



An Introduction To the

USES® SHUNT EFFICIENCY SYSTEM

The patented **USES® Shunt Efficiency System** provides power conditioning and protection from potentially damaging power line surges and spikes. Additionally, the **USES® Shunt Efficiency System** can reduce the electrical energy costs associated with the operation of inductive loads – motor driven equipment and appliances and magnetically ballasted lighting systems.

USES® technology capabilities include:

- Protection from surges and spikes, including secondary lightning effects;
- Power conditioning, dynamic power factor correction, RF noise reduction, and reduction of the total current content including harmonic current; and
- Reduction of the electrical power drawn from the utility to operate inductive loads such as air conditioning and ventilation systems, pumps, compressors, & magnetically ballasted fluorescent & high pressure sodium lighting systems.

The benefits derived from **USES®** units include:

- Improved equipment reliability, including computer and electronic systems;
- Reduced life cycle maintenance, repair, and replacement costs; and
- An average return on investment is from 6 to 36 months.

The **USES®** approach is superior to other methods for improving electrical system performance, reliability, and efficiency from both an operational and cost standpoint. The technology's patent and listing by UL and CSA attest to the validity of **USES®** capabilities. The devices are maintenance-free, have a three year limited warranty, and have a projected life of 10 years. Models range from 120/240 volt residential units up to three-phase 600 volt industrial units.

USES® works, it works very well, and it saves energy and money. The unique application of the wrap-around magnetic chokes enables wasted magnetic energy to be converted to useful energy, which is then supplied to the electrical system. This reduces the electrical power that the utility must provide resulting in lower electric bills. The units consistently provide real power (KW) savings when installed in systems with inductive loads. These savings exceed the KW reduction achieved merely from the reduction of I^2R losses. Specific savings are contingent on the electrical load configuration, equipment operating hours, and KWH cost. Additional savings can be realized from the reduction of demand charges and the reduction or elimination of power factor penalties. Units generally pay for themselves through utility cost savings in approximately 2 years.

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USES[®] PRODUCT BACKGROUND

Certifications and Approvals:

1. Underwriters Laboratories [UL]:
File Number: E132743
Category: 5B81 Industrial Control Equipment
2. Canadian Standards Association [CSA]:
Category: LR99910
3. U.S. Patent:
Number: 5,105,327 – A.C. Power Conditioning Circuit
4. General Services Administration [GSA]:
Federal Supply Schedule
Power Distribution Equipment, FSC Group 61, Part V, Section B
Special Item 412-12, Line Conditioners
5. New York City Approval:
Submission #: 92A0390
6. Funacion Instituto de Ingenieria, Caracas, Venezuela:
Electric and Electric System Engineering Center Test Report No. 24-000593

List of Customers:

1. U.S. Navy: Patuxent River Naval Air Station, Lexington Park, MD
Naval Academy, Annapolis, MD
2. U.S. Marine Corps Headquarters, Henderson Hall, Washington, DC
3. Washington National Airport, Washington, DC
4. U.S. Social Security Administration, Pawtucket, RI
5. Town of Salem, Connecticut
6. Reebok International, Stoughton, MA
7. Brockton Housing Authority, Brockton, MA
8. National Tire Wholesale (NTW), Woodbridge, VA (national chain)
9. Nutrena Feed – Cargill, Swanton, VA

Exports:

1. Canada
2. Republic of South Korea
3. Commonwealth of the Bahamas
4. Republic of Venezuela

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Breakdown of Underwriters Laboratory's Characterization Of USES[®] Technology

1. Helps reduce wattage
2. Reduces current on line
3. Corrects power factor
4. Suppresses voltage surges and spikes
5. Improves voltage regulation
6. Helps to balance loads on all phases
7. Reduces current on the neutral
8. Reduces line-transmitted and motor/appliance-generated noise
9. Reduces total harmonic current contents
10. Reduces magnetic fields



BUT HOW DOES IT WORK

“With two **USES**® units on line, ... we are now saving an average of 285 KWH per day, over 2000 KWH per week. I don’t know what is in those boxes, but I am more than happy with the results.”

-Dan Ruggles, Durgin and Crowell Lumber Co., Inc., New London, New Hampshire

What is in those boxes is **USES**® patented technology, consisting of parallel, wrap-around magnetic chokes oriented to couple magnetic forces generated across each electrical phase by the current. On the basis of the magnetic fields sensed, a signal is generated that enhances the AC wave form and matches it to the requirements of the inductive load. The peak portion of the current wave on the line side is decreased and electrical system inefficiencies originating in the supplying transformer are reduced. The complementary winding technique, used with chokes and capacitors, lowers kilowatt-hour [KWH] consumption, energy usage and demand rate, when connected to inductive loads.

USES® systems lessen electrical energy waste by: 1) matching voltage and current phases in inductive systems; 2) reducing harmonics, spikes and noise; 3) reducing I^2R losses; and 4) balancing loads across all phases. It has been found that the unique arrangement of chokes provides substantial reductions in power usage, particularly for inductive loads in industrial application. The immediate benefit is a verifiable reduction of electric utility bills. Additionally, equipment life is increased while maintenance and down time are reduced.

The benefits derived from **USES**® units include:

- Improved equipment reliability, including computer and electronic systems.
- Reduced life cycle maintenance, repair, and replacement costs.
- An average return on investment in 6 to 36 months.

The maintenance-free units are easily installed at service panels or distribution panels or they can be connected locally to equipment on the line side of any controllers, depending on the facility’s equipment and electrical distribution system. Each unit comes with a three-year warranty covering the repair or replacement of the **USES**® unit. If the unit fails during use, **USES MFG INC.** will replace the unit at no charge.

Unlike the “black boxes” of the 1980s, **USES**® technology really works. The energy savings are proven by their many satisfied customers.

Current users of the **USES**® systems include:

U.S. Navy	Unilever
U.S. Marine Corps	Reebok International
U.S. Army Corps of Engineers	Nabisco
Washington National Airport	Cargill
Xerox Corp.	Sheraton Hotels Corp.
J.C. Penney	National Tire Corp.
St. Francis Hospital	Ethan Allen Furniture
Federal Die Casting Inc.	Marlin Firearms

USES® is a UL [Underwriters Laboratory] listed product, and is manufactured under a UL program that calls for unannounced inspections. The **USES**® system is made entirely out of UL approved, recognized, or listed components. **USES**® is also Canadian Standards Association [CSA] listed and approved. **USES**® products also are listed in the General Services Administration catalog.

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NOT JUST A BIG FISH STORY

Cambridge, MD. – Between October of 1993 and July of 1994, the Coldwater Seafood Corporation of Cambridge, MD. Bought 11 **USES® Shunt Efficiency System** units and had them installed on the north end of their plant. After November 26, 1994, they wished they had installed the **USES®** system in the southern end of the plant as well.

On Saturday, November 26, 1994, something happened to the Coldwater plant. Sifting through the evidence, they believe there was a major voltage sag. Although the voltage sag lasted only a few seconds, it caused the plant considerable electrical damage, knocking out two of the three transformers that supplied electricity to the plant's south end freezers. The phase protection on that set of transformers, designed to protect against single-phasing, never tripped; it's magnetic coil melted. Two of the transformers were knocked out, after which, single-phasing did occur, causing the refrigeration units' motors to burn out. On that circuit, the coils on the 480 volt and 110 volt motor starter were cooked and the contacts were welded together. Consequently, the refrigeration units failed.

No damage was sustained in the north end of the plant, even though all of the transformers owned by Coldwater were wired in parallel, with the north end of the plant generally drawing 10 to 20 times the power used by the south end during a normal weekend. A conservative estimate of the damage that would have occurred in the north end was over six to eight million dollars, or roughly 200 times the total cost of the **USES®** units.

According to a news release prepared by Coldwater, "All these north end loads have been protected by **USES®** units which evidently do stabilize voltage as claimed. These units not only saved the motors from damage, preventing a loss of temperature in the freezers which contain 5 to 6 million pounds of fish, but they protected the transformers which are up line. The investment in the **USES®** units has certainly been repaid, particularly since they have also dropped the Kw demand in the north end by 40 to 50 Kw."

USES® units save money in a number of ways. According to E. Brian Wohlforth, **USES®** inventor, and many satisfied customer, the **USES®** system improves equipment reliability, including computer and electronic systems, reduce life-cycle maintenance, repair and replacement costs. In an average industrial setting, the **USES®** system generally provides an average return on investment in 6 to 36 months; in cases like the Coldwater plant, the system can pay for itself overnight.

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USES[®] Technology for Economical, Effective Energy Conservation



The rising costs of coal, oil and natural gas, the three primary fuels used in the production of electrical energy, have made the conservation of electricity a major concern. The extensive use of the basic fuels in the production of electrical power has made saving electricity synonymous with saving important non-renewable natural resources.

Most efforts to conserve electrical energy emphasize the more efficient use and effective management of available electrical energy – improved insulation and efficient lighting systems, staggered loading to minimize peak demand, or elimination of unnecessary use of electrical energy. However, problems arise because programs focused in these areas are not always sufficiently cost effective to merit implementation or are too dependent on public cooperation. **USES[®]** technology provides highly cost-effective solutions which help prevent electrical waste.

USES[®] technology works on inductive loads to improve the efficiency of the electrical system. Virtually any setting can be accommodated – industrial sites, commercial buildings, hospitals, stores, supermarkets, apartment buildings, or private dwellings. Rather than lower the demand of the system, the **USES[®]** system raises the percentage of billed energy that is readily usable. By maximizing the amount of billed energy that is usable, **USES[®]** reduces the energy required to do the same amount of work.

USES[®] focuses on providing more efficient and effective use of electrical power. Not all energy supplied and billed to the customer is used or usable, even in the most efficient systems. The raw, or “dirty” power supplied by the power plant contain surges, spikes, harmonics, line noise and other natural electrical phenomena which are not only unusable, but in many cases are harmful to equipment. The **USES[®]** units work as a power conditioner and a filter to “clean” the energy before it enters the system.

USES[®] further reduces the amount of energy required by improving the system’s power factor. Some devices, primarily motors, interact with the power supplied such that the equipment automatically draws a surplus of energy, wasting the energy and damaging the motor. Power factor measures this waste. Improving the power factor reduces the overdraw of wasted energy, preventing the wear and tear damage the excess voltage causes.

The **USES[®]** units enhance the AC wave form, matching it to the requirements of the inductive load. The peak portion of the current wave on the line side is decreased and electrical inefficiencies that originate in the supplying transformer are reduced. This, combined with **USES[®]** power factor correction capabilities, reduces wasted electricity, maximizing the amount of usable billed energy. Effectively, **USES[®]** provides more electricity per capital dollar.

USES[®] units provide a number of other benefits, including surge and spike protection and the reduction of harmful magnetic fields. Spikes, surges, and magnetic fields are naturally produced by electrical energy. Using electrical equipment causes these electrical anomalies to occur more frequently, exacerbating the situation. **USES[®]** units are designed to absorb and attenuate major transients before damage is done. The units respond to spikes and surges in less than 5 nanoseconds. This feature extends the life of the equipment as well as reduces the power required.

USES[®] technology reduces electrical waste, conserves valuable natural resources, and saves money, generally paying for itself in electrical saving and reduced maintenance costs in 1- 3 years. With dwindling resources and the eventuality of stricter environmental and conservation policies, **USES[®]** is the environmentally and economically responsible choice.

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