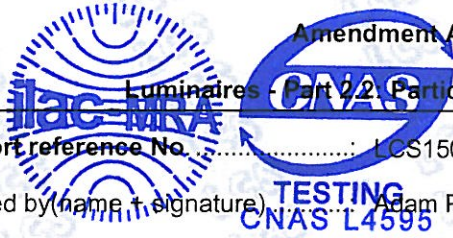


**TEST REPORT**

**Amendment A to AS/NZS 60598.2.2: 2001**

**Luminaires - Part 2.2 Particular requirements—Recessed luminaires**



Report reference No. ....: LCS1506181242S

Tested by (name + signature) ..... Adam Peng



Approved by (name + signature) ..... Hart Qiu

Date of issue .....: June 24, 2015

Contents .....: 11 pages

**Testing laboratory**

Name .....: Shenzhen LCS Compliance Testing Laboratory Ltd.

Address .....: 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue,  
Bao'an District, Shenzhen, Guangdong, China

Testing location .....: As above

**Client**

Name .....: KLM Lighting Co., Limited

Address.....: 15# Xi Zhou Wei Street, Zhongshan, Guangdong, China 528421

**Manufacturer**

Name .....: KLM Lighting Co., Limited

Address.....: 15# Xi Zhou Wei Street, Zhongshan, Guangdong, China 528421

**Test specification**

Standard .....: Amendment A of AS/NZS 60598.2.2: 2001

Test procedure .....: Compliance with Amendment A of AS/NZS 60598.2.2: 2001

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

**Test item Description** .....: LED Down Light






Trademark .....: KLM LIGHTING


Model and/or type reference.....: KLM-HP10WSN




Rating(s) .....: Input: 220-240V~, 50/60Hz, 10W






Output : 24-36V—, 0.3A

<p><b>Test item particulars</b></p> <p>Classification of installation and use .....: Class II</p> <p>Supply Connection .....: Supply leads</p>
<p><b>Test case verdicts</b></p> <p>Test case does not apply to the test object...: N(N/A)</p> <p>Test item does meet the requirement.....: P(Pass)</p> <p>Test item does not meet the requirement ....: F(Fail)</p>
<p><b>Testing</b></p> <p>Date of receipt of test item.....: June 20, 2015</p> <p>Date(s) of performance of test.....: June 20, 2015 – June 24, 2015</p>
<p><b>General remarks</b></p> <p>This report shall not be reproduced except in full without the written approval of the testing laboratory.</p> <p>The test results presented in this report relate only to the item tested.</p> <p>"(see remark #)" refers to a remark appended to the report.</p> <p>"(see Annex #)" refers to an annex appended to the report.</p> <p>Throughout this report a comma is used as the decimal separator.</p>
<p><b>General product information</b></p> <ol style="list-style-type: none"> <li>1. The test temperature is 25°C</li> <li>2. The report include: Attachment No. 1: 1 page of product photos</li> </ol>

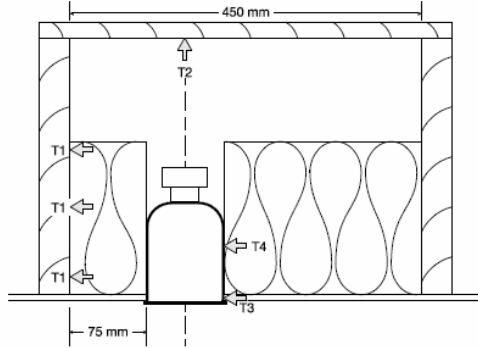
Marking:			--
The symbol was permanently marked on the back of the fitting, be clearly visible, at least 20 mm high and clearly legible		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	--
		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	--
		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	--
		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	--
		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	--
The following information shall be included the manufacturer's instructions:			--
IC-F:	<b>RISK OF FIRE</b> -Required clearance from structural members and building elements SCB= 20 mm                      HCB= 20 mm	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	--
IC:	<b>RISK OF FIRE</b> -Required clearance from structural members and building elements SCB= mm                      HCB= mm	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	--
CA80:	<b>RISK OF FIRE</b> – Building insulation must not cover this luminaire MIC= mm                      SCB= mm                      HCB= mm	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	--
CA135:	<b>RISK OF FIRE</b> – Building insulation must not cover this luminaire MIC= mm                      SCB= mm                      HCB= mm	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	--
Non-IC:	<b>DANGER-RISK OF FIRE</b> -Shall not be installed in residential premises SCI = mm                      MIC = mm SCB = mm                      HCB= mm	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	--

AS/NZS 60598.2.2:2001			
Cl.	Requirement – Test	Result	Verdict
<b>2.1</b>	<b>Scope</b>		--
	This section of IEC 60598.2 AS/NZS 60598.2 specifies requirements for recessed luminaires incorporating electric light sources for operation from supply voltages up to 1000 V. This section does not apply to air-handling or liquid-cooled luminaires		--
<b>2.2</b>	<b>General test requirements</b>		<b>P</b>
	Information for luminaires design considered	Yes [ <input checked="" type="checkbox"/> ] No [ <input type="checkbox"/> ]	P
	More sections applicable	LED Driver: 220-240V~	P
<b>2.3</b>	<b>Definitions</b>		--
<b>2.4</b>	<b>Classification of luminaires</b>		<b>P</b>
2.4.1	Recessed luminaires shall be classified according to their suitability to be in contact with building insulation. They shall be classified as one of the following:		P
	a) IC-F- building insulation that can safely be continuously exposed to 90°C allowed to abut and cover the luminaire.		P
	b) IC-building insulation that can safely be continuously exposed to 90°C allowed to abut the luminaire.		N
	c) CA 80-building insulation that can safely be continuously exposed to 90°C allowed to abut the luminaire.		N
	d) CA 135-building insulation that can safely be continuously exposed to temperatures up to 150°C allowed to abut the luminaire.		N
	e) NON IC –luminaire not suitable for covering or abutting with building insulation.		N
<b>2.5</b>	<b>MARKING</b>		<b>P</b>
2.5.1	Insulating ceiling IC-F mark, symbol: 		P
	Type IC-F recessed luminaire where building insulation that can safely be exposed continuously to 90°C may abut or cover the luminaire. The symbol shall be permanently marked on the back of the fitting. be clearly visible. At least 20 mm high and clearly legible.		P
	The following information shall be included the	See specification of	P

AS/NZS 60598.2.2:2001			
Cl.	Requirement – Test	Result	Verdict
	manufacturer's instructions: <div style="border: 1px solid black; padding: 5px;"> <b>RISK OF FIRE</b>-Required clearance from structural members and building elements                       SCB= 20 mm                      HCB= 20 mm                 </div>	product	
2.5.2	Insulating ceiling IC mark: 		N
	Type IC recessed luminaire where building insulation that can safely be exposed continuously to temperatures up to 90°C may abut and cover the luminaire. The symbol shall be permanently marked on the back of the fitting, be clearly visible, at least 20mm high and clearly legible.		N
	The following information shall be included in the manufacturer's instructions: <div style="border: 1px solid black; padding: 5px;"> <b>RISK OF FIRE</b>-Required clearance from structural members and building elements                       SCB= mm                      HCB= mm                 </div>		N
2.5.3	Insulating ceiling CA 80 mark: 		N
	Type CA 80, closed abutted, recessed luminaire where fixed, building insulating material that can safely be exposed continuously to temperatures up to 90°C must not cover but may closely abut the sides of the luminaire. The symbol shall be permanently marked on the back of the fitting, be clearly visible, at least 20 mm high and clearly legible.		N
	The following information shall be included in the manufacturer's instructions: <div style="border: 1px solid black; padding: 5px;"> <b>RISK OF FIRE</b> – Building insulation must not cover this luminaire                       MIC= 25 mm   SCB= 100 mm   HCB= 100 mm                 </div>		N
2.5.4	Insulating ceiling CA 135 mark: 		N
	Type CA 135, closed abutted, recessed luminaire where fixed, building insulating material that can safely be exposed continuously to temperatures up to 150°C must not cover but may closely abut the sides of the luminaire. The symbol shall be permanently marked on the back of the fitting, be clearly visible, at least 20 mm high and clearly legible.		N

AS/NZS 60598.2.2:2001			
Cl.	Requirement – Test	Result	Verdict
	<p>The following information shall be included in the manufacturer's instructions:</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p><b>RISK OF FIRE</b> –Building insulation must not cover this luminaire</p> <p>MIC= mm    SCB= mm    HCB= mm</p> </div>		N
2.5.5	<p>Insulating ceiling NON IC mark:</p> 		N
	<p>Recessed luminaire where building insulating material must not cover or come into contact with any part of the luminaire. The symbol shall be permanently marked on the back of the fitting, be clearly visible, at least 20 mm high and clearly legible.</p>		N
	<p>The following information shall be included in the manufacturer's instructions:</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p><b>DANGER-RISK OF FIRE</b></p> <p>-Shall not be installed in residential premises</p> <p>SCI = mm    MIC = mm</p> <p>SCB = mm    HCB = mm</p> </div>		N
2.5.6	<p>Restriction on use of luminaires</p>		P
	<p>All recessed luminaires not marked with one of the the symbols</p> <div style="display: flex; justify-content: space-around; align-items: center;">     </div> <p>shall be marked NON IC and shall have a warning notice on an attached label or given in the manufacturer's instruction leaflet supplied with the luminaire, that the luminaire shall, under no circumstances be covered or abutted with building insulation or be installed in a residential installation.</p>		P
2.5.7	<p>Luminaires supplied with control gear</p>	LED Driver	P
	<p>For luminaires supplied with control gear, pictorial diagrams showing safe installation of the control gear above or below building insulation shall be included in the manufacturer's instructions</p>	LED driver can not be covered with insulation material	P
<b>2.6</b>	<b>Construction</b>		<b>P</b>
2.6.1	<p>Thermal protectors</p>		N
	<p>If thermal protectors are used to meet the requirements of Annex ZA they shall comply with the safety requirements specified in IEC 60730-1.</p>		N

AS/NZS 60598.2.2:2001			
Cl.	Requirement – Test	Result	Verdict
2.6.2	Protection against building insulation contact for Type IC-F, IC, CA 80 and CA 135 recessed luminaires		P
	For recessed luminaires classified as IC-F, IC, CA 80 and CA 135 there shall be adequate protection against building insulation contacting the lampholder or the lamp and causing risk of fire.		P
	For IC-F recessed luminaires compliance is determined by applying the test of clause 13.2 for first characteristic numeral 4 of IEC 60529. Additionally, there shall be no openings in horizontal surfaces, or surfaces within 20 degrees of the horizontal, on the top of the recessed luminaire.		P
	For IC, CA 80 and CA 135 recessed luminaires compliance is determined by applying the test probe 1 of IEC 61032 with a force of $3N \pm 10\%$ to all surfaces and all openings excluding the opening for the light output. The temperature of any part of the reflector, bracketry, body, lamp or lampholder which the probe contacts shall not exceed 80°C for IC and CA 80 type luminaires or 135°C for CA 135 type luminaires.		N
	For Type IC recessed luminaires that do not have a thermal protector it shall not be possible for the test probe to contact the lamp or the lampholder.		N
2.6.3	Building insulation abutting or covering luminaires		P
	a) Maintain its dimensions and structural integrity when exposed to the maximum surface temperature of the class of luminaire, being 150°C in the case of CA-135 luminaires and 90°C in the case of IC-F, IC and CA-80 luminaires;		P
	b) When intended to be in contact with IC, CA 80 and CA 135 recessed luminaires, withstand a 30 s needle flame test carried out in accordance with AS/NZS 60695.11.5 with the flame applied to all surfaces of the sample.		N
<b>2.10</b>	<b>External and internal wiring</b>		<b>P</b>
<b>2.11</b>	<b>Endurance tests and thermal tests</b>		<b>P</b>
	For Type IC-F, IC, CA 80 and CA 135 recessed luminaires the requirements of Annex ZA also apply.		P
<b>Annex ZA</b>			--
ZA.1	Type IC-F, IC, CA 80 and CA 135 recessed		P

AS/NZS 60598.2.2:2001			
Cl.	Requirement – Test	Result	Verdict
	luminaires shall be subjected to the following tests and operated as described in clause 12.4.1 of AS/NZS 60598.1. The test shall be conducted on a separate sample to that used for the tests of AS/NZS 60598.1		
ZA.2	<p>The test sample is mounted in a wooden test box with internal dimensions 1200 mm (L) x 450 mm (W) by 300 mm (H) and a base thickness of 15 to 20 mm. The test sample is mounted 75 mm from one wall and centrally in the other horizontal dimension. See figure ZA.1</p>  <p>Figure ZA.1 – Test box for Type IC-F, IC, CA 80 and CA 135 luminaires</p>		P
ZA.3	For CA 80 and CA 135 luminaires the test box is filled with a single piece of approximately 200 mm thick glass wool thermal insulation having a thermal resistivity (R-value) of 3.2 such that it closely abuts the test sample without compressing or deforming the insulation.		N
	For IC-F and IC luminaires the test box is completely filled with glass wool thermal insulation fully contacting the luminaire.		P
ZA.4	Three thermocouples, T1, are mounted on the side of the test box 75 mm from the test sample at the hottest locations. The thermocouples shall be in a vertical plane through the centreline of the test sample.		P
	One thermocouple, T2, is positioned on the ceiling of the test box directly above the test sample at the hottest location and a further thermocouple, T3, is positioned on the mounting ring.		P
ZA.5	Normal test		P
	The test sample is fitted with the hottest recommended lamp and the test sample operated for six hours or until the fixture has stabilised thermally.		P
	During the test the hottest point on the outer surface of the test sample where it is abutted by		P



AS/NZS 60598.2.2:2001																		
Cl.	Requirement – Test	Result	Verdict															
	insulation (for example, the reflector, bracketry or body) shall be determined, T4, and the temperature measured.																	
	<p>The maximum temperature at any thermocouple shall not exceed the values in table ZA.1. Additionally, the limits of table 12.1 of AS/NZS 60958.1 shall not be exceeded during the test.</p> <p><b>Table ZA.1 – Normal test – Maximum thermocouple temperatures</b></p> <table border="1"> <thead> <tr> <th>Thermocouple reference (figure ZA.1)</th> <th>IC-F</th> <th>IC</th> <th>CA 80</th> <th>CA 135</th> </tr> </thead> <tbody> <tr> <td>T1, T2, T3</td> <td>90°C</td> <td>90°C</td> <td>90°C</td> <td>90°C</td> </tr> <tr> <td>T4</td> <td>80°C</td> <td>80°C</td> <td>80°C</td> <td>135°C</td> </tr> </tbody> </table>	Thermocouple reference (figure ZA.1)	IC-F	IC	CA 80	CA 135	T1, T2, T3	90°C	90°C	90°C	90°C	T4	80°C	80°C	80°C	135°C		P
Thermocouple reference (figure ZA.1)	IC-F	IC	CA 80	CA 135														
T1, T2, T3	90°C	90°C	90°C	90°C														
T4	80°C	80°C	80°C	135°C														
	Thermal protectors shall not operate during the test.		N															
ZA.6	Abnormal test 1		N															
	The test box is then completely filled with glass wool insulation and the tests repeated.		N															
	<p>The maximum temperature of any thermocouple shall not exceed the values in table ZA.2.</p> <p><b>Table ZA.2 – Abnormal test 1 – Maximum thermocouple temperatures</b></p> <table border="1"> <thead> <tr> <th>Thermocouple reference (figure ZA.1)</th> <th>IC-F</th> <th>IC</th> <th>CA 80</th> <th>CA 135</th> </tr> </thead> <tbody> <tr> <td>T1, T2, T3</td> <td>90°C</td> <td>90°C</td> <td>90°C</td> <td>90°C</td> </tr> <tr> <td>T4</td> <td>90°C</td> <td>90°C</td> <td>90°C</td> <td>150°C</td> </tr> </tbody> </table>	Thermocouple reference (figure ZA.1)	IC-F	IC	CA 80	CA 135	T1, T2, T3	90°C	90°C	90°C	90°C	T4	90°C	90°C	90°C	150°C		N
Thermocouple reference (figure ZA.1)	IC-F	IC	CA 80	CA 135														
T1, T2, T3	90°C	90°C	90°C	90°C														
T4	90°C	90°C	90°C	150°C														
	If a thermal protector operates during this test, the test is repeated on a second sample. This second test shall be terminated in the same mode unless the test is otherwise satisfactorily completed.		N															
ZA.7	Replacement lamps test		N															
	All luminaires with E27 or B22 lampholders shall meet one of the following requirements;		N															
	a) The luminaires uses thermal protection to comply with the abnormal test of ZA.6		N															
	b) The luminaire is provided with a warning label as per ZA.8		N															
	c) The luminaire design does not accept any other lamp type or wattage than that specified by the manufacturer		N															
	d) The luminaire complies with the test of ZA.7.1		N															
ZA7.1	The test sample shall be fitted with a 100 W test lamp and operated for six hours.		N															
	The maximum temperature at any thermocouple shall not exceed the values in table ZA.2 during the entire test except that if a thermal protector is fitted it shall operate within one hour and the		N															

AS/NZS 60598.2.2:2001																		
Cl.	Requirement – Test	Result	Verdict															
	<p>maximum temperature at any thermocouple shall not exceed the values in table ZA.3 during the entire test.</p> <p><b>Table ZA.3 – Abnormal test 2 – Maximum thermocouple temperatures</b></p> <table border="1"> <thead> <tr> <th>Thermocouple reference (figure ZA.1)</th> <th>IC-F</th> <th>IC</th> <th>CA 80</th> <th>CA 135</th> </tr> </thead> <tbody> <tr> <td>T1, T2, T3</td> <td>110°C</td> <td>110°C</td> <td>110°C</td> <td>110°C</td> </tr> <tr> <td>T4</td> <td>110°C</td> <td>110°C</td> <td>110°C</td> <td>150°C</td> </tr> </tbody> </table>	Thermocouple reference (figure ZA.1)	IC-F	IC	CA 80	CA 135	T1, T2, T3	110°C	110°C	110°C	110°C	T4	110°C	110°C	110°C	150°C		
Thermocouple reference (figure ZA.1)	IC-F	IC	CA 80	CA 135														
T1, T2, T3	110°C	110°C	110°C	110°C														
T4	110°C	110°C	110°C	150°C														
	After all the above tests that are relevant the luminaire shall withstand the tests of Section 10 of AS/NZS 60598.1		N															
ZA.8	Wrong lamp warning label		N															
	<p>A durable label of a size and with the substance of the wording depicted in figure ZA.2 shall be affixed to the luminaire such that it is clearly visible when a replacement lamp is being fitted. The lettering shall be black on a yellow background.</p> <div style="border: 2px solid black; padding: 10px; text-align: center;"> <p><b>WARNING DANGER OF FIRE</b></p> <p>Do not exceed the lamp rating or use an alternate lamp type to that specified</p> </div> <p><b>Figure ZA.2 – Wrong lamp warning label</b></p>		N															

## Tables

Annex ZA.5		Normal Temperature Test		P
	Model.....:	KLM-HP10WSN		--
	Test voltage.....:	1.06x240V~		--
	Measurement current, Power and power factor.....:	0.039A, 9.2W		
	Size of test box (mm)	1200mm(L)x450mm(W)x300mm(H)		
	Test condition	A glass wool thermal insulation thermal resistivity of 3.2 filled with test box		
No.	Thermocouple location	T (°C)	Limit (°C)	Verdict
102	T1 (on the side of the test box 75mm from the test sample)	30.4	90	Pass
103	T2 (on the ceiling of the test box directly above the test sample)	36.9	90	Pass
104	T3 (on the mounting ring)	70.9	90	Pass
105	T4 (on the test sample nearest the lamp)-01	77.7	80	Pass
106	T4 (on the test sample nearest the lamp)-02	77.9	80	Pass
107	T4 (on the test sample nearest the lamp)-03	76.7	80	Pass
101	Ambient	25.0	--	--

# ATTACHMENT 1

## Photo Documentation

View:  
Model:  
KLM-  
HP10WSN

- General
- Front
- Rear
- Internal
- Top
- Bottom
- PWB

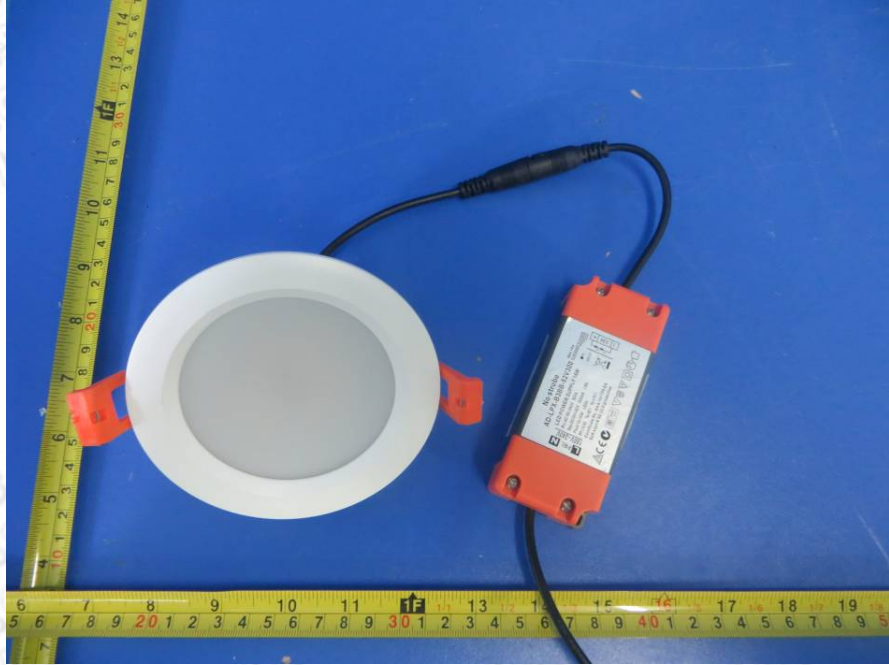


Figure 1

View:

- General
- Front
- Rear
- Internal
- Top
- Bottom
- PWB



Figure 2