Product Data Sheet

3M™ Dyneon™ TFM™

Modified PTFE Powder TFM 1700

Product Description

Modified non-free-flowing suspension PTFE of the 2nd generation for compression moulding applications like shaped parts, skived films and sealing applications.

Special Features

- Meets ASTM D 4894 Type III, Grade 1 classification
- Produced by suspension polymerisation
- Improved particle coalescence
- Dense polymer structure with reduced void content
- Low permeability
- Substantially lower deformation under load (“cold flow”)
- Preferred basic material for filled PTFE (compounds)
- Very good electrical and mechanical properties
- Increased modulus of elasticity
- Good weldability
- Excellent chemical inertness
- Low friction behaviour
- Good flame retardance
- Exceptional temperature resistance

Properties	Test method	Unit	Value*
Bulk Density	DIN EN ISO 60	g/l	410
Average Particle Size	ISO 13320	µm	25
Powder Flow Properties			Non-free-flowing
Specific Gravity	DIN EN ISO 12086	g/cm³	2.16
Tensile Strength (0.1 mm film)	DIN EN ISO 527-3	MPa	43
Elongation at Break (0.1 mm film)	DIN EN ISO 527-3	%	625
Hardness Shore D	DIN EN ISO 868	-	59
Shrinkage, Cylinder 45 mm dia	Internal Dyneon method	%	5.6
Tensile Modulus	DIN EN ISO 527	MPa	650
Deformation Under Load (15 MPa)	Similar to ASTM D 621, 24 h	%	8
	Similar to ASTM D 621, 100 h	%	9
	Similar to ASTM D 621, permanent	%	4
Thermal Conductivity	DIN 52 612	W/m • K	0.22
Coefficient of Linear Expansion (parallel to moulding direction)	DIN 53 752, 30 – 100 °C	K^{-1}	$12 \cdot 10^{-5}$
	DIN 53 752, 30 – 200 °C	K^{-1}	$14 \cdot 10^{-5}$
	DIN 53 752, 30 – 260 °C	K^{-1}	$17 \cdot 10^{-5}$
Flammability	UL 94	-	V-0
Dielectric Strength (0.1 mm film)	DIN EN ISO 12086	kV/mm	90
Volume Resistivity	IEC 60093	Ω • cm	10^{18}
Surface Resistivity	IEC 60093	Ω	10^{17}

* typical values

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Typical Properties

PTFE moulding powder with very small particle size is preferred for moulded parts requiring very good mechanical and electrical properties, a denser polymer structure, significantly lower deformation under load and improved weldability.

Typical Applications

3M™ Dyneon™ TFM™ Modified PTFE Powder TFM 1700 is a non-free-flowing compression moulding powder for applications like shaped parts, cylinders or blocks, skived films of >20 µm, linings in the chemical processing industry (CPI) and seals, and is suitable as basic material for filled PTFE (compounds).

Processing Recommendations

3M™ Dyneon™ TFM™ Modified PTFE Powder TFM 1700 can be processed by compression moulding and in the next step by sintering of the moulded part. This type of product is used to fill moulds manually, because particle size is relatively small. It does not flow properly and cannot be fed sufficiently e.g. in automatic moulding technologies.

To achieve optimum properties, compression moulding should be carried out within a temperature range of 23 °C to 26 °C at a recommended pressure of 15 MPa. The sintering temperature should be in the range of 375 °C to 380 °C.

The necessary pressure holding time varies with the size of moulded part. Lower moulding pressures usually result in inferior physical properties. For the following sintering process step a programmable oven is a prerequisite for good physical properties of the moulded part. In this sintering cycle the temperature is raised slowly from room temperature up to 375 °C and then cooled down at a certain rate. Sintering time, interim holding steps at lower temperature levels and cooling rate depend on the dimension of the compressed mould and determine the quality of the finished product.

Storage and Handling

3M™ Dyneon™ TFM™ Modified PTFE Powder TFM 1700 can be stored for a relatively long period of time. It should preferably be stored in a clean, dry place at a temperature of less than 30 °C. Before processing it is advisable to store the material in a sealed container for 24 hours in the production area. This is particularly important if ambient temperature is low; in such cases the material should be conditioned for up to 72 hours in the production area.

If transport or storage temperatures are too high, the material may agglomerate in its container. In such cases, it is advisable to store the material for 48 hours at below 23 °C and then sieve it (mesh size 4 mm) before filling the mould.

Safety Instructions

Follow the normal precautions observed with all fluoropolymer materials.

Please consult the Material Safety Data Sheet and Product Label for information regarding the safe handling of the material. By following all precautions and safety measures, processing these products poses no known health risks. General handling/processing precautions include: 1) Process only in well-ventilated areas. 2) Do not smoke in areas contaminated with powder/residue from these products. 3) Avoid eye contact. 4) If skin comes into contact with these products during handling, wash with soap and water afterwards. 5) Avoid contact with hot fluoropolymer.

Potential hazards, including release of toxic vapours, can arise if processing occurs under excessively high temperature conditions. Vapour extractor units should be installed above processing equipment. When cleaning processing equipment, do not burn off any of this product with a naked flame or in a furnace.

Delivery Form

3M™ Dyneon™ TFM™ Modified PTFE Powder TFM 1700 is delivered in powder form.

Packaging size is:

- 25 kg plastic drum

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Important Notice

All information set forth herein is based on our present state of knowledge and is intended to provide general notes regarding products and their uses. It should not therefore be construed as a guarantee of specific properties of the products described or their suitability for a particular application. Because conditions of product use are outside Dyneon's control and vary widely, user must evaluate and determine whether a Dyneon product will be suitable for user's intended application before using it.

The quality of our products is warranted under our General Terms and Conditions of Sale as now are or hereafter may be in force.
Technical information, test data, and advice provided by Dyneon personnel are based on information and tests we believe are reliable and are intended for persons with knowledge and technical skills sufficient to analyze test types and conditions, and to handle and use raw polymers and related compounding ingredients.

No license under any Dyneon or third party intellectual rights is granted or implied by virtue of this information.
General recommendations on health and safety in processing, on work hygiene and on measures to be taken in the event of accident are detailed in our material safety data sheets.

You will find further notes on the safe handling of fluoropolymers in the brochure "Guide for the safe handling of Fluoropolymers Resins" (download link) by PlasticsEurope, Box 3, B-1160 Brussels, Tel. +32 (2) 676 17 32.

You can also download it with your smartphone using the QR code below.

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