

How to unblock a nozzle

How do I diagnose a blocked nozzle?

A blocked nozzle is easily diagnosed by attempting a manual purge. This involves pushing the filament through the nozzle with a pair of pliers while the nozzle is at temperature. If the nozzle is blocked the nozzle may purge for a few seconds, and then cease, despite continued downward pressure from the filament.

What is a blocked nozzle?

A blocked nozzle is a nozzle which cannot extrude because of a blockage at the orifice. This is usually caused by a foreign entity which has been dragged into the nozzle. If the entity is larger than the diameter of the orifice and has a higher melting point than the nozzle temperature, it will not purge and will subsequently prevent any flow of plastic through the nozzle.

How do I unblock the nozzle?

Correct method:

- Remove the nozzle from the extruder, but keep it wired in.
- Hold the nozzle on one of the stand offs with a pair of pliers, and bring the nozzle up to melting temperature.



ESSENTIAL WARNING: wear heat-proof gloves to prevent burning during nozzle handling.

- Using a $\varnothing 3$ mm drill bit, cautiously dig out the plastic inside the nozzle from the back of the nozzle. You may need to remove the PTFE tube from the nozzle. This will drag out any blocking entities. Do not turn the bit excessively inside the nozzle as this may damage the inner nozzle surfaces.

False method: Nozzles can be *temporarily* unblocked while the nozzle is still attached to the extruder by poking a drill bit of the same diameter up the orifice and into the nozzle. However, all this does is temporarily dislodge the blocking entity, pushing it back up into the melt zone. Then, when the extruder is started again, the nozzle will purge briefly but the flow will move the entity back over the orifice, re-blocking the nozzle. Occasionally the user may be fortunate enough to re-orientate the entity in such a way that it can flow through the orifice, however, this is rare (requires a blocking entity of specific proportions) and entirely lucky (it is impossible to gauge manipulation of the entity).

How do I prevent my nozzle from blocking?

Blocked nozzles are rare, but when they do block it can be time-consuming to clear the blockage. Therefore, prevention is better than the cure. It is good practice to follow the procedures below:

- If swapping from a high melting point material to a low melting point material: run the new low-material at the previous material's melting temperature for a short time. This will make sure the nozzle is completely purged of any old high-melting point material before running with the new, lower melting point material. Any material present with a higher melting point has the potential to freeze during operation and block the nozzle.
- Ensure you are running your machine in a clean environment. Make sure particulate contaminants (e.g. swarf, particles from the ceiling etc) are kept away from the extruder head and filament reel.
- Ensure filament is properly dressed before inserting down into the PTFE tube in the hot end (i.e. the end of the filament is properly rounded so as to eliminate a sharp which can cut a sliver of PTFE en-route which would form a blocking entity). See [here](#) for graphic instructions.