

# The danger that lurks underwater

## Drain covers for pools and spas that are meant to protect might not be safe

By Patricia Callahan, Tribune reporter [pcallahan@tribune.com](mailto:pcallahan@tribune.com)

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Tim McIntyre, a Calif. dad, tested the new anti-entrapment drains at his condo and found himself momentarily sucked into the drain. (Mark Boster/Los Angeles Times)

Equipment meant to prevent powerful drains from causing people to drown in pools and hot tubs is being used across the country even though the products underwent flawed safety evaluations, then failed subsequent, more stringent tests, a Tribune investigation has found.

A confidential report describing one laboratory's tests concluded that the equipment "could result in serious injuries and or death." Yet the manufacturers and federal regulators have not alerted the public about potential safety problems.

At issue are drain covers meant to protect children and others from a grisly fate — being trapped underwater by hundreds of pounds of suction from improperly covered drains in hot tubs and pools in hotels, park districts and backyards.

The Consumer Product Safety Commission, which regulates pools, has received complaints for two years that some models weren't working properly. But the CPSC didn't launch an investigation until July. Subpoenas obtained by the Tribune show the agency is investigating whether differing testing procedures at independent labs allowed drain covers to be sold even though they don't comply with the law.

The safety concerns extend beyond the few models that failed tests. When an accreditation authority investigated the lab that certified most U.S. drain covers, its team found incorrect testing procedures that didn't accurately mimic the entrapment forces in a real pool or spa, records show.

The Tribune found that AquaStar Pool Products Inc., which makes some of the more popular drain covers, did not issue a warning to the public after one of its products failed tests at independent labs last year. Nor did the company widely recall the product.

Instead, AquaStar asked its distributors to stop selling that model and return the remaining inventory. In a letter in July, the [California](#) company asked distributors "out of an abundance of caution" to notify past buyers of different installation instructions and offer a new plastic piece to raise the cover.

Since there was no public alert, it's unlikely word reached every pool and hot tub owner relying on this safety equipment, which costs less than \$20. Distributors sold more than 20,000 of them, an attorney for AquaStar said.

CPSC spokesman Scott Wolfson declined to comment on AquaStar's actions. In general, though, he said: "A company is not allowed to take unilateral action that is intended to fix a safety problem with their product without reporting and coordinating that action with the CPSC."

Steven Getzoff, an attorney for AquaStar, said the company's actions have been "perfectly lawful." Notifying distributors was the most efficient way to reach the pool professionals who typically buy the covers and know how to install and remove them without creating an entrapment hazard, Getzoff said.

"We don't want the homeowner going to the bottom of their pool and fiddling with it," Getzoff said. "That's how entrapment happens."

CPSC officials are aware of AquaStar's letter to distributors, he said, and "they've expressed no problem with what we've done." He reiterated this point twice more during the interview but later denied to the Tribune that he had made such assertions.

Getzoff said the CPSC has an ongoing investigation of AquaStar and declined to comment further.

## **Warnings ignored**

To keep most pools sanitary, pumps move water through a filtering system that relies on one or more drains. When a drain cover is broken or missing or if a body covers all the holes on a cover, the pool's pump can act like a supercharged vacuum cleaner that tries to suck the person into the drain with hundreds of pounds of force.

Skilled swimmers have drowned when rescuers were unable to free them from the powerful suction force. Children sitting on drains with missing covers have been disemboweled. Others died when hair tangled in drains tethered them underwater.

From 1999 to 2009, federal regulators received reports of 94 entrapments, including a dozen deaths, in pools, hot tubs and whirlpool tubs. A federal law passed in 2007, after a 7-year-old girl died in a hot tub, requires public pools and spas to install anti-entrapment drain covers certified as having passed safety tests at one of three approved labs.

Since then, more than 1 million of these covers were sold.

Paul Pennington, chairman of the nonprofit Pool Safety Council, said he has sent 73 e-mails to CPSC and standards officials, pleading with them to do something about unsafe drain covers since the new law took effect in December 2008.

"Some child is going to die," Pennington said. His group is largely funded by the makers of devices that shut off a pool's pump when a dangerous vacuum forms, like a circuit breaker turns off power when it senses an overload.

Why did Pennington think the covers were dangerous? As soon as the new drain covers hit the market in 2008, pool owners who had vacuum-release devices complained that their pumps were turning off after they installed the covers. Pennington, who owns a stake in a vacuum-release system company, investigated and concluded that the new covers were allowing the hazardous suction forces they were supposed to prevent.

Pennington said his concerns were ignored by the federal government and by the standards committee that

writes the testing rules for the drain covers. That committee consists mostly of people who work in the pool and spa business.

Eventually, though, complaints from others in industry got the attention of the standards committee chairman and led to more testing of the drain covers.

Labs that test drain covers give them a rating based on the strength of the pump in the pool or spa where they'll be used. A pool's pump circulates water at a certain number of gallons per minute. Public children's wading pools, hot tubs, backyard pools and small motel pools, for instance, typically have pumps that move less than 100 gallons of water per minute, so a drain cover rated at 100 gallons per minute should be safe.

The AquaStar model had a listed flow rating of 100 gallons per minute, based on tests by a lab called IAPMO R&T. But testing by NSF International Engineering Laboratories for the standards committee chairman found it had a flow rating of zero, meaning it wouldn't work safely in any pools or spas, records show.

Committee Chairman Leif Zars, who has been building pools for five decades and sells a different kind of drain cover, e-mailed the test report to the CPSC in March, saying, "I was astonished to see this cover fail time and time again."

NSF, on its own, then conducted additional tests on three more models and found they also had pump-flow rates far below what IAPMO, its competitor, had certified. NSF reported the results on all four models to the American National Standards Institute, which accredits IAPMO as a product certifier, and alleged that there was an imminent threat to the public.

### **A big 'fiasco'**

As a result of those tests, in July the institute sent one of its technical assessors, Zars and three others to witness testing of those four drain covers at IAPMO.

The team found that IAPMO was using improper equipment, including pumps that didn't create the necessary vacuum forces, according to a standards institute report. The lab also tested drain covers as though they were suspended in water rather than mounted to the pool floor where the drain is situated.

While the standard didn't spell this out, Zars said he thought it was "common sense" that a cover to be used on a drain in the floor of a pool should be tested as though it's mounted on the floor. "You have people who are trying to find ways over the fence, through the fence, around the fence, and legally we didn't close that door," he said.

When the tests were modified to address some of these concerns, three of the four drain covers — the two made by AquaStar and one made by Afras Industries — had lower flow ratings than what their labels stated, according to the standards institute report.

The report, sent by the standards institute's technical assessor to the team that witnessed the testing, concluded: "The difference between a safe flow rate and a dangerous flow rate is substantial due to incorrect testing practices. The covers allowed for public use due to the original results could result in serious injuries and or death."

The standards institute now is distancing itself from that report. "Whether or not they're safe is beyond our purview," said Lane Hallenbeck, a vice president at the institute.

He said the document, labeled "Final Report," is not actually the final report, but he declined to release any later version because it is confidential. No such version was sent to the team that witnessed the tests.

In an effort to figure out which drain covers are safe and which aren't, the federal safety commission in September took the rare step of issuing subpoenas to the three testing labs allowed to certify drain covers, demanding not only the results on all drain covers but also how the tests were performed. The CPSC also hired a third lab, Northbrook-based [Underwriters Laboratories](#), to test drain covers but has not made those results public.

Russ Chaney, CEO of the IAPMO Group, said the drain covers his lab certified meet the safety standard and noted that labs could get different results depending on how they interpreted performance requirements. "The standards have to be written as clearly as possible so that the test labs can produce repeatable results," Chaney said.

Gary Duren, a pool safety engineer who was one of the witnesses to the standards institute's tests, said he has raised concerns about the "wiggle room" built into the pool-drain safety standard for years.

"I've seen a lot of fiascos in my days, but this one tops them all," said Duren, who has served as an expert for plaintiffs and defendants in entrapment cases. "Somebody's life is in danger on this. It's just a matter of time."

### **The telltale 'hickey'**

Reza Afshar, president of Afras Industries, dismissed the poor test results on his product as "totally off." He said IAPMO tested his drain cover many times and always found it complies with the law. The product has been on the market 30 years, he said, and has never been involved in an entrapment.

AquaStar attorney Getzoff also said that IAPMO tests show its products comply with the law and that no one has ever been entrapped on any of its drain covers.

But Tim McIntyre said he complained to AquaStar about just such a scenario in 2009. The California father said he decided to check the effectiveness of the new drain covers on his condo association spa that February in Seal Beach, Calif., because he thought the long, flat drain covers from AquaStar didn't look as safe as the old, domed round ones.

So he dipped underwater and placed himself over the drain cover. He got stuck for a moment, and though he was able to roll off, the suction force left bruises in the shape of the drain cover on his trunk. "It shocked the heck out of me," McIntyre said.

The drain cover was one of two AquaStar models that delivered substandard test results.

McIntyre said he complained to an AquaStar executive, who told him, "In order to block our drain, you have to be 500 pounds." Ultimately, the condo association scaled back the power of the spa's pump to address the concerns, said McIntyre, who lets his children use it.

AquaStar's attorney said the drain cover, which is a different model than the one AquaStar stopped selling, worked well because McIntyre was able to roll off it.

"The safety of the drain cover is not to prevent a hickey," Getzoff said. "It's to prevent a serious injury or death by allowing a person to immediately roll himself off the cover and come to the surface of the pool."

Pennington, of the Pool Safety Council, who saw photos of McIntyre's injury in a CPSC report, said it's wrong to minimize bruising from entrapment as a "hickey."

"The children and adults who have died all had similar 'hickey' markings," he said.

### **How to stay safe**

Federal regulators have not completed their investigation of drain covers, so it's not clear which are safe and which aren't. In the meantime, here are some general ways to prevent entrapment in pools and spas:

- Teach children to stay away from drains, pipes and other openings.
- If you see a loose or broken drain cover, leave the water and let the owner know that the pool or spa should be shut until it is fixed.
- If you need to replace a drain cover, hire a professional to do so.
- If your pool or spa is serviced, make sure the drain covers are replaced securely.

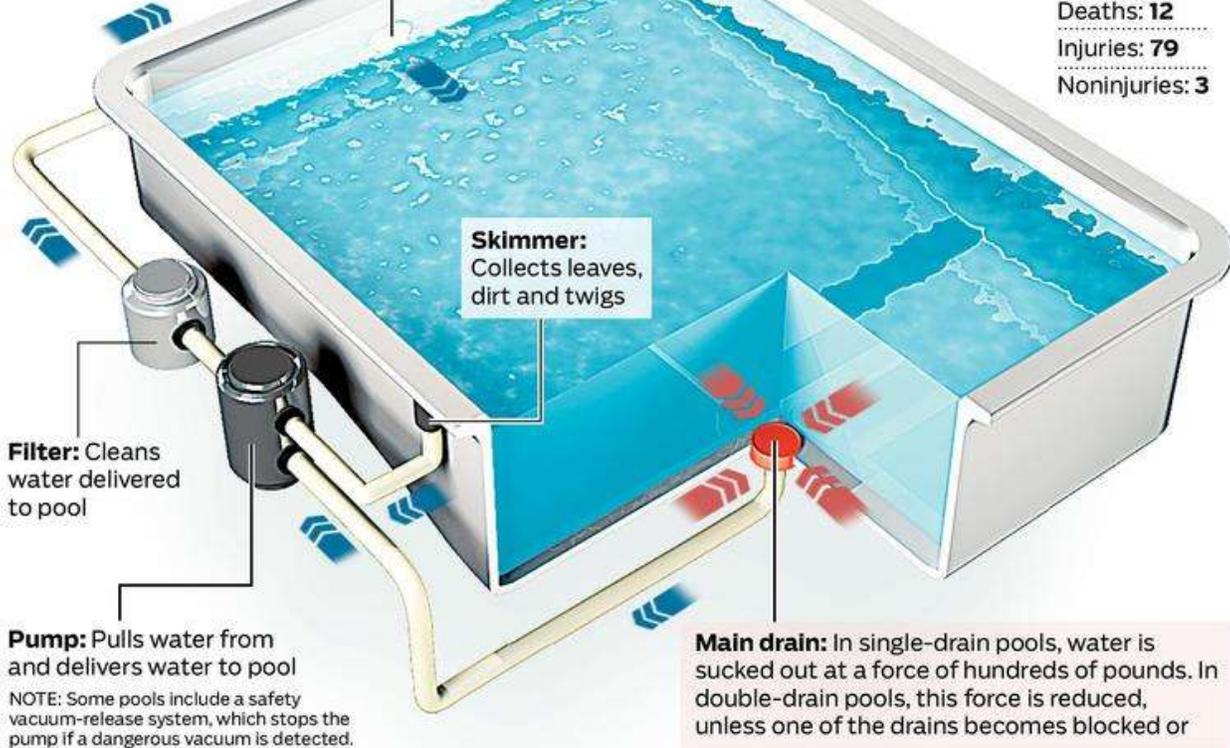
For more tips, go to [poolsafely.gov](http://poolsafely.gov)

## Peril in the water

Depending on factors such as the size of the pool or spa and drain design, a drain can pass hundreds of gallons of water per minute, creating a suction force of hundreds of pounds. A person can become trapped on the drain, unable to break free.

### HOW A SWIMMING POOL'S WATER CIRCULATION SYSTEM WORKS

**Water enters pool through return inlet**



### CIRCULATION-RELATED ENTRAPMENTS

Pools, spas and whirlpool tubs, from 1999-2009, by age



## Testing drain covers

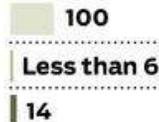
Drain covers are rated by the number of gallons of water that can be pumped through them per minute without creating an entrapment hazard. The three drain covers below were all sold with flow ratings that testing later showed were too high. The manufacturers dispute the results.

■ Listed rating   ■ Rating when tested by competing lab   ■ Rating when retested by original lab using more stringent standards

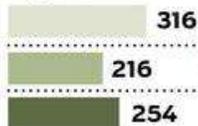
#### AFRAS ABF64\*



#### AQUASTAR LP8AV\*



#### AQUASTAR 32CDFL\*



\*Additional letters or numbers signify color. NOTE: Photos approximately to scale.

SOURCES: The Association of Pool & Spa Professionals, Consumer Product Safety Commission, tests by NSF International Engineering Laboratories, National Standards Institute report of witnessed testing at IAPMO R&T, Tribune reporting

JEMAL R. BRINSON AND ADAM ZOLL/TRIBUNE

