

# The Defect in Smoke Alarms



by Richard H. Taylor

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## The Defect in Smoke Alarms

Do you have a smoke alarm in your home? Most likely you do. Is it a photoelectric or an ionization smoke alarm? If you are like an overwhelming majority of Americans you have an ionization smoke alarm, but did not know there were two types of smoke alarms. You're also likely to be among the millions of consumers who believe a smoke alarm will detect smoke and sound if smoke is present. Think again!

If you have a fire, then it matters a great deal whether you have an ionization or photoelectric alarm. If you have a slow smoldering fire, then there is a good chance your ionization fire alarm may not sound, or may sound too late for you and your family to get out of the house alive. Most people do not know that ionization smoke alarms have this hidden defect, but the manufacturers have known for decades. After you read this article, go look at your smoke alarm and see if it is an ionization or photoelectric. If it is an ionization, install a photoelectric also, or a combination photoelectric/ionization smoke alarm. It may save your life and the lives of your family.

### BRIEF HISTORY OF SMOKE ALARMS

Around 1970, battery powered smoke alarms were first introduced in America. FEMA indicated that by 1991, 81% of American homes had at least one smoke detector. Current statistics from the National Fire Protection Association put the figure at approximately 96%. The Department of Homeland Security determined that from 2001 through 2004 that there are an estimated 402,500 fires reported in residential structures. These fires cause an average of 3,055 fatalities, 14,475 injuries and \$5.93 billion dollars in property loss. Alarms were present in approximately 60% of the fatal residential structural fires. Of those fatal fires with an alarm present, the detector operated 39% of the time. That is, these statistics indicate that smoke alarms were present and operated in 23% of fatal residential structure fires. The Homeland Security report went on to state that "fatal residential fires with working smoke alarms tend to occur in the late evenings and early morning hours when most individuals are sleeping."

One could conclude that these fire fatalities with working smoke detectors is a result of the defect in ionization smoke alarms.

### PHOTOELECTRIC V. IONIZATION

There are two primary types of smoke alarm sensing technologies: photoelectric and ionization. A photoelectric smoke alarm is best for detecting slow smoldering fires. Slow smoldering fires typically involve lots of smoke and little or no flames at the initial stage. For example, a couch may smolder and billow plumes of toxic smoke for a long period of time before developing into a flaming fire. Slow smoldering fires typically occur when people are asleep and are generally responsible for more deaths than fast flaming fires. Photoelectric smoke alarms cost approximately \$15.00, but represent less than 5% of all smoke alarms sold in America. Many experts recommend a photoelectric smoke alarm or a photoelectric/ionization combination. The manufacturers recommend that you have both an ionization and photoelectric, but a vast majority of people do not even know there are two technologies.

The ionization smoke alarm is best for detecting fast flaming fires where there is less smoke. In fact, ionization detectors should be called "fire alarms" not smoke detectors because they are designed to detect flames and often do not detect smoke only. Ionization smoke alarms cost approximately \$10.00 and represent approximately 95% of alarms sold in America. The ionization smoke alarm may not respond at all to a slow smoldering fire even when a room is completely filled with smoke. If an ionization smoke alarm sounds in a slow smoldering fire, it may take up to **15-30 minutes longer** for it to sound when compared to a photoelectric. Gary Lederer, a Senior Vice President for smoke alarm manufacturer BRK, appeared on the National T.V. program 20/20 in May 1996 where he was questioned about a 15 minute delay in sounding:

Gary Lederer: The photoelectric will sound an alarm sooner than an ionization, but both will sound an alarm in sufficient time to allow you to evacuate the building.

Arnold Diaz: How much sooner would the photoelectric sound the alarm in a slow, smoldering smoke fire?

Gary Lederer: Fifteen minutes prior to the ionization detector.

Arnold Diaz: Well, I want that extra 15 minutes to go wake up other members of my family, to go make sure everybody's safe, to herd them outside.

Gary Lederer: We, we have the answer for you. We have a combination unit that has both detection principals in one unit.

There is an abundance of technical literature showing that ionization smoke alarms have a substantial delay in sounding when compared to a photoelectric in a slow smoldering fire. Experts for the manufacturers admit this delay. Surprisingly, the in-house engineers and executives at the major smoke alarm manufacturers, such as Mr. Lederer, admit this fact also. At the same time, all the major smoke alarm manufacturers promote the idea that "every second counts" in a fire.

The ionization chamber in ionization smoke alarms is basically the same in all ionization smoke alarms sold in America. The technology for the ionization sensing chamber has not changed in over 30 years. The defect associated with ionization smoke alarms has been the subject of several investigative news programs in this country and others, but nothing has been done to correct the defect. Fire expert and Boston Deputy Fire Chief Jay Fleming believes the defective ionization alarm has claimed the lives of more than 10,000 in house fires over the past few decades. Despite all this publicity and investigation, the smoke alarm manufacturers continue to sell ionization smoke alarms at an alarming rate and have chosen not to inform or warn the purchasing public about the defect.

### **WHAT DO THE SMOKE ALARM MANUFACTURERS HAVE TO SAY?**

There are two major smoke alarm manufacturers in America: BRK Electronics , Inc. (BRK) and Walter Kidde Portable, Inc. (Kidde). BRK at one

time controlled the smoke alarm market, but Kidde, a subsidiary of United Technologies (NYSE:UTX) now has the largest market share. Kidde is now the major manufacturer and seller of ionization smoke alarms in America. The manufacturers defend these cases with the same old song and dance: Underwriters Laboratories (UL) tested and certified the smoke alarms. How can they be defective? They also point to the "government studies" they believe supports their conduct.

UL's Standard 217 for smoke alarms was promulgated approximately 30 years ago. The ionization smoke alarms do pass the UL 217 test and all smoke alarms sold in America do have the UL certification emblem on them. The UL 217 Standard is, of course, a minimum performance Standard promulgated by the "industry" itself.

The ionization smoke alarms are subjected to the numerous UL laboratory tests, including the UL 217 smoke box test. However, the UL smoke box test is the only UL test relevant to a slow smoldering fire. The alarm is placed in a test chamber and a cotton wick is ignited. The cotton wick slowly burns and smolders until the smoke becomes thick enough (obscuration rate) for the ionization smoke alarm to sound. If the smoke alarm sounds before a 10% obscuration rate is reached, then the alarm passes and the smoke alarm gets the UL "stamp of approval." The problem with the test is that it is outdated and does not represent fires in the real world. The test procedures and certification protocol have not undergone any significant changes during the 30 years since their inception. The minor changes in the UL 217 test have been a change in the type of material burned and a change in the obscuration level. Both changes conveniently resulted in a test protocol that was more accommodating to the ionization alarm.

When the UL 217 test was promulgated in the 1970's, most homes had furniture made of cotton. Today's homes contain very little cotton; instead, most homes now contain furniture made of materials such as polyurethane. Polyurethane is an oil-based product that gives off huge amounts of smoke and deadly gases such as carbon monoxide and hydrogen cyanide. The deadly

gases emitted by polyurethane fires and other modern day building materials can cause unconsciousness and death very quickly. In fact, most people who die in a slow smoldering fire die as a result of smoke inhalation and not thermal injury. The UL 217 test does not test smoke alarms using modern-day products. We ask the Senior Product Engineer at Kidde if the UL test procedure should be questioned in light of the ionization detector's performance in real world fires. He responded:

A: I don't know if I would say it questions them. It may – it may say that maybe other material could be tested. And as I said, that's a project that's in process right now.

Underwriters Laboratories knows about the problem with ionization smoke alarms. In January 2000, our law firm presented Paul Patty, an UL representative on the UL 217 committee, with over 100 consumer complaints lodged against BRK concerning failures with the ionization smoke alarms. He basically said they may have been discussed in various UL meetings and it would be reasonable and prudent to investigate them. That was almost ten (10) years ago. However, a review of UL 217 minutes clearly reveal that UL and the manufacturers have known about and have discussed this defect for well over ten to twenty (10-20) years.

Underwriters Laboratories is, so to speak, "in bed" with the smoke alarm manufacturers. UL is a non-profit organization; but, UL's funding comes from the manufacturers whose products UL tests. The majority of voting members of the UL 217 committee consist of representatives from the smoke alarm industry, consultants paid by the manufacturers, and UL employees. Have you ever heard the term "the fox guarding the hen house?" The UL Standards will not change unless or until the smoke alarm manufacturers are forced to change by jury verdicts or legislation.

The smoke detector manufacturers often times rely on government studies to defend these cases. One of their favorite studies is the National Institute of Standards and Technology (NIST) report dated February 2008. The abstract to this study and one of the conclusions provides:

Smoke alarms of either the ionization type or the photoelectric type consistently provide time for the occupants to escape from **most** residential fires, although in some cases the escape time provided can be short. Consistent with prior findings, ionization type alarms provide somewhat better response to flaming fires than photoelectric alarms, and **photoelectric alarms provide (often) considerably faster response to smoldering fires than ionization type alarms.**

This conclusion is very carefully worded. Note that the study concludes that the smoke alarms provide time for occupants to escape from **MOST** residential fires. A smoke alarm, like a seatbelt in a car, is a life safety product. How would a person react if the seatbelt contained a sticker that stated "this seatbelt will hold you **most** of the time?" Stated differently, perhaps the smoke detector industry should put a warning on its smoke detector that states "this smoke alarm will sound **most** of the time if there is a fire." Unfortunately, that would be a true statement because the last time we checked "most" can simply mean 51% of the time.

Nonetheless, the study specifically concludes that "photoelectric alarms provide (often) considerably faster response to smoldering fires than ionization type alarms." Exactly the point. When one reads the data contained in this study and in other studies the term "considerably faster" shows that the photoelectric is anywhere from 15-30 minutes quicker than an ionization in slow smoldering fires. In other words, it will take an ionization approximately 15 to 30 minutes longer to sound in a slow smoldering fire when compared to a photoelectric. As Arnold Diaz stated on 20/20 in 1996, "Well, I want that extra 15 minutes to wake up other members of my family, to go make sure every body is safe, to herd them outside."

## CONSUMER COMPLAINTS

We know how ionization smoke alarms perform in the UL 217 laboratory smoke box test. They pass with flying colors. But, how do the smoke alarms perform in real-world fires?

When our law firm litigates with a smoke alarm manufacturer, we request complaints from

consumers who write or call the manufacturer complaining about the performance of ionization smoke alarms in their homes. The smoke alarm manufacturers do not like producing these consumer complaints, so trial judges typically have to compel the smoke alarm manufacturers to produce them. When we eventually get the consumer complaints, we contact some of the consumers and ask that they give a video deposition. The testimony of these consumers can be truly amazing. Some of these videos can be viewed on our website: [www.TaylorMartino.com](http://www.TaylorMartino.com)

The consumer complaints tell us two significant things. First, the consumer complaints tell us how the smoke alarms perform in real-world. The consumer complaints and the testimony of the consumers clearly show that ionization smoke detectors do not perform as they perform in the UL 217 laboratory smoke box. For example, one consumer testified under oath that he had 3 fully powered ionization smoke alarms in his home when he went to bed. He awoke to a house full of smoke and none of the alarms had sounded. He was alarmed that they did not sound and he sent all 3 smoke alarms back to the manufacturer along with a complaint letter. The manufacturer placed the 3 smoke alarms in a UL 217 smoke box and they passed the test. The manufacturer sent a standard form letter explaining why his smoke alarms did not sound. The response letter from the manufacturer stated that smoke did not reach the alarm (not true according to the sworn testimony) or it was cold smoke in the house (whatever that is.)

Secondly, the consumer complaints and documents tell us that the smoke alarm manufacturers know how their ionization smoke alarms perform in real-world. In one case, over 370 consumer complaints were produced, and in another case over 100 consumer complaints were produced. Our law firm has taken the depositions of the representatives of each major smoke alarm manufacturer whose responsibility is to monitor consumer complaints. The testimony of these representatives boggles the mind. For example, a corporate representative for Kidde testified as follows:

**Q.** ...well, first of all, you agree with me that Kidde knows about this phenomenon, being, your house will fill with smoke and your ionization won't sound, it knows about that, didn't it?

**A.** Apparently, yes.

**Q.** Okay. And it's apparent because they even have people calling and had to make it a frequently asked question and to have a response to it, right?

**A.** Yes.

**Q.** Okay. Yet that is not communicated to the folks like the Spencer family when they went to buy their smoke detectors, is it?

**A.** It is not communicated on the packaging – that question is not communicated on the packaging.

**Q.** And even though you agree, as 23 years with this company, that it's a safety concern, it's not communicated, is it?

**A.** No, it's not on the packaging.

Similarly, a BRK representative testified as follows:

**Q.** . . . Has it to this day ever caused you any concern that on average you receive a call a week from folks saying, this smoke detector is not responding to smoke?

**A.** Well, I'm not sure what you mean by concern. We certainly took any call or inquiry like that seriously so that we would make arrangements to get the detector replaced and in-house for testing.

**Q.** Well, by concern I mean do you ever kind of worry about it or lay awake in bed going hmm, that sure is a lot of calls we're getting in on these smoke detectors that people rely on to save their life?

**A.** Well, if the detectors weren't working then I would be concerned.

\* \* \* \* \*

**Q.** And you [have] received hundreds of complaints of people saying this smoke detector didn't respond to smoke?

**A.** We have.

The bottom line is that the smoke alarm manufacturers know ionization smoke alarms are defective, but they do not tell people.

### **DO YOU HAVE A SMOKE ALARM CASE?**

If you have a case involving a fire and there is a death or substantial injury, then you should consider a potential smoke alarm case. The first order of business is to secure the scene and locate all smoke alarms in the structure. The smoke alarms must be preserved. If the smoke alarm is still on the wall or ceiling, then remove a section of the wall or ceiling with the smoke alarm intact. The smoke alarm can be x-rayed to determine if the battery is still intact and properly positioned. The smoke alarm must be inspected by a smoke alarm expert and a battery expert if there is an issue with the battery. Failure to maintain the integrity of the smoke alarm and the battery during removal may result in spoliation of evidence issues. If the manufacturer can be identified prior to removal, then it is a good idea to contact the manufacturer and place it on notice of your intentions to remove the detector.

People familiar with the house should be questioned about the number and location of the smoke alarms and when and where they were purchased. Determine the make and model and purchase an exemplar. You should determine if the smoke alarm sounded or sounded late during the fire. Immediately interview any survivors, neighbors, and first responders to determine if they heard a smoke alarm sound. If the smoke alarm is powered, but did not sound in the presence of smoke, then you most likely have a defective ionization smoke alarm. If your investigation reveals that the smoke alarm did

sound, then determine at what point in the fire it sounded. Remember that ionization smoke alarms have a significant delay in sounding. Oftentimes, the sleeping occupant needs only 30 more seconds to get out of the burning structure and a smoke alarm sounding 15-30 minutes late could certainly be the cause of their inability to escape.

Another favorite defense of the manufacturers is the battery. The defense will look for evidence that there was no battery in the smoke alarm, it had been disconnected or the battery was old. Ionization smoke alarms are notorious for nuisance alarms during cooking. Oftentimes, people disconnect their smoke alarm battery and fail to reconnect it. Therefore, your investigation should immediately focus on the battery itself and any witnesses who have knowledge about the maintenance of the smoke detector, especially any testing or replacement of the battery.

Smoke alarms are designed to alert people to a fire. Most smoke alarm cases involve situations where the family is asleep, a fire breaks out, and the smoke alarm does not sound or delays in sounding during the early stages. If the fire occurs when people inside the house are awake and aware of the fire, then there may be no proximate cause between the failure of a smoke alarm and any resulting death or injury. Therefore, determine where everyone was in the house at the time of the fire and what they were doing. It is very important to establish a detailed time line with regard to the progression of the fire and the activities of the people inside the house. Many experts are needed in these product liability cases.

### **CAUSES OF ACTION**

The causes of action against a smoke alarm manufacturer are well known to most lawyers. You allege product liability, negligence and wantonness. However, you should also consider breach of warranty and failure to warn.

One of the best theories of recovery against a smoke alarm manufacturer is failure to warn. It can be easily proven that the smoke alarm manufacturer knows that the ionization smoke alarm has a history of failure and defect. The

manufacturer will admit the delay in sounding and will have to admit its knowledge of the consumer complaints. However, despite this knowledge, the manufacturers do not warn about the hazard. Purchase an ionization smoke alarm at a local retail store and read the package front and back before opening it. Typically, the only information pertaining to the limitation (defect) of the smoke alarm is wording such as:

“Kidde recommends for maximum protection that both ionization and photoelectric smoke alarms be installed. Ionization technology is faster at detecting fast flaming fires that give off little smoke. Photoelectric technology is faster at responding to slow smoldering, smoky fires.”

There is no warning on the package telling the purchaser how much faster the photoelectric is at detecting a slow smoldering fire. The manufacturer knows the ionization alarm has a 15-30 minute delay in sounding when compared to the photoelectric. However, this is not revealed. In fact, the smoke alarm manufacturers have testified that they do not warn about the substantial delay in sounding or the risk of not sounding. They must admit this because there are no “warnings” concerning this defect in the packaging or on the alarm.

Our firm conducted a statistically valid marketing survey of people in the State of Alabama. The marketing study revealed, among other things, the following: 95% did not know the difference between ionization and photoelectric, and 60% did not purchase their smoke alarm.

A similar survey can be conducted in your case. It costs very little and can be the foundation of your failure to warn theory. The survey should show that approximately 95% of the purchasing public does not know the difference between ionization and photoelectric. When we conduct focus groups and voir dire in these type cases, we have never had a person say they knew the difference between ionization and photoelectric. In fact, we have never had a person say they even knew there were two different types of smoke alarm technology. This alone tells you the manufacturers

have done a very poor job educating and informing, much less warning, the public about the “defect.” It is the manufacturer’s responsibility to educate the public on any hazards associated with a smoke alarm which should at the very least, include an explanation of the limitations of the ionization smoke alarm. Obviously, the manufacturers have not done this since few people know the difference. Further, even though the manufacturers recommend both ionization and photoelectric smoke alarms for maximum safety, they do not adequately explain the reason. Plus, the manufacturers know people do not follow this “safety recommendation” to have both technologies because 95% of sales are ionization. Very few people (about 2.5%) have a photoelectric.

Another important fact revealed in the marketing study is that 60% of people do not purchase their smoke alarm. Did you purchase yours? Most people rent an apartment or move into a home where the smoke alarms are already present. Therefore, the plaintiff and the members of the plaintiff’s family never read or have the opportunity to read the package inserts or the owner’s manual. They only see the smoke alarm itself attached to the wall or ceiling. The smoke alarm itself is completely void of any warnings. Therefore, one should focus on the total lack of warnings on the smoke alarm itself. There is a complete and utter failure to inform or warn on the smoke alarm itself.

Most smoke alarms have a 5 -10 year express warranty and may not adequately exclude the implied warranty of merchantability. A warranty cause of action is important in states such as Alabama where only punitive damages can be awarded in a wrongful death case. If breach of warranty is alleged, then the plaintiffs are entitled to recover compensatory damages incurred before death. This would include mental anguish and pain and suffering while attempting to get out of the house during the course of the fire. These damages can be very emotional for a jury. Also, in many States there are only limited defenses to a breach of warranty claim.

## HOW CAN WE GET IONIZATION SMOKE ALARMS OFF THE MARKET?

At least three states have “outlawed” ionization-only smoke alarms in new construction. Massachusetts, Vermont and Iowa passed laws that do not allow ionization-only smoke alarms in new construction. A similar bill should soon be enacted in Tennessee. Unfortunately, these laws were initiated before the state legislatures by families who lost loved ones in fires where ionization smoke alarms did not sound or delayed in sounding. We should not wait for more deaths before we bring the issue before the state legislatures. The laws that were passed by Massachusetts, Vermont and Iowa can be found on our website.

Our law firm recently reached a confidential settlement in the Spencer v Kidde in Mobile,

Alabama against a major smoke alarm manufacturer. In that case, a single mother age 32, and her two minor children ages 11 and 14, died when their ionization smoke alarm did not sound during a slow smoldering fire. The Spencer family and our law firm established a foundation called Smoke Alarm Awareness Foundation, or SAAF. The purpose of the foundation is to make the public aware of the defects in ionization smoke alarms and to introduce a law in the Alabama Legislature similar to the laws in Massachusetts, Vermont and Iowa. It appears that the only way to get ionization smoke detectors off the market is to have legislation passed or for juries to hold the manufacturers accountable. Hopefully, you can help by introducing legislation in your State or by asking a jury to hold the manufacturers accountable.

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### A Message from The World Fire Safety Foundation

The Foundation thanks Mr Richard Taylor and the team at Taylor Martino for permission to reproduce this article. Are you a victim of ionization smoke alarms failing to sound a timely warning? Please consider taking action by asking a jury to hold manufacturers accountable - thank you.

Adrian Butler, Chairman, [The World Fire Safety Foundation](http://www.thewfsf.org)  
Queensland, Australia. 19 December, 2010



### Defective Smoke Alarm Victim Interviews



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