

3D printing ETPU/TPU/TPE



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Tricks & Tips

Flexible materials do not need to be very difficult to print and perhaps your printer can print them without modifications but some things needs to be considered.

- Start slow and ramp up the speed to check the limits of your printer.
- Direct drive feeding is much easier than Bowden feeding (ETPU 95-250 has successfully been used in a Bowden extruder but it is not recommended).
- Lubricate the filament/tube to get smoother feeding: the use of something like this is good <http://www.thingiverse.com/thing:492067>
- Softer materials -> slower speed; Harder materials -> higher speeds.
- A good feeding of material - low friction all the way to the melt-zone (or else the print will be uneven), PTFE lining is preferred.
- A good extruder feeding mechanism that keeps the pressure on the softer filament (spring loaded is good).
- A good PTFE lined support directly under the feeder wheel so that the filament cannot escape.
- Nozzle diameter matters: smaller gives more counter pressure, thus slower speeds. Bigger gives a better bond between the layers and makes for higher speeds. I personally use 0.7mm nozzle to get good speeds (to prevent the counter pressure from building up) but at slower speeds it's totally fine with 0.4mm.
- Different soft material filaments will behave differently (for instance ETPU 95-250 will not give much problem with "spider webbing" compared with non conductive versions), play with the retraction settings.
- Be careful with what print table surface you use, if unlucky the material can bond so hard that it is impossible to separate, like ETPU on PS white plastic or TPU on Kapton-tape (I personally use blue tape, glass or PVA-gluue right now).

ETPU has a nice matte surface (due to the carbon black) and if the fact that it is conductive is not an issue it will make some really nice looking parts even if the conductivity is not a main feature for that part. This material gives few problems with "webbing" and the stretch is only 250% which helps if you use it for traction belts etc.

The normal TPU/TPE materials are more glossy and stretchy and will have more "spider webbing" issues.

ETPU/TPU/TPE will for sure not destroy your extruder but it is very sticky and will build up over time and potentially clog the nozzle at higher temperatures (recommended print temp is 200-230 deg C) so it's a good idea to clean the nozzle occasionally with other material filaments (the carbon black takes some time to clean out before the next material is clean in color). If you get a failed print so that ETPU smudges the outside of the nozzle and heating block you might get a conductive bridge over the temp sensor and that will need to be cleaned up before next print obviously.

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Softness/flexibility

- SHORE 85A
- SHORE 90A
- SHORE 95A
- SHORE 60D
- SHORE 64D

Higher SHORE value means less flexibility. The above list describes increasing hardness. Harder filaments (less flexible) are easier to 3D print with compared to softer, more flexible filaments.

3D Printer Compatibility List (Recommendation by [Creative Tools AB](#))

3D Printer Model	ETPU/TPU/TPE
3DFactories - EASY3DMAKER	✓
3DFactories - PROF13DMAKER	✓
be3D - DeeGreen	✓
BEEVERYCREATIVE - BEETHEFIRST	✗
FELIXrobotics - FELIX 3.0	✓
Flashforge - Dreamer	✓
Magicfirm - ZYYX 3D-printer	✓
MakerBot - Replicator Dual	✓
MakerBot - Replicator 2	✓
MakerBot - Replicator 2X	✓
MakerBot - Replicator Desktop	✗
MakerBot - Replicator Mini	✗
MakerBot - Replicator Z18	✗
Printrbot - Simple Metal	✓
RepRapPro - Ormerod 2	✓
RepRapPro Huxley	✓
RepRapPro Mono Mendel	✓
RepRapPro Tricolour Mendel	✓
Robo3D	✗
Ultimaker - Ultimaker 2 (3.0 mm filament)	✗
Velleman - K8400	✗
Velleman - K8200 (3.0 mm filament)	✗
WANHAO - Duplicator i3	✗
WANHAO - Duplicator 4S	✓
WANHAO - Duplicator 5S	✓
ZMorph - 3D-Printer 2.0 S	✓
Zortrax - M200	✗

Thanks for your interest in my materials and good luck with your projects

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