

## IEEE-519 Harmonic standard

*This article is quoted from the harmonic standard "IEEE Std—2014 Recommended Practices and Requirements for Harmonic Control of Power Systems" revised in 2014 by the Institute of Power Electronics Engineers. If there are copyright issues, please contact to delete.*

The United States IEEE Std. 519-2014 on the harmonic standards of power grids is a relatively authoritative standard in the world, produced by the United States IEEE Power and Energy Society, it is used as a reference standard by many countries and regions around the world.

### Current distortion limits for systems rated 120 V through 69 kV

The limits in this subclause apply to users connected to systems where the rated voltage at the PCC is 120 V to 69 kV. At the PCC, users should limit their harmonic currents as follows:

<b>Maximum harmonic current distortion in percent of <math>I_L</math></b>						
<b>Individual harmonic order (odd harmonics)<sup>a, b</sup></b>						
<b><math>I_{sc}/I_L</math></b>	<b><math>3 \leq h &lt; 11</math></b>	<b><math>11 \leq h &lt; 17</math></b>	<b><math>17 \leq h &lt; 23</math></b>	<b><math>23 \leq h &lt; 35</math></b>	<b><math>35 \leq h \leq 50</math></b>	<b>TDD</b>
<20 <sup>c</sup>	4%	2%	1.5%	0.6%	0.3%	5%
20<50	7%	3.5%	2.5%	1%	0.5%	8%
50<100	10%	4.5%	4%	1.5%	0.7%	12%
100<1000	12%	5.5%	5%	2%	1%	15%
>1000	15%	7%	6%	2.5%	1.4%	20%

**Definitions:**

$I_{sc}$  = maximum short-circuit current at PCC

$I_L$  = maximum demand load current (fundamental frequency component)  
at the PCC under normal load operating conditions

PCC (point of common coupling): Point on a public power supply system, electrically nearest to a

particular load, at which other loads are, or could be, connected. The PCC is a point located upstream of the considered installation

<sup>a</sup> Even harmonics are limited to 25% of the odd harmonic limits above.

<sup>b</sup> Current distortions that result in a dc offset, e.g., half-wave converters, are not allowed.

<sup>c</sup> All power generation equipment is limited to these values of current distortion, regardless of actual  $I_{sc}/I_L$ .

TDD (total demand distortion): The ratio of the root mean square of the harmonic content, considering harmonic components up to the 50th order and specifically excluding interharmonics, expressed as a percent of the maximum demand current. Harmonic components of order greater than 50 may be included when necessary.

THD (total harmonic distortion): The ratio of the root mean square of the harmonic content, considering harmonic components up to the 50th order and specifically excluding interharmonics, expressed as a percent of the fundamental. Harmonic components of order greater than 50 may be included when necessary.