Product Information

Fluoropolymer coating, 1 coat type

POLYFLON$_{TM}$ PTFE Toughcoat enamel

POLYFLON PTFE Toughcoat enamel is a coating which contains heat-resistant polymer with high hardness in order to improve the softness of fluoropolymer, as well as having good cohesiveness and sufficient film thickness. Adhesion can be acquired with one layer only (1 coat method).

The coating film excels in mechanical properties, including hardness and wear resistance, and has superior characteristics as fluoropolymer, such as non-stick property and low friction.

1. Product Number

POLYFLON PTFE Tough coat enamel has 3 series according to differences in workability, coating film properties, and purpose. Products are indicated in Table 1 in response to each color difference.

Table 1 Products of POLYFLON PTFE Tough coat enamel

Products		Appearance of coating film	Solid content (mass%)	Specific gravity of coating	Specific gravity of coating film	Viscosity (Ford Cup #4) (sec.)(25°C)	Stability in storage(Room temperature) (months)*
TC-7100 Series	TC-7105GN	Green	Approx. 21	1.03	1.86	Approx. 25	3
	TC-7109BK	Black	Approx. 20	1.04	1.70	Approx. 30	3
	TC-7113LB	Pale brown	Approx. 20	1.02	1.77	Approx. 25	3
	TD-7139BD	Black	Approx. 19	1.03	1.70	Approx. 25	3
TC-7400 Series ***	TC-7400CR	**	Approx. 33	0.98	1.58	Approx. 20	3
	TC-7405GN	Green	Approx. 35	1.00	1.57	Approx. 20	3
	TC-7408GY	Gray	Approx. 35	1.00	1.55	Approx. 20	3
	TC-7409BK	Black	Approx. 33	0.98	1.52	Approx. 20	3
	TD-7439BDN	Black	Approx. 32	0.98	1.55	Approx. 20	3
TC-7800 Series	TC-7609M1	Photoluminescent black	Approx. 22	1.04	1.80	Approx. 25	5
	TC-7805GN	Green	Approx. 22	1.02	1.81	Approx. 20	3
	TC-7808GY	Gray	Approx. 23	1.00	1.91	Approx. 25	3
	TC-7809BK	Black	Approx. 21	1.03	1.79	Approx. 30	3

* Store in a cool and dark place. Strictly observe handling care.

** Color changes depending on the material of the base material and processing. As thinners, TC-7100, TT-7100 are for the TC-7100, TC-7800 series, and for the TC-7400 series, TT-7400 is recommended.

*** The TC-7400 series can be processed at low temperature (130°C) by adding optional TC-7400B.

2. Characteristics of TC-7000 series coating film

Table 2 shows the characteristics of POLYFLON PTFE tough coat enamel.

Table 2 Characteristics of the coating film

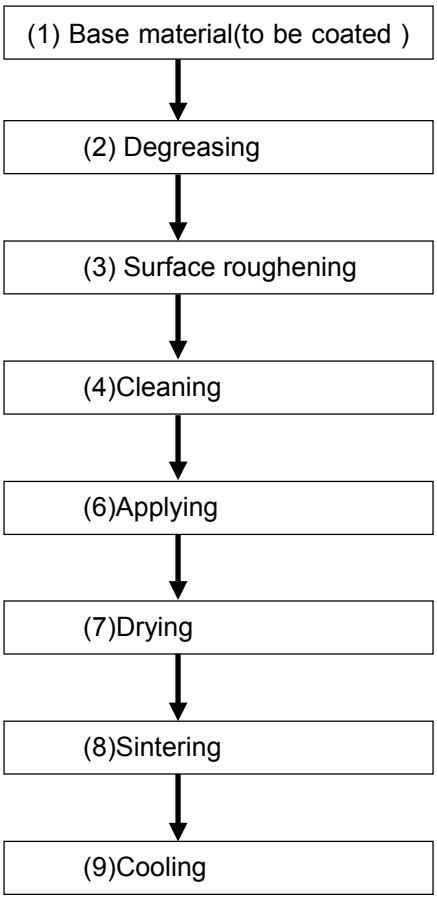
	POLYFLON PTFE tough coat enamel				POLYFLON PTFE enamel
	TC-7100 Series	TC-7400 Series	TC-7800 Series	TC-7609M1	
Maximum temperature for continuous use (°C)	220	160	250	250	260
Adhesion to metal	Excellent	Excellent	Good	Good	Good
Stretching of coating film	Small	Small	Large	Large	Large
Wear resistance※1					
Taber abrasion (mg/1000r)	12~20	25~35	30~50	30~50	8~11
Sliding abrasion (mg/cm^2)	0.1~0.2	0.2~0.3	—	—	2.4
Friction coefficient※2	0.04~0.07	0.04~0.08	0.04~0.08	0.04~0.08	0.02~0.04
Pencil hardness (Mitsubishi Uni)					
———	3H	3H	H~2H	H~2H	F~H
After immersed in boiled water for 500h	H	H	H~2H	H~2H	HB~F
After immersed in hot oil for※3 24h	—	—	F~H	F~H	B
Ericssen (aperture 10mm)	Good	Excellent	Excellent	Excellent	Excellent
Contact angle at 25°C (°)					
(Water)	102~106	92~96※4	104~108	106~110	108~112
(Hexadecane)	49~52	35~41	40	—	41
Chemical resistance (Room temperature, for 16h)					
Sulfuric acid	No change	No change	No change	No change	No change
Hydrochloric acid	No change	No change	No change	No change	No change
Nitric acid	No change	No change	No change	No change	No change
Sodium hydroxide	Not possible (Swelling)	No change	No change	No change	No change
Xylene	Not possible (Swelling)	Swelling 1.0%	No change	No change	No change
Methanol	Not possible (Swelling)	No change	No change	No change	No change

*1) Taber abrasion: with CS-17, 1kgf load, 1000 rounds.
Sliding abrasion : with SUS 23B, 55.9kPa, 2.3m/s, 10 minutes
*2) Bauden leben type, Steel ball 8mmϕ, Linear velocity 0.27cm/s, Loading 1.0kg
*3) 260°C lard oil is used
*4) In case of sintering for 3 minutes at 290°C,
(water) 101~103°, (hexadecane) 47~51°

3. Processing

●Procedure

Each series is processed as follows:



Note: Dust/grit in the atmosphere and oil/water in high-pressure air for spraying may cause spots and stains on the coating film. Please apply coating in a clean atmosphere and with using clean high-pressure air for spraying.

(1) Base material (to be coated)

It can be applied to materials which can withstand the sintering temperature of general metals (iron, aluminum, and stainless), glass, and ceramics.

(3) Surface roughening

Sufficient removal of grease and dust from base materials (sintering or cleaning with solvent) brings strong adhesion. Although roughening is not always necessary, to further strengthen adhesion, sandblasting or rubbing with emery paper is recommended.

(6) Applying

It applying with a general air-spray equipment. (Use after filtrating with a gauge-mesh of approximately 100~200μm)

Air-spray equipment:

Use general spray guns (gravity-, force feed-, and suction-systems)

Nozzle diameter of the spray gun is 0.8-1.3mmϕ and atomization pressure is 0.15-0.25MPa.

Spray with a distance of 15~25cm to the material.

(7) Drying

If you sinter immediately after applying, it may cause a failure of the coating film, such as adhesion failure, crack, and bubbles. Therefore, drying to evaporate the solvent by infrared drying equipment or a hot-air drying furnace is required. The drying conditions are as follows:

Table 3 Drying condition

Products	Drying condition	Film thickness (after sintering, μm)
TC-7100 Series	(80~100°C)×30min	Approx. 35
TC-7400 Series	(80~100°C)×30min	Approx. 40
TC-7800 Series	(80~100°C)×(20~30min)	Approx. 30
TC-7600 Series	(80~100°C)×(20~30min)	Approx. 30

Note 1) If you want to make thick film, please dry sufficiently. If you raise the drying temperature gradually or extend the drying time, you may avoid bubbling.

Note 2) If you process at high humidity, set the applied material into an infrared drying equipment immediately after spraying, especially with the TC-7100 and TC-7800 series. Applied film absorbing moisture may show spots or stain even after drying.

(8) Sintering

Sinter with a batch furnace such as an electric furnace or a continuous kiln. The standard sintering condition of each coating is as follows:

Table 4 Sintering condition

Products	Sintering condition
TC-7100 Series	280°C×30min
TC-7400 Series	180°C×30min (If you sinter 280°C×3min additionally, non-stick property improves. In this case, there may be a slight change of color.)
TC-7800 Series	380°C×(10~15min)
TC-7600 Series	380°C×(10~15min)

Note: Be careful as the color and property of the coating film may change if the sintering temperature is unstable.

4. Notes on handling

(1) Store the agent in a well-ventilated location at 5~25°C.
(2) Be careful as the agent may clot when abrasively shaken at temperatures of over 25°C.
(3) During storage, slowly shake the container once a week or every 10 days.
(4) Be careful to avoid direct contact with the agent, as it is an irritant to skin and mucus, especially the eyes.
In case such contact occurs, clean thoroughly with copious water. Mucous membranes, especially eyes, must be washed with copious amounts of water.
(5) Only eat or smoke after washing your hands sufficiently.
(6) Be careful not to inhale steam, spray mist, and waste gas during burning, and when you handle the agent please ensure sufficient ventilation. (by using local ventilation equipment)
(7) Before use, be sure to shake (refer to the dispersion method) at 15~25°C, filtrate with a metal mesh with gauge of approximately 100μm.
(8) Close the container tightly during storage. If you store in a cold and dark place to avoid freezing, it can be stored for a considerably long period (between 3 and 5 months), however it is recommended that the agent be used as soon as possible.
(9) Wash your hands sufficiently after handling.
(10) TC Series should be careful of fire. For dilution and cleaning, please use a specific thinner.
* Be sure to read the Merchandise Safety Data Sheet(MSDS) before you use. For further information, please refer to “Guide for safety handling of fluorine resin” by the Japan Fluoropolymers Industry Association.

5. Packaging

Container: Polyethylene bottle
Weight: 10kg

(In case of overseas shipping)
Container: 2 polyethylene bottles in one box
Weight: 5kg

- The products described in this material are supplied for use by general industry and not designed and manufactured for medical purposes. Their adequacy and safety for medical uses has not been tested and cannot be guaranteed. For this reason, regarding medical use, you must judge such use yourself based on tests, the views of medical experts, and legal restrictions of related authorities. Also, if you use the products in such way, we would provide them only provided you consent to the conditions and contents of contracts which we offer.
- The data released in this material is one example of the actual value, and the examples of usage in this material do not guarantee the results of application of this product to such usage.

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