

Reducing Energy Use

The expertise to design and manufacture dry type transformers to reduce energy use and costs

Introducing our Xtra Transformer

Units specifically addressing the increase in technology-driven energy usage

Low voltage transformers are frequently lightly loaded. Studies and evidence gathered from engineers in the field reveal this is especially true of schools, colleges, hospitals, commercial office complexes and apartment buildings where load profiles vary greatly throughout the day and low load losses are extreme. The engineers and designers at Jefferson Electric understand this problem and have addressed it by developing transformers specifically designed to minimize low load losses.

Xtra Transformers were developed with higher efficiency ratings than the Department of Energy standards.

There is great cost and energy savings in specifying a transformer that is sized more appropriately to the usage. At the same time, the transformer needs to be able to handle future system needs and the harmonics generated by today's higher technology loads.

While these transformers can be more expensive in their up front cost, the savings that they provide more than pay for the system over time. Correct sizing is necessary, so discussions about end use goals are important. The details to consider are harmonics, inrush, managing impedance and other factors that effect energy usage.



Jefferson Xtra Transformers

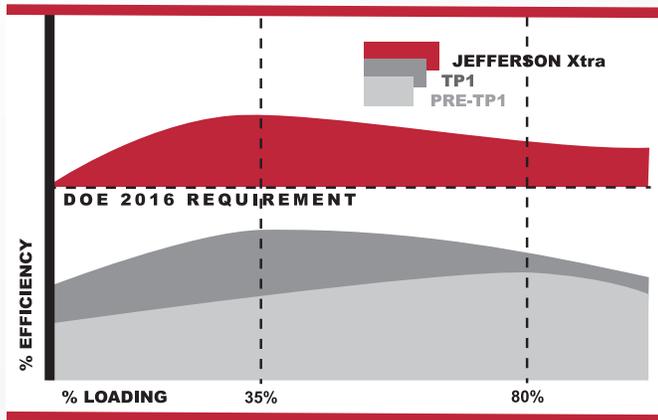
Efficiency

All manufacturers have designed their low-voltage transformers to meet the latest U.S. Department of Energy requirements (DOE 2016), setting a minimum efficiency standard. These updated standards can save you hundreds, if not thousands of dollars in energy costs as well as reducing overall energy usage.

Beyond energy savings, the DOE indicates that the wear and tear on a unit is reduced when loading is optimized, extending the life of equipment.

Increased efficiency

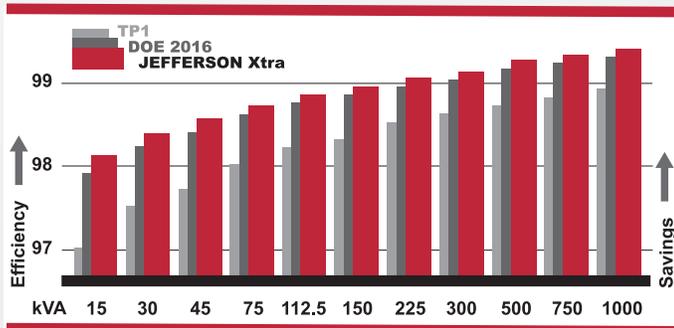
This chart displays the energy savings realized with the **Xtra** over and above DOE 2016 standards



Note: TP1 standards were developed to be most efficient at 35% load, recognizing that most transformers were operating at low load levels. Previous designs were most efficient at 80% load. The Jefferson **Xtra** is an improvement overall, maximizing usage at 30-60% load.

Cost savings

DOE-2016 saved significant amounts over the old standards, and the **Xtra** continues the trend.



Note: All efficiency values are at 35 percent of nameplate-rated load, determined according to the DOE Test Method for Measuring the Energy Consumption of Distribution Transformers under Appendix A to Subpart K of 10 CFR part 431.

The technology

Jefferson has been solving client problems for over one hundred years. In that time we have developed many solutions for low load use applications. This is no longer a “one size fits all” marketplace. Each situation has differences in floor plan, energy use, total draw and building requirements. We understand these situations, and have many options to provide. The **Xtra** is the latest design to deal with the ever-changing modern power usage.

With these updated specifications built on high technology use, the **Xtra** line is excellent for LEED® buildings, working to meet energy usage requirements for High Performing Buildings.

Since most of transformers used in modern settings are for predominantly electronic equipment, they are oversized to allow for the large harmonic spikes and the heat created. These non-linear loads are best served with K-rated units. We expect energy cost savings between 4.9 and 20%. The other benefits are a smaller footprint and less noise.

Our design engineers will work with you on your specifications, allowing for growth and future needs. We look at your full situation, and develop the best suited system.

The Xtra specifications

Our **Xtra** low voltage dry type transformer line is built for extra efficiency, determined case by case. These units exceed the Department of Energy (DOE 2016) efficiency standards. Units are built per UL 1561, with application appropriate K-rating per C57.110. By more closely meeting the energy demands, we can reduce the footprint of ordered units.

Xtra 3-phase models are built to NEMA ST-20, IEEE and ANSI standards, are UL listed and CSA approved. They are 60 Hz standard with a common core built of high quality electrical steel, 10 kVA BIL with a 200% rated neutral. Units have front access to primary and secondary terminals typically with five 2.5% voltage taps. Electrostatic shields are standard on the **Xtra** line. Insulation is 220°C class. Many other options are available to customize units.

The **Xtra** ventilated indoor/outdoor enclosures are NEMA 3R, made of heavy steel and heat-cured with ASA-61 gray powder coating finish. Our units have gone through rigorous international testing to verify that they meet OSHPD seismic requirements plus IBC and California building codes. Tests assure that units meet ICC-ES AC156 qualifications for up to 2.0g, required of essential facilities centers such as hospitals or data centers. As each unit is individually developed, we can also customize enclosures to meet your specifications.

K-Factor options

The **Xtra** line is based on ratings developed by Underwriters Laboratories to provide uniform standards for transformers designed to handle non-linear loads. Jefferson offers many options. In addition to the specifications we have devised for our **Xtra** line, giving us the ability to evaluate individual application needs and design the appropriately sized transformer.

Sound Levels

Manufactured according to our usual high NEMA ST-20 standards, **Xtra** units work quietly in the background of any application. An option for a more rigorous standard, 3dB lower, is available.

Spikes and flashes

The design of the **Xtra** manages inrush currents while using standard 125% primary protection. This avoids tripping of the primary breaker, ensuring smoother operation. Impedance is capped to manage arc flashes and fault levels. Even lower inrush designs are available if the application requires.

Testing and certifications

Each unit we manufacture is tested before shipping. A certified test report can be created and sent along with the transformer. The **Xtra** line units are subjected to an efficiency verification during production. Our manufacturing processes are state of the art, meeting competitive, ISO 14001 quality, UL and CSA approved methods. Each unit is UL listed.

This line of high performance transformers was developed to exceed DOE 2016 efficiencies, and as such is applicable to LEED® requirements, reducing the carbon footprint to set green building and Net Zero goals. We offer options such as integrated metering for design engineers that want to incorporate higher rating standards in their system.



Standards

- 15 to 2,500 kVA
- 60 Hz
- 150°C temperature rise
- Aluminum windings
- NEMA 3R enclosure
- UL / cUL rated

Options

In addition to the qualities described, our engineers have the knowledge and ability to customize equipment to meet your demanding situation.

- 50 Hz
- Other sizes, voltages
- Current customization: low inrush, custom impedance
- Integrated metering of capacity, load profile, power quality and energy usage
- 130, 80 or 65°C temperature rise
- Copper windings
- K-1 through K-20
- Dual electrostatic shields
- Electrical noise attenuation (shields)
- Harmonic content and mitigation
- Rectifier / inverter duty: 6, 12 and 18 pulse configurations
- Sound level
- Thermal sensors at 170°C and 200°C
- Forced air cooling
- Enclosure style and color: NEMA 1, 3R, 4, 4X, 12, 12X
- IR port with quick access and arc flash risk reduction
- Wall mount kits for units up to 75 kVA
- Accessories: terminal blocks, fusing, disconnects
- Agency and seismic certifications

Best applications

Use the **Xtra** line of high efficiency transformers where non-linear loads, rich in odd harmonics generates heat and produces losses in the windings. Some facilities where this is seen are

- Medical facilities, including hospitals
- Data centers
- Office buildings
- Schools
- Environments with non-linear loads such as computers, printers, communication equipment
- Where stable load and operation is necessary

A better way to size

By looking at transformer size in a new way we can save energy and cost over time. While up front equipment cost may be higher than lower performance units, the cost savings over time more than pays for the investment.

These high performance and harmonic-reducing or -eliminating transformers also reduce the wear on the equipment they are powering. Fewer replacements, less down time and smoother operation have value that is immeasurable.

Xtra transformers assist overall power quality in a plant or facility by reducing expensive changes to the electrical system from traditional high inrush, low impedance along with increased fault and arc flash levels.

Custom Solutions

We will design to meet your requirements

Let us work with you to develop the best answer to your unique situation. Our experts in power quality work hand in hand with our experienced engineers, providing designs and drawings for your team approval.

More options at our disposal:

- Power: 50 VA through 10,000 kVA
- Input through 35 kV
- Multiple primaries and secondaries, and phase angles
- Frequencies: 60, 50, 400 or special
- Primary tap configuration
- Core and winding material options
- Altitude

The experience and capability to satisfy your unique magnetic needs



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"Right-Sized" Solution

Jefferson has a wide range of transformer designs to answer the growing list of industrial and commercial needs. Each type has its best use applications. For more information, call us for a detailed discussion on your application, usage and growth needs.

Energy savings, sized for 80% of load

