

New 2016 DOE Efficiency Standards Change Transformer Landscape

Overview

Beginning January 1, 2016, new DOE efficiency standards for low and medium voltage dry-type as well as liquid-immersed distribution transformers will take effect. All units subject to the standard that are manufactured on or after January 1, 2016 are required to meet these new standards. The new DOE standards replace the current TP-1 standards which went into effect on January 1, 2007 for low-voltage, dry-type distribution transformers and January 1, 2010 for medium-voltage, dry-type transformers.

According to the US Department of Energy, these newly amended energy efficiency standards will save up to \$12.9 billion in total costs to consumers — ultimately saving families and businesses money while also reducing energy consumption. The new distribution transformer standards will also save 3.63 quadrillion British Thermal Units (BTUs) of energy for equipment sold over the 30-year period of 2016 to 2045.

The new amendments to the existing efficiency standards further decrease electrical losses by about 8

percent for liquid-immersed transformers, 13 percent for medium-voltage dry-type transformers, and 18 percent for low-voltage dry-type transformers.

Distribution transformers covered by this standard are defined in the Code of Federal Regulations, 10 CFR 431.192. Three types of distribution transformers are covered by the standard: low-voltage dry-type, liquid-immersed, and medium-voltage, dry-type. The full standard can be found in the Code of Federal Regulations, 10 CFR 431.196.

Product Impacts

The new standards apply to all distribution transformers sold in the US. The majority of transformer units will be required to deliver higher efficiencies, but the mandated efficiencies for some types/classes of transformers remain unchanged from previous regulations. Several types/classes of transformers that have been exempt from regulation remain exempt under 2016 DOE.



The table below briefly summarizes which products fall under the new standard. Please refer to the full standard for your specific transformer type.

Higher efficiencies required to meet 2016 DOE standards
Three-Phase Low-Voltage (600V), Dry-Type: 15KVA to 1000KVA Three-Phase Medium-Voltage, Dry-Type: 15KVA to 2500KVA
No change in efficiency requirement under 2016 DOE standards
All Single-Phase Distribution Transformers
Exempt from 2016 DOE standards
Low-Voltage (600V) Transformers rated <15KVA OR >1000KVA Medium-Voltage Transformers Rated <15KVA OR >2500KVA Transformers with Input Voltage >34.5kV AND/OR Output Voltage >600V Transformers exported for use outside the US (even if manufactured in US) Transformers not rated for 60Hz operation Transformers with Tap Range of 20% or more Transformers typically utilized in specialty applications: Autotransformer, Drive Isolation, Grounding, Mining, Machine Tool, Non-Ventilated, Rectifier, Regulating, Sealed, Special-Impedance, Testing, UPS & Welding Transformers

Transformer efficiency increase and associated loss decrease will require most manufacturers to re-design their current transformers to achieve the new standard. These re-designs may require an increase in use of wiring conductor, use of more efficient grades of electrical core steel and/or more efficient core construction design. These design modifications may increase the physical size and weight of the units along with their costs.

Federal Pacific & 2016 DOE

As a leader in delivering high quality distribution transformers that adhere to government standards, Federal Pacific is working diligently to re-tool its product line ahead of the January 1, 2016 cutover to the new DOE requirements. Prototype designs and initial builds are complete, and pilot production runs are in progress.

Federal Pacific is now quoting engineered 2016 DOE transformers for standard lead time delivery, with quotes valid for 30 days. Budgetary pricing information is avail-

able for products with desired delivery dates outside of the standard lead time. Inventory of stock 2016 DOE-compliant transformers will be built in Q4 2015 so that product will be available for immediate delivery after the December 31st end of manufacturing date for TP-1 compliant products. Depending on customer demand, inventory of TP-1 units that were built before January 1st may be available into 2016 but once this inventory is depleted there will be no more TP-1 units available due to the manufacturing cutover.

Pricing for stock units, availability and full specifications, including enclosure sizes and weights, will be published in Q4 2015. If you have a specification question about a model ahead of formal release please contact your local sales representative as information on your specific model may be available earlier. Updates on DOE 2016 from Federal Pacific will be released in future issues of *Let's Be Pacific*.

The efficiencies mandated under the new standards vary by transformer type and rating. The charts below summarize the new efficiencies compared to the old standard.

Chart 1: Low-Voltage (600V), Dry-Type Efficiency % (600 Volt Class)

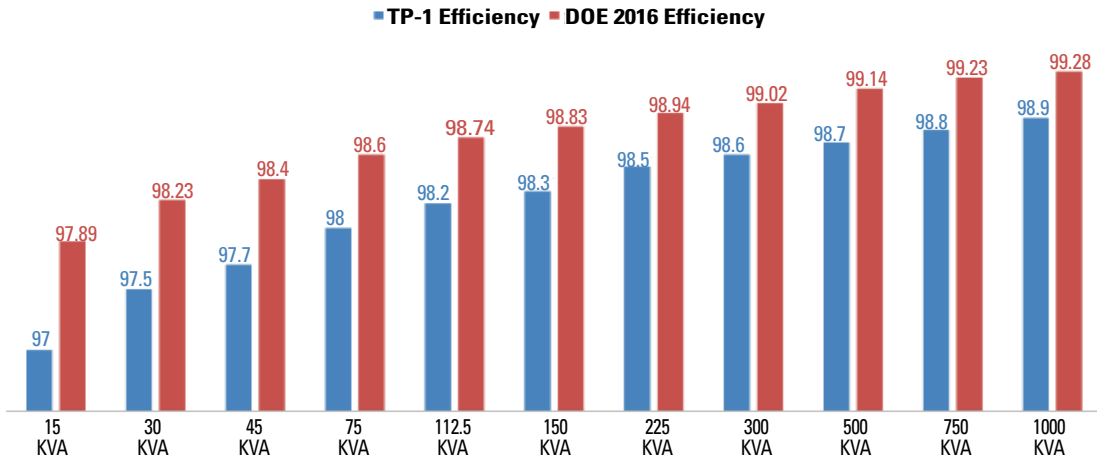


Chart 2: Medium-Voltage Dry-Type Efficiency % (20-45kV BIL)

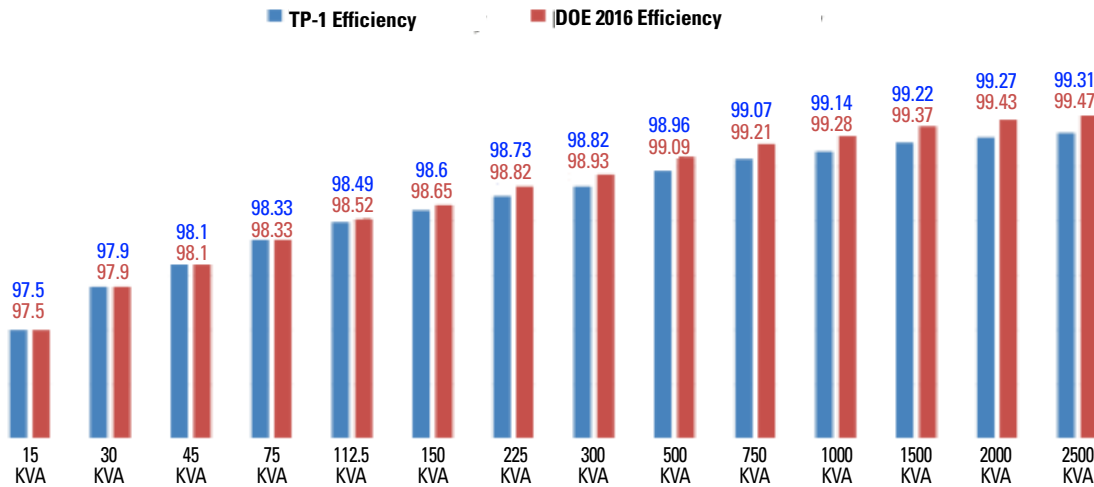
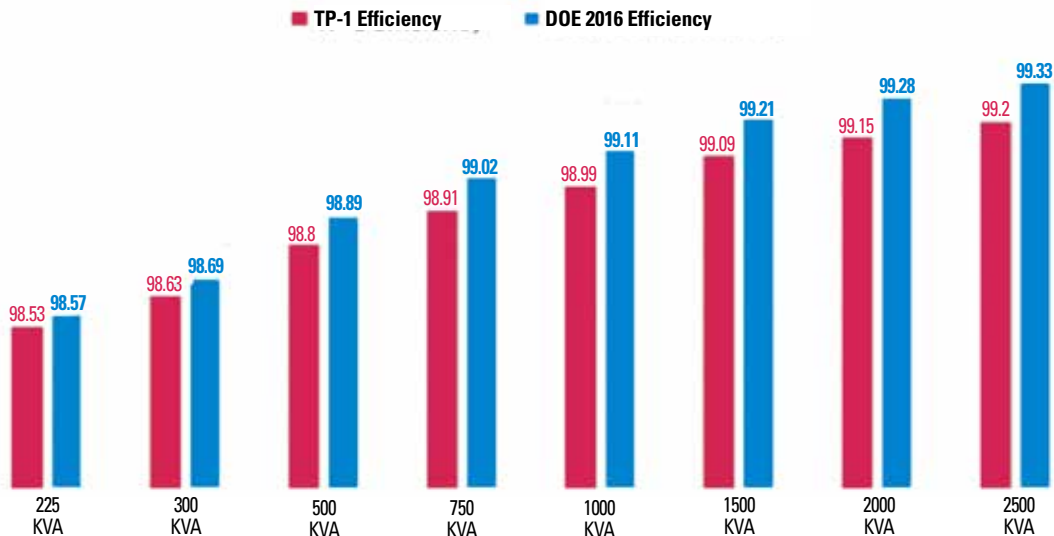


Chart 3: Medium-Voltage Dry-Type Efficiency % (>96kV BIL)



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