



Performance of New and Aged Residential Fire Smoke Detectors

Nist



As part of the Consumer Product Safety Commission (CPSC) technical staff program to determine the effects of emissions from imported drywall on residential electrical, gas distribution, and fire safety components, the National Institute of Standards and Technology (NIST) has generated data to aid assessment of whether there has been a loss of functionality of fire smoke detectors exposed to those emissions. NIST tested four sets of smoke detectors in the Fire Emulator/Detector Evaluator (FEDE) and the UL 217 test apparatus. Set 1 (ionization only) detectors were provided by CPSC staff and described as having been installed in homes with imported drywall Set 2 (ionization only) detectors (same models as Set 1 but different batches) were described as coming from contemporaneous homes without the presence of imported drywall Set 3 smoke detectors were purchased new by NIST and tested as received and Set 4 comprised detectors from Set 3 that had been subjected to an accelerated aging protocol to simulate 10-year exposure to the effluent from imported drywall. Detectors from Set 1 and Set 2 activated within UL 217 sensitivity test parameters. Tests using the FEDE found differences in sensitivity between Sets 1 and 2 and between the ionization detectors in Sets 3 and 4 that were numerically small compared to the allowable performance range. An even smaller improvement in sensitivity was found for photoelectric smoke detectors between Sets 3 and 4. Two of the Set 1 smoke detectors sensed the presence of smoke, but would not send the signal to activate interconnected alarms. Two other Set 1 smoke detectors failed to operate under AC power, but operated properly under the required 9V battery back-up. It could not be determined whether the observations of Set 1 detector performance could be attributed to exposure to the emissions from imported drywall or to other factors.

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