



The truth about ammonium bifluoride

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Feature

Product advertised as "20 times safer than HF" may be just as lethal.

by: James Gormley, News Editor

Ammonium bifluoride (ABF) is one of the most common, and dangerous, wheel cleaners used in automatic carwashes today. Its effectiveness removing brake dust and difficult contaminants from chrome wheels is undisputed, but some chemists say ABF presents an unjustifiable and potentially lethal risk to carwash operators and their employees.

But just how aware are carwash operators of the risks inherent to the use of ABF in carwash applications? Industry experts say that the dangers of ABF are clearly outlined on the chemical's Material Safety Data Sheet (MSDS), and many operators consciously ignore the obvious risks because ABF is cost effective and reliable.

However, some manufacturers and operators worry that ABF is being marketed as a safe alternative to highly-corrosive hydrofluoric acid (HF), even though the two chemicals pose nearly identical health risks. Experts say that some operators have been lead to believe that ABF is "up to 20 times safer" than HF and that this misinformation may be causing a time bomb at hundreds of carwashes.

A history of problems

Kevin Freudenberg, vice president of Indianapolis-based Car Brite Inc.'s Auction Division, sells wheel cleaners and presoaks containing ABF. Although Freudenberg says ABF is an extremely effective cleaner, he remains a reluctant defender of the product.

"I consider ABF a wolf in sheep's clothing," he says. "We've heard of some manufacturers saying it's 20 times safer than HF. When operators begin to believe this, that's where problems arise."

In fact, the marketing of ABF as a safe alternative to HF is not uncommon. Mark Ellis, operator of Southland Auto Wash in Wyoming, MI also has seen ABF sold as a safe stand-in for HF in wheel-cleaning applications. Ellis personally removed all HF and ABF from his wash in 1984, and any attempts to portray ABF as a safe product deeply trouble him.

"A lot of mom-and-pop operations are relying on the soap guy who comes and drops off their barrels," he says. "They don't give it a second thought."

Chemical experts say they are disturbed by any marketing that would seek to differentiate ABF from HF, because these chemicals are, in fact, very similar.

ABF, sometimes known as ammonium fluoride or ammonium hydrogen fluoride, is a crystalline salt formed when ammonium hydroxide reacts with HF. Through a complicated chemical reaction, ABF essentially becomes HF when mixed with water or liquid cleaning solutions.

Similar to HF, ABF was originally developed for industrial uses, like etching glass, removing oxides from metals and eliminating mineral stains from stone, glass and porcelain.

"Hydrogen fluoride and ammonium bifluoride. are created for industrial use only," says Dr. Andras Nagy, chief chemist for S&S Car Care, a North Canton, OH-based manufacturer of car-care products. "In Europe, people are stunned that carwashes are using these types of chemicals."

A history of danger

The US Consumer Products Safety Commission has documented dozens of injuries and deaths resulting from the misuse of products containing ABF. However, many in the car-care industry first awoke to the dangers of ABF in 1997, when retail wheel cleaners began causing a series of infant deaths and disabilities.

Two deaths and one case of brain damage resulting from ingestion of retail wheel cleaners have been confirmed since 1997. Two of the cases involved Armor All Quicksilver Wheel Cleaner, which was recalled by The Clorox Co. (NYSE:CLX). The product is now formulated without ABF.

While most carwash owners can be fairly certain that their employees are not intentionally ingesting wheel cleaner, ABF can be just as deadly if it comes in contact with skin or is inhaled as a mist.

Chemists say it's the fluoride ions in HF and ABF that make many wheel cleaners and pre-soaks so potentially dangerous. Whether fluoride ions enter body tissues as the result of inhalation or skin contact, they cause deep, progressive burning that may quickly lead to multi-organ failure and death. Long-term exposure to even minimal amounts of ABF can lead to brittle bones, weight loss, anemia, and calcified ligaments.

"ABF is extremely hazardous and can be harmful to several target organs in the human body, including the lungs, skin, eyes and kidneys," warns Roger McFadden, technical director and senior chemist with Coastwide Laboratories, Portland, OR.

McFadden says one of the most frightening aspects of fluoride poisoning is that its effects are not immediately apparent. Unlike hydrochloric acid or sulfuric acid, damage caused by HF and ABF takes place slowly. By the time a victim feels the effects, it's too late to reverse the damage.

A safe alternative?

Freudenberg says Car Brite sells more HF than ABF. He warns that ABF actually presents some unique dangers of its own when used in carwash applications. For example:

- The fluoride concentration, which makes ABF and HF dangerous, can actually be higher in ABF.
- HF has a more distinctive odor than ABF, which allows users to detect its presence more easily.
- When HF first comes into contact with skin, a light sensation will be felt and a red spot will often appear. These telltale symptoms can be lacking or delayed with ABF burns.

Finally, Freudenberg says one of the most significant dangers of ABF is that operators do not fully understand the risks the chemical presents.

"What's most troubling about ABF is that a lot of people might not even realize the danger involved," he says. "ABF is often misunderstood."

Is it necessary?

Although some operators are not fully aware of the serious dangers associated with ABF, Freudenberg points out that many operators make the conscious decision to ignore the risks. In fact, the increased demands that touchless carwashing has placed on detergents have caused some operators to rely on ABF more than ever before.

"Fewer operators are using HF and ABF than three years ago," Freudenberg says. "But the vast majority of operators, if given the choice, still want HF and ABF because nothing else can clean metal or cut through brake dust like them."

Ellis agrees that HF and ABF are extremely effective cleaners. However, he points out that he has survived 16 years in the carwashing industry since making the decision to remove HF and ABF from his wash.

"There are ways to clean cars without these dangerous chemicals," Ellis says. "They require more effort, may cost more, but I believe that the value of our lives and those we employ requires us to spend the extra time and money."

Lon Swinehart, president of S&S Car Care, has decided to focus his company's research-and-development effort on polymer technology, which lifts dirt from wheels, rather than burning it off. He acknowledges that ABF and HF are cost-effective cleaners, but feels that the public-relations risks that accompany these products make even the nominal cost unjustifiable.

"We have to get rid of this decades-old mentality, that says 'If it doesn't burn my hands off then it doesn't work,'" he says. "What happens if a customer goes through the wash and they happen to have the window open and they come in contact with this stuff? From a public-relations standpoint, it could set the industry back 50 years."

Keeping employees safe

Despite the obvious risks associated with ABF, experts agree that many operators will continue to use the product for years to come. Car Brite Distributor Specialist Steve Hass says that his company advises operators who decide to use ABF to take extreme safety precautions. Car Brite includes additional safety information with the MSDS to educate customers about the risks of ABF.

"We don't want our customers to take this stuff lightly," Haas says.

If a wash owner chooses to use ABF or HF, experts say the wash should be equipped with a safety shower and eye-irrigation system. If employees will handle these products, they should be provided with gloves, goggles and aprons. If HF or ABF will be used in mist form, which is not recommended, wash employees should also wear masks or respirators.

The Occupational Safety and Health Administration also recommends employers provide a series of gels, injections and pills to combat fluoride poisoning. If these precautions sound extreme, think again. Lethal doses of ABF and HF are estimated between one teaspoon and one ounce. A fluoride burn covering less than two percent of the body can be fatal.

For his part, Ellis hopes the carwashing industry will come to see ABF and HF as more trouble than they're worth. He says it is up to the operators to rid the industry of unsafe chemicals.

"After more than 30 years in the business, I don't believe that we as an industry are equipped to use HF or ABF safely," he says. "We the operators are the ones who have to stand up and say 'Hey, we don't need this stuff.' Because as long as the operator demands hydrofluoric acid or ammonium bifluoride, the manufacturers are going to sell it to us."