

10.3 Touch current, protective conductor current and electric burn

The touch current or protective conductor current that may occur during normal operation of the luminaire shall not exceed the values given in Table 10.3 when measured in accordance with Annex G:

Table 10.3 – Limits of touch current or protective conductor current and electric burn

Touch current		Max. limit (peak)
All luminaires of class II and class I luminaires rated up to and including 16 A fitted with a plug connectable to an unearthed socket outlet		0,7 mA
Protective conductor current	Supply currents	Max. limit (r.m.s.)
Class I luminaires fitted with a single or multiphase plug, rated up to and including 32 A	≤ 4 A	2 mA
	> 4 A but ≤ 10 A	0,5 mA/A
	> 10 A	5 mA
Class I luminaires intended for permanent connection	≤ 7 A	3,5 mA
	> 7 A but ≤ 20 A	0,5 mA/A
	> 20 A	10 mA
Electric burn		Under consideration

Compliance is checked in accordance with Annex G.

10.3 接触电流，保护导体电流和电烧伤。

接触电流或保护导体电流在正常运行过程中可能发生的灯具应不超过给定值时,测量在表 10.3 按照附件 G:

表 10.3 接触电流或保护导体电流和电烧伤的极限值

接触电流		最大极限 (PEAK)
所有二类和一类灯具额定到包括 16A 装有一个插头可能连接到一个插座上		0.7mA
保护导体电流	供应电流	最大限值 RMS
一类灯具安装了一个单相或多相插头、额定值到包括 32A	≤ 4A	2mA
	> 4A but ≤ 10A	0.5mA/A
	> 10A	5mA
一类灯具长久的连接	≤ 7A	3.5mA
	> 7A but ≤ 20A	0.5mA/A
	> 20A	10mA
电烧伤		

G.1 The luminaire is tested at an ambient temperature of $25\text{ °C} \pm 5\text{ °C}$ and at rated supply voltage and frequency in the test circuit shown in Figure G.1.

G.2 The luminaire is operated with the lamp(s) of the type for which it is intended, such that, when stabilized at rated voltage, the lamp wattage and voltage of fluorescent and other discharge lamps are within $\pm 5\%$ of the rated values.

G.3 The protective conductor current is measured with the luminaire connected as described in 12.4.1. In addition, the measuring network in Figure G.4, with A and B connected in Figure G.1 between the PE conductor of the luminaire and the earth connection is used. The measuring network for touch current is disconnected. The test sequence shall be as detailed in Clause G.5 but “e” always open and no measurements shall be made on class II luminaires. The voltage U_4 measured with a high resistance voltmeter (electronic or an oscilloscope) in r.m.s. is divided by the resistor R and the value for the current is given in r.m.s. **G.4** For the measurements of the touch current, the circuit specified in Figures G.1, G.2, and G.3 are used. The test sequence shall be as detailed in Clause G.5. The standard test finger in accordance with IEC 60529 is used as the test probe and is applied to accessible metal parts, or accessible insulating parts wrapped in foil, 10 cm x 20 cm in size, of the luminaire body. The method of measurement described here is based on the assumption that the luminaire is used in a star TN or TT system, i.e. the luminaire is connected between line (L) and neutral (N). For other systems, see relevant clauses of the IEC 60990. In case of multi phase connections, the same procedure occurs, but the measurements are made on one phase at the time. The same limits apply for each phase. Measuring network of Figure G.3 is used for portable class I luminaires, while the measuring network of Figure G.2 is used in all other cases except when the protective conductor current is asked for. The voltage U_2 and U_3 in the measuring networks of Figure G.2 and G.3 are peak voltages. If frequencies above 30 kHz are involved, measurement of touch current shall include measurement with regard to electric burn effects in addition to measurement of Figure G.2. For the burn effects, the unweighted r.m.s. value of the touch-current is relevant. Unweighted touch-current is calculated from the r.m.s. voltage U_1 , measured across the 500 . resistor of Figure G.2. 3) The tests and the requirements of this Annex G are taken from IEC 60990. For full details, see IEC 60990.

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The terminal A electrode (standard test finger) shall be applied to each accessible part in turn. For each application of the terminal A electrode, the terminal B electrode shall be applied to earth, then applied to each of the other accessible parts in turn. For measurement on class II luminaires, the protective conductor is ignored. The test circuit of Figure G.1 shall employ an isolating transformer. NOTE Requirements for class III luminaires, tracks and wire systems are under consideration.

G.5 Test sequence The touch-current is measured as follows: **Table G.1 – Position of switch e, n and p for the measurements of the different classes of luminaires**

Type of luminaire	Position of the switch (see Figure G.1)		
	e	n	p
a) Class II	-	Closed	1
	-	Closed	2
	-	Open	1
	-	Open	2
b) Class I, permanently connected ^a	Closed	Closed	1
	Closed	Closed	2
	Closed	Open	1
	Closed	Open	2
c) Class I, pluggable	Closed	Closed	1
	Closed	Closed	2
	Open	Closed	1
	Open	Closed	2
	Closed	Open	1
	Closed	Open	2
	Open	Open	1
	Open	Open	2

^a These measurements are relevant for class I luminaires containing class II insulated parts only.

In the case of portable and adjustable luminaires incorporating a switch for use with fluorescent or other discharge lamps, the luminaire shall be switched off after the measurements. The luminaire is then switched on and before the lamp(s) restarts, the touch-current is measured again as stated in Table G.1.

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Annex G

(normative)

测量电流接触和保护导体电流

G.1 被测试灯具在环境温度 $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$, 和稳定的额定电压和频率在测试电路显示在图 G.1。

G.2 被测试的这一类的灯具, 为了预期的目的, 当稳定在额定电压时, 灯的功率与电压的荧光和其他气体灯 $\pm 5\%$ 以内的额定值。

G.3 测量被连接的灯具的保护导体电流在 12.4.1 内所描述。此外, 在图 G.4 测量网络, 用 A 和 B 之间连接, 被使用的灯具和地的连接 PE 导体之间的图 G.1。测量网络的接触电流被断开。

测试顺序应该被详细描述, 在条款 G.5 中, 但“e”总是打开的, II 类灯具不需要测量。

电压 U_4 被测量用一个高阻电压表(电子或示波器), r. m. s. 除以电阻 R 得出电流的 r. m. s 值。

G.4 为了测量接触电流，指定使用电路 G.1, G.2 和 G.3 图。

测试顺序应尽可能详细在第 G.5。在按照与 IEC60529 标准测试手指被用作测试探针，并应用于金属部件或者被包在箱内的绝缘部分，灯具的大小 10 厘米×20 厘米。

在这里描述的测量方法是根据使用的灯具是在 TN 或 TT 系统，即灯具之间连接线 (L) 和中性线 (N)。对于其他的系统，看 IEC60990 的有关条款。

在多阶段连接的情况下，同样的过程发生，但在测量上一阶段取得的时间。同样的限制适用于每个阶段。

测量图 G.3 网络用于便携式 I 类灯具，而图 G.2 测量网络是在所有其他情况下使用，除保护导体电流被要求外。

电压 U2 和 U3 在图 G.2 测量网络和 G.3 的峰值电压。

如果涉及超过 30 千赫的频率，接触电流测量应包括关于电击伤，除了图 G.2 测量的影响测量。

对于烧伤影响，接触电流加权 r. m. s. 的值是有关的。从 RMS 电压 U1 计算出未加权接触电流，图 G.2 测量通过 500 Ω 电阻。

终端 A 电极（标准测试手指）应适用于依次访问的一部分。对于使用电极 A 和电极 B 都应该适用于地，然后应用到其他依次访问的每个部分。

对 II 类灯具测量，保护导体被忽略。

在图 G.1 测试电路应采用隔离变压器。

III类灯具，轨道和电线系统的注记需求正在考虑之中。

G.5 测试序列

接触电流测试如下：开关 E、N、P 对不同类别的灯具测量

灯具类型	开关位置（看图 G.1）
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Type of luminaire	Position of the switch (see Figure G.1)		
	e	n	p
a) Class II	-	Closed	1
	-	Closed	2
	-	Open	1
	-	Open	2
b) Class I, permanently connected ^a	Closed	Closed	1
	Closed	Closed	2
	Closed	Open	1
	Closed	Open	2
c) Class I, pluggable	Closed	Closed	1
	Closed	Closed	2
	Open	Closed	1
	Open	Closed	2
	Closed	Open	1
	Closed	Open	2
	Open	Open	1
	Open	Open	2

^a These measurements are relevant for class I luminaires containing class II insulated parts only.

这些有关的一类灯具的测量，只包含II类的绝缘部件。

Class I, permanently connected---一类永久连接

Class I, pluggable Closed-----一类，可插拔

在便携式和可调纳入与荧光灯或其他放电灯开关灯具使用的情况下，灯具应关闭后测量。然后是灯具和前灯（s）重新启动开关，触摸电流的测量，如表G.1再次说明。

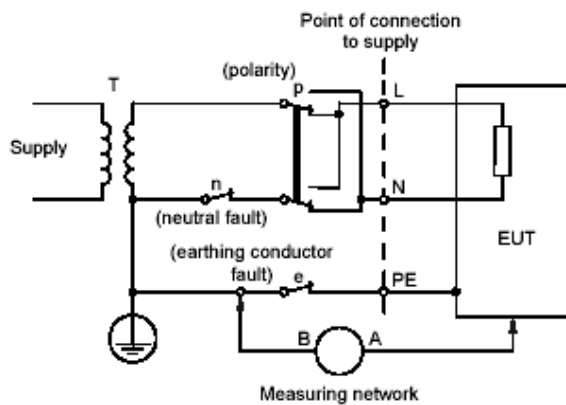


Figure G.1 – Test configuration: single-phase equipment on star TN or TT system

测试配置：单项设备在开始TN或TT系统

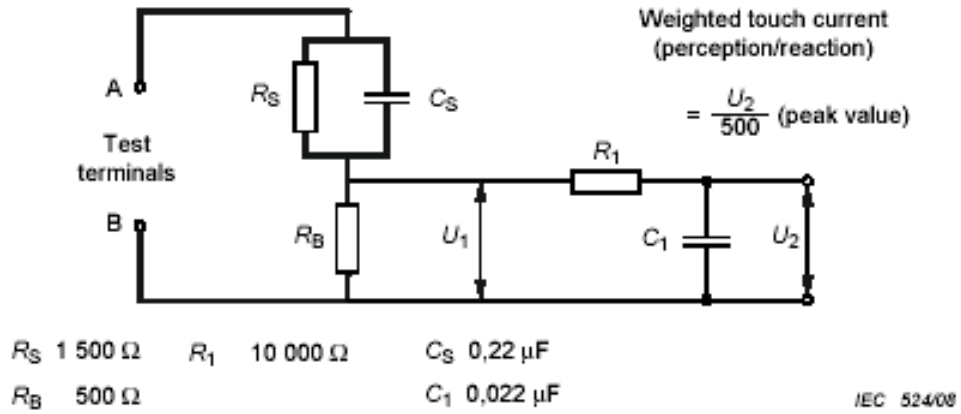


Figure G.2 – Measuring network, touch current weighted for perception or reaction (for all class II and fixed class I luminaires)

测量网络，加权知觉或反应接触电流（为了所有二类和固有的一类灯具）

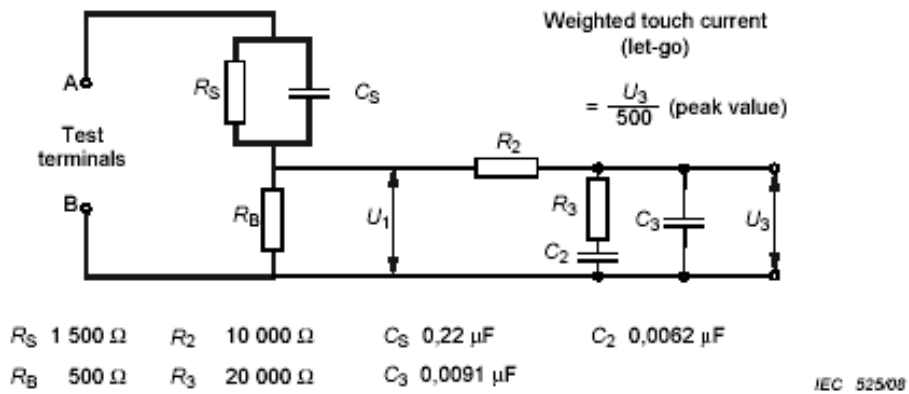
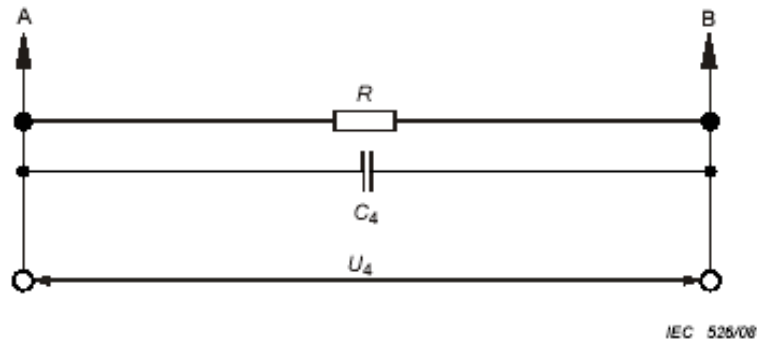


Figure G.3 – Measuring network, touch current weighted for let-go (for portable class I luminaires)

测量网络，加权摆脱接触电流（为了便携式的一类灯具）

$$I_{\text{protective}} = U_4 / R$$



$$R = 150 \Omega$$

$$C_4 = 1,5 \mu\text{F}$$

Figure G.4 – Measuring network, weighted for high frequency protective conductor currents

测量网络，高频保护导体加权的电流

上面是：IEC60598-2008 英文版，接触电流在附录 G 部分，

下面是：IEC60598-2008 中文版，附录 G 已经删除，接触电流在附录 A 部分。

10.3 泄漏电流

灯具正常工作时在电源各极和灯具壳体(见表 10.2)之间可能产生的泄漏电流不应超过表 10.3 规定的数值。合格性根据 IEC 60990 的第 7 章检验。

注：用交流电子镇流器的灯具，由于光源高频工作，泄漏电流可能主要取决于光源和接地启动装置之间的空隙。

表 10.3 泄漏电流

灯具类型	泄漏电流最大均方根值
	mA
0 类和 II 类 ¹⁾	0.5
I 类可移式 ²⁾	1.0
I 类固定式，额定输入小于 1kVA，每 1kVA，增加 1.0mA，最大值 5.0mA ¹⁾	1.0
1) 根据 IEC 60990 的第 5.1.1 条测量加权感知反应电流 (a.c)。	
2) 根据 IEC 60990 的第 5.1.2 条测量加权摆脱电流 (a.c)。	
3) 采用 IEC60990 图 4 和图 5 的网络时，峰值电压 U2 和 U3 应改为均方根值。	

附录A (标准的附录)

确定导电部件是否会引起触电的试验：

为了确定某一导电部件是否是可能引起触电的带电部件，灯具要在额定电源电压和标称频率下进行下述试验：

a) 测量被测件与地线之间的电流，测量线路的无感电阻为 $2000\ \Omega \pm 50\ \Omega$ 。如果测得的交流电流大于 0.7mA （峰值）或直流电流大于 0.2mA ，则该部件为带电部件。

频率超过 1kHz ，极限值为 0.7mA 乘以频率以 kHz 为单位的数值，但不应超过 70mA （峰值）。部件的泄漏电流极限值是累积的。

b) 测量被测件与可触及件之间的电压，测量线路的无感电阻为 $50000\ \Omega$ 。如果测得的电压大于 34V （峰值），则该部件为带电部件。

以上试验，试验电源的一个极应处于地电位。

注：一种简化的测量方法正在考虑中。