

Electromagnetic Fields (EMF) of Luminaires

Assessment of lighting equipment with regard to human exposure to electromagnetic fields

EU directive and underlying standards

Assessment of human exposure to electromagnetic fields is classed as a safety feature in Europe and falls within the purview of the Low Voltage Directive. The basic technical standard for EMF – EN 62311 – is listed in the Official Journal of the European Union (OJEU). Because no precursor standard exists, luminaire assessment is required to be implemented without a transitional period.

The new EMF product standard for luminaires, IEC 62493:2009-12, is published in Germany as DIN EN 62493 (VDE 0848-493):2010-09. The standard sets out the procedure for assessing general public exposure to electromagnetic fields generated by luminaires. It does **NOT** deal with **EMC**, it is a safety standard and, like the basic technical EMF standard, is listed under the Low Voltage Directive. As of the *doc* in the Official Journal (which is normally the same as the *dow*, in this case 2013-02-01), the only EMF standard that can be used for luminaires is EN 62493. The standard applies to luminaires and independent components regardless of illuminant, i.e. including luminaires with LEDs. With the aim of obtaining a relatively simple method of measuring and assessing the EMF behaviour of luminaires and independent components, the standard provides for a number of EMF impacts to be measured and assessed by the procedure set out in EN 55015. The supplemental measurement and assessment procedure defined in DIN EN 62493 is conducted with a Van der Hoofden test head.

Verification of conformity

DIN EN 62493 (VDE 0848-493) sets no limits itself; it refers only to limits set out in the recommendations of the ICNIRP (for Europe) or the standard IEEE C95.1 (for the United States). Conformity to the standard means that the requirements of the ICNIRP are met and the identical limits set out in the EU Council Recommendation (1999/519/EC) observed.

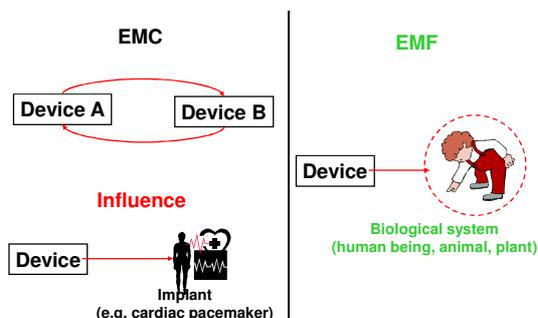
Conformity to the requirements is achieved as follows:

1. Luminaires and independent components need to meet the requirements of the EMC standard DIN EN 55015 (VDE 0875-15-1):2009-11 (interference voltage limits from 20 kHz to 30 MHz, magnetic field strength from 100 kHz to 30 MHz, electrical field strength from 30 MHz to 300 MHz). It is also important here to demonstrate conformity in the frequency range from 30 MHz to 300 MHz!

2. The measurement procedure defined in the standard needs to be performed on luminaires and independent components in the 20 kHz - 10 MHz frequency range and the findings must not exceed the stipulated limit. This procedure is new and unfamiliar.

Application of the standard

The new EMF standard will be identified in the Official Journal of the EU as applicable under the Low Voltage Directive. Because conformity assessment procedures are presumed compliant with the Low Voltage Directive as soon as the standard defining them is published in a member state, DIN EN 62493 can be applied already since it has been published in several EU countries. DIN EN 62493 (VDE 0848-493) can thus be referenced for declarations of conformity to the Low Voltage Directive (2006/95/EC) for luminaires and independent components.



Procedure for component manufacturers (ballasts, converters, etc.)

This new standard sets out **no** requirements for components that are designed to be integrated in luminaires. However, independent components are directly subject to the requirements of the standard.

Practical procedure for luminaire and independent component manufacturers

As well as assessing EMF in accordance with EN 55015, a luminaire or independent component manufacturer should perform the new measurement procedure (20 kHz - 10 MHz) – or arrange for it to be performed – on a number of representative models in the series of devices manufactured. During the procedure, a simulated head is used to establish the current densities produced in the head by the electromagnetic fields radiated by the luminaires (see illustration below).



If the values measured are significantly below the stipulated limit, it can be assumed with a very high degree of probability that the series of devices as a whole is within the limits set out in the standard.

A luminaire EMF measurement campaign is currently being conducted among luminaire and component manufacturers in the ZVEI in cooperation with the VDE. The purpose of the exercise is to obtain empirical data that will enable assessment of EMF behaviour to be taken into account in luminaire design.

Further information is available from:

EMF for luminaires in general: Norbert Wittig (norbert.wittig@vs.vossloh-schwabe.com)
EMF/EMC verification: Dr. Stephan Kloska (stephan.kloska@vde.com)
VDE marks approval: Dietmar Gläser (Dietmar.Glaeser@vde.com)

Contact:

ZVEI – Zentralverband Elektrotechnik
und Elektronikindustrie e.V.
Lyoner Str. 9
60528 Frankfurt am Main; Germany
Phone: +49 69 6302-293
Fax: +49 69 6302-400
E-Mail: licht@zvei.org
www.zvei.org/licht