

3D printed Nozzles

Compatible with garden hose connectors



There are different ways to get well working nozzles for water rockets. They can either be built with a tap nut adaptor and a bottle cap, they can be bought online or they can be 3D printed. The main advantage of 3D printing is that the nozzle opening can be adjusted and optimized for your rocket.

Watch out:

Too small nozzle diameters can cause the rocket to fly unstable. Objects, animals and humans could be harmed or damaged. Only use small nozzle diameters in a safe environment (e.g. a test bench).

Materials and components



- **3D printed:** Nozzle
- O-ring sealing $d=9\text{mm}$
- Sealing outer diameter 25mm, inner diameter 16mm
- Hot glue gun

3D printing the components

The components are offered as printable STL files but also as editable and customizable CAD files. You can use the free software FreeCAD to optimize the components for your own needs.

[Download FreeCAD for free](#)



You have to convert the STL files with software (depends on your 3D printer or 3D printing shop) to a printer specific format. It is maybe necessary to rotate and to move the components before printing. You also have to optimize the printing settings so that an optimum print quality is ensured.

The correct operation of a 3D printer requires experience and knowledge of the materials and print settings used. Incorrect print settings can cause damage to the printer and inoperable components. The print process should therefore only be controlled by persons with enough experience. DLR_next and DLR_School_Lab Lampoldshausen/Stuttgart cannot guarantee the functionality of the components, as the 3D printing of the parts cannot be influenced nore controlled. Before usage, detailed tests should always be done in a safe environment.

Assembly and test

After printing, check the quality of the nozzle and remove any unevenness if necessary.



Fill the inner bottom with hot glue and insert the sealing ring. Then screw the nozzle onto a bottle and wait until the hot glue dries. The hot glue residues can now be removed.



Mount the O-ring seal. Always check the nozzle for leaks in a safe environment before use. Go beyond the planned operating pressure during testing. Wear safety goggles and hearing protection.



Important note

All 3D components offered on this site were designed and tested in DLR_School_Lab Lampoldshausen/Stuttgart with the help of Raketfued Rockets. The German Aerospace Center (DLR) is one of Europe's largest and most modern research institutions and offers children and young people an opportunity to discover for themselves the fascinating world of research. After filling in the application form, students and classes can visit the School_Labs, which are located at many DLR sites in Germany, for free. To succeed with the construction of a water rocket, you will have to work very precisely and carefully. Especially some of the adhesives are pretty dangerous. Thus, please wear gloves when working with adhesive or epoxy and don't breathe in the gases. It is recommended to work outside whenever toxic gases could develop. The launch of a water rocket may need permission from the competent authority, depending on your location. You need the permission of the landowner if you launch on foreign territory. Please wear safety goggles when pressure testing or launching your rocket. Keep a safe distance to the pressurized rocket. We can not guarantee the accuracy, completeness or feasibility of any of our tutorials. We are not responsible for any damage or harm on objects, animals or humans. We do not guarantee that the information provided on this web site is complete, accurate and always current. This applies also to all links cited on this website points, either directly or indirectly. We are not responsible for any damage or harm to objects or individuals.