

## GRANULAR POLYTETRAFLUOROETHYLENE

### TECHNICAL DATA SHEET

#### Product Description

Flonio™ S-202 is a fine cut virgin granular PTFE resin with a narrow particle size distribution powder, specially designed for blending and compounding with fillers and additives. It is typically a non-free flowing virgin polymer. The low particle size of Flonio™ S-202 helps to minimise the void content in the article, resulting in good electrical property. Its exceptional properties and characteristics make it an ideal choice for a wide range of applications.

#### Product Highlights

The superior quality of Flonio™ S-202 is confirmed by its exceptional combination of properties and processing capabilities, including:

- Uniform and narrow particle size distribution
- Fully homogeneous with compounds
- High thermal stability
- Chemical inertness
- Excellent surface texture
- Good processability

- Optimal mechanical and electrical properties
- Excellent for production of very thin skived film
- Low coefficient of friction
- Service temperature from: -250°C to 250°C

#### Product Applications

Flonio™ S-202 resin has relatively small particle size virgin polymer compatible for adding fillers and additives for enhancement of different properties for superior performance in end use applications. These versatile materials find applications in various industries, including but not limited to:

- Electrical circuit breakers
- Reactor line
- Mechanical seals and gaskets
- Packings and separators
- Bridge or pipeline bearing pads
- Diaphragm
- Spacers and bushes
- Piston ring

#### Typical Product Properties

Properties	Test Method	Unit	Typical Values*
Bulk density	ASTM D4894	g/l	350
Average particle size (d50)	ISO 13320	µm	16 - 22
Mould shrinkage	ASTM D4894	%	4.5
Std. specific gravity (SSG)	ASTM D4894	--	2.1500
Melting point (initial)	ASTM D4894	°C	342
Melting point (final)	ASTM D4894	°C	327
Tensile strength	ASTM D4894	MPa	35
Elongation at break	ASTM D4894	%	350
Moisture	Internal	%	0.03

\*Flonio™ S-202 meets ASTM D4894-19, Type II.

\* Values given above are just typical test properties for reference only, should not be considered as material quality specifications.

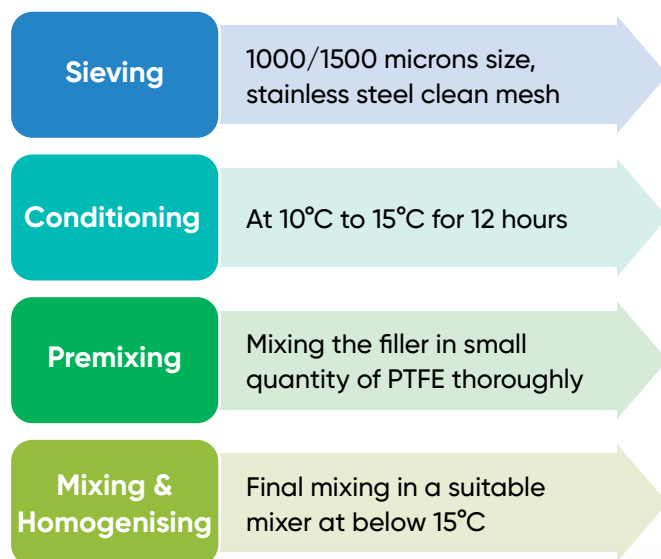
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### Processing recommendations for blending applications

The blending process for Flonio<sup>TM</sup> S-202 involves critical steps to ensure optimal results. Once received at the customer location, the PTFE material should be brought to normal temperature at 20-23°C for at least 24 hours.

A natural tendency of PTFE is to agglomerate during transportation & long storage, so it is important to break the agglomerates by manually shaking the product with a stainless-steel spatula tool (avoid using bare hands or other objects that may contaminate the PTFE). To achieve the finest quality of filled compounds, it is recommended to sieve the material using 1-1.5mm mesh to get a uniform and consistent powder. This will prevent from surface defects like fisheye, white spots or particles, thereby resulting in good quality final parts. It is important to precondition the PTFE at 10-15°C before proceeding with the next steps of blending or compounding process.

### Fig: General compounding process of Flonio<sup>TM</sup> S-202



The processing of Flonio<sup>TM</sup> S-202 is carried out primarily in three stages, namely, mixing, preforming, and sintering. The powder is initially mixed by compatible fillers with suitable loading then compressed by a cold compression moulding machine at 23±2°C to form a billet (preform) or application part. Subsequently, the preform is subjected to the sintering process as per specific sintering cycle to melt it above its crystalline melting point in order to obtain the final part.

Several factors, such as moulding pressure, sintering temperature, sintering time, rate of heating and cooling, depend significantly on various factors like filled type, size, and shape of final item. The sintering temperatures must exceed the melting point of PTFE (342°C) and typically range from 370°C to 380°C. Total duration of sintering cycle varies based on the shapes and dimensions of target item. Additionally, the ramp-up time, dwell time, and ramp-down time can be adjusted by processor according to the thickness or wall thickness of the preform. These precise parameters are crucial in achieving the desired outcome during the moulding process.

Note: If the material used for virgin compression moulding operation, kindly refer separate **Processing Guidelines for Flonio<sup>TM</sup> PTFE Resin Powders**

### FDA Compliance

The moulded items/components produced using Flonio<sup>TM</sup> S-202 PTFE resins have to be accurately processed, in terms of pre-forming, moulding and sintering at high temperature. Industries may comply with FDA Regulation 21 CFR 177.1550 for use in contact with food.

Additionally, processors must inform SRF of any other obligations to be fulfilled by the company as a PTFE polymer resin producer and supplier for specific applications which require FDA compliances.

Do not use "Flonio PTFE resins" in medical devices that are designed for permanent implantation in the human body. For other medical uses, prior permission of SRF must be sought.

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### Long Storage and Material Handling

Appropriate storage and handling of Flonio<sup>TM</sup> S-202 PTFE powder is essential to ensure the integrity of the final products. The powder must be stored in a clean and dry area and handled with care to prevent any irregularities in the end results. To avoid lump formation, it should be stored at a temperature of 19°C or lower, as higher temperature can lead to concerns during the moulding process. As PTFE resin is extremely pressure sensitive, all activity subjected to pressings should be avoided.

The work area and facilities where the powder is used should be immaculate and free from contaminants. Maintaining good housekeeping practices is highly recommended. Additionally, it is crucial to securely close the liner bags & containers when not in use to preserve the quality of the moulding powder. Clean the mixer each time before mixing to avoid contamination from an earlier compound particle(s).

### Safety Precautions

It is crucial to thoroughly review the Material Safety Data Sheet before handling Flonio<sup>TM</sup> S-202 and adhere to all labelled instructions and precautions. The material should be handled and processed in a well-ventilated area to prevent inhalation and contact of fumes with the eyes and skin.

In case of skin contact, wash the affected area with mild soap and water, and if the fumes come into contact with the eyes, immediately rinse with cold water and seek medical assistance, if necessary. Smoking is strictly prohibited in both the storage and processing areas. Additionally, it is recommended to position vapour extractor units above processing equipment to ensure the safety of the working environment.

### Packaging

The Flonio<sup>TM</sup> S-202 powder is packaged in a 25 Kg plastic drum enclosed with two layers of liner bags.

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