



MGM TRANSFORMER COMPANY

5701 SMITHWAY STREET • CITY OF COMMERCE, CALIF. 90040
www.mgm-transformer.com



K-FACTOR TRANSFORMERS

600 Volt Class

K-4 TO K-50

15KVA TO 10MVA

APPLICATIONS

- ARC WELDERS
- COMPUTERS/SWITCHING POWER SUPPLIES
- HIGH INTENSITY DISCHARGE (HID) LIGHTING
- INDUCTION HEATERS
- INVERTERS/FREQUENCY CONVERTERS
- PRINTING PRESSES
- UNINTERRUPTIBLE POWER SUPPLIES (UPS)
- VARIABLE SPEED DRIVES

Introduction

Today's modern office and plant are dominated by non-linear loads; desktop computers, solid state ballasts, HID lighting, programmable controllers, and variable speed drives to name a few. Due to these electronic loads, significant harmonic currents have been added to the building's distribution system. One result is the overheating of transformers causing premature failure.

Until now, the only solution has been to derate a standard distribution transformer for application on these non-linear loads. This no longer is acceptable

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is proud to introduce the NSHL 600V class transformer, for Non-Sinusoidal Harmonic loads. The line carries the UL Listing for K-Factor application from 15 KVA to 1500 KVA, and K-4 to K-50.

WHERE USED ?

- AUDIO-VISUAL STUDIOS
- BANKING/FINANCIAL INSTITUTIONS
- GOVERNMENT/MUNICIPAL SITES
- HOSPITALS/MEDICAL BUILDINGS
- INDUSTRIAL FACILITIES
- LABORATORIES (MEDICAL AND RESEARCH)
- OFFICE/COMMERCIAL BUILDINGS

What is K-Factor?

ANSI Standard C57.110-1986 addresses harmonic problems in transformers and the design solution. In this standard, the K-Factor is defined and its method of calculation shown. Once the K-Factor is determined, it is used in the design of the transformer to compensate for the additional heating effects generated by the harmonic currents.

Underwriters Laboratories recognized the problems with derating transformers. As a result, new test procedures that coincided with ANSI C57.110-1986 were established. Today, only those manufacturers that have their transformers evaluated by U.L. for harmonic loads can apply the label, "Suitable for Non-Sinusoidal Current Load with K-Factor not to exceed 4, 13, 20, 30, 40, or 50. To derate a standard U.L. Listed distribution transformer would be a misapplication of that device.



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What's different about a Type NSHL?

There are several areas where designs are changed to accommodate the effects of harmonics:

1. SECONDARY WINDINGS

The secondary winding, instead of working with a pure sine wave and producing normal values and stray losses, has to cope with nonsinusoidal wave forms containing multiple harmonics, which raise the stray losses significantly. To compensate for these increased losses, a multiple of small, individually insulated conductors are used. Transposition is also used where necessary.

2. NEUTRAL

Since harmonic currents are additive in the neutral, neutral currents in excess of two times phase current can be measured. To compensate for this, a double size neutral bus and lug pad is furnished.

3. PRIMARY WINDING

The primary winding has some of the lower order harmonics circulating within the delta, inducing losses and additional heating. This is compensated for by using a heavier conductor.

4. CORE

The core is effected by voltage harmonic distortion. This voltage distortion increases the core flux density, creating higher core loss, higher magnetizing currents, higher audible noise, and heating problems. To reduce the flux density, a low induction designed core is used.

What's the Same About a Type NSHL?

Once the harmonic content of the load is known, and/or a K-Factor is specified (K4, K13, etc.), the appropriate Type NSHL can be fully loaded up to 100% or nameplate KVA. All other optional features that industry is accustomed to can be specified.

1. Copper or aluminum
2. 80°C, 115°C, 150°C
3. Electro-static shield

What You Should Remember

1. Harmonic loads do cause premature failures when standard distribution transformers are used.
2. Average reading RMS meters do not measure harmonic currents. True reading RMS meters must be used.
3. Insist on a K-Factor transformer that has been 3rd party tested and listed. Accept no verbal claims - the proof must be on the label
4. If in doubt or confused, call MGM Transformer Company now at (323)726-0888.