



3rd May 2024

4TUNATA : FLAME RETARDANT BIOBASED HIGH DENSITY POLYETHYLENE

The **4TUNATA** pellets, crafted from premium and **biobased (37.6%) High Density Polyethylene (HDPE)** material, is a thermoplastic polymer. A **complex blend of flame-retardant additives** offers an extremely high fire protection performance material, ensuring compliance with stringent aerospace (FAR 25.853) and railway regulation EN 45545 (HL2-R1) standards.

KEY FEATURES

- Biobased content 37,6%
- Excellent fire protection (compatible with HL2-R1 EN 45545 & FAR 25.853)
- Phthalate and Halogen-free
- Excellent durability and resistance to thermooxidation
- Easy to print
- Easy to machine

COLOURS



Gray



Pellet available

Material Properties					
Description	Test Method	Injection Moulded	3D Printed XYZ	3D Printed YZX	3D Printed ZXY
MFR (@190°C – 5.0kg)	ISO 1133-1	5.08 g/10min			
Hardness Test	ISO 48-4	-	95 ShA	82 ShA	82 ShA
Flexural Modulus	ISO 178	-	4230 MPa	3660 MPa	2070 MPa
Flexural Strength	ISO 178	-	20 MPa	19 MPa	11 MPa
Tensile Strength at yield	ISO 37	-	10 MPa	9 MPa	5 MPa
Elongation Strain at Break	ISO 37	-	0.4 – 0.5%	0.2 – 0.4%	0.1 – 0.2%
Tensile (E) modulus	ISO 37	-	2820 MPa	2710 MPa	2330 MPa
Heat Release (MAHRE)	ISO 5660-1	< 90 kW/m ² [thickness range: 3 – 10 mm]			
Flame spread (CFE)	ISO 5658-2	> 20 kW/m ² [thickness range: 3 – 10 mm]			
Smoke density (VOF4)	ISO 5659-2	<300 kW/m ² [thickness range: 3 – 10 mm]			
Optical smoke density (Ds(4))	ISO 5659-2	<150 kW/m ² [thickness range: 3 – 10 mm]			
Toxicity Index of Smoke	ISO 5659-2	<0.9 [thickness range: 3 – 10 mm]			

Durability Test	Thermooxidation condition	@120°C, compatible with HL2-R1 after 59 days @110°C, compatible with HL2-R1 after 238 days @100°C compatible with HL2-R1, no change after 282 days
Print Properties		
Description	Typical Value	
Nozzle Size	0.8 mm	
Bed Adhesion	Dimafix	
Nozzle Temperature	220 ± 10°C	
Bed Temperature	145 ± 10°C	
Layer Height	0.32 mm	
Print Speed	20 mm/s	
Fan Speed	0%	
Extrusion Multiplier / Material Flow	100%	
Retraction Distance	-	
Retraction Speed	-	
Coasting distance	-	
Wipe nozzle	-	
Difficulty to Print	Easy	
Drying Required	-	

Additional info

4TUNATA is particularly designed for applications requiring very good fire protection.



Figure 1. Example of parts printed with 4TUNATA

Print Conditions: All specimens have been printed using a 0.8mm nozzle and the layer height was set to 0.32mm. The room in which the 3D-printer was located had an environmental temperature of ± 45°C.

* The room in which the Universal Testing Machine was located had an environmental temperature of ± 20°C.

* Test Conditions: The flame spread, heat release and Smoke density test have been carried out according to ISO 5658-2, ISO 5660-1 and ISO 5659-2 at the lab scale. Certification tests are in progress on 3D printed parts, but already done on injected parts.

 4D PIONEERS cannot be held responsible for any inaccuracies. No guarantees can be given since differences in data could be caused by differences between individual 3D-printers.