

The Euclid Test

On January 10 & 11, 2013 NEOFPA conducted two full-scale, real-world smoke alarm comparison tests in the city of Euclid, Ohio. Test 2 conducted on January 11 was videotaped for a story by ABC News affiliate WEWS NewsChannel 5 from Cleveland Ohio.

The home, which was slated for demolition by the city of Euclid, was a two-story wood framed, brick veneer bungalow single-family home. The interior walls and ceiling finish were of painted drywall. During the tests, all doors and windows were in the closed position. Also, there was no artificial air movement in the home during the tests.

The two tests conducted were both smoldering fire type tests which were created by inserting a brand new soldering iron into the cushions of a love-seat and a couch . The love-seat and couch were located in the front living room in their typical location. The heated soldering iron caused the cushions to smolder without igniting for a considerable length of time and create large volumes of smoke, replicating a typical smoldering fire incident in a single-family residence. A firefighter in full turnout gear in self-contained breathing apparatus was stationed approximately 10' from the couch during the tests to observe and report conditions.

The brand new smoke alarms were mounted to a wooden board which was then mounted to the first floor hallway ceiling in what would have been the recommended location per national standards. This hallway connected the front living room, kitchen, bathroom and bedrooms. The smoke alarms were identified by manufacturer and sensor type and were numbered. The distance from the ignition point to the smoke alarms was approximately 12 feet. A firefighter in full turnout gear and self-contained breathing apparatus was stationed directly below the smoke alarms during the tests to observe and report conditions and smoke alarm functioning.

Test 1: January 10, 2013 at 2:10 pm

Equipment used:

Heat source: Weller 110 volt, 25 watt soldering-iron model SP23LK. Maximum temperature of 750°F.

Furniture/Fuel Source: Love-seat. Used condition. Polyester/synthetic cover with foam cushions. Wood frame.

Smoke alarms used:

(Model numbers, manufacture dates & battery types not recorded)

- 1: Kidde photoelectric sensor
- 2: Kidde ionization sensor
- 3: First Alert photoelectric sensor
- 4: First Alert dual sensor (photoelectric & ionization sensors)
- 5: First Alert ionization sensor

Carbon monoxide detectors and oxygen monitor used:

(Model numbers not recorded)

Kidde Nighthawk 110 volt with Digital readout

Kidde Nighthawk 110 volt with Digital readout

Oxygen meter: Fire department owned. The make and model number were not recorded.

Test 1 Time Line:

(Time in parentheses indicates minutes and seconds since the start of the test.)

2:10 PM: Start test.

2:15 PM: CO level: zero.

2:18 PM: (7m:53s): smoke alarm 1 activates

2:19 PM (8m:24s): smoke alarm 3 activates. CO level: zero.

2:20 PM (9m:29s): smoke alarm 3 stops sounding. CO level: 3 ppm.

2:20 PM (10m:17s): smoke alarm 3 activates again.

2:21 PM (10m:30s): smoke alarm 4 activates. CO level: 2 ppm

2:23 PM (12m:30s) CO level: 10 ppm

2:26 PM: (15m:00s): CO level: 4 ppm. Oxygen level: 21.7%. Firefighters monitoring the conditions inside need to begin using self-contained breathing apparatus (SCBA) due to the smoke conditions.

2:30 PM (20m:00s): CO level: 20 ppm. Oxygen level: 21.8%.

2:33 PM (22m:43s): smoke alarm 5 activates. CO level: 20 ppm. Oxygen level: 21.9%.

2:36 PM (25m:00s): CO level: 25 ppm. Oxygen level: 20.6%

2:38 PM (27m:28s): smoke alarm 2 activates. CO level: 34 ppm. Oxygen level: 20.6%.

2:39 PM (28m:45s): test ended.

Test 1 Summary:

The Kidde photoelectric smoke alarm (#1) sounded at 7m:53s.

The First Alert photoelectric smoke alarm (#3) sounded at 8m:24s. 31 seconds after the first photoelectric smoke alarm sounded.

The First Alert dual sensor smoke alarm (#4) sounded at 10m:30s. Two minutes and 37 seconds after the first photoelectric smoke alarm sounded.

The First Alert ionization smoke alarm (#5) sounded at 22m:43s. 14 minutes and 50 seconds after the first photoelectric smoke alarm sounded.

The Kidde ionization smoke alarm (#2) sounded at 27m:28s. 19 minutes and 35 seconds after the first photoelectric smoke alarm sounded.

Test 2: January 11, 2013 at 2:28 pm

Equipment used:

Heat source: Weller 110 volt, 25 watt soldering-iron model SP23LK. Maximum temperature of 750°F.

Furniture/Fuel Source: Sofa. Used condition. Polyester/synthetic cover with foam cushions. Wood frame.

Smoke alarms used:

- 1: Kidde ionization sensor model I9010. Manufacture date: 2012. Sealed 10 yr. lithium-ion battery.
- 2: Kidde photoelectric sensor model P3010L. Manufacture date: 7-21-12. Sealed 10 yr. lithium-ion battery.
- 3: Kidde dual sensor (Photoelectric & ionization sensors) model PI9010. Manufacture date: 2-18-12. 9 volt battery.
- 4: First Alert ionization sensor model SA304. Manufacture date: 11-13-12. 9 volt battery.
- 5: First Alert photoelectric sensor model SA720. Manufacture date: 12-07-12. 9 volt battery.
- 6: First Alert dual sensor (photoelectric & ionization sensors) model SA320. Manufacture date: 11-08-12. 9 volt battery.

Carbon monoxide detectors and oxygen monitor used:

First Alert carbon monoxide detector model CO615. 110 volt with battery backup.

Kidde carbon monoxide detector model KN-COPP-3. 110 volt with battery backup. Manufacture date: 11-02-12.

Carbon monoxide meter: Fire department owned. Make and model number were not recorded.

Oxygen meter: Fire department owned. Make and model number were not recorded.

Test 2 Time Line:

(Time indicates minutes and seconds since the start of the test)

2:28 PM: Start test

0m:46s: FD oxygen level: 20.2%

1m:45s: First visible smoke.

4m:31s: Smoke alarm 2 activates. FD oxygen level: 20.9%.

5m:20s: Smoke alarm 5 activates.

6m:10s: Smoke alarm 3 activates. First Alert CO meter: 2 ppm. FD oxygen level: 20.9%.

6m:58s: Smoke alarm 6 activates. First Alert CO meter: 4 ppm. FD oxygen level: 20.5%.

12m:00s: FD CO meter: 4 ppm. FD oxygen level: 20.7%.

13m:43s: smoke alarm 1 activates.

13m:59s: smoke alarm 4 activates.

16m:33s: FD oxygen level: 20.5%.

29m:26s: Sofa ignites to open flame. FD oxygen level: 20.5%. End of test.

Test 2 Summary:

The Kidde photoelectric smoke alarm (#2) sounded at 4m:31s.

The First Alert photoelectric smoke alarm (#5) sounded at 5m:20s. 49 seconds after the first photoelectric smoke alarm sounded.

The Kidde dual sensor smoke alarm (#3) sounded at 6m:10s. One minute and 39 seconds after the first photoelectric smoke alarm sounded.

The First Alert dual sensor smoke alarm (#6) sounded at 6m:58s. Two minutes and 27 seconds after the first photoelectric smoke alarm sounded.

The Kidde ionization smoke alarm (#1) sounded at 13m:43s. Nine minutes and 12 seconds after the first photoelectric smoke alarm sounded.

The First Alert ionization smoke alarm (#4) sounded at 13m:59s. Nine minutes and 28 seconds after the first photoelectric smoke alarm sounded.

Pictures From The Tests







