ČSN EN ISO 15883-2 ČSN EN ISO 15883-3 ČSN EN ISO 15883-4 ČSN EN ISO 16201 ČSN EN 12183 ČSN EN 12184 ČSN EN 13976-1 ČSN EN 13976-2 ČSN EN 1789 ČSN EN 1865-3 ČSN EN 1865-4 ČSN EN 1865-5 ČSN EN ISO 10535 ČSN EN ISO 10524-1 ČSN EN ISO 10524-2 ČSN EN ISO 10524-3 ČSN EN ISO 10524-4 ČSN EN ISO 15002 ČSN EN ISO 18777 ČSN EN ISO 18779 ČSN EN ISO 21969 ČSN EN ISO 5359 ČSN EN ISO 7396-1 ČSN EN ISO 7396-2 ČSN EN ISO 8359 ČSN EN ISO 9170-1 ČSN EN ISO 9170-2 ČSN EN 60522 ČSN EN 60580 ČSN EN 60627 ČSN EN 61676





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Ordinal number <sup>1)</sup>	Product/Product group name	Conformity assessment procedure/module	Standards/normative documents
			ČSN EN 62220-1 ČSN EN 62220-1-2 ČSN EN 62220-1-3 ČSN EN 12470-3 ČSN EN 12470-4 ČSN EN 12470-5 ČSN EN ISO 17510-1 ČSN EN ISO 17510-2 ČSN EN 61217 ed. 2 ČSN EN 62083 ed. 2 ČSN EN ISO 22442-1 ČSN EN ISO 22442-2 ČSN EN ISO 22442-3 ČSN EN ISO 17664 ČSN EN ISO 17665-1 ČSN EN ISO 13408-1 ČSN EN ISO 13408-2 ČSN EN ISO 13408-3 ČSN EN ISO 13408-4 ČSN EN ISO 13408-5 ČSN EN ISO 13408-6 ČSN EN ISO 11135-1 ČSN EN ISO 11137-1 ČSN EN ISO 11137-2 ČSN EN ISO 11138-2 ČSN EN ISO 11138-3 ČSN EN ISO 11140-1 ČSN EN ISO 11140-3 ČSN EN 556-1 ČSN EN 556-2 ČSN EN ISO 11607-1 ČSN EN ISO 11607-2 ČSN EN ISO 11737-1 ČSN EN ISO 11737-2 ČSN EN ISO 14937 ČSN EN 13718-1 ČSN EN ISO 10993-1 ČSN EN ISO 10993-11 ČSN EN ISO 10993-12 ČSN EN ISO 10993-13 ČSN EN ISO 10993-14 ČSN EN ISO 10993-15 ČSN EN ISO 10993-16 ČSN EN ISO 10993-17 ČSN EN ISO 10993-18 ČSN EN ISO 10993-3 ČSN EN ISO 10993-4 ČSN EN ISO 10993-5 ČSN EN ISO 10993-6



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Ordinal number <sup>1)</sup>	Product/Product group name	Conformity assessment procedure/module	Standards/normative documents
2 <sup>x</sup>	Medical devices - active implantable (AIMD)	Gov. Reg. No. 55/2015 Coll. Annex 2, 3, 4, 5 <sup>3)</sup>	ČSN EN ISO 10993-7 ČSN EN ISO 10993-9 ČSN EN 45502-1 ČSN EN 45502-2-1 ČSN EN 50077 ČSN EN 60601-1 ČSN EN 60601-1 ed. 2 ČSN EN 60601-1-1 ed. 2 ČSN EN 60601-1-2 ed. 2 ČSN EN 60601-1-3 ed. 2 ČSN EN 60601-1-4 ČSN EN 60601-1-6 ed. 3 ČSN EN 60601-1-8 ed. 2 ČSN EN 60601-1-10 ČSN EN 61010-1 ČSN EN 62304 ČSN EN 62366 ČSN EN ISO 14971

<sup>1/</sup> Asterisk at the ordinal number identifies that within the scope of accreditation, the certification body is allowed to include new/updated/revised technical specifications listed in the relevant conformity assessment procedure for the assessment of conformity with safety requirements. The precondition is that the product area, regulations and conformity assessment procedure must not change. Updated list of activities provided within the flexible scope of accreditation is available at the Certification Body from the Medical Devices Product Manager.

<sup>2/</sup> Government Regulation No. 54/2015 Coll., laying down technical requirements for medical devices and amending the Government Regulation No. 251/2003 Coll., amending some of the Government Regulations implementing the Act No. 22/1997 Coll. on product technical requirements and on change and amendment of some relating acts, as amended, as amended by Government Regulation No. [212/2007 Coll.](#), Government Regulation No. [245/2009 Coll.](#) and Government Regulation No. [65/2011 Coll.](#) (corresponds to the Council Directive 93/42/EEC, as amended)

<sup>3/</sup> Government Regulation No. 55/2015 Coll., laying down technical requirements for active implantable medical devices, amending Government Regulation No. 251/2003 Coll., amending some government regulations issued as implementing for Act No 22/1997 Coll., on Technical Requirements for Products and Amendments to Some Related Acts, as amended (corresponds to the Council Directive 90/385/EEC, as amended)

**The Certificate of Accreditation does not replace the Decision on Notification issued by the Authorizing Body.**



# Cree® XLamp® XT-E White LEDs



NVLAP Lab Code 500041-0

## INFORMATION REQUIRED BY LM-80-08

Cree classifies these LEDs as "LED packages" per Sep 9, 2011 ENERGY STAR guidelines<sup>1</sup>.

1. Number of LED light sources tested	See individual data sets on following pages.
2. Description of LED light sources	<p>XLamp XT-E White LEDs (Series: XTEAWT)</p> <p>This LM-80 report is applicable to the following order codes: XTEAWT-xx-xxxx-xxxxxxxxxx</p> <p>All measurements provided are LED package measurements.</p>
3. Description of test and auxiliary equipment	<p>Instrument Systems ISP-500 Integrating Sphere</p> <p>Instrument Systems CAS-140 Spectrometer</p> <p>Keithley 2420 Sourcemeter</p>
4. Operating cycle	LED packages are driven at constant current.
5. Ambient conditions	<p>LED packages are operated in environmental control chambers. The temperature of the ambient air around the LED packages is actively controlled by air flowing through the chamber.</p> <p><math>T_A</math> : See individual data sets on following pages RH : &lt; 45% Air flow : 800 CFM</p>
6. Case temperature	See individual data sets on following pages.
7. Drive current of the LED light source during life-time test.	See individual data sets on following pages.
8. Initial luminous flux and forward voltage at photometric measurement current	See individual data sets on following pages.
9. Lumen maintenance data for each individual LED light source	See individual data sets on following pages. Ambient temperature during luminous flux testing set to 25°C ±2°C.
10. Observation of LED light source failures	No failures occurred during testing.
11. LED light source monitoring interval	See individual data sets on following pages.
12. Photometric measurement uncertainty	Cree maintains a tolerance of ±2.0% on flux measurements for LM-80 testing.
13. Chromaticity shift reported over the measurement time	See individual data sets on following pages. Ambient temperature during chromaticity testing set to 25°C ±2°C.
Test Report Authorization	Arthur Pun, Components Reliability Laboratory Manager

<sup>1</sup> [http://www.energystar.gov/ia/partners/prod\\_development/new\\_specs/downloads/luminaires/ENERGY\\_STAR\\_Final\\_Lumen\\_Maintenance\\_Guidance.pdf](http://www.energystar.gov/ia/partners/prod_development/new_specs/downloads/luminaires/ENERGY_STAR_Final_Lumen_Maintenance_Guidance.pdf)

**REVISION HISTORY**

Revision	Date	Change
0	Mar 29, 2012	Date of first issue
1	Sep 27, 2012	Removed successor data set 1. Added data set 2.
2	Oct 23, 2012	Added data set 3.
3	Nov 14, 2012	Added data set 4.
4	Apr 17, 2013	Revised data sets 2 & 4 to add additional test duration. Added data sets 5 & 6.
5	Aug 22, 2013	Revised data sets 2-6 to add additional test duration.
6	Nov 13, 2013	Revised data sets 5 & 6 to add additional test duration.
7	Sep 29, 2014	Removed data sets 3 & 4. Added data sets 3+ & 4+. Revised data sets 2 & 5 to add additional test duration.
8	Nov 20, 2015	Added data sets 8 & 9. Revised report format.
9	Jun 06, 2016	Added data sets 10 & 11. Removed data sets 2 & 4+. Extended data sets 8 & 9 with additional test duration.
10	Sep 22, 2016	Extended data sets 8 & 9 with additional test duration. Updated mechanical drawings and product photograph.

**TEST RESULTS SUMMARY**

Data Set	Case Temp. [T <sub>s</sub> ]	Ambient Temp. [T <sub>A</sub> ]	Drive Current [I <sub>F</sub> ]	ANSI CCT Target	Sample Count	Test Duration	Reported TM-21 Lifetimes
8	85°C	85°C	500 mA	3000K	20	12,096 hrs	L90(12k) > 72,600 hrs L80(12k) > 72,600 hrs L70(12k) > 72,600 hrs
9	105°C	105°C	500 mA	3000K	20	13,104 hrs	L90(13k) > 78,600 hrs L80(13k) > 78,600 hrs L70(13k) > 78,600 hrs
3+	55°C	55°C	1000 mA	3000K	16	18,144 hrs	L90(18k) = 45,600 hrs L80(18k) = 88,500 hrs L70(18k) > 99,800 hrs
10	85°C	85°C	1000 mA	3000K	20	10,080 hrs	L90(10k) > 60,500 hrs L80(10k) > 60,500 hrs L70(10k) > 60,500 hrs
11	105°C	105°C	1000 mA	3000K	20	10,080 hrs	L90(10k) > 60,500 hrs L80(10k) > 60,500 hrs L70(10k) > 60,500 hrs
5	55°C	55°C	1250 mA	3000K	25	10,080 hrs	L90(10k) = 46,100 hrs L80(10k) > 60,500 hrs L70(10k) > 60,500 hrs
6	85°C	85°C	1250 mA	3000K	25	9,072 hrs	L90(9k) = 19,300 hrs L80(9k) = 41,400 hrs L70(9k) > 54,400 hrs

**DATA SET 8: 85°C; 500 mA**

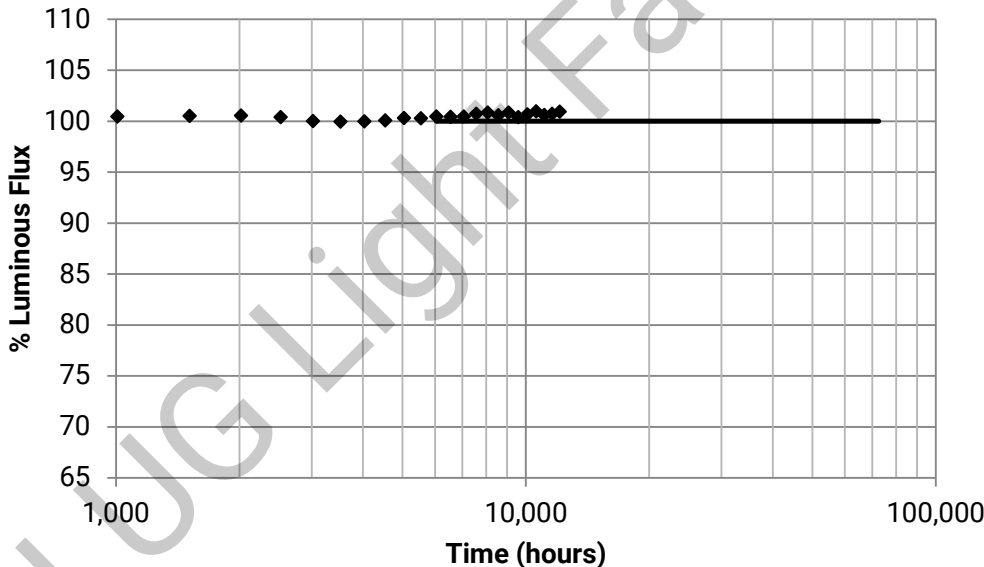
LED Package Series	XLamp XT-E White LEDs (Series: XTEAWT) This LM-80 report is applicable to the following order codes: XTEAWT-xx-xxxx-xxxxxxxxxx
Tested Model Number	XTEAWT-00-0000-00000LBE7
Drive Current [I <sub>F</sub> ]	500 mA
Testing Initiation Date	December 4, 2014
Case Temperature [T <sub>S</sub> ]	85°C
Ambient Temperature [T <sub>A</sub> ]	85°C
Failures observed	None

**Projection Generated By Cree’s Internal TM-21 Calculator:**

<b>Test duration</b>	12,096 hours
<b>Test duration used for projection</b>	t=6,048 to t=12,096
<b>α</b>	-5.311E-07
<b>β</b>	1.002E+00
<b>Reported Lifetimes</b>	<b>L90(12k) &gt; 72,600 hours</b>
	<b>L80(12k) &gt; 72,600 hours</b>
	<b>L70(12k) &gt; 72,600 hours</b>

**LM-80 Data For The Official TM-21 Calculator\***

Time (hours)	Lumen Maintenance
0	100.00%
3024	100.02%
3528	99.95%
4032	99.98%
4536	100.07%
5040	100.30%
5544	100.28%
6048	100.46%
6552	100.45%
7056	100.47%
7560	100.74%
8064	100.85%
8568	100.59%
9072	100.85%
9576	100.41%
10080	100.66%
10584	100.96%
11088	100.62%
11592	100.73%
12096	100.93%



\* <http://www.energystar.gov/TM-21calculator>

Note: Data points t=168 hr through t=2520 hr are intentionally excluded from this table, since the ENERGY STAR tool has a 20 data point input limit. Per TM-21 methodology, data points t=168 hr through t=2520 hr would be excluded, so the projection is unaffected.

DATA SET 8: 85°C; 500 mA

Table with 18 columns: Lamp #, Initial (0 hrs) (LF, Vf, Calc. CCT, ANSI Target), and Lumen Maintenance (%) (168, 1008, 1512, 2016, 2520, 3024, 3528, 4032, 4536, 5040, 5544, 6048). Includes summary statistics (Mean, Median, sigma, Min, Max) for each column.

Table with 18 columns: Lamp #, Initial (0 hrs) (CCx, CCy, Calc. CCT, ANSI Target), and Chromaticity Shift (Delta u'v) (168, 1008, 1512, 2016, 2520, 3024, 3528, 4032, 4536, 5040, 5544, 6048). Includes summary statistics (Mean, Median, sigma, Min, Max) for each column.



**DATA SET 9: 105°C; 500 mA**

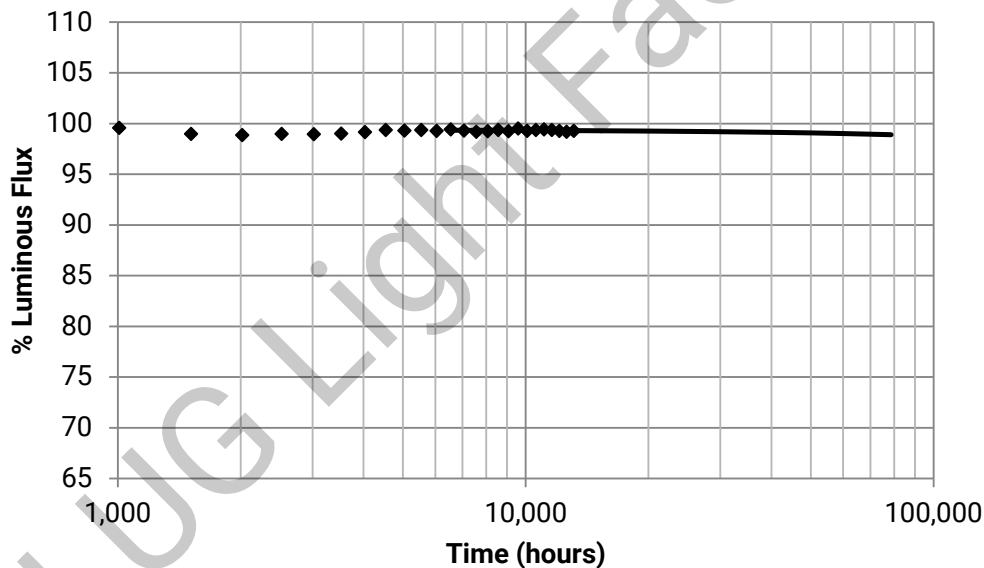
LED Package Series	XLamp XT-E White LEDs (Series: XTEAWT) This LM-80 report is applicable to the following order codes: XTEAWT-xx-xxxx-xxxxxxxxxx
Tested Model Number	XTEAWT-00-0000-00000LBE7
Drive Current [I <sub>F</sub> ]	500 mA
Testing Initiation Date	December 4, 2014
Case Temperature [T <sub>s</sub> ]	105°C
Ambient Temperature [T <sub>A</sub> ]	105°C
Failures observed	None

**Projection Generated By Cree's Internal TM-21 Calculator:**

<b>Test duration</b>	13,104 hours
<b>Test duration used for projection</b>	t=6,552 to t=13,104
<b>α</b>	6.205E-08
<b>β</b>	9.938E-01
<b>Reported Lifetimes</b>	<b>L90(13k) &gt; 78,600 hours</b>
	<b>L80(13k) &gt; 78,600 hours</b>
	<b>L70(13k) &gt; 78,600 hours</b>

**LM-80 Data For The Official TM-21 Calculator\***

Time (hours)	Lumen Maintenance
0	100.00%
4032	99.16%
4536	99.35%
5040	99.29%
5544	99.37%
6048	99.29%
6552	99.43%
7056	99.31%
7560	99.20%
8064	99.23%
8568	99.38%
9072	99.25%
9576	99.53%
10080	99.26%
10584	99.36%
11088	99.43%
11592	99.37%
12096	99.27%
12600	99.18%
13104	99.28%



\* <http://www.energystar.gov/TM-21calculator>

Note: Data points t=168 hr through t=3528 hr are intentionally excluded from this table, since the ENERGY STAR tool has a 20 data point input limit. Per TM-21 methodology, data points t=168 hr through t=3528 would be excluded, so the projection is unaffected.







**DATA SET 3+: 55°C; 1000 mA**

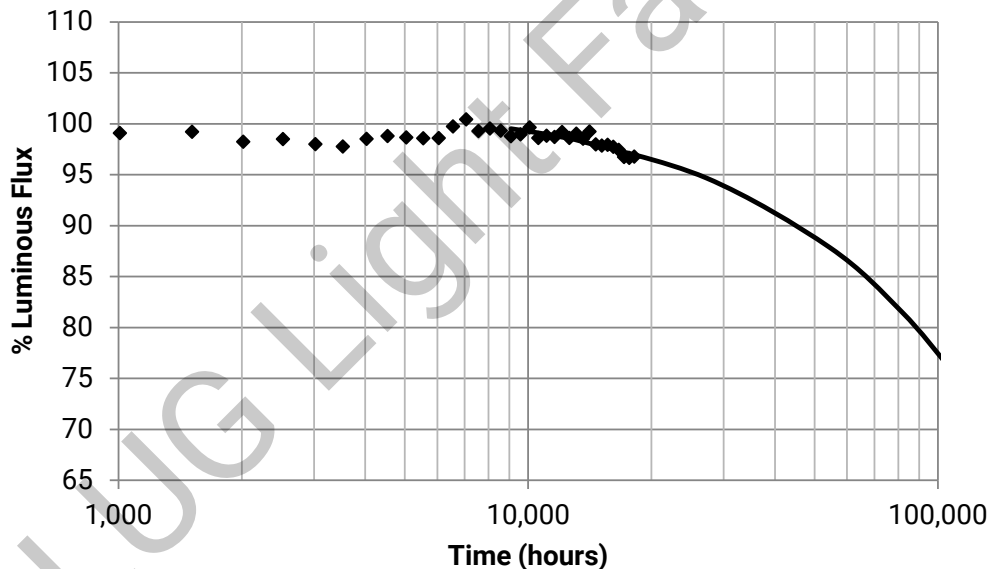
LED Package Series	XLamp XT-E White LEDs (Series: XTEAWT) This LM-80 report is applicable to the following order codes: XTEAWT-xx-xxxx-xxxxxxxxxx
Tested Model Number	XTEAWT-00-0000-00000LBE7
Drive Current [I <sub>F</sub> ]	1000 mA
Testing Initiation Date	December 19, 2011
Case Temperature [T <sub>S</sub> ]	55°C
Ambient Temperature [T <sub>A</sub> ]	55°C
Failures observed	None

**Projection Generated By Cree's Internal TM-21 Calculator:**

Test duration	18,144 hours
Test duration used for projection	t=9,072 to t=18,144
$\alpha$	2.745E-06
$\beta$	1.020E+00
Reported Lifetimes	<b>L90(18k) = 45,600 hours</b>
	<b>L80(18k) = 88,500 hours</b>
	<b>L70(18k) &gt; 99,800 hours</b>

**LM-80 Data For The Official TM-21 Calculator\***

Time (hours)	Lumen Maintenance
0	100.00%
9072	98.78%
9576	98.96%
10080	99.64%
10584	98.61%
11088	98.83%
11592	98.71%
12096	99.19%
12600	98.61%
13104	99.03%
13608	98.53%
14112	99.24%
14616	97.98%
15120	97.86%
15624	97.94%
16128	97.74%
16632	97.44%
17136	96.74%
17640	96.65%
18144	96.78%



\* <http://www.energystar.gov/TM-21calculator>

Note: Data points t=168 hr through t=8568 hr are intentionally excluded from this table since the ENERGY STAR tool has a 20 data point input limit. Per TM-21 methodology, data points t=168 hr to t=8568 hr would be excluded, so the projection is unaffected.

**DATA SET 3+: 55°C; 1000 mA**

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V <sub>F</sub> (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	268.5	3.43	3009	3000	100.66	98.74	99.60	98.68	98.00	98.15	97.49	98.44	98.41	98.14	98.96	99.53
2	261.7	3.39	3046	3000	99.40	98.40	98.46	97.27	97.94	97.54	97.81	99.14	98.69	98.52	98.73	98.42
3	260.1	3.41	3064	3000	99.79	99.64	99.85	99.06	99.15	98.34	98.77	99.95	99.49	99.40	99.57	99.37
4	239.5	3.40	2897	3000	101.40	99.58	100.01	98.93	98.80	97.61	97.70	98.23	98.94	98.60	99.24	100.34
5	258.3	3.43	3004	3000	98.32	97.84	98.06	97.57	97.42	96.91	97.21	97.28	96.97	96.87	97.22	97.12
6	243.1	3.42	2984	3000	99.90	98.33	98.50	97.86	97.70	97.25	97.52	98.54	98.45	98.26	98.45	98.30
7	253.7	3.44	3022	3000	100.10	98.82	99.76	98.38	98.09	97.62	97.54	97.22	98.24	97.85	98.01	99.38
8	256.4	3.39	2941	3000	100.86	100.66	101.14	99.92	100.15	99.70	99.96	100.83	100.60	100.27	100.69	100.49
9	267.5	3.43	3202	3000	100.86	100.37	100.41	99.33	99.54	98.00	97.93	97.81	99.01	98.54	98.75	100.28
10	271.5	3.42	2903	3000	100.33	98.89	98.21	97.96	98.76	98.29	97.48	98.17	98.52	99.63	97.98	97.64
11	256.9	3.40	2957	3000	99.79	99.78	99.16	98.26	98.95	98.69	97.84	98.91	99.30	99.12	98.64	98.56
12	262.4	3.43	3030	3000	100.01	99.47	99.66	98.12	98.90	98.75	98.32	99.11	99.35	99.41	98.54	98.69
13	260.7	3.46	2983	3000	98.47	97.88	97.93	96.41	97.13	96.87	96.18	97.36	97.67	97.18	97.25	96.21
14	255.4	3.41	3025	3000	100.84	98.03	99.00	98.21	98.74	98.49	98.09	98.96	99.47	99.01	98.96	98.45
15	258.0	3.49	3046	3000	101.06	100.00	98.88	98.16	98.76	97.95	96.55	97.52	98.58	99.05	97.61	96.60
16	256.4	3.43	3080	3000	100.73	99.00	98.79	97.66	97.96	97.83	97.89	98.81	99.09	98.72	98.59	98.16
n	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Mean	258.1	3.42			100.16	99.09	99.21	98.24	98.50	98.00	97.77	98.52	98.80	98.66	98.57	98.60
Median	258.2	3.43			100.21	98.94	99.08	98.18	98.75	97.98	97.76	98.49	98.82	98.66	98.61	98.50
σ	8.3	0.03			0.88	0.88	0.90	0.84	0.80	0.73	0.85	0.99	0.83	0.88	0.87	1.28
Min.	239.5	3.39			98.32	97.84	97.93	96.41	97.13	96.87	96.18	97.22	96.97	96.87	97.22	96.21
Max.	271.5	3.49			101.40	100.66	101.14	99.92	100.15	99.70	99.96	100.83	100.60	100.27	100.69	100.49

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	0.4359	0.4023	3009	3000	0.0004	0.0005	0.0006	0.0007	0.0008	0.0008	0.0009	0.0009	0.0009	0.0008	0.0009	0.0008
2	0.4320	0.3986	3046	3000	0.0006	0.0011	0.0012	0.0010	0.0014	0.0015	0.0015	0.0017	0.0018	0.0016	0.0019	0.0018
3	0.4302	0.3969	3064	3000	0.0005	0.0008	0.0008	0.0008	0.0009	0.0009	0.0009	0.0010	0.0010	0.0008	0.0009	0.0008
4	0.4406	0.3987	2897	3000	0.0005	0.0007	0.0009	0.0009	0.0010	0.0010	0.0012	0.0013	0.0013	0.0013	0.0012	0.0011
5	0.4293	0.3881	3004	3000	0.0009	0.0009	0.0008	0.0009	0.0008	0.0008	0.0009	0.0010	0.0009	0.0010	0.0007	0.0007
6	0.4389	0.4055	2984	3000	0.0004	0.0005	0.0005	0.0006	0.0006	0.0005	0.0005	0.0007	0.0007	0.0006	0.0005	0.0005
7	0.4374	0.4071	3022	3000	0.0006	0.0007	0.0011	0.0011	0.0013	0.0013	0.0013	0.0016	0.0016	0.0016	0.0016	0.0017
8	0.4392	0.4010	2941	3000	0.0011	0.0011	0.0013	0.0012	0.0013	0.0013	0.0013	0.0015	0.0015	0.0014	0.0013	0.0013
9	0.4280	0.4091	3202	3000	0.0004	0.0007	0.0011	0.0011	0.0012	0.0013	0.0012	0.0014	0.0015	0.0015	0.0015	0.0016
10	0.4432	0.4045	2903	3000	0.0005	0.0008	0.0008	0.0009	0.0010	0.0011	0.0012	0.0013	0.0013	0.0014	0.0011	0.0014
11	0.4406	0.4057	2957	3000	0.0004	0.0005	0.0005	0.0006	0.0007	0.0008	0.0006	0.0009	0.0009	0.0009	0.0009	0.0010
12	0.4354	0.4039	3030	3000	0.0002	0.0006	0.0007	0.0007	0.0008	0.0009	0.0008	0.0009	0.0010	0.0009	0.0008	0.0010
13	0.4353	0.3981	2983	3000	0.0004	0.0008	0.0008	0.0009	0.0010	0.0012	0.0012	0.0012	0.0014	0.0014	0.0014	0.0014
14	0.4366	0.4058	3025	3000	0.0004	0.0003	0.0005	0.0007	0.0008	0.0010	0.0010	0.0011	0.0011	0.0011	0.0011	0.0012
15	0.4329	0.4005	3046	3000	0.0004	0.0005	0.0002	0.0004	0.0005	0.0006	0.0002	0.0007	0.0008	0.0007	0.0005	0.0009
16	0.4371	0.4138	3080	3000	0.0005	0.0007	0.0009	0.0010	0.0010	0.0012	0.0012	0.0014	0.0015	0.0014	0.0014	0.0015
n	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Mean					0.0005	0.0007	0.0008	0.0008	0.0009	0.0010	0.0010	0.0012	0.0012	0.0011	0.0011	0.0012
Median					0.0005	0.0007	0.0008	0.0009	0.0009	0.0010	0.0011	0.0012	0.0012	0.0012	0.0011	0.0012
σ					0.0002	0.0002	0.0003	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0004
Min.					0.0002	0.0003	0.0002	0.0004	0.0005	0.0005	0.0002	0.0007	0.0007	0.0006	0.0005	0.0005
Max.					0.0011	0.0011	0.0013	0.0012	0.0014	0.0015	0.0015	0.0017	0.0018	0.0016	0.0019	0.0018

**DATA SET 3+: 55°C; 1000 mA**

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V <sub>F</sub> (V)	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096
1	268.5	3.43	3009	3000	99.64	101.27	98.44	100.09	99.21	98.07	98.47	99.30	98.16	98.76	98.51	98.53
2	261.7	3.39	3046	3000	99.24	100.19	99.75	99.74	99.94	99.15	99.67	99.44	99.51	99.16	98.92	99.25
3	260.1	3.41	3064	3000	100.31	101.31	100.83	100.87	100.87	100.38	100.63	100.90	100.38	99.98	99.80	100.35
4	239.5	3.40	2897	3000	100.89	102.33	99.06	100.63	99.77	98.62	98.44	99.79	97.68	98.80	98.94	98.94
5	258.3	3.43	3004	3000	98.05	98.95	98.48	98.59	98.73	98.24	98.65	98.78	98.50	98.21	97.77	98.42
6	243.1	3.42	2984	3000	99.24	100.06	99.28	99.66	99.82	99.33	99.47	99.77	98.76	98.98	98.73	99.10
7	253.7	3.44	3022	3000	100.25	101.33	97.88	99.51	98.51	97.64	97.23	98.73	96.73	97.34	97.21	97.87
8	256.4	3.39	2941	3000	101.58	102.37	102.16	101.96	102.29	101.79	101.89	101.98	102.13	101.39	101.10	101.61
9	267.5	3.43	3202	3000	101.34	102.22	99.03	100.36	99.55	98.22	97.92	99.11	98.16	98.65	98.69	98.83
10	271.5	3.42	2903	3000	99.57	99.55	98.40	99.98	99.16	98.27	98.27	99.88	98.13	98.43	98.33	98.86
11	256.9	3.40	2957	3000	99.91	99.96	99.75	99.31	98.55	99.73	99.62	100.04	99.35	99.21	99.18	99.90
12	262.4	3.43	3030	3000	100.10	100.37	100.02	99.35	99.73	99.69	99.56	100.11	98.68	99.06	99.22	99.95
13	260.7	3.46	2983	3000	97.94	98.05	97.85	96.60	96.56	97.20	97.68	98.36	96.72	97.52	97.56	98.16
14	255.4	3.41	3025	3000	99.68	100.02	99.65	98.69	99.33	97.87	99.60	100.01	98.56	99.12	99.14	99.67
15	258.0	3.49	3046	3000	98.71	99.16	98.53	98.70	97.75	98.34	97.48	98.90	98.05	98.16	97.66	98.47
16	256.4	3.43	3080	3000	99.37	99.79	99.51	98.50	99.38	97.92	98.79	99.16	98.19	98.45	98.53	99.16
n	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Mean	258.1	3.42			99.74	100.43	99.29	99.53	99.32	98.78	98.96	99.64	98.61	98.83	98.71	99.19
Median	258.2	3.43			99.66	100.13	99.17	99.59	99.36	98.31	98.72	99.61	98.35	98.78	98.71	99.02
σ	8.3	0.03			1.03	1.27	1.12	1.22	1.26	1.18	1.22	0.90	1.32	0.95	0.95	0.94
Min.	239.5	3.39			97.94	98.05	97.85	96.60	96.56	97.20	97.23	98.36	96.72	97.34	97.21	97.87
Max.	271.5	3.49			101.58	102.37	102.16	101.96	102.29	101.79	101.89	101.98	102.13	101.39	101.10	101.61

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096
1	0.4359	0.4023	3009	3000	0.0010	0.0009	0.0010	0.0010	0.0010	0.0011	0.0011	0.0014	0.0012	0.0015	0.0010	0.0014
2	0.4320	0.3986	3046	3000	0.0019	0.0019	0.0020	0.0020	0.0020	0.0020	0.0021	0.0024	0.0022	0.0026	0.0026	0.0026
3	0.4302	0.3969	3064	3000	0.0009	0.0008	0.0008	0.0008	0.0010	0.0009	0.0010	0.0013	0.0010	0.0011	0.0012	0.0013
4	0.4406	0.3987	2897	3000	0.0014	0.0013	0.0015	0.0014	0.0014	0.0015	0.0014	0.0014	0.0014	0.0016	0.0016	0.0016
5	0.4293	0.3881	3004	3000	0.0007	0.0006	0.0008	0.0007	0.0007	0.0008	0.0011	0.0010	0.0007	0.0010	0.0010	0.0010
6	0.4389	0.4055	2984	3000	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	0.0007	0.0009	0.0007	0.0009	0.0009	0.0010
7	0.4374	0.4071	3022	3000	0.0018	0.0017	0.0019	0.0019	0.0020	0.0021	0.0021	0.0023	0.0020	0.0023	0.0021	0.0024
8	0.4392	0.4010	2941	3000	0.0013	0.0012	0.0012	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0014	0.0014	0.0014
9	0.4280	0.4091	3202	3000	0.0017	0.0016	0.0017	0.0018	0.0019	0.0017	0.0019	0.0020	0.0020	0.0022	0.0022	0.0022
10	0.4432	0.4045	2903	3000	0.0015	0.0016	0.0017	0.0016	0.0018	0.0020	0.0020	0.0019	0.0020	0.0021	0.0021	0.0022
11	0.4406	0.4057	2957	3000	0.0009	0.0011	0.0011	0.0010	0.0009	0.0012	0.0012	0.0012	0.0011	0.0013	0.0013	0.0014
12	0.4354	0.4039	3030	3000	0.0009	0.0011	0.0010	0.0009	0.0010	0.0011	0.0011	0.0011	0.0010	0.0011	0.0013	0.0013
13	0.4353	0.3981	2983	3000	0.0014	0.0017	0.0017	0.0013	0.0013	0.0017	0.0019	0.0020	0.0016	0.0023	0.0023	0.0023
14	0.4366	0.4058	3025	3000	0.0011	0.0012	0.0013	0.0011	0.0012	0.0012	0.0015	0.0015	0.0013	0.0015	0.0016	0.0015
15	0.4329	0.4005	3046	3000	0.0009	0.0008	0.0010	0.0009	0.0008	0.0011	0.0011	0.0010	0.0012	0.0011	0.0011	0.0010
16	0.4371	0.4138	3080	3000	0.0016	0.0016	0.0017	0.0013	0.0017	0.0015	0.0018	0.0019	0.0014	0.0020	0.0020	0.0021
n	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Mean					0.0012	0.0012	0.0013	0.0012	0.0013	0.0014	0.0015	0.0015	0.0014	0.0016	0.0016	0.0017
Median					0.0012	0.0012	0.0012	0.0012	0.0013	0.0012	0.0014	0.0014	0.0013	0.0015	0.0015	0.0015
σ					0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0005	0.0005	0.0005	0.0005	0.0006
Min.					0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	0.0007	0.0009	0.0007	0.0009	0.0009	0.0010
Max.					0.0019	0.0019	0.0020	0.0020	0.0020	0.0021	0.0021	0.0024	0.0022	0.0026	0.0026	0.0026

**DATA SET 3+: 55°C; 1000 mA**

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V <sub>F</sub> (V)	Calc. CCT	ANSI Target	12600	13104	13608	14112	14616	15120	15624	16128	16632	17136	17640	18144
1	268.5	3.43	3009	3000	98.17	99.11	97.29	98.62	97.23	98.01	96.73	95.51	96.22	96.08	96.17	96.01
2	261.7	3.39	3046	3000	98.83	99.48	98.77	99.50	98.17	98.45	98.18	98.33	97.61	97.56	97.28	97.49
3	260.1	3.41	3064	3000	99.59	100.23	99.64	100.42	98.83	99.09	98.95	98.66	97.96	97.47	96.83	96.91
4	239.5	3.40	2897	3000	98.44	99.00	98.25	98.96	97.55	97.89	97.77	96.75	96.87	96.68	96.82	96.40
5	258.3	3.43	3004	3000	97.78	98.52	98.14	98.09	97.29	97.42	97.38	97.71	96.92	96.62	96.39	96.43
6	243.1	3.42	2984	3000	98.69	99.17	98.96	99.62	98.35	98.39	98.40	98.53	97.92	97.74	97.27	97.53
7	253.7	3.44	3022	3000	97.40	98.21	97.28	97.96	97.01	96.57	97.08	96.36	96.20	95.75	95.99	95.87
8	256.4	3.39	2941	3000	101.02	102.00	101.37	102.04	100.65	100.43	100.71	100.76	100.37	99.71	99.75	99.94
9	267.5	3.43	3202	3000	97.92	98.67	97.84	98.24	96.89	96.71	96.57	96.38	96.19	95.77	95.84	95.71
10	271.5	3.42	2903	3000	98.43	98.18	97.75	98.64	97.57	97.69	97.29	96.69	97.87	96.10	95.85	96.75
11	256.9	3.40	2957	3000	99.41	99.15	99.16	100.06	98.63	98.14	98.68	97.95	98.19	97.08	97.01	97.08
12	262.4	3.43	3030	3000	99.02	99.16	99.20	100.10	98.33	97.86	98.47	98.88	97.97	97.11	97.06	97.13
13	260.7	3.46	2983	3000	97.57	97.75	97.55	98.31	97.13	96.75	97.17	97.44	96.19	95.34	95.45	95.76
14	255.4	3.41	3025	3000	99.17	99.64	99.26	100.10	98.93	98.42	98.50	99.19	98.47	97.50	97.32	97.58
15	258.0	3.49	3046	3000	97.78	97.22	97.42	98.06	97.36	96.95	97.50	97.33	97.21	95.88	95.94	96.27
16	256.4	3.43	3080	3000	98.50	98.95	98.64	99.08	97.74	97.00	97.59	97.40	96.86	95.44	95.49	95.61
n	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Mean	258.1	3.42			98.61	99.03	98.53	99.24	97.98	97.86	97.94	97.74	97.44	96.74	96.65	96.78
Median	258.2	3.43			98.47	99.05	98.45	99.02	97.66	97.88	97.68	97.58	97.41	96.65	96.60	96.59
σ	8.3	0.03			0.92	1.08	1.08	1.12	0.97	1.01	1.03	1.31	1.11	1.13	1.05	1.08
Min.	239.5	3.39			97.40	97.22	97.28	97.96	96.89	96.57	96.57	95.51	96.19	95.34	95.45	95.61
Max.	271.5	3.49			101.02	102.00	101.37	102.04	100.65	100.43	100.71	100.76	100.37	99.71	99.75	99.94

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	12600	13104	13608	14112	14616	15120	15624	16128	16632	17136	17640	18144
1	0.4359	0.4023	3009	3000	0.0015	0.0013	0.0013	0.0014	0.0014	0.0013	0.0012	0.0014	0.0012	0.0012	0.0009	0.0006
2	0.4320	0.3986	3046	3000	0.0026	0.0028	0.0029	0.0031	0.0032	0.0033	0.0034	0.0035	0.0034	0.0035	0.0034	0.0034
3	0.4302	0.3969	3064	3000	0.0012	0.0011	0.0011	0.0011	0.0012	0.0010	0.0009	0.0010	0.0007	0.0004	0.0004	0.0002
4	0.4406	0.3987	2897	3000	0.0017	0.0016	0.0018	0.0019	0.0017	0.0017	0.0017	0.0017	0.0015	0.0014	0.0012	0.0010
5	0.4293	0.3881	3004	3000	0.0010	0.0008	0.0009	0.0010	0.0011	0.0008	0.0009	0.0009	0.0009	0.0009	0.0008	0.0006
6	0.4389	0.4055	2984	3000	0.0010	0.0008	0.0009	0.0011	0.0011	0.0010	0.0011	0.0010	0.0010	0.0008	0.0006	0.0005
7	0.4374	0.4071	3022	3000	0.0026	0.0026	0.0027	0.0029	0.0029	0.0028	0.0029	0.0028	0.0028	0.0027	0.0024	0.0023
8	0.4392	0.4010	2941	3000	0.0016	0.0015	0.0015	0.0016	0.0017	0.0015	0.0013	0.0014	0.0015	0.0013	0.0012	0.0011
9	0.4280	0.4091	3202	3000	0.0023	0.0023	0.0024	0.0026	0.0026	0.0025	0.0024	0.0025	0.0024	0.0023	0.0020	0.0021
10	0.4432	0.4045	2903	3000	0.0021	0.0023	0.0022	0.0022	0.0025	0.0024	0.0024	0.0023	0.0024	0.0026	0.0025	0.0025
11	0.4406	0.4057	2957	3000	0.0015	0.0014	0.0014	0.0014	0.0014	0.0013	0.0013	0.0010	0.0011	0.0007	0.0006	0.0005
12	0.4354	0.4039	3030	3000	0.0013	0.0012	0.0013	0.0012	0.0011	0.0012	0.0011	0.0010	0.0009	0.0007	0.0006	0.0007
13	0.4353	0.3981	2983	3000	0.0024	0.0024	0.0023	0.0025	0.0024	0.0026	0.0026	0.0027	0.0027	0.0028	0.0030	0.0030
14	0.4366	0.4058	3025	3000	0.0017	0.0018	0.0017	0.0016	0.0018	0.0016	0.0015	0.0015	0.0016	0.0014	0.0011	0.0010
15	0.4329	0.4005	3046	3000	0.0012	0.0012	0.0012	0.0012	0.0014	0.0014	0.0013	0.0014	0.0013	0.0012	0.0011	0.0008
16	0.4371	0.4138	3080	3000	0.0022	0.0022	0.0022	0.0022	0.0021	0.0022	0.0021	0.0019	0.0019	0.0017	0.0016	0.0013
n	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Mean					0.0017	0.0017	0.0017	0.0018	0.0018	0.0018	0.0018	0.0018	0.0017	0.0016	0.0015	0.0014
Median					0.0016	0.0015	0.0016	0.0016	0.0017	0.0016	0.0014	0.0015	0.0015	0.0013	0.0011	0.0010
σ					0.0006	0.0006	0.0006	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0009	0.0009	0.0010
Min.					0.0010	0.0008	0.0009	0.0010	0.0011	0.0008	0.0009	0.0009	0.0007	0.0004	0.0004	0.0002
Max.					0.0026	0.0028	0.0029	0.0031	0.0032	0.0033	0.0034	0.0035	0.0034	0.0035	0.0034	0.0034

**DATA SET 10: 85°C; 1000 mA**

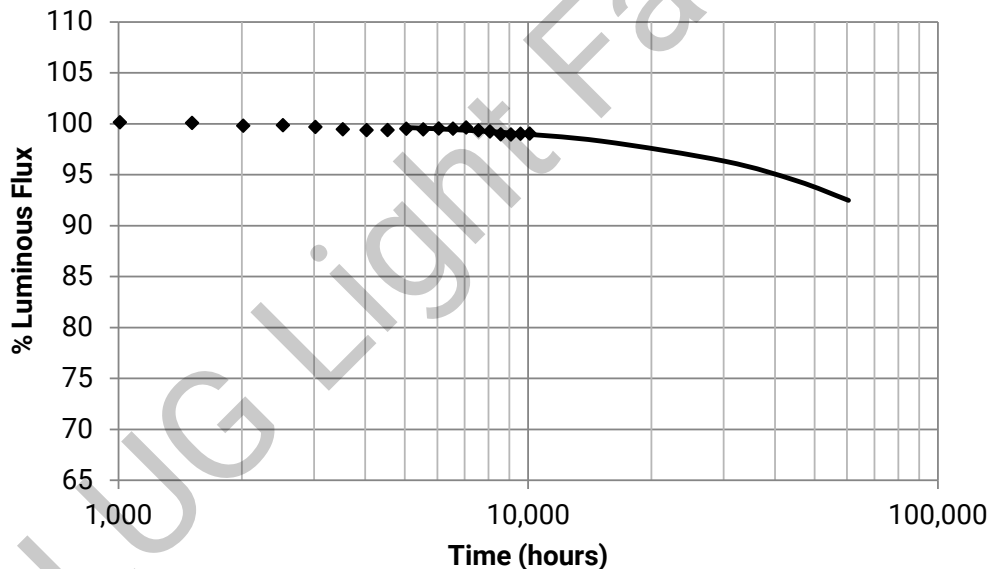
LED Package Series	XLamp XT-E White LEDs (Series: XTEAWT) This LM-80 report is applicable to the following order codes: XTEAWT-xx-xxxx-xxxxxxxxxx
Tested Model Number	XTEAWT-00-0000-00000LBE7
Drive Current [I <sub>F</sub> ]	1000 mA
Testing Initiation Date	December 4, 2014
Case Temperature [T <sub>S</sub> ]	85°C
Ambient Temperature [T <sub>A</sub> ]	85°C
Failures observed	None

**Projection Generated By Cree's Internal TM-21 Calculator:**

Test duration	10,080 hours
Test duration used for projection	t=5,040 to t=10,080
$\alpha$	1.341E-06
$\beta$	1.003E+00
Reported Lifetimes	<b>L90(10k) &gt; 60,500 hours</b>
	<b>L80(10k) &gt; 60,500 hours</b>
	<b>L70(10k) &gt; 60,500 hours</b>

**LM-80 Data For The Official TM-21 Calculator\***

Time (hours)	Lumen Maintenance
0	100.00%
1008	100.15%
1512	100.08%
2016	99.81%
2520	99.86%
3024	99.69%
3528	99.46%
4032	99.38%
4536	99.39%
5040	99.51%
5544	99.45%
6048	99.54%
6552	99.52%
7056	99.64%
7560	99.36%
8064	99.24%
8568	98.97%
9072	98.95%
9576	99.02%
10080	99.03%



\* <http://www.energystar.gov/TM-21calculator>

Note: The data point t=168 hr is intentionally excluded from this table, since the ENERGY STAR tool has a 20 data point input limit. Per TM-21 methodology, the data point t=168 hr would be excluded, so the projection is unaffected.





**DATA SET 10: 85°C; 1000 mA**

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)							
	LF (lm)	V <sub>F</sub> (V)	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080
1	300.0	3.25	3298	3000	99.39	99.35	98.78	98.49	98.11	98.14	97.81	97.78
2	336.6	3.27	3279	3000	99.64	99.74	99.88	99.82	99.49	98.71	99.21	99.78
3	298.6	3.23	3251	3000	99.74	99.66	98.91	98.71	98.12	97.63	97.87	97.95
4	328.7	3.24	3276	3000	99.47	99.57	99.87	99.91	99.56	99.80	99.71	99.72
5	302.4	3.27	3237	3000	99.44	99.58	98.43	98.51	98.14	98.58	98.18	97.98
6	331.1	3.26	3280	3000	99.86	99.91	99.70	99.80	99.07	99.47	99.83	99.40
7	307.4	3.31	3145	3000	99.76	99.96	99.36	99.29	98.77	99.06	98.69	99.15
8	334.3	3.23	3264	3000	100.20	100.34	99.96	100.13	99.80	99.60	99.64	99.58
9	306.2	3.24	3240	3000	99.66	100.02	98.99	98.81	98.98	98.48	99.06	99.11
10	310.7	3.33	3303	3000	98.99	99.62	99.33	98.62	98.56	98.51	98.95	97.90
11	329.8	3.23	3218	3000	99.75	99.38	99.79	99.82	99.68	99.54	99.56	99.43
12	333.4	3.21	3197	3000	99.73	99.61	100.03	99.77	99.48	99.40	99.46	99.49
13	307.3	3.35	3285	3000	99.43	99.40	99.77	99.93	99.87	100.09	99.91	99.94
14	337.7	3.29	3255	3000	99.59	99.50	99.30	99.56	99.64	99.58	99.55	99.69
15	303.8	3.26	3305	3000	99.18	99.41	99.72	99.46	99.40	99.34	99.35	99.39
16	337.4	3.26	3317	3000	99.25	99.52	98.93	98.77	98.45	98.31	98.45	98.51
17	298.9	3.23	3232	3000	98.72	99.17	99.00	98.27	97.86	97.74	98.01	98.30
18	331.9	3.22	3238	3000	99.57	99.68	98.77	99.18	99.20	99.03	98.84	98.65
19	302.4	3.24	3283	3000	99.56	99.78	99.49	98.94	98.45	99.05	99.27	99.76
20	302.4	3.30	3207	3000	99.44	99.55	99.13	99.10	98.69	98.93	99.07	99.14
n	20	20	20	20	20	20	20	20	20	20	20	20
Mean	317.1	3.26			99.52	99.64	99.36	99.24	98.97	98.95	99.02	99.03
Median	309.1	3.25			99.57	99.59	99.35	99.24	99.02	99.04	99.14	99.27
σ	15.6	0.04			0.32	0.27	0.47	0.58	0.64	0.68	0.66	0.72
Min.	298.6	3.21			98.72	99.17	98.43	98.27	97.86	97.63	97.81	97.78
Max.	337.7	3.35			100.20	100.34	100.03	100.13	99.87	100.09	99.91	99.94

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')							
	CCx	CCy	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080
1	0.4208	0.4041	3298	3000	0.0015	0.0017	0.0017	0.0017	0.0017	0.0017	0.0016	0.0015
2	0.4209	0.4019	3279	3000	0.0024	0.0025	0.0026	0.0026	0.0026	0.0027	0.0025	0.0025
3	0.4236	0.4048	3251	3000	0.0018	0.0020	0.0020	0.0021	0.0021	0.0021	0.0023	0.0020
4	0.4230	0.4066	3276	3000	0.0024	0.0024	0.0024	0.0026	0.0025	0.0026	0.0024	0.0023
5	0.4250	0.4063	3237	3000	0.0018	0.0018	0.0018	0.0019	0.0019	0.0018	0.0020	0.0017
6	0.4208	0.4018	3280	3000	0.0019	0.0019	0.0018	0.0020	0.0018	0.0020	0.0019	0.0018
7	0.4293	0.4048	3145	3000	0.0023	0.0023	0.0023	0.0024	0.0024	0.0024	0.0024	0.0024
8	0.4229	0.4047	3264	3000	0.0022	0.0023	0.0022	0.0024	0.0024	0.0025	0.0023	0.0023
9	0.4248	0.4063	3240	3000	0.0020	0.0022	0.0021	0.0021	0.0022	0.0021	0.0021	0.0019
10	0.4198	0.4022	3303	3000	0.0017	0.0019	0.0018	0.0019	0.0019	0.0018	0.0017	0.0017
11	0.4261	0.4066	3218	3000	0.0016	0.0017	0.0017	0.0017	0.0017	0.0016	0.0016	0.0016
12	0.4261	0.4040	3197	3000	0.0017	0.0018	0.0017	0.0017	0.0019	0.0018	0.0019	0.0018
13	0.4235	0.4090	3285	3000	0.0022	0.0022	0.0021	0.0022	0.0022	0.0023	0.0021	0.0021
14	0.4229	0.4037	3255	3000	0.0024	0.0024	0.0025	0.0026	0.0025	0.0026	0.0024	0.0022
15	0.4189	0.4003	3305	3000	0.0024	0.0024	0.0025	0.0026	0.0025	0.0026	0.0026	0.0023
16	0.4205	0.4057	3317	3000	0.0018	0.0019	0.0019	0.0020	0.0019	0.0020	0.0017	0.0018
17	0.4264	0.4090	3232	3000	0.0018	0.0019	0.0021	0.0021	0.0020	0.0022	0.0021	0.0019
18	0.4235	0.4030	3238	3000	0.0022	0.0022	0.0023	0.0023	0.0023	0.0023	0.0023	0.0023
19	0.4202	0.4007	3283	3000	0.0020	0.0021	0.0023	0.0023	0.0022	0.0022	0.0022	0.0021
20	0.4269	0.4070	3207	3000	0.0020	0.0021	0.0022	0.0022	0.0021	0.0021	0.0021	0.0021
n	20	20	20	20	20	20	20	20	20	20	20	20
Mean					0.0020	0.0021	0.0021	0.0022	0.0021	0.0022	0.0021	0.0020
Median					0.0020	0.0021	0.0021	0.0021	0.0022	0.0022	0.0021	0.0020
σ					0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
Min.					0.0015	0.0017	0.0017	0.0017	0.0017	0.0016	0.0016	0.0015
Max.					0.0024	0.0025	0.0026	0.0026	0.0026	0.0027	0.0026	0.0025

**DATA SET 11: 105°C; 1000 mA**

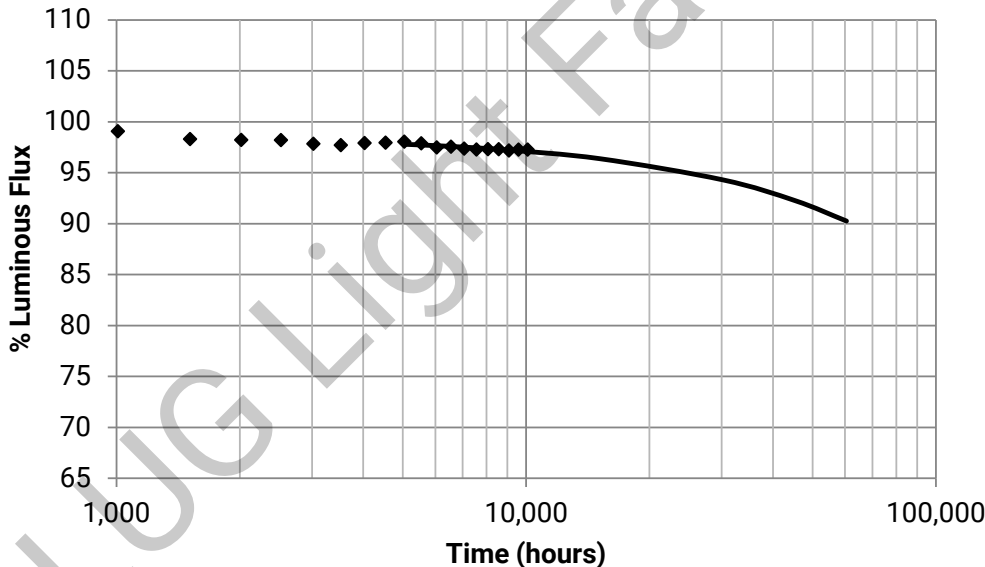
LED Package Series	XLamp XT-E White LEDs (Series: XTEAWT) This LM-80 report is applicable to the following order codes: XTEAWT-xx-xxxx-xxxxxxxxxx
Tested Model Number	XTEAWT-00-0000-00000LBE7
Drive Current [I <sub>F</sub> ]	1000 mA
Testing Initiation Date	December 12, 2014
Case Temperature [T <sub>S</sub> ]	105°C
Ambient Temperature [T <sub>A</sub> ]	105°C
Failures observed	None

**Projection Generated By Cree’s Internal TM-21 Calculator:**

Test duration	10,080 hours
Test duration used for projection	t=5,040 to t=10,080
$\alpha$	1.448E-06
$\beta$	9.852E-01
Reported Lifetimes	<b>L90(10k) &gt; 60,500 hours</b>
	<b>L80(10k) &gt; 60,500 hours</b>
	<b>L70(10k) &gt; 60,500 hours</b>

**LM-80 Data For The Official TM-21 Calculator\***

Time (hours)	Lumen Maintenance
0	100.00%
1008	99.07%
1512	98.30%
2016	98.22%
2520	98.21%
3024	97.84%
3528	97.71%
4032	97.91%
4536	97.95%
5040	98.05%
5544	97.89%
6048	97.48%
6552	97.56%
7056	97.37%
7560	97.28%
8064	97.31%
8568	97.31%
9072	97.18%
9576	97.27%
10080	97.27%



\* <http://www.energystar.gov/TM-21calculator>

Note: The data points t=168 hr is intentionally excluded from this table, since the ENERGY STAR tool has a 20 data point input limit. Per TM-21 methodology, the data point t=168 hr would be excluded, so the projection is unaffected.



**DATA SET 11: 105°C; 1000 mA**

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)							
	LF (lm)	V <sub>F</sub> (V)	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080
1	293.0	3.36	3246	3000	97.40	96.88	97.28	97.41	97.19	96.79	96.91	96.97
2	330.7	3.24	3247	3000	96.10	96.07	95.99	96.27	95.93	95.88	96.32	96.37
3	329.5	3.29	3309	3000	98.05	98.12	98.15	98.03	97.83	97.88	97.78	97.74
4	304.1	3.32	3318	3000	96.60	96.49	96.36	96.28	96.36	96.35	96.47	96.38
5	327.2	3.27	3227	3000	98.17	97.52	97.82	97.67	97.68	97.61	97.74	98.01
6	322.2	3.24	3152	3000	98.23	97.90	97.78	97.73	97.50	97.61	97.56	97.58
7	292.0	3.26	3172	3000	96.74	96.67	96.28	96.52	96.45	96.38	96.40	96.40
8	335.2	3.22	3219	3000	98.49	98.15	98.26	97.95	97.83	97.91	98.06	97.97
9	305.4	3.25	3203	3000	97.65	97.01	96.82	97.00	96.66	96.78	97.00	96.94
10	298.9	3.24	3295	3000	97.65	97.44	97.17	97.08	97.05	96.99	96.93	97.01
11	334.1	3.24	3315	3000	97.19	97.45	97.50	97.30	97.87	97.37	97.27	97.41
12	331.5	3.26	3226	3000	97.17	97.20	97.12	97.01	97.10	97.07	97.37	97.34
13	326.6	3.23	3171	3000	96.28	96.10	96.32	96.96	96.43	96.21	96.40	96.23
14	316.5	3.27	3189	3000	98.07	97.70	98.11	97.77	97.84	97.72	97.79	97.84
15	297.9	3.23	3180	3000	96.50	96.89	96.63	96.23	96.90	96.46	96.43	96.29
16	324.7	3.28	3212	3000	98.54	98.11	98.52	98.19	98.01	98.14	98.17	98.07
17	335.9	3.28	3277	3000	98.56	98.34	97.56	97.94	98.06	97.89	98.27	97.65
18	327.7	3.26	3254	3000	98.17	97.95	97.32	97.82	97.85	97.63	97.81	98.06
19	333.6	3.22	3301	3000	98.10	97.78	97.21	97.68	97.77	97.54	97.69	98.19
20	289.3	3.27	3159	3000	97.46	97.54	97.34	97.41	97.87	97.42	96.98	96.95
n	20	20	20	20	20	20	20	20	20	20	20	20
Mean	<b>317.8</b>	<b>3.26</b>			<b>97.56</b>	<b>97.37</b>	<b>97.28</b>	<b>97.31</b>	<b>97.31</b>	<b>97.18</b>	<b>97.27</b>	<b>97.27</b>
Median	325.6	3.26			97.65	97.49	97.30	97.41	97.59	97.39	97.32	97.38
σ	16.5	0.04			0.78	0.68	0.72	0.62	0.66	0.66	0.64	0.68
Min.	289.3	3.22			96.10	96.07	95.99	96.23	95.93	95.88	96.32	96.23
Max.	335.9	3.36			98.56	98.34	98.52	98.19	98.06	98.14	98.27	98.19

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')							
	CCx	CCy	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080
1	0.4234	0.4038	3246	3000	0.0008	0.0007	0.0010	0.0011	0.0010	0.0011	0.0011	0.0011
2	0.4243	0.4060	3247	3000	0.0008	0.0010	0.0011	0.0011	0.0012	0.0011	0.0010	0.0009
3	0.4198	0.4032	3309	3000	0.0017	0.0018	0.0019	0.0019	0.0021	0.0019	0.0020	0.0019
4	0.4189	0.4020	3318	3000	0.0009	0.0010	0.0010	0.0010	0.0013	0.0011	0.0010	0.0011
5	0.4252	0.4056	3227	3000	0.0015	0.0016	0.0018	0.0016	0.0017	0.0017	0.0018	0.0018
6	0.4305	0.4083	3152	3000	0.0014	0.0015	0.0015	0.0015	0.0017	0.0016	0.0016	0.0019
7	0.4280	0.4053	3172	3000	0.0007	0.0008	0.0008	0.0008	0.0010	0.0012	0.0012	0.0012
8	0.4249	0.4040	3219	3000	0.0014	0.0016	0.0016	0.0015	0.0017	0.0017	0.0017	0.0019
9	0.4264	0.4054	3203	3000	0.0018	0.0019	0.0017	0.0018	0.0021	0.0020	0.0017	0.0020
10	0.4208	0.4039	3295	3000	0.0017	0.0016	0.0018	0.0016	0.0018	0.0016	0.0016	0.0020
11	0.4204	0.4052	3315	3000	0.0016	0.0016	0.0017	0.0015	0.0017	0.0016	0.0018	0.0019
12	0.4242	0.4031	3226	3000	0.0016	0.0018	0.0019	0.0019	0.0020	0.0020	0.0021	0.0022
13	0.4288	0.4068	3171	3000	0.0012	0.0014	0.0014	0.0014	0.0013	0.0012	0.0011	0.0011
14	0.4269	0.4049	3189	3000	0.0012	0.0013	0.0013	0.0013	0.0013	0.0010	0.0012	0.0014
15	0.4294	0.4095	3180	3000	0.0009	0.0010	0.0011	0.0011	0.0012	0.0012	0.0011	0.0014
16	0.4251	0.4034	3212	3000	0.0015	0.0016	0.0017	0.0017	0.0019	0.0019	0.0019	0.0021
17	0.4207	0.4014	3277	3000	0.0017	0.0017	0.0018	0.0019	0.0019	0.0020	0.0020	0.0021
18	0.4228	0.4035	3254	3000	0.0015	0.0016	0.0017	0.0018	0.0019	0.0019	0.0016	0.0017
19	0.4196	0.4016	3301	3000	0.0015	0.0017	0.0018	0.0020	0.0020	0.0020	0.0020	0.0020
20	0.4308	0.4099	3159	3000	0.0014	0.0016	0.0016	0.0016	0.0018	0.0018	0.0017	0.0016
n	20	20	20	20	20	20	20	20	20	20	20	20
Mean					<b>0.0013</b>	<b>0.0014</b>	<b>0.0015</b>	<b>0.0015</b>	<b>0.0016</b>	<b>0.0016</b>	<b>0.0016</b>	<b>0.0017</b>
Median					0.0015	0.0016	0.0017	0.0016	0.0017	0.0017	0.0016	0.0018
σ					0.0004	0.0004	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004
Min.					0.0007	0.0007	0.0008	0.0008	0.0010	0.0010	0.0010	0.0009
Max.					0.0018	0.0019	0.0019	0.0020	0.0021	0.0020	0.0021	0.0022

**DATA SET 5: 55°C; 1250 mA**

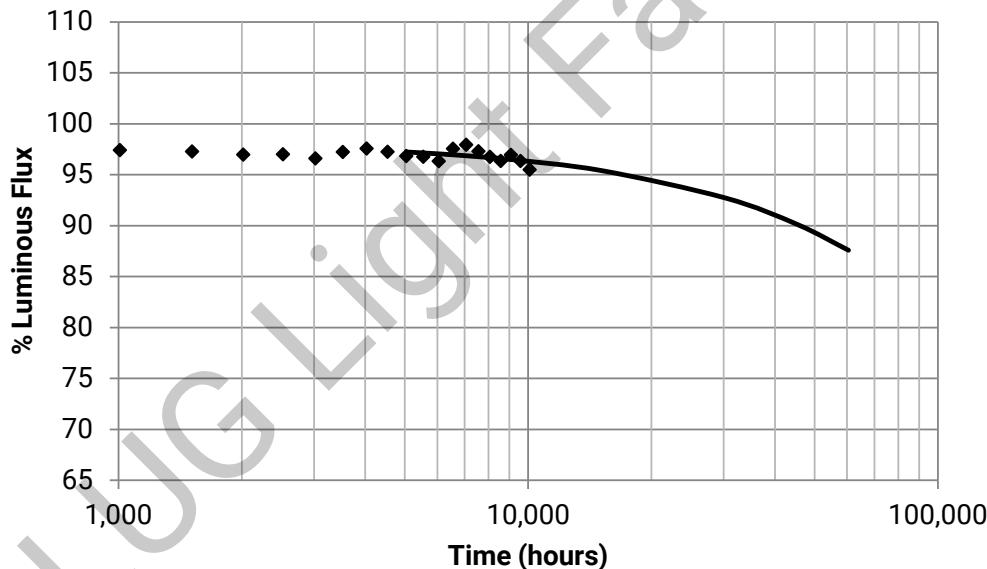
LED Package Series	XLamp XT-E White LEDs (Series: XTEAWT) This LM-80 report is applicable to the following order codes: XTEAWT-xx-xxxx-xxxxxxxxxx
Tested Model Number	XTEAWT-00-0000-00000LBE7
Drive Current [I <sub>F</sub> ]	1250 mA
Testing Initiation Date	January 8, 2012
Case Temperature [T <sub>S</sub> ]	55°C
Ambient Temperature [T <sub>A</sub> ]	55°C
Failures observed	None

**Projection Generated By Cree’s Internal TM-21 Calculator:**

Test duration	10,080 hours
Test duration used for projection	t=5,040 to t=10,080
$\alpha$	1.885E-06
$\beta$	9.817E-01
Reported Lifetimes	<b>L90(10k) = 46,100 hours</b>
	<b>L80(10k) &gt; 60,500 hours</b>
	<b>L70(10k) &gt; 60,500 hours</b>

**LM-80 Data For The Official TM-21 Calculator\***

Time (hours)	Lumen Maintenance
0	100.00%
1008	97.42%
1512	97.28%
2016	96.97%
2520	97.01%
3024	96.60%
3528	97.23%
4032	97.57%
4536	97.25%
5040	96.83%
5544	96.76%
6048	96.33%
6552	97.55%
7056	97.94%
7560	97.30%
8064	96.75%
8568	96.35%
9072	96.95%
9576	96.35%
10080	95.50%



\* <http://www.energystar.gov/TM-21calculator>

Note: The data point t=168 hr is intentionally excluded from this table, since the ENERGY STAR tool has a 20 data point input limit. Per TM-21 methodology, the data point t=168 hr would be excluded, so the projection is unaffected.



## DATA SET 5: 55°C; 1250 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)							
	LF (lm)	V <sub>F</sub> (V)	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080
1	266.7	3.60	2981	3000	97.60	97.88	97.29	96.13	95.29	96.95	96.62	95.38
2	283.7	3.66	3042	3000	99.18	99.34	98.67	98.37	97.92	98.00	97.34	97.14
3	262.7	3.57	2979	3000	95.16	95.17	94.75	93.80	93.93	94.65	94.35	93.30
4	281.7	3.59	3035	3000	98.94	99.27	98.83	98.37	98.00	98.29	97.99	97.27
5	265.5	3.60	3036	3000	94.77	95.36	94.63	94.00	94.32	94.48	94.38	93.27
6	287.5	3.66	3070	3000	98.91	99.26	98.83	98.19	97.74	97.95	97.61	97.15
7	283.8	3.63	3014	3000	98.35	98.57	98.06	97.48	97.30	97.18	96.65	96.31
8	275.6	3.63	2997	3000	95.88	96.45	95.91	95.61	95.07	95.49	95.08	94.40
9	262.5	3.55	2911	3000	97.54	97.21	96.68	95.55	95.12	95.73	94.75	93.68
10	282.5	3.68	3016	3000	98.68	98.46	97.89	98.04	97.34	97.80	96.83	95.96
11	267.4	3.63	3082	3000	94.90	95.00	94.39	93.70	93.75	94.38	93.92	92.93
12	295.8	3.56	3004	3000	98.52	98.94	98.49	98.02	97.92	97.97	97.30	96.86
13	261.7	3.68	2991	3000	96.66	97.36	96.85	96.36	95.65	96.67	96.21	95.52
14	285.1	3.61	2971	3000	97.06	97.92	97.47	96.93	96.56	96.61	96.30	95.81
15	269.5	3.64	2995	3000	98.41	98.93	98.51	97.87	97.70	97.64	97.05	96.63
16	279.2	3.58	2990	3000	97.00	97.96	97.28	96.85	96.45	96.85	96.63	96.13
17	262.6	3.59	3220	3000	97.73	97.90	96.98	96.09	95.29	96.93	96.39	94.21
18	288.2	3.60	3156	3000	99.50	100.24	99.24	98.87	98.44	98.53	97.75	96.60
19	270.7	3.58	3021	3000	97.00	97.20	96.52	95.83	95.07	96.97	95.89	94.46
20	285.3	3.63	3047	3000	98.22	98.70	97.83	97.46	97.00	97.14	96.48	95.47
21	261.7	3.60	2943	3000	96.84	97.56	96.62	96.18	95.37	97.95	96.47	95.28
22	279.1	3.66	3013	3000	98.73	99.16	98.20	97.69	97.37	97.62	97.11	96.23
23	279.7	3.61	2955	3000	98.81	99.26	98.43	97.98	97.71	97.86	97.15	96.45
24	271.3	3.67	2977	3000	95.89	96.80	95.91	95.55	94.77	96.32	95.04	94.12
25	290.9	3.60	3117	3000	98.59	98.59	98.30	97.92	97.68	97.81	97.36	96.82
n	25	25	25	25	25	25	25	25	25	25	25	25
Mean	276.0	3.62			97.55	97.94	97.30	96.75	96.35	96.95	96.35	95.49
Median	279.1	3.61			97.73	97.96	97.47	96.93	96.56	97.14	96.62	95.81
σ	10.4	0.04			1.39	1.38	1.37	1.49	1.45	1.19	1.14	1.34
Min.	261.7	3.55			94.77	95.00	94.39	93.70	93.75	94.38	93.92	92.93
Max.	295.8	3.68			99.50	100.24	99.24	98.87	98.44	98.53	97.99	97.27

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')							
	CCx	CCy	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080
1	0.4382	0.4039	2981	3000	0.0006	0.0008	0.0007	0.0007	0.0006	0.0008	0.0006	0.0006
2	0.4322	0.3985	3042	3000	0.0008	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0007
3	0.4365	0.4000	2979	3000	0.0007	0.0010	0.0009	0.0009	0.0009	0.0011	0.0011	0.0010
4	0.4324	0.3982	3035	3000	0.0009	0.0011	0.0012	0.0012	0.0010	0.0011	0.0010	0.0009
5	0.4309	0.3951	3036	3000	0.0007	0.0010	0.0011	0.0010	0.0010	0.0011	0.0013	0.0011
6	0.4305	0.3983	3070	3000	0.0007	0.0008	0.0009	0.0007	0.0007	0.0007	0.0007	0.0006
7	0.4359	0.4030	3014	3000	0.0008	0.0008	0.0008	0.0007	0.0005	0.0004	0.0005	0.0004
8	0.4365	0.4021	2997	3000	0.0006	0.0008	0.0008	0.0008	0.0008	0.0009	0.0010	0.0009
9	0.4466	0.4122	2911	3000	0.0009	0.0010	0.0010	0.0012	0.0013	0.0011	0.0009	0.0009
10	0.4346	0.4007	3016	3000	0.0005	0.0006	0.0006	0.0005	0.0005	0.0007	0.0006	0.0007
11	0.4301	0.3989	3082	3000	0.0005	0.0005	0.0006	0.0006	0.0004	0.0005	0.0006	0.0005
12	0.4371	0.4043	3004	3000	0.0009	0.0012	0.0012	0.0011	0.0011	0.0012	0.0012	0.0010
13	0.4396	0.4079	2991	3000	0.0005	0.0006	0.0007	0.0006	0.0006	0.0008	0.0007	0.0006
14	0.4407	0.4078	2971	3000	0.0007	0.0008	0.0008	0.0008	0.0007	0.0008	0.0007	0.0007
15	0.4391	0.4074	2995	3000	0.0004	0.0005	0.0006	0.0005	0.0005	0.0005	0.0006	0.0004
16	0.4394	0.4072	2990	3000	0.0007	0.0009	0.0009	0.0009	0.0009	0.0010	0.0011	0.0010
17	0.4168	0.3849	3220	3000	0.0009	0.0010	0.0010	0.0010	0.0009	0.0013	0.0012	0.0011
18	0.4200	0.3852	3156	3000	0.0008	0.0010	0.0011	0.0011	0.0011	0.0013	0.0012	0.0012
19	0.4363	0.4048	3021	3000	0.0007	0.0008	0.0008	0.0007	0.0007	0.0008	0.0007	0.0006
20	0.4334	0.4018	3047	3000	0.0007	0.0007	0.0008	0.0009	0.0008	0.0009	0.0008	0.0007
21	0.4432	0.4093	2943	3000	0.0007	0.0008	0.0008	0.0008	0.0008	0.0007	0.0007	0.0006
22	0.4352	0.4015	3013	3000	0.0012	0.0012	0.0012	0.0013	0.0013	0.0014	0.0013	0.0013
23	0.4409	0.4062	2955	3000	0.0006	0.0007	0.0007	0.0007	0.0007	0.0007	0.0006	0.0006
24	0.4395	0.4060	2977	3000	0.0008	0.0008	0.0008	0.0009	0.0008	0.0009	0.0008	0.0007
25	0.4294	0.4017	3117	3000	0.0003	0.0003	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002
n	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0007	0.0008	0.0008	0.0008	0.0008	0.0009	0.0008	0.0008
Median					0.0007	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0007
σ					0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003
Min.					0.0003	0.0003	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002
Max.					0.0012	0.0012	0.0012	0.0013	0.0013	0.0014	0.0013	0.0013

**DATA SET 6: 85°C; 1250 mA**

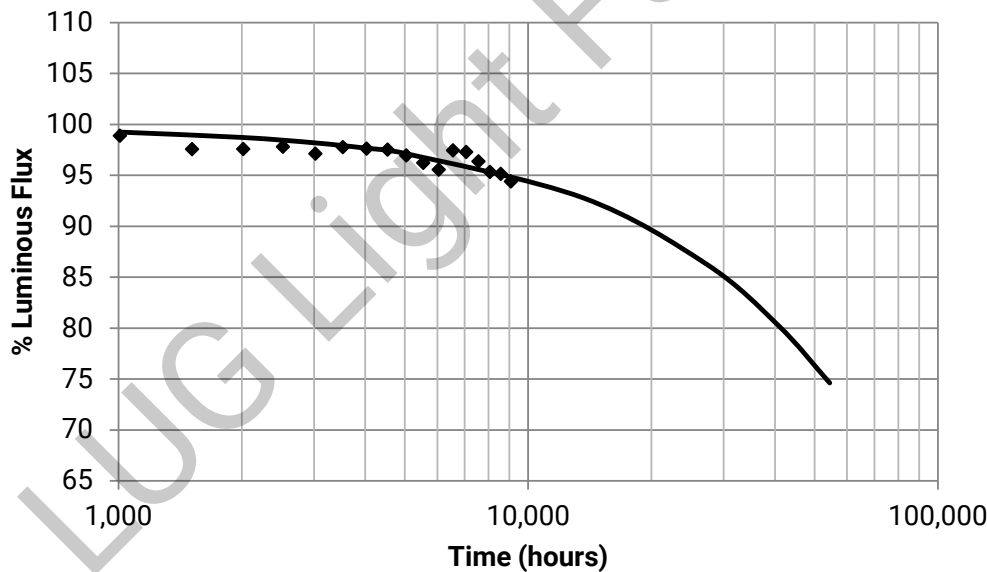
LED Package Series	XLamp XT-E White LEDs (Series: XTEAWT) This LM-80 report is applicable to the following order codes: XTEAWT-xx-xxxx-xxxxxxxxxx
Tested Model Number	XTEAWT-00-0000-00000LBE7
Drive Current [I <sub>F</sub> ]	1250 mA
Testing Initiation Date	January 7, 2012
Case Temperature [T <sub>S</sub> ]	85°C
Ambient Temperature [T <sub>A</sub> ]	85°C
Failures observed	None

**Projection Generated By Cree's Internal TM-21 Calculator:**

Test duration	9,072 hours
Test duration used for projection	t=4,032 to t=9,072
$\alpha$	5.337E-06
$\beta$	9.977E-01
Reported Lifetimes	<b>L90(9k) = 19,300 hours</b>
	<b>L80(9k) = 41,400 hours</b>
	<b>L70(9k) &gt; 54,400 hours</b>

**LM-80 Data For The Official TM-21 Calculator\***

Time (hours)	Lumen Maintenance
0	100.00%
168	98.72%
1008	98.89%
1512	97.57%
2016	97.58%
2520	97.81%
3024	97.12%
3528	97.77%
4032	97.62%
4536	97.52%
5040	96.95%
5544	96.22%
6048	95.56%
6552	97.45%
7056	97.29%
7560	96.37%
8064	95.34%
8568	95.14%
9072	94.40%



\* <http://www.energystar.gov/TM-21calculator>



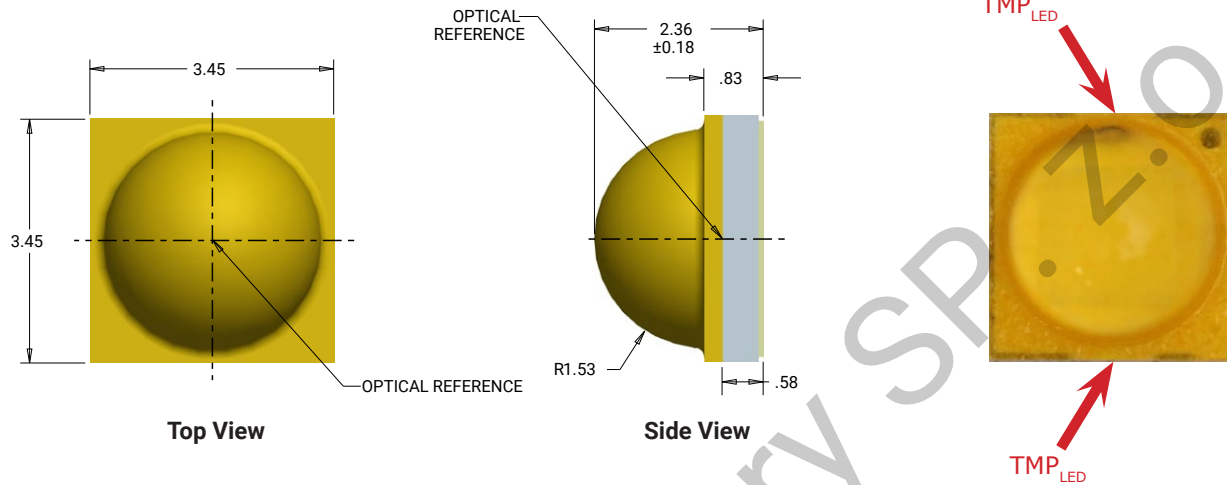
**DATA SET 6: 85°C; 1250 mA**

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)																	
	LF (lm)	V <sub>f</sub> (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048	6552	7056	7560	8064	8568	9072
1	261.9	3.54	3198	3000	98.97	98.59	96.65	97.18	98.89	96.84	97.64	98.00	97.85	97.06	96.21	95.35	97.20	97.12	96.97	95.06	94.70	94.74
2	284.7	3.61	3176	3000	98.82	98.93	98.05	97.91	97.73	97.42	98.56	97.99	98.16	97.75	97.06	96.30	98.75	97.94	97.80	97.22	97.12	96.43
3	269.8	3.51	3193	3000	99.28	99.18	97.59	98.22	98.44	97.44	97.97	98.33	98.12	97.41	96.02	95.82	97.96	98.06	97.33	95.66	95.53	95.66
4	289.7	3.63	3161	3000	99.36	99.81	98.43	98.38	98.30	98.03	99.13	98.76	98.68	98.16	97.54	96.53	98.66	97.68	96.87	95.69	94.95	93.89
5	287.1	3.55	3199	3000	99.18	98.76	97.65	97.47	97.39	96.90	98.07	97.62	97.74	97.12	96.59	95.81	98.17	97.44	96.64	95.69	95.40	94.13
6	271.6	3.58	3207	3000	100.60	99.89	98.15	98.71	98.66	97.90	97.62	97.89	97.63	97.05	96.13	95.22	97.47	97.06	96.48	95.78	95.69	96.02
7	288.6	3.60	3194	3000	98.88	98.58	97.71	97.63	97.27	97.10	98.17	97.66	97.73	97.39	96.58	96.23	98.28	98.10	97.64	97.27	96.42	96.40
8	273.6	3.55	3217	3000	98.15	97.44	97.02	96.14	97.06	96.53	95.90	96.40	96.09	95.31	94.73	93.96	95.80	97.49	95.86	94.24	93.80	93.33
9	287.2	3.70	3206	3000	99.00	98.87	98.02	98.11	97.86	97.43	98.73	98.16	98.18	97.80	96.93	96.48	98.71	98.30	97.15	96.49	95.47	95.22
10	284.0	3.60	3186	3000	99.73	99.07	97.98	97.58	97.66	97.48	98.36	98.06	98.13	97.80	97.03	96.19	98.59	98.65	97.92	97.52	96.34	96.20
11	269.9	3.60	3177	3000	97.63	97.80	96.99	96.76	97.30	96.14	96.25	96.48	96.24	95.51	94.61	93.67	94.62	95.76	93.09	91.93	90.61	91.67
12	257.2	3.54	2989	3000	98.28	99.01	97.08	97.44	98.42	97.26	97.12	97.94	97.57	96.95	96.48	95.59	96.36	97.03	96.05	93.67	95.20	93.77
13	271.7	3.58	2993	3000	98.89	99.11	97.73	97.50	97.62	97.47	98.39	97.66	98.00	97.68	96.99	96.58	98.35	97.88	97.66	97.19	96.86	96.14
14	280.8	3.55	3091	3000	97.74	98.59	97.14	97.24	97.20	97.22	98.30	97.69	97.83	97.38	96.77	96.34	97.92	97.46	97.06	96.22	95.29	94.03
15	254.7	3.55	2929	3000	99.13	99.30	97.85	98.14	98.93	97.38	97.77	98.11	97.73	97.12	96.46	95.61	97.05	97.14	96.34	95.09	96.75	95.41
16	269.8	3.60	2973	3000	98.71	99.38	97.84	97.65	97.68	97.67	98.78	98.06	98.16	97.76	97.03	96.43	98.08	97.86	96.80	95.54	94.43	93.26
17	273.8	3.56	3025	3000	98.70	99.72	98.26	98.10	97.93	98.00	98.80	98.21	98.48	97.78	97.33	96.75	98.54	98.42	97.53	96.93	96.19	94.93
18	259.2	3.59	3074	3000	98.64	99.61	97.33	97.72	98.27	96.89	97.28	97.30	97.10	96.49	95.71	95.13	97.07	96.82	96.15	95.27	96.77	95.65
19	289.0	3.62	3196	3000	98.46	98.46	97.26	97.20	96.83	96.36	96.76	96.16	96.19	95.83	95.14	94.82	97.01	96.48	95.93	95.80	95.30	94.78
20	265.9	3.58	3159	3000	97.30	98.21	96.75	96.78	97.32	96.11	96.83	97.20	96.81	95.97	95.15	94.25	95.91	95.78	94.44	92.30	93.11	92.15
21	288.9	3.65	3179	3000	97.72	97.54	97.18	97.24	96.97	96.46	96.84	96.39	96.14	95.60	94.88	94.36	96.24	96.65	93.87	92.59	91.24	90.18
22	264.5	3.62	2994	3000	98.71	99.15	97.33	97.36	97.89	96.83	97.18	97.45	97.04	96.23	95.50	94.70	96.70	96.55	95.63	94.26	96.17	94.82
23	276.1	3.63	3124	3000	98.57	98.46	97.34	97.22	97.17	96.69	97.85	97.37	97.33	96.85	96.18	95.65	97.69	97.33	96.49	96.01	95.15	94.07
24	281.8	3.64	2996	3000	99.07	99.03	98.06	97.70	97.88	97.52	98.58	98.16	98.16	97.61	97.02	96.44	98.54	98.20	97.44	96.93	96.18	95.11
25	264.4	3.69	2997	3000	98.50	99.64	97.87	98.20	98.46	96.95	97.30	97.42	97.00	96.19	95.49	94.69	96.57	95.96	94.29	93.03	93.91	92.04
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	274.6	3.59			98.72	98.89	97.57	97.58	97.80	97.12	97.77	97.62	97.52	96.95	96.22	95.56	97.45	97.29	96.37	95.34	95.14	94.40
Median	273.6	3.60			98.71	99.01	97.65	97.58	97.73	97.22	97.85	97.69	97.73	97.12	96.46	95.65	97.69	97.44	96.64	95.69	95.40	94.78
σ	11.0	0.05			0.70	0.66	0.49	0.57	0.61	0.55	0.85	0.67	0.76	0.83	0.86	0.90	1.10	0.87	1.28	1.62	1.62	1.61
Min.	254.7	3.51			97.30	97.44	96.65	96.14	96.83	96.11	95.90	96.16	96.09	95.31	94.61	93.67	94.62	95.65	93.09	91.93	90.61	90.18
Max.	289.7	3.70			100.60	99.89	98.43	98.71	98.93	98.03	99.13	98.76	98.68	98.16	97.54	96.75	98.75	98.65	97.92	97.52	97.12	96.43

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')																	
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048	6552	7056	7560	8064	8568	9072
1	0.4181	0.3856	3198	3000	0.0006	0.0011	0.0010	0.0012	0.0016	0.0013	0.0013	0.0017	0.0016	0.0016	0.0016	0.0017	0.0017	0.0016	0.0019	0.0019	0.0024	0.0028
2	0.4199	0.3871	3176	3000	0.0005	0.0009	0.0009	0.0010	0.0012	0.0013	0.0012	0.0013	0.0013	0.0014	0.0014	0.0015	0.0017	0.0016	0.0019	0.0020	0.0022	0.0026
3	0.4182	0.3851	3193	3000	0.0006	0.0009	0.0008	0.0009	0.0011	0.0010	0.0009	0.0011	0.0010	0.0010	0.0010	0.0011	0.0012	0.0013	0.0014	0.0012	0.0014	0.0019
4	0.4206	0.3869	3161	3000	0.0004	0.0009	0.0008	0.0010	0.0011	0.0012	0.0011	0.0012	0.0012	0.0013	0.0014	0.0015	0.0017	0.0016	0.0021	0.0023	0.0025	0.0024
5	0.4188	0.3872	3199	3000	0.0005	0.0010	0.0009	0.0011	0.0011	0.0013	0.0012	0.0013	0.0014	0.0014	0.0016	0.0016	0.0019	0.0020	0.0026	0.0027	0.0032	0.0036
6	0.4197	0.3903	3207	3000	0.0007	0.0009	0.0009	0.0011	0.0012	0.0011	0.0010	0.0012	0.0010	0.0012	0.0011	0.0012	0.0014	0.0012	0.0014	0.0014	0.0017	0.0021
7	0.4180	0.3849	3194	3000	0.0003	0.0007	0.0007	0.0008	0.0009	0.0010	0.0009	0.0010	0.0010	0.0011	0.0011	0.0012	0.0013	0.0015	0.0019	0.0021	0.0023	0.0027
8	0.4191	0.3901	3217	3000	0.0003	0.0007	0.0005	0.0006	0.0008	0.0007	0.0006	0.0008	0.0008	0.0008	0.0009	0.0010	0.0010	0.0016	0.0017	0.0018	0.0021	0.0021
9	0.4172	0.3844	3206	3000	0.0002	0.0008	0.0007	0.0009	0.0009	0.0011	0.0010	0.0011	0.0012	0.0012	0.0014	0.0016	0.0019	0.0023	0.0028	0.0029	0.0032	0.0031
10	0.4179	0.3836	3186	3000	0.0004	0.0008	0.0007	0.0009	0.0008	0.0008	0.0009	0.0009	0.0009	0.0009	0.0009	0.0011	0.0013	0.0014	0.0019	0.0020	0.0024	0.0029
11	0.4222	0.3926	3177	3000	0.0004	0.0007	0.0005	0.0005	0.0007	0.0006	0.0005	0.0007	0.0007	0.0008	0.0008	0.0011	0.0014	0.0019	0.0022	0.0024	0.0024	0.0026
12	0.4372	0.4026	2989	3000	0.0004	0.0006	0.0005	0.0005	0.0007	0.0007	0.0007	0.0006	0.0007	0.0006	0.0007	0.0007	0.0007	0.0011	0.0011	0.0007	0.0005	0.0008
13	0.4374	0.4036	2993	3000	0.0003	0.0005	0.0006	0.0005	0.0006	0.0007	0.0007	0.0007	0.0008	0.0008	0.0007	0.0008	0.0008	0.0007	0.0008	0.0008	0.0009	0.0008
14	0.4282	0.3957	3091	3000	0.0007	0.0004	0.0004	0.0005	0.0006	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0008	0.0008	0.0009	0.0011	0.0008	0.0007
15	0.4412	0.4037	2929	3000	0.0004	0.0006	0.0005	0.0006	0.0007	0.0008	0.0007	0.0009	0.0010	0.0010	0.0010	0.0010	0.0009	0.0010	0.0009	0.0010	0.0010	0.0010
16	0.4371	0.4006	2973	3000	0.0004	0.0006	0.0005	0.0007	0.0008	0.0008	0.0008	0.0009	0.0010	0.0010	0.0010	0.0009	0.0009	0.0010	0.0010	0.0013	0.0022	0.0028
17	0.4328	0.3979	3025	3000	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0009	0.0011	0.0011	0.0010	0.0010	0.0010	0.0009	0.0008	0.0008	0.0008	0.0011	0.0014
18	0.4268	0.3908	3074	3000	0.0003	0.0004	0.0005	0.0006	0.0007	0.0007	0.0008	0.0008	0.0009	0.0009	0.0011	0.0010	0.0010	0.0009	0.0009	0.0009	0.0008	0.0009
19	0.4186	0.3864	3196	3000	0.0003	0.0010	0.0011	0.0013	0.0014	0.0015	0.00											

**MECHANICAL DIMENSIONS & TEMPERATURE MEASUREMENT POINT**

All measurements are  $\pm .13$  mm unless otherwise indicated.



The LED temperature measurement point ( $TMP_{LED}$ ) should be measured on the PCB surface, as close to the LED's thermal pad as possible (shown in the picture above). It is not required to use a solder footprint for the thermal pad that is larger than the LED itself. In testing, Cree has found such a solder pad to have insignificant impact on the resulting temperature measurement. Either one of the two shown  $TMP_{LED}$  locations may be used and are equivalent to each other.



Management Service

# CERTIFICATE

The Certification Body  
of TÜV SÜD Management Service GmbH

certifies that



**LUG LIGHT FACTORY Sp. z o.o.**  
ul. Gorzowska 11  
65-127 Zielona Góra  
Poland

including the sites and scope of application  
see enclosure

has established and applies  
a Quality Management System.

An audit was performed, Report No. **73423157**.  
Proof has been furnished that the requirements  
according to

**ISO 9001:2015**

are fulfilled.

The certificate is valid from **2018-04-03** until **2021-03-06**.

Previous certificate valid until 2018-03-06.

Certificate Registration No.: **12 100 23152 TMS**.

Product Compliance Management  
Munich, 2018-04-05



Page 1 of 2



Management Service

## Enclosure of Certificate Registration No.: 12 100 23152 TMS

Sites	Scope of application
<b>LUG LIGHT FACTORY Sp. z o.o.</b> ul. Gorzowska 11 65-127 Zielona Góra Poland	Designing, production and sales of lighting systems.
<b>Lug Light Factory Sp. z o.o.</b> ul. Nowa 7 66-002 Nowy Kisielin Poland	Designing and production of lighting systems.

Product Compliance Management  
Munich, 2018-04-05

Page 2 of 2



Management Service

# CERTIFICATE

The Certification Body  
of TÜV SÜD Management Service GmbH

certifies that



**LUG LIGHT FACTORY Sp. z o.o.**

ul. Gorzowska 11  
65-127 Zielona Góra  
Poland

including the sites and scope of application  
see enclosure

has established and applies  
an Environmental Management System.

An audit was performed, Report No. **73423157**.

Proof has been furnished that the requirements  
according to

**ISO 14001:2015**

are fulfilled.

The certificate is valid from **2018-04-03** until **2021-04-02**.

Certificate Registration No.: **12 104 23152 TMS**.



Product Compliance Management  
Munich, 2018-04-05





Management Service

## Enclosure of Certificate Registration No.: 12 104 23152 TMS

Sites	Scope of application
<b>LUG LIGHT FACTORY Sp. z o.o.</b> ul. Gorzowska 11 65-127 Zielona Góra Poland	Designing, production and sales of lighting systems.
<b>Lug Light Factory Sp. z o.o.</b> ul. Nowa 7 66-002 Nowy Kisielin Poland	Designing and production of lighting systems.

Product Compliance Management  
Munich, 2018-04-05

Page 2 of 2



# CERTIFICATE

The Certification Body  
of TÜV SÜD Management Service GmbH

certifies that



**LUG LIGHT FACTORY Sp. z o.o.**

**ul. Gorzowska 11  
65-127 Zielona Góra  
Poland**

Scope of application

**Designing, production and sales of  
lighting systems**

**ul. Nowa 7  
66-002 Nowy Kisielin  
Poland**

Scope of application

**Designing and production of  
lighting systems**

has established and applies  
an Energy Management System.

An audit was performed, Report No. **73424335**.

Proof has been furnished that the requirements according to

**ISO 50001:2011**

are fulfilled.

The certificate is valid from **2018-04-18** until **2021-04-17**.

Certificate Registration No.: **12 340 23152 TMS**.

Product Compliance Management  
Munich, 2018-04-18



Deutsche  
Akkreditierungsstelle  
D-ZM-14143-01-00



LUG Light Factory Spółka z o.o.  
Producent Opraw Oświetleniowych



## ОБЩИЕ УСЛОВИЯ ГАРАНТИИ НА ОСВЕТИТЕЛЬНУЮ ПРОДУКЦИЮ КОМПАНИИ LUG LIGHT FACTORY SP. Z O. O.

### 1. Общие условия гарантии

- 1.1. Компания LUG Light Factory Sp. z o. o., зарегистрированная по адресу: ул. Гожовска, 11, 65-127 Зелена-Гура, KRS 0000290498 (далее – «Гарант»), настоящим предоставляет гарантию на осветительную продукцию в соответствии с положениями, определенными в настоящем документе.
- 1.2. Гарант заявляет, что вышеназванные продукты не имеют производственных дефектов и дефектов материала и в случае использования по назначению будут действовать надлежащим образом в период не короче срока действия гарантийной защиты, с оговоркой случаев, описанных в настоящем документе.
- 1.3. Гарант дает гарантию на продаваемую продукцию на срок:
  - 5 лет на всю продукцию бренда LUG, содержащие светодиодный источник света;
  - 5 лет на всю продукцию бренда FLASH&DQ;
  - 3 года на продукцию бренда LUGBOX;
  - 2 года на традиционные светильники (не содержащие светодиодного источника света);
  - 1 год на светильники в аварийном исполнении.
- 1.4. Гарантия действует только при выполнении следующих условий:
  - 1.4.1. Гарантия распространяется только на производственные дефекты и дефекты, возникшие по причинам, связанным с товаром, т. е. дефекты, возникшие в результате производственных дефектов или скрытых дефектов материалов;
  - 1.4.2. Светильники используются, устанавливаются и хранятся согласно информации, содержащейся в каталожной карте и монтажной инструкции;
  - 1.4.3. Если в каталожной карте не указано иначе, светильники LUG Light Factory Sp. z o. o. предназначены для стандартных условий работы;
  - 1.4.4. Стандартные условия – это температура окружающей среды от -10°C до +25°C, влажность: <85%, давление: 690-1060 гПа;
  - 1.4.5. Светильники не следует применять в среде с условиями, создающими опасность для конструкции, лакового покрытия и электрооснастки светильника. К таким условиям относятся высокая влажность, температура, запыление, присутствие в воздухе неинертных химических веществ, УФ-излучение, а также тряска и вибрации;





- 1.4.6. Каталогная карта содержит детальное описание продукции с общими указаниями по применению, которые относятся к стандартным условиям работы;
  - 1.4.7. Если продукт предназначен для использования в среде, требующей особых технических характеристик, описание этих характеристик приводится в каталожной карте. При отсутствии отдельно указанных особых технических характеристик требуется согласование использования светильников с Отделом технической подготовки продукции компании LUG Light Factory Sp. z o.o.;
  - 1.4.8. Если условия, в которых должны применяться светильники, отличаются от условий, для которых эти светильники предназначены, Покупатель перед покупкой сообщил Гаранту об условиях, преобладающих в месте монтажа светильников, а Гарант подтвердил возможность их применения в такой среде;
  - 1.4.9. Эксплуатация продуктов осуществляется в соответствии с их назначением и представленной спецификацией продуктов (в инструкции по монтажу, каталожной карте и на этикетке); кроме того, проводятся сервисные осмотры на основе консультаций с Отделом технической подготовки продукции компании LUG Light Factory Sp. z o.o., если такое требование предусматривается в сопроводительной документации к продуктам;
  - 1.4.10. Установка продукции проводится профессионально, уполномоченным персоналом, согласно условиям, приведенным в монтажной инструкции, приложенной к продуктам, и каталожной карте, а также принятой практике и техническим знаниям;
  - 1.4.11. Модификацию функций продукции или обновления программного обеспечения проводит исключительно производитель светильников или назначенное ним третье лицо;
  - 1.4.12. Все ремонты или техход за продуктами производился согласно профессиональным знаниям и рекомендациям производителя;
  - 1.4.13. Продукция не подвергалась механическим и/или химическим нагрузкам, не соответствующим ее назначению и создающим опасность для конструкции светильника, лакового покрытия или электронных компонентов, находящихся внутри светильника;
  - 1.4.14. Температура окружающей среды и напряжение в сети питания не превышали номинальных величин, указанных для данной продукции в спецификации или технических стандартах.
- 1.5. Нарушение вышеперечисленных и других приведенных в настоящем документе положений ведет к утрате прав по гарантии.



## 2. Объем гарантии

- 2.1. Гарантия действует с даты покупки продукта Покупателем, указанной в счете-фактуре НДС, которая подтверждает факт покупки товара.
- 2.2. Исключаются права Покупателя по ответственности за дефекты, о которой говорится в гражданском кодексе. Это положение также относится к программному обеспечению.
- 2.3. Настоящая Гарантия распространяется исключительно на дефекты продукции, возникшие по причине ошибок в конструкции, материале или производстве, а также превышения среднего номинального показателя аварийности, который для электронных компонентов (блоки питания, контроллеры, стабилизаторы, светодиодные модули) составляет 0,2% повреждений на 1000 ч работы, если технические карты / брошюры о продукции предусматривают иное.
- 2.4. Гарантия не распространяется на:
  - 2.4.1. Любые сменные элементы, такие как традиционные источники света, стартеры, конденсаторы, аккумуляторы, батареи и другие элементы, подверженные нормальному износу в ходе эксплуатации;
  - 2.4.2. Компоненты, поставленные внешними субъектами, такие как жесткие диски, компьютеры, серверы и т. д. На такое оборудование производитель может дать свою гарантию, что требует подтверждения у этого производителя оборудования;
  - 2.4.3. Естественный износ используемых материалов, например, обесцвечивание или утрата эластичности деталей из пластмассы (например, пожелтение поликарбонатных колпаков), утрата блеска лаковых покрытий в результате действия атмосферных факторов, процесса старения и т. д.;
  - 2.4.4. Дефекты, возникшие из-за поврежденного программного обеспечения, вирусов, услуг, связанных с обновлением программного обеспечения или перезапуском, ошибочных настроек компонентов в результате износа, загрязнения, действия третьих лиц (в частности, монтажников, использующих продукты, на которые распространяется гарантия) и т. д.;
  - 2.4.5. Дефекты, возникающие из-за воздействия химических, тепловых, механических, световых и иных факторов, воздействие которых на продукцию противоречит инструкциям по обслуживанию и техническим знаниям;
  - 2.4.6. Дополнительные затраты, связанные с принятием гарантии и устранением дефектов, состоящие из стоимости монтажа и демонтажа дефектного продукта, стоимости транспортировки этого продукта производителю и отправления нового или отремонтированного продукта, а также иные аналогичные затраты. Эти затраты оплачивает Покупатель;
  - 2.4.7. Продукты со снятыми, закрытыми или нечитабельными серийными номерами, номерами артикулов, названием светильника, знаками,



указывающими на их производителя, или иной маркировкой, дающей возможность их идентификации.

- 2.5. Уменьшение светового потока в течение срока службы продукции до 0,6%/1000 ч и изменение цвета модулей светодиодов – это нормальное явление, на которое гарантия не распространяется.
- 2.6. Общее время свечения светильников в течение года не может превышать 4300 ч.
- 2.7. Параметры новых светодиодных светильников (модулей) имеют допуск +/-10% для светового потока, мощности и цветовой температуры.

### 3. Требования по гарантии

- 3.1. Заявление вносится при помощи рекламационного заявления, образец которого доступен на веб-сайте LUG Light Factory Sp. z o. o. по адресу: <http://www.lug.com.pl/download/dokumenty>
- 3.2. Клиент, вносящий рекламацию, обязан заполнить рекламационное заявление и немедленно отправить его Гаранту.
- 3.3. Гарантийные заявления предъявляются Гаранту под страхом потери вытекающих из гарантии прав в письменной форме факсом или по электронной почте по адресу: [service@lug.com.pl](mailto:service@lug.com.pl) вместе с приложенным доказательством покупки продукта (счет-фактура НДС, счет и или копия договора продажи) и подробным и задокументированным описанием возникшего дефекта. После получения правильно заполненного заявления Покупателю будет отправлено сообщение о получении заявления вместе с присвоенным номером рекламации.
- 3.4. Гарант рассматривает заявление в течение 14 дней с даты поставки ему дефектного товара и документов, перечисленных в пункте 3.3, с возможностью продления этого срока при необходимости проведения детальных технических исследований, о чем Гарант немедленно сообщит Покупателю.
- 3.5. Покупатель высылает дефектный товар, о котором говорится в п. 3.4 настоящих Общих условий гарантии, с отдельным указанием на посылке полученного от Гаранта номера рекламации, в случае отсутствия которого посылка может не приниматься Гарантом на склад.
- 3.6. О рассмотрении заявления Гарант сообщит заявителю в письменной форме, по телефону, факсу или электронной почте.
- 3.7. Ответственность Гаранта ограничивается стоимостью продукта на дату его покупки.
- 3.8. В случае принятия гарантийного требования Гарант в каждом случае принимает решение о ремонте дефектного продукта, его замене на продукт без дефектов, снижении его цены или замене на продукт с аналогичным назначением и схожими техническими параметрами, когда продукт, по которому была заявлена рекламация, уже не продается.



- 3.9. Гарант, ремонтируя дефектный продукт, допускает замену компонентов на бывшие в употреблении или восстановленные компоненты, которые с точки зрения продуктивности, функциональности и надежности эквивалентны новым компонентам, не имеют дефектов и брака материала.
- 3.10. По мере осуществления гарантийного процесса ремонт продукта или его замена на продукт без дефектов проводятся бесплатно.
- 3.11. Если в результате принятия гарантийного заявления в дефектном продукте меняются какие-либо элементы, гарантийный срок не начинается отсчитываться с начала.
- 3.12. В случае признания рекламации Гарант примет меры, необходимые для реализации гарантийного обязательства, не позднее 21 дня с даты информирования Покупателя о способе реализации рекламации, если не возникнет не зависящих от Гаранта обстоятельств, которые могут увеличить этот срок (ими могут быть, например, необходимость выполнения дополнительных лабораторных испытаний, заказ нестандартных компонентов, которые будут использованы в ремонтируемом светильнике и должны быть получены от поставщиков, и т. д.).
- 3.13. В случае если продукт не будет забран после уведомления Гаранта, на Покупателя возлагается стоимость хранения продукта (и, возможно, стоимость его отправки).
- 3.14. Срок хранения продукта Гарантом составляет не более 6 месяцев. После этого продукт будет выслан Покупателю за его счет.
- 3.15. Все затраты, связанные с рассмотрением Гарантом необоснованного гарантийного заявления, несет Покупатель.

#### 4. Другие положения

- 4.1. Если Покупатель или назначенные им третьи лица вмешиваются в конструкцию светильника, ремонтируют его, меняют что-либо или устраняют дефекты в продуктах без письменного согласия Гаранта, все претензии по настоящей гарантии становятся недействительными в момент выполнения вышеперечисленных действий.
- 4.2. Гарантия также аннулируется при использовании продукции не по назначению.
- 4.3. В случае получения от Покупателя рекламационного заявления Гарант оставляет за собой право на проверку дефектов продуктов на месте их использования. Отсутствие согласия Покупателя на проведение такой проверки Гарантом или назначенным им представителем рассматривается как отзыв рекламационного заявления.
- 4.4. Гарант допускает возможность выполнения платных сервисных ремонтов продукции, в том числе послегарантийных, условия которых будут в каждом случае подлежать согласованию между Покупателем и Гарантом.
- 4.5. Компания LUG Light Factory Sp. z o. o. в рамках, установленных действующим законодательством, не несет ответственности за какие-либо потери, ущерб,



LUG Light Factory Spółka z o.o.  
Producent Opraw Oświetleniowych



возросшие расходы или издержки, потерю возможности пользоваться продуктом, его функциями, повреждение продукта, а также какую-либо утраченную выгоду, экономию, контракты, поступления, потери или дополнительные затраты, которые не возникли непосредственно по вине LUG Light Factory Sp. z o. o.

- 4.6. Настоящая гарантия регулируется законодательством Польши.
- 4.7. Настоящие Общие условия гарантии действуют с 1 декабря 2017 г. и относятся ко всем заказам, оформленным после этой даты.
- 4.8. Условия гарантия доступны на веб-сайте производителя: [www.lug.com.pl](http://www.lug.com.pl).

**LUG**<sup>®</sup>LUG Light Factory Ltd.  
Producer of Professional Lighting Fittings

# PHOTOMETRIC TEST REPORT

Test Report according to LM-79 / EN13032

## 1. Device Under Test specification:

<b>TEST REPORT NO. :</b>	029/2016
<b>TEST PROTOCOL NO. :</b>	4040, 1586
<b>PLACE/DATE:</b>	ZIELONA GÓRA, 20.07.2016
<b>TESTED AND COMPILED BY:</b>	ROBERT TRACZ
<b>APPROVED BY:</b>	MARIUSZ EJSMONT
<b>DEVICE UNDER TEST:</b>	LIGHT FITTING
<b>LUMINAIRE NAME:</b>	LUGCLASSIC LB LED
<b>ARTICLE NO:</b>	903061.00274
<b>MANUFACTURER:</b>	LUG LIGHT FACTORY
<b>VERSION INFO:</b>	PMMA DIFFUSER
<b>LED MODULE:</b>	ML 1501801.W840.01A tc=75°C max, CE
<b>LAMP IDENTIFICATION :</b>	LED 4000K
<b>LED DRIVER:</b>	PHILIPS CERTA DRIVE 40W, tc=75°C max, CE, ENEC
<b>INPUT VOLTAGE/FREQUENCY:</b>	230V/50Hz
<b>LUMINAIRE DIMENSIONS :</b>	L: 0.595/W : 0.595 m / H : 0.060 m
<b>LIGHT OUTPUT DIMENSIONS :</b>	L : 0.575 m / W : 0.575 m

## 2. Goniophotometry Test Results:

<b>LUMINOUS FLUX :</b>	4653lm
<b>ACTIVE POWER :</b>	42,3W
<b>EFFICIENCY :</b>	110lm/W
<b>RMS SUPPLY CURRENT</b>	0,191A
<b>POWER FACTOR:</b>	0,962
<b>RMS SUPPLY VOLTAGE :</b>	230,0V
<b>FREQUENCY :</b>	50,0Hz
<b>CURRENT THD (IEC) :</b>	10 %
<b>NORMALIZED PERFORMANCE :</b>	UTE C 71-121 : 1.00 D
<b>LIGHT DISTRIBUTION ANGLE:</b>	112°
<b>ACCURACY :</b>	± 5 %
<b>AMBIENT TEMPERATURE :</b>	25 °C ± 1 °C

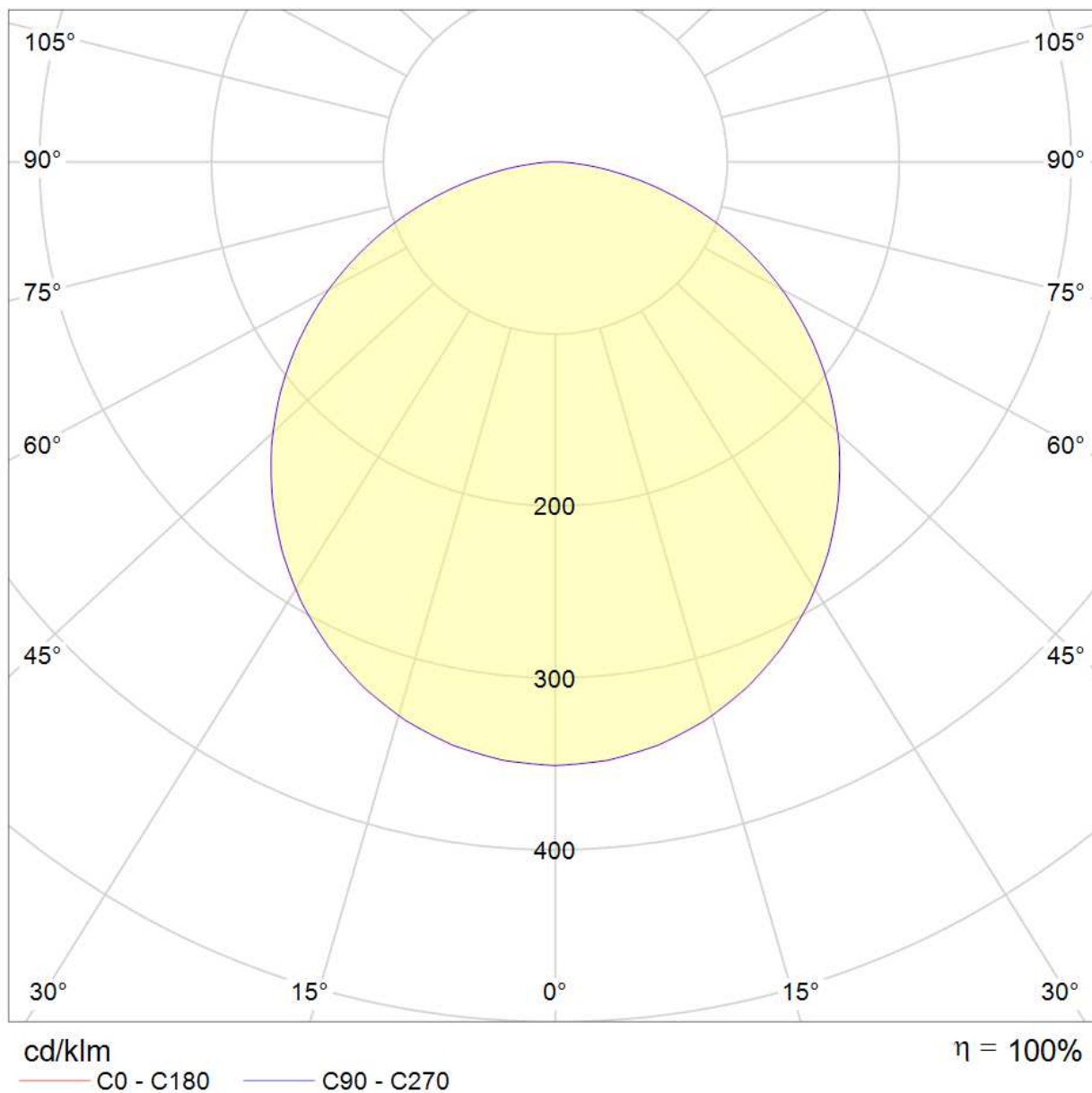


**LUG**<sup>®</sup>

LUG Light Factory Ltd.  
Producer of Professional Lighting Fittings



### 3. LIGHT DISTRIBUTION (POLAR) CURVE :



**LUG**<sup>®</sup>LUG Light Factory Ltd.  
Producer of Professional Lighting Fittings**4. LUMINOUS INTENSITY DISTRIBUTION in cd/1000lm :**

	C0°	C15°	C30°	C45°	C60°	C75°	C90°
0°	351	351	351	351	351	351	351
5°	349.3	349.4	349.4	349.3	349.4	349.3	349.2
10°	344.3	344.6	344.5	344.3	344.5	344.6	344.4
15°	336.4	336.5	336.5	336.5	336.6	336.6	336.2
20°	325.5	325.7	325.6	325.7	325.6	325.8	325.2
25°	311.7	312	311.9	311.9	311.9	312.2	311.6
30°	295.6	295.9	295.7	295.7	295.6	295.7	295.4
35°	277	277.2	277.1	277.2	277.1	277.2	276.8
40°	256.1	256.4	256.4	256.5	256.2	256.5	255.9
45°	233.5	233.9	233.6	233.8	233.5	233.8	233.4
50°	209	209.3	209	209.2	208.9	209.2	208.8
55°	182.8	183	182.7	182.9	182.6	182.9	182.5
60°	155.1	155.2	155.2	155.2	154.9	155	154.8
65°	125.8	126.2	125.7	126	125.6	125.9	125.6
70°	96.1	96.3	95.9	96	95.6	95.9	95.6
75°	66	66.3	65.8	66	65.6	65.9	65.4
80°	37.9	37.9	37.7	37.7	37.4	37.4	37.2
85°	14.2	14.3	14.2	14.2	14.1	14.1	13.8
90°	0	0	0	0	0	0	0

**5. SPHERE SPECTROMETRY (CIE Colorimetric Parameters)**

<b>MEASURED CCT :</b>	4026K
<b>MEASURED CRI:</b>	83,5
<b>CHROMATICITY COORDINATES :</b>	$x=0.3792$ $y=0.3758$
<b>COLOR RATIO:</b>	R=0.183 G=0.781 B=0.036
<b>PEAK WAVELENGTH:</b>	448nm
<b>DOMINANT WAVELENGTH:</b>	597,9nm
	$u(u')=0.2247$ $v=0.3340$ $v'=0.5010$





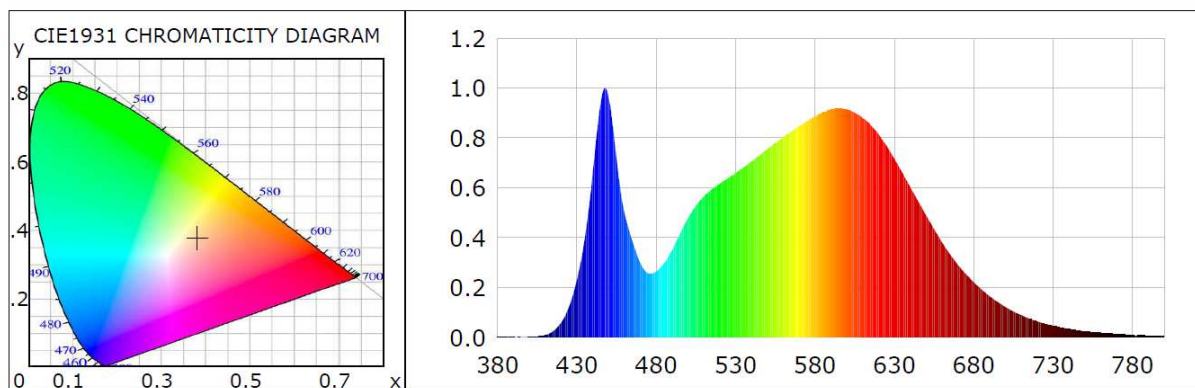
# LUG<sup>®</sup>

LUG Light Factory Ltd.  
Producer of Professional Lighting Fittings



## 6. LIGHT SPECTRAL DISTRIBUTION :

R1 =82	R2 =88	R3 =94	R4 =84	R5 =83	R6 =85	R7 =86	R8 =67
R9 =13	R10=73	R11=83	R12=67	R13=83	R14=97	R15=76	



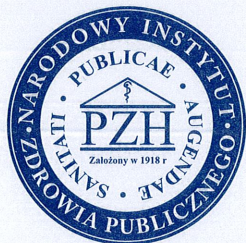
## 7. TEST INFORMATION

Photometric Method: sphere-spectroradiometer Lisun LMS-9000A(Plus)  
 Scan Range: 380nm~800nm:1nm  
 Sphere diameter: 1.50m, 4PI  
 Stabilization Time: 60 min  
 Integration Time: 31.04 ms  
 Goniophotometer type C-Gama Spectro Color<sup>®</sup>  
 Precision of angle settings 0,2°  
 Precision of position read 0,005°  
 Photometer – luxmeter Digi02 Spectro Color<sup>®</sup>, accuracy: class a  
 Powermeter with harmonic analyser: PF9811 Everfine, accuracy: class 0,5  
 AC testing power source DPS1005 Everfine

## 8. AUTHORIZED SIGNATURES

Tested by:

Approved by:



**NARODOWY INSTYTUT ZDROWIA PUBLICZNEGO  
- PAŃSTWOWY ZAKŁAD HIGIENY**

**NATIONAL INSTITUTE OF PUBLIC HEALTH  
- NATIONAL INSTITUTE OF HYGIENE**

**ZAKŁAD HIGIENY ŚRODOWISKA  
DEPARTMENT OF ENVIRONMENTAL HYGIENE**

24 Chocimska 00-791 Warsaw • Phone (22) 5421354; (22) 5421349 • Fax (22) 5421287 • e-mail: sek-zhk@pzh.gov.pl

**ATEST HIGIENICZNY  
HYGIENIC CERTIFICATE**

**HK/B/0997/01/2014**

ORYGINAŁ

Wyrób / product: **Oprawa oświetleniowa: LUGCLASSIC**  
**modele: PAR, PPAR, SLA, PLX, MPRM, PRM, LED, ECO LED, LB ECO LED,**  
**typ montażu: NT, PT, GK,**  
**typ źródła światła: T5, T8, LED**

Zawierający / containing: stal, aluminium i inne składniki wg dokumentacji producenta

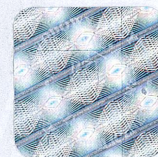
Przeznaczony do / destined: oświetlania pomieszczeń w obiektach szpitalnych i budynkach opieki zdrowotnej, a także w zakładach przemysłowych branży kosmetycznej i spożywczej

Wymieniony wyżej produkt odpowiada wymaganiom higienicznym przy spełnieniu następujących warunków / is acceptable according to hygienic criteria with the following conditions:

- Atest nie dotyczy parametrów technicznych i walorów użytkowych
- Zastosowanie wyrobów musi być zgodne z przepisami dotyczącymi obiektu, w którym są one montowane

Wytwórca / producer:

LUG Light Factory Sp. z o. o.  
65-127 Zielona Góra  
ul. Gorzowska 11



Niniejszy dokument wydano na wniosek / this certificate issued for:

LUG Light Factory Sp. z o. o.  
65-127 Zielona Góra  
ul. Gorzowska 11

**Atest może być zmieniony lub unieważniony po przedstawieniu stosownych dowodów przez którąkolwiek stronę. Niniejszy atest traci ważność po 2019-08-29 lub w przypadku zmian w recepturze albo w technologii wytwarzania wyrobu.**

**The certificate may be corrected or cancelled after appropriate motivation. The certificate loses its validity after 2019-08-29 or in the case of changes in composition or in technology of production.**

Data wydania atestu higienicznego: 29 sierpnia 2014

The date of issue of the certificate: 29th August 2014

Kierownik  
Zakładu Higieny Środowiska

*Bożena Krogulska*  
dr Bożena Krogulska

Reprodukowanie, kopiowanie, fotografowanie, skanowanie, digitalizacja Atestu Higienicznego w celach marketingowych bez zgody NIZP-PZH jest zabronione.

proj. T. Podsiady

**IEC****IECEE**  
CB  
SCHEME

Ref. Certif. No.

**CZ-2764**IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST  
CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE)  
CB SCHEMESYSTEME CEI D'ACCEPTATION MUTUELLE DE  
CERTIFICATS D'ESSAIS DES EQUIPEMENTS  
ELECTRIQUES (IECEE) METHODE OC**CB TEST CERTIFICATE**  
**CERTIFICAT D'ESSAI OC**Product  
Produit

Fixed general purpose luminaires, recessed luminaires

Name and address of the applicant  
Nom et adresse du demandeurLUG Light Factory Sp. z o.o.  
ul. Gorzowska 11, 65-127 Zielona Góra, PolandName and address of the manufacturer  
Nom et adresse du fabricantLUG Light Factory Sp. z o.o.  
ul. Gorzowska 11, 65-127 Zielona Góra, PolandName and address of the factory  
Nom et adresse de l'usineLUG Light Factory Sp. z o.o.  
ul. Gorzowska 11, 65-127 Zielona Góra, PolandRatings and principal characteristics  
Valeurs nominales et caractéristiques principales220-240 V, 50-60 Hz, 40 W, IP20 (optical part IP40),  
class IITrademark (if any)  
Marque de fabrique (si elle existe)Model / Type Ref.  
Ref. De typeLUGCLASSIC LB LED PT  
variants: 600X600, 625X625Additional information (if necessary)  
Information complémentaire (si nécessaire)

PUBLICATION

EDITION

A sample of the product was tested and found  
to be in conformity withUn échantillon de ce produit a été essayé et a été  
considéré conforme à la

IEC 60598-1

2014

IEC 60598-2-2

2011

As shown in the Test Report Ref. No. which forms part  
of this CertificateComme indiqué dans le Rapport d'essais numéro de  
référence qui constitue partie de ce Certificat

700590-01/01 of: 30.05.2017

This CB Test Certificate is issued by the National Certification Body  
Ce Certificat d'essai OC est établi par l'Organisme National de CertificationElektrotechnický zkušební ústav, s.p.  
Pod Lisem 129, 171 02 Praha 8 – Troja  
Czech Republic

Date: 14.07.2017

Signature: Miroslav Sedláček  
Certification and Inspection Manager

# ELEKTROTECHNICKÝ ZKUŠEBNÍ ÚSTAV



ELECTROTECHNICAL TESTING INSTITUTE - CZECH REPUBLIC  
ELEKTROTECHNISCHE PRUFANSTALT - TSCHECHISCHE REPUBLIK  
INSTITUT ELECTROTECHNIQUE D'ESSAIS - REPUBLIQUE TCHÈQUE  
ЭЛЕКТРОТЕХНИЧЕСКИЙ ИСПЫТАТЕЛЬНЫЙ ИНСТИТУТ - ЧЕШСКАЯ РЕСПУБЛИКА

Pod Lisem 129, 171 02 Praha 8 - Troja

## CERTIFICATE

No.: 1170479

**Product:** Fixed general purpose luminaires, recessed luminaires

**Type:** LUGCLASSIC LB LED PT  
variants: 600X600, 625X625

**Rating:** 220-240 V, 50-60 Hz, 40 W, IP20 (optical part IP40), class II

**Ordering firm:** LUG Light Factory Sp. z o.o.  
ul. Gorzowska 11, 65-127 Zielona Góra, Poland

**Manufacturer:** LUG Light Factory Sp. z o.o.  
ul. Gorzowska 11, 65-127 Zielona Góra, Poland

**Factories:** LUG Light Factory Sp. z o.o.  
ul. Gorzowska 11, 65-127 Zielona Góra, Poland

**Trade mark:**

**The test results are stated in the test-report No.:** 700590-01/01 of: 30.05.2017


**A sample of the product was found to be in conformity with:**  
EN 60598-1:15, EN 60598-2-2:12

**Other data:**

**The validity of the certificate is limited to:** 31.07.2020

14.07.2017

Prague

  
Mgr. Miroslav Sedláček  
Head of Certification Body



Stamp



700590-01

## Deklaracja Zgodności WE

(EC Declaration of Conformity, EG - Konformitätsklärung, Déclaration de conformité)

06/005/15/CE

My (We, Wir, Nous)

LUG Light Factory Spółka z o. o.  
65-127 Zielona Góra, ul. Gorzowska 11

deklarujemy z pełną odpowiedzialnością, że wyrób:

(hereby declare on our own responsibility, that the product:, hiermit bestätigen wir, dass die leuchte;  
déclarons sous notre seule responsabilité que le produit:)

Typ wyrobu: (Model type:, Typenart:, Type du produit:)	<b>OPRAWY RASTROWE I MODUŁOWE</b> (Louver & recessed luminaires) (Raster und modulleuchten; Persiennes et modulaire)
Nazwa wyrobu: (Model name:;, Nom du produit:;, Bezeichnung:)	<b>LUGCLASSIC LB LED PLX PT</b> ( 220-240V/50/60Hz, IP40)
Oznaczenie fabryczne: (Type number:;, Art.Nr. :;, Référence:;)	<b>ZAŁĄCZNIK (Annex, Anbau, Annexe)</b>

jest zgodny z postanowieniami następujących dyrektyw:

(is in conformity with the following directives:;, entspricht die Bestimmungen der folgenden Richtlinien:;  
est conforme aux dispositions des directives suivantes:;)

### ErP

(Eco-design of Energy-Related Products )

**2009/125/WE** (2009/125/EG, EC)

### RoHS

(Restriction of Hazardous Substances )

**2011/65/WE** (2011/65/EG, EC)

### Niskonapięciowa

(LVD, EG-Niederspannungsrichtlinie, Basse tension )

**2006/95/WE** (2006/95/EG, EC)

### Kompatybilności elektromagnetycznej

(EMC, Compatibilité électromagnétique, Elektromagnetische Verträglichkeit)

**2004/108/WE** (2004/108/EG, EC)

oraz z następującymi normami: (and with the following standards:;, und folgende Normen:;, ainsi que les normes suivantes:;)

**PN-EN 60598-1:2011**

**PN-EN 61000-3-2:2007/A2:2010**

**EN 60598-2-1:1989**

**PN-EN 61000-3-3:2013-10**

**PN-EN 55015:2013-10**

**PN-EN 62471:2010**

**PN-EN 61547:2009**

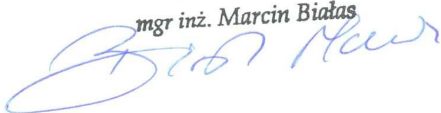
**PN-EN 60598-2-2:2012**

rok oznaczenia produktu symbolem CE:

15

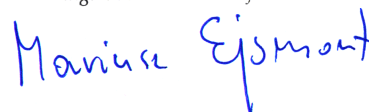
(implementation year of the EC regulation:;, Anbringung der CE-Kennzeichnung:;, année de marquage du produit par le symbole CE:;)

LUG Light Factory Sp. z o.o.  
Inżynier Laboratorium  
Laboratory Engineer  
mgr inż. Marcin Białas



DYREKTOR  
DS. TECHNICZNYCH

mgr inż. Mariusz Ejsmont



Wystawił:

(Compiled by:;, Zusammengestellt von:;, Publié:;)

**Zielona Góra, 2015-10-28**

Podpis osoby upoważnionej

(Signature of authorized person, Unterschrift des Bevollmächtigten,

Signature de la personne autorisée)

Strona (Page, Seite) 1 / 2

LUGCLASSIC LB LED PLX PT

**Oznaczenie fabryczne:**

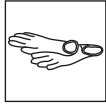
*(Type number., Art.Nr. ;Référénce:)*

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300061.00150  
300061.00151  
300061.00152  
300061.00153  
300061.00154  
300061.00155  
300061.00156  
-----

**Model:**

LUGCLASSIC LB LED PT 4500lm 830  
LUGCLASSIC LB LED PT 4700lm 840  
LUGCLASSIC LB LED PT 4500lm 830 DALI  
LUGCLASSIC LB LED PT 4700lm 840 DALI  
LUGCLASSIC LB LED PT 4500lm 830 625  
LUGCLASSIC LB LED PT 4700lm 840 625  
LUGCLASSIC LB LED PT 4500lm 830 DALI 625  
LUGCLASSIC LB LED PT 4700lm 840 DALI 625

**WAŻNE INFORMACJE | IMPORTANT INFORMATIONS | IMPORTANTES INFORMAÇÕES ÚTEIS | ВАЖНАЯ ИНФОРМАЦИЯ | WICHTIGE INFORMATIONEN**



Podczas montażu oprawy oraz czynności konserwacyjnych zaleca się stosowanie rękawic ochronnych.  
Use protective gloves during the montage.  
Durant l'installation et l'entretien du luminaire il est recommande de mettre les gants de protection.  
Use luvas de proteção durante a montagem.  
При монтаже и обслуживании светильника рекомендуется использовать защитные перчатки.  
Bei der Montage bitte die mitgelieferten Schutzhandschuhe verwenden.



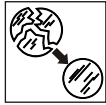
Kurz lub inne zabrudzenia należy usuwać za pomocą ściereczek z microfibry.  
Remove the dirt & dust with microfiber wipes.  
La poussiere et les autres saletés il faut enlever en utilisant un tissu en microfibre.  
Remova a sujeira e poeira com microfibra limpa.  
Пыль или другие загрязнения должны быть удалены салфеткой из микрофибры.  
Staub und Schmutz bitte mit einem Microfasertuch entfernen.



Nie dotykać komponentów elektrycznych, wrażliwe na uszkodzenia esd.  
Do not touch electrical appliances. Electrostatic sensitive device (esd).  
Il est interdit de toucher les composants électriques, ils sont sensibles aux décharges électrostatiques.  
Não toque os aparelhos elétricos. Dispositivo sensível eletrostático (dse).  
Не трогать электрических компонентов, чувствительные к esd.  
Die elektronischen Komponenten wegen einer möglichen elektrostatischen Aufladung nicht anfassen.



Unikać bezpośredniego patrzenia na źródła led.  
Avoid direct looking at led source light.  
Il faut éviter un regard direct sur les sources led.  
Evite olhar direto para a fonte de luz led.  
Не следует смотреть непосредственно на светодиодные источники света.  
Den direkten Augenkontakt in die Led vermeiden.



Wymienić stłuczoną szybę.  
Replace broken glass.  
Remplacement du vitre cassé.  
Substituir o vidro quebrado.  
Заменить разбитое стекло.  
Austausch zerbrochenes Glas.



Nie przykrywać materiałem izolacyjnym.  
Do not cover by insulating material.  
Ne pas couvrir avec du matériau isolant.  
Não cubra o material de isolante.  
Не закрывать изоляционным материалом.  
Nicht mit Dämmplatten abdecken.



**LUG Light Factory Sp. z o.o.**  
65-127 Zielona Góra, ul. Gorzowska 11  
e-mail: handlowy@lug.pl  
tel. +48 68 411 72 68 | 69 | 70 | 71 | 79 |  
fax +48 68 411 72 88 | 89

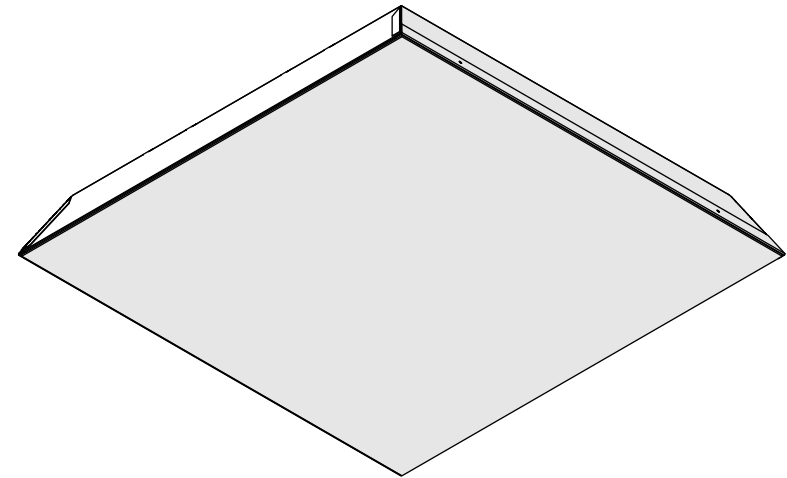
INFORMACJA KGO  
W sprawie odbioru zużytych opraw prosimy kontaktować się z Organizacją Odzysku Sprzętu Elektrycznego i Elektronicznego BIOSYSTEM ELEKTRORECYCLING S.A.  
30-556 Kraków ul. Wodna 4  
tel. 012 29 666 25  
KRS 0000256584  
nr WEE E0000628S  
www.bioelektro.pl, www.biosystem.pl  
Biuro@bioelektro.pl



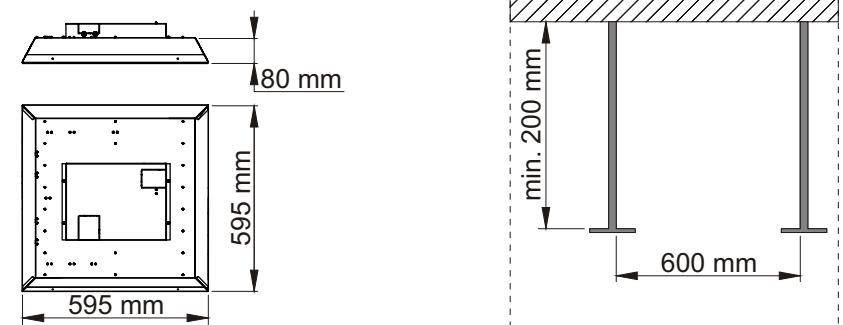
**LUGCLASSIC LB LED AW**

INSTRUKCJA MONTAŻU | ИНСТРУКЦИЯ ПО МОНТАЖУ | MONTAGEANLEITUNG | INSTRUCTIONS DE MONTAGE | NÁVOD K MONTÁŽI | SZERELÉSI UTASÍTÁSOK  
MONTERINGSVEJLEDNING | INSTRUÇÕES DE MONTAGEM | MONTERINGSVEJLEDNING | INSTRUCCIONES DE MONTAJE | KOKOONPANO - JA KIINNITYSONJEET  
MONTAGE INSTRUKTIE | INSTRUZIONI DI MONTAGGIO | ИНСТРУКЦІЯ З МОНТАЖУ | MONTAJ YÖNERGESİ

- PL MONTAŻU POWINNA DOKONAĆ OSOBA POSIADAJĄCA ODPOWIEDNIE UPRAWNIENIA. GB INSTALLATION MUST BE PERFORMED BY AN AUTHORIZED TECHNICIAN. FR LA MONTAGE DOIT FAIRE UNE PERSONNE QUI POSSEDER LES EXPERIENCES COMPETENTES.
- BRPT A INSTALAÇÃO TEM QUE SER FEITA POR UM TÉCNICO AUTORIZADO. RU МОНТАЖ НУЖЕН БЫТЬ СОВЕРШЕН ЧЕРЕЗ ЛИЦО ИМЕЮЩЕ СООТВЕТСТВЕННЫЕ ПРАВА. DE DIE MONTAGE MUSS VON EINER PERSON MIT ERFORDERLICHEN KENNNTISSEN DURCHFÜHRT WERDEN.

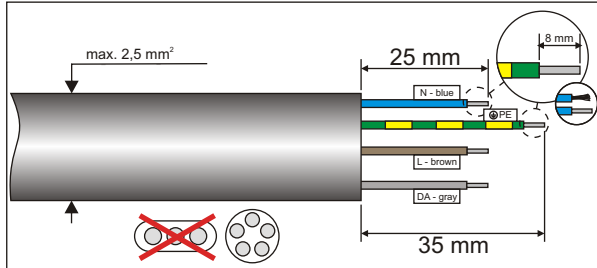
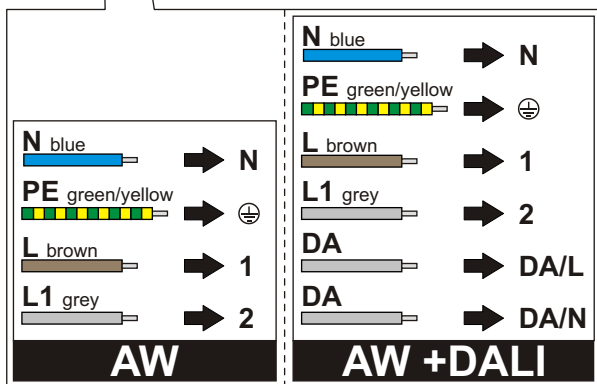
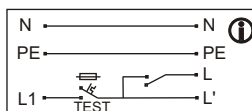
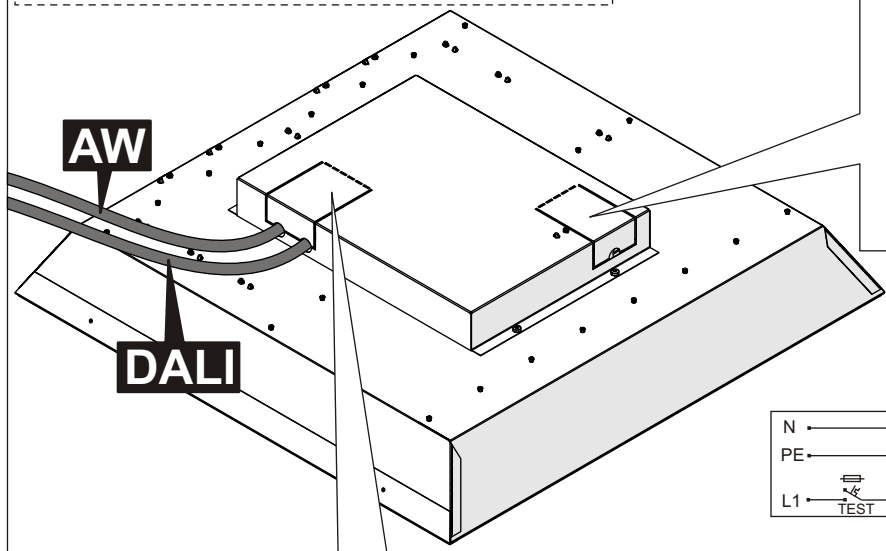


**WYMIARY | DIMENSIONS | DIMENSIONS  
DIMENSIONES | РАЗМЕРЫ | ABMESSUNGEN**

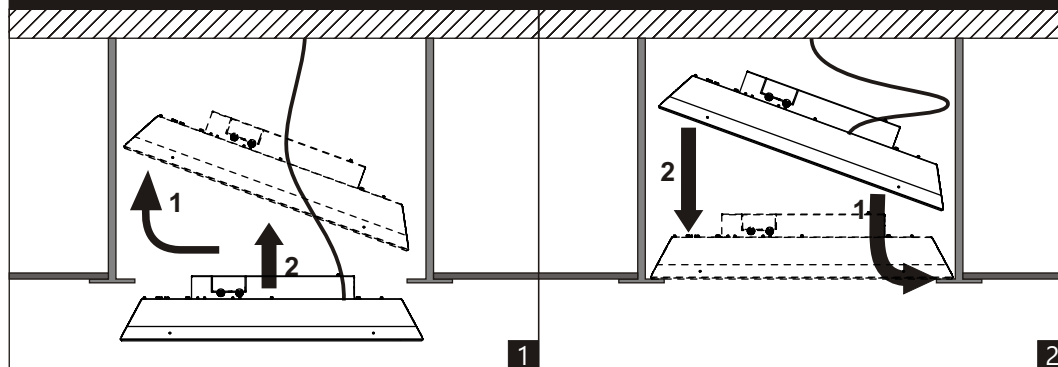


**PODŁĄCZENIE ZASILANIA | POWER CONNECTION | BRANCHEMENT D'ALIMENTATION  
CONEXÃO DA ALIMENTAÇÃO | ПОДКЛЮЧЕНИЕ ПИТАНИЯ | STROMVERSORGUNG**

Podłączyć baterię przed oddaniem obiektu do użytku!  
Connect the battery before putting the facility into service!  
Il faut brancher la batterie en avant de la mise l'utilisation du bâtiment  
Ligue a bateria antes de pôr a unidade em serviço!  
Подключить Аккумулятор Перед Сдачей Объекта К Использованию!  
Akku anschließen bevor die Gebäude zum Nutzung abgegeben wird!



**MONTAŻ | MONTAGE | MONTAGE | MONTAGEM | МОНТАЖ | MONTAGE**



**PL | Do montażu w sufitach gips-kartonowych (g/k) stosować dodatkowe akcesorium!**

**PT | Permet la pose dans un faux plafond à découpe (g/k) et nécessite l' utilisation d'accessoires!**

**PL | Do montażu w sufitach gips-kartonowych (g/k) stosować dodatkowe akcesorium!**

**RU | Для монтажа в гипсокартонных потолках необходимо использовать дополнительное аксессуары!**

**FR | Permet la pose dans un faux plafond à découpe (g/k) et nécessite l' utilisation d'accessoires!**

**DE | Für die Montage in der Gipskarton Decke bitte das zusätzliche Zubehör verwenden!**





# ДЕКЛАРАЦИЯ СООТВЕТСТВИЯ ТРЕБОВАНИЯМ

LB/2016/02/011



Мы

LUG Light Factory Spółka z o.o.  
ul. Gorzowska 11  
65-127 Zielona Góra

заявляет под свою исключительную ответственность, что изделие

ИМЯ	<b>LUGCLASSIC LB LED p/t</b>
группа	<b>Светильники растровые и модульные</b>
Заводская	<b>ПРИКРЕПЛЕНИЕ</b>

в соответствии с положениями следующих актов:

Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility

Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits

Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products

и следующие стандарты:

**PN-EN 60598-1:2011**  
**EN 60598-2-1:1989**  
**PN-EN 55015:2013-10**  
**PN-EN 61547:2009**  
**PN-EN 61000-3-2:2014-10**

**PN-EN 61000-3-3:2013-10**  
**PN-EN 50581:2013**  
**PN-EN 62471:2010**  
**PN-EN 60598-2-2:2012**

LUG Light Factory Sp. z o.o.  
Inżynier Laboratorium  
Laboratory Engineer  
mgr inż. Marcin Biały

Опубликовано

DYREKTOR  
DS. TECHNICZNYCH

mgr inż. Mariusz Ejsmont

Уполномоченное лицо подписи



# ДЕКЛАРАЦИЯ СООТВЕТСТВИЯ ТРЕБОВАНИЯМ

LB/2016/02/011



## ПРИКРЕПЛЕНИЕ

### Заводская

300061.00149	300061.00151	300061.00153	300061.00155
300061.00150	300061.00152	300061.00154	300061.00156

### Номера Производитель аксессуаров

150210.00605

Данная декларация действительна для всех серийных номеров, произведенных по данному символу завода.

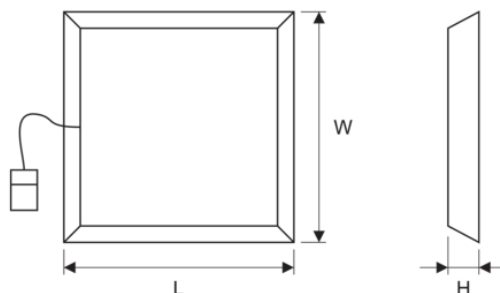
**300061.00150****LUGCLASSIC LB LED p/t 600x600 40W 4400lm 4000K****белый**

Современный светильник, предназначенный для подвесных модульных потолков, для источников LED.

**МЕХАНИЧЕСКИЕ  
ХАРАКТЕРИСТИКИ****монтаж:** непосредственно на конструкции потолка**Корпус:** порошковым покрытием листовая сталь**цвет:** белый**Не закрывайте изоляционным материалом:** да**ЭЛЕКТРИЧЕСКИЕ  
ХАРАКТЕРИСТИКИ****Эффективность питания:** 95%**мощность:** 220-240V 50/60Hz**источник света:** Да**выходной ток [mA]:** 1050**оборудование:** ED**Замена обычной технологии [W]:** 4x14W T5 (76W)**тип источника:** LED**ОПТИЧЕСКИЕ  
ХАРАКТЕРИСТИКИ****распределение света:** вращение симметричный**Способ свечения:** прямой**Плафон:** абажур с плекси (PLX)**CRI/Ra:** ≥80**Световой поток LED [лм]:** 5100**Световой поток [лм]:** 4400**Цветовая температура [K]:** 4000**UGR:** <19**ОБЩИЕ ДАННЫЕ****продолжительность жизни (L80B10):** 100 000 h**продолжительность жизни (TM21 L90B10):** 30 000 h**Диапазон рабочих температур:** 0°С ... +40°С**гарантия:** 5 года**Применение:** офисы, классы, актовывй зал

Код	оборудование	Мощность LED [Вт]	Мощность системы [Вт]	Световой поток LED [лм]	Световой поток [лм]	эффективность [lm/W]	Цветовая температура [K]	CRI/Ra	UGR
300061.00150	ED	35	40	5100	4400	110	4000	≥80	<19

Код	Размеры [mm] L W H	Вырежьте размеры [mm] L W	Поддоны количество	Количество в упаковке	Вес нетто [кг]
300061.00150	595 595 80	600 600	40	1	3,3



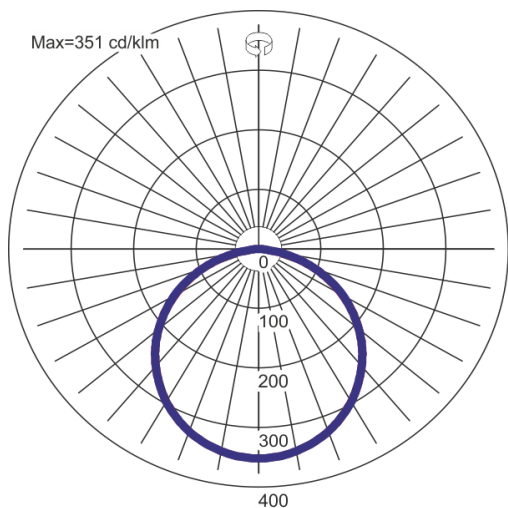
## ACCESSORIES



150210.00605

Рамка для монтажа в потолок из гипсокартона 595x595

## КРИВЫЕ СВЕТОВОГО ПУЧКА





Test Report issued under the responsibility of:

**ezú** electrotechnical  
testing  
institute

**TEST REPORT**  
**IEC 60598-2-2**  
**Luminaires**  
**Part 2: Particular requirements**  
**Section 2: Recessed luminaires**

Report Number..... : 700590-01/01

Date of issue ..... : 30. 5. 2017

Total number of pages..... : 37

Name of Testing Laboratory preparing the Report ..... : **Elektrotechnický zkušební ústav s.p.**  
**Pod Lisem 129, 171 02 Praha 71 – Troja, Czech Republic**

Applicant's name ..... : LUG LIGHT FACTORY SP. Z O. O.

Address ..... : 65-127 Zielona Góra ul. Gorzowska 11; Polska

**Test specification:**

Standard ..... : IEC 60598-2-2:2011 (Third Edition) used in conjunction with  
IEC 60598-1:2014 (Eighth Edition)  
EN 60598-2-2:2012 used in conjunction with  
EN 60598-1:2015

Test procedure..... : CB / ENEC Scheme

Non-standard test method..... : N/A

Test Report Form No. .... : IEC60598\_2\_2D

Test Report Form(s) Originator.... : Intertek Semko AB

Master TRF ..... : 2014-09

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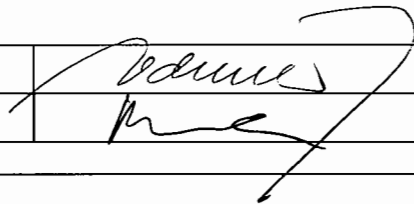
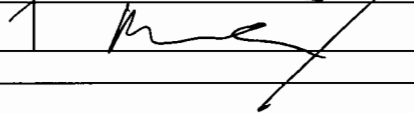
If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

**This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.**

**General disclaimer:**

The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

<b>Test item description</b> .....	Recessed luminaires – in ceiling	
<b>Trade Mark</b> .....	 LUG	
<b>Manufacturer</b> .....	LUG LIGHT FACTORY SP. Z O. O 65-127 Zielona Góra ul. Gorzowska 11; Polska	
<b>Model/Type reference</b> .....	LUGCLASSIC LB LED p/t 600x600, 625x625	
<b>Ratings</b> .....	220-240 V, 50-60 Hz, 40 W, IP20/40, <input type="checkbox"/>	
<b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b>		
<input checked="" type="checkbox"/>	<b>CB Testing Laboratory:</b>	
<b>Testing location/ address</b> .....	Elektrotechnický zkušební ústav s.p. Pod Lisem 129, 171 02 Praha 71-Troja, Czech Republic	
<input type="checkbox"/>	<b>Associated CB Testing Laboratory:</b>	
<b>Testing location/ address</b> .....	---	
<b>Tested by (name, function, signature)</b> .....	Pavel Vodrážka	
<b>Approved by (name, function, signature)</b> ...	Lukáš Burda	
<input type="checkbox"/>	<b>Testing procedure: TMP/CTF Stage 1:</b>	
<b>Testing location/ address</b> .....	---	
<b>Tested by (name, function, signature)</b> .....		
<b>Approved by (name, function, signature)</b> ...		
<input type="checkbox"/>	<b>Testing procedure: WMT/CTF Stage 2:</b>	
<b>Testing location/ address</b> .....	---	
<b>Tested by (name + signature)</b> .....		
<b>Witnessed by (name, function, signature)</b> ..:		
<b>Approved by (name, function, signature)</b> ...		
<input type="checkbox"/>	<b>Testing procedure: SMT/CTF Stage 3 or 4:</b>	
<b>Testing location/ address</b> .....	---	
<b>Tested by (name, function, signature)</b> .....		
<b>Witnessed by (name, function, signature)</b> ..:		
<b>Approved by (name, function, signature)</b> ...		
<b>Supervised by (name, function, signature)</b> :		

**List of Attachments (including a total number of pages in each attachment):**

Annex 1: components (one page)

Annex 2: temperature measurements, thermal tests of Section 12 (two pages)

Annex 5: photo (four pages)

Annex 6: installation (one page)

European group differences and national differences (two pages)

Photobiological safety of lamps and lamps system - Blue light hazard (one page)

**Summary of testing:****Tests performed (name of test and test clause):**

All required tests.

**Testing location:**

same address as on page 2.

**Summary of compliance with National Differences: ---****List of countries addressed**

The product fulfils the requirements of \_\_\_\_\_ (insert standard number and edition and delete the text in parenthesis, leave it blank or delete the whole sentence, if not applicable)

**Copy of marking plate:**

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



<b>Test item particulars</b> .....	
<b>Classification of installation and use</b> ..... : Recessed luminaires – in ceiling	
<b>Supply Connection</b> ..... : Screwless terminal block in driver ..... :	
<b>Possible test case verdicts:</b>	
- test case does not apply to the test object ..... : —	
- test object does meet the requirement ..... : P (Pass)	
- test object does not meet the requirement ..... : F (Fail)	
<b>Testing</b> .....	
<b>Date of receipt of test item</b> ..... : 17. 3. 2017	
<b>Date (s) of performance of tests</b> ..... : 4. 4. 2017 + 30. 5. 2017	
<b>General remarks:</b>	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.	
Throughout this report a <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.	
<b>Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60529:</b>	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided .....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable
<b>When differences exist; they shall be identified in the General product information section.</b>	
<b>Name and address of factory (ies)</b> ..... : —	
<b>General product information:</b>	
Recessed luminaires – in ceiling	
The body of the luminaire is made of sheet.	
Type of protection: class II.	
Degree of protection: IP20, optical part IP40	
Luminaires suitable for normally flammable surfaces.	
Operating temperature: 25°C	
All tests were performed on type: LUGCLASSIC LB LED p/t 600x600 300061.001152 LUGCLASSIC LB LED p/t 625x625 300061.001154	
Used light source: LED module - LUG ML 1501801	



IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
<b>2.3 (0)</b>	<b>GENERAL TEST REQUIREMENTS</b>		
2.3 (0.1)	Information for luminaire design considered .....	Standard Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	---
2.3 (0.3)	More sections applicable .....	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	---
<b>2.4 (2)</b>	<b>CLASSIFICATION</b>		
2.5 (2.2)	Type of protection .....	Class II	---
2.5 (2.3)	Degree of protection .....	IP20	---
2.5 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces .....	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	---
2.5 (2.5)	Luminaire for normal use .....	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	---
	Luminaire for rough service .....	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	---
<b>2.6 (3)</b>	<b>MARKING</b>		
2.6 (3.2)	Mandatory markings		P
	Position of the marking		P
	Format of symbols/text		P
2.6 (3.3)	Additional information		P
	Language of instructions		P
2.6 (3.3.1)	Combination luminaires		---
2.6 (3.3.2)	Nominal frequency in Hz		P
2.6 (3.3.3)	Operating temperature		---
2.6 (3.3.4)	Symbol or warning notice		---
2.6 (3.3.5)	Wiring diagram		---
2.6 (3.3.6)	Special conditions		---
2.6 (3.3.7)	Metal halide lamp luminaire – warning		---
2.6 (3.3.8)	Limitation for semi-luminaires		---
2.6 (3.3.9)	Power factor and supply current		---
2.6 (3.3.10)	Suitability for use indoors		P
2.6 (3.3.11)	Luminaires with remote control		---
2.6 (3.3.12)	Clip-mounted luminaire – warning		---
2.6 (3.3.13)	Specifications of protective shields		---
2.6 (3.3.14)	Symbol for nature of supply		---
2.6 (3.3.15)	Rated current of socket outlet		---


IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
2.6 (3.3.16)	Rough service luminaire		---
2.6 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments		---
2.6 (3.3.18)	Non-ordinary luminaires with PVC cable		---
2.6 (3.3.19)	Protective conductor current in instruction if applicable		---
2.6 (3.3.20)	Provided with information if not intended to be mounted within arm's reach		---
2.6 (3.3.21)	Non replaceable and non-user replaceable light sources information provided		---
	Cautionary symbol		---
2.6 (3.3.22)	Controllable luminaires, classification of insulation provided		---
2.6 (3.4)	Test with water		P
	Test with hexane		P
	Legible after test		P
	Label attached		P

<b>2.7 (4)</b>	<b>CONSTRUCTION</b>		
2.7 (4.2)	Components replaceable without difficulty		P
2.7 (4.3)	Wireways smooth and free from sharp edges		P
<b>2.7 (4.4)</b>	<b>Lampholders</b>		
2.7 (4.4.1)	Integral lampholder		---
2.7 (4.4.2)	Wiring connection		---
2.7 (4.4.3)	Lampholder for end-to-end mounting		---
2.7 (4.4.4)	Positioning		---
	- pressure test (N) .....		—
	After test the lampholder comply with relevant standard sheets and show no damage		---
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		---
	- bending test (N) .....		—
	After test the lampholder have not moved from its position and show no permanent deformation		---
2.7 (4.4.5)	Peak pulse voltage		---
2.7 (4.4.6)	Centre contact		---

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
2.7 (4.4.7)	Parts in rough service luminaires resistant to tracking		---
2.7 (4.4.8)	Lamp connectors		---
2.7 (4.4.9)	Caps and bases correctly used		---
2.7 (4.4.10)	Light source for lampholder or connection according IEC 60061 not connected another way		---
<b>2.7 (4.5)</b>	<b>Starter holders</b>		
	Starter holder in luminaires other than class II		---
	Starter holder class II construction		---
<b>2.7 (4.6)</b>	<b>Terminal blocks</b>		
	Tails		P
	Unsecured blocks		P
<b>2.7 (4.7)</b>	<b>Terminals and supply connections</b>		
2.7 (4.7.1)	Contact to metal parts		---
2.7 (4.7.2)	Test 8 mm live conductor		P
	Test 8 mm earth conductor		P
2.7 (4.7.3)	Terminals for supply conductors		P
2.7 (4.7.3.1)	Welded method and material		
	- stranded or solid conductor		---
	- spot welding		---
	- welding between wires		---
	- Type Z attachment		---
	- mechanical test according to 15.8.2		---
	- electrical test according to 15.9		---
	- heat test according to 15.9.2.3 and 15.9.2.4		---
2.7 (4.7.4)	Terminals other than supply connection		---
2.7 (4.7.5)	Heat-resistant wiring/sleeves		---
2.7 (4.7.6)	Multi-pole plug		---
	- test at 30 N		---
<b>2.7 (4.8)</b>	<b>Switches</b>		
	- adequate rating		---
	- adequate fixing		---
	- polarized supply		---
	- compliance with IEC 61058-1 for electronic switches		---

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
<b>2.7 (4.9)</b>	<b>Insulating lining and sleeves</b>		
2.7 (4.9.1)	Retainment		---
	Method of fixing .....		---
2.7 (4.9.2)	Insulated linings and sleeves:		
	Resistant to a temperature > 20 °C to the wire temperature or		---
	a) & c) Insulation resistance and electric strength		---
	b) Ageing test. Temperature (°C) .....		---
<b>2.7 (4.10)</b>	<b>Double or reinforced insulation</b>		
2.7 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		P
	Safe installation fixed luminaires		P
	Capacitors and switches		---
	Interference suppression capacitors according to IEC 60384-14		---
2.7 (4.10.2)	Assembly gaps:		
	- not coincidental		---
	- no straight access with test probe		---
2.7 (4.10.3)	Retainment of insulation:		
	- fixed		---
	- unable to be replaced; luminaire inoperative		---
	- sleeves retained in position		---
	- lining in lampholder		---
<b>2.7 (4.11)</b>	<b>Electrical connections and current-carrying parts</b>		
2.7 (4.11.1)	Contact pressure		P
2.7 (4.11.2)	Screws:		
	- self-tapping screws		---
	- thread-cutting screws		---
2.7 (4.11.3)	Screw locking:		
	- spring washer		---
	- rivets		---
2.7 (4.11.4)	Material of current-carrying parts		P
2.7 (4.11.5)	No contact to wood or mounting surface		P
2.7 (4.11.6)	Electro-mechanical contact systems		---
<b>2.7 (4.12)</b>	<b>Screws and connections (mechanical) and glands</b>		

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
2.7 (4.12.1)	Screws not made of soft metal		---
	Screws of insulating material		---
	Torque test: torque (Nm); part.....:		---
	Torque test: torque (Nm); part.....:		---
	Torque test: torque (Nm); part.....:		---
2.7 (4.12.2)	Screws with diameter < 3 mm screwed into metal		---
2.7 (4.12.4)	Locked connections:		
	- fixed arms; torque (Nm).....:		---
	- lampholder; torque (Nm) .....		---
	- push-button switches; torque 0,8 Nm.....:		---
2.7 (4.12.5)	Screwed glands; force (Nm).....:		---
<b>2.7 (4.13)</b>	<b>Mechanical strength</b>		
2.7 (4.13.1)	Impact tests:		
	- fragile parts; energy (Nm).....:		---
	- other parts; energy (Nm) .....	0,35	P
	1) live parts		P
	2) linings		P
	3) protection		P
	4) covers		P
2.7 (4.13.3)	Straight test finger		P
2.7 (4.13.4)	Rough service luminaires		
	- IP54 or higher		---
	a) fixed		---
	b) hand-held		---
	c) delivered with a stand		---
	d) for temporary installations and suitable for mounting on a stand		---
2.7 (4.13.6)	Tumbling barrel		---
<b>2.7 (4.14)</b>	<b>Suspensions, fixings and means of adjusting</b>		
2.7 (4.14.1)	Mechanical load:		
	A) four times the weight		---
	B) torque 2,5 Nm		---
	C) bracket arm; bending moment (Nm).....:		---
	D) load track-mounted luminaires		---

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
	E) clip-mounted luminaires, glass-shelve. Thickness (mm) .....		---
	Metal rod. diameter (mm) .....		---
	Fixed luminaire or independent control gear without fixing devices		---
2.7 (4.14.2)	Load to flexible cables		
	Mass (kg) .....		—
	Stress in conductors (N/mm <sup>2</sup> ) .....		---
	Mass (kg) of semi-luminaire .....		
	Bending moment (Nm) of semi-luminaire .....		---
2.7 (4.14.3)	Adjusting devices:		
	- flexing test; number of cycles .....		---
	- strands broken .....		---
	- electric strength test afterwards		---
2.7 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		---
2.7 (4.14.5)	Guide pulleys		---
2.7 (4.14.6)	Strain on socket-outlets		---
<b>2.7 (4.15)</b>	<b>Flammable materials</b>		---
	- glow-wire test 650°C .....	See Test Table 2.16 (13.3.2)	
	- spacing $\geq 30$ mm		---
	- screen withstanding test of 13.3.1		---
	- screen dimensions		---
	- no fiercely burning material		---
	- thermal protection		---
	- electronic circuits exempted		---
2.7 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		
	a) construction		---
	b) temperature sensing control		---
	c) surface temperature		---
<b>2.7 (4.16)</b>	<b>Luminaires for mounting on normally flammable surfaces</b>		
	No lamp control gear .....	(compliance with Section 12)	---
2.7 (4.16.1)	Lamp control gear spacing:		
	- spacing 35 mm		---
	- spacing 10 mm		---

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Clause	Requirement + Test	Result - Remark	Verdict
2.7 (4.16.2)	Thermal protection:		
	- in lamp control gear		P
	- external		---
	- fixed position		---
	- temperature marked lamp control gear	T100 OSRAM	P
2.7 (4.16.3)	Design to satisfy the test of 12.6	(see clause 12.6)	---
<b>2.7 (4.17)</b>	<b>Drain holes</b>		
	Clearance at least 5 mm		---
<b>2.7 (4.18)</b>	<b>Resistance to corrosion</b>		
2.7 (4.18.1)	- rust-resistance		---
2.7 (4.18.2)	- season cracking in copper		---
2.7 (4.18.3)	- corrosion of aluminium		---
2.7 (4.19)	Igniters compatible with ballast		---
2.7 (4.20)	Rough service vibration		---
<b>2.7 (4.21)</b>	<b>Protective shield</b>		
2.7 (4.21.1)	Shield fitted if tungsten halogen lamps or metal halide lamps		---
	Shield of glass if tungsten halogen lamps		---
2.7 (4.21.2)	Particles from a shattering lamp not impair safety		---
2.7 (4.21.3)	No direct path		---
2.7 (4.21.4)	Impact test on shield		---
	Glow-wire test on lamp compartment.....:	See Test Table 2.16 (13.3.2)	---
2.7 (4.22)	Attachments to lamps not cause overheating or damage		---
2.7 (4.23)	Semi-luminaires comply Class II		---
<b>2.7 (4.24)</b>	<b>Photobiological hazards</b>		
2.7 (4.24.1)	No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P)		---
2.7 (4.24.2)	Retinal blue light hazard		
	Luminaires with $E_{thr}$ :		
	a) Fixed luminaires		---
	- distance x m, borderline between RG1 and RG2....:		---
	- marking and instruction according 3.2.23		---
	b) Portable and handheld luminaires		---

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Clause	Requirement + Test	Result - Remark	Verdict
	- marking according 3.2.23 if RG1 exceeded at 200 mm according to IEC/TR 62778		---
	Portable luminaires for children IEC 60598-2-10 and Mains socket outlet nightlights IEC 60598-2-12 not exceed RG1 at 200 mm according to IEC/62778		---
<b>2.7 (4.25)</b>	<b>Mechanical hazard</b>		
	No sharp point or edges		P
<b>2.7 (4.26)</b>	<b>Short-circuit protection</b>		
2.7 (4.26.1)	Adequate means of uninsulated accessible SELV parts		---
2.7 (4.26.2)	Short-circuit test with test chain according 4.26.3		
	Test chain not melt through		---
	Test sample not exceed values of Table 12.1 and 12.2		---
<b>2.7 (4.27)</b>	<b>Terminal blocks with integrated screwless earthing contacts</b>		
	Test according Annex V		---
	Pull test of terminal fixing (20 N)		---
	After test, resistance < 0,05 $\Omega$		---
	Pull test of mechanical connection (50 N)		---
	After test, resistance < 0,05 $\Omega$		---
	Voltage drop test, resistance < 0,05 $\Omega$		---
<b>2.7 (4.28)</b>	<b>Fixing of thermal sensing control</b>		
	Not plug-in or easily replaceable type		---
	Reliably kept in position		---
	No adhesive fixing if UV radiations from a lamp can degrade the fixing		---
	Not outside the luminaire enclosure		---
	Test of adhesive fixing:		
	Max. temperature on adhesive material ( $^{\circ}\text{C}$ ).....:		---
	100 cycles between t min and t max		---
	Temperature sensing control still in position		---
<b>2.7 (4.29)</b>	<b>Luminaires with non-replaceable light source</b>		
	Not possible to replace light source		---
	Live part not accessible after parts have been opened by hand or tools		---
<b>2.7 (4.30)</b>	<b>Luminaires with non-user replaceable light source</b>		



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Clause	Requirement + Test	Result - Remark	Verdict
	If protective cover provide protection against electric shock and marked with "caution, electric shock risk" symbol:		
	Minimum two fixing means		---
<b>2.7 (4.31)</b>	<b>Insulation between circuits</b>		
	Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3		---
	Controllable luminaires requiring same level of insulation for all components, the insulation between control terminals and LV supply fulfil requirements according 4.31.1 – 4.31.3		---
<b>2.7 (4.31.1)</b>	<b>SELV circuits</b>		
	Used SELV source		---
	Voltage $\leq$ ELV		---
	Insulating of SELV circuits from LV supply		---
	Insulating of SELV circuits from other non SELV circuits		---
	Insulating of SELV circuits from FELV		---
	Insulating of SELV circuits from other SELV circuits		---
	SELV circuits insulated from accessible parts according Table X.1		---
	Plugs not able to enter socket-outlets of other voltage systems		---
	Socket outlets does not admit plugs of other voltage systems		---
	Plugs and socket-outlets does not have protective conductor contact		---
<b>2.7 (4.31.2)</b>	<b>FELV circuits</b>		
	Used FELV source		---
	Voltage $\leq$ ELV		---
	Insulating of FELV circuits from LV supply		---
	FELV circuits insulated from accessible parts according Table X.1		---
	Plugs not able to enter socket-outlets of other voltage systems		---
	Socket outlets does not admit plugs of other voltage systems		---
	Socket-outlets does not have protective conductor contact		---
<b>2.7 (4.31.3)</b>	<b>Other circuits</b>		

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Clause	Requirement + Test	Result - Remark	Verdict
	Other circuits insulated from accessible parts according Table X.1		---
	Class II construction with equipotential bonding for protection against indirect contacts with live parts:		
	- conductive parts are connected together		---
	- test according 7.2.3 of above		---
	- conductive part not cause an electric shock in case of an insulation fault		---
	- equipotential bonding in master/slave applications		---
	- master luminaire provided with terminal for accessible conductive parts of slave luminaires		---
	- slave luminaire constructed as class I		---
<b>2.7 (4.32)</b>	<b>Overvoltage protective devices</b>		
	Comply with IEC 61643-11		---
	External to controlgear and connected to earth:		
	- only in fixed luminaires		---
	- only connected to protective earth		---

<b>2.8 (11)</b>	<b>CREEPAGE DISTANCES AND CLEARANCES</b>		
2.8 (11.2)	Creepage distances and clearances .....	See Table 1.7 (11.2)	
	Working voltage (V) .....	220 – 240	—
	Rated pulse voltage (kV) .....		—
	Voltage form .....	Sinusoidal <input checked="" type="checkbox"/> Non-sinusoidal <input type="checkbox"/>	—
	PTI .....	< 600 <input checked="" type="checkbox"/> ≥ 600 <input type="checkbox"/>	—
	Impulse withstand category (Normal category II) (Category III Annex U)	Category II <input checked="" type="checkbox"/> Category III <input type="checkbox"/>	—

<b>2.9 (7)</b>	<b>PROVISION FOR EARTHING</b>		
2.9 (7.2.1 + 7.2.3)	Accessible metal parts		---
	Metal parts in contact with supporting surface		---
	Resistance < 0,5 Ω .....		---
	Self-tapping screws used		---
	Thread-forming screws		---
	Thread-forming screw used in a grove		---

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Clause	Requirement + Test	Result - Remark	Verdict
	Earth makes contact first		---
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		---
	Protective earthing of the luminaire not via built-in control gear		---
2.9 (7.2.2 + 7.2.3)	Earth continuity in joints, etc.		---
2.9 (7.2.4)	Locking of clamping means		---
	Compliance with 4.7.3		---
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		---
2.9 (7.2.5)	Earth terminal integral part of connector socket		---
2.9 (7.2.6)	Earth terminal adjacent to mains terminals		---
2.9 (7.2.7)	Electrolytic corrosion of the earth terminal		---
2.9 (7.2.8)	Material of earth terminal		---
	Contact surface bare metal		---
2.9 (7.2.10)	Class II luminaire for looping-in		---
	Double or reinforced insulation to functional earth		---
2.9 (7.2.11)	Earthing core coloured green-yellow		---
	Length of earth conductor		---
<b>2.10 (14)</b>	<b>SCREW TERMINALS</b>		
	Separately approved; component list .....	(see Annex 1)	---
	Part of the luminaire .....	(see Annex 3)	---
<b>2.10 (15)</b>	<b>SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS</b>		
	Separately approved; component list .....	(see Annex 1)	P
	Part of the luminaire .....	(see Annex 4)	---
<b>2.11 (5)</b>	<b>EXTERNAL AND INTERNAL WIRING</b>		
<b>2.11 (5.2)</b>	<b>Supply connection and external wiring</b>		
2.11 (5.2.1)	Means of connection .....	Screwless terminal block in driver	P
	Outdoor luminaire has not PVC insulated external wiring if not class III or SELV $\leq 25$ V a.c./60 V d.c. or protected from outdoor environment		---
2.11 (5.2.2)	Type of cable .....	H03VV-F	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Nominal cross-sectional area (mm <sup>2</sup> ) .....	2x0,5	P
	Cables equal to IEC 60227 or IEC 60245		P
2.11 (5.2.3)	Type of attachment, X, Y or Z		---
2.11 (5.2.5)	Type Z not connected to screws		---
2.11 (5.2.6)	Cable entries:		
	- suitable for introduction		P
	- adequate degree of protection		P
2.11 (5.2.7)	Cable entries through rigid material have rounded edges		---
2.11 (5.2.8)	Insulating bushings:		
	- suitably fixed		P
	- material in bushings		P
	- material not likely to deteriorate		P
	- tubes or guards made of insulating material		P
2.11 (5.2.9)	Locking of screwed bushings		---
2.11 (5.2.10)	Cord anchorage:		
	- covering protected from abrasion		---
	- clear how to be effective		---
	- no mechanical or thermal stress		---
	- no tying of cables into knots etc.		---
	- insulating material or lining		---
2.11 (5.2.10.1)	Cord anchorage for type X attachment:		
	a) at least one part fixed		---
	b) types of cable		---
	c) no damaging of the cable		---
	d) whole cable can be mounted		---
	e) no touching of clamping screws		---
	f) metal screw not directly on cable		---
	g) replacement without special tool		---
	Glands not used as anchorage		---
	Labyrinth type anchorages		---
2.11 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment		---

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Clause	Requirement + Test	Result - Remark	Verdict
2.11 (5.2.10.3)	Tests:		
	- impossible to push cable; unsafe		---
	- pull test: 25 times; pull (N).....:		---
	- torque test: torque (Nm) .....		---
	- displacement $\leq 2$ mm		---
	- no movement of conductors		---
	- no damage of cable or cord		---
	- function independent of electrical connection		---
2.11 (5.2.11)	External wiring passing into luminaire		P
2.11 (5.2.12)	Looping-in terminals		---
2.11 (5.2.13)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		---
2.11 (5.2.14)	Mains plug same protection		---
	Class III luminaire plug		---
	No unsafe compatibility		---
2.11 (5.2.16)	Appliance inlets (IEC 60320)		---
	Installation couplers (IEC 61535)		---
	Other appliance inlet or connector according relevant IEC standard		---
2.11 (5.2.17)	No standardized interconnecting cables properly assembled		---
2.11 (5.2.18)	Used plug in accordance with		
	- IEC 60083		---
	- other standard		---
<b>2.11 (5.3)</b>	<b>Internal wiring</b>		
2.11 (5.3.1)	Internal wiring of suitable size and type	H05V-U	P
	Through wiring		
	- not delivered/ mounting instruction		---
	- factory assembled		---
	- socket outlet loaded (A).....:		---

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Clause	Requirement + Test	Result - Remark	Verdict
	- temperatures .....	(see Annex 2)	---
	Green-yellow for earth only		---
2.11 (5.3.1.1)	Internal wiring connected directly to fixed wiring		
	Cross-sectional area (mm <sup>2</sup> ) .....	0,5	P
	Insulation thickness		P
	Extra insulation added where necessary		---
2.11 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		
	Adequate cross-sectional area and insulation thickness		P
2.11 (5.3.1.3)	Double or reinforced insulation for class II		---
2.11 (5.3.1.4)	Conductors without insulation		---
2.11 (5.3.1.5)	SELV current-carrying parts		---
2.11 (5.3.1.6)	Insulation thickness other than PVC or rubber		---
2.11 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		---
	Joints, raising/lowering devices		---
	Telescopic tubes etc.		---
	No twisting over 360°		---
2.11 (5.3.3)	Insulating bushings:		
	- suitable fixed		---
	- material in bushings		---
	- material not likely to deteriorate		---
	- cables with protective sheath		---
2.11 (5.3.4)	Joints and junctions effectively insulated		---
2.11 (5.3.5)	Strain on internal wiring		---
2.11 (5.3.6)	Wire carriers		---
2.11 (5.3.7)	Wire ends not tinned		---
	Wire ends tinned: no cold flow		---
<b>2.12 (8)</b>	<b>PROTECTION AGAINST ELECTRIC SHOCK</b>		
2.12 (8.2.1)	Live parts not accessible		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Basic insulated parts not used on the outer surface without appropriate protection		P
	Basic insulated parts not accessible with standard test finger on portable, settable and adjustable luminaires		---
	Basic insulated parts not accessible with Ø 50 mm probe from outside, other types of luminaires		P
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		---
	Basic insulation only accessible under lamp or starter replacement		---
	Protection in any position		P
	Double-ended tungsten filament lamp		---
	Insulation lacquer not reliable		P
	Double-ended high pressure discharge lamp		---
	Relevant warning according to 3.2.18 fitted to the luminaire		---
2.12 (8.2.2)	Portable luminaire adjusted in most unfavourable position		---
2.12 (8.2.3.a)	Class II luminaire:		
	- basic insulated metal parts not accessible during starter or lamp replacement		---
	- basic insulation not accessible other than during starter or lamp replacement		---
	- glass protective shields not used as supplementary insulation		---
2.12 (8.2.3.b)	BC lampholder of metal in class I luminaires shall be earthed		---
2.12 (8.2.3.c)	SELV circuits with exposed current carrying parts:		
	Ordinary luminaire:		
	- touch current .....		---
	- no-load voltage .....		---
	Other than ordinary luminaire:		
	- nominal voltage .....		---
2.12 (8.2.4)	Portable luminaire have protection independent of supporting surface		---

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Clause	Requirement + Test	Result - Remark	Verdict
2.12 (8.2.5)	Compliance with the standard test finger or relevant probe		P
2.12 (8.2.6)	Covers reliably secured		P
2.12 (8.2.7)	Discharging of capacitors $\geq 0,5 \mu\text{F}$		---
	Portable plug connected luminaire with capacitor		---
	Other plug connected luminaire with capacitor		---
	Discharge device on or within capacitor		---
	Discharge device mounted separately		---

<b>2.13 (12)</b>	<b>ENDURANCE TEST AND THERMAL TEST</b>		
2.13.1 (-)	If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 4.13		---
2.13 (12.3)	Endurance test:		
	- mounting-position .....	Recessed	---
	- test temperature (°C) .....	35	---
	- total duration (h) .....	240	---
	- supply voltage: Un factor; calculated voltage (V) ...:	264	---
	- lamp used .....	LED modules LUG	---
2.13 (12.3.2)	After endurance test:		
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		---
	- marking legible		P
	- no cracks, deformation etc.		P
2.13 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
2.13 (12.5)	Thermal test (abnormal operation)	(see Annex 2)	---
2.13 (12.6)	Thermal test (failed lamp control gear condition):		
2.13 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A) .....		---
	- case of abnormal conditions.....	Driver - output short-circuit (Philips)	---
	- electronic lamp control gear		P
	- measured winding temperature (°C): at 1,1 Un .....		---
	- measured mounting surface temperature (°C) at 1,1 Un .....	29	P



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Clause	Requirement + Test	Result - Remark	Verdict
	- calculated mounting surface temperature (°C) .....		---
	- track-mounted luminaires		---
2.13 (12.6.2)	Temperature sensing control		
	- case of abnormal conditions.....		—
	- thermal link		---
	- manual reset cut-out		---
	- auto reset cut-out		---
	- measured mounting surface temperature (°C).....		---
	- track-mounted luminaires		---
2.13 (12.7)	Thermal test (failed lamp control gear in plastic luminaires):		
2.13 (12.7.1)	Luminaire without temperature sensing control		---
2.13 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		---
	Test method 12.7.1.1 or Annex W .....		—
	Test according to 12.7.1.1:		
	- case of abnormal conditions.....		—
	- Ballast failure at supply voltage (V) .....		—
	- Components retained in place after the test		---
	- Test with standard test finger after the test		---
	Test according to Annex W:		
	- case of abnormal conditions.....		—
	- measured winding temperature (°C): at 1,1 Un .....		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un.....		—
	- calculated temperature of fixing point/exposed part (°C) .....		—
	Ball-pressure test.....	See Table 2.16 (13.2.1)	---
2.13 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		
	- case of abnormal conditions.....		—
	- measured winding temperature (°C): at 1,1 Un .....		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un.....		—

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Clause	Requirement + Test	Result - Remark	Verdict
	- calculated temperature of fixing point/exposed part (°C) .....		—
	Ball-pressure test.....	See Table 2.16 (13.2.1)	---
2.13 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		---
	- case of abnormal conditions.....		—
	- Components retained in place after the test		---
	- Test with standard test finger after the test		---
2.13 (12.7.2)	Luminaire with temperature sensing control		
	- thermal link .....	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- manual reset cut-out.....	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- auto reset cut-out .....	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- case of abnormal conditions.....		—
	- highest measured temperature of fixing point/ exposed part (°C): .....		—
	Ball-pressure test:.....	See Table 2.16 (13.2.1)	---
2.13.1 (-)	Wiring, for connection to the supply, not reach unsafe temperature		
	- measured temperature of the cable (°C) .....	39 ...152; 40 ...154	P

<b>2.14 (9)</b>	<b>RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE</b>		
2.14 (-)	If IP > IP 20 the order of tests as specified in clause 2.12		
2.14 (9.2)	Tests for ingress of dust, solid objects and moisture:		—
	- classification according to IP .....	IP20 optical part IP40	—
	- mounting position during test .....	Recessed in ceiling	—
	- fixing screws tightened; torque (Nm).....		—
	- tests according to clauses .....	9.2.0	—
	- electric strength test afterwards		P
	a) no deposit in dust-proof luminaire		---
	b) no talcum in dust-tight luminaire		---
	c) no trace of water on current-carrying parts or on insulation where it could become a hazard		---
	d) i) For luminaires without drain holes – no water entry		---
	d) ii) For luminaires with drain holes – no hazardous water entry		---

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Clause	Requirement + Test	Result - Remark	Verdict
	e) no water in watertight luminaire		---
	f) no contact with live parts (IP 2X)	IP2x	P
	f) no entry into enclosure (IP 3X and IP 4X)		---
	f) no contact with live parts (IP3X and IP4X)		---
	g) no trace of water on part of lamp requiring protection from splashing water		---
	h) no damage of protective shield or glass envelope		---
2.14 (9.3)	Humidity test 48 h		P

2.15 (10) : INSULATION RESISTANCE AND ELECTRIC STRENGTH			
2.15 (10.2.1)	Insulation resistance test		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø .....		—
	Insulation resistance (MΩ).....		—
	SELV		
	- between current-carrying parts of different polarity :		---
	- between current-carrying parts and mounting surface .....	>110 MΩ	P
	- between current-carrying parts and metal parts of the luminaire .....	>110 MΩ	P
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts .....		---
	- Insulation bushings as described in Section 5 .....		---
	Other than SELV		
	- between live parts of different polarity .....		---
	- between live parts and mounting surface.....	>550 MΩ	P
	- between live parts and metal parts .....	>550 MΩ	P
	- between live parts of different polarity through action of a switch .....		---
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts .....		---
	- Insulation bushings as described in Section 5 .....		---
2.15 (10.2.2)	Electric strength test		P
	Dummy lamp		---

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Clause	Requirement + Test	Result - Remark	Verdict
	Luminaires with ignitors after 24 h test		---
	Luminaires with manual ignitors		---
	Test voltage (V) .....		---
	SELV		
	- between current-carrying parts of different polarity :		---
	- between current-carrying parts and mounting surface .....	500 V	P
	- between current-carrying parts and metal parts of the luminaire .....	500 V	P
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts .....		---
	- Insulation bushings as described in Section 5 .....		---
	Other than SELV		
	- between live parts of different polarity .....		---
	- between live parts and mounting surface .....	2920 V	P
	- between live parts and metal parts .....	2920 V	P
	- between live parts of different polarity through action of a switch .....		---
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts .....		---
	- Insulation bushings as described in Section 5 .....		
2.15 (10.3)	Touch current (mA) .....	<0,003	P
	Protective conductor current (mA) .....		---

<b>2.16 (13)</b>	<b>RESISTANCE TO HEAT, FIRE AND TRACKING</b>		
2.16 (13.2.1)	Ball-pressure test .....	See Test Table 2.16 (13.2.1)	---
2.16 (13.3.1)	Needle-flame test (10 s) .....	See Test Table 2.16 (13.3.1)	---
2.16 (13.3.2)	Glow-wire test (650°C) .....	See Test Table 2.16 (13.3.2)	---
2.16 (13.4)	Proof tracking test (IEC 60112) .....	See Test Table 2.16 (13.4)	---

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Clause	Requirement + Test	Result - Remark					Verdict
<b>2.8 (11.2)</b>	<b>TABLES: Creepage distances and clearances</b>						
<b>Table 11.1</b>	<b>Minimum distances (mm) for a.c. (50/60 Hz) sinusoidal voltages</b>						
<b>RMS working voltage (V) not exceeding</b>	<b>50</b>	<b>150</b>	<b>250</b>	<b>500</b>	<b>750</b>	<b>1000</b>	
<b>Creepage distances</b>							
<b>Required basic insulation, PTI <math>\geq</math> 600</b>	<b>0,6</b>	<b>0,8</b>	<b>1,5</b>	<b>3</b>	<b>4</b>	<b>5,5</b>	
Measured	---	---	---	---	---	---	
<b>Required basic insulation, PTI <math>&lt;</math> 600</b>	<b>1,2</b>	<b>1,6</b>	<b>2,5</b>	<b>5</b>	<b>8</b>	<b>10</b>	
Measured	>1,2	---	---	---	---	---	
<b>Required supplementary insulation PTI <math>\geq</math> 600</b>	<b>---</b>	<b>0,8</b>	<b>1,5</b>	<b>3</b>	<b>4</b>	<b>5,5</b>	
Measured	---	---	---	---	---	---	
<b>Required supplementary insulation PTI <math>&lt;</math> 600</b>	<b>---</b>	<b>1,6</b>	<b>2,5</b>	<b>5</b>	<b>8</b>	<b>10</b>	
Measured	---	---	---	---	---	---	
<b>Required reinforced insulation</b>	<b>---</b>	<b>3,2</b>	<b>5</b>	<b>6</b>	<b>8</b>	<b>11</b>	
Measured	---	---	>5	---	---	---	
<b>Clearances</b>							
<b>Required basic insulation</b>	<b>0,2</b>	<b>0,8</b>	<b>1,5</b>	<b>3</b>	<b>4</b>	<b>5,5</b>	
Measured	>0,2	---	---	---	---	---	
<b>Required supplementary insulation</b>	<b>---</b>	<b>0,8</b>	<b>1,5</b>	<b>3</b>	<b>4</b>	<b>5,5</b>	
Measured	---	---	---	---	---	---	
<b>Required reinforced insulation</b>	<b>---</b>	<b>1,6</b>	<b>3</b>	<b>6</b>	<b>8</b>	<b>11</b>	
Measured	---	---	>3	---	---	---	
<b>Table 11.2</b>	<b>Minimum distances (mm) for non-sinusoidal pulse voltages</b>						
<b>Rated pulse voltage (peak kV)</b>	<b>2,0</b>	<b>2,5</b>	<b>3,0</b>	<b>4,0</b>	<b>5,0</b>	<b>6,0</b>	<b>8,0</b>
<b>Required clearances</b>	<b>1,0</b>	<b>1,5</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5,5</b>	<b>8</b>
Measured	---	---	---	---	---	---	---
<b>Rated pulse voltage (peak kV)</b>	<b>10</b>	<b>12</b>	<b>15</b>	<b>20</b>	<b>25</b>	<b>30</b>	<b>40</b>
<b>Required clearances</b>	<b>11</b>	<b>14</b>	<b>18</b>	<b>25</b>	<b>33</b>	<b>40</b>	<b>60</b>
Measured	---	---	---	---	---	---	---
<b>Rated pulse voltage (peak kV)</b>	<b>50</b>	<b>60</b>	<b>80</b>	<b>100</b>	<b>---</b>	<b>---</b>	<b>---</b>
<b>Required clearances</b>	<b>75</b>	<b>90</b>	<b>130</b>	<b>170</b>	<b>---</b>	<b>---</b>	<b>---</b>
Measured	---	---	---	---	---	---	---

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

**List of used test equipment**

Device	Type	Inv. No.
Greisinger - thermometer	GHT 1200 A	20211
High voltage transformer KIKUSUI	TOS 5301	00110285
Voltmeter	EL20	14672
Power supply KIKUSUI	PCR500M	00110185
Multimeter FLUKE	1587	551734
Load gauge 10N	BRNO	21369
Caliper	MITUTOYO	551392
Test finger	BRNO	21364
Impact test aparature	F 22.50	4994
Touch and leakage current measurement		N 700054



ANNEX 2		TABLE: Temperature measurements (thermal tests of Section 12)					
Type reference.....	LUGCLASSIC LB LED 600 x 600 300061.00152						
Lamp used .....	8 x LED modules						
Lamp control gear used .....	OSRAM OPTOTRONIC INTELLIGENT OTi DALI 50/220-240/1A4 LT2 FAN 220-240 V, T100 tc80						
Mounting position of luminaire .....	Recessed in ceiling						
Supply wattage (W) .....	42,4						
Supply current (A).....	---						
Calculated power factor .....	---						
Table: measured temperatures corrected for ta = 25 °C:							
- abnormal operating mode .....	Temperature marked control gear T100						
- test 1: rated voltage .....	230						
- test 2: 1,06 times rated voltage or 1,05 times rated wattage .....	243,8						
- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage .....	---						
- test 4: 1,1 times rated voltage or 1,05 times rated wattage .....	---						
Through wiring or looping-in wiring loaded by a current of A during the test .....	---						
<b>Temperature measurements, (°C)</b>							
Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
LED driver tc	25,4	52	---	---	80	---	---
LED module tc	25,4	44	---	---	75	---	---
LED wires	25,4	---	36	---	90	---	---
External wiring in driver	25,4	---	35	---	90	---	---
Terminal block	25,4	---	35	---	85	---	---
Mounting surface ↑ 20 mm	25,4	---	32	---	90	---	---
External wiring - light surface	25,4	---	39	---	90	---	---
Supplementary information: Not used: temperature marked lamp control gear T100.							



ANNEX 2		TABLE: Temperature measurements, thermal tests of Section 12	
Type reference.....	LUGCLASSIC LB LED 625 x 625 300061.00154		
Lamp used .....	8 x LED module		
Lamp control gear used.....	PHILIPS Cert Drive 40W, 1,05A 38V 220-240 V, tc 75°		
Mounting position of luminaire.....	Recessed in ceiling		
Supply wattage (W) .....	39,7 W		
Supply current (A).....	---		
Calculated power factor .....	---		
Table: measured temperatures corrected for $t_a = 25\text{ °C}$ :			
- abnormal operating mode .....	Driver - output short-circuit		
- test 1: rated voltage .....	230		
- test 2: 1,06 times rated voltage or 1,05 times rated wattage .....	243,8		
- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage.....	---		
- test 4: 1,1 times rated voltage or 1,05 times rated wattage .....	---		
Through wiring or looping-in wiring loaded by a current of A during the test .....	---		

## Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
LED driver tc	25,3	57	---	---	75	---	---
LED module tc	25,3	47	---	---	75	---	---
LED wires	25,3	---	42	---	90	---	---
External wiring in driver	25,3	---	38	---	90	---	---
Terminal block	25,3	---	38	---	85	---	---
Mounting surface ↑ 20 mm	25,3	---	37	---	90	---	---
External wiring - light surface	25,3	---	40	---	90	---	---

Supplementary information: abnormal operating mode: Driver - output short-circuit Clause 12.6

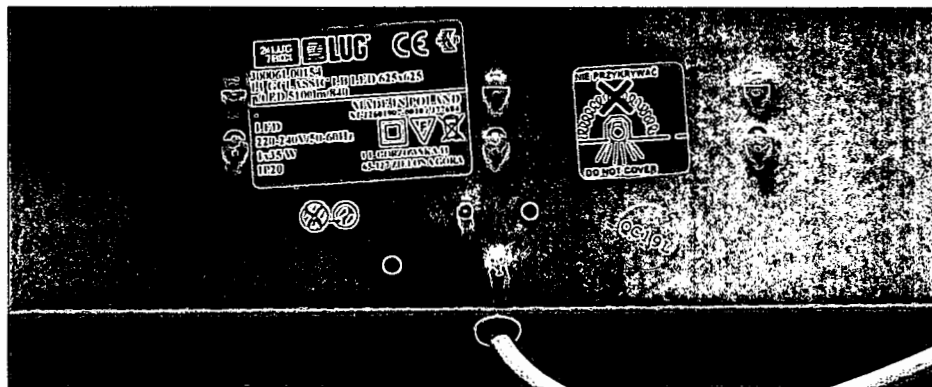
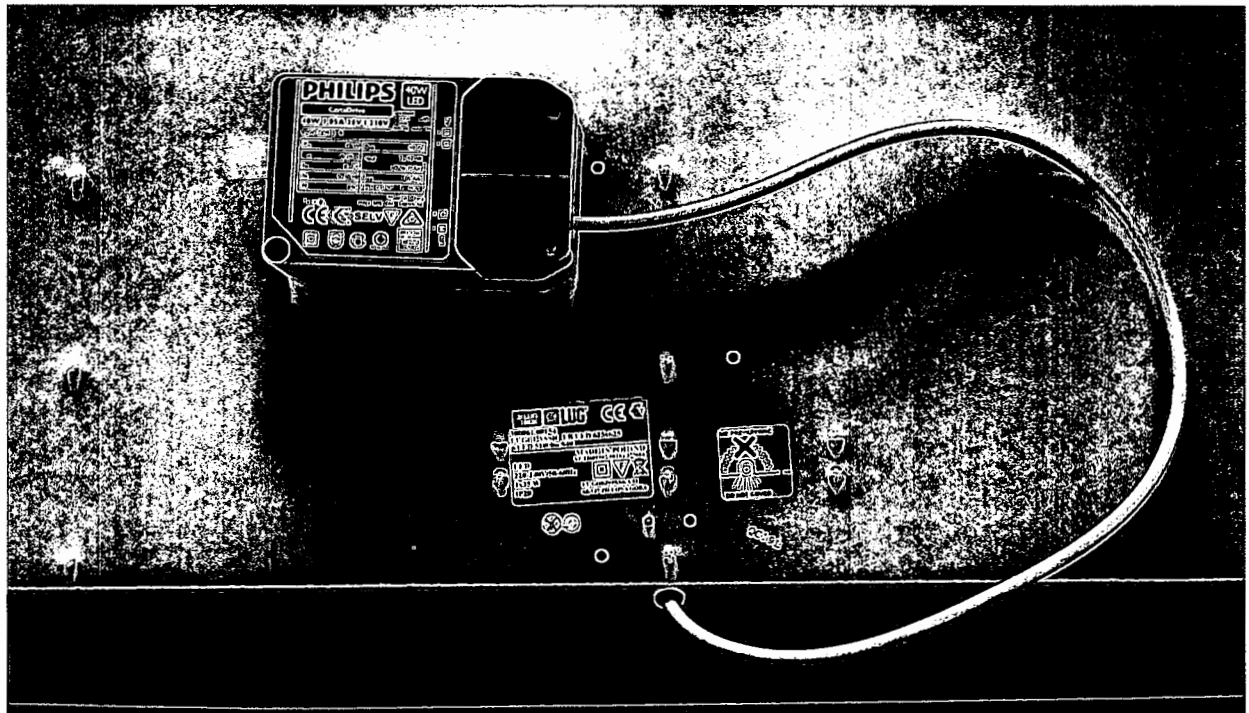
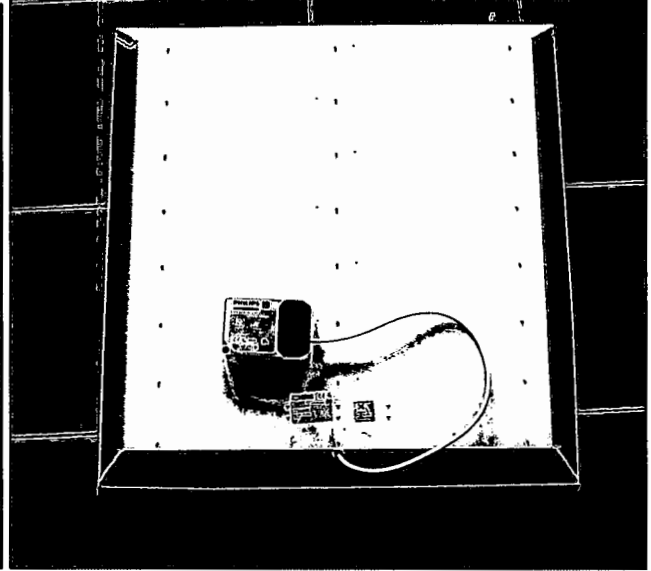
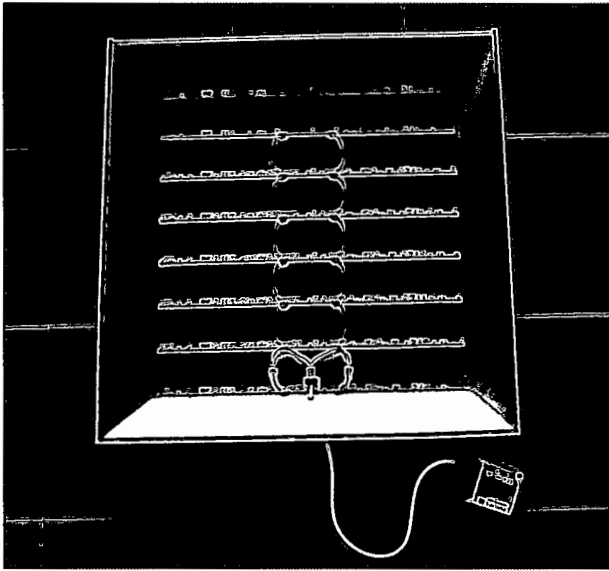
ANNEX 3	Screw terminals (part of the luminaire)
	not applicable

ANNEX 4	Screwless terminals (part of the luminaire)
	not applicable

ANNEX 5

Photo

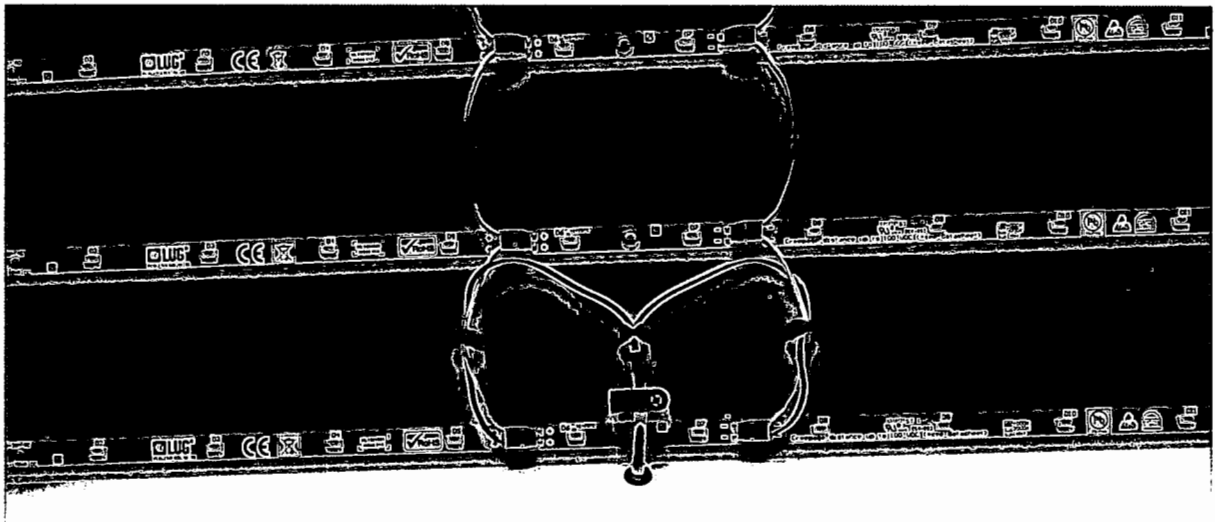
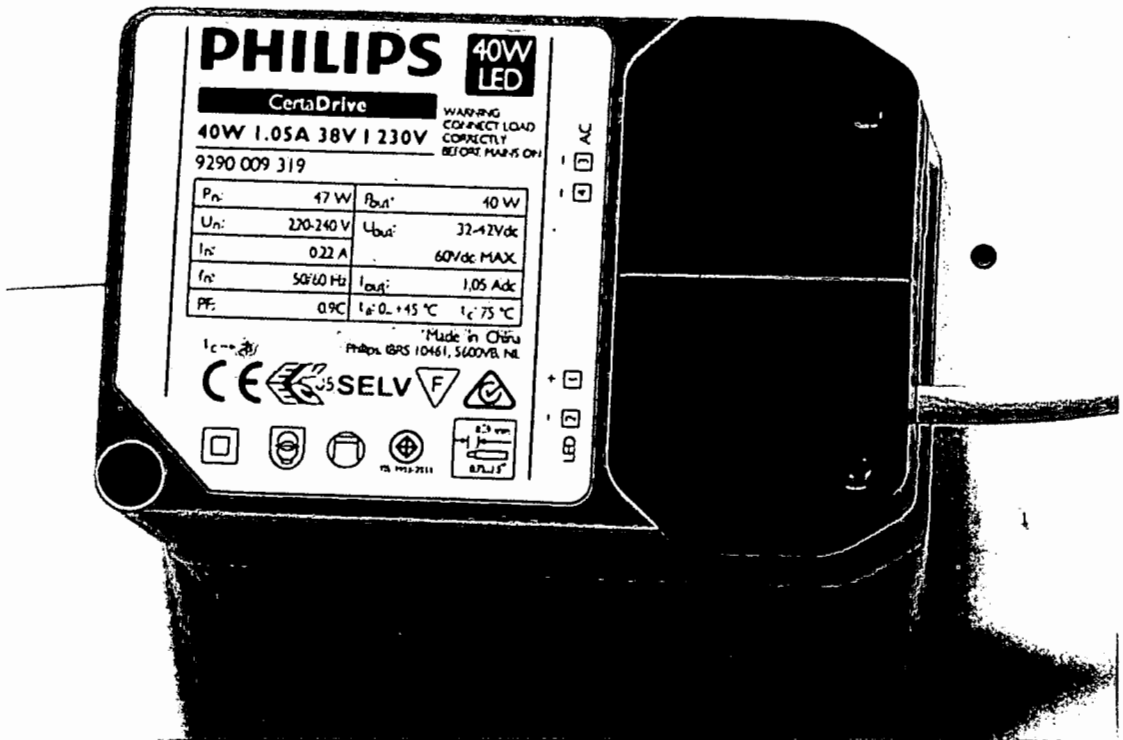
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ANNEX 5

Photo

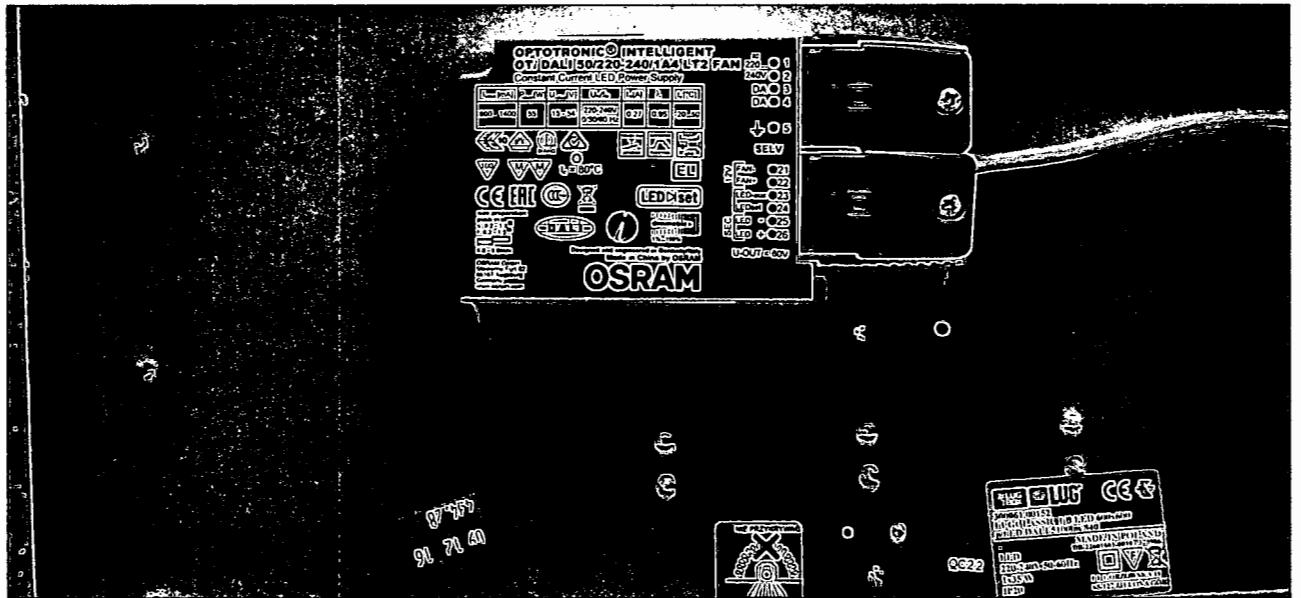
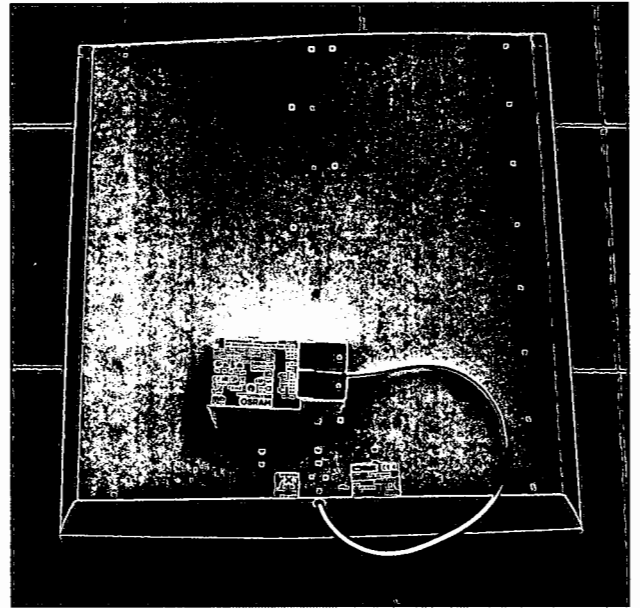
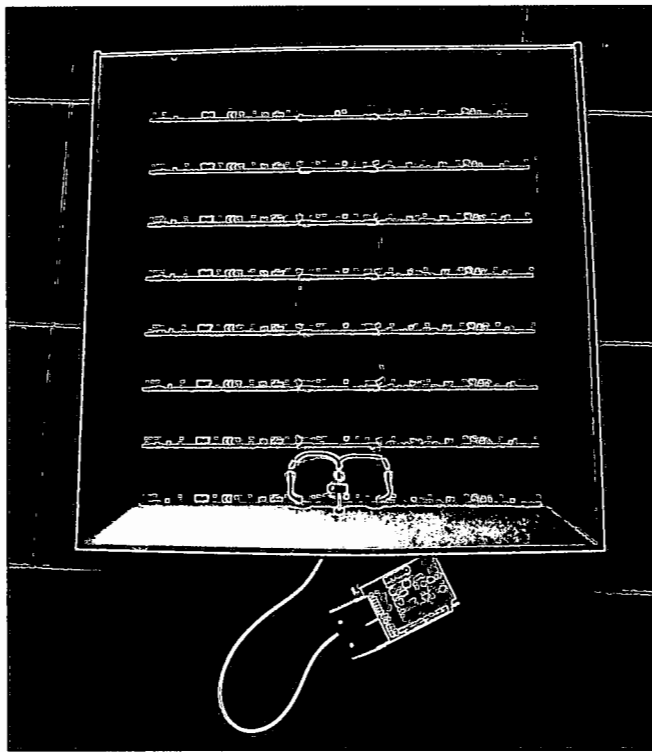
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ANNEX 5

Photo

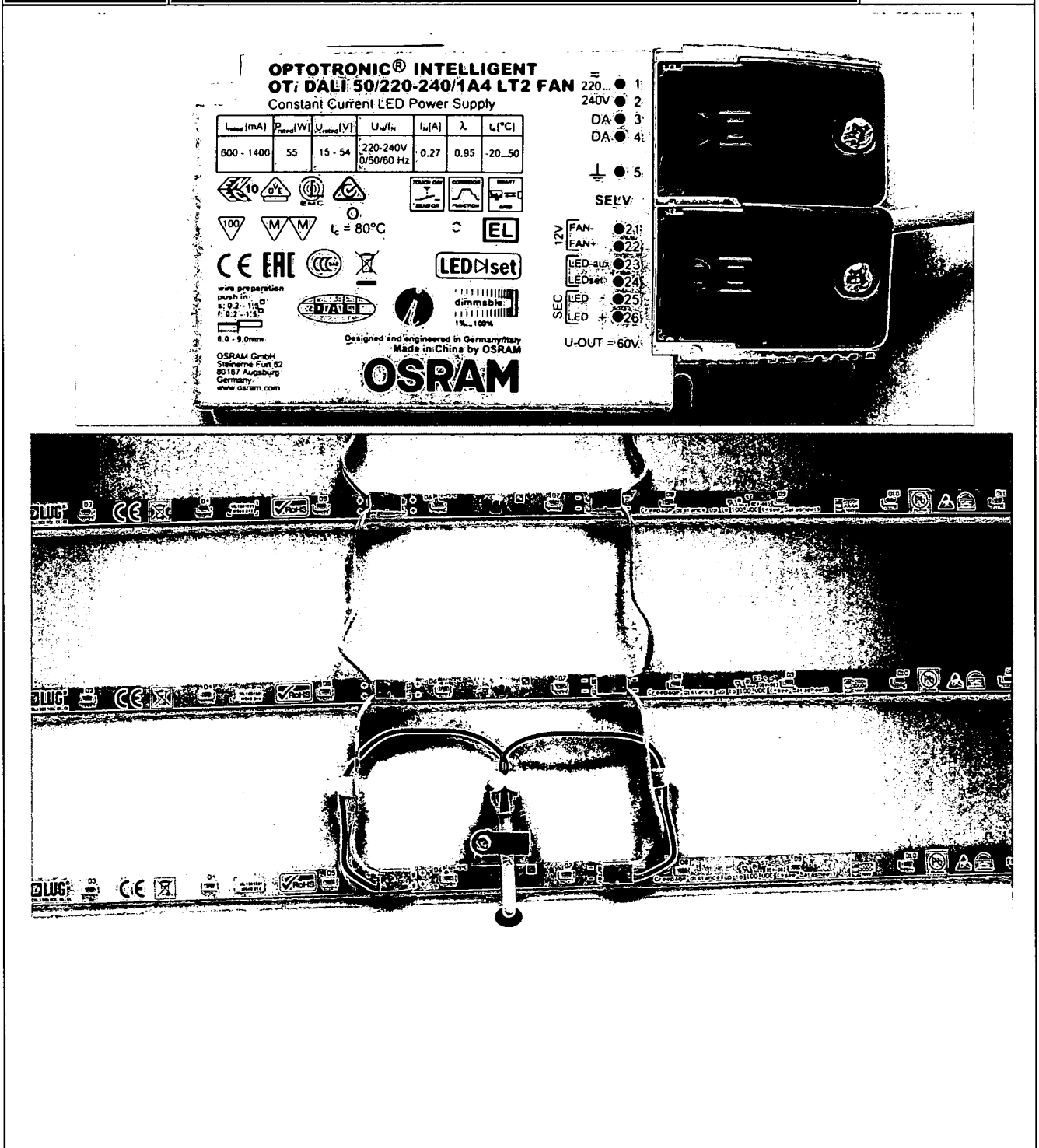
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ANNEX 5

Photo

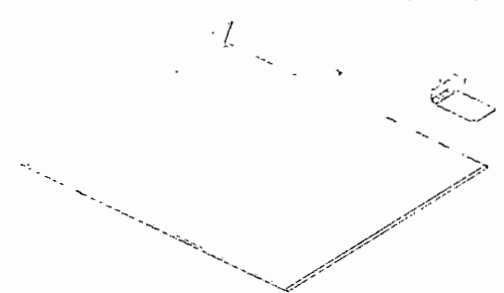
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**ANNEX 6 Instalation**

**LUG<sup>®</sup> INSTALLATION INSTRUCTION**  
**LUGCLASSIC LB PLX PT**

1. WYKONAJCIE PRACĘ MONTAŻOWĄ W TRYBIE WYKONAWCZY (PRACOWNIKI MUSZĄ BYĆ WYKONAWCZĄ OSOBĄ I NIE MOGĄ BYĆ PRACOWNIKAMI). PRACOWNICY MOGĄ WYKONAĆ TYLKO PRACĘ MONTAŻOWĄ W TRYBIE WYKONAWCZY, WYKONAWCZY MUSI BYĆ OSOBĄ WYKONAWCZĄ, KONTROLUJĄCĄ JĄ.
2. PRACOWNICY MUSZĄ BYĆ WYKONAWCZĄ OSOBĄ I NIE MOGĄ BYĆ PRACOWNIKAMI. PRACOWNICY MOGĄ WYKONAĆ TYLKO PRACĘ MONTAŻOWĄ W TRYBIE WYKONAWCZY, WYKONAWCZY MUSI BYĆ OSOBĄ WYKONAWCZĄ, KONTROLUJĄCĄ JĄ.
3. PRACOWNICY MUSZĄ BYĆ WYKONAWCZĄ OSOBĄ I NIE MOGĄ BYĆ PRACOWNIKAMI. PRACOWNICY MOGĄ WYKONAĆ TYLKO PRACĘ MONTAŻOWĄ W TRYBIE WYKONAWCZY, WYKONAWCZY MUSI BYĆ OSOBĄ WYKONAWCZĄ, KONTROLUJĄCĄ JĄ.



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 fax: +48 68 411 72 68 | 85  
 www.lug.com.pl

**WYMIARY | DIMENSIONS | DIMENSIONS**  
**DIMENSIONES | РАЗМЕРЫ | ABMESSUNGEN**

Wymiary (mm)	300x300	300x600	600x600
Wyższość (mm)	595	470	470
Wyższość (mm)	595	620	620
Wyższość (mm)	600	675	675
Wyższość (mm)	200	200	200

IP20 / IP40

INSTRUCTION INDEX  
 1/a IA-0723

**PODLACZENIE ZASILANIA | POWER CONNECTION | BRANCHEMENT D'ALIMENTATION**  
**CONEXÃO DA ALIMENTAÇÃO | ПОДКЛЮЧЕНИЕ ПИТАНИЯ | STROMVERSORGUNG**  
**LUGCLASSIC LB PLX LED PT (ON/OFF)**

**LUGCLASSIC LB PLX LED PT (DALI)**

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**MONTAZ | MONTAGE | MONTAGE | MONTAGEM | MONTAJ | MONTAGE**

**PL | Do montażu w sufitach gipsowo-kartonowych (gł) stosować dodatkowe akcesorium!**  
**PT | Permet la pose dans un faux plafond à découpe (gł) et nécessite l'utilisation d'accessoires!**

**PL | Do montażu w sufitach gipsowo-kartonowych (gł) stosować dodatkowe akcesorium!**  
**RU | Для монтажа в гипсоватонных потолках, необходимо использовать дополнительные аксессуары!**

**FR | Permet la pose dans un faux plafond à découpe (gł) et nécessite l'utilisation d'accessoires!**  
**DE | Für die Montage in der Gipskarton Decke, bitte das zusätzliche Zubehör verwenden!**

**WAŻNE INFORMACJE | IMPORTANT INFORMATIONS | INFORMACIONES ÚTILES | ВАЖНАЯ ИНФОРМАЦИЯ | WICHTIGE INFORMACIONEN**

- Przed rozpoczęciem pracy należy przeczytać instrukcję obsługi i wykonać wszystkie czynności opisane w niej. Przed instalacją należy sprawdzić, czy miejsce instalacji jest odpowiednie i czy nie ma tam żadnych przeszkód. Nie należy instalować urządzenia w miejscach, gdzie może wystąpić wilgoć lub woda. Nie należy instalować urządzenia w miejscach, gdzie może wystąpić wstrząs lub drganie. Nie należy instalować urządzenia w miejscach, gdzie może wystąpić wysokie napięcie.
- Przed rozpoczęciem pracy należy przeczytać instrukcję obsługi i wykonać wszystkie czynności opisane w niej. Przed instalacją należy sprawdzić, czy miejsce instalacji jest odpowiednie i czy nie ma tam żadnych przeszkód. Nie należy instalować urządzenia w miejscach, gdzie może wystąpić wilgoć lub woda. Nie należy instalować urządzenia w miejscach, gdzie może wystąpić wstrząs lub drganie. Nie należy instalować urządzenia w miejscach, gdzie może wystąpić wysokie napięcie.

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<b>ATTACHMENT TO TEST REPORT IEC 60598-2-2</b> <b>EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES</b> <b>LUMINAIRES</b> <b>PART 2: PARTICULAR REQUIREMENTS</b> <b>SECTION 1: FIXED GENERAL PURPOSE LUMINAIRES</b>	
<b>Differences according to</b> .....	EN 60598-2-2:2012 used in conjunction with EN 60598-1:2015
<b>Annex Form No.</b> .....	EU_GD_IEC60598_2_2D
<b>Annex Form Originator</b> .....	OVE
<b>Master Annex Form</b> .....	2015-04
<b>Copyright © 2015 IEC System for Conformity Testing and Certification of Electrical Equipment (IECEE), Geneva, Switzerland. All rights reserved.</b>	

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

	<b>CENELEC COMMON MODIFICATIONS (EN)</b>		
--	--	--	--

<b>1.5 (3)</b>	<b>MARKING</b>		
1.5 (3.3.101)	For luminaires not supplied with terminal block: Adequate warning on the package		---

<b>1.6 (4)</b>	<b>CONSTRUCTION</b>		
1.6 (4.11.6)	Electro-mechanical contact systems		---

<b>1.10 (5)</b>	<b>EXTERNAL AND INTERNAL WIRING</b>		
1.10 (5.2.1)	Connecting leads		---
	- without a means for connection to the supply		---
	- terminal block specified		---
	- relevant information provided		---
	- compliance with 4.6, 4.7.1, 4.7.2, 4.10.1, 11.2, 12 and 13.2 of Part 1		---
1.10 (5.2.2)	Cables equal to EN 50525		---
	Replace table 5.1 – Supply cord		---

<b>1.12 (12)</b>	<b>ENDURANCE TESTS AND THERMAL TESTS</b>		
1.12 (12.4.2c)	Thermal test (normal operation) see footnote c to table 12.2 relating to unsleeved fixed wiring		---

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
<b>ZB</b>	<b>ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)</b>		
(3.3)	DK: power supply cords of class I luminaires with label		---
(4.5.1)	DK: socket-outlets		---
(5.2.1)	CY, DK, FI, GB: type of plug		---
<b>ZC</b>	<b>ANNEX ZC, NATIONAL DEVIATIONS (EN)</b>		
(4 & 5)	FR: Shuttered socket-outlets 10/16A		---
	FR: Safety requirements for high buildings (Arrêté du 30 décembre 2011 portant règlement de sécurité pour la construction des immeubles de grande hauteur et leur protection contre les risques d'incendie et de panique; Section VIII; Article GH 48, Eclairage)		---
	Glow-wire test for outer parts of luminaires:		
	- 850°C for luminaires in stairways and horizontal travel paths		---
	- 650°C for indoor luminaires		---
	GB: Requirements according to United Kingdom Building Regulation		---



**ATTACHMENT TO TEST REPORT 700590-01/01**  
**ČSN EN 62471:2009**  
**Photobiological safety of lamps and lamps systems**  
**(Blue light hazard)**

**Measured values**

Risk	Symbol	Measured value	Group
Blue light	$L_B$	11,92 W.m <sup>-2</sup> .sr <sup>-1</sup>	Exempt

Measured with supply voltage 230 V. Ambient temperature 25 °C. Measured at 500 lx distance.

**Conclusion**

Light source can be considered as low risk light source – Risk Group 0 (RG 0).

Emission limits for risk groups of continuous wave lamps						
Risk	Action spectrum	Symbol	Units	Emission Measurement		
				Exempt	Low risk	Mod risk
				Limit	Limit	Limit
Blue light	B( $\lambda$ )	$L_B$	W.m <sup>-2</sup> .sr <sup>-1</sup>	100	10000	4000000

*Lukáš Fér*

Measured by: Lukáš Fér

## PHOTOMETRIC TEST REPORT LM79 & EN 13032



LUG Light Factory Ltd ul. Gorzowska 11 65-127 Zielona Góra, POLAND KRS 0000290498 REGON 080212116 NIP PL 929-17-85-452		LUG Testing Laboratory address ul. Nowa 7 66-002 Nowy Kisielin, POLAND	TEST SPECIFICATION – STANDARDS: PN – EN 13032 – 4 :2015 LM79 – 08
Test Report No./Test protocol BF_06_6045_18		Tested by: Krzysztof Olek	Compiled by: Krzysztof Olek
Sample No. 327/1/18		Approved by: Marcin Białas	Client name: LUG Light Factory
Date :	2018-10-11	Model name:	6045 LUGCLASSIC LB 600x600 nt 4350lm 840 PLX biały
Index:	903061.00918	Company:	LUG Light Factory
This protocol shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products.			

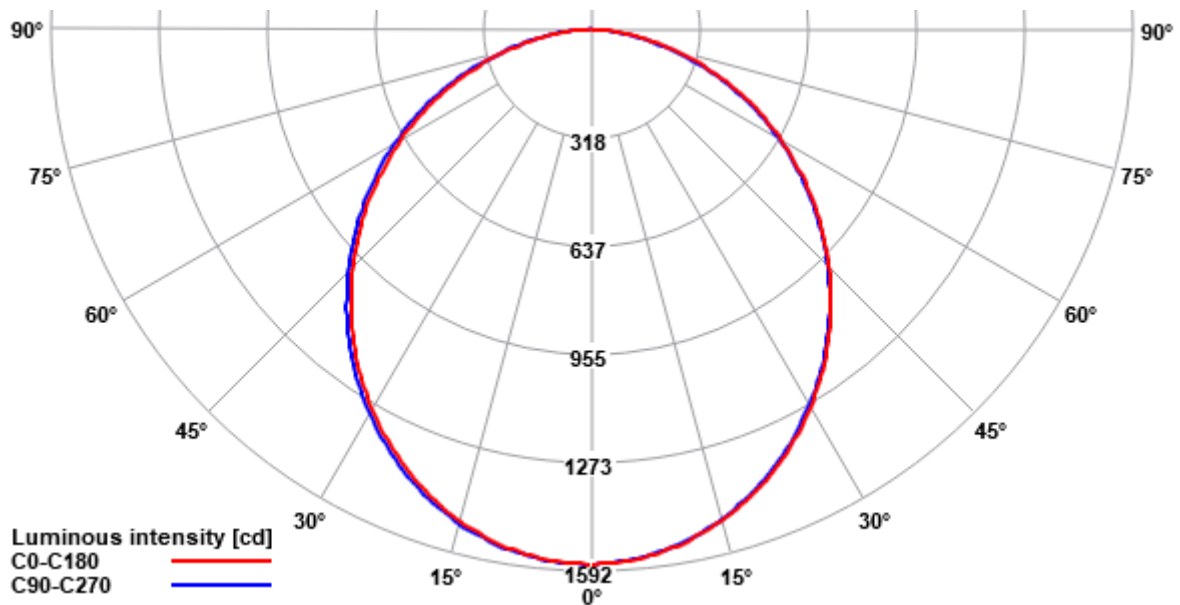
### Eulumdat Fields

<p><b>Dimensions of luminaire</b> Length: 604 mm Width: 604 mm Height: 93 mm</p> <p><b>Dimensions of luminous area</b> Length: 525 mm Width: 525 mm C0-plane 0 mm C90-plane 0 mm C180-plane 0 mm C270-plane 0 mm</p> <p><b>Utilization factors:</b> k = 0.60 0,291      k = 2.00 0,680 k = 0.80 0,379      k = 2.50 0,730 k = 1.00 0,457      k = 3.00 0,768 k = 1.25 0,533      k = 4.00 0,819 k = 1.50 0,591      k = 5.00 0,850</p>	<p><b>Lamps:</b> Type of lamps: LED Total luminous flux: 4275,86 lm Color temperature: 3956.55 K Color rendering index: 82,12 Wattage including ballast: 41,13 W</p> <p><b>Electrical parameters:</b> U = 229,717 V I = 0,185 A P = 41,129 W Power factor = 0,968 Power apparent = 42,475 VA Power Reactive = -10,609 var Frequency = 50,002 Hz THDI = 13,508 % Temperature = 25,0 C</p>
--	--

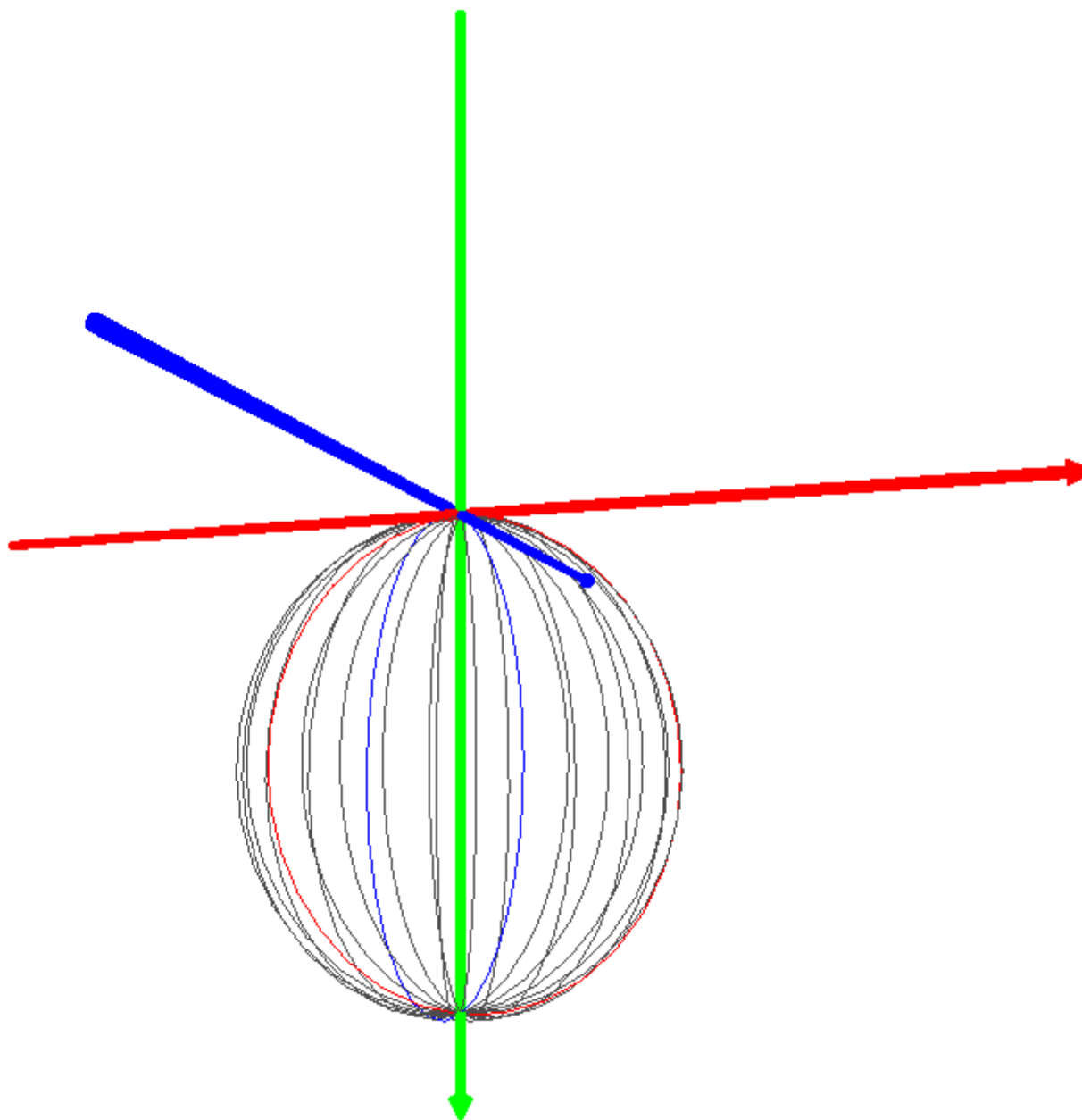
## Goniometric measurement results

Total flux (utilized luminaire flux)	4275,86 lm
Flux in lower hemisphere	100,00 %
Flux in upper hemisphere	0,00 %
Maximum luminous intensity	1576,08 cd
Light output ratio (LOR)	100,00 %
Luminous efficacy	103,96 lm/W

## Light intensity distribution diagram



### 3D Chart



## Legend



- C0-C180



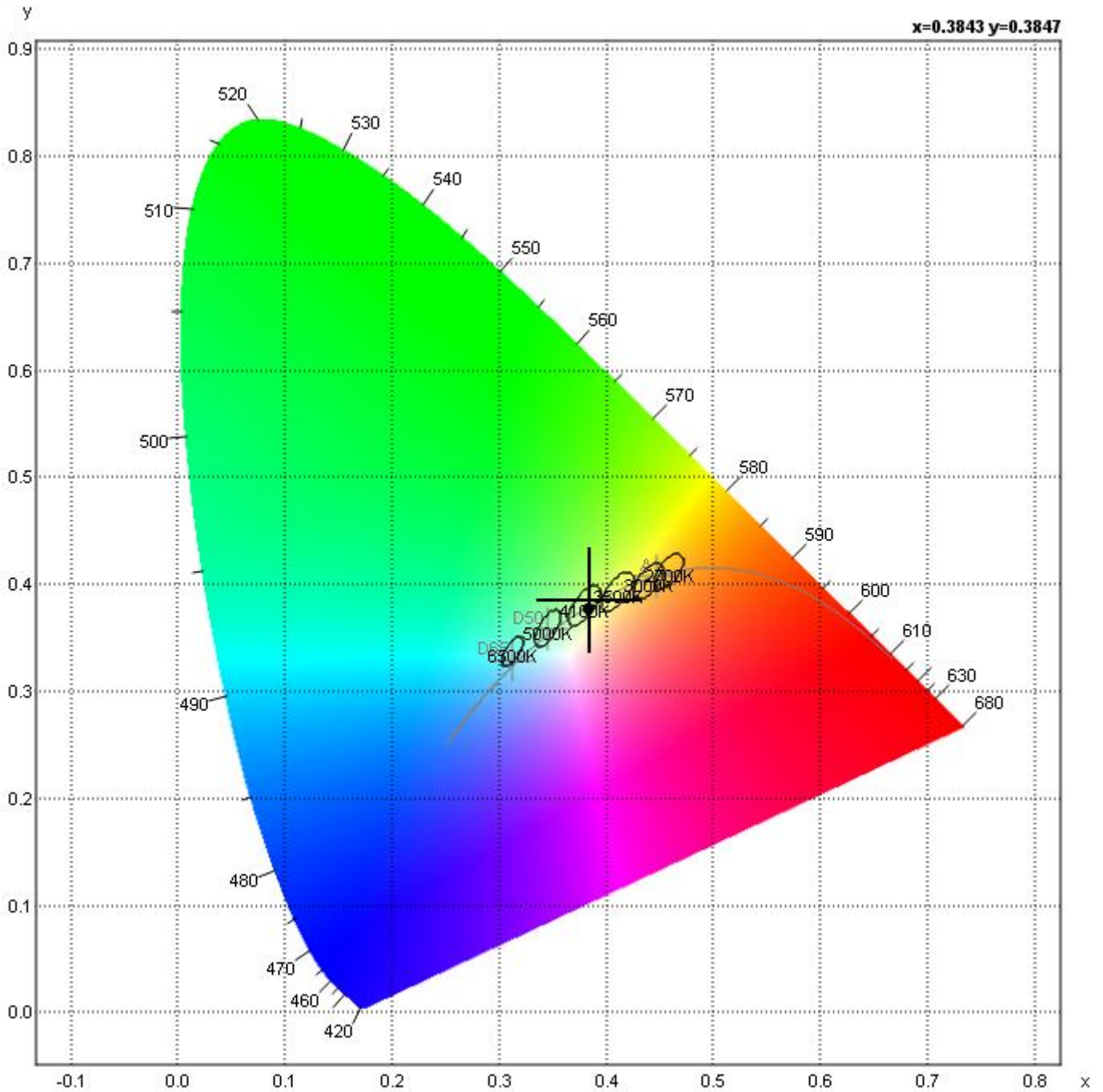
- C90-C270



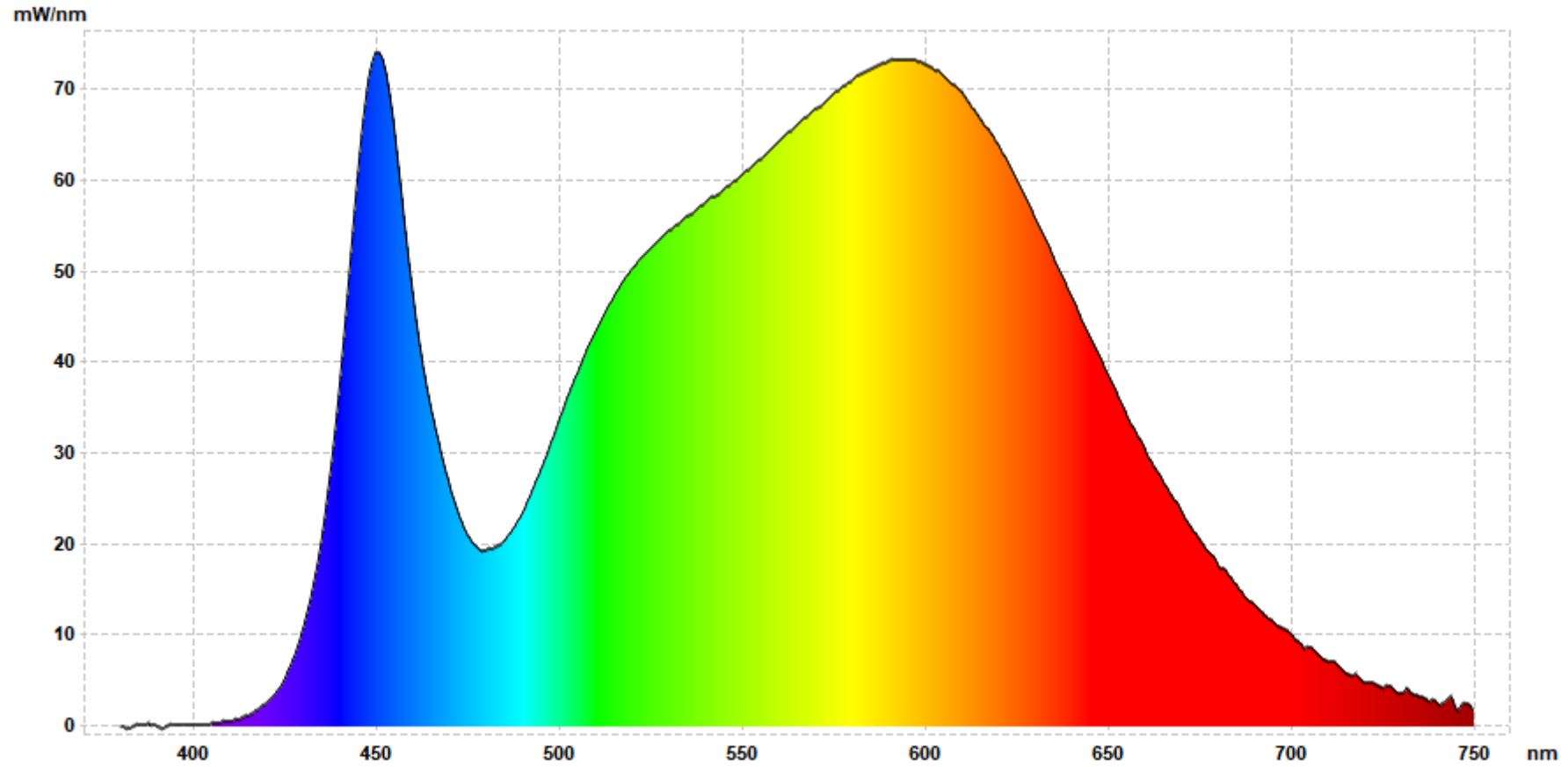
- G0-G180

## CIE 1931 diagram

x 0,3843  
 y 0,3847  
 Angular Colour Uniformity 0,0000



## Spectrum



## Luminous intensity [cd/klm]

G \ C	0°	15°	30°	45°	60°	75°	90°	105°	120°	135°	150°	165°
0°	368,60	368,60	368,60	368,60	368,60	368,60	368,60	368,60	368,60	368,60	368,60	368,60
5°	366,53	366,45	366,50	366,34	366,16	366,06	366,14	366,18	365,97	366,13	366,11	366,21
10°	360,30	360,21	360,24	360,20	359,78	359,79	359,68	359,55	359,28	359,54	359,48	359,41
15°	350,44	350,54	350,11	350,07	349,69	349,56	349,37	349,40	349,16	348,94	349,00	348,98
20°	337,06	337,16	336,79	336,70	336,28	336,18	335,71	335,62	335,61	335,27	335,06	335,41
25°	320,94	320,39	320,36	320,23	319,79	319,38	319,37	318,89	318,87	318,45	318,35	318,18
30°	301,62	301,37	300,90	301,11	300,73	300,47	300,19	299,97	299,63	299,11	298,89	299,02
35°	280,30	280,02	279,75	279,66	279,54	279,33	279,02	278,61	278,12	277,85	277,51	277,50
40°	256,89	256,86	256,70	256,07	255,88	255,93	255,48	255,08	254,71	253,93	253,85	253,71
45°	231,87	232,31	231,56	231,53	231,04	231,08	230,62	230,34	229,56	229,11	228,58	228,61
50°	205,70	205,77	205,14	205,79	204,77	204,84	204,05	204,22	203,10	203,05	202,20	202,60
55°	178,61	178,61	177,91	177,94	177,49	177,67	176,78	176,59	175,69	175,82	174,96	175,08
60°	150,33	150,62	149,81	149,93	149,15	149,29	148,55	148,52	147,51	147,48	146,79	146,97
65°	121,89	121,80	121,31	120,81	120,70	120,08	119,72	119,34	118,70	118,10	118,09	118,06
70°	91,87	91,91	91,49	90,86	90,79	90,26	89,74	89,21	88,78	88,32	87,97	88,11
75°	62,27	62,48	61,87	61,92	61,11	61,33	60,28	60,18	59,32	59,28	59,07	59,12
80°	34,70	34,58	33,97	33,97	33,28	33,09	32,46	32,42	31,87	31,71	31,65	31,46
85°	11,42	11,29	10,91	10,36	10,56	9,82	10,01	9,18	9,85	8,95	9,58	9,14
90°	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,22	0,09

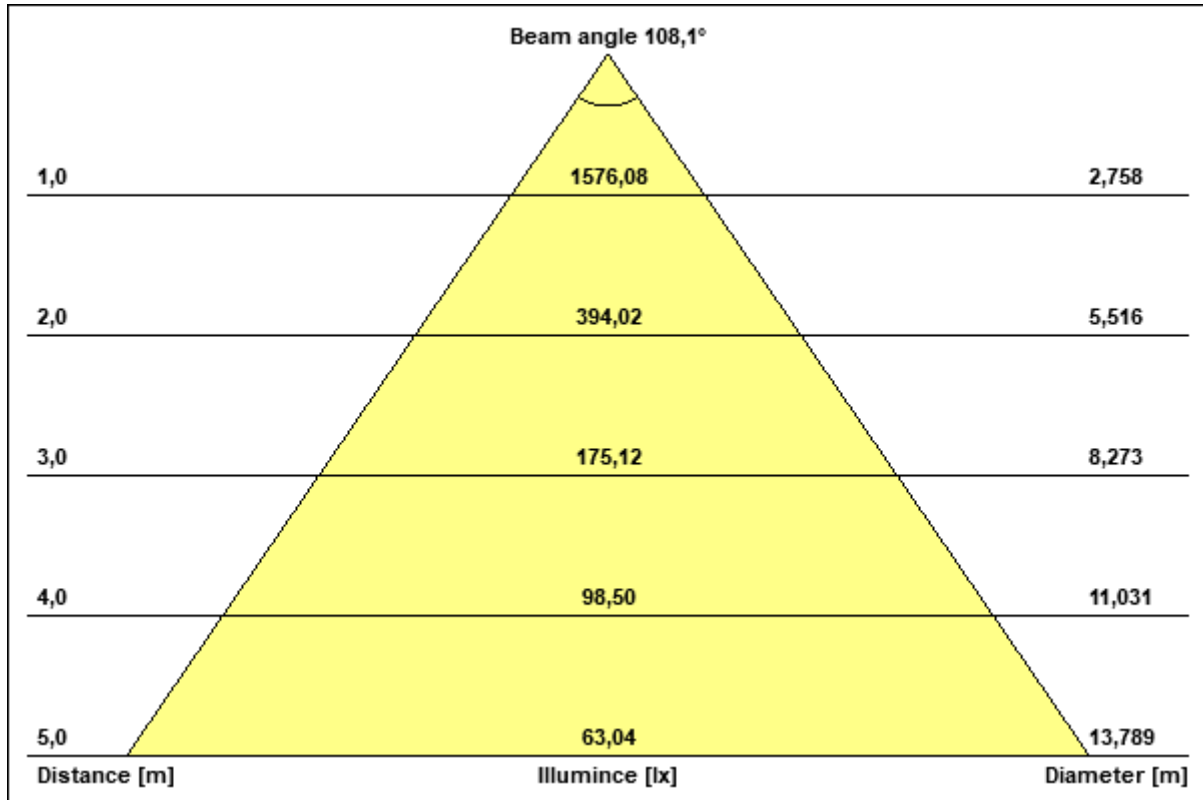





G \ C	180°	195°	210°	225°	240°	255°	270°	285°	300°	315°	330°	345°
0°	368,60	368,60	368,60	368,60	368,60	368,60	368,60	368,60	368,60	368,60	368,60	368,60
5°	366,60	366,49	366,76	366,82	367,05	366,86	367,00	367,05	367,44	367,12	367,35	367,43
10°	360,62	360,61	360,70	361,09	361,30	361,36	361,59	361,68	361,95	361,77	361,77	361,68
15°	350,82	350,65	351,07	351,38	351,62	351,94	352,37	352,51	352,58	352,48	352,38	352,22
20°	337,08	337,34	337,76	338,24	338,62	339,13	339,66	339,78	339,77	339,79	339,63	339,33
25°	320,71	320,75	321,34	322,20	322,64	323,15	323,79	323,88	324,32	323,78	323,80	323,25
30°	301,69	301,47	302,55	303,34	303,87	304,49	305,18	305,55	305,56	305,06	305,05	304,35
35°	280,43	280,18	281,34	282,11	283,13	283,33	284,38	284,40	284,60	284,01	284,14	283,36
40°	257,13	257,17	257,95	258,90	260,12	260,39	261,47	261,32	261,71	260,99	261,09	260,09
45°	231,80	231,87	233,02	233,97	234,70	235,78	236,25	236,62	237,00	236,52	236,20	235,76
50°	205,66	205,68	206,60	207,45	208,56	209,16	210,39	210,34	210,75	210,32	210,08	209,27
55°	178,48	178,42	179,12	180,48	181,29	182,43	183,05	183,24	183,35	183,22	182,76	182,43
60°	150,21	150,32	151,07	151,96	152,99	153,88	154,69	154,89	154,97	154,99	154,77	154,20
65°	121,50	121,31	122,29	122,81	124,22	124,85	125,75	125,74	126,38	126,08	126,13	125,54
70°	91,58	91,65	92,52	92,85	93,88	94,69	95,65	95,51	96,43	96,13	96,02	95,70
75°	61,97	61,86	62,43	63,23	63,84	64,97	65,43	65,58	66,21	66,48	66,28	65,85
80°	34,19	34,19	34,58	35,77	35,75	36,63	37,08	37,49	38,07	38,45	38,12	38,07
85°	10,84	11,33	11,25	12,38	11,90	13,30	12,89	13,59	13,65	14,47	13,67	14,54
90°	0,04	0,00	0,00	0,00	0,00	0,28	0,26	0,17	0,29	0,54	0,74	0,84



## Beam cone

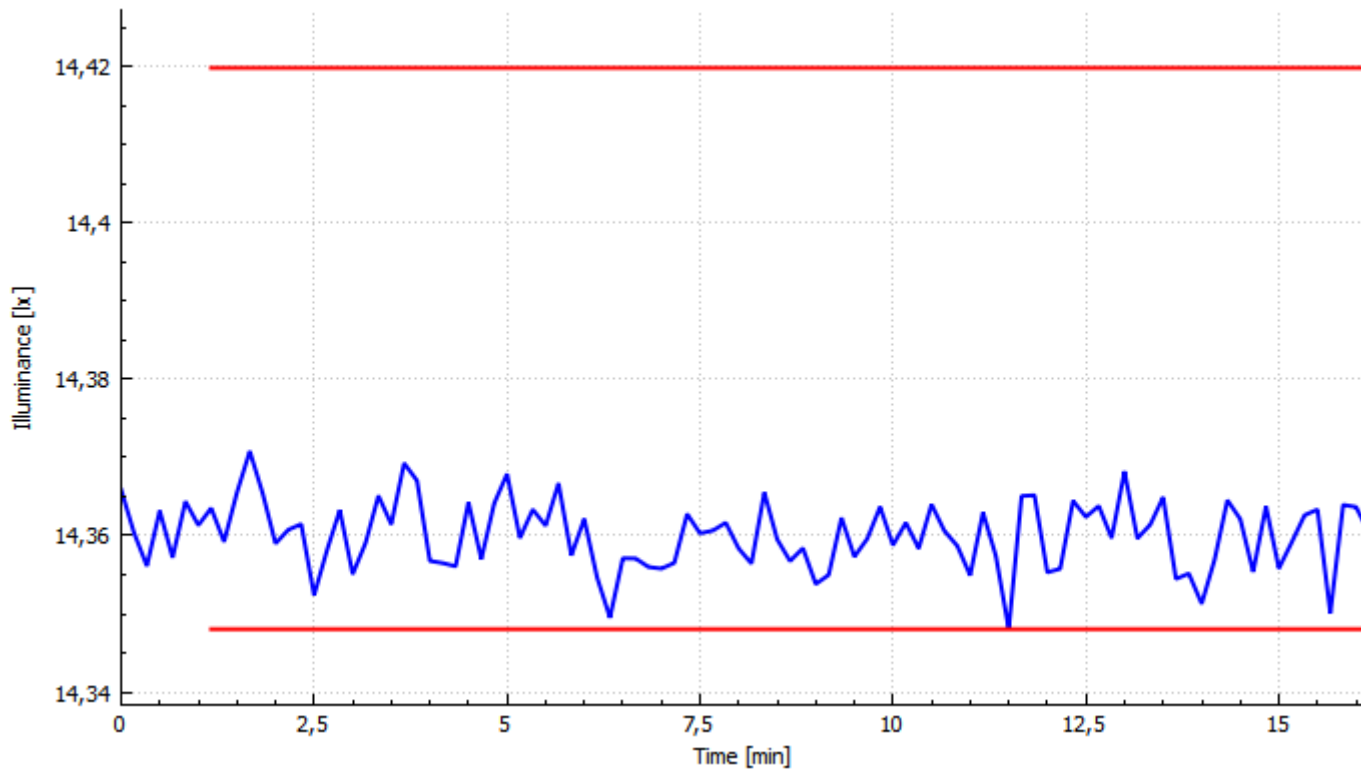


Distance [m]	Max illuminance [lx]	Diameter [m]
1	1576,0776	2,758
2	394,0194	5,516
3	175,1197	8,273
4	98,5049	11,031
5	63,0431	13,789

## Beam angles

C plane	Beam angle [°]	Gamma max [°]	Start [°]	Stop [°]
<b>0-180</b>	107,9	0,0	-53,9	54,0
<b>15-195</b>	107,9	0,0	-53,9	54,0
<b>30-210</b>	107,9	0,0	-54,1	53,8
<b>45-225</b>	108,1	0,0	-54,3	53,9
<b>60-240</b>	108,2	0,0	-54,4	53,8
<b>75-255</b>	108,4	0,0	-54,6	53,8
<b>90-270</b>	108,4	0,0	-54,8	53,6
<b>105-285</b>	108,4	0,0	-54,8	53,6
<b>120-300</b>	108,3	0,0	-54,8	53,4
<b>135-315</b>	108,2	0,0	-54,8	53,4
<b>150-330</b>	108,0	0,0	-54,7	53,3
<b>165-345</b>	108,0	0,0	-54,7	53,3

## Stabilization



220-240V  
50/60 HzIK  
03IP  
20/40

Modern surface mounted luminaire for LED light sources emitting light with it's entire diffuser surface. The subject of modification is adapting the luminaire to a surface-mounted and economical version.

**TECHNICAL DATA**
**Mounting:** directly on the ceiling

**Body:** powder-painted steel sheet

**Colour:** white

**Diffuser:** opal plexiglass (PLX)

**ELECTRICAL DATA**
**Power supply efficiency:** 88%

**Power:** 220-240V 50/60Hz

**Includes light source:** yes

**Type of equipment:** ED

**Electrical connection:** max 2x1,5 mm<sup>2</sup> wire

**Light distribution:** rotationally-symmetric

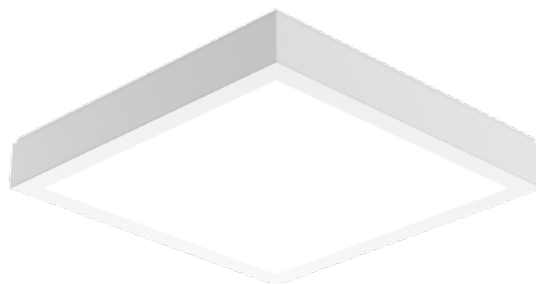
**OPTICAL DATA**
**Way of lighting:** direct

**GENERAL DATA**
**Lifetime (L80B10):** 100 000 h

**Lifetime (TM21 L90B10):** 30 000 h

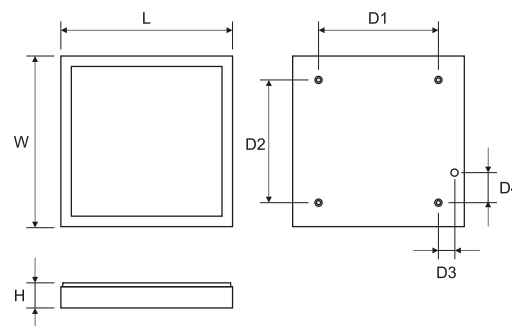
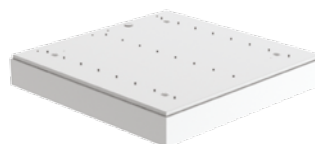
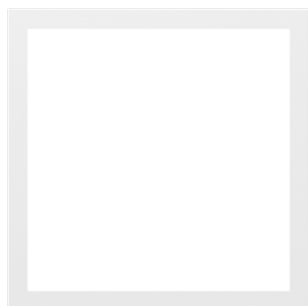
**Operating temperature range:** 0°C ... +40°C

**Warranty:** 3 years

**Application:** offices, classrooms, auditorium


Code	Luminaire power [W]	Lumen luminaire [lm]	Efficacy [lm/W]	Colour temperature [K]	CRI/Ra
903061.00918	40	4300	108	4000	≥80

Code	Dimensions [mm] L W H D1 D2 D3 D4	Pallet quantity	Quantity in package	Net weight [kg]
903061.00918	605 605 95 424 430 55 106	36	1	4.4


**OTHER PICTURES**


Luminous flux tolerance +/- 10%.

Power tolerance +/- 5%.

Lighting beam, light intensity distribution and light efficiency were examined in accordance with the EN ISO 17025:2005 norm for EN13032 norm series and the LM-79 norm.

## **AEE - sediul Stefan cel Mare**

Renovarea sistemului de iluminat al sediului AEE pe bd. Stefan cel mare 162, et. 10

Data: 02.04.2019  
Proiectant:

Proiectant  
Telefon  
Fax  
e-mail

## Cuprins

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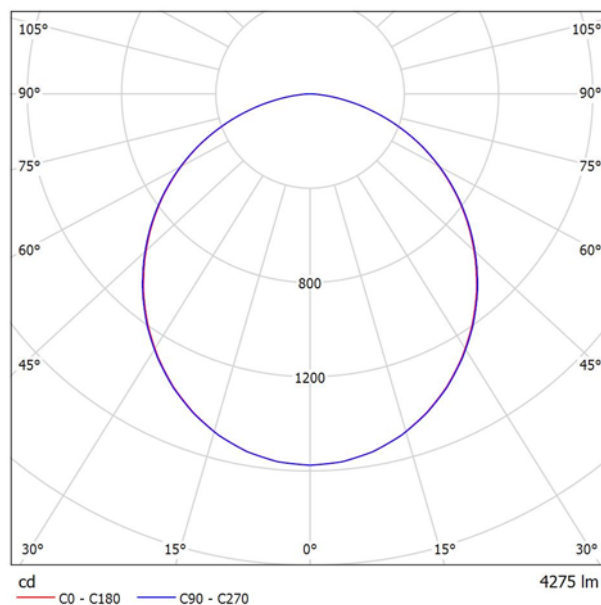


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## LUG Light Factory 903061.00918 6045 LUGCLASSIC LB 600x600 nt 4350lm 840 PLX bialy / Fișă cu date corpuri de iluminat

Distribuția luminoasă 1:

Vedeți catalogul nostru de corpuri de iluminat pentru o imagine a corpului de iluminat.



Clasificarea corpurilor de iluminat conform CIE: 100  
Cod flux CIE: 48 80 96 100 100

Distribuția luminoasă 1:

Evaluarea orbirii conform UGR											
ρ Tavan		70	70	50	50	30	70	70	50	50	30
ρ Pereți		50	30	50	30	30	50	30	50	30	30
ρ Podea		20	20	20	20	20	20	20	20	20	20
Dimensiunile spațiului X Y		Direcția vederii transversală la axa lămpii					Direcția vederii paralelă la axa lămpii				
2H	2H	18.1	19.4	18.4	19.6	19.8	18.1	19.4	18.4	19.7	19.9
	3H	19.6	20.8	19.9	21.0	21.3	19.6	20.8	20.0	21.1	21.4
	4H	20.2	21.3	20.5	21.6	21.9	20.2	21.3	20.6	21.6	21.9
	6H	20.5	21.6	20.9	21.9	22.2	20.6	21.6	21.0	21.9	22.2
	8H	20.6	21.6	21.0	22.0	22.3	20.7	21.7	21.1	22.0	22.3
4H	12H	20.7	21.6	21.1	22.0	22.3	20.7	21.7	21.1	22.0	22.4
	2H	18.8	19.9	19.1	20.2	20.4	18.8	19.9	19.1	20.2	20.5
	3H	20.4	21.4	20.8	21.7	22.1	20.5	21.4	20.9	21.8	22.1
	4H	21.1	22.0	21.5	22.3	22.7	21.2	22.0	21.6	22.4	22.7
	6H	21.6	22.4	22.1	22.7	23.1	21.7	22.4	22.1	22.8	23.2
8H	8H	21.8	22.5	22.2	22.9	23.3	21.8	22.5	22.3	22.9	23.3
	12H	21.9	22.5	22.3	22.9	23.3	21.9	22.5	22.3	22.9	23.4
	4H	21.4	22.1	21.9	22.5	22.9	21.5	22.1	21.9	22.5	22.9
	6H	22.0	22.6	22.5	23.0	23.5	22.1	22.6	22.5	23.1	23.5
	8H	22.2	22.7	22.7	23.2	23.6	22.3	22.8	22.8	23.2	23.7
12H	12H	22.4	22.8	22.8	23.2	23.7	22.4	22.8	22.9	23.3	23.8
	4H	21.4	22.1	21.9	22.5	22.9	21.5	22.1	21.9	22.5	22.9
	6H	22.1	22.6	22.6	23.0	23.5	22.1	22.6	22.6	23.1	23.5
8H	22.3	22.7	22.8	23.2	23.7	22.4	22.8	22.8	23.2	23.7	
Variația poziției observatorului pentru distanțele S ale corpurilor de iluminat											
S = 1.0H		+0.1 / -0.1					+0.1 / -0.1				
S = 1.5H		+0.2 / -0.4					+0.2 / -0.4				
S = 2.0H		+0.4 / -0.7					+0.4 / -0.7				
Tabel standard		BK05					BK05				
Suma corecțiilor		4.7					4.7				
Indici de orbire corecțai referitor la 4275lm Flux luminos total											

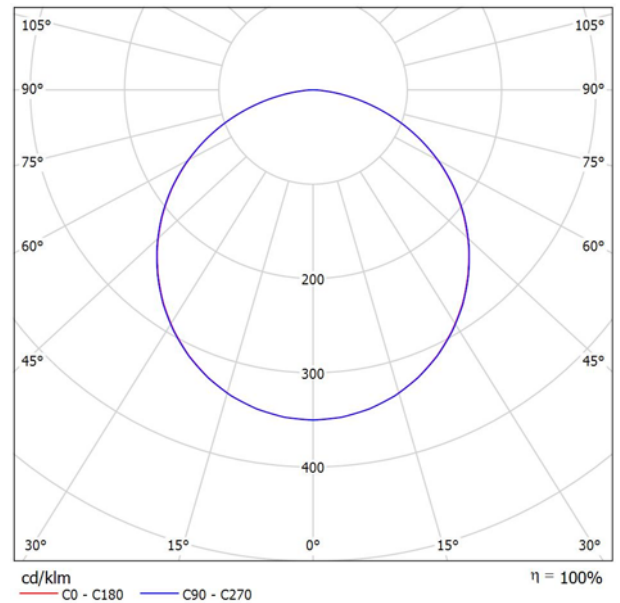


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## LUG LIGHT FACTORY 300061.00065 3361\_4 LUGCLASSIC ECO LB LED NT 4500 840 / Fișă cu date corpuri de iluminat

Distribuția luminoasă 1:

Vedeți catalogul nostru de corpuri de iluminat pentru o imagine a corpului de iluminat.



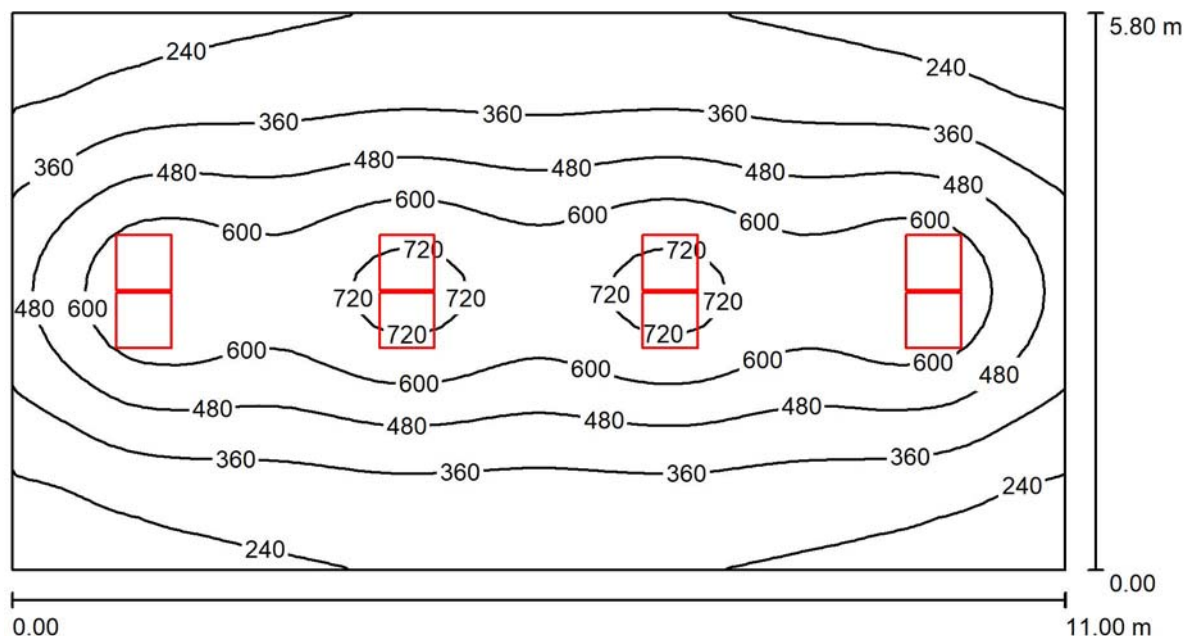
Clasificarea corpurilor de iluminat conform CIE: 100  
Cod flux CIE: 47 79 96 100 100

Distribuția luminoasă 1:

Evaluarea orbirii conform UGR											
ρ Tavan	70	70	50	50	30	70	70	50	50	30	
ρ Pereți	50	30	50	30	30	50	30	50	30	30	
ρ Podea	20	20	20	20	20	20	20	20	20	20	
Dimensiunile spațiului x y	Direcția vederii transversală la axa lămpii					Direcția vederii paralelă la axa lămpii					
	2H	2H	19.6	20.9	19.9	21.2	21.4	19.6	21.0	19.9	21.2
	3H	21.2	22.4	21.5	22.7	22.9	21.2	22.4	21.5	22.7	23.0
	4H	21.8	22.9	22.1	23.2	23.5	21.8	23.0	22.2	23.2	23.5
	6H	22.2	23.2	22.6	23.6	23.9	22.2	23.3	22.6	23.6	23.9
	8H	22.3	23.3	22.7	23.6	24.0	22.3	23.4	22.7	23.7	24.0
	12H	22.3	23.3	22.7	23.6	24.0	22.4	23.4	22.8	23.7	24.0
4H	2H	20.3	21.5	20.7	21.7	22.0	20.3	21.5	20.7	21.7	22.0
	3H	22.1	23.0	22.4	23.4	23.7	22.1	23.1	22.5	23.4	23.7
	4H	22.8	23.7	23.2	24.0	24.4	22.8	23.7	23.2	24.0	24.4
	6H	23.3	24.1	23.7	24.4	24.8	23.3	24.1	23.8	24.5	24.9
	8H	23.5	24.2	23.9	24.5	25.0	23.5	24.2	23.9	24.6	25.0
	12H	23.5	24.2	24.0	24.6	25.0	23.6	24.2	24.0	24.6	25.0
8H	4H	23.1	23.8	23.5	24.2	24.6	23.1	23.8	23.5	24.2	24.6
	6H	23.7	24.3	24.2	24.7	25.2	23.7	24.3	24.2	24.7	25.2
	8H	23.9	24.4	24.4	24.9	25.4	24.0	24.5	24.4	24.9	25.4
	12H	24.1	24.5	24.6	25.0	25.5	24.1	24.5	24.6	25.0	25.5
12H	4H	23.1	23.7	23.6	24.1	24.6	23.1	23.7	23.6	24.2	24.6
	6H	23.8	24.3	24.3	24.7	25.2	23.8	24.3	24.3	24.7	25.2
	8H	24.0	24.4	24.5	24.9	25.4	24.0	24.5	24.5	24.9	25.4
Variația poziției observatorului pentru distanțele S ale corpurilor de iluminat											
S = 1.0H	+0.1 / -0.1					+0.1 / -0.1					
S = 1.5H	+0.2 / -0.4					+0.2 / -0.3					
S = 2.0H	+0.4 / -0.7					+0.4 / -0.7					
Tabel standard	BK06					BK06					
Suma corecțiilor	6.8					6.8					
Indici de orbire corecțai referitor la 3700lm Flux luminos total											

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### Situatia 1. Sala sedinte 300061.00150 / Rezumat



Înălțimea spațiului: 3.000 m, Înălțime de montare: 3.000 m, Factor de menținere: 0.90

Valoare în Lux, Scară 1:79

Suprafață	$\rho$ [%]	$E_m$ [lx]	$E_{min}$ [lx]	$E_{max}$ [lx]	$u_0$
Plan util	/	434	172	768	0.396
Podea	20	380	193	553	0.509
Tavan	70	87	59	127	0.676
Pereți (4)	50	200	74	495	/

#### Plan util:

Înălțime: 0.800 m  
Raster: 64 x 32 Puncte  
Zonă de margine: 0.000 m

#### UGR

Pe lungime-  
Perete stânga 21  
Perete inferior 21  
(CIE, SHR = 0.25.)

Pe lungime-

Transversal

la axa corpului de iluminat

#### Listă bucăți corpuri de iluminat

Nr.	Bucăți	Denumire (Factor de corecție)	$\Phi$ (Corp de iluminat) [lm]	$\Phi$ (Lămpi) [lm]	P [W]
1	8	LUG LIGHT FACTORY 300061.00150 4040 LUGCLASSIC LB LED PLX PT 600 840 (1.000)	4350	4350	39.0
Total:			34800	34800	312.0

Putere specifică:  $4.89 \text{ W/m}^2 = 1.13 \text{ W/m}^2/100 \text{ lx}$  (Suprafață:  $63.80 \text{ m}^2$ )

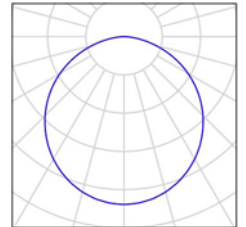


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### Situatia 1. Sala sedinte 300061.00150 / Listă număr corpuri de iluminat

8 Bucăți LUG LIGHT FACTORY 300061.00150 4040  
LUGCLASSIC LB LED PLX PT 600 840  
Nr.articol: 300061.00150  
Flux luminos (Corp de iluminat): 4350 lm  
Flux luminos (Lămpi): 4350 lm  
Putere corpuri de iluminat: 39.0 W  
Clasificarea corpurilor de iluminat conform CIE:  
100  
Cod flux CIE: 47 79 96 100 100  
Dotare: 1 x LED 4000K (Factor de corecție  
1.000).

Vedeți catalogul nostru  
de corpuri de iluminat  
pentru o imagine a  
corpului de iluminat.



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### Situatia 1. Sala sedinte 300061.00150 / Rezultate fotometrice

Flux luminos total: 34800 lm  
Putere totală: 312.0 W  
Factor de menținere: 0.90  
Zonă de margine: 0.000 m

Suprafață	Iluminare medie [lx]			Grade de reflexie [%]	Luminanță medie [cd/m <sup>2</sup> ]
	direct	indirect	total		
Plan util	356	78	434	/	/
Podea	296	83	380	20	24
Tavan	0.00	87	87	70	19
Perete 1	110	78	188	50	30
Perete 2	149	76	224	50	36
Perete 3	110	78	187	50	30
Perete 4	149	76	224	50	36

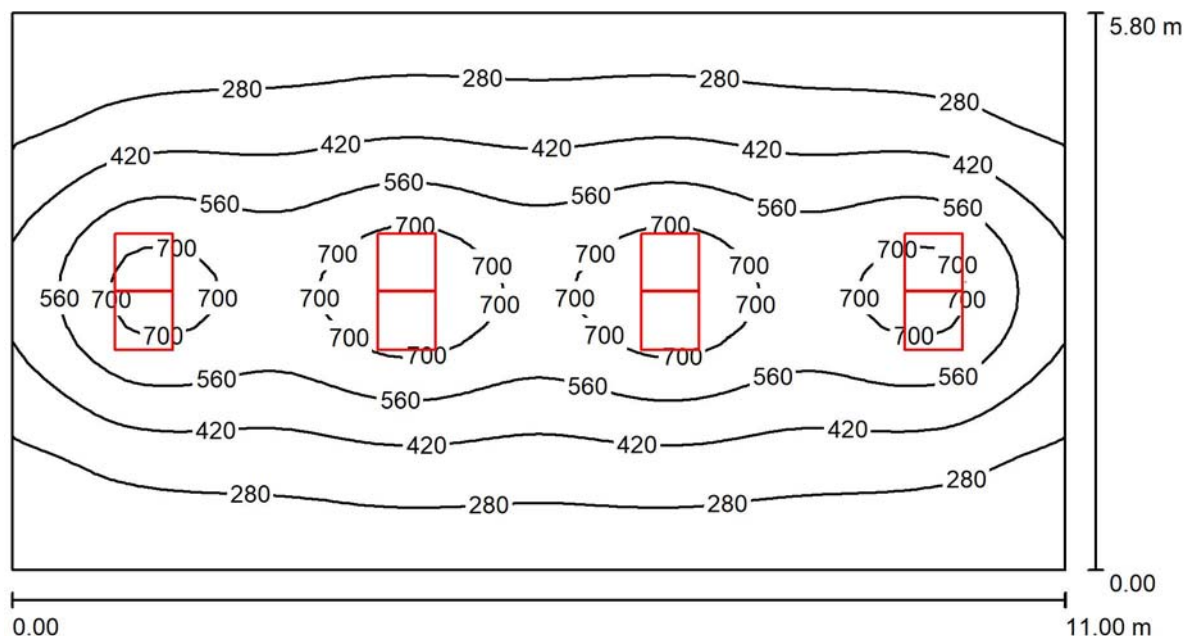
Uniformitate pe planul util  
u<sub>0</sub>: 0.396 (1:3)  
E<sub>min</sub>/E<sub>max</sub>: 0.224 (1:4)

**UGR** Pe lungime- Transversal la axa corpului de iluminat  
Perete stânga 21 21  
Perete inferior 21 21  
(CIE, SHR = 0.25.)

Putere specifică:  $4.89 \text{ W/m}^2 = 1.13 \text{ W/m}^2/100 \text{ lx}$  (Suprafață: 63.80 m<sup>2</sup>)

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### Situatia 1. Sala sedinte 903061.00918 / Rezumat



Înălțimea spațiului: 3.000 m, Înălțime de montare: 3.000 m, Factor de menținere: 0.90

Valoare în Lux, Scară 1:79

Suprafață	$\rho$ [%]	$E_m$ [lx]	$E_{min}$ [lx]	$E_{max}$ [lx]	$u_0$
Plan util	/	435	161	818	0.369
Podea	20	382	185	575	0.485
Tavan	70	84	55	103	0.660
Pereți (4)	50	188	65	478	/

#### Plan util:

Înălțime: 0.800 m  
Raster: 64 x 32 Puncte  
Zonă de margine: 0.000 m

#### UGR

Pe lungime-  
Perete stânga 22  
Perete inferior 21  
(CIE, SHR = 0.25.)

Pe lungime-

Transversal

la axa corpului de iluminat

#### Listă bucăți corpuri de iluminat

Nr.	Bucăți	Denumire (Factor de corecție)	$\Phi$ (Corp de iluminat) [lm]	$\Phi$ (Lămpi) [lm]	P [W]
1	8	LUG Light Factory 903061.00918 6045 LUGCLASSIC LB 600x600 nt 4350lm 840 PLX bialy (1.000)	4275	4275	41.1
			Total: 34200	Total: 34200	329.0

Putere specifică:  $5.16 \text{ W/m}^2 = 1.19 \text{ W/m}^2/100 \text{ lx}$  (Suprafață:  $63.80 \text{ m}^2$ )



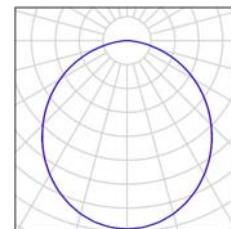
Proiectant  
Telefon  
Fax  
e-mail

### Situatia 1. Sala sedinte 903061.00918 / Listă număr corpuri de iluminat

8 Bucăți

LUG Light Factory 903061.00918 6045  
LUGCLASSIC LB 600x600 nt 4350lm 840 PLX  
bialy  
Nr.articol: 903061.00918  
Flux luminos (Corp de iluminat): 4275 lm  
Flux luminos (Lămpi): 4275 lm  
Putere corpuri de iluminat: 41.1 W  
Clasificarea corpurilor de iluminat conform CIE:  
100  
Cod flux CIE: 48 80 96 100 100  
Dotare: 1 x LED (Factor de corecție 1.000).

Vedeți catalogul nostru  
de corpuri de iluminat  
pentru o imagine a  
corpului de iluminat.



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### Situatia 1. Sala sedinte 903061.00918 / Rezultate fotometrice

Flux luminos total: 34200 lm  
Putere totală: 329.0 W  
Factor de menținere: 0.90  
Zonă de margine: 0.000 m

Suprafață	Iluminare medie [lx]			Grade de reflexie [%]	Luminanță medie [cd/m <sup>2</sup> ]
	direct	indirect	total		
Plan util	361	74	435	/	/
Podea	302	80	382	20	24
Tavan	0.01	84	84	70	19
Perete 1	100	75	175	50	28
Perete 2	139	73	212	50	34
Perete 3	100	75	175	50	28
Perete 4	139	73	212	50	34

Uniformitate pe planul util  
u<sub>0</sub>: 0.369 (1:3)  
E<sub>min</sub>/E<sub>max</sub>: 0.196 (1:5)

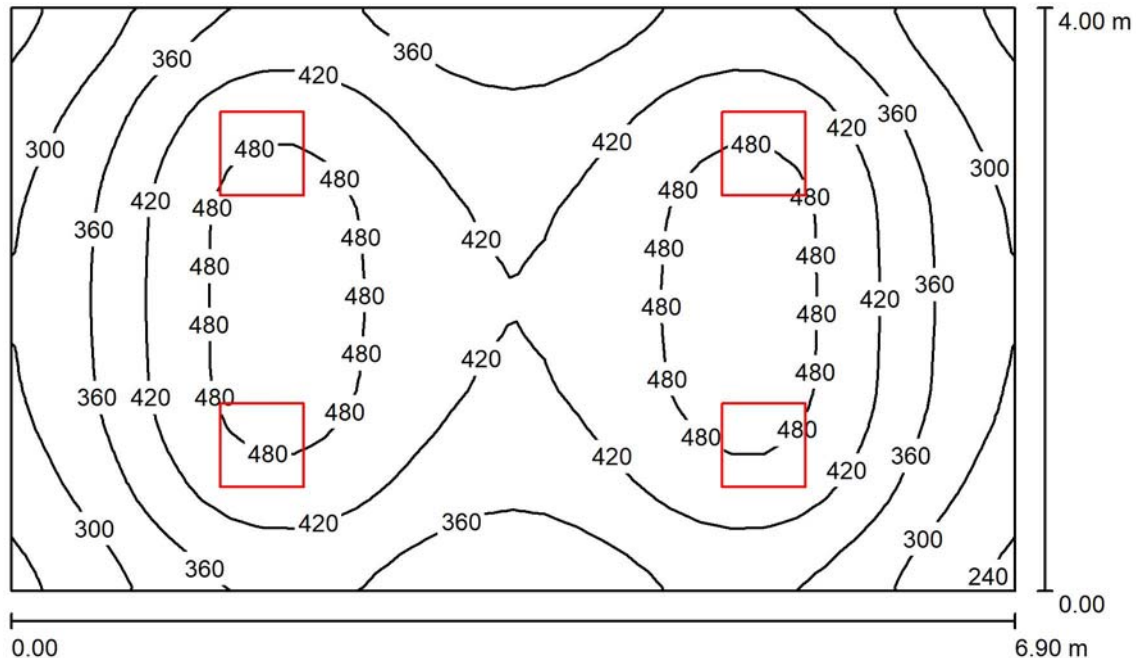
**UGR** Pe lungime- Transversal la axa corpului de iluminat  
Perete stânga 22 22  
Perete inferior 21 21  
(CIE, SHR = 0.25.)

Putere specifică:  $5.16 \text{ W/m}^2 = 1.19 \text{ W/m}^2/100 \text{ lx}$  (Suprafață: 63.80 m<sup>2</sup>)



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## Situatia 2. Birou 6.9x4 30061.00150 / Rezumat



Înălțimea spațiului: 3.000 m, Înălțime de montare: 3.000 m, Factor de menținere: 0.90

Valoare în Lux, Scară 1:52

Suprafață	$\rho$ [%]	$E_m$ [lx]	$E_{min}$ [lx]	$E_{max}$ [lx]	$u_0$
Plan util	/	400	229	511	0.572
Podea	20	330	216	398	0.654
Tavan	70	97	67	116	0.690
Pereți (4)	50	229	88	514	/

Plan util:	UGR	Pe lungime-	Transversal	la axa corpului de iluminat
Înălțime: 0.800 m	Perete stânga 20	20	20	
Raster: 32 x 32 Puncte	Perete inferior 18	18	18	
Zonă de margine: 0.000 m	(CIE, SHR = 0.25.)			

### Listă bucăți corpuri de iluminat

Nr.	Bucăți	Denumire (Factor de corecție)	$\Phi$ (Corp de iluminat) [lm]	$\Phi$ (Lămpi) [lm]	P [W]
1	4	LUG LIGHT FACTORY 30061.00150 4040 LUGCLASSIC LB LED PLX PT 600 840 (1.000)	4350	4350	39.0
Total:			17400	17400	156.0

Putere specifică:  $5.65 \text{ W/m}^2 = 1.41 \text{ W/m}^2/100 \text{ lx}$  (Suprafață:  $27.60 \text{ m}^2$ )

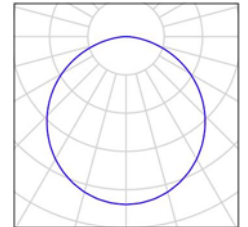


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## Situatia 2. Birou 6.9x4 30061.00150 / Listă număr corpuri de iluminat

4 Bucăți LUG LIGHT FACTORY 300061.00150 4040  
LUGCLASSIC LB LED PLX PT 600 840  
Nr.articol: 300061.00150  
Flux luminos (Corp de iluminat): 4350 lm  
Flux luminos (Lămpi): 4350 lm  
Putere corpuri de iluminat: 39.0 W  
Clasificarea corpurilor de iluminat conform CIE:  
100  
Cod flux CIE: 47 79 96 100 100  
Dotare: 1 x LED 4000K (Factor de corecție  
1.000).

Vedeți catalogul nostru  
de corpuri de iluminat  
pentru o imagine a  
corpului de iluminat.



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## Situatia 2. Birou 6.9x4 30061.00150 / Rezultate fotometrice

Flux luminos total: 17400 lm  
Putere totală: 156.0 W  
Factor de menținere: 0.90  
Zonă de margine: 0.000 m

Suprafață	Iluminare medie [lx]			Grade de reflexie [%]	Luminanță medie [cd/m <sup>2</sup> ]
	direct	indirect	total		
Plan util	302	98	400	/	/
Podea	233	97	330	20	21
Tavan	0.00	97	97	70	22
Perete 1	152	88	240	50	38
Perete 2	123	88	211	50	34
Perete 3	152	88	240	50	38
Perete 4	123	89	212	50	34

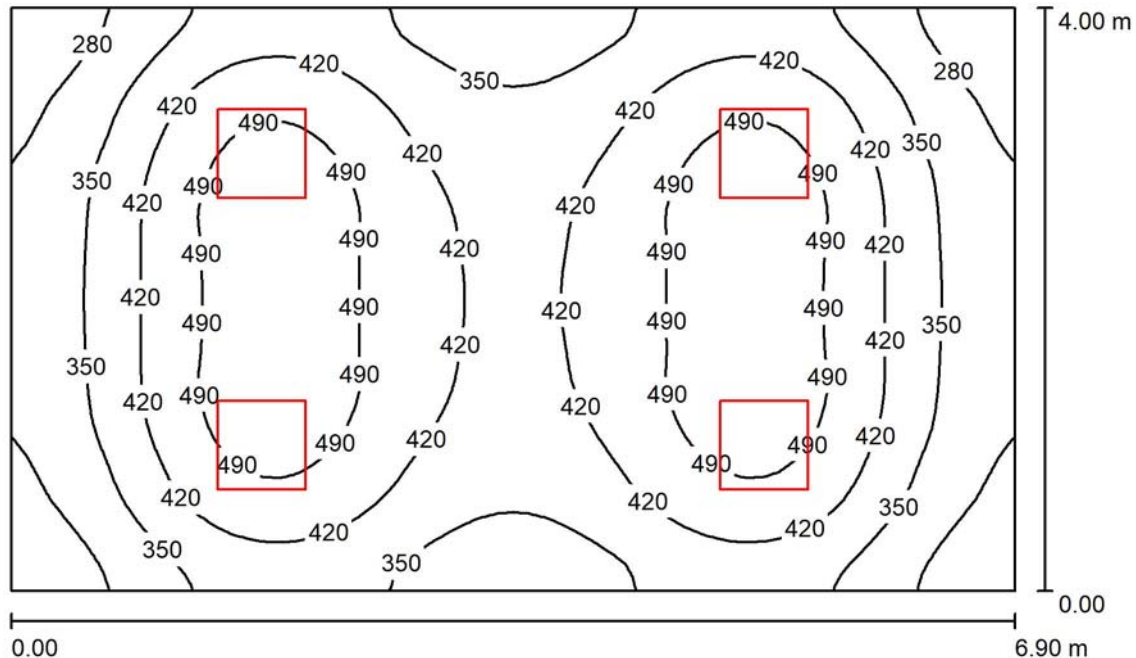
Uniformitate pe planul util  
u<sub>0</sub>: 0.572 (1:2)  
E<sub>min</sub>/E<sub>max</sub>: 0.448 (1:2)

**UGR** Pe lungime- Transversal la axa corpului de iluminat  
Perete stânga 20 20  
Perete inferior 18 18  
(CIE, SHR = 0.25.)

Putere specifică:  $5.65 \text{ W/m}^2 = 1.41 \text{ W/m}^2/100 \text{ lx}$  (Suprafață: 27.60 m<sup>2</sup>)

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## Situatia 2. Birou 6.9x4 903061.00918 / Rezumat



Înălțimea spațiului: 3.000 m, Înălțime de montare: 3.000 m, Factor de menținere: 0.90

Valoare în Lux, Scară 1:52

Suprafață	$\rho$ [%]	$E_m$ [lx]	$E_{min}$ [lx]	$E_{max}$ [lx]	$u_0$
Plan util	/	406	223	533	0.550
Podea	20	335	217	406	0.648
Tavan	70	92	62	107	0.669
Pereți (4)	50	218	75	494	/

### Plan util:

Înălțime: 0.800 m  
Raster: 64 x 64 Puncte  
Zonă de margine: 0.000 m

### UGR

Pe lungime-  
Perete stânga 20  
Perete inferior 19  
(CIE, SHR = 0.25.)

Pe lungime-

Transversal

la axa corpului de iluminat

### Listă bucăți corpuri de iluminat

Nr.	Bucăți	Denumire (Factor de corecție)	$\Phi$ (Corp de iluminat) [lm]	$\Phi$ (Lămpi) [lm]	P [W]
1	4	LUG Light Factory 903061.00918 6045 LUGCLASSIC LB 600x600 nt 4350lm 840 PLX bialy (1.000)	4275	4275	41.1
Total:			17100	17100	164.5

Putere specifică:  $5.96 \text{ W/m}^2 = 1.47 \text{ W/m}^2/100 \text{ lx}$  (Suprafață:  $27.60 \text{ m}^2$ )



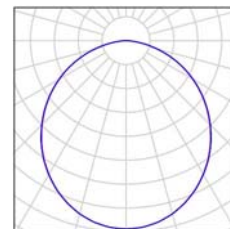
Proiectant  
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Fax  
e-mail

## Situatia 2. Birou 6.9x4 903061.00918 / Listă număr corpuri de iluminat

4 Bucăți

LUG Light Factory 903061.00918 6045  
LUGCLASSIC LB 600x600 nt 4350lm 840 PLX  
bialy  
Nr.articol: 903061.00918  
Flux luminos (Corp de iluminat): 4275 lm  
Flux luminos (Lămpi): 4275 lm  
Putere corpuri de iluminat: 41.1 W  
Clasificarea corpurilor de iluminat conform CIE:  
100  
Cod flux CIE: 48 80 96 100 100  
Dotare: 1 x LED (Factor de corecție 1.000).

Vedeți catalogul nostru  
de corpuri de iluminat  
pentru o imagine a  
corpului de iluminat.



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## Situatia 2. Birou 6.9x4 903061.00918 / Rezultate fotometrice

Flux luminos total: 17100 lm  
Putere totală: 164.5 W  
Factor de menținere: 0.90  
Zonă de margine: 0.000 m

Suprafață	Iluminare medie [lx]			Grade de reflexie [%]	Luminanță medie [cd/m <sup>2</sup> ]
	direct	indirect	total		
Plan util	312	93	406	/	/
Podea	241	94	335	20	21
Tavan	0.01	92	92	70	21
Perete 1	144	85	229	50	36
Perete 2	115	85	200	50	32
Perete 3	144	85	229	50	36
Perete 4	115	85	201	50	32

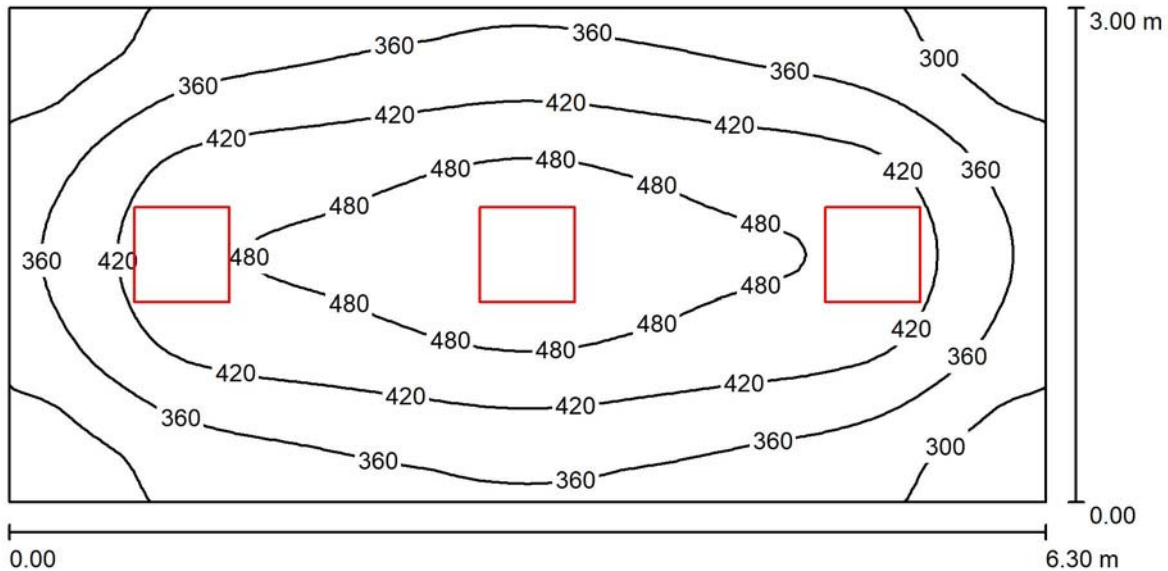
Uniformitate pe planul util  
u<sub>0</sub>: 0.550 (1:2)  
E<sub>min</sub>/E<sub>max</sub>: 0.419 (1:2)

**UGR** Pe lungime- Transversal la axa corpului de iluminat  
Perete stânga 20 20  
Perete inferior 19 19  
(CIE, SHR = 0.25.)

Putere specifică:  $5.96 \text{ W/m}^2 = 1.47 \text{ W/m}^2/100 \text{ lx}$  (Suprafață: 27.60 m<sup>2</sup>)

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### Situatia 3. Birou 6.3x3 30061.00150 / Rezumat



Înălțimea spațiului: 3.000 m, Înălțime de montare: 3.000 m, Factor de menținere: 0.90

Valoare în Lux, Scară 1:46

Suprafață	$\rho$ [%]	$E_m$ [lx]	$E_{min}$ [lx]	$E_{max}$ [lx]	u0
Plan util	/	398	241	520	0.606
Podea	20	314	209	384	0.666
Tavan	70	99	70	130	0.710
Pereți (4)	50	229	85	472	/

#### Plan util:

Înălțime: 0.800 m  
Raster: 64 x 32 Puncte  
Zonă de margine: 0.000 m

#### Listă bucăți corpuri de iluminat

Nr.	Bucăți	Denumire (Factor de corecție)	$\Phi$ (Corp de iluminat) [lm]	$\Phi$ (Lămpi) [lm]	P [W]
1	3	LUG LIGHT FACTORY 300061.00150 4040 LUGCLASSIC LB LED PLX PT 600 840 (1.000)	4350	4350	39.0
			Total: 13050	Total: 13050	117.0

Putere specifică:  $6.19 \text{ W/m}^2 = 1.56 \text{ W/m}^2/100 \text{ lx}$  (Suprafață:  $18.90 \text{ m}^2$ )

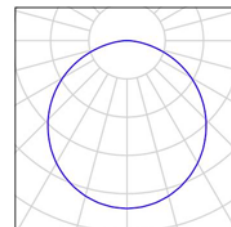


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### Situatia 3. Birou 6.3x3 30061.00150 / Listă număr corpuri de iluminat

3 Bucăți LUG LIGHT FACTORY 300061.00150 4040  
LUGCLASSIC LB LED PLX PT 600 840  
Nr.articol: 300061.00150  
Flux luminos (Corp de iluminat): 4350 lm  
Flux luminos (Lămpi): 4350 lm  
Putere corpuri de iluminat: 39.0 W  
Clasificarea corpurilor de iluminat conform CIE:  
100  
Cod flux CIE: 47 79 96 100 100  
Dotare: 1 x LED 4000K (Factor de corecție  
1.000).

Vedeți catalogul nostru  
de corpuri de iluminat  
pentru o imagine a  
corpului de iluminat.





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### Situatia 3. Birou 6.3x3 30061.00150 / Rezultate fotometrice

Flux luminos total: 13050 lm  
Putere totală: 117.0 W  
Factor de menținere: 0.90  
Zonă de margine: 0.000 m

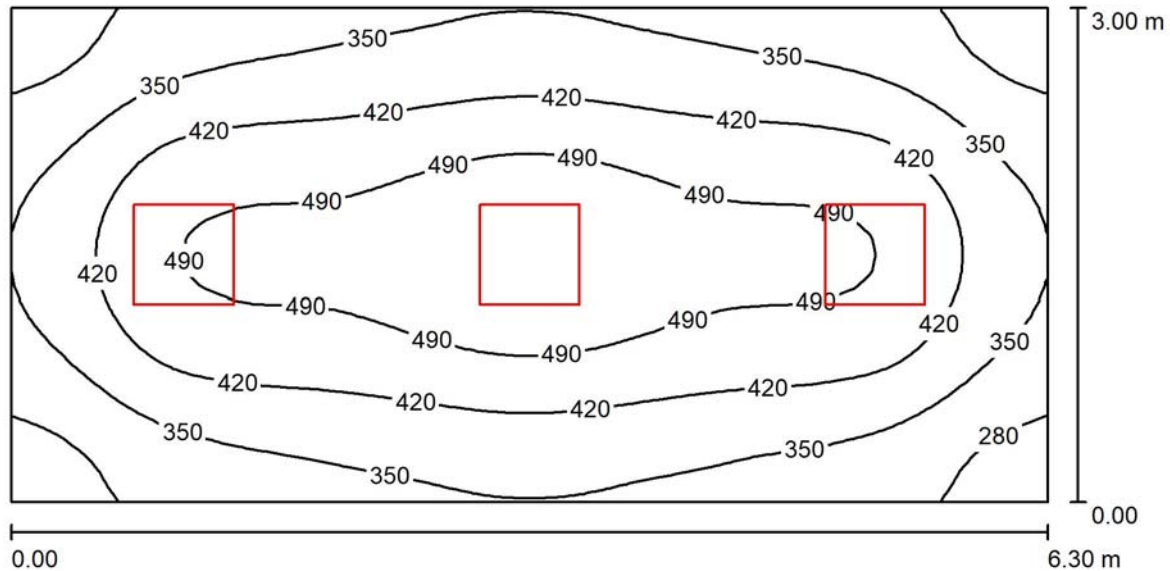
Suprafață	Iluminare medie [lx]			Grade de reflexie [%]	Luminanță medie [cd/m <sup>2</sup> ]
	direct	indirect	total		
Plan util	294	103	398	/	/
Podea	214	99	314	20	20
Tavan	0.00	99	99	70	22
Perete 1	135	92	226	50	36
Perete 2	145	89	234	50	37
Perete 3	135	92	226	50	36
Perete 4	145	90	235	50	37

Uniformitate pe planul util  
u<sub>0</sub>: 0.606 (1:2)  
E<sub>min</sub>/E<sub>max</sub>: 0.464 (1:2)

Putere specifică:  $6.19 \text{ W/m}^2 = 1.56 \text{ W/m}^2/100 \text{ lx}$  (Suprafață: 18.90 m<sup>2</sup>)

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### Situatia 3. Birou 6.3x3 903061.00918 / Rezumat



Înălțimea spațiului: 3.000 m, Înălțime de montare: 3.000 m, Factor de menținere: 0.90

Valoare în Lux, Scară 1:46

Suprafață	$\rho$ [%]	$E_m$ [lx]	$E_{min}$ [lx]	$E_{max}$ [lx]	$u_0$
Plan util	/	406	235	546	0.579
Podea	20	321	206	397	0.641
Tavan	70	94	64	105	0.687
Pereți (4)	50	219	73	458	/

#### Plan util:

Înălțime: 0.800 m  
Raster: 64 x 32 Puncte  
Zonă de margine: 0.000 m

#### Listă bucăți corpuri de iluminat

Nr.	Bucăți	Denumire (Factor de corecție)	$\Phi$ (Corp de iluminat) [lm]	$\Phi$ (Lămpi) [lm]	P [W]
1	3	LUG Light Factory 903061.00918 6045 LUGCLASSIC LB 600x600 nt 4350lm 840 PLX biały (1.000)	4275	4275	41.1
			Total: 12825	Total: 12825	123.4

Putere specifică:  $6.53 \text{ W/m}^2 = 1.61 \text{ W/m}^2/100 \text{ lx}$  (Suprafață:  $18.90 \text{ m}^2$ )

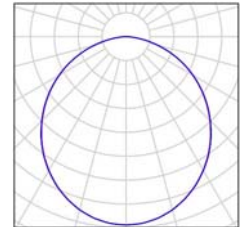


Proiectant  
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### Situatia 3. Birou 6.3x3 903061.00918 / Listă număr corpuri de iluminat

3 Bucăți LUG Light Factory 903061.00918 6045  
LUGCLASSIC LB 600x600 nt 4350lm 840 PLX  
bialy  
Nr.articol: 903061.00918  
Flux luminos (Corp de iluminat): 4275 lm  
Flux luminos (Lămpi): 4275 lm  
Putere corpuri de iluminat: 41.1 W  
Clasificarea corpurilor de iluminat conform CIE:  
100  
Cod flux CIE: 48 80 96 100 100  
Dotare: 1 x LED (Factor de corecție 1.000).

Vedeți catalogul nostru  
de corpuri de iluminat  
pentru o imagine a  
corpului de iluminat.



Proiectant  
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### Situatia 3. Birou 6.3x3 903061.00918 / Rezultate fotometrice

Flux luminos total: 12825 lm  
Putere totală: 123.4 W  
Factor de menținere: 0.90  
Zonă de margine: 0.000 m

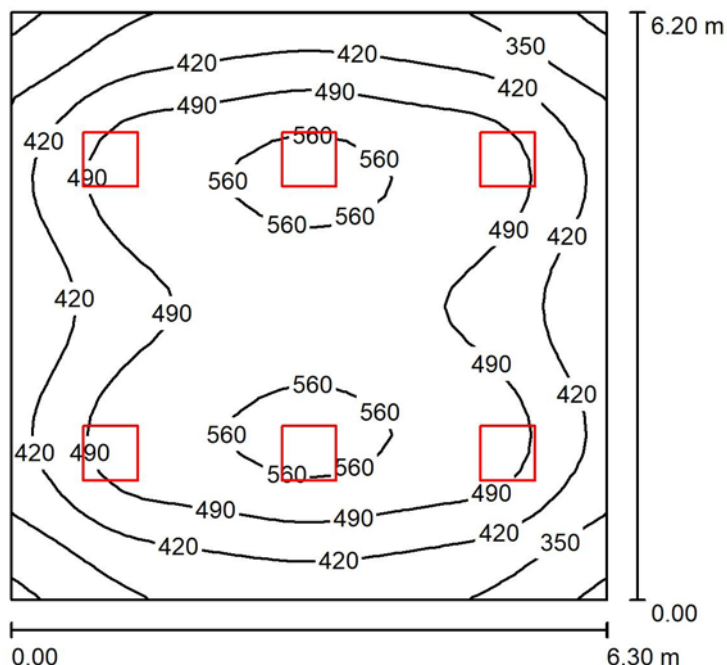
Suprafață	Iluminare medie [lx]			Grade de reflexie [%]	Luminanță medie [cd/m <sup>2</sup> ]
	direct	indirect	total		
Plan util	307	99	406	/	/
Podea	224	97	321	20	20
Tavan	0.00	94	94	70	21
Perete 1	127	88	216	50	34
Perete 2	138	86	224	50	36
Perete 3	127	89	216	50	34
Perete 4	138	86	225	50	36

Uniformitate pe planul util  
u<sub>0</sub>: 0.579 (1:2)  
E<sub>min</sub>/E<sub>max</sub>: 0.431 (1:2)

Putere specifică:  $6.53 \text{ W/m}^2 = 1.61 \text{ W/m}^2/100 \text{ lx}$  (Suprafață: 18.90 m<sup>2</sup>)

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### Situatia 4. Birou 6.3x6.2 30061.00150 / Rezumat



Înălțimea spațiului: 3.000 m, Înălțime de montare: 3.000 m, Factor de menținere: 0.90

Valoare în Lux, Scară 1:80

Suprafață	$\rho$ [%]	$E_m$ [lx]	$E_{min}$ [lx]	$E_{max}$ [lx]	$u_0$
Plan util	/	465	270	585	0.580
Podea	20	396	254	482	0.643
Tavan	70	108	77	133	0.714
Pereți (4)	50	261	104	498	/

Plan util:	UGR	Pe lungime-	Transversal	la axa corpului de iluminat
Înălțime: 0.800 m	Perete stânga 20	20	20	
Raster: 32 x 32 Puncte	Perete inferior 20	20	20	
Zonă de margine: 0.000 m	(CIE, SHR = 0.25.)			

#### Listă bucăți corpuri de iluminat

Nr.	Bucăți	Denumire (Factor de corecție)	$\Phi$ (Corp de iluminat) [lm]	$\Phi$ (Lămpi) [lm]	P [W]
1	6	LUG LIGHT FACTORY 300061.00150 4040 LUGCLASSIC LB LED PLX PT 600 840 (1.000)	4350	4350	39.0
Total:			26100	26100	234.0

Putere specifică:  $5.99 \text{ W/m}^2 = 1.29 \text{ W/m}^2/100 \text{ lx}$  (Suprafață:  $39.06 \text{ m}^2$ )

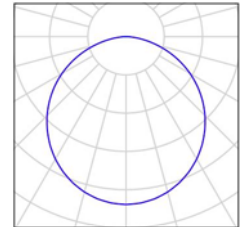


Proiectant  
Telefon  
Fax  
e-mail

#### Situatia 4. Birou 6.3x6.2 30061.00150 / Listă număr corpuri de iluminat

6 Bucăți LUG LIGHT FACTORY 300061.00150 4040  
LUGCLASSIC LB LED PLX PT 600 840  
Nr.articol: 300061.00150  
Flux luminos (Corp de iluminat): 4350 lm  
Flux luminos (Lămpi): 4350 lm  
Putere corpuri de iluminat: 39.0 W  
Clasificarea corpurilor de iluminat conform CIE:  
100  
Cod flux CIE: 47 79 96 100 100  
Dotare: 1 x LED 4000K (Factor de corecție  
1.000).

Vedeți catalogul nostru  
de corpuri de iluminat  
pentru o imagine a  
corpului de iluminat.



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### Situatia 4. Birou 6.3x6.2 30061.00150 / Rezultate fotometrice

Flux luminos total: 26100 lm  
Putere totală: 234.0 W  
Factor de menținere: 0.90  
Zonă de margine: 0.000 m

Suprafață	Iluminare medie [lx]			Grade de reflexie [%]	Luminanță medie [cd/m <sup>2</sup> ]
	direct	indirect	total		
Plan util	360	105	465	/	/
Podea	289	107	396	20	25
Tavan	0.00	108	108	70	24
Perete 1	155	99	254	50	40
Perete 2	171	99	269	50	43
Perete 3	155	98	253	50	40
Perete 4	171	97	268	50	43

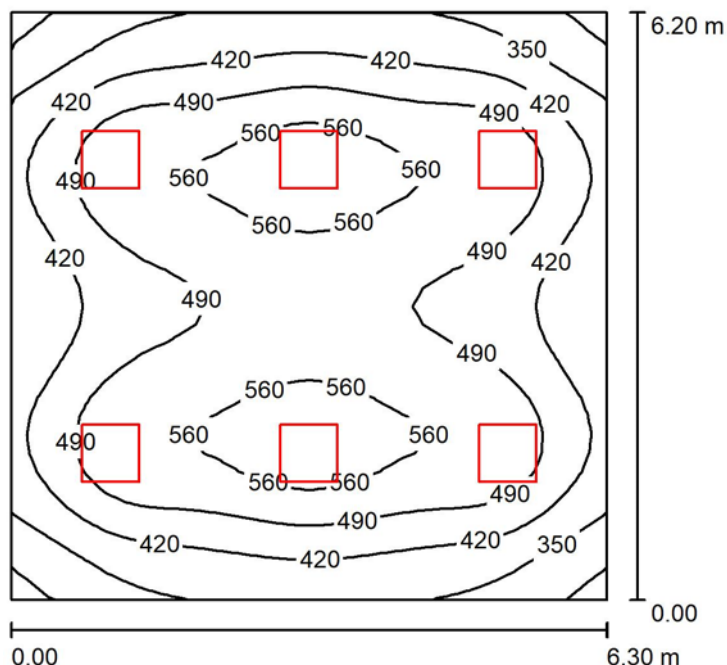
Uniformitate pe planul util  
u<sub>0</sub>: 0.580 (1:2)  
E<sub>min</sub>/E<sub>max</sub>: 0.461 (1:2)

**UGR** Pe lungime- Transversal la axa corpului de iluminat  
Perete stânga 20 20  
Perete inferior 20 20  
(CIE, SHR = 0.25.)

Putere specifică:  $5.99 \text{ W/m}^2 = 1.29 \text{ W/m}^2/100 \text{ lx}$  (Suprafață: 39.06 m<sup>2</sup>)

Proiectant  
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Fax  
e-mail

### Situatia 4. Birou 6.3x6.2 903061.00918 / Rezumat



Înălțimea spațiului: 3.000 m, Înălțime de montare: 3.000 m, Factor de menținere: 0.90

Valoare în Lux, Scară 1:80

Suprafață	$\rho$ [%]	$E_m$ [lx]	$E_{min}$ [lx]	$E_{max}$ [lx]	$u_0$
Plan util	/	468	260	605	0.556
Podea	20	399	253	485	0.634
Tavan	70	103	72	122	0.700
Pereți (4)	50	246	88	477	/

#### Plan util:

Înălțime: 0.800 m  
Raster: 32 x 32 Puncte  
Zonă de margine: 0.000 m

#### UGR

Pe lungime-  
Perete stânga 21  
Perete inferior 21  
(CIE, SHR = 0.25.)

Pe lungime-

Transversal

la axa corpului de iluminat

#### Listă bucăți corpuri de iluminat

Nr.	Bucăți	Denumire (Factor de corecție)	$\Phi$ (Corp de iluminat) [lm]	$\Phi$ (Lămpi) [lm]	P [W]
1	6	LUG Light Factory 903061.00918 6045 LUGCLASSIC LB 600x600 nt 4350lm 840 PLX bialy (1.000)	4275	4275	41.1
Total:			25650	25650	246.8

Putere specifică:  $6.32 \text{ W/m}^2 = 1.35 \text{ W/m}^2/100 \text{ lx}$  (Suprafață:  $39.06 \text{ m}^2$ )





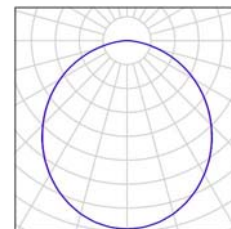
Proiectant  
Telefon  
Fax  
e-mail

#### Situatia 4. Birou 6.3x6.2 903061.00918 / Listă număr corpuri de iluminat

6 Bucăți

LUG Light Factory 903061.00918 6045  
LUGCLASSIC LB 600x600 nt 4350lm 840 PLX  
bialy  
Nr.articol: 903061.00918  
Flux luminos (Corp de iluminat): 4275 lm  
Flux luminos (Lămpi): 4275 lm  
Putere corpuri de iluminat: 41.1 W  
Clasificarea corpurilor de iluminat conform CIE:  
100  
Cod flux CIE: 48 80 96 100 100  
Dotare: 1 x LED (Factor de corecție 1.000).

Vedeți catalogul nostru  
de corpuri de iluminat  
pentru o imagine a  
corpului de iluminat.



Proiectant  
Telefon  
Fax  
e-mail

### Situatia 4. Birou 6.3x6.2 903061.00918 / Rezultate fotometrice

Flux luminos total: 25650 lm  
Putere totală: 246.8 W  
Factor de menținere: 0.90  
Zonă de margine: 0.000 m

Suprafață	Iluminare medie [lx]			Grade de reflexie [%]	Luminanță medie [cd/m <sup>2</sup> ]
	direct	indirect	total		
Plan util	369	99	468	/	/
Podea	297	102	399	20	25
Tavan	0.01	103	103	70	23
Perete 1	145	94	239	50	38
Perete 2	161	93	254	50	40
Perete 3	145	94	239	50	38
Perete 4	161	93	254	50	40

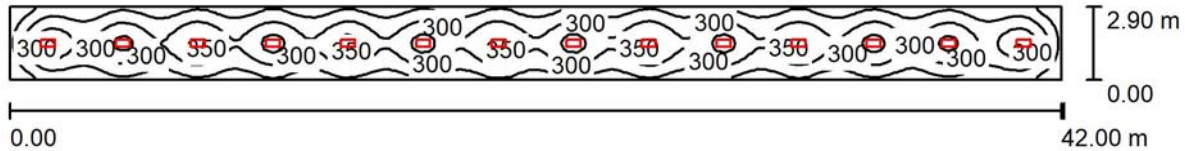
Uniformitate pe planul util  
u<sub>0</sub>: 0.556 (1:2)  
E<sub>min</sub>/E<sub>max</sub>: 0.430 (1:2)

**UGR** Pe lungime- Transversal la axa corpului de iluminat  
Perete stânga 21 21  
Perete inferior 21 21  
(CIE, SHR = 0.25.)

Putere specifică:  $6.32 \text{ W/m}^2 = 1.35 \text{ W/m}^2/100 \text{ lx}$  (Suprafață: 39.06 m<sup>2</sup>)

Proiectant  
Telefon  
Fax  
e-mail

### Situatia 5. Hal 42 x 2.9 / Rezumat



Înălțimea spațiului: 3.000 m, Înălțime de montare: 3.000 m, Factor de menținere: 0.90

Valoare în Lux, Scară 1:301

Suprafață	$\rho$ [%]	$E_m$ [lx]	$E_{min}$ [lx]	$E_{max}$ [lx]	$u_0$
Plan util	/	284	156	369	0.551
Podea	20	234	149	267	0.635
Tavan	70	64	56	77	0.872
Pereți (4)	50	157	62	240	/

#### Plan util:

Înălțime: 0.850 m  
Raster: 128 x 32 Puncte  
Zonă de margine: 0.000 m

#### Listă bucăți corpuri de iluminat

Nr.	Bucăți	Denumire (Factor de corecție)	$\Phi$ (Corp de iluminat) [lm]	$\Phi$ (Lămpi) [lm]	P [W]
1	14	LUG LIGHT FACTORY 300061.00065 3361_4 LUGCLASSIC ECO LB LED NT 4500 840 (1.000)	3700	3700	37.0
			Total: 51799	Total: 51800	518.0

Putere specifică:  $4.25 \text{ W/m}^2 = 1.50 \text{ W/m}^2/100 \text{ lx}$  (Suprafață:  $121.80 \text{ m}^2$ )

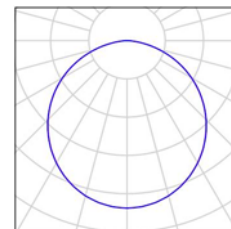


Proiectant  
Telefon  
Fax  
e-mail

### Situatia 5. Hal 42 x 2.9 / Listă număr corpuri de iluminat

14 Bucăți LUG LIGHT FACTORY 300061.00065 3361\_4  
LUGCLASSIC ECO LB LED NT 4500 840  
Nr.articol: 300061.00065  
Flux luminos (Corp de iluminat): 3700 lm  
Flux luminos (Lămpi): 3700 lm  
Putere corpuri de iluminat: 37.0 W  
Clasificarea corpurilor de iluminat conform CIE:  
100  
Cod flux CIE: 47 79 96 100 100  
Dotare: 1 x PCBL1402500 840 (Factor de  
corecție 1.000).

Vedeți catalogul nostru  
de corpuri de iluminat  
pentru o imagine a  
corpului de iluminat.





Proiectant  
Telefon  
Fax  
e-mail

### Situatia 5. Hal 42 x 2.9 / Rezultate fotometrice

Flux luminos total: 51799 lm  
Putere totală: 518.0 W  
Factor de menținere: 0.90  
Zonă de margine: 0.000 m

Suprafață	Iluminare medie [lx]			Grade de reflexie [%]	Luminanță medie [cd/m <sup>2</sup> ]
	direct	indirect	total		
Plan util	220	64	284	/	/
Podea	169	65	234	20	15
Tavan	0.00	64	64	70	14
Perete 1	98	61	159	50	25
Perete 2	84	57	141	50	22
Perete 3	98	60	158	50	25
Perete 4	84	57	141	50	22

Uniformitate pe planul util  
u<sub>0</sub>: 0.551 (1:2)  
E<sub>min</sub>/E<sub>max</sub>: 0.424 (1:2)

Putere specifică:  $4.25 \text{ W/m}^2 = 1.50 \text{ W/m}^2/100 \text{ lx}$  (Suprafață: 121.80 m<sup>2</sup>)

# **BIOTcloud**

## **Description of the system**

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## 1. Introduction

The purpose of this specification is to present the Smart City system, designed and created to monitor and manage lighting infrastructures with connected sensors.

## 2. BIOTcloud system

The BIOTcloud system consists of:

- a. the management system installed in the internet cloud,
- b. 'Urban' application and 'Urban Mobile' mobile application
- c. external devices:
  - hubs,
  - controllers placed inside the luminaires.

The following chapters present successively the functions and features of each system component.

### 2.1. Management system

The core solution of BIOTcloud is the management system installed on servers operating in the cloud. The purpose of this system is to manage the operation of the entire BIOTcloud environment, communication, collecting data from controllers, processing and analysing collected data, taking action based on implemented algorithms. The management system is responsible also for updating the software and configuring field devices.

The system includes an interface for communicating with the factory. It ensures that all the devices at the production stage are programmed in a secure manner, using the target, unique encryption and authentication data. This greatly simplifies and shortens the process of installing external devices, as the activation within the system requires only scanning of a QR code present at the housing of the device (hub) or the luminaire with integrated controller, and assigning it to the previously created installation point. With this solution start-up and first configuration are performed automatically, not requiring further action from the user of the system.

### 2.2. User interface

Urban application is a Web application that runs in a Web browser. It does not require installation of additional software. This application, depending on the assigned authorisations of the logged user (system administrator / manager of monitored



network /planner /installer etc.) provides the personalized data and enables the user to perform certain operating procedures.

The application provides:

- a. two-level authentication of the user,
- b. configuration of user settings,
- c. a function of administrator for the customer with the authorisation to manage other users from the customer organisation (creating, modifying, and deleting accounts, assigning roles and permissions to users),
- d. dashboard with the most important information for the user,
- e. a map with:
  - plan of streets,
  - plan of buildings,
  - lighting network layout,
  - icons illustrating points of installation on the map.

The user may also see a location of an incident or alarm on the map. Details are available by clicking on the selected object. After clicking on the selected object, the user gains access to other information and parameters of this object. In this way, the user may check the current status, history of operation and incidents, as well as measured parameters such as voltage, consumed power and energy or temperature. History of these parameters may be also presented on the charts.

- f. an overview of alarms for a single object on the map, as well as for a group in the current time and historically. The user may also define incidents that will be notified to him/her via SMS or e-mail (optionally). The incidents may relate to power decrease, exceeded temperature and many others.
- g. module for inventorying, which provides full visibility of owned assets. This includes devices in stock, but not installed yet and those installed and dismantled. The user may search and filter them based on selected attributes and export data to files, such as csv, txt and xlsx.
- h. a module for programming operation of lighting points, which provides an interface for defining work of both single points of light, as well as their groups. The user has the ability to create multiple work programs for individual days, selected periods (weekdays, weekends), as well as public holidays within the week. The may assign

priorities to individual plans. As part of the module of work programming, the user can also set individual luminaires (individually or in groups) and their power changes depending on the time of day and geographic position (astronomical clock). The defined programs are then sent to the controller as part of the configuration of devices. This ensures the operation according to the programmed settings even after the loss of the connection.

- i. network planning module gives the user ability to create new points of installation, modify existing ones and delete those unused. Each point of installation has assigned coordinates and attributes. It is also possible to define and limit the types and devices that can be installed within them, providing clear information for installation and maintenance teams to define actions to be taken and eliminate mistakes. Access to the planning module is restricted only to users with a defined role of the planner.

Urban Mobile application complements the options of access to the BIOTcloud system. Access to the system from mobile devices is particularly important from the point of view of network maintenance and servicing. Urban Mobile application is dedicated to mobile devices. i.e. phones or tablets working with the most common versions of Android or iOS operating systems. Urban Mobile application provides users with a map presenting the points of installation. Similarly as in the Urban web application, it presents a map with pre-defined alarms and incidents for the individual points. After selecting a certain point, full information is accessible in relation to the incident or alarm.

In order to facilitate the work of the field personnel, the Urban Mobile application works with a GPS receiver to facilitate displaying the current position of the user on the map and find a specific point on the map. Urban Mobile may operate with a QR code reader. This allows user to quickly and automatically identify a point on the map.

Installation of new devices does not require manually adding device data to the system (e.g. serial number, IMEI number). To complete the entire process of installing a new device, the installer only scans its QR code and selects a point of installation to enable the system adding the device to a specific location. A further configuration of the device (network connection, updating settings) is made automatically

In addition to presentation functions, the application also has a diagnostic module, available as an extension for a user with maintenance authorisation. This module enables the user, who works in the field, to check the status of the lighting point

(online/offline), perform ON/OFF test procedure, change operational settings by darkening/brightening of the lamp, read-out the operational time and temperature.

The management system also has implemented security mechanisms that detect and ignore the connection attempts from unauthorized devices. The system is also protected against theft of SIM cards.

### **3. External devices**

In addition to the server located in the cloud, the system also includes the field-installed devices. Their task is to control and check luminaires, as well as monitoring their selected factors (brightness, luminaire temperature, etc.) and communication with the management system. Field-installed devices may operate alone or be grouped in one or more clusters.

#### **3.1. Hub (gate)**

Hub acts as a bridge between the management system installed in the cloud and field- installed controllers and sensors. Communication between the hub and the management system is carried out using MQTT protocol and SSL certificates. The connection method is as follows:

- a. wireless via LTE network,
- b. optionally over Ethernet, if access is provided.

Communication between the hub and the controllers is wireless by using 802.15.4, 6lowpan technology and Thread protocol with extensions dedicated to the Smart City. Using Thread protocol makes it possible to organize devices in Mesh arrangement. This increases the reliability of communication, as in case of a single node failure, the network is automatically re-configured /repaired, ensuring that the communication is maintained. The hub has two independent radio interfaces operating in the 2.4GHz band and supporting protocols such as Thread, 802.15.4 or 6lowpan.

In addition to the support of communication with controllers to manage the operation of lighting and monitoring its parameters, the hub serves also as the main point for distributing software updates among devices connected to it from Thread network side. In order to optimize the amount of data transmitted over the LTE network, it is possible to configure the hub as the main point for downloading software updates from the management system and distributing them to other hubs. The optimization results in savings on LTE transmission costs, because instead of 'n' transmissions of update files to 'n' routers, only one file is transmitted by the LTE network and Thread protocol sends it to other 'n-1' hubs. They, in turn, provide the updates to the controllers.

## 3.2. Controller

The controller has a range of analogue and digital interfaces, allowing for controlling and checking the lighting points. It is available in a basic version and in expanded version with an electricity meter. Power control of the luminaires may be analogue (ON/OFF function using a contactor, light intensity control using 1-10V protocol) or digital via DALI 2.0 interface. Each controller may be connected to 4 DALI devices of SLAVE type. The controller supports the connection of a NTC thermometer that monitors the temperature of the luminaire. This four-pin expansion socket allows user to connect devices by using UART, I2C, SPI, 1-Wire, RS485, GPIO, analogue-digital transducer and others.

The controller is designed in a modular manner by separating the radio part from the rest of the device. This makes it easy quickly adapted to customer requirements. This approach creates the option for applying the radio module using a different radio technology, reduces certification costs and decreases time-to-market.

The controller has the function of autonomous work with the last saved configuration in case of losing the connection with the management system. All defined lighting plans for individual days or periods, together with a reduction in power for a given point and the function of the astronomical clock are stored locally and available in case of lost connection. When the connection with the system is restored, the controller automatically checks whether a new configuration is available and if it is, the settings are updated.

The controller also has a built-in real time clock with battery backup. In case of a power failure (even lasting for a few days), after restoring it, the controller is able to precisely control the lighting, even without communication with the outside world. In addition, controllers synchronize time with each other using radio communication - so one device with the current time is sufficient to ensure the power work of entire cluster after a power failure, even in the absence of LTE connectivity.

In case of missing or improper configuration, serious damage or other unexpected incidents, the controller turns on the light permanently, to ensure maximum comfort of road users at night.

The data collected by the controller is transferred to the hub, where it goes into the management system. In case of missing connection with the hub, data is buffered in the controller for several hours and all of the historical data from the buffer is transferred to the system after the communication is restored. When the connection

between the hub and the management system is missing, the data is stored on the hub up to one week and sent to the system after the connection is restored.

## 4. BIOTcloud system features

### a. the management system:

- installed in the cloud,
- available for 24 hours, 365 days a year,
- it provides access through web interface without the need of installing dedicated software,
- it collects and uses a database to save statistics, configurations and incident logs from managed devices,
- fully scalable,
- manages the automatic software updates for the hub and the controller in a manner that does not require any action from the user,
- integrated with the factory producing external devices, making the installation of the hub and router simple - it requires only scanning the QR code and selecting the installation point,
- it has security mechanisms to protect against unauthorized access and theft of SIM cards
- includes full encryption of all communications from the user through the system and the hub up to the end device,

### b. user interface:

- Urban application:
  - dedicated Web application to run in a web browser without installing additional software,
  - supported browsers: Google Chrome, Firefox, Safari, Microsoft Edge,
  - secure access through a two-level logging-in using HTTPS protocol,
  - dashboard displaying key parameters from the point of view of the user,
  - 3D map showing the layer of buildings with marked points of installation and lighting network arrangement. Details of the selected luminaire are available after clicking it. In addition to technical details, information is displayed about

- incidents and alarms according to definable thresholds,
- the section for notification and reporting provides the following functionalities:
    - reporting alarms and events based on defined thresholds using templates with modifiable parameters,
    - notification of incidents and alarms via SMS and e-mail,
    - generating reports according to defined criteria,
    - presenting the history of alarms for selected points or a group of points,
  - the section for network inventory provides the following functionalities:
    - reporting assets basing on the user-defined queries,
    - displaying and exporting reports to files,
  - the section for network presentation provides the following functionalities:
    - presentation of the radio equipment layout on the map with indicated signal strength,
    - indication of notification or alarm,
    - presentation of detailed information regarding the equipment and radio parameters, notifications and alarms after click icon of the selected device,
    - presentation of diagram with connections between individual devices,
    - presentation of the amount of transferred data,
    - presentation of device status (online, offline, duration of specified status),
  - the section for network planning provides the following functionalities:
    - creating, deleting and editing points of installation (POI),
    - adding attributes,
  - the section of lighting plans provides the following functionalities:
    - defining a new lighting scheme,
    - modifying, deactivating the existing lighting schemes,
    - introducing an automatic change of light intensity depending on the time of day, fixed operation hours or depending on the astronomical

- clock for a given location,
- option for defining schemes for workdays (Mon. - Fri.), weekends (Sat. - Sun) and individual public holidays.
- defining a plan for a single light source and the ability to define any group,
- Defining a number of plans for a single point or for a group and ability to set priorities of the plans,
- the section of managing the users provides the following functionalities:
  - assigning the administrator from the customer's organisation, who manages all users of the organisation,
  - creating user accounts with different roles and access rights by the administrator from the customer's organisation,
  - option of editing the account at any time,
- Urban Mobile application
  - supported operating systems: Google Android (7 and later), Apple iOS 10 and later,
  - presentation of:
    - street maps,
    - points of installation (POI) with information about alarms and incidents based on defined criteria,
    - devices installed in POI's (available, and unavailable)
    - alarms and notifications,
  - customizable display settings,
  - access by logging in,
  - supporting different user profiles (supervision / installer mode),
  - GPS and displaying position on the map with an option of selecting the nearest point of installation (POI) on the map,
  - operation of QR code reader,
  - the extended maintenance mode for the user with the authorisations of the installer:

- installation/uninstallation of devices with the option of adding notes,
- remote diagnostics (status checked remotely, ON/OFF test / light intensity change),

c. external devices:

- hub:
  - power supply: 230V/50Hz,
  - processor: i.MX6,
  - Flash: 32MB
  - RAM: 256MB,
  - Operating System: Linux,
  - Secure boot (operating system protected against unauthorized alteration and access),
  - ambient temperature range: -30°C – 55 ° C
  - installation location: on the lighting pole,
  - housing: IP66
  - mechanical resistance of the housing IK: 08,
  - Protection class I and II,
  - communication with system in the cloud: wireless LTE or wired Ethernet 10/100. MQTT protocol and SSL certificates secure authentication and communication with the management system,
  - connection with controllers and sensors: wireless Thread standard (based on 802.15.4 and 6lowpan) and Mesh arrangement - the network has the self-repair and reconfiguration ability in case of failure of one of the devices,
  - Communication interfaces:
    - LTE: connection with the system,
    - 2.4GHz dual radio interface with support for protocols: Thread, 802.15.4, 6lowPan. Support for Mesh networks and self-repairs in case of a failure of any of the nodes.
    - Ethernet type 10/100base-T,



- Ready for the communication in the 868MHz band,
- option for connecting a power meter,
- Modbus support,
- slot for micro-SD card,
- expansion slots with support for:
  - I2C,
  - UART,
  - SPI,
  - 1-wire,
  - option for RS-485,
- Status indicated by four diodes.
- USB slot,
- option of autonomous work with the last saved settings in case of losing the connection with the management system. Automatically updated settings after the connection is restored.
- buffering data from controllers in case of losing connection with the system,
- built-in LTE antennas (optionally x2), 2,4GHz x2, 868MHz,
- controller
  - power supply: 230V/50Hz,
  - ambient temperature range: -40°C – 85 ° C
  - installation location: inside the luminaire,
  - communication interfaces:
    - nRF 2,4GHz: connection with the hub and other controllers,
  - control of lamp operation by:
    - ON/OFF relay, receiver with a power up to 400W,
    - 2.0 DALI protocol (DALI Master supporting up to 4 SLAVE devices),
    - 1..10V protocol,
    - temperature measurement with +/- 1°C accuracy

- other
  - 1-wire,
  - NTC
  - I2C,
  - option for RS485,
  - analogue-digital converter (ADC), 12 bits
- support for defined plans of illumination and light intensity changes, depending on the time of day,
- the extended version with power measurement option (active, passive, apparent power), power factor, voltage, current, frequency, power measurement,
- ability to work independently or in a defined group of devices,
- responding to commands sent to a single device and to a group of devices
- Individual addressing providing identification within the system,
- option of autonomous work with the last saved settings in case of losing the connection with the management system or hub.
- continued work without the connection to the hub using the last correctly functioning configuration. Automatic update of settings after restoring power supply.
- taking over the function buffering data gathered after connection with the system is lost, until it is restored.
- gathering information on:
  - operational hours of the controller,
  - lighting hours of the luminaire,
  - number of light switching cycles,
- "power panic" operation: system shutdown and immediate (a delay of several tens of milliseconds) information sent to the management system about switching off due to lack of power supply.
- The speed of communication between the controllers and controller-hub: 250 kbit/s.

## 5. Plans for extending the BIOTcloud system

In the future it is planned to extend the functionality of the BIOTcloud system by sensors measuring light intensity, monitoring air quality and detecting motion (tracking lighting). This will result in extending the portfolio of external devices with sensory devices and their integration with the BIOTcloud system the range of data use, configuration and maintenance.