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Hyflon® MFA® 1041

perfluoropolymer

Hyflon® MFA 1041 is a high extrusion speed resin specifically designed for insulation for plenum-rated LAN cables. MFA 1041 delivers superior electrical performance in addition to its excellent fire characteristics, physical properties, and processing. The unique chemical structure of MFA provides the superior properties necessary for the increasingly demanding telecommunications industry.

Cables manufactured with MFA 1041 have met the Telecommunications Industry Association (TIA) Category 6 standard. The extremely low attenuation of MFA 1041 makes it a logical choice for the developing Augmented Category 6 standard. Cables made from MFA 1041 have met the fire performance requirements called out in NFPA 90a ("Standard for Air- Conditioning and Ventilating Systems").

Hyflon® MFA 1041 is not recommended for heavy wall applications where significant thermal stress crack resistance is required.

General

Material Status	• Commercial: Active		
Availability	• Africa & Middle East • Asia Pacific	• Europe • Latin America	• North America
Features	• Flame Retardant	• Good Electrical Properties	
Uses	• Telecommunications	• Tubing	• Wire & Cable Applications
Agency Ratings	• NFPA Code 90a		
RoHS Compliance	• RoHS Compliant		
Forms	• Pellets		
Processing Method	• Extrusion Coating		

Physical	Typical Value	Unit	Test method
Specific Gravity	2.13 to 2.18		ASTM D792
Melt Mass-Flow Rate (MFR) (372°C/5.0 kg)	22 to 28	g/10 min	ASTM D1238

Mechanical	Typical Value	Unit	Test method
Tensile Modulus [1] (23°C)	500 to 600	MPa	ASTM D1708
Tensile Strength (Break, 23°C)	> 20.0	MPa	ASTM D1708
Tensile Elongation (Break, 23°C)	> 280	%	ASTM D1708
Flex Life [2]	6.0E+2 to 1.0E+3	Cycles	ASTM D2176

Impact	Typical Value	Unit
Charpy Notched Impact Strength	No Break	

Hardness	Typical Value	Unit	Test method
Durometer Hardness (Shore D)	55 to 60		ASTM D2240

Thermal	Typical Value	Unit	Test method
Melting Temperature	280 to 290	°C	ASTM D3307
CLTE - Flow	1.2E-4 to 2.0E-4	cm/cm/°C	ASTM D696
Specific Heat (23°C)	900 to 1100	J/kg/°C	DSC
Thermal Conductivity (40°C)	0.20	W/m/K	ASTM C177
Heat of Fusion	18.0 to 26.0	J/g	DSC

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Electrical	Typical Value	Unit	Test method
Surface Resistivity	> 1.0E+17	ohms	ASTM D257
Volume Resistivity	> 1.0E+17	ohms·cm	ASTM D257
Dielectric Strength [3]	35 to 40	kV/mm	ASTM D149
Dielectric Constant			ASTM D150
23°C, 1 MHz	2.00		
23°C, 850 MHz	2.00		
23°C, 2.10 GHz	2.00		
Dissipation Factor			ASTM D150
23°C, 1 MHz	2.0E-4		
23°C, 850 MHz	2.0E-4		
23°C, 2.10 GHz	9.0E-4		

Flammability	Typical Value	Unit	Test method
Flame Rating	V-0		UL 94
Oxygen Index	95	%	ASTM D2863

Additional Information	Typical Value	Unit	Test method
Potential Heat	970	J/g	NFPA 259

COLOR MASTER BATCHES

- We recommend that only Color Master Batches based in MFA 1041 be used. Master Batches based on other fluoropolymers can negatively influence the superior processing and electrical performance of MFA 1041. A list of suppliers can be obtained from your Solvay sales representative.

HEALTH SAFETY AND ENVIRONMENT

- Hyflon MFA 1041 is a very inert polymer and it is not harmful if used and handled according to standard processing procedures. If handled inappropriately, it may release harmful toxic chemicals. Please refer to the Material Safety Data Sheets for more information on handling and safety. MFA 1041 is not produced using APFO and contains no APFO. MFA also complies with Directive 2002/95/EC ("Restrictions of hazardous substances in waste from electrical and electronic equipment" - RoHS), Directive 2000/53/EC ("End of life of vehicles" - ELV) and Directive 76/769/EEC ("Restrictions on the marketing and use of certain dangerous substances and preparations"), as subsequently amended.

PACKAGING AND STORAGE

- Hyflon MFA 1041 resin is available in 25 kg (55 lbs) and 500 kg (1102 lbs) packaging. Though it has an indefinite shelf life, it is recommended to store it in a clean area, protected by direct sun light and possible contamination.

Extrusion	Typical Value	Unit
Cylinder Zone 1 Temp.	250 to 290	°C
Cylinder Zone 2 Temp.	290 to 330	°C
Cylinder Zone 3 Temp.	340 to 360	°C
Cylinder Zone 4 Temp.	360 to 390	°C
Cylinder Zone 5 Temp.	375 to 395	°C
Flange Temperature	390 to 400	°C
Adapter Temperature	390 to 400	°C
Crosshead Temperature	390 to 410	°C
Melt Temperature	400	°C
Die Temperature	400 to 420	°C
Wire Preheat	100 to 130	°C

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Extrusion Notes

WIRE AND CABLE PROCESSING GUIDELINES

- As with other fluoropolymers, Hyflon MFA is corrosive in the melt. Therefore all parts coming into prolonged contact with the melt should be made with corrosion resistant materials such as Hastelloy®, Inconel®, Monel® or Xaloy®. Chrome or nickel plating is not recommended since they are typically only sufficient for brief processing tests.

- MFA 1041 is applied onto wire using tubing extrusion techniques similar to other thermoplastic materials. An overview of the temperature, tooling and equipment requirements are in the following tables.

- MFA can be processed with many different screw designs. Single-flight screws are recommended while barrierflights should be avoided. A typical screw design consist of a long feed section, followed by a 2 to 6 flight transition and a 5 to 7 flight metering section. The addition of a Saxton mixing or other block mixing sections can improve the processing performance.

EQUIPMENT/TOOLING REQUIREMENTS

- Line Speed: 1,500-2,500 ft/min (450-750 m/min)
- Draw Down Ratio: 80-120
- Draw balance: 0.98-1.05
- Extruder: L/D 24/1-30/1
- Screen pack: Breaker plate only is required

Notes

Typical properties: these are not to be construed as specifications.

[1] 1.0 mm/min

[2] 0.3 mm film

[3] 50 Hz

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