Can you 3D print a garden hose adapter?

Asked 3D Content Team
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Abstract. Yes. Copy the 3/4-11.5 NH garden hose thread, not 3/4 in NPT, let a rubber washer seal a flat face, and print PETG or ASA upright with four or more walls.

Keywords: watertight, threads-and-fasteners, petg

Table 1. Garden hose thread against pipe thread

Thread	Threads per inch	Male thread diameter	Taper	What seals it	Source
Garden hose thread (GHT), 3/4-11.5 NH (National Hose)	11.5	1-1/16 in (27 mm)	None	A rubber or plastic washer in the female end	ASME B1.20.7, via Wikipedia and Ring & Plug Thread Gages
3/4 in NPT (National Pipe Taper)	14	1.043 in (26.49 mm)	1° 47′	The threads, with sealant	Swagelok
3/4 in NPSM (National Pipe Straight Mechanical)	14	1.029 in (26.14 mm)	None	A 30° cone seat	Swagelok

1 Can you 3D print a garden hose adapter?

Yes, with conditions. Copy the US garden hose thread, 3/4-11.5 NH: 11.5 threads per inch and about 1-1/16 in across. It does not mate with 3/4 in NPT pipe thread. A rubber washer pressed on a flat face seals the joint. Print PETG or ASA upright with four or more walls, then pressure-test it at the spigot.

1.1 Garden hose thread against pipe thread

The hose row is the thread ASME B1.20.7 defines, with the pitch from Ring & Plug Thread Gages and the diameter from Wikipedia's garden hose entry. The pipe rows come from Swagelok's Thread and End Connection Identification Guide.

The "3/4" in the hose name is the hose size, not the thread diameter. Ring & Plug Thread Gages notes that 1/2, 5/8 and 3/4 in garden hose all share one thread at 11.5 per inch. The three diameters differ by less than 1 mm, so tell them apart by pitch: Swagelok's method is calipers for the diameter and a pitch gauge for the threads per inch.

If the other end of your adapter is NPT, that end does seal on its threads. MarineLab3D's rule for printed NPT is 3 to 5 wraps of PTFE (polytetrafluoroethylene) tape, then snug plus a quarter turn. Tape wedges the taper apart, and "plastic will split long before brass does".

1.2 Why the washer seals and the thread does not

Garden hose thread is straight, so it only clamps. Wikipedia's garden hose entry says the threads "are not tapered and are not used to create a seal". A washer in the female end does that job, squeezed by the male end face. MarineLab3D says the same of any parallel thread, and adds that PTFE tape on one "does very little except take up slack".

That decides what the print has to get right:

- **Printing a female end** (it screws onto a spigot or a hose's male end): give the washer a flat floor at the bottom of the thread and a recess that keeps it in place. The federal coupling description, A-A-59614A, requires that the washer "not fall out of the coupling" when the halves come apart.
- **Printing a male end** (a hose screws onto it): your end face is the sealing surface. Keep it flat and unbroken.

Either face has to be smooth. The same federal description asks metal couplings for gasket surfaces of 125 microinch RMS (root mean square) or smoother. Printed upright, the sealing face comes out as a flat top or bottom layer, and MarineLab3D notes that this keeps the seam off the sealing surfaces. If that face is the bottom, print it on a smooth plate: in MarineLab3D's words on printed gaskets, a textured plate "leaves a texture that will weep".

1.3 Print settings for a hose fitting

- **Material.** PETG (glycol-modified PET) or ASA (acrylonitrile styrene acrylate). The Prusa Knowledge Base calls ASA suitable outdoors for its "high UV light and temperature resistance", and PETG fit for most exterior use below 80 °C (176 °F). MarineLab3D finds that PETG seals better than ASA but suggests ASA for parts that sit in the sun. Skip PLA (polylactic acid): Prusa calls it unsuitable for outdoor use, degraded by UV and soft above 60 °C (140 °F).
- **Orientation.** Hose axis vertical. Snapmaker notes that threads printed lying down come out oval. MarineLab3D adds that upright puts the hoop stress (the pressure load running around the wall) along the layers' strong direction.
- **Walls.** Four to five perimeters, per MarineLab3D, which finds that infill does almost nothing for sealing. In Prusa

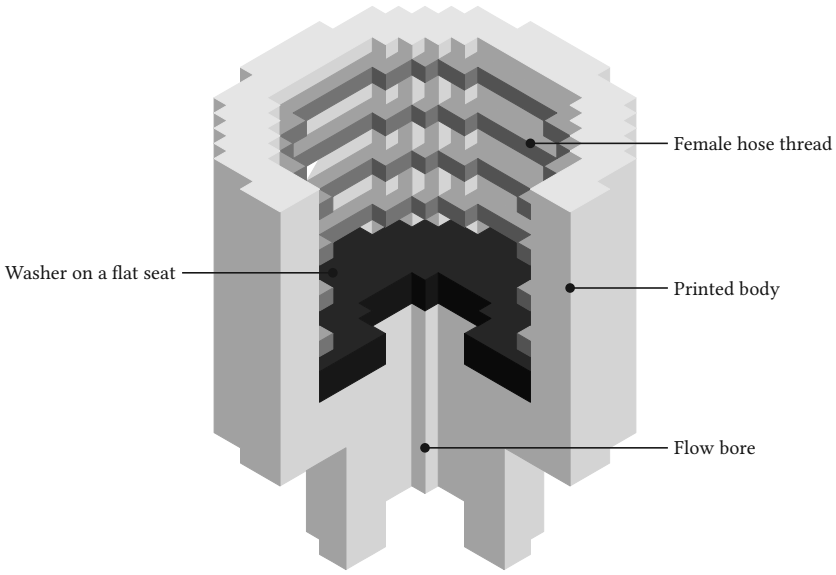


Figure 1. The washer sits on a flat seat at the bottom of the thread, so the mating end face squeezes the washer while the thread only clamps.

Research's leak tests, PETG needed at least four perimeters to hold water and ASA two. The per-material counts are on the perimeter page.

- **Layers and seam.** Layers of 0.12 to 0.16 mm (MarineLab3D, Snapmaker). Turn on a scarf seam if your slicer has one: MarineLab3D says ramping each layer's start and end closes the channel a hard seam leaves.

1.4 How much pressure it has to hold

The Portland Water Bureau, for example, keeps most homes between 40 and 80 psi. It notes that plumbing code requires a pressure-reducing valve above 80 psi. With the nozzle shut or a cap on, the adapter carries that full pressure. Federal buyers ask a metal garden hose coupling to hold 100 psi for one minute without a leak (A-A-59614/1), while a printed adapter has no rating at all: your own test is the rating.

MarineLab3D finds a 2 to 3 mm PETG wall far stronger than needed at 2 to 3 bar (29 to 44 psi). Above about 4 bar (58 psi), it brushes a thin coat of epoxy inside the part, so a home above 58 psi calls for that coat. Uncoated prints have let water in at higher pressure: the pressure page has the published results, and the epoxy page covers the coat.

1.5 What about a 3D printed water hose?

Print the ends and buy the hose. The settings above are for rigid parts: fittings, caps and nozzles. No source here reports a printed flexible hose holding tap pressure, and Rain Bird rates its rubber garden hose at 125 psi working pressure and 500 psi burst.

1.6 How to check it at the spigot

1. Spin it on by hand before any water runs. If it binds early, count the threads over one inch: 11.5 is hose thread, 14 is 3/4 in pipe thread.
2. Fit a new washer and press it firmly into the female end, as Rain Bird's instructions direct. Tighten by hand. The washer seals, so extra torque only loads the printed thread.
3. Cap the outlet or close the nozzle so the adapter sees full static pressure. Work over a bucket or dry pavement, then open the spigot fully.
4. Wrap a dry paper towel around the body and watch the joint. Hold pressure for at least one minute (the federal coupling test's hold time), then recheck after your first real use.
5. Read the result. A drip at the joint points at the washer or the sealing face: fit a fresh washer and check the face is flat. A damp towel on the body points at too few walls or the seam: reprint with more walls or coat the bore. The slower fill-and-wait test is on the leak test page.
6. Close the spigot when you finish. Rain Bird tells owners not to leave its hose under pressure when not in use, and a printed fitting deserves the same care: never leave one pressurized unattended.

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