SHIELDED TRANSFORMERS

HUBBELL®

Acme Electric®

Three easy steps to cleaner power

Acme Shielded transformers are designed and manufactured with an extra benefit in mind. Protect electrical and electronic equipment from the damaging effects of "dirty" power. While you may not be able to stop "dirty" power at its sources, you can clean it on the power distribution system before it disrupts the operation of sensitive equipment. All you have to do is take the following easy steps.

Step #1: Install Acme shielded transformers

Using Acme transformers is the most cost-effective step toward making your electrical system deliver cleaner power.

Step #2: Begin an ongoing practice of always using shielded transformers. There is no added cost.

Instead of using "regular" non-shielded transformers, install Acme shielded transformers wherever non-shielded units would normally be used. Acme shielded transformers are competitively priced with other manufacturers' non-shielded units.

Step #3: Always use Acme shielded transformers for system expansions.

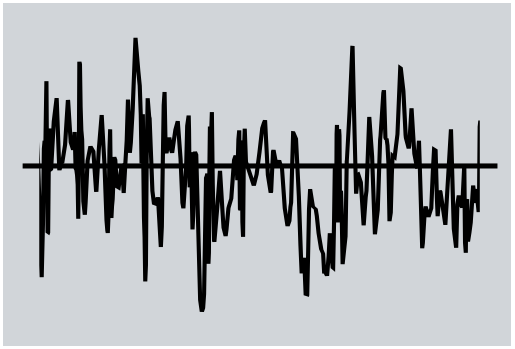
Continue to improve the noise/transient free aspects of your electrical system. Always use shielded transformers on inter-connected feeders and branch circuits to get the multiplying advantages of cascading. Noise and transient reduction benefits multiply from one shielded transformer to the next. So the more shielded transformers you use, the cleaner your system will be.

Noise and transients need to be controlled

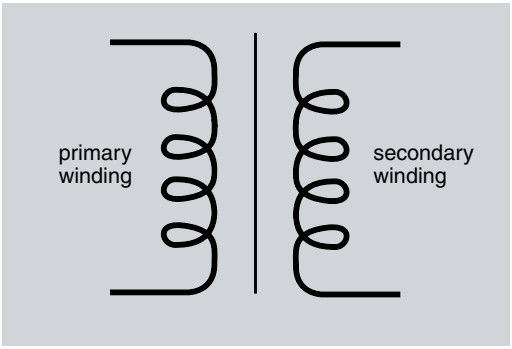
Noise and transient voltages can range from a few volts to a whopping thousand volt spike capable of extensive damage to most electronic equipment. Spikes can happen quickly, faster than the blink of an eye.

In the pre-solid-state days, voltage spikes and noise were not much of a problem. AC powered equipment was not very sensitive to "dirty power". But, today's solid-state devices are used in virtually all electrical and electronic equipment found in the home, office or factory.

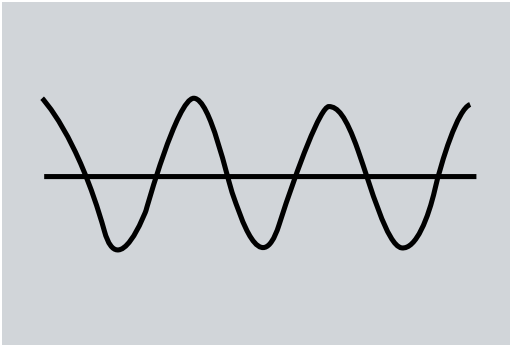
The problem is that these solid-state devices are very sensitive to "dirty" power. The potential damage to everything from automatic coffee pots to computers exposed to "dirty" power is enormous. Compounding the problem is the simple fact that it doesn't take thousands of volts from a nearby lightning strike to damage modern equipment. The many day-to-day low levels of noise superimposed on the voltage wave shape, usually 100 volts or less, will erode integrated circuits, memory boards and chips, SCR's and micro-processors inherent in today's sensitive equipment. Eventually, a hard failure will occur. But, shielded transformers substantially reduce this risk.



Power, dirty with noise and spikes going into the shielded transformer



Transformer with grounded electrostatic shield



Clean power coming out of the shielded transformer

What causes transient spikes and noise?

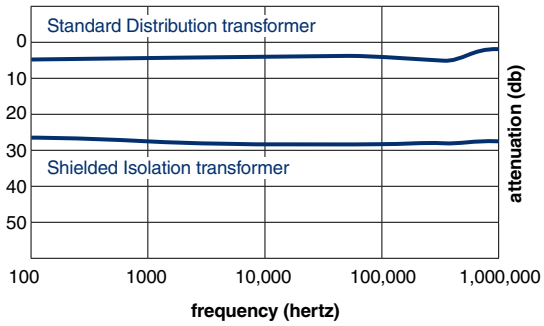
The most catastrophic cause of spikes and noise is a lightning strike on or near power lines. A more frequent, although less dramatic, threat is "conducted" noise. This damaging noise is conducted for long distances over power lines feeding a building, or is transmitted from equipment connected to the power lines within a building.

Conducted noise is caused by electric motors, contactors, capacitor switching and switching operations somewhere on the power line. Other sources of conducted noise are office machines, HVAC systems, power tools, microwaves, motor driven appliances and fluorescent lights.

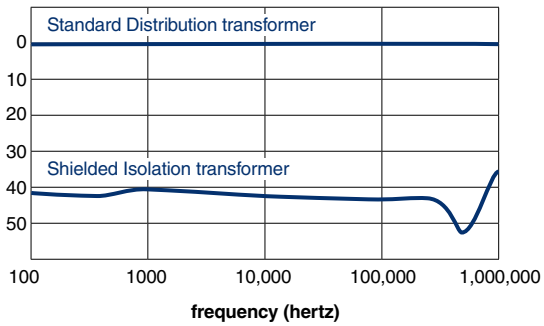
In addition to feeding "conducted" noise to electrical and electronic equipment, power lines also absorb "radiated" noise from TV and radio signals, automobile ignition systems, mobile radios and other signal emitting devices not connected directly to power lines.

Single Phase

3 KVA - 10 - 60 HZ

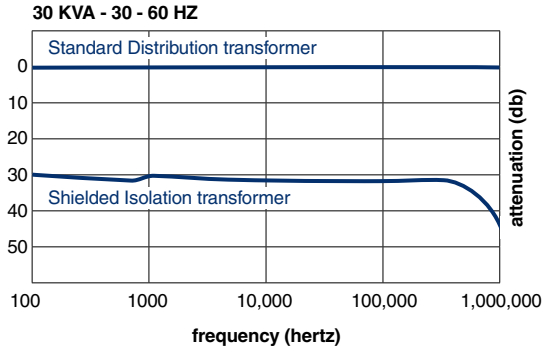


15 KVA - 10 - 60 HZ

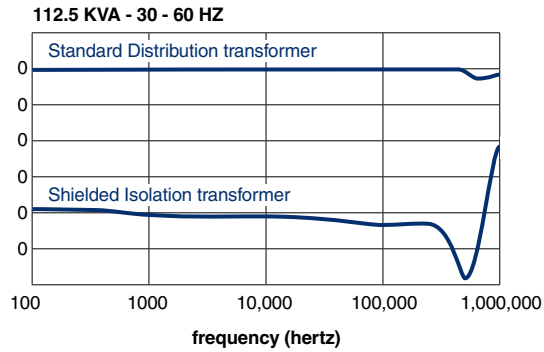


Three Phase

30 KVA - 30 - 60 HZ



112.5 KVA - 30 - 60 HZ



These graphs depict transient noise attenuation of typical Acme® Transformer shielded isolation units. This data was generated using the following Hewlett-Packard equipment (1) 141T Display Section, (2) 7035B XY Plotter; (3) 8443A Tracking Generator; (4) 8552B IF Section; (5) 8553B RF Section; (6) 8556A LF Section. All test equipment is calibrated to standards traceable to NBS.

Data represents attenuation achieved by transformer alone (without external capacitance assistance).

Regardless of where you are located, the incoming power is often very "dirty" from any influences, both inside and outside the building. The potential damaging effects of noise and spikes are also difficult, if not impossible to assess. Noise and voltage spikes most frequently are random, unpredictable and generated from a large number of sources. Just trying to determine the type of noise or transient voltages affecting a system at any given time is usually not practical, and could be very costly.

How much attenuation is needed?

Buyers should beware of transformer advertising claims of "million to one" attenuation. These claims may be highly exaggerated and practically impossible to achieve in actual applications. Such claims cloud the subject and may not realistically address the issue of how much noise and spike attenuation is truly required, and at what added cost. Most authorities agree that transformers delivering 60:1 reduction will solve or prevent most noise and transient related problems. Acme's shielded transformers with 100:1 attenuation, achieve this ratio and even better it.

Here is how shielding works

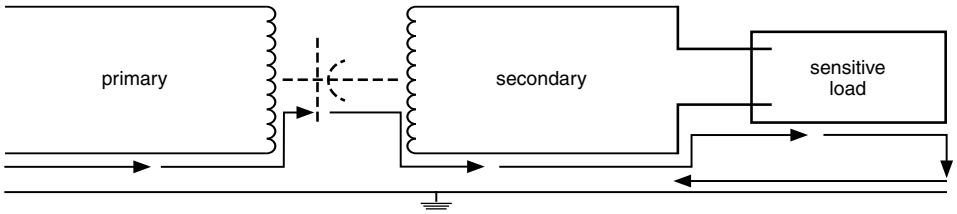
Electrostatic shielding is a metallic barrier built into a transformer between the primary and secondary winding. The shield is grounded and, therefore, helps prevent noise and transients from passing through the transformer to sensitive equipment. Shielded transformers perform two extra preventive functions.

(1) They filter noise and, thus, deliver a cleaner output voltage.

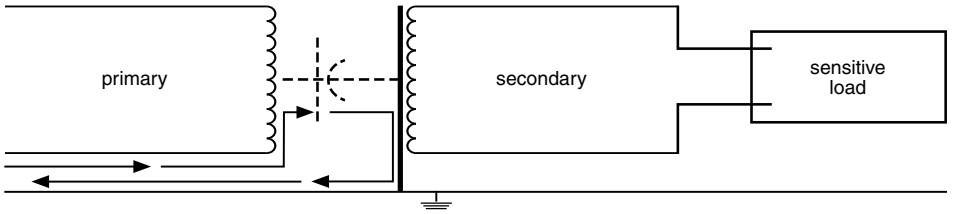
(2) They reduce voltage transients/spikes.

For example, a lightning strike may induce a 1000 volt spike on the power lines traveling to the primary winding of the transformer. The shield takes the majority of this spike to ground allowing only about 10 volts to pass through to the secondary winding and on the feeder or branch circuit. This slight, instantaneous "bump" is almost always within the tolerance that equipment can withstand without damage. The shield reduces the voltage spike by an approximate 100:1 ratio. If this "bump", now reduced to 10 volts, travels to the next shielded transformer located somewhere down line, the "bump" will be further reduced by the second transformer to less than 1 volt. Such reduction is the effect of transformer "cascading".

Unshielded Transformer



Shielded Transformer



Cascading for greater protection

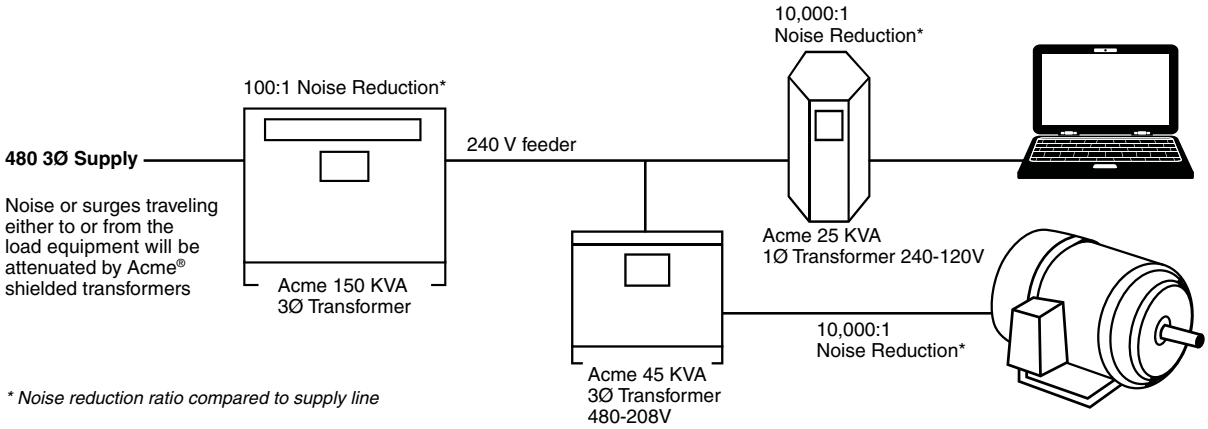
Normal day-to-day transformer installations involve cascading. This term simply means that two or more transformers are on the same system. The first is connected to the incoming power source, and its output feeds the inputs of one or more other transformers. This routine installation increases or reduces voltage in steps from the feeder circuit to the branch circuits. Cascading inherently multiplies the attenuation effectiveness of shielded transformers. The figure illustrates how the use of shielded transformers, cascaded as done in normal practice, will increase the noise and spike protection from a 100:1 ratio with the first transformer to a 10,000:1 ratio at the output of the second transformer, and so on.

Acme Electric shielded transformers: the best value

Shielded transformers won't solve every single power problem your business encounters. NOTHING WILL! But years of successful field experience have proven that in the vast majority of applications, Acme shielded transformers eliminate the problems we've discussed here. If you are replacing transformers or adding new service, be sure to specify Acme transformers and get all the protection that shielding and cascading offer.

Add these benefits Acme Electric's 10-year warranty, and you get the best value and the cleanest power in the transformer business.

For more information, contact your nearest sales representative at 800.334.5214.



** Noise reduction ratio compared to supply line*

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