



# GREEN CHEMISTRY **ADDING VALUE**

EXPANDING FLUOROPOLYMER HORIZONS



# ABOUT the Company

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## **Gujarat Fluorochemicals Limited**

An ISO 9001:2015, ISO 14001:2015, ISO 45001:2018 and SA 8000:2014 certified organization, GFL is a leading producer of Fluoropolymers, Fluorospecialties, Refrigerants and Chemicals for applications in varied industries. GFL derives its strength from expertise in fluorine chemistry, vertical integration and strong R&D, enabling it to provide one of the best quality products by meeting the regulatory compliances, to our clientele globally.

The year 1989 marked commencement of Company's commercial operations with India's largest refrigerant manufacturing unit at Ranjitnagar, Gujarat, India. The site was further expanded to produce Fluorospecialty products catering to the growing demands in global agriculture and pharmaceutical industry. Foraying into new avenues in 2007, with one of the world's most integrated facilities at Dahej, Gujarat, India. GFL now has a diverse portfolio of Fluoropolymers comprising PTFE, PFA, FEP FKM, PVDF and Fluoropolymer Additives.

With three manufacturing facilities in India, a captive Fluorspar mine in Morocco, offices and warehouses in Europe and USA, and a marketing network spread across the world, GFL is one of the established players in Fluoropolymers and Fluorospecialty markets.

Our Sustainability goals are interwoven with the way we do business all along our value chain. The company is signatory to the United Nations Global Compact (UNGC), Science Based Targets Initiative (SBTi) and is a member of the Indian Chemical Council (ICC). Our focus on Health, Safety and Environment is reflected in the well-being and safety of our people. All-inclusive efforts towards sustainability at various facets make us long-term partners for our customers across geographies.

**Our motto is to create value through green chemistry**



# INOLUB™

## Fluoropolymer Additives

INOLUB™ fluoropolymer additives are the ingredients that enable critical performance in the most demanding applications. Whether it is high-temperature grease, rub-resistant ink or coating, wear-resistant & low friction plastic component, high transparency food packaging film, or a television housing meeting stringent fire regulation - we have the right ingredients to ensure success.



### INOLUB™ T Series

#### PTFE MICROPOWDERS

INOLUB™ T Series are finely divided low molecular PTFE resins to be used as additives to enhance properties of substrates including engineering plastics, elastomers, lubricants, coatings, inks and paints.



### INOLUB™ P Series

#### POLYMER PROCESSING ADDITIVES

INOLUB™ P series are a range of fluoropolymer based processing additives that can be incorporated in very low concentrations as extrusion processing aids to eliminate melt fracture and reduce die build-up.



### INOLUB™ R Series

#### RHEOLOGY MODIFIERS

INOLUB™ R series are high molecular weight PTFE resins for use as additives and designed to increase the melt viscosity, to contain fire spread by the elimination of flaming droplet.

## Applications of INOLUB™ fluoropolymer additives



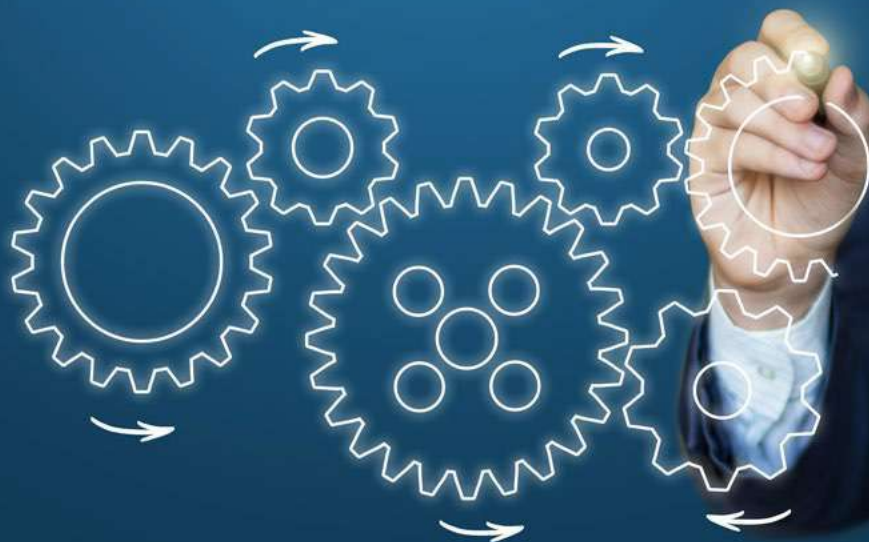
Polymer Compounding

Inks and Paints

Coatings

Lubricants

# IDEAS IN MOTION



## INOLUB™ T SERIES

Gujarat Fluorochemicals has successfully developed best available manufacturing processes to offer a versatile range of PTFE micropowders – INOLUB™ T. The excellent dispersibility of these products confers the classic low coefficient of friction characteristics of PTFE, enhancing the properties of a variety of substrates including thermoplastics, thermosets, inks, paints, coatings, and elastomers.



Lithographic printing inks



Floor varnish



Polyamide gear



Dynamic seals



Lubricating grease



Powder coatings

INOLUB™ T series PTFE micropowders can be divided in two main categories:

INOLUB™ T200 Series

INOLUB™ T300 Series

Directly Polymerized

Thermo-Mechanical

With investments in state-of-the-art manufacturing technologies, employing eco-friendly and sustainable processes, GFL has developed an unrivalled range of PTFE micropowders.

GFL is an integrated manufacturer of fluoropolymers, providing its customers full traceability from raw materials via manufacturing processes to PTFE micropowders. GFL invests heavily in research and product development. Through close collaboration with our customers, we refine the product requirements for their applications. Our extensive fluoropolymer experience enables us to provide effective technical service and development support to a rapidly expanding global customer base.

We have invested in best available technologies with a strong commitment to quality, health, safety and environment. GFL is fully compliant with all regulations on PFOA content in PTFE globally.

We invite you to put our dependability and innovative capabilities to the test.

# INOLUB™ T-200 SERIES

## PMP - Directly Polymerized Micropowders

The INOLUB™ T-200 series are PTFE micropowders manufactured through direct polymerization (PMP). As a consequence, the resulting product does not require any degradation and milling steps. The observed particles are agglomerates of very fine particles ( $< 1 \mu\text{m}$ ). These agglomerates can be easily broken up to their primary particles by applying shear, providing excellent mixing and dispersion in the desired medium. Our best available polymerization technology ensures there is absolutely no PFOA contained in the PTFE micropowders.

Grade		T201F	T202F	T203F	T204F	T205F
<b>Properties</b>						
BD	g/l	400	400	400	400	400
D50	$\mu\text{m}$	6	6	8	4	5
SSA	$\text{m}^2/\text{g}$	12	12	12	12	12
MFI	g/10 min (Load 2.16 kg)	0.2	0.75	No flow	3	8
	g/10 min (Load 10 kg)	1	4.5	No flow	16	37
	g/10 min (Load 21.6 kg)	10	30	0.5	60	100
MP	$^{\circ}\text{C}$	329	329	329	329	327
<b>Applications</b>						
Elastomers		✓	✓	✓	✓	✓
Polymer Compounding		✓	✓	✓	✓	✓
Lubricants & Greases		✓	✓	✓	✓	✓
Coatings		✓	✓	✓	✓	✓
Inks & Paints		✓	✓	✓	✓	✓
<b>Compliance</b>						
177.1550		✓	✓	✓	✓	✓
175.300		✓	✓	✓	✓	✓
EC10/2011		✓	✓	✓	✓	✓
NSF HX1		✓	✓	✓	✓	✓

Note: These are typical properties and not to be used for specification purposes.  
For TDS and MSDS, please refer to our website: [www.inolub.com](http://www.inolub.com)

# INOLUB™ T-300 SERIES

## XMP - Micropowders produced by Thermo-Mechanical Process

The INOLUB™ T-300 series are PTFE micropowders manufactured from high molecular weight PTFE by thermo-mechanical processing under controlled environment (XMP). This process considerably reduces the formation of PFOA and results in a clean PTFE micropowder. The PTFE polymer can then be conveniently milled to particles in the micro-meter range. We guarantee that the PFOA level in the INOLUB™ T-300 series will remain well below the limit imposed by REACH.

Grade		T303	T304	T305	T308	T315F	T320F	T330F
<b>Properties</b>								
BD	g/l	250	250	250	275	400	400	400
D50	µm	3	4	5	8	15	20	30
SSA	m <sup>2</sup> /g	3	3	3	3	3	3	3
MP	°C	326	326	326	326	327	327	327
<b>Applications</b>								
Elastomers		✓	✓	✓	✓	✓	✓	✓
Polymer Compounding		✓	✓	✓	✓	✓	✓	✓
Lubricants & Greases		✓	✓	✓	✓	✓	✓	✓
Coatings		✓	✓	✓	✓	✓	✓	✓
Inks & Paints		✓	✓	✓	✓			
<b>Compliance</b>								
177.1550						✓	✓	✓
175.300		✓	✓	✓	✓	✓	✓	✓
EC10/2011		✓	✓	✓	✓	✓	✓	✓

Note: These are typical properties and not to be used for specification purposes.  
For TDS and MSDS, please refer to our website: [www.inolub.com](http://www.inolub.com)

# INOLUB™ T-5000 SERIES

## Combination of two distinct morphologies

The INOLUB™ T-5000 series are a new line of PTFE micropowders, that complement the properties of our INOLUB™ T-200 series and the INOLUB™ T-300 series. The INOLUB™ T-5000 series have a broader particle size distribution compared to the INOLUB™ T-300 series, with a prolonged tail at the lower particle sizes.

Grade	Units	T5154	T5158
<b>Properties</b>			
BD	g/l	300	300
D50	µm	5	7
SSA	m²/g	7	7
MP	°C	329	329
<b>Compliance</b>			
175.300		✓	✓
EC10/2011		✓	✓

# INOLUB™ WD-200 Series

## Directly Polymerised Micropowders, dispersed in water

The INOLUB™ WD-200 series are aqueous dispersions of the T-200 Series PTFE micropowders, that are produced via direct polymerization technology (PMP). These dispersions contain very small particles (< 0.20µm) of PTFE resin stabilized in water by non-ionic surfactant.

Grade	Units	WD201F	WD204F
<b>Properties</b>			
Solid content	wt.%	50	50
D50	µm	< 0.20	< 0.20
Specific gravity		1.51	1.51
MFI	g/10 min (Load 2.16 kg)	0.5	3
PH		> 9.5	> 9.5
<b>Compliance</b>			
177.1550		✓	✓
175.300		✓	✓
EC10/2011		✓	✓



# INOLUB™ T SERIES APPLICATIONS



## Thermoplastics

- Incorporated “dry lubricant”
- Excellent abrasion and wear performance
- Soiling resistance
- Anti-squeak

## Coatings

- Improved anti-sticking and slip properties
- Reduced friction and enhanced release properties
- Resistance to microbiological growth - “Anti-fouling” effect



## Ink

- Long term rub, scuff and scratch resistance
- Improved anti-blocking and slip properties

## Lubricants

- Excellent thickener
- Improved wear resistance
- Reduced coefficient of friction
- Performance booster in mould release agents



## Elastomers

- Increased abrasion resistance
- Incorporated release agent to prevent demould damage
- Enhanced non-stick properties





## INOLUB™ R Series & I-SAN

INOLUB™ R Series & I-SAN are high molecular weight PTFE based additives designed to increase melt viscosity. They are effective at low concentrations and are typically used to contain fire-spread by the elimination of flaming droplets falling from plastic articles. As a drip suppressant additive, they are usually combined with flame retardants in low enough concentrations, in order that a polymer may be classified as “zero halogen”. In addition, this product class is used to enhance melt strength of difficult-to-process polymers. They may be successfully incorporated directly, provided that special handling conditions are employed, or more easily by first incorporating into a masterbatch.

R740F	R810F	I-SAN 50	I-SAN 60
PTFE	PTFE	PTFE encapsulated by SAN	PTFE encapsulated by SAN
Emulsion polymer	Suspension polymer	50% PTFE / 50% SAN	60% PTFE / 40% SAN
High fibrillation	Easier handling	Good combination of fibrillation and flowability	Good combination of fibrillation and flowability
Particle size (D50) - 500 µm	Particle size (D50) - 600 µm	Particle size (D50) - 450 µm	Particle size (D50) - 450 µm

The INOLUB™ R series & I-SAN are most widely used as drip suppressant in flame retardant polymers for housings of business machines and household electrical appliances, as well as electronic components.



# RESEARCH & DEVELOPMENT

## GFRC

Gujarat Fluoropolymers Research Center (GFRC) located at Dahej, India, is at the forefront of product & application development activities and serves as an essential bridge between market requirements and manufacturing operations. It focuses on offering genuine expertise and prompt customer support on INOLUB™ products.

GFRC, a team of research scientists & product specialists, is equipped with state-of-the-art application development laboratory including DCS operated pilot reactors. It has collaborated with renowned research institutes globally to work on the areas of new product development & sustainable manufacturing technologies. With this, the center focuses on delivering customized fluoropolymer products for novel applications and on developing manufacturing technologies which have minimal impact on the environment, thereby ensuring a sustainable future for the next generation.

## Core functions of GFRC

Customer Support	Production Support	Quality Support
Technical service	Product development	Functional testing
Records and citations	Process optimization	Certifications and regulatory compliances
Pre-sales documentation	Analytical support	Statistical analysis and control
Development of processing guidelines		Customer on-site audits
Application development		Customer feedback analysis
Product literature		Compliance to quality agreements

# Regulatory Compliance

GFL is committed to 'Green Chemistry' and offers environment-friendly products using sustainable technologies. Our extensive research and development in the field of Fluoropolymers enable us to comply with all major global compliances and regulations and facilitate our customers to choose greener products manufactured by sustainable technologies.



REACH - Registration, Evaluation, Authorization and Restriction of Chemicals



WRAS - Water Regulation Advisory Scheme



EC 1935/2004 - European Commission



EC 10/2011 - European Commission



ROHS - Restriction of Hazardous Substances



FDA - Food and Drug Administration



USP Class VI - United States Pharmacopeia



3A - Sanitary standards for design and fabrication of equipment



SVHC - Substances of Very High Concern

# Sustainability

GFL is committed to social, environmental and economic sustainability through responsible processes, practices and greener initiatives not only in our products but also in our principles. While consistent operating results and strong financial performance are a business imperative, treading towards the success keeping Health and Safety as paramount, remains one of our enduring values. The Company measures the impact of its business operations through 3 key pillars of Sustainability, namely People, Planet & Profit.

SA 8000:2014	ISO 37001:2016	ISO/IEC 27001:2013	ISO 26000:2010	ISO 20400:2017
Social Accountability System	Anti-bribery and Anti- Corruption Management System	Information Management Security System	Social Responsibility Management System	Sustainable Procurement System



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