

# PTFE

## FLUOROPLAST-4

### grade PN90



**Manufacturer:**  
"HaloPolymer Perm", OJSC

QMS for production is certified:  
ISO 9001:2015, EN 9100:2016, IATF 16949:2016

**Chemical name:** Poly(tetrafluoroethylene) (IUPAC)  
**Structural formula:**  $(C_2F_4)_n$   
**CAS No.** 9002-84-0  
**HS code** 39 0461 0000

Fluoroplast-4 grade PN90 (F-4PN90) is fully fluorinated resin which has an excellent chemical stability, electrical and mechanical properties. The material is a granular powder product designed for usage from small to medium billet compression molding, which is well suited to thin skived film applications requiring excellent physical and electrical properties.



PROPERTIES	UNITS	TYPICAL VALUE	TEST METHOD
Bulk density	g/l	500±30	internal method <sup>1</sup>
Particle size, average diameter (d <sub>50</sub> )	µm	80-100	Laser-diffraction analyses (internal method <sup>1</sup> )
Mass fraction of moisture, max	% wt	0,02	internal method <sup>1</sup>
Density (SSG), max	g/sm <sup>3</sup>	2,17	internal method <sup>1</sup>
Tensile strength at break, min	MPa	25	internal method <sup>1</sup>
Elongation at break, min	%	350	internal method <sup>1</sup>
Shrinkage	%	1,8-2,8	internal method <sup>1</sup>
Melting point (initial / second), ±5	°C	344 / 327	ASTM D4894

Note:

1) The value of the parameters is per GOST, because manufactured products are analyzed according to GOST (Russian State Standard). The sample preparation procedure has a difference with the ASTM. The standard of the company is GOST 10007-80 (Specific molding pressure is 29.4 MPa with dwell time of 1 minute, temperature of heat treatment of plates for the samples is 380-390 °C, and time of heat treatment is 13 hours).



### Main application:

- for compression molding of big billets;
- further milling;
- fabricating the end products such as skived films, sheets, cylinders, gaskets, valve seats, seals, support slide for heavy loads;
- preparing the pre-sintered material



### Package:

25 kg (net) card boxes with 2×12,5 kg polyethylene inserts on wooden pallet boards. 30 boxes on one pallet. Gross weight per pallet is 860 kg.

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## 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:

1. heating,
2. dwell before melting,
3. complete melting of a billet,
4. dwell above melting point,
5. cooling to crystallization point,
6. crystallization of the melt of PTFE,
7. final cooling.

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



## Storage and handling:

Storage and handling preforming is the easiest when the resin is uniformly between 21–27°C (70–80°F). As the 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.

F-4PN90 tends to form agglomerates easily; therefore, do not store large quantities of powder in deep containers; avoid strong vibrations. Storage at temperatures above 19°C tends to promote agglomerate formation. Should agglomerates form, keep the powder at less than 19°C (ideally 15°C or below) for two days then sift through a coarse screen and allow to come to room temperature before molding.



## PFOA FREE Quality data:

Fluoroplast-4PN90 can be classified as type II, ASTM D 4894 standard. Typical properties are not suitable for specification purposes. For the detailed specification please contact the commercial department.

**HaloPolymer does not use PFOA/APFO or its salts/LCPFAC in the 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 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.



## Guarantee storage life:

24 months from the date of manufacture.