

The Fullbore T-Nozzle

The most common and simplest nozzle for water rockets is the full throat opening of the regular PET (**Polyethylene Terephthalate**) beverage bottle. This makes for simple launchers with an O-ring seal on a stub of 1/2 inch PVC pipe. The water is ejected quite rapidly from the open throat nozzle. When the water is gone, there is a quick burst of the compressed air remaining in the bottle, and the rocket stops accelerating and coasts the rest of the way up. A reduced nozzle opening slows the ejection of the water, decreases the acceleration of the rocket and the amount of drag due to air resistance during burn. Longer burn times can lead to more altitude.

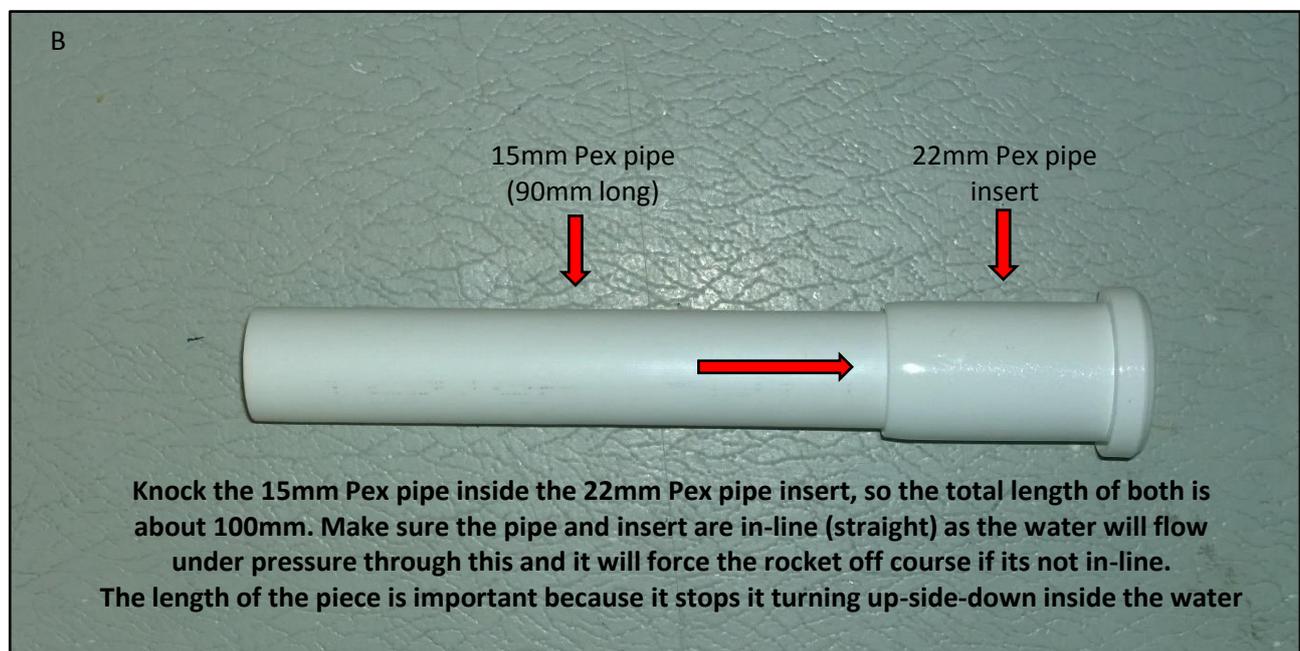
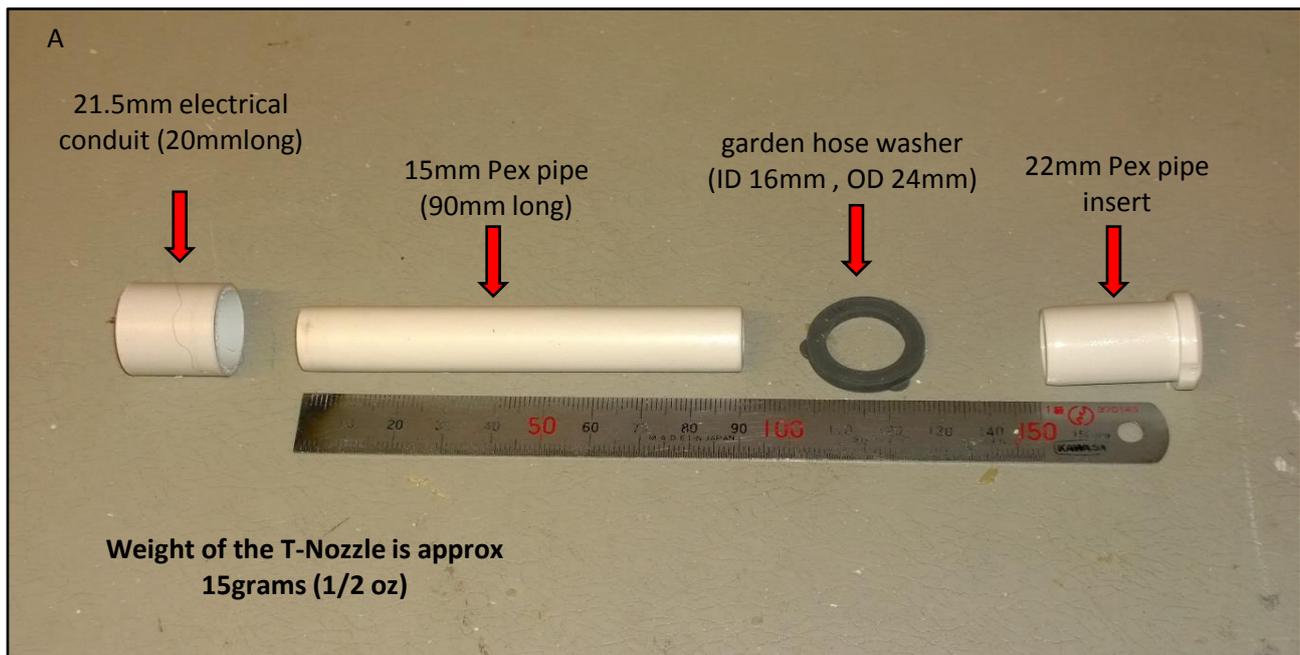
After looking at a few T-Nozzle designs on the internet, I came up with a design which is as simple as possible to build, does the job very well, and very little water is left inside which would add weight. The parts for the T-Nozzle can be found in most DIY stores.

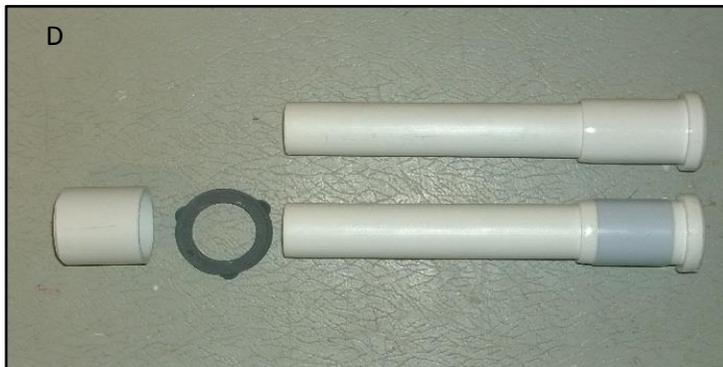
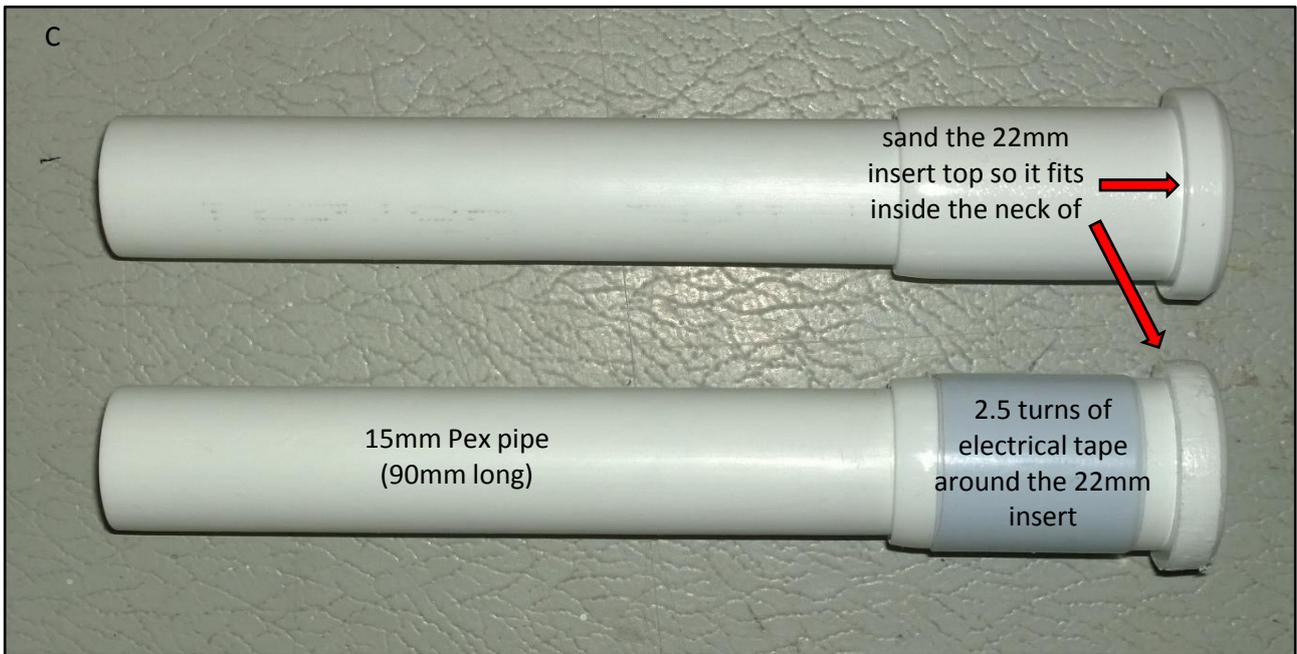
The Fullbore T-Nozzle weight is about 15grams (1/2oz).

This design requires a little bit of sand-papering around the top of the 22mm pipe insert.

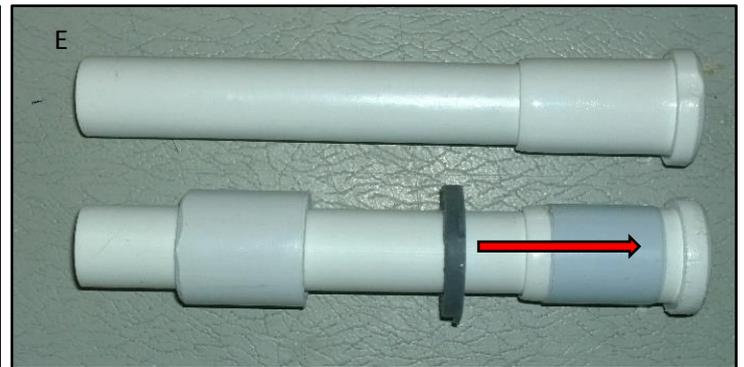
The design I have was inspired by the

SST-Nozzle (SuperSimpleT-nozzle) - link <http://www.zenoamerica.com/waterrocket/SST-nozzle/index.html>

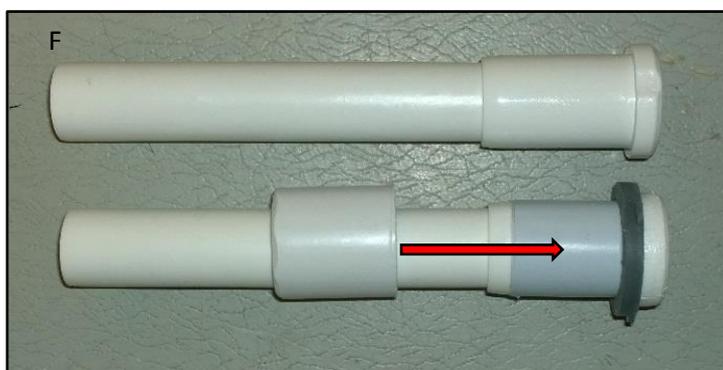




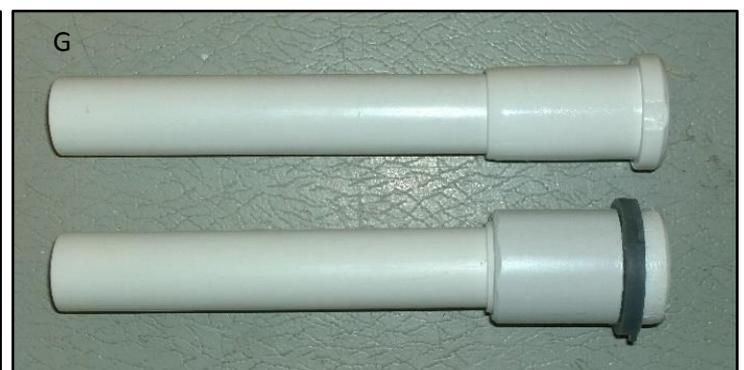
Get the garden washer and the 21.5mm conduit and slide onto the 15mm pex pipe.



Slide the garden washer all the way to the end of the 22mm pipe insert.



Slide the 21.5mm conduit over the electrical tape until it pushes up against the washer.



The completed T-Nozzle outside the water rocket

Tip

If the electrical conduit goes on to the tape and if very difficult to get on then remove some of the tape to approx 2 turns. It won't make any difference to the end result, but it makes a difference if you plan on removing the T-Nozzle without destroying the water rocket to get it out. The conduit is used to centre the T-Nozzle in the neck of the bottle. You can also use electrical grommets or rubber washers instead of the garden washers.

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Hold the T-Nozzle by the 15mm pex pipe, if it falls inside don't worry as it will always drop down when you lift the bottle neck down. Push the washer over the 15mm pex pipe and through the neck of the bottle, (you can use something to help get the washer through like a small screwdriver). Work the washer all the way to the top of the 22mm insert by pulling the washer against the bottle neck or use a piece of conduit.

Slide the 21.5mm electrical conduit (20mm long) along the 15mm pex pipe and push it through the neck of the bottle as you hold on to the pex pipe.



1. Slide the washer down the tube.



2. Push the washer through the bottle neck.



3. Work the washer down the tube.



4. Move the washer over the tape.



5. Keep working the washer to the end.



6. The washer at the end.



7. Put the 20mm long conduit along the 15mm pex pipe.



8. Push the conduit through the bottle neck.



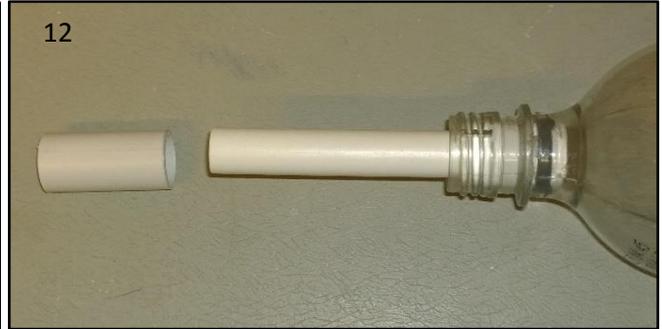
9. Push the conduit over the tape..



10. Use a spare piece of tube to push the conduit to the washer.



11. Remove the spare conduit.



12. Pull the t-nozzle into the bottle neck.



13. Completed T-Nozzle in the bottle.



14. Hanger wire removal tool.