

LAUNCH TIPS

IF THE AIR PUMP LOCKS UP it's because too much water got into the launching tube and the check valve on your pump is not working. Then water leaked into the pump. The check valve is a one-way valve that is supposed to let air go out of the pump, but not go into the pump. It's on all air pumps, near where the hose goes into the pump, but it is usually not accessible for repair. You'll have to unhook the pump from the launcher and pump out the water. To prevent it from happening--short of getting a new pump--is to pump fast so there is little back flow and...

TIP OUT THE WATER IN THE LAUNCHER AFTER EACH USE

IF THERE IS A LEAK AS YOU PRESSURIZE THE BOTTLE you can readjust the zip ties for a better fit. If it's a hot day and you don't mind getting sprayed a little, you don't have to fix a small leak.

To adjust the launcher, loosen the hose clamp so you can slide the taped-together zip ties. You might want to mark on the pipe so you know how much you are moving them. Move them just 1/16" or so at a time, toward the bottom of the launcher to tighten the fit. If you move them too much you won't be able to get the bottle hooked on.

Very rarely, if the bottle has landed on hard pavement, the neck of the spout can crack, causing a leak.

HOW MUCH WATER depends on what you want. You don't have to put any water in the bottle, which might be good on a cold day when you don't want to get wet. It makes a satisfying sonic boom when launched without water. Note, however that the trigger mechanism has to be well adjusted (see above) because air volume leaks out much faster than water.

If you want to get wet, you can fill the bottle up to half full with water. However, if you fill it much more than that it can be dangerous. Too much water displaces the compressed air, which is your stored energy source once the bottle is in the air. And the bottle is heavier, too, so a bottle with too much water might fall on someone before having ejected all its water.

When launching water balloons (see below) I find that a bottle 1/3 full of water works well.

HOW MUCH PRESSURE DO YOU NEED IN THE BOTTLE? Depending on how hard you have the bottle jammed onto the bump, you will likely need 30 or 40 psi of pressure just to get the bottle off of the launcher. And you need that much pressure to eject all the water before the bottle lands. Young kids will need some help getting the pressure high enough.

So how much pressure is too much? I talked to a bottle manufacturer who said they can

guarantee the bottle will not burst up to 100 psi, but that is a new bottle, unscratched and not crushed, not left in the sun for weeks, etc. Although you can see internet videos of people bursting bottles at 168 psi, (<https://youtu.be/o7TuvMw2xyU>) I stick to 70 psi maximum. If you are going to go higher, use a different kind of launcher where you are not so close to the bottle, and wear earplugs!

If your pump does not have a pressure gage, you can unhook the air-pump use a cheap tire gage from an auto parts store to check the pressure. With a typical bicycle tire pump, it gets pretty hard to pump after 70 psi.

WHAT ABOUT FINS ON THE WATER ROCKET? When we taped the Ask This Old House segment about water rockets, I was the overhead launcher construction expert. But the show's producer, Chris Wolf, was the water rocket expert. He made some cool rockets with nose cones and fins, and they soared really high, much higher than the plain old bottles that I launch. Bottles tend to tumble around in the air, creating a huge amount of drag, so they don't go as high. Fins keep the low profile of the nose pointing up, so the rocket goes higher.

But we found that the upside of adding fins to rockets is the downside as well. Unlike a tumbling bottle, they speed down hard and fast enough to possibly lacerate a scalp or break a windshield.

There're ideas on the internet for parachutes and other recovery devices to slow the descent of the rocket, but they're much harder to get to work than anyone thinks heading into it. So if you launch finned rockets, do it in a wide open space with no kids or cars nearby.

LAUNCHING WATER BALLOONS

Water balloons launched from water rockets go as high as finned rockets. Although the dense balloon would sting if it landed on you, it's unlikely that you would need stitches. I have heard of people launching tennis balls, too. The simple modification for the bottle to launch balloons is shown near the end of the video instructions. Of course you still have to launch water balloons in wide open spaces sans young kids. And it goes without saying that launching hard objects like stones could cause severe injury--or even kill someone.