Expert commentary

BS EN 61000-3-3:2013+A2:2021 — *Electromagnetic compatibility (EMC) — Part 3-3: Limits. Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection*

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Full document details: BS EN 61000-3-3:2013+A2:2021 ExComm

1 Overview

BS EN 61000-3-3:2013+A2:2021 (based on IEC 61000-3-3: 2013+AMD1:2017+AMD2:2021 Edition 3.2) is the standard that provides limits for voltage changes, voltage fluctuations and flicker in public low-voltage supply systems. The standard applies to equipment with rated current below 16 A per phase. BS EN 61000-3-3:2013+A2:2021 replaces BS EN 61000-3-3:2013+A1:2019. This document is maintained by IEC TC 77.

Amendment 2:2021 to BS EN 61000-3-3:2013+A1:2019 introduces a number of clarifications to the test methods, test set-ups and exercising conditions described in BS EN 61000-3-3:2013+A1:2019. These changes are intended to enhance the clarity of the standard and to reduce ambiguity in the application of the standard.

The clarifications apply to the existing test methods or exercising conditions for:

- microwave ovens
- refrigerators (the requirements for which are extended to fridge freezers)
- hairdryers (the requirements for which are extended to similar haircare equipment)
- air conditioners, dehumidifiers, heat pumps and commercial refrigerating equipment

In addition, new specific exercising conditions are given for:

- coffee machines and tea machines
- portable fan heaters
- comfort fans and similar equipment

1.1 Reasons for change

This amendment to BS EN 61000-3-3:2013+A1:2019 was developed in response to National Committee comments and to requirements from the European Union that standards should be more specific and less ambiguous.

2 Main commentary

2.1 Power-line flicker measurements of P_{lt} and P_{st}

Power-line flicker is a visible change in visible brightness due to rapid fluctuations (flicker) in the voltage of the power supply caused by the load. It was originally described for lighting circuits but is now extended to an equivalent effect for non-lighting equipment.

The effect is produced by a voltage drop that is generated over the source impedance of the grid by the changing load current of an equipment or facility. These fluctuations in time generate flicker and requirements are set for short-term flicker (P_{st}) measured over a 10-minute period and long-term flicker effects (P_{lt}) assessed over a 2-hour period.

From the resulting momentary value of power-line flicker the short-term flicker 'perceptibility' value P_{st} is calculated according to a statistical process over a standardized 10-minute observation interval. Long-term flicker P_{lt} is calculated as the cubic mean of several P_{st} values over a standardized 2-hour period.

The perceptibility value calculation and scaling algorithms were developed from subjective assessments to determine how obvious and how annoying the perceived flicker was. The P value of 1.0 corresponds to a level at which 50 per cent of test subjects found the flicker to be both noticeable and irritating.

2.2 Amendments to test processes and procedures

BS EN 61000-3-3:2013+A2:2021 is a broad ranging standard that encompasses a number of different types of equipment.

There are no changes to the applicability of the standard and no impact on the limit levels applied to equipment. The clarifications introduced, however, impact the set-ups or exercising conditions that measurement laboratories use to assess the compliance of pieces of equipment.

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