

IEEE Standard Surge Withstand Capability (SWC) Tests for Protective Relays and Relay Systems

Sponsor
**IEEE Power System Relaying Committee
of the
Power Engineering Society**

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Foreword

(This Foreword is not a part of ANSI/IEEE C37.90.1-1989, IEEE Standard Surge Withstand Capability (SWC) Tests for Protective Relays and Relay Systems.)

As the use of semiconductor devices in protective relays and communication equipment increases, so does the need for standard surge tests. Assurance is needed that the relays and relay systems will operate satisfactorily when installed in the harsh environment of a substation or switchyard. Standard surge tests will provide assurance that the relays and relay systems will withstand a specified surge level. The use of proper grounding and shielding techniques when installing the equipment, will assure that the actual surge level impinging on the equipment does not exceed the level to which the equipment was tested.

The first standard document to specify a SWC Test was ANSI C37.90a-1974/ IEEE Std 472-1974 (redesignated ANSI/IEEE C37.90.1-1974), Guide for Surge Withstand Capability (SWC) Tests.

Experience with ANSI/IEEE C37.90.1-1974 was good, and in 1978 the Guide was incorporated as Section 9 of ANSI/IEEE C37.90-1978, Relays and Relay Systems Associated with Electric Power Apparatus. This meant that the oscillatory SWC Test was now a required test for relays and relay systems containing semiconducting devices.

From the beginning, it was realized that the oscillatory SWC test had limitations and did not identify all the problems. The need for a complementary test was recognized and the general type of test required was identified. The problem then became one of a search for a circuit that would produce a repeatable, controllable output. During the search, the IEC "showering arc" test was studied as well as a number of other tests proposed by various organizations. These were all rejected because they were not repeatable or controllable.

The "fast transient" test using the typical test circuit shown was selected, because it was found to be very stable and easy to control. The test can therefore be performed in a minimum time and at a reasonable cost. The typical test circuit has been tried by a number of organizations (relay manufacturers, test equipment manufacturers, utilities, etc.), and found to give good results. In fact, IEC is now trying a similar test circuit.

The addition of the "fast transient" SWC test to the SWC test requirements should identify problems not identified by the oscillatory SWC test alone.

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