# Flonio™ S-203

## GRANULAR POLYTETRAFLUOROETHYLENE

## TECHNICAL DATA SHEET

### Product Description

Flonio™ S-203 is a fine cut virgin granular PTFE resin powder with good particle size distribution. It is typically white in colour and non-free flowing powder. The low particle size of Flonio™ S-203 helps to minimise the void content in the article, even at relatively low moulding pressure. It is designed for making billets by compression moulding and well suited to thin skived film applications requiring excellent physical and electrical properties. Its exceptional properties and characteristics make it an ideal choice for a wide range of applications.

### Product Highlights

The superior quality of Flonio™ S-203 is confirmed by its exceptional combination of properties and processing capabilities including:

- High thermal stability
- Chemical inertness
- Excellent surface texture
- Uniform and narrow particle size distribution
- 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

A wide range of products can be made from the compression moulded billets and sheets including skived films. These versatile materials find applications in various industries, including but not limited to:

- Electrical insulators
- Reactor line
- Mechanical seals and gaskets
- Packings and separators
- Thin gaskets by die-cut
- 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 |
| Avg. particle size (d50) | ISO 13320 | µm | 34 |
| Mould shrinkage | ASTM D4894 | % | 4 |
| 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 | 30 |
| Elongation at break | ASTM D4894 | % | 325 |
| Moisture | Internal | % | 0.03 |

** Flonio™ S-203 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

The moulding process for Flonio™ S-203 involves critical steps to ensure optimal results. The moulding powder needs to be conditioned above 19°C (with an acceptable range of 23±2°C).

As PTFE has a natural tendency to agglomerate during transport and long storage, it is important to break the agglomerates by manually shaking with stainless steel scoop tool (avoid using bare hands or other objects which may contaminate the PTFE). For thin wall applications and to avoid porosity, it is recommended to sieve the material under 1-1.5mm mesh to ensure uniform and consistent powder, preventing defects and resulting in good quality final parts.

The processing of Flonio™ S-203 occurs in two main stages: preforming and sintering. In the preforming stage, the moulding powder is 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 the size and shape of the final item. The recommended preforming pressure for Flonio™ S-203 moulding powder falls between 16 – 24 MPa.

The sintering temperatures must exceed the melting point of PTFE (342°C) and typically range from 370°C to 380°C. The total duration of the sintering cycle varies based on the shapes and dimensions of the target item. Additionally, the ramp-up time, dwell time, and ramp-down time can be adjusted by the 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.

Kindly refer separate **Processing Guidelines for Flonio™ PTFE Resin Powders**

### FDA Compliance

The moulded items/components produced using Flonio™ S-203 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.

### Long Storage and Material Handling

Appropriate storage and handling of Flonio™ S-203 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 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.

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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.

### Safety Precautions

It is crucial to thoroughly review the Material Safety Data Sheet before handling Flonio™ S-203 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, rinse the affected area with mild soap and water, and if the fumes come in 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™ S-203 powder is packaged in a 25Kg plastic drum enclosed with two layers of liner bags.

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