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## Coupling Capacitor Voltage Transformers for Revenue Metering Applications

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### Product Bulletin HV-11-PB004r2

At the present state-of-technology, the steady-state accuracy of coupling capacitor voltage transformers (CVTs) matches that of wound-type voltage transformers (VTs). Currently, the use of CVTs for revenue metering is an accepted practice at many utilities.

Performing as a voltage transformer, CVTs provide a secondary voltage that is almost an exact analog replica of the applied voltage, with an attenuation factor called the transformation ratio. Areva can design and manufacture CVTs type OTCF for revenue metering with an accuracy rating down to 0.15%.

The two primary concerns with using CVTs for revenue metering are (1) accuracy drift over time and (2) accuracy drift over temperature.

#### (1) Accuracy Drift Over Time

Accuracy drift over time is mainly caused by changes in the capacitance of the capacitor voltage divider while in-service. Because during manufacture of the CVT, the series reactor is tuned to the capacitance of the capacitor divider, any change in capacitance directly causes the transformer correction factor (TCF) to change (accuracy drift). This change in capacitance over time is due to a change in the space between the electrodes (spacing factor) of the individual capacitor elements. To ensure the spacing factor remains constant over the life of the unit, Areva type OTCF separates the capacitor divider into smaller assemblies. These small capacitor stacks are hydraulically compressed at a controlled pressure and then bound together using fiberglass-reinforced epoxy tape. By utilizing the small capacitor stacks, the spacing factor can be tightly controlled and the capacitance of each capacitor element is extremely uniform.

#### (2) Accuracy Drift Over Temperature

Areva type OTCF uses a mixed-dielectric insulation system for CVTs. This system is comprised of kraft paper and polypropylene film layers, impregnated with synthetic oil. The paper and film have properties that act in an opposite manner, with regard to temperature, thus providing a relatively flat capacitance change vs, temperature.

The capacitance change vs. temperature of the mixed dielectric system is greatly improved over the older paper/mineral oil systems.

## **AREVA T&D**

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