New Jersey's Clean Energy PROGRAM
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Office of Clean Energy

Pay for Performance - NC Technical Tip

Distribution Transformers

This technical topic only pertains to new construction projects. ASHRAE 90.1-2010, Section 8 has expanded to include low voltage dry-type distribution transformers. Distribution transformers can now be included as an energy reduction measure in the scope of work.

Measure Requirements

A low voltage distribution transformer has the following characteristics:

- Air-cooled,
- Does not use oil as a coolant,
- Has an input voltage ≤ 600 V, and
- Is rated for operation at a frequency of 60 Hz

Distribution transformers can only be included in the scope of work if the proposed building transformers exceed the efficiency requirements of Table 8.4.4 and meet the above characteristics. The ratio of the capacity to peak electrical load of the transformer shall be the same as the ratio in the proposed design.

TABLE 8.4.4 Minimum Nominal Efficiency Levels for 10 CFR 431 Low-Voltage Dry-Type Distribution Transformers[a]

Single-Phase Transformers		Three-Phase Transformers	
kVA[b]	Efficiency,%[c]	kVA[b]	Efficiency,%[c]
15	97.7	15	97.0
25	98.0	30	97.5
37.5	98.2	45	97.7
50	98.3	75	98.0
75	98.5	112.5	98.2
100	98.6	150	98.3
167	98.7	225	98.5
250	98.8	300	98.6
333	98.9	500	98.7
		750	98.8
		1000	98.9

a. A low-voltage distribution transformer is a transformer that is air-cooled, does not use oil as a coolant, has an input voltage ≤600 V, and is rated for operation at a frequency of 60 Hz.
b. Kilovolt-ampere rating.
c. Nominal efficiencies shall be established in accordance with the 10 CFR 431 test procedure for low-voltage dry-type transformers.

Key Model Inputs

All inputs should be included for the baseline and proposed design:

- Transformer Capacity (kVA)
- Transformer Efficiency (%)
- Ratio of capacity to peak electrical load

These inputs should be included in Table 5 under the <Other> section (row 40).

Example:

The proposed design includes a high efficiency transformer rated at 100 kVa and with an efficiency of **98.9%.**

Based on Table 8.4.4, the baseline efficiency requirement for this transformer is **98.6%.**

Therefore, the transformer savings can be modeled to account for the **0.3%** improvement in efficiency.