

**TECHNICAL DATA SHEET**
**GRANULAR MODIFIED PTFE  
FLUOROPLAST-4PN-M type 1**
**PRODUCT OVERVIEW**

HaloPolymer modified PTFE grade PN-M type 1 (F-4PN-M1) is a granular powder product designed for general purpose compression molding. This fully fluorinated resin has the same applications as conventional PTFE, improved electrical, mechanical properties and reduced porosity. Granular modified PTFE is best suited for compression moulding. This material can be used for production of articles for chemical, mechanical, low-friction and electrical applications.

**TYPICAL APPLICATIONS**

- production of articles (rods, pipes, bushings) by molding and ram extrusion.
- production of of small articles by automatic pressing (molding).
- compression (direct) molding and isostatic pressing

**PAKING**

28 kg cardboxes with 2×14 kg polyethylene inserts on wooden pallet boards

**Typical properties**

Properties	Units	Typical Value	Test Method
Appearance	-	White, easily lumping powder, without visible inclusions	visual
Water content, min	% wt	0.02	ASTM D4894
Bulk density	g/l	545±45	ASTM D4894
Particle size, average diameter (d50)	µm	145±30	Laser-diffraction analyses <sup>2)</sup> (internal method)
Mould shrinkage	%	6.0-6.5	internal method <sup>2)</sup>
Dielectric strength (0.100±0.005 mm thickness) at constant voltage, min	kV/mm	100	internal method <sup>2)</sup>
Density (SSG)	g/sm <sup>3</sup>	2.15-2.175	internal method <sup>2)</sup>
Melting points	°C	327±10	ASTM D4591(DSC)
Tensile strength at break, min	MPa	30	internal method <sup>2)</sup>
Elongation at brake, min	%	350	internal method <sup>2)</sup>

**Note:**

- 1) Typical properties are not suitable for specification purposes. Detailed specification please contact the commercial department
- 2) The parameters are indicated according to Technical Specifications (TU), because the manufactured products are analyzed in accordance with TU (internal company standard). The procedure of sample preparation differs from that in ASTM, ISO, DIN
- 3) Fluoroplast-4PN-M can be classified as type III, grade 1 ASTM D 4894 standard

**REGULATIONS:** HaloPolymer do not use PFOA/APFO or its salts/LCPFAC in our process of polymerization of TFE  
HaloPolymer PTFE is compliant with  
RoHS Directive 2011/65/EU

FDA 21 CFR 177.1380 & FDA 21 CFR 177.1550

Class VI acc. USP 35 <88>

3-A Sanitary Standard for Multiple-Use Plastic Materials 20-27

## SAFETY PRECAUTIONS

### WARNING!

VAPORS CAN BE LIBERATED THAT MAYBE HAZARDOUS IF INHALED.

Before using Halopolymer Fluoroplast-4 (PTFE) read the Material Safety Data Sheet.

Open and use containers only in well-ventilated areas using local exhaust ventilation. Vapors and fumes liberated during hot processing, or from smoking tobacco or cigarettes contaminated with Halopolymer Fluoroplast may cause flu-like symptoms (chills, fever, sore throat) that may not occur until several hours after exposure and that typically pass within about 24 hours. Vapors and fumes liberated during hot processing should be exhausted completely from the work area; contamination of tobacco with polymers should be avoided. Mixtures with some finely divided metals, such as magnesium or aluminum, can be flammable or explosive under some conditions.

**STORAGE AND HANDLING PREFORMING** is easiest when the resin is uniformly between 21–27°C (70–80°F). As temperature declines below this range, the resin will be increasingly difficult to mold without cracks and problems with condensed moisture. Higher temperatures inhibit flow and promote lumping. Storage conditions should be set accordingly. Cleanliness is a critical requirement for successful use of PTFE. The white resin and high sintering temperatures cause even very small foreign particles to become visible in finished moldings. Keep resin boxes closed and clean. Good housekeeping and careful handling are essential.

## PROCESSING

PTFE is usually processed in two steps: preforming and sintering.

The powder is first compacted into a preformed shape approximating that of the desired molding.

### SINTERING

The preformed PTFE powder is sintered under a temperature program generally containing 7 temperature steps including:

- heating,
- dwell before melting,
- complete melting of a billet,
- dwell above melting point,
- cooling to crystallization point,
- crystallization of the melt of PTFE,
- final cooling.

Annealing steps are also required for bigger billets sintering in order to reduce article distortion.

### MACHINING

PTFE billets are machined in the same way that mild metals are. Sharp steel cutting tools are suitable for the machining process. PTFE billets designed for further skived films production are processed at elevated temperatures.

QMS for production is certified:



*ISO 9001:2015*

*AS/EN/JISQ 9100 (OIN: 6147662240)*

*For additional information please contact with Commercial Department:*

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