



Investigation Guideline

Product : Circuit Breakers

Appendix # : 128

Date : May 2003

I. Introduction

Use this guideline, *in addition to* the product-specific guideline (s), for conducting investigations of *any electrical incident* involving a fire, shock, electrocution, or a potential fire/shock hazard.

A. Product Description

According to the National Electrical Code (NEC) definition, the circuit breaker is a device designed to open and close a circuit by non-automatic means and to open the circuit automatically on a predetermined overcurrent without damage to itself when properly applied within its rating. Simply put, circuit breakers monitor the flow of the electrical current and they cut off the power when current levels get too high and protect from potential fires and shocks. Hence, they are a simple solution to a potentially deadly problem.

There are many different types of circuit breakers, such as 1-pole, 2-pole, duplex, triplex, AFCI, or GFCI. Each breaker type has its own unique design features and specialty. For example, while Arc Fault Circuit Interrupter (AFCI) breakers monitor the circuit for arcs, the Ground Fault Circuit Interrupter (GFCI) breakers monitor for ground faults and prevent shocks. For detailed information and illustrations on the various types of breakers, please refer to the Appendix on Panelboards and Circuit Breakers.

B. Specific Items of Interest

In general, whenever an electrical product malfunction is being investigated, we would like to collect more and better information on the functioning of electrical circuit breakers. It would be useful to determine whether the circuit breaker (or maybe the fuse), for the electrical outlet that the product was plugged into, tripped. If the circuit breaker did not trip, and technical follow-up investigation later determines that the

breaker should have tripped under the circumstances of the incident, it would be important to have available the manufacturer information on BOTH the panelboard and the breaker (they may be from different manufacturers).

When the incident does not involve a failure of the panelboard itself, the manufacturer information is USUALLY readily available from the paper labels on the door of the panelboard and on the visible portion of the breaker. We realize this information can only be obtained during on-site investigations, or when others (e.g. fire departments, etc.) can obtain it. We do NOT want the investigator to remove the trim (door portion of the enclosure) to get this information. If label information is inaccessible, some good photographs (with door open, door closed, and a close-up of the involved breaker) would go a long way in helping to identify the manufacturer (s). A note of caution here: occasionally the panelboard or the breaker may have shiny metal casings, in which case flash photography may be futile.

At a minimum, we would like to know if the circuit breaker tripped when the electrical product (e.g. toaster, hair dryer, stove, lamp, etc.) short-circuited or malfunctioned.

C. Headquarters Contact

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II. **Instructions for Collecting Specific Information**

- When writing the synopsis of the product-specific investigation report, please indicate whether the relevant circuit breaker (i.e. for the outlet where the product was plugged into) tripped. This information may also be available from the fire department or insurance agency investigation reports.
- When collecting manufacturer information on the specific product being investigated, please include the manufacturer information on the circuit breaker AND the panelboard following the steps outlined above.
- There is no need to collect the circuit breaker as a sample. However, good photographs are always helpful.
- **Please understand that the information on the circuit breaker is supplemental only to the information that you will collect based on the product-specific investigation. THIS GUIDELINE DOES NOT REPLACE THE ASSIGNMENT MESSAGE OR THE GUIDELINE (S) THAT APPLY TO THE SPECIFIC PRODUCT YOU ARE INVESTIGATING.**