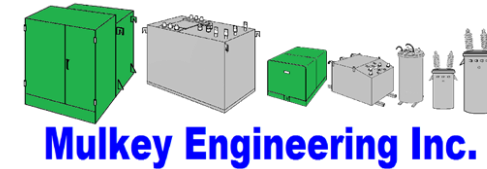


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New Dual Nameplate kVA For Distribution Transformers

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Background

- This project began in 2016 with investigation into Distribution Transformer Loading
 - Using smart meter data, loads measured each 15 minutes on thousands of distribution transformers for full calendar year
 - Purpose was to determine RMS-equivalent load
 - RMS-equivalent load for North America seems close to 30% of nameplate
 - Peak load is < 80% of nameplate

Results

- Loading likely to increase 10-40% with:
 - Electric vehicle charging
 - HVAC conversions away from gas and oil
- RMS equivalent up to 50% of nameplate and peak >100%
- New insulations allow higher loading at higher temperatures
- Possibility to raise kVA without loss of life
- Base kVA must meet DOE energy efficiency

Results

- Dual nameplate kVA ratings work well
 - Base kVA set with 65 C rise parameters
 - Meets DOE energy efficiency, typically 4:1 Load/Core loss ratio
 - Low load loss important, Copper vs. Aluminum
 - Complies with all aspects of C57.12 series standards
 - Higher kVA based on thermal class of insulation system
 - Same transformer in same tank.
 - Upgraded insulation system with natural ester liquid and thermally upgraded Kraft Paper

Conclusions/Recommendations

- Dual Nameplate kVA Distribution Transformers make a lot of sense for the foreseeable future
 - Expected to result in much improved value for all stakeholders
 - Modest Cost increases for higher thermal class materials
- Loading changes should be monitored closely
- We now anticipate that future load growth can be met without increasing physical transformer tank sizes