

Commission communication in the framework of the implementation of:

Commission Regulation (EC) No 244/2009 of 18 March 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for non-directional household lamps, amended by Commission Regulation (EC) No 859/2009 of 18 September 2009 as regards the ecodesign requirements on ultraviolet radiation of non-directional household lamps

and

Commission Delegated Regulation (EU) No 874/2012 of 12 July 2012 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of electrical lamps and luminaires

and

Commission Regulation (EU) No 1194/2012 of 12 December 2012 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for directional lamps, light emitting diode lamps and related equipment

(Publication of titles and references of transitional methods of measurement ⁽¹⁾ for the implementation of Commission Regulation (EC) No 244/2009 amended by Commission Regulation (EC) No 859/2009, Commission Delegated Regulation (EU) No 874/2012, and Commission Regulation (EU) No 1194/2012)

(Text with EEA relevance)

(2014/C 22/02)

For the purposes of verification of compliance with the requirements of Commission Regulation (EC) No 244/2009 amended by Commission Regulation (EC) No 859/2009, Commission Delegated Regulation (EU) No 874/2012, and Commission Regulation (EU) No 1194/2012 the following measurement procedures shall be used if:

- no other measurement procedures are specified in harmonised standards of which the reference numbers have been published for that purpose in the *Official Journal of the European Union*, (particularly, most of the mentioned EN standards are also ISO standards)
- or no other specific measurement procedures for verification of compliance are referenced in the aforementioned Regulations.

The definitions of 'directional lamps' and 'non-directional lamps' in Article 2 of Commission Regulation (EU) No 1194/2012 shall apply.

1. In case no specific documents have been referenced for measured parameters, reliable, accurate and reproducible measurement procedures, which take into account generally recognised state-of-the-art measurement methods, shall be used. This includes but is not limited to the number of switching cycles, the rated lifetime for LEDs, and the premature failure rate of LEDs.
2. Photometric parameters shall be measured according to prEN 13032-4 for LED lamps and modules (including colourimetric parameters), and EN 13032-1 for all other types.
3. For non-directional lamps tests shall be carried out as follows:
 - a. Incandescent light bulbs shall be measured according to methods set out in the following documents:

⁽¹⁾ It is intended that these transitional methods will ultimately be replaced by harmonised standards. When available, reference(s) to the harmonised standards will be published in the *Official Journal of the European Union* in accordance with Articles 9 and 10 of Directive 2009/125/EC.

Non-directional incandescent light bulbs		
Measured parameter	Reference	Remarks
EEI	EN 60064, 3.4.1 and Annex A for power; CIE 84 for basics of luminous flux measurement; EN60064, 3.4.2 for luminous flux	The average EEI value shall be calculated from the arithmetic mean of each product's individual EEI.
Lamp caps	EN 60064 in conjunction with EN 60061-1	
Lamp survival factor	CIE 97	
Rated lifetime, lamp lifetime	EN 60064, Annex A and B	
Lumen maintenance, lamp lumen maintenance factor	EN 60064, 3.5 and Annex A	
Number of switching cycles	—	Reliable, accurate and reproducible measurement procedures shall be used.
Starting time	—	Not relevant for incandescent lamps.
Lamp warm-up time	—	Not relevant for incandescent lamps.
Premature failure rate	EN 60064, 3.5	
Lamp power factor	—	Not relevant for incandescent lamps (power factor equals 1).
Chromaticity coordinates	CIE S 010 (= ISO 23539) for basics on photometry, CIE 15 for basics on colorimetry, CIE 63 for spectroradiometric measurement	
CCT	CIE 15	
CRI	—	Not relevant for incandescent lamps (CRI is 100).
Luminance	CIE 18.2	
Specific effective UV radiant power	EN/CIE 62471	
Dimensions	EN 60064	

- b. Halogen incandescent light bulbs shall be measured according to methods set out in the following documents:

Non-directional halogen incandescent light bulbs		
Measured parameter	Reference	Remarks
Lamp efficacy, luminous efficacy	EN 60357, 1.4.5 and Annex A for luminous flux; CIE 84 for basics of luminous flux; EN 60357, 1.4.4 for power	The average efficacy value shall be calculated from the arithmetic mean of each product's individual efficacy.

Non-directional halogen incandescent light bulbs		
Measured parameter	Reference	Remarks
Lamp caps	EN 60432-2, 1.1 for halogen for domestic and general lighting; EN 60432-3, 2.3 for halogen (not for vehicles); in conjunction with EN 60061-1	
Lamp survival factor	CIE 97	
Rated lifetime, lamp lifetime	EN 60357, 1.4 and Annex A	
Lumen maintenance, lamp lumen maintenance factor	EN 60357, 1.4 and Annex A	
Number of switching cycles	—	Reliable, accurate and reproducible measurement procedures shall be used.
Starting time	—	Not relevant for halogen incandescent lamps.
Lamp warm-up time	—	Not relevant for halogen incandescent lamps.
Premature failure rate	EN 60357, Annex A	
Lamp power factor (only for lamps with integrated controlgear)	EN 61000-3-2	
Chromaticity coordinates	CIE S 010 (= ISO 23539) for basics on photometry, CIE 15 for basics on colorimetry, CIE 63 for spectroradiometric measurement	
CCT	CIE 15	
CRI	—	Not relevant for halogen incandescent lamps (CRI is 100).
Luminance	CIE 18.2	
Specific effective UV radiant power	EN/CIE 62471	
Lamp dimensions	EN 60357	

- c. Compact fluorescent lamps with integrated control gear shall be measured according to methods set out in the following documents:

Non-directional compact fluorescent lamps		
Measured parameter	Reference	Remarks
Lamp efficacy, luminous efficacy	EN 60969, at present 34A/1701/CDV Annex A for luminous flux;	The average efficacy value shall be calculated from the arithmetic mean of each product's individual efficacy.

Non-directional compact fluorescent lamps		
Measured parameter	Reference	Remarks
	CIE 84 for basics of luminous flux; 34A/1701/CDV Annex A for power	
Lamp caps	EN 60968 in conjunction with EN 60061-1	
Lamp survival factor	CIE 97	
Rated lifetime, lamp lifetime	EN 60969, at present 34A/1701/CDV Annex G	
Lumen maintenance, lamp lumen maintenance factor	EN 60969, at present 34A/1701/CDV Annex D	
Number of switching cycles	EN 60969, at present 34A/1701/CDV Annex F	
Starting time	EN 60969, at present 34A/1701/CDV Annex B	
Lamp warm-up time	EN 60969, at present 34A/1701/CDV Annex C	The run-up time shall be used instead.
Premature failure rate	EN 60969, at present 34A/1701/CDV Annex G	
Lamp power factor (only for lamps with integrated controlgear)	EN 61000-3-2	
Chromaticity coordinates	CIE 15	
CCT	CIE 15	
CRI	CIE 13.3	
Luminance	CIE 18.2	
Specific effective UV radiant power	EN/CIE 62471	
Lamp dimensions	EN 60969, at present 34A/1701/CDV Table 3	
Mercury content	Commission Decision 2002/747/EC (Annex)	
Dimmability	—	Reliable, accurate and reproducible measurement procedures shall be used.

- d. Light emitting diode lamps shall be measured according to methods set out in the following documents:

Non-directional light emitting diode lamp		
Measured parameter	Reference	Remarks
Lamp efficacy	EN 62612, 9.3 efficacy. To be corrected according to IM 244 with correction factor.	The average efficacy value shall be calculated from the arithmetic mean of each product's individual efficacy.

Non-directional light emitting diode lamp		
Measured parameter	Reference	Remarks
Rated lifetime, lamp lifetime	—	Reliable, accurate and reproducible measurement procedures shall be used. For LED lamps, EN 62612 provides procedures for 6 000 h testing time.
Lamp survival factor	EN 62612, 11.2	The compliance criteria of the regulations shall be applied.
Lumen maintenance, lamp lumen maintenance factor	EN 62612, 11.2	The compliance criteria of the regulations shall be applied.
Number of switching cycles	EN 62612, 11.3.3	
Starting time	—	Reliable, accurate and reproducible measurement procedures shall be used.
Lamp warm-up time	—	Reliable, accurate and reproducible measurement procedures shall be used.
Premature failure rate	EN 62612, 11.2	An additional read point at 1 000 h and the compliance criteria according to the regulations shall be applied.
Lamp power factor	EN 61000-3-2	
Chromaticity coordinates	prEN 13032-4	
CCT	prEN 13032-4	
CRI	prEN 13032-4	
Luminance	CIE 18.2	
Specific effective UV radiant power	EN/CIE 62471	
UVA+UVB	EN/CIE 62471	
Lamp dimensions	EN 62612, 6	
Dimmability	EN 62560, 5.2	The presence of a symbol or warning shall be checked.
Lamp caps	EN 62560	

- e. Light emitting diode modules shall be measured according to methods set out in the following documents:

Non-directional light emitting diode modules		
Measured parameter	Reference	Remarks
Lamp efficacy, luminous efficacy	IEC 62717, at present 34A/1659/CDV, 9.3 efficacy	The average efficacy value shall be calculated from the arithmetic mean of each product's individual efficacy.
Rated lifetime, lamp lifetime	—	Reliable, accurate and reproducible measurement procedures shall be used. For LED lamps, EN 62612 provides procedures for 6 000 h testing time.

Non-directional light emitting diode modules		
Measured parameter	Reference	Remarks
Lamp survival factor	IEC 62717, 10.2	The compliance criteria of the regulations shall be applied.
Lumen maintenance, lamp lumen maintenance factor	IEC 62717, 10.2	The compliance criteria of the regulations shall be applied.
Number of switching cycles	IEC 62717, at present 34A/1659/CDV, 11.3.3	
Starting time	—	Reliable, accurate and reproducible measurement procedures shall be used. The method described in 34A/1701/CDV (for CFLi) may be adapted.
Lamp warm-up time	—	Reliable, accurate and reproducible measurement procedures shall be used. The method described in 34A/1701/CDV (for CFLi) may be adapted.
Premature failure rate	IEC 62717, 11.2	An additional read point at 1 000 h and the compliance criteria according to the regulations shall be applied.
Lamp power factor	EN 61000-3-2	
Chromaticity coordinates	prEN 13032-4	
CCT	prEN 13032-4	
CRI	prEN 13032-4	
Luminance	CIE 18.2	
Specific effective UV radiant power	EN/CIE 62471	
UVA+UVB	EN/CIE 62471	
Lamp dimensions	IEC 62717, at present 34A/1659/CDV, 5	
Dimmability	IEC 62717, at present 34A/1659/CDV, 6 and 7.2	The presence of a symbol or warning shall be checked. A list of compatible dimmers is not possible due to the arbitrary combination with controlgears.

4. For directional lamps tests shall be carried out as follows:

- a. Incandescent light bulbs shall be measured according to methods set out in the following documents:

Directional incandescent light bulbs		
Measured parameter	Reference	Remarks
EEL	CIE 84 for general conditions of luminous flux measurement. L2(AP)005 for cone luminous flux. EN 60064, 3.4.1 for power.	The average EEL value shall be calculated from the arithmetic mean of each product's individual EEL.

Directional incandescent light bulbs		
Measured parameter	Reference	Remarks
Rated lifetime	EN 60064, Annex A and B	
Lumen maintenance	EN 60064, 3.5 and Annex A	
Number of switching cycles	—	Reliable, accurate and reproducible measurement procedures shall be used.
Starting time	—	Not relevant for incandescent lamps.
Lamp warm-up time	—	Not relevant for incandescent lamps.
Premature failure rate	EN 60064, 3.5 and Annex A	
Lamp power factor	—	Not relevant for incandescent lamps (power factor equals 1).
Chromaticity coordinates	CIE S 010 (= ISO 23539) for basics on photometry, CIE 15 for basics on colorimetry, CIE 63 for spectroradiometric measurement	
CRI	—	Not relevant for incandescent lamps (CRI is 100).
Equivalence claim for retrofit lamps	—	Not relevant for incandescent lamps.
Beam angle	IEC/TR 61341	
Peak intensity	IEC/TR 61341	

- b. Halogen incandescent light bulbs shall be measured according to methods set out in the following documents:

Directional halogen incandescent light bulbs		
Measured parameter	Reference	Remarks
EEI	CIE 84 for general conditions of luminous flux measurement. L2(AP)005 for cone luminous flux. EN 60357, 1.4.4 for power.	The average EEI value shall be calculated from the arithmetic mean of each product's individual EEI.
Rated lifetime	EN 60357, 1.4 and Annex A	
Lumen maintenance	EN 60357, 1.4 and Annex A	
Number of switching cycles	—	Reliable, accurate and reproducible measurement procedures shall be used. EN 60357, A.3 duty cycle, may partially be used.
Starting time	—	Not relevant for halogen incandescent lamps.

Directional halogen incandescent light bulbs		
Measured parameter	Reference	Remarks
Lamp warm-up time	—	Not relevant for halogen incandescent lamps.
Premature failure rate	EN 60357, Annex A	
Lamp power factor	—	Not relevant for halogen incandescent lamps (power factor equals 1).
Chromaticity coordinates	CIE S 010 (= ISO 23539) for basics on photometry, CIE 15 for basics on colorimetry, CIE 63 for spectroradiometric measurement	
CRI	—	Not relevant for halogen incandescent lamps (CRI is 100).
Equivalence claim for retrofit lamps	—	See measurement of luminous flux and power under parameter EEI.
Beam angle	IEC/TR 61341, further conditions EN 60357, Annex A	
Peak intensity	IEC/TR 61341, further conditions EN 60357, Annex A	
Lamp type (MR11, GU4, etc.)	EN 60357	

- c. Compact fluorescent lamps with integrated control gear shall be measured according to methods set out in the following documents:

Directional compact fluorescent lamps		
Measured parameter	Reference	Remarks
EEI	CIE 84 for general conditions of luminous flux measurement; L2(AP)005 for cone luminous flux; EN 60969, at present 34A/1701/CDV Annex A for power.	The average EEI value shall be calculated from the arithmetic mean of each product's individual EEI.
Rated lifetime	EN 60969, at present 34A/1701/CDV Annex G	
Lamp survival factor	EN 60969, at present 34A/1701/CDV Annex G	
Lumen maintenance	EN 60969, at present 34A/1701/CDV Annex D	
Number of switching cycles	EN 60969, at present 34A/1701/CDV Annex F	

Directional compact fluorescent lamps		
Measured parameter	Reference	Remarks
Starting time	EN 60969, at present 34A/ 1701/CDV Annex B	
Lamp warm-up time	EN 60969, at present 34A/ 1701/CDV Annex C	The run-up time shall be used instead.
Premature failure rate	EN 60969, at present 34A/ 1701/CDV Annex G	
Lamp power factor	EN 61000-3-2	
Chromaticity coordinates	CIE 15	
CCT	CIE 15	
CRI	CIE 13.3	
Spectral power distribution	CIE 63	
Lamp dimensions	EN 60969, at present 34A/ 1701/CDV Table 3	
Beam angle	IEC/TR 61341	
Peak intensity	IEC/TR 61341	
Mercury content	Commission Decision 2002/747/EC (Annex)	
Lamp type (MR11, GU4, etc.)	EN 60968 at present 34A/ 1624/CD - caps	
Cone luminous flux	L2(AP)005	
Cap	EN 60968	

- d. High intensity discharge lamps shall be measured according to methods set out in the following documents:

Directional high intensity discharge lamps		
Measured parameter	Reference	Remarks
EEL	CIE 84 for general conditions of luminous flux measurement; L2(AP)005 for cone luminous flux; EN 61167 Annex B or E for power, for metal halide lamps.	The average EEL value shall be calculated from the arithmetic mean of each product's individual EEL.
Rated lifetime	—	Reliable, accurate and reproducible measurement procedures shall be used.
Lumen maintenance	—	Reliable, accurate and reproducible measurement procedures shall be used.
Number of switching cycles	—	Reliable, accurate and reproducible measurement procedures shall be used.

Directional high intensity discharge lamps		
Measured parameter	Reference	Remarks
Starting time	EN 61167, Annex A for electro-magnetic operation, Annex G for square wave operation for metal halide lamps;; EN 60662 8.2 for high pressure sodium lamps	The method for square wave operation of metal halide lamps shall be considered if "starting time" can be identified as the sum of time for break down, take-over and run-up. (EN 61167, Annex G)
Lamp warm-up time to 60%	EN 61167, Annex A for electro-magnetic operation, Annex G for square wave operation of metal halide lamps.	
Premature failure rate	—	Reliable, accurate and reproducible measurement procedures shall be used.
Lamp power factor (only for lamps with integrated controlgear)	EN 61000-3-2	
Chromaticity coordinates	CIE 15	
CCT	CIE 15	
CRI	CIE 13.3	
Spectral power distribution	CIE 63	
Lamp dimensions	EN 61167, 6 for metal halide lamps	
Beam angle	IEC/TR 61341	
Peak intensity	IEC/TR 61341, further conditions EN 61167, 4.7 for metal halide lamps	
Mercury content	Commission Decision 2002/747/EC (Annex)	
Dimmability	—	Reliable, accurate and reproducible measurement procedures shall be used.
Lamp type (MR11, GU4, etc.)	EN 61167, 6.2.2 for metal halide lamps	
Cone luminous flux	L2(AP)005	

- e. Light emitting diode lamps shall be measured according to methods set out in the following documents:

Directional light emitting diodes lamps		
Measured parameter	Reference	Remarks
EEL	CIE 84 for general conditions of luminous flux measurement; L2(AP)005 for cone luminous flux;	The average EEL value shall be calculated from the arithmetic mean of each product's individual EEL.

Directional light emitting diodes lamps		
Measured parameter	Reference	Remarks
	EN 62612, 9.3 for efficacy; EN 62612, 9.1 and Annex A for luminous flux, EN 62612, 8.1 and Annex A for power	
Rated lifetime, lamp lifetime	—	Reliable, accurate and reproducible measurement procedures shall be used.
Lamp survival factor	EN 62612, 11.2	The compliance criteria of the regulations shall be applied.
Lumen maintenance	EN 62612, 11.2	The compliance criteria of the regulations shall be applied.
Number of switching cycles	EN 62612, 11.3.3	
Starting time	—	Reliable, accurate and reproducible measurement procedures shall be used. The method described in 34A/1701/CDV (for CFLi) may be adapted.
Lamp warm-up time	—	Reliable, accurate and reproducible measurement procedures shall be used. The method described in 34A/1701/CDV (for CFLi) may be adapted.
Premature failure rate	EN 62612, 11.2	An additional read point at 1 000 h and the compliance criteria according to the regulations shall be applied.
Lamp power factor (only for lamps with integrated controlgear)	EN 61000-3-2	
CCT	prEN 13032-4	
CRI	prEN 13032-4	
Colour consistency	EN 62612, 10.1	
Spectral power distribution	CIE 63	
Lamp dimensions	EN 62612, 6	
Beam angle	EN 62612, 9.2	
Peak intensity	EN 62612, 9.2	
Dimmability	EN 62560, 5.2	The presence of a symbol or warning shall be checked.
Lamp type (MR11, GU4, etc.)	See parameter "cap".	
Cone luminous flux	L2(AP)005	
Cap	EN 62560	

- f. Light emitting diode modules shall be measured according to methods set out in the following documents:

Directional light emitting diodes modules		
Measured parameter	Reference	Remarks
EEL	IEC 62717, at present 34A/ 1659/CDV, 9.3 efficacy	The average EEI value shall be calculated from the arithmetic mean of each product's individual EEI.

Directional light emitting diodes modules		
Measured parameter	Reference	Remarks
Rated lifetime		Reliable, accurate and reproducible measurement procedures shall be used.
Lamp survival factor	IEC 62717, 10.2	The compliance criteria of the regulations shall be applied.
Lumen maintenance	IEC 62717, 10.2	The compliance criteria of the regulations shall be applied.
Number of switching cycles	IEC 62717, at present 34A/1659/CDV, 10.3	
Starting time	—	Reliable, accurate and reproducible measurement procedures shall be used. The method described in 34A/1701/CDV (for CFLi) may be adapted.
Lamp warm-up time	—	Reliable, accurate and reproducible measurement procedures shall be used. The method described in 34A/1701/CDV (for CFLi) may be adapted.
Premature failure rate	IEC 62717, 10.2	An additional read point at 1 000 h and the compliance criteria according to the regulations shall be applied.
Lamp power factor (only for lamps with integrated controlgear)	EN 61000-3-2	
Chromaticity coordinates	prEN 13032-4	
Colour consistency	IEC 62717, at present 34A/1659/CDV, 9.1 CIE 15	
CRI	prEN 13032-4A	
Spectral power distribution	CIE 63	
Lamp dimensions	IEC 62717, at present 34A/1659/CDV, 5	
Beam angle	IEC 62717, at present 34A/1659/CDV, 8.2.5 IEC/TR 61341	
Peak intensity	IEC 62717, at present 34A/1659/CDV, 8.2.4 IEC/TR 61341	
Dimmability	IEC 62717, at present 34A/1659/CDV, 6 and 7.2	The presence of a symbol or warning shall be checked.
Cone lumen	L2(AP)005	

5. For control gear tests shall be carried out as follows:

Control gear		
Measured parameter	Reference	Remarks
Standby power for lighting transformers (halogen and LED)	IEC 62442-3, at present 34C/1019/CDV	

Control gear		
Measured parameter	Reference	Remarks
Standby power for household luminaires	—	Not relevant for luminaires (determined from the controlgear components).
Fluorescent lamp controlgear efficiency measurement	EN 62442-1, replacing EN 50294	
High intensity discharge lamp controlgear efficiency measurement	IEC 62442-2, at present 34C/1016/CDV	

6. The following reference documents shall be used:

Overview of referenced documents		
Reference document	Organisation	Title
Commission Decision 2002/747/EC (Annex)	European Commission	Commission Decision 2002/747/EC of 9 September 2002 establishing revised ecological criteria for the award of the Community ecolabel to light bulbs and amending Decision 1999/568EC.
EN 60061-1	CENELEC	Lamp caps and holders together with gauges for the control of interchangeability and safety Part 1 – lamp caps
EN 60064	CENELEC	Tungsten filament lamps for domestic and similar general lighting purposes — Performance requirements
EN 60357	CENELEC	Tungsten halogen lamps (non vehicle) — Performance specifications
EN 60432-1	CENELEC	Incandescent lamps – Safety specifications – Part 1: Tungsten filament lamps for domestic and similar general lighting purposes
EN 60432-2	CENELEC	Incandescent lamps – Safety specifications – Part 2: Tungsten halogen lamps for domestic and similar general lighting purposes
EN 60432-3	CENELEC	Incandescent lamps – Safety specifications – Part 3: Tungsten halogen lamps (non-vehicle)
EN 60662	CENELEC	High-pressure sodium vapour lamps – Performance specifications
EN 60968 ed. 2 and 34A/1624/CD	IEC/CENELEC	Self-ballasted lamps for general lighting services – Safety requirements
EN 60969 ed. 2 and 34A/1701/CDV	IEC/CENELEC	Self-ballasted lamps for general lighting services – Performance requirements

Overview of referenced documents

Reference document	Organisation	Title
EN 61000-3-2	CENELEC	Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
EN 61167	CENELEC	Metal halide lamps – Performance specification
IEC/TR 61341	IEC	Method of measurement of centre beam intensity and beam angle(s) of reflector lamps
EN 62442-1	CENELEC	Energy performance of lamp controlgear – Part 1: Controlgear for fluorescent lamps - Method of measurement to determine the total input power of controlgear circuits and the efficiency of the controlgear
IEC 62442-2; at present 34C/1016/CDV	IEC	Energy performance of lamp controlgear – Part 2: Controlgear for high intensity discharge lamps (excluding fluorescent lamps) – Method of measurement to determine the efficiency of controlgear
IEC 62442-3, at present 34A/1019/CDV	IEC	Energy performance of lamp controlgear – Part 3: Controlgear for halogen lamps and LED modules – Method of measurement to determine the efficiency of the controlgear
EN 62471	CENELEC	Photobiological safety of lamps and lamp systems
EN 62554	CENELEC	Sample preparation for measurement of mercury level in fluorescent lamps
EN 62560	CENELEC	Self-ballasted LED lamps for general lighting services by voltage >50 V – Safety specifications
EN 62612	CENELEC	Self-ballasted LED lamps for general lighting services with supply voltages > 50 V – Performance requirements
IEC 62717, at present 34A/1659/CDV	IEC	LED modules for general lighting - Performance requirements
prEN 13032-4	CEN	Light and lighting - Measurement and presentation of photometric data - Part 4: LED lamps, modules and luminaires
CIE TR 13.3:1995	CIE	Method of Measuring and Specifying Colour Rendering Properties of Light Sources

Overview of referenced documents

Reference document	Organisation	Title
CIE TR 15:2004	CIE	Colorimetry
CIE 18	CIE	Principles of Light Measurement
CIE 43:1979	CIE	Photometry of Floodlights
CIE TR 53:1982	CIE	Methods of characterizing the performance of radiometers and photometers
CIE 63:1984	CIE	The spectroradiometric measurement of light sources
CIE 70:1987	CIE	The measurement of absolute luminous intensity distributions
CIE TR 84:1989	CIE	The measurement of luminous flux
CIE TR 127:2007	CIE	Measurement of LEDs
CIE TR 149:2002	CIE	The use of tungsten filament lamps as secondary standard sources
CIE S 010/E:2004 / ISO 23539:2005	CIE/ISO	Photometry - The CIE System of Physical Photometry
L2(AP)005, to be converted into an EN standard	European Lamp Manufacturers Association in the Preparation of Standards	Cone luminous flux measurement