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## 8. What is IEEE Std 519 and how does it apply to VFD installations?

IEEE Std 519 was first introduced in 1981 as 'Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems'. Most recently revised in 1992, it provides direction on dealing with harmonics introduced by static power converters and other nonlinear loads so that power quality problems can be averted. It is being applied by consulting engineers and enforced by Utilities more frequently in recent years as the use of Variable Frequency Drives and other non-linear loads has grown.

Although IEEE Std 519 can be useful for ensuring that VFD harmonics are controlled for trouble-free operation, it can be a somewhat difficult standard to apply. Two reasons for this are that it can be difficult to determine an appropriate point of common coupling (PCC) and to establish a demand current at the design stage. This is because the standard does not provide a very clear definition for PCC and the recommended definition of demand current is a value that can only be determined by measurements taken after installation. For one interpretation of how to apply IEEE Std 519 see the reference paper below.

In most VFD applications, it is difficult to meet the harmonic limits defined in IEEE Std 519 without some form of harmonic treatment. A minimum requirement is an AC line reactor or DC link choke but usually this simple form of treatment falls short of compliance. Often engineers will specify multipulse VFD's (typically 12 or 18-pulse) but these can be expensive, bulky and less efficient options. Combining a LINEATOR™ Advanced Universal Harmonic Filter with a standard 6-pulse VFD can be a very effective method of meeting IEEE Std 519 harmonic limits.

Reference:

1. A. Hoevenaars, K. LeDoux, M. Colosino, *'Interpreting IEEE Std 519 and Meeting Its Harmonic Limits in VFD Applications'*, PCIC-2003-15, PCIC 2003 Conference Proceedings, pp 145-150.

## 9. What is the LINEATOR™ AUHF and how does it treat VFD harmonics?

The LINEATOR™ a purely passive device consisting of a revolutionary new inductor combined with a relatively small capacitor bank. Its innovative design achieves cancellation of all the major harmonic currents generated by VFD's and other similar 3-phase, 6-pulse rectifier loads. By reducing current harmonic distortion to < 8% and often as low as 5%, the LINEATOR™ matches 18-Pulse VFD performance in a smaller footprint, at lower cost and with higher efficiency.