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NFPA urges replacing home smoke alarms after 10 years

Quincy, MA, October 23, 2001—Replacing batteries in home smoke alarms will be a common task for many people as daylight savings time ends. But if smoke alarms in your home are more than 10 years old, NFPA (National Fire Protection Association) recommends replacing them, as well.

Why? According to NFPA, aging smoke alarms don't operate as efficiently and often are the cause of fire deaths. Older smoke alarms are estimated to have a 30% probability of failure within the first 10 years. Newer smoke alarms do better, but should be replaced after 10 years. Unless you know that the smoke alarm is working properly, replacing them when moving into a new residence is also recommended by NFPA.

Smoke alarms, when properly installed, give an early audible warning needed to safely escape a home in a fire. This is critical because 85% of all fire deaths occur in the home, and the majority occur at night when people are sleeping. Last year, NFPA documented 3,420 home fire deaths.

Fully 94% of U.S. homes had at least one smoke alarm as of 1997, according to NFPA, but a significant number of the home fires reported to U.S. fire departments and 52% of home fire deaths still occurred in homes with no smoke alarms. Half of the deaths from fires in homes equipped with smoke alarms occurred in homes in which the smoke alarm did not sound—usually when batteries were dead, disconnected, or not working.

"Simple steps like maintaining smoke alarms and replacing older ones help diminish the possibility of fire in the home," says John R. Hall, Jr., NFPA's assistant vice president for fire analysis and research. "Smoke alarms in the home are largely responsible for the decreasing number of home fire deaths over the past several decades."

NFPA offers the following smoke alarm safety tips:

- Install new batteries in all alarms once a year or when the alarm chirps to warn that the batteries are low.
- Test units at least monthly. Test the units using the test button or an approved smoke test.
- Clean the units, in accordance with the manufacturers' instructions.
- Do not use an open-flame device for testing because of the danger the flame poses.
- Smoke alarms should be placed outside each sleeping area and on each level of the home, including the basement.
- In new homes, smoke alarms are required in all sleeping rooms, according to the *National Fire Protection Association Code*.
- Alarms should be mounted on the wall 4-12 inches from the ceiling; ceiling-mounted alarms should be positioned 4 inches away from the nearest wall. On a vaulted ceiling, be sure to mount the alarm at the highest point of the ceiling.

As electronic devices, alarms are subject to random failures. Product, installation, and maintenance are used to assure products work as designed despite this. Part of the technical basis for the standard was an assessment of expected failure rate, estimated at four per million hours of operation, or once every 30 years. Early field studies of alarm reliability, notably by Canada's Ontario Housing Corporation,

confirmed the essential accuracy of this estimate, restated as a 3% failure rate per year. This fraction of home smoke alarms will fail almost immediately, and 3% will fail by the end of the years, nearly all the alarms will have failed, most years earlier.

How soon should you replace your alarm? This is a value judgment. Only 3% of alarms are li year, and annual replacement would be very expensive, so that doesn't make sense. At 15 y are better than 50/50 that your alarm has failed, and that seems too big a risk to take. Manuf for the early alarms typically ran out in 3-5 years. So, in ten years there is roughly a 30% prol before replacement. This seemed to balance safety and cost in a way that made sense to the technical committees.

If a 30% failure probability still seems too high, remember that replacement on a schedule is replacement based on testing. A national study found home smoke alarms, when they fail, te opposed to hard-to-detect creeping failure, such as a loss of sensitivity.¹ Regular monthly tes discover alarm failure as well as a dead or missing battery. You can replace your alarm wher

The same study showed *all* the inoperable alarms tested in 1992 were at least 5 years old an change in product standards that reduced sensitivity to reduce nuisance alarms. Changes in among other improvements, make it likely that electronic failure now occurs at a rate much le million hours of operation.

Replacing alarms after 10 years protects against the accumulated chance of failure, but mon your first, best means of making sure alarms work. Today's alarms are even less vulnerable t alarms. Regular maintenance of the more sophisticated systems used in larger buildings can very reliably for many decades.

¹ Julie I. Shapiro, *Smoke Detector Operability Survey*, Washington: U.S. Consumer Product October 1994 revised.

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