ANSI/IEEE C37.09e-1985
Supplement to ANSI/IEEE C37.09-1979

Supplement to IEEE Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis

Sponsor

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The following replaces 4.6.5.3 (2) found in ANSI/IEEE C37.09-1979.

Transient Recovery Voltage. The inherent transient recovery voltage of the test circuit shall meet or exceed the rated envelope as defined in 5.11.1 and 5.11.2 of ANSI/IEEE C37.04-1979. The rated envelopes are required for rated symmetrical short circuit currents. For short circuit currents other than rated, the envelope shall be adjusted to establish the capabilities as stated in 5.11.4 of ANSI/IEEE C37.04-1979.

For synthetic interruption tests with asymmetrical short circuit currents, the values listed in Table 7 of C37.06-1979 may be used to determine the required inherent transient recovery voltage (TRV).

The inherent recovery voltage may be determined before or after the interruption tests. Various methods may be used to determine the inherent transient recovery voltage, including current injection or calculation.

NOTE — Care must be exercised to use a measuring technique that does not introduce transients to the circuit that can increase the apparent severity of the TRV. For example, in current injection techniques a small 60 Hz current pulse is passed through the circuit and the voltage transient is observed after the current is interrupted. The current slope should not be deformed before current zero, nor should residual current flow after current zero. Such modifications to the current can add spurious transients to the measured voltage and result in an inaccurate record of the inherent TRV of the circuit being tested.

The actual TRV measured during a circuit interruption may differ from the inherent TRV because of arc resistance, circuit breaker impedance, etc. These circuit breaker influences are complex functions of time, current, and voltage. The circuit breaker/circuit interaction process and its modifying effect on TRV cannot be determined by simple calculations. However, the interaction process can result in differences between the actual and inherent TRVs. This difference is permissible if the circuit breaker would affect the system voltages in the same manner. In place of the above, the circuit breaker shall be considered to have passed the test if the actual measured TRV meets or exceeds the rated or related envelope.

Some circuit breakers have substantial amounts of added shunt impedance, such as capacitors or resistors, specifically intended to modify the TRV. It may not be desirable to test the circuit breaker with this added impedance. Therefore, a test circuit that produces the modified inherent TRV may be used to test the interrupting device without its added

impedance. Such a circuit with impedance Z_b, is shown in Fig A. This is permissible provided the test circuit and the interrupting device interact in the same manner as would the actual circuit interrupter, and its added impedance and the test circuit produced the required inherent TRV. In place of this, the circuit breaker shall be considered to have passed the test if the actual measured TRV meets or exceeds the modified inherent TRV.

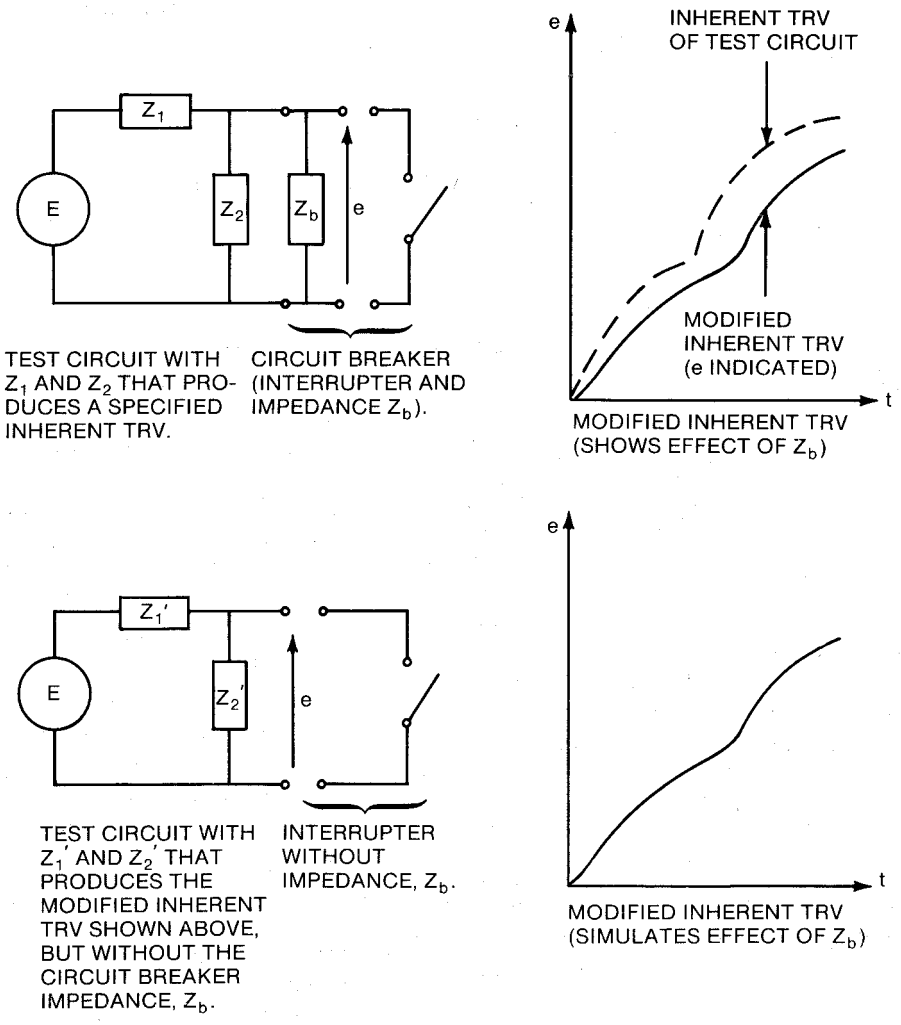

Figure A —A Test Circuit Designed to Simulate the Effect of Circuit Breaker Modifying Impedance