

Description

INOFLON™ 610 is a white powder (see Table I) with a nominal particle size of 180 μm . The unique characteristics of this fine cut resin include its relatively high bulk density and moderate flow. The latter allows relatively easy charging of moulds for billets, sheets and other stock shape mouldings. High bulk density of INOFLON™ 610 makes larger mouldings possible from a given mould or press opening (daylight).

INOFLON™ 610 is ideal for large mouldings such as billets, where a balance between part economics and mechanical and electrical properties are required. When correctly processed, products fabricated from INOFLON™ 610 exhibit the superior properties that we have come to expect of polytetrafluoroethylene resins. The parts retain useful properties at service temperatures in the range of -240°C to (-400°F) to $+260^{\circ}\text{C}$ ($+500^{\circ}\text{F}$) such as chemical inertness to almost every industrial chemical and solvent, low friction and non-stick surfaces. Moulded articles are moderately stiff and possess tensile properties that meet requirements of many applications. This resin is not recommended for compounding with fillers. Other grades such as INOFLON™ 630 and 640 are available for filled compounds.

Parts made from INOFLON™ 610 resist ignition when exposed to fire and do not spread flame. These parts generate a small amount of heat and smoke when ignited by an external flame source. Please note that these remarks are not intended to predict the hazards of burning of PTFE in an actual fire.

Typical End Use Products

Many end products are fabricated by moulding INOFLON™ 610 and machining of shapes. Examples include sheets, gaskets, spacers, O rings, bushings, packings, seals, bridge or pipeline bearing pads.

FDA Compliance

When products made from INOFLON™ 610 are correctly processed, that is sintered at high temperatures as practiced by the industry; they may comply with FDA Regulation 21 CFR 177.1550 for use in contact with food.



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Before using, the powder must be conditioned above 19°C (66°F). First the mould is filled manually with the resin. Next, it is compacted into a preform that has a shape similar to the final shape of the desired molding. The preform is then sintered in an oven where it undergoes heating and cooling cycles, in which heating and cooling rates and dwell times are defined and programmed. The two cycles together are commonly called *sintering cycle*. The preform is heated to a temperature above the crystalline melting point of the resin during the sintering cycle. The cooling cycle is used to control the crystallinity of the part. The properties of a part are functions of preforming pressure, dwell time, sintering time and temperature and the cooling rate.

Table I- Typical Properties of INOFLON™610

Properties	Test Method	Unit	Nominal Value
Bulk Density	ASTM D 4894	g/l	500
Avg. Particle Size	ASTM D 4894	µm	180
Mould Shrinkage (max.)	ASTM D 4894	%	3
Std. Specific Gravity	ASTM D 4894	-	2.16 - 2.18
Melting Point Initial	ASTM D 4894	°C (°F)	342 (648)
Melting Point Second		°C (°F)	327 (621)
Tensile Strength (min.)	ASTM D 4894	Mpa (Psi)	25 (3625)
Elongation (min.)	ASTM D 4894	%	250

Note: These are typical properties and are not to be used for specification purposes.

Safety Precautions

Handling and processing of PTFE must be done in ventilated areas to prevent personnel exposure to the fumes liberated during sintering and heating of the resin. Fumes should not be inhaled and eye and skin contact must be avoided. In case of skin contact, wash with soap & water immediately. In case of eye contact, flush with water immediately and seek medical help. Smoking tobacco or cigarettes contaminated with PTFE may result in a flu-like condition including chills, fever and sore throat that may not occur until a few hours after exposure has taken place. This symptom usually passes within about 24 hours. Vapors and gases generated by PTFE during sintering must be completely removed from the factory areas. Mixtures of some metal powders such as magnesium or aluminum are flammable and explosive under some conditions. Please read the Material Safety Data Sheet and the detailed information in the "Guide to the Safe Handling of Fluoropolymer Resins" published by the Fluoropolymer Division of The Society of the Plastics Industry available at www.fluoropolymers.org.

Handling and Storage

Preforming at temperatures in the range of 23-28°C (73-82°F) is most preferable. Resin temperature must be above 19°C (66°F) during moulding because of a special molecular transition of PTFE at 19°C (66°F). PTFE molecule, which has a helical shape, tightens up by transition from a helix where 15 carbons are required for 180° turn to 13 carbons. Below 19°C (66°F), PTFE molecule becomes stiff and less conformable, thus there is a chance that moulded parts could end up cracked. PTFE powder becomes sticky, forms lumps and loses all flow at temperatures above 28°C (82°F).

For best results, the powder processing areas should be kept clean and free of all contamination. Organic contamination and foreign matter usually appear as dark spots often easily visible against the white PTFE background. Organic contamination material degrades at the sintering temperatures and forms discolored spots. They oxidize away as carbon dioxide wherever sufficient oxygen exposure takes place. It is, therefore, not unusual to encounter discoloration inside a part away from the surface where hardly any oxygen is present.

Packaging

INOFLON™610 is packed in plastic or fiber drums or corrugated boxes. Inside of this, resin is filled in double liner bags & closed with a plastic tie.

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NOTE Warning: Do not use any of INOFLON™ PTFE resins in medical devices that are designed for permanent implantation in the human body. For other medical uses, prior permission of GFL may be sought.