

Creating Material Change



SYNERG»»^{3D}
SUPERTOUGH FILAMENT

Technical Data Sheet



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SynerG SuperTough PLA 3D Printing Filament

Haydale's SynerG nanomaterial enhanced polylactic acid (PLA) filaments for 3D printing are improving the speed, strength, print quality and accuracy of 3D printed parts.

- 35% increase in Young's modulus of the filament
- 25% increase in tensile strength and 45% increase in strain to failure of printed test specimens when printed in the z-direction
- 3x increase in thermal conductivity
- High quality print and excellent first layer adhesion and z-axis bonding
- Improved dimensional stability

Product code: FM-MEC
 Physical form: 1.75mm diameter filament packaged on 1000g reels and 2.85mm diameter filament packaged on 750g reels
 Appearance: Black filament
 Product status: Commercial

Properties			
Property Tested	Method Standard	Units	Average Value
Filament:			
Young's Modulus	Internal	MPa	660
Tensile Strength	Internal	MPa	48
Strain to Failure	Internal	%	14.4
XY Direction Printed Test Specimens:			
Young's Modulus	ISO 527-2	MPa	2363
Tensile Strength	ISO 527-2	MPa	36
Strain to Failure	ISO 527-2	%	2.5
Z Direction Printed Test Specimens:			
Young's Modulus	ISO 527-2	MPa	1879
Tensile Strength	ISO 527-2	MPa	20
Strain to Failure	ISO 527-2	%	1.2
Thermal Conductivity (2.85 diameter filament)	ASTM D7984	W/mK	0.39

NB: All properties listed are typical properties only, using 1.75mm diameter filament unless stated otherwise. Data are indicative of as-tested performance and are not to be construed as specifications.

Processing Guidance

- SynerG SuperTough PLA 3D printing filament can be processed on all FDM/FFF type 3D printers.
- SynerG SuperTough PLA 3D printing filament should typically be extruded using a nozzle temperature of 208°C to 210°C, and a heated bed temperature of 55°C to 58°C is recommended for good first layer adhesion in 3D printing.
- SynerG SuperTough PLA 3D printing filament should be printed at 60mm/sec, and no less than 50 mm/sec, with 100% fan on using a 0.4mm brass or tungsten carbide nozzle.
- SynerG SuperTough PLA 3D printing filament should not be left hot in the nozzle when not printing and should be removed using a forward purge followed by retraction.
- 3D printers, especially their nozzles, should always be maintained, and should be cleaned before and after use in line with the printer manufacturer's instructions.

Storage

PLA is a biodegradable thermoplastic polyester and will absorb moisture over time which can affect product performance. To ensure a good shelf life before use the 3D printing filament is packaged under a controlled vacuum and sealed to prevent moisture ingress. It is recommended that filament be kept in cool and dry conditions before use.

Health, Safety and Environmental

Please refer to the Safety Datasheet for the product before use – available at <https://haydale.com/resources/>.

The content supplied in this technical data sheet ("Information") supersedes all previous versions supplied. Version 4, April 2021

The Information should be used solely as guidance for the safe handling, storage, processing and/or use of the Product and is only typical of the methods described. The Haydale Group (Haydale Group means Haydale Limited, as a subsidiary of Haydale Graphene Industries plc., and any subsidiary or holding company from time to time and any subsidiary from time to time of any holding company of Haydale Limited) gives no express or implied warranty or guarantee or representation as to the behaviour of the Product described herein during any handling or storage or processing or use of the Product. To the extent permissible by law the Haydale Group shall under no circumstances whatever be liable whether in contract, tort (including negligence), breach of statutory duty, or otherwise, for any damage, including loss of profit, or any indirect or consequential loss arising under or in connection with any handling or storage or processing or use of the Product.



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