

3M Advanced Materials Division

3M™ Dyneon™ TFM™ Modified PTFE Fine Powder TFM 2001Z

Introduction

3M™ Dyneon™ TFM™ Modified PTFE Fine Powder TFM 2001Z is a second generation emulsion PTFE grade for high-performance tubing and flat gasket applications.

Features

- Meets ASTM D 4895 Type I, Grade 1, Class B classification
- High molecular weight PTFE powder produced by emulsion polymerisation.
- Fine powder grade for low to medium reduction ratio (RR) range
- Isotropic mechanical properties in sintered tubings
- Used successfully as a basic material for flat gaskets
- Very good weldability
- Excellent chemical inertness
- Smooth surfaces and high transparency
- High stress-cracking resistance
- High pressure resistance under surge stress
- Processing by standard paste extrusion method
- Low friction behavior
- High flame retardance
- Exceptional temperature resistance
- Very good electrical properties

Properties	Test Method	Unit	Value*
Bulk Density	DIN EN ISO 60	g/l	460
Average Particle Size	ISO 13320	µm	520
Powder Flow Properties		-	free-flowing
Extrusion Pressure (Reduction Ratio 400)	ASTM D 4895	Mpa	23
Reduction Ratio Range	Internal Dyneon method	-	20 - 1000:1
Mechanical properties, measured at 23°C on sintered moldings			
Tensile Strength	DIN EN ISO 527-3	MPa	38
Elongation at Break	DIN EN ISO 527-3	%	440
Specific Gravity	DIN EN ISO 12086	g/cm³	2.15
Mechanical properties of a tube with the dimension 12mm x 10mm at 23°C			
Tensile Strength, Longitudinal	DIN EN ISO 527-3	MPa	31
Tensile Strength, Transverse	DIN EN ISO 527-3	MPa	30
Specific Gravity	DIN EN ISO 12086	g/cm³	2.14

*average values

Typical Properties

3M™ Dyneon™ TFM™ Modified PTFE Fine Powder TFM 2001Z is a chemically modified PTFE fine powder product grade with a denser polymer structure providing lower gas permeability, higher transparency and improved stress-cracking resistance compared to standard PTFE grades. TFM 2001Z, unlike unmodified PTFE grades, is weldable.

Typical Applications

3M™ Dyneon™ TFM™ Modified PTFE Fine Powder TFM 2001Z is recommended for high-performance tubing applications with reduction ratios up to 1000:1. The tubing can be assembled with high strength braiding (aramide or stainless-steel wire) to give the tubing flexibility and pressure resistance.

Furthermore it can be used as basic material in flat gasket applications in the general industry sector or as lining material for corrosion protection in the chemical industry sector.

Processing Recommendations

3M™ Dyneon™ TFM™ Modified PTFE Fine Powder TFM 2001Z can be processed by the standard paste extrusion methods, which means the processing of the fine powder together with a suitable lubricant to prevent excessive shearing of sensitive PTFE particles during extrusion. To achieve optimum extrudate quality, all processing parameters such as temperature settings, extrusion pressure, lubricant content, extrusion rate and extrudate dimensions must be carefully balanced.

The fine powder should be mixed with a suitable lubricant, stored for at least 24 hours at a minimum temperature of 25 °C and compacted into a preform, which is then extruded through a die on a ram-type extruder to produce extrudate. The lubricant is usually evaporated in a suitable drying oven and in the next step the extrudate is sintered by passing the sintering zone.

During paste extrusion the round fine powder particles get fibrillated and the extrudate builds up its mechanical green strength. In the following sintering step the particles fuse together and the voids are closed.

The reduction ratio (RR) is defined as the result of the cross-section of the extrusion cylinder divided by the cross-section of the extrusion die. It is an important processing parameter for paste extrusion, which influences the extrudate quality.

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 vapors, can arise if processing occurs under excessively high temperature conditions. Vapor 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.

Storage and Handling

3M™ Dyneon™ TFM™ Modified PTFE Fine Powder TFM 2001Z can be stored for a relatively long period of time provided it is kept in a clean, dry place at a temperature of less than 19 °C to safeguard free-flowing properties. Careful handling of fine powder is recommended because it is relatively shear-sensitive. Excessively sheared particles usually result in extrudate defects.

Delivery Form

3M™ Dyneon™ TFM™ Modified PTFE Fine Powder TFM 2001Z is delivered in powder form.

Packaging size is:

- 25 kg plastic drum

Customer Service

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