

LOG OF MEETING

SUBJECT: Twist-On Wire Connectors for Aluminum Wire.

DATE: April 8, 1996

PLACE: Room 714
East West Towers

DATE OF LOG ENTRY: April 9, 1996

SOURCE OF LOG ENTRY: William H. King, Jr., ESEE *W.H.K.*

CPSC PARTICIPANTS:

William H. King, Jr., ESEE
 Bob Ochsman, ESHF
 Ed Krawiec, ESEE
 Linda Edwards, ESEE

NON-CPSC PARTICIPANTS:

Dr. Jesse Aronstein, Consulting Engineer
 Dave Haataja, Underwriters Laboratories Inc.
 Bill Blaha, Ideal Industries, Inc.
 Wayne Morris, Assoc. of Home Appliance Mfrs. (AHAM)
 Joan Sterling, Inchcape

SUMMARY:

At the request of Dr. Jesse Aronstein, Consulting Engineer, a meeting took place between the CPSC staff and Dr. Aronstein to inform the staff about test results for a twist-on connector rated for use with aluminum wire.

The tests included a Heat-Cycling Test described in the UL 486C safety standard, and electrical measurements of aluminum wire connections made up using samples of the twist-on connector (measurements were made both before and after environmental exposure).

Dr. Aronstein reported that when two of the four connectors that were being subjected to the Heat-Cycling Test failed, the test was terminated after completing only approximately half of the required number of cycles. One failed sample overheated and the other failed sample did not meet the stability requirement.

During the test, current not exceeding 60 amperes flowed from one aluminum wire to another aluminum wire. The connectors under test each joined two No. 10 solid aluminum wires and one No. 18 solid copper wire. During the current cycling, the off time was extended when necessary to allow the test to be attended during the portion of the cycle when the current was flowing. Dr. Aronstein described the test procedure used and answered all questions about this work. Questions asked covered various

aspects of the test including the ambient temperature conditions (they varied from 12C to 16C), control conductor temperature (they were in the range of 98C to 103C @ 60 amps), and characteristics of the aluminum wire used (it was UL recognized ACM alloy fabricated into Type NM cable).

Dr. Aronstein also described the other part of his test work; i.e., the electrical measurements involving 20 twist-on connectors made up using combinations of multiple aluminum wires and copper wire as prescribed in the connector listing, and assembled by following the connector manufacturer's installation instructions with the product. Dr. Aronstein reported a wide scatter of electrical resistances among the connectors as initially made up, and without having subjected the connectors to any electrical loading. He concluded that this was indicative of poor aluminum-to-aluminum connections. Following conditioning of the samples at temperature and humidity conditions representative of seasonal changes within outlet boxes in homes, Dr. Aronstein reported an increase in resistance with time. He concluded that this upward trend is further evidence of poor connections that may not remain free from dangerous overheating during the expected life of the connector while in service within a dwelling.

Several questions of Dr. Aronstein were asked by Messrs. King, Krawiec, and Blaha. The other attendees were observers.