

Maintenance

Maintenance of 3D printers

- [Which lube to use](#)
- [What and how to lubricate?](#)
- [WIP: Belts tensioning](#)

Which lube to use

In short, **Synthetic Greases with PTFE**, especially good ones are Super Lube [21014](#), [SL21030](#) and [41150](#). They are all the same, just different bottle sizes. SuperLube also sell ~200kg (~440lbs) drums, 1ml (1cc) packets and everything in-between

If using carbon-fiber rods, then lubrication is different. Generally speaking rods themselves won't need lubrication, just cleaning. Lineral bearings need lubrication tho. Wear on carbon fiber rods happens mostly because of rusty or chipped bearing, which smashes parts out from CF rods. It's safe to use syntethic greases, but should avoid petroleum and mineral oils, since they aren't compatible with resins used to bind carbon-fibers together

Synthetic lubricants

- **Properties:** Excellent temperature stability, resistance to degradation, superior performance at extreme temperatures (~200C and above). Does not get crusty or gummy over time
- **Uses:** Automotive engines and high-performance applications
- **Ideal For:** Situations requiring durable, high-performance lubrication under varying conditions

Synthetic greases with PTFE

- **Properties:** Low friction (due to PTFE), stable across a wide temperature range. Does not get crusty or gummy over time
- **Uses:** Precision instruments, bearings in high-performance and high-temperature applications
- **Ideal For:** Applications where minimal friction and wear are critical

Silicone-based greases

- **Properties:** Excellent thermal stability, non-reactive, good plastic and rubber compatibility. Does get crusty and gummy over time, especially with temperature fluctuations
- **Uses:** Electrical insulations, plumbing, automotive components, food-grade applications
- **Ideal For:** Moisture-rich environments and applications requiring material compatibility

Lithium-based Greases

- **Properties:** Good temperature tolerance. Will get crusty and gummy overtime. Especially with high temperature fluctuations. Will damage carbon-fiber rods over-time
- **Uses:** Automotive, industrial heavy-duty bearings
- **Ideal For:** General-purpose, heavy-load applications, especially where moisture is present

Dry lubricants

- **Properties:** Do not attract dust or dirt, function well under high temperatures, up to 1100°C (2012°F). Get crusty when overapplied, doesn't reduce friction nor protect as good as liquid ones
- **Uses:** Locks, hinges, super-high-temperature environments
- **Ideal For:** Situations where cleanliness is crucial and temperature is too high for liquid alternatives

Sewing machine oil

- **Properties:** Fluid at low temperatures, need to be applied often (daily). Can't take temperatures above 100°C. Will get gummy over time, especially with temperature changes
- **Uses:** Small bearings, household tools, precision instruments, not ideal for carbon-fiber parts - petroleum based. Shouldn't be too bad, since it's so light with refined nature, but still not recommended
- **Ideal For:** General-purpose lubrication at room temperature

What and how to lubricate?

3D printer has several moving parts. Main things are toolhead and bed. Toolhead moves in X and Y directions, bed moves in Z direction

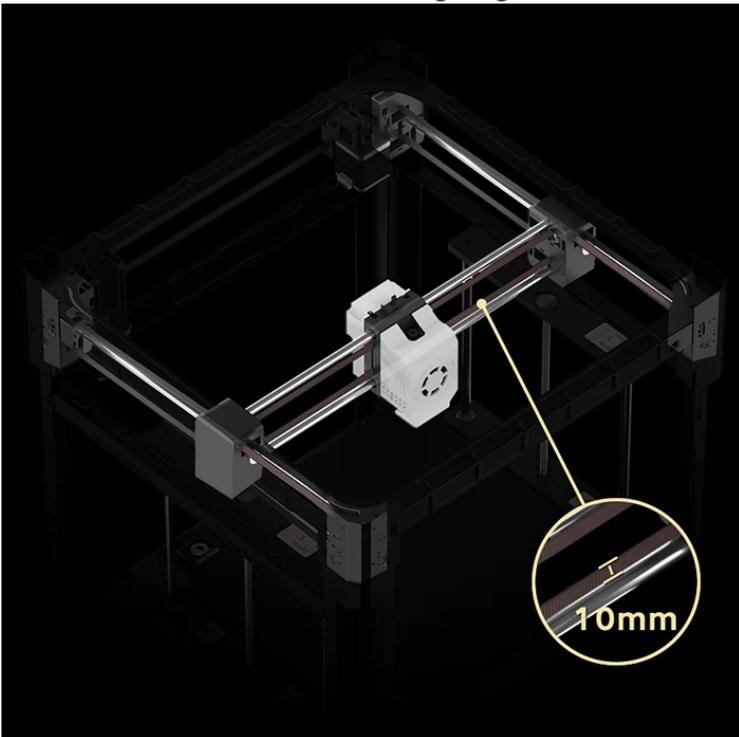
Cleaning and greasing rods should be done every month on heavy usage or at least once per three months

Also read: [Which lube to use?](#)

X-Max 3 and X-Plus 3

X and Y axis

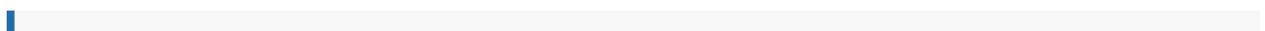
X-Y rods are steel beams, two going across the bed and one on each side



(Picture from Qidi marketing materials)

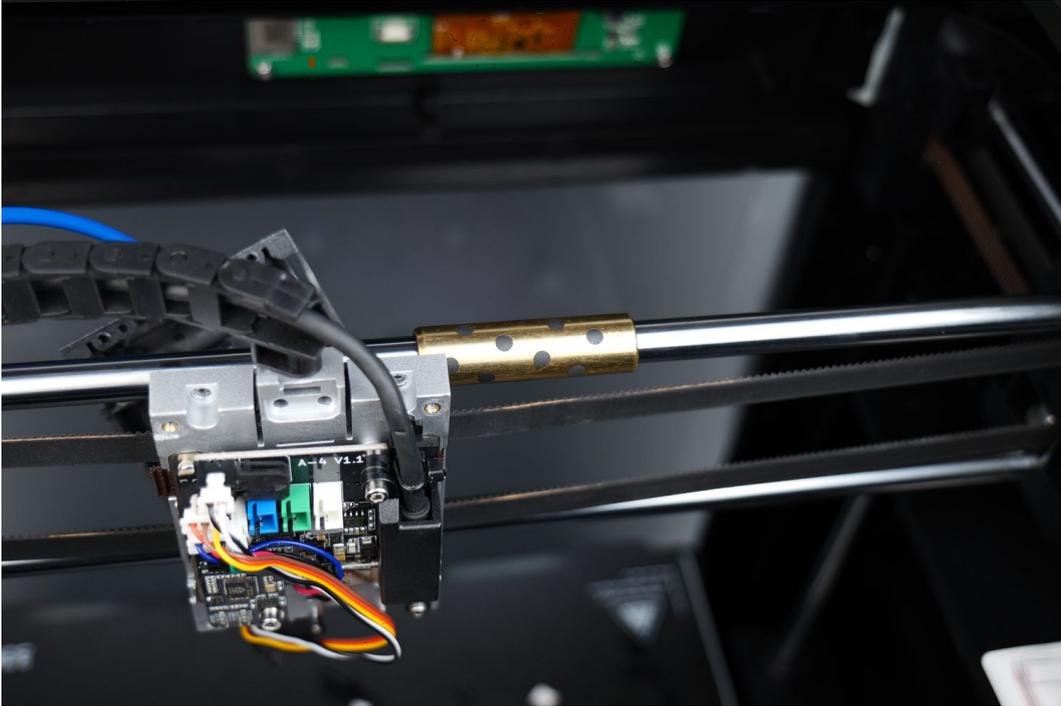
X-Max 3 and X-Plus 3 use two kinds of different bearings. On Y axis, on both sides of bed, they have LMU10UU bearings (regular ones basically). On X axis (across the bed) they have [graphite impregnated bushings](#), which are self-lubricating. Make sure to use pure full synthetic oils or full synthetic with PTFE (even better). Using different oil types `_MIGHT_` cause graphite to glog up

Qidi official support response on lubricating X axis:



Our graphite bushings also need to be lubricated.

We recommend lubricating the x-axis with this. <https://www.super-lube.com/multi-purpose-synthetic-grease-with-syncolon-ptfe-21014>



(Graphite impregnated bushings, picture by <https://3dprintbeginner.com/qidi-x-max-3-review/>)

To lubricate rods on the side of bed, move toolhead to one corner, clean rods with soft cloth - to remove all dust and particles. Move toolhead to another corner and re-wipe all

Apply grease on cloth or rods and spread it across them. Move toolhead to other corner and re-do the process

It's important to not apply too much lubricant, since it will have the opposite effect - it makes printer movements harder and will start to accumulate dust and particles

After lubing move toolhead from corner-to-corner several times, to ensure grease is spread evenly across the rods and inner bearings

Z axis

Z axis has two leadscrews and four linear rods with LMU10UU bearings. They require periodic maintenance (1-3months). Workflow is the same as Y axis: move bed down, clean the rods with soft cloth of old grease and dust. Move bed up, clean part that was inaccessible before. Apply grease sparingly to rods and leadscrews on both side of bed. Try to spread the grease while applying it with fingers, cloth or tip of the grease container. Don't overdo it, since too much grease will start to accumulate dust and particles

After applying grease move bed up and down several times, to make sure grease is spread out evenly



(Rods and leadscrew on one side. Picture by <https://drucktipps3d.de/qidi-x-max-3-testbericht/>)

X-Smart 3

X and Y axis

X axis carbon rods don't require any lubrication. They just need to be cleaned from dust every some weeks. That can be done with soft cloth. If you really want to lube, make sure you use **synthetic PTFE** lube.

Petroleum and mineral based lubes will react with carbon-fiber bonding material and damage the rods!

Y axis works the same as all other X-3 series printers:

- Move toolhead to one corner
- Clean rods with soft cloth of dust, debry and old grease
- Move toolhead to other corner and re-clean with cloth
- Apply grease to rods on both side of bed, trying to apply it evenly on the rods
- Move toolhead back to first corner
- Apply grease to previously inaccessible parts

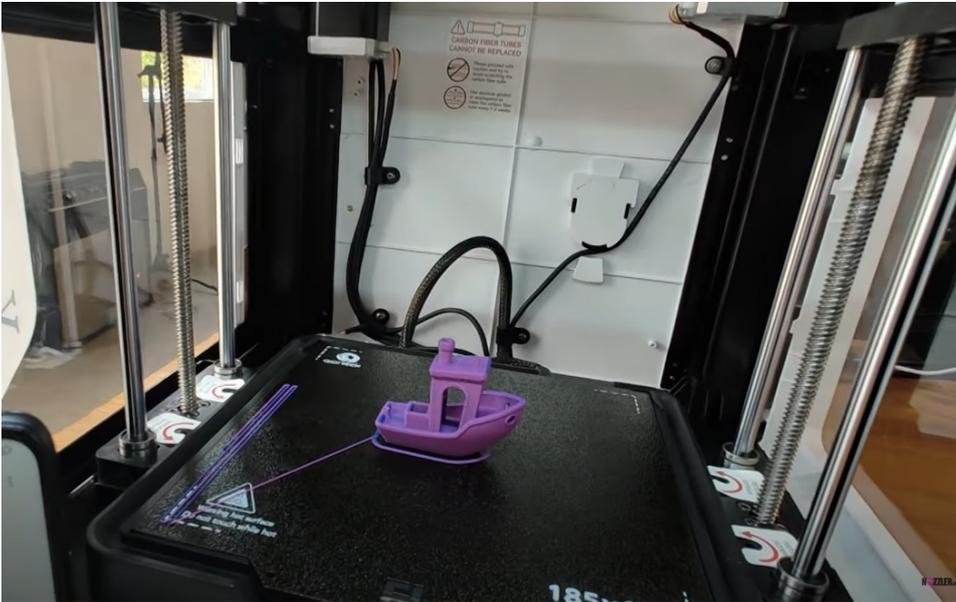
Try to apply grease evenly on the rod, by evening it out with finger, cloth or tip of the grease container

Don't apply too much grease, as it will have opposite effect - increasing friction, will accomulate dust and debry

Move toolhead from corner to corner several times, to even out grease on the rods and in the bearings

Z axis

Works the same as other X-3 series printers. On both side of the bed there are two rods and leadscrew



(Picture from Nozzler [Youtube video](#))

To lube them, same technique is used as for everything else. Move bed to one max, clean rods and leadscrew with soft cloth from dust, debris and old grease. Move bed to other max and clean part that was inaccessible before. Apply thin layer of grease across the rods and leadscrews. Move bed to other max again to grease part that was blocked by bed

Don't apply too much grease, as it will have opposite effect - increasing friction, will accumulate dust and debris

Move bed several times up and down to ensure grease is applied evenly across the rods and bearings

WIP: Belts tensioning

There's cool tool that helps with tensioning: <https://github.com/Frix-x/klippain-shaketune>

> **McSneaky:**

> Got it working following their tutorial? Or had to hack on something?

> **MickNugget:**

> Just a little, basically search all it's files for `printer_data/config` and replace it with `klipper_config`, I had an extra (broken) `plot_graph` macro that I needed to remove, other then that it works fine (edited)