



# Extruder steps per mm

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$$\text{E-Steps-per-MM} = \frac{\text{Motor Steps} * \text{Micro-stepping} * \text{Gear Ratio}}{(\text{Hobb Diameter} * \pi)}$$

- Standard motor steps / rev = 400
- Standard micro-stepping = 16x
- Gear Ratio = 3
- Hobb Diameter (Effective) = 7.3

$$400 * 16 * 3 / (7.3 * 3.142) = \mathbf{837 \text{ E-steps-per-mm}}$$

(For the motor sold with the Titan)

## Step 1 — Starting Value

$$\text{E-Steps-per-MM} = \frac{\text{Motor Steps} * \text{Micro-stepping} * \text{Gear Ratio}}{(\text{Hobb Diameter} * \pi)}$$

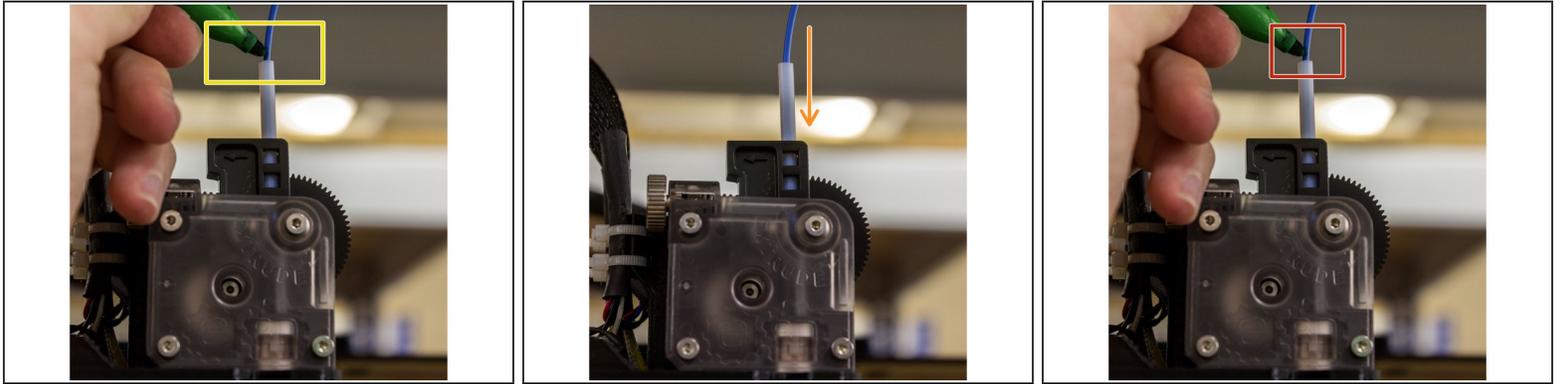
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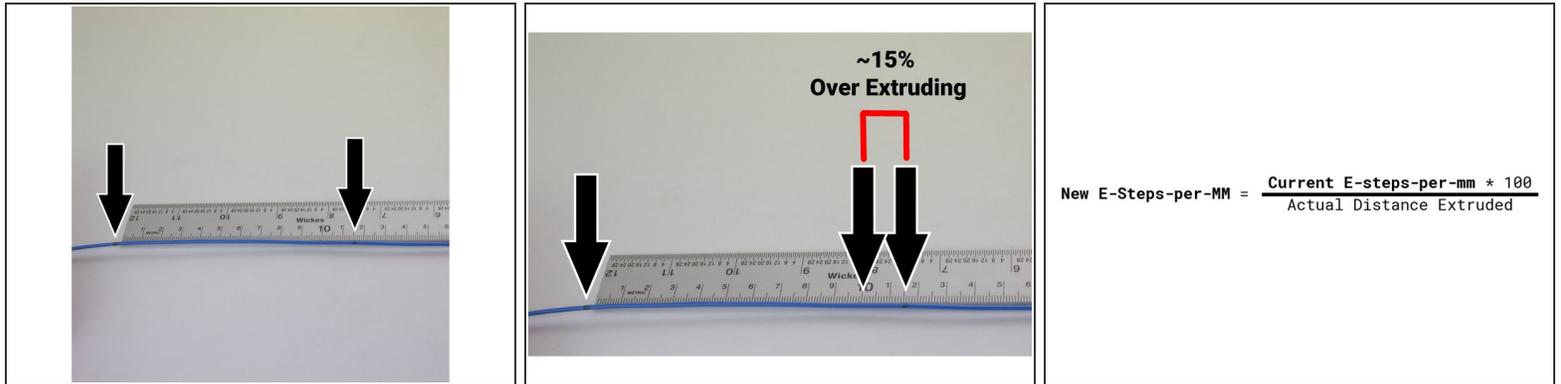
- For the Titan, Titan Aero and Titan Aqua 837 Steps-per-mm should be the starting value for the extruder calibration. This is based on using a 0.9 degree stepper motor, x 16 micro stepping, and a hobb diameter of 7.3mm.
- For more information about calculating the theoretical value for the esteps per mm please read the relevant firmware guide: [Titan Firmware Guides](#)

## Step 2



- ① To get a more exact value for your E-steps-per-mm, measure the exact amount of filament that is pushed out of your extruder.
  - Load filament into your extruder, just until it is gripped by the drive shaft (you can't pull it out without moving the large gear turning)
  - Mark your filament at the top of the idler arm or PTFE tubing with a pen or permanent marker .
  - Tell your printer to extrude 100mm of filament. Use your printer's LCD screen, or send it: `G92 E0`, then `G1 E100` via your printer control software.
- ① You may need to heat your HotEnd before your printer allows you to extrude filament. You can use `M302` command to get around that.
  - Mark your filament again at the top of your idler arm or PTFE tubing
  - Eject your filament.

### Step 3



- With a ruler or calipers, measure the distance between the two marks on your filament.
- If the distance wasn't exactly 100mm, use a proportion to calculate a more precise E-steps-per-mm value.
- $\text{New Esteps} = \text{Current Esteps} \times 100 / \text{Actual Distance Extruded}$ .
- Enter that new value into your firmware or EEPROM as you did before.

### Step 4



- Upload the new value to the firmware as you normally would. Typically this means plugging in your printer to your computer, selecting the correct COM port and board type, and pressing the upload button.
- If you're unsure of how to update your printer's firmware, check with its manufacturer.