

TPU98A_{@df}

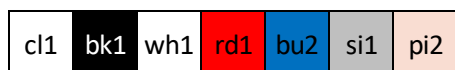
TPU98A_{@df} is a specifically formulated flexible filament for easy & high speed printing on both direct and Bowden style 3D printers. TPU98A_{@df} features an exceptionally high heat resistance (138°C) and can be stretched as far as 450% before reaching its breaking point. TPU98A_{@df} does not require the use of a heated bed and can even be printed straight onto (clean) glass. TPU98A_{@df} is the flexible filament for (semi)professional users who do not want to compromise and require a high mechanical flexible filament that prints easily. TPU98_{@df} is an extremely usable flex-filament with a wide variety of different applications such as Orthopedic insoles, Prosthetics, Vibration dampers and much more.

Features:

- Strong & Flexible
- Works on Direct & Bowden style 3D printers
- Printable at speeds of >75mm/s
- Exceptionally high softening point of 138°C
- 450% elongation at break
- FDA / FCA & water contact acceptable
- Resistance to oils, greases & microorganisms
- Easily print watertight objects

Colours:

TPU98A_{@df} is available from stock in 7 colours.



Packaging:

TPU98A_{@df} is available in nearly any type of packaging and labelling. Ask our team to help you customizing your product.

Filament specs.

Size	∅ tolerance	Roundness
1,75mm	± 0,05mm	≥ 95%
2,85mm	± 0,10mm	≥ 95%

Material properties

Description	Testmethod	Typical value
Specific gravity	ISO 1183	1,16 g/cc
Tensile strength at yield	ISO 527 1/2	50 Mpa
Elongation at break	ISO 527 1/2	450%
Tensile modulus	ISO 527	150 MPa
Impact strength - Charpy notched 23°C	ISO 179	NB
Shore A Hardness	ISO 7619-1	98A
Printing temp.	DF	225-250°C
Melting temp.		220°C ± 10°C
Glass transition (Tg)	DSC	-16°C
Vicat softening temperature	ASTM D 1525	138°C

Additional info:

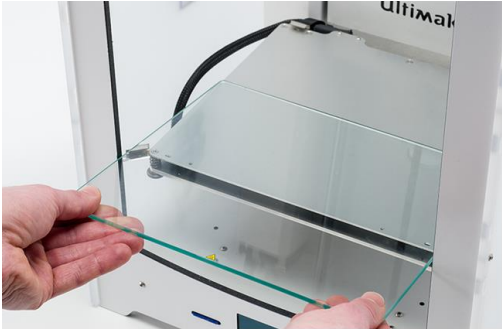
TPU98A_{@df} does not require a heated bed to stick well though you can set it to 0-60c for extra reassurance. TPU98A_{@df} works superb with a direct drive feeder, or newer types of Bowden FDM or FFF technology 3D printers. By changing the infill / amount of walls you can create the perception of a higher / lower shore than 98A.

Storage: Cool and dry (15-25°C) and away from UV light. This enhances the shelf life significantly.

How to print with TPU98A flexible filament:

When compared to rigid materials, flexible materials are often more difficult to print. Even though we took great care of making one of the most easily printable flex filaments it is still recommended to read this datasheet in order to better familiarize yourself with the do's and don'ts of flexible 3D printing.

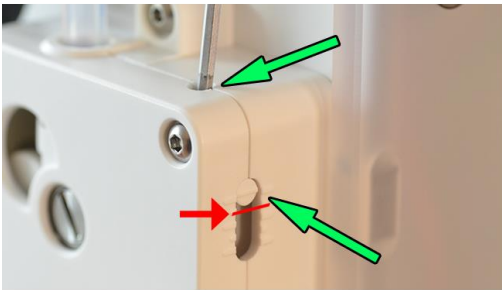
Several factors are extra important for flexible filaments and need to be considered when printing;



Make sure you have a clean glass plate (free of any oils / greases)



Prepare your plate for the perfect 1st layer / following your 3D printers bed calibration method (make sure to do it properly and maybe even 2 times)



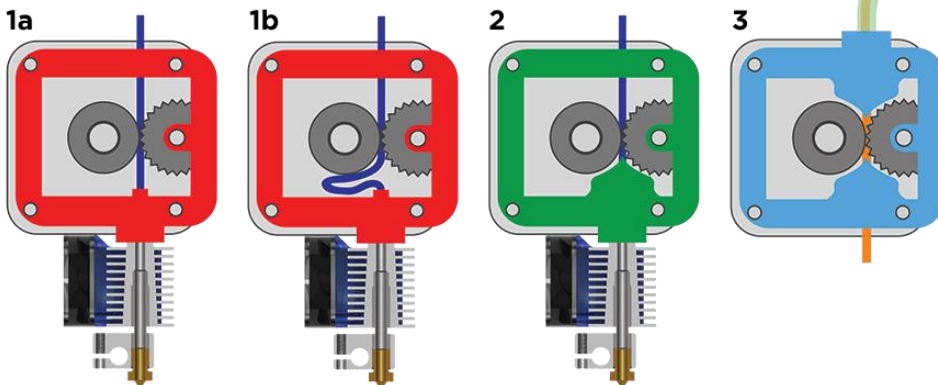
Take care of your tension settings (if possible). This is one of the most important steps for being successful with flexible filament. (We recommend the above setting for UM2+ printers)



Check your PTFE (if your printer has this in the hotend) for problems. (Brown / Crunchy = bad)

Design of the feeder & hotend:

Several types of hotends and feeders are available on the market. We will focus on the below mentioned 3 types.



- 1a. Extruder assembly with incomplete filament guidance to the hotend.
- 1b. Improper filament guidance can lead to feeding issues before reaching the hotend.
2. Example of proper filament guidance on a Direct drive 3D printer (eg; ZYYX+, Dremel etc.)*
3. Example of proper filament guidance on a Bowden drive 3D printer (eg.: Ultimaker 2+/3)



* These type of printers often have a springloaded feeder design which helps tremendously with flex printing!

Dutch Filaments recommends to stay away from the 1a/1b setup if at all possible in order to avoid printing issues. That does not mean that it is impossible to print with this setup though in practice this means you will have to print slow (30 – 40 mm/s) and will have to spend a decent amount of time on tweaking your print settings & feeder tension.

When properly dialed in TPU98A will print like butter at extremely fast speeds (>75mm/s) on both Direct (2) and Bowden (3) setups. It is still important to spend time on finding the perfect tension settings and temperature settings in order to avoid problems during printing.

Proper tension settings:

Much can be said about accomplishing correct tension settings on your 3D printer. Unfortunately there's such a wide variety of different systems that it is impossible for us to discuss every specific 3D printer.

In practice most Direct drive printers will feature a spring loaded system or don't allow for much tweaking of the tension. The recommendation is that you make sure that your feeder has a tight grip on the filament but does not over-compress the filament which can cause grinding of the filament.



Example of a spring loaded direct drive

For Bowden drive printers it is crucial that you have either a 2 / 3 type setup as less "filament restricting". Setups (like for example UM2) will cause mayor issues when you try to print faster than 30mm/s, and even then it can cause issues due to the feeder design. The recommendation for the tightness of the feeder on a Bowden drive printer is basically the same as a direct drive printer.



A surprising example of what can go wrong when you don't have the right feeder for printing flexible filament.

TPU98A@DF slicer settings (Cura, Simplify3D) can be found on the Dutch Filaments news blog