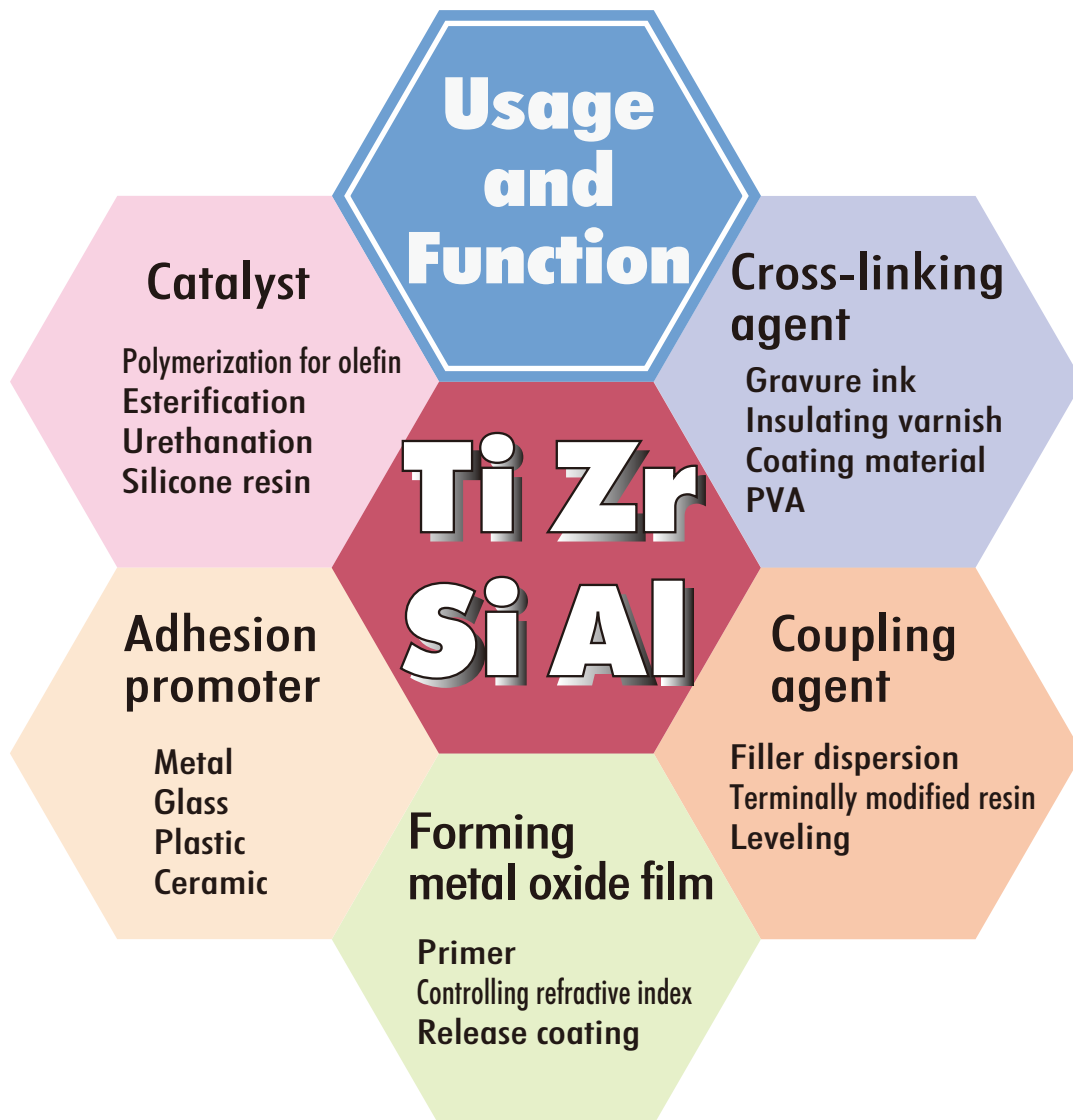

Product Information

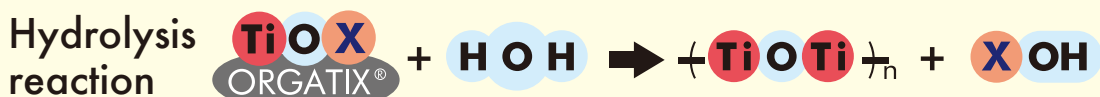
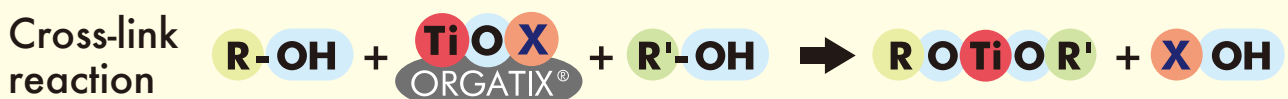
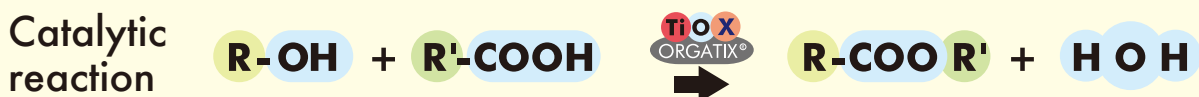


ORGATIX[®]

ORGATIX[®]



Elementary chemical reaction of ORGATIX

$$\text{Ti-OR} + \text{HO-X} \Rightarrow \text{Ti-OX} + \text{R-OH}$$


**Only
One**

Matsumoto Fine Chemical Co., Ltd. is the sole manufacturer specializing in organometallic compounds in Japan.

**Number
One**

We have been making advancements in the product development of organic titanium and organic zirconium compounds by utilizing accumulated proprietary technologies.

**New
challenges**

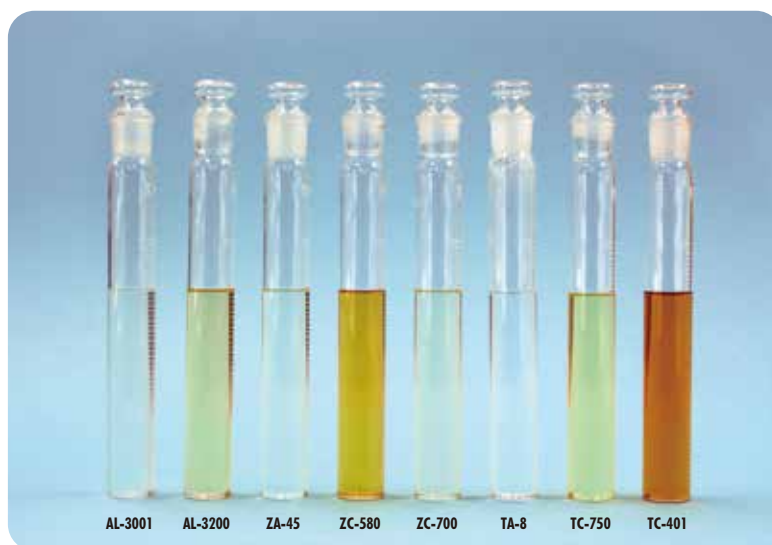
We are working on development of new organometallic compounds from aluminum, zinc, bismuth and other metals.

Matsumoto Fine Chemical welcomes your requests and inquiries.

Partners

We offer close-knit contract manufacturing services tailored to the needs of every customer.

**Product
appearance**



ORGATIX has a different color depending on its composition.

Contents

| | |
|--------------------------|------|
| Titanium Lineup | 3, 4 |
| Zirconium Lineup | 5 |
| Silicon Lineup | 6 |
| Polymer - Coating Lineup | 7 |
| SIC Lineup | 8 |
| Anchor - Coating Lineup | 8 |
| VISTEX® Lineup | 9 |

<Organic Titanate>

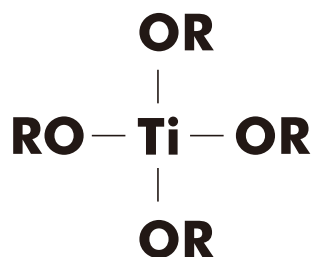
ORGATIX Ti reacts with a variety of functional groups including a hydroxy group (-OH), a carboxyl group (-COOH) and an amino group (-NH₂). It is used as additives for ink and paint and as a surface treatment agent for films, metals and glass. The titanium atom is tetravalent and 6-coordinate, and therefore, organic titanium compounds (organic titanates) have three types of structures of alkoxide, chelate (complex) and acylate.

| Stock | | | | | | | | | |
|-------------------|---------------------------|--|---|-----------|-----|-----|----|----|---|
| Category | Products Name | Formula/Chemical Name | Content/ Appearance | Inventory | | | | | Applications |
| | | | | JP | US | CN | KR | TW | |
| Alkoxide | ORGATIX TA-8 | Ti(O-<i>i</i>-C₃H₇)₄ Tetra <i>i</i> - propyl titanate (TPT) | ≥ 99% Colorless to pale yellow clear liquid | ✓ | ✓ | ✓ | ✓ | ✓ | Catalyst for · Esterification · Polymerization for olefin · Urethanation · Silanol condensation Cross linking agent for insulating varnish Binder for inorganic coating material Forming for TiO ₂ layer for various materials TiO ₂ fine particle material Piezoelectric ceramic materials |
| | ORGATIX TA-21 | Ti(O-<i>n</i>-C₄H₉)₄ Tetra <i>n</i> - butyl titanate (TBT) | ≥ 99% Pale yellow to yellow clear liquid | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | ORGATIX TA-23 | (<i>n</i>-C₄H₉O)₃Ti-O-Ti(O-<i>n</i>-C₄H₉)₃ <i>n</i> - Butyl titanate dimer (DBT) | ≥ 95% Pale yellow to yellow liquid | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | ORGATIX TA-30 | Ti[OCH₂CH(C₂H₅)C₄H₉]₄ Tetra 2 - ethylhexyl titanate (TOT) | ≥ 99% Pale yellow liquid | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Chelate (Solvent) | ORGATIX TC-100 | (<i>i</i>-C₃H₇O)₂Ti(C₅H₇O₂)₂ Titanium acetylacetonate (TAA) | 75% Reddish-brown liquid | ✓ | ✓ | ✓ | ✓ | ✓ | Crosslinking agent for gravure inks Dryer for coating materials Adhesion improvement for resins Curing catalyst |
| | ORGATIX TC-401 | Ti(C₅H₇O₂)₄ Titanium tetra - acetylacetonate (TAA) | 65% Reddish-brown liquid | ✓ | ✓ | N/A | ✓ | ✓ | |
| | ORGATIX TC-710 | (<i>i</i>-C₃H₇O)₂Ti(C₆H₉O₃)₂ Titanium ethyl acetoacetate | 63% Pale yellow to reddish-orange liquid | ✓ | ✓ | ✓ | ✓ | ✓ | Acetylacetone free crosslinking agent for gravure inks Crosslinking agent for adhesive |
| | ORGATIX TC-810 | Trade secret, Ti(O-<i>i</i>-C₃H₇)₄ Titanium dodecylbenzene sulfonate | 93% Yellowish-brown liquid | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | ORGATIX TC-1040 | Trade secret Titanium phosphate complex | 75% Pale yellow liquid | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | ORGATIX TC-750 | (<i>i</i>-C₃H₇O)₂Ti(C₆H₉O₃)₂ Titanium ethyl acetoacetate | ≥ 95% Pale yellow to reddish-orange liquid | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Chelate (Aqueous) | ORGATIX TC-300 | (HO)₂Ti[OCH(CH₃)COO⁻]₂(NH₄⁺)₂ Titanium lactate ammonium salt | 41% Pale yellow liquid | ✓ | ✓ | ✓ | ✓ | ✓ | Water base crosslinking agent Water resistant agent for PVA TiO ₂ coating agent Water base dispersing agent Catalyst for polyester polymerization |
| | ORGATIX TC-310 | (HO)₂Ti[OCH(CH₃)COOH]₂ Titanium lactate | 44% Pale yellow liquid | ✓ | N/A | N/A | ✓ | ✓ | |
| | ORGATIX TC-400 | (<i>i</i>-C₃H₇O)₂Ti(C₆H₁₄NO₃)₂ Titanium triethanolamine | 79% Pale yellow to yellow clear liquid | ✓ | ✓ | ✓ | ✓ | ✓ | |

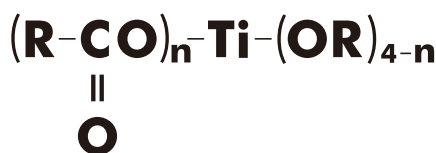
<Organic Titanate>

We also offer make-to-order products in at least the quantities listed below.

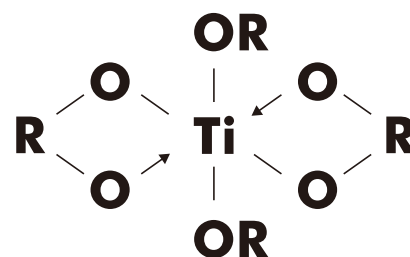
Make-to-order products are not held in stock. We can provide samples for evaluation free of charge.



Titanium alkoxide



Titanium acylate

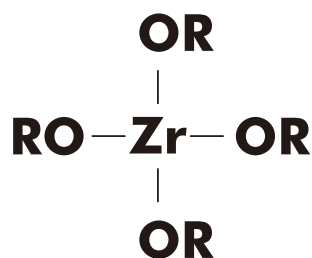


Titanium chelate

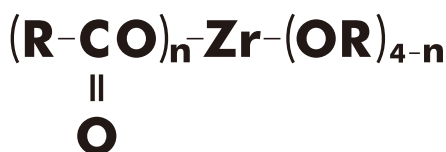
| Make to Order | | | | | | | | | |
|------------------|--------------------------|--|---|-----------|-----|-----|----|----|---|
| Category | Products Name | Formula/Chemical Name | Content/ Appearance | Inventory | | | | | Applications |
| | | | | JP | US | CN | KR | TW | |
| Alkoxide | ORGATIX TA-12 | Ti(O-<i>i</i>-C₃H₇)₄ Tetra <i>i</i> -propyl titanate (Refined) | ≥ 99% Colorless to pale yellow clear liquid | ✓ | ✓ | ✓ | ✓ | ✓ | Materials for CVD and MOCVD Nano particle materials |
| | ORGATIX TA-80 | Ti(O-<i>t</i>-C₄H₉)₄, Ti(O-<i>i</i>-C₃H₇)₄ Tetra <i>t</i> -butyl titanate (TTBT) | ≥ 83% Pale yellow liquid | ✓ | ✓ | ✓ | ✓ | ✓ | Curing catalyst for silicone resin (Low color application) |
| | ORGATIX TA-90 | Ti(OC₁₈H₃₇)₄ Tetra stearyl titanate (TST) | ≥ 98% Pale yellow solid | ✓ | ✓ | N/A | ✓ | ✓ | Additives for resin (Possible for mixing and kneading) Catalyst for polyester polymerization |
| Chelate(Solvent) | ORGATIX TC-120 | (<i>i</i>-C₃H₇O)₂Ti(C₅H₇O₂)₂ Titanium acetylacetonate | 53% Reddish-brown liquid | ✓ | ✓ | ✓ | ✓ | ✓ | Catalyst for modified silicone resin |
| | ORGATIX TC-245 | Trade secret Titanium octyleneglycolate | 68% Pale yellow liquidx | ✓ | ✓ | ✓ | ✓ | ✓ | TiO ₂ coating agent (High temperature burning type) Binder for inorganic particle |
| Acylate | ORGATIX TC-800 | (<i>i</i>-C₃H₇O)Ti(OCOC₁₇H₃₅)₃ Titanium isostearate | 77% Orange liquid | ✓ | ✓ | ✓ | ✓ | ✓ | Additive for paint |
| Chelate(Aqueous) | ORGATIX TC-315 | (HO)₂Ti[OCH(CH₃)COOH]₂ Titanium lactate (aqueous) | 44% Pale yellow liquid | ✓ | N/A | N/A | ✓ | ✓ | Water base crosslinking agent Water resistant agent for PVA TC-335 is classified as Non-DG, Non-UN |
| | ORGATIX TC-335 | (HO)₂Ti[OCH(CH₃)COO⁻]₂(NH₄⁺)₂ Titanium lactate ammonium salt | 35% Pale yellow liquid | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | ORGATIX TC-510 | (<i>i</i>-C₃H₇O)Ti(OC₂H₄NHC₂H₄NH₂)₃ Titanium aminoethylaminoethanolate | 70% Pale yellow to yellow liquid | ✓ | ✓ | ✓ | ✓ | ✓ | Adhesion improvement for resin and metal / Cosslinking agent for resin Water base inorganic coating material binder |

<Organic Zirconate>

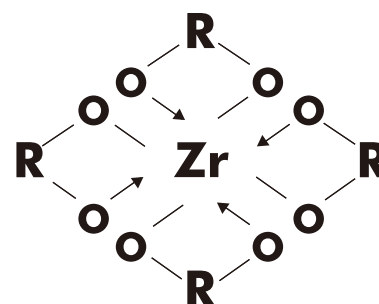
ORGATIX Zr reacts with a variety of functional groups including a hydroxy group (-OH), a carboxyl group (-COOH) and an amino group (-NH₂) similar to ORGATIX Ti. In contrast to the Ti series, ORGATIX Zr causes less coloration on materials to which it is applied. The Zirconium atom is tetravalent and 8-coordinate, and therefore, organic zirconium compounds have three types of structures of alkoxide, chelate (complex) and acylate.



Zirconium alkoxide



Zirconium acylate



Zirconium chelate

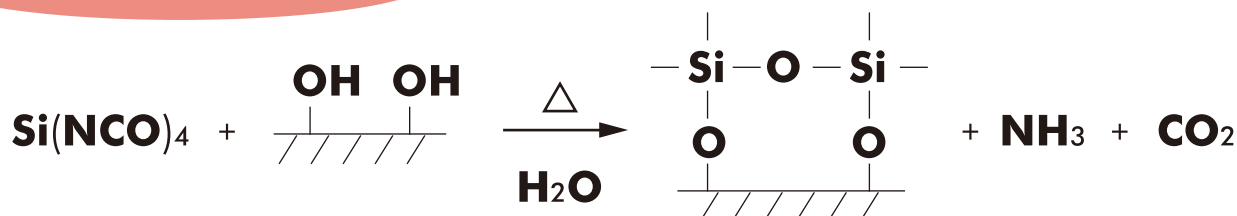
| Stock | | | | | | | | | |
|------------------|--------------------------|---|--|-----------|-----|----|-----|----|--|
| Category | Products Name | Formula/Chemical Name | Content/ Appearance | Inventory | | | | | Applications |
| | | | | JP | US | CN | KR | TW | |
| Alkoxide | ORGATIX ZA-45 | $\text{Zr}(\text{O}-n-\text{C}_3\text{H}_7)_4$ Tetra <i>n</i> - propyl zirconate (NPZ) | 75% Pale yellow to yellow liquid | ✓ | ✓ | ✓ | ✓ | ✓ | Catalyst for • Esterification • Polymerization for olefin Forming ZrO ₂ layer for various materials Nano particle material Ceramics material |
| | ORGATIX ZA-65 | $\text{Zr}(\text{O}-n-\text{C}_4\text{H}_9)_4$ Tetra <i>n</i> - butyl zirconate (NBZ) | 87% Pale yellow to yellow liquid | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Chelate(Solvent) | ORGATIX ZC-150 | $\text{Zr}(\text{C}_5\text{H}_7\text{O}_2)_4$ Zirconium tetra acetylacetonate | $\geq 99\%$ White to pale yellow powder | ✓ | ✓ | ✓ | ✓ | ✓ | Crosslinking agent for gravure inks Curing catalyst for urethane resin Catalyst for silanol condensation |
| | ORGATIX ZC-162 | $\text{Zr}(\text{C}_5\text{H}_7\text{O}_2)_4$ Zirconium tetra acetylacetonate (Fine grinding of ZC-150) | $\geq 99\%$ White to pale yellow powder | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | ORGATIX ZC-540 | $(n-\text{C}_4\text{H}_9\text{O})_3\text{Zr}(\text{C}_5\text{H}_7\text{O}_2)$ Zirconium mono acetylacetonate | 45% Pale yellow to yellow liquid | ✓ | N/A | ✓ | N/A | ✓ | Forming ZrO ₂ layer for various materials |
| | ORGATIX ZC-700 | $\text{Zr}(\text{C}_5\text{H}_7\text{O}_2)_4$ Zirconium tetra acetylacetonate (Solution type of ZC-150) | 20% Pale yellow liquid | ✓ | ✓ | ✓ | ✓ | ✓ | Catalyst Crosslinking agent • Urethane • Low odor • Epoxy resin • Reduced yellowing color |

| Make to Order | | | | | | | | | |
|----------------------|--------------------------|--|--------------------------------------|-----------|-----|-----|-----|-----|--|
| Category | Products Name | Formula/Chemical Name | Content/ Appearance | Inventory | | | | | Applications |
| | | | | JP | US | CN | KR | TW | |
| Acylate | ORGATIX ZC-200 | Trade secret Zirconium 2-ethylhexanoate complex | 80% Yellowish-brown liquid | ✓ | ✓ | ✓ | ✓ | ✓ | Curing Catalyst for • Silicone resin |
| | ORGATIX ZC-320 | $(n-\text{C}_4\text{H}_9\text{O})_3\text{Zr}(\text{OCOC}_{17}\text{H}_{35})$ Zirconium stearate | 81% Pale yellow liquid | ✓ | N/A | N/A | N/A | ✓ | Water repellent Additive for paint |
| Chelate (Aqueous) | ORGATIX ZC-126 | Trade secret Zirconyl chloride compound | 30% Clear liquid | ✓ | ✓ | N/A | ✓ | N/A | Water resistant agent for PVA • Coating for printing paper • Polarizing ceramics materials |

<Isocyanate Silane>

ORGATIX SI is a silicone compound directly bonded with an isocyanate group. As distinct from organic isocyanates, it is susceptible to hydrolysis at low temperatures.

Diagram of reaction example



| Make to Order | | | | | | | | |
|-----------------------|---|--------------------------------|-----------|-----|-----|-----|----|---|
| Products Name | Formula/Chemical Name | Content/ Appearance | Inventory | | | | | Applications |
| | | | JP | US | CN | KR | TW | |
| ORGATIX SI-310 | CH₃Si (NCO)₃ Methyltriisocyanate silane | 99% Colorless liquid | ✓ | N/A | N/A | N/A | ✓ | Forming SiO ₂ layer for various materials • Insulating layer for semiconductor • Alkali-elution prevention layer • Material for CVD |
| ORGATIX SI-400 | Si(NCO)₄ Tetraisocyanate silane | 99% Colorless liquid | ✓ | N/A | N/A | ✓ | ✓ | |

ORGATIX® Polymer-Coating Lineup

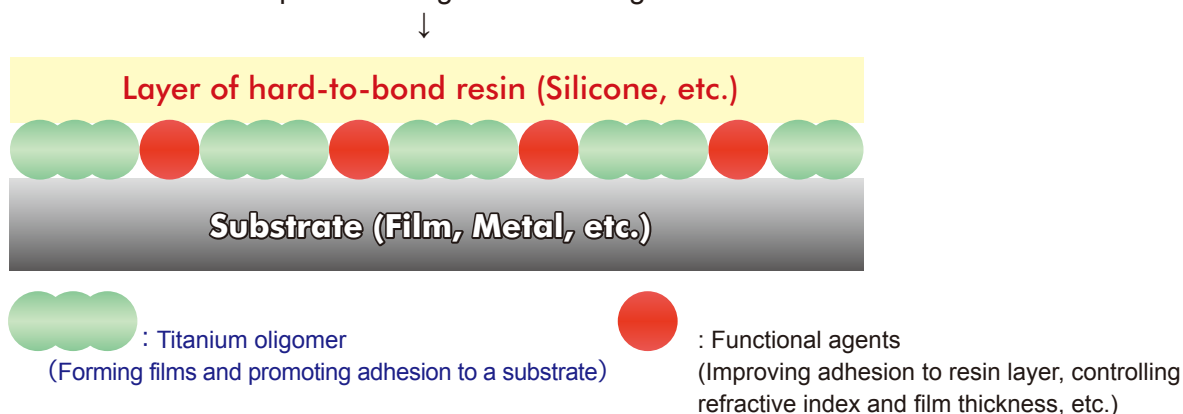
ORGATIX PC is titanium oligomer coating material offering excellent film formation. Combined with a variety of functional agents, it delivers higher performance. The product lineup includes high-refractive film forming agent (PC-200) and high adhesive primer (PC-601, PC-640). Both types of products offer high transparency.

<High refractive index coating agent>

| Make to Order | | | | | |
|---------------------------|------------------|---|----------------------------------|----------------------------------|--|
| Products Name | Component | Coating Method | Diluent Solvent/ Diluent rate | Curing | Applications |
| ORGATIX PC-200 | One (Solvent) | Roll-to-roll coating Spin coating | n-Butanol and Other 5-factor | 120°C to 150°C for 60 seconds | TiO ₂ thin film • Refractive index: 1.81 • Film thickness: 90nm |

<Primer treatment agent>

Conceptual drawing of film forming

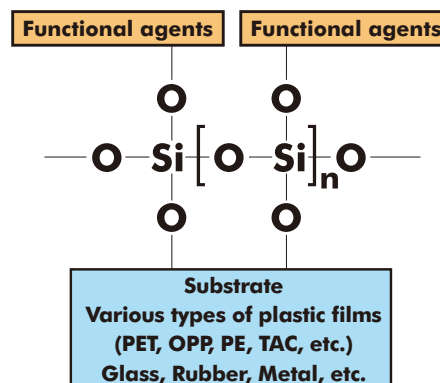


| Make to Order | | | | | |
|---------------------------|------------------|--------------------------------------|----------------------------------|---------------------------------|---|
| Products Name | Composition | Coating Method | Diluent Solvent/ Diluent rate | Curing | Applications |
| ORGATIX PC-601 | One (Solvent) | Hand painting | Original solution | Dry in room temp | Primer for various adhesion coating • Sealant for Building • Various adhesion |
| ORGATIX PC-640 | Two (Solvent) | Roll-to-roll coating Spin coating | n-Butanol 5-factor | 90°C to 120°C for 30 seconds | Primer for Silicone Coating (Addition curing type) • Separator • Release film • Adhesive tape |

ORGATIX® SIC Lineup

<Silicone release coatings>

ORGATIX SIC is a one-component coating material comprised of our own product, isocyanate silane compound (hardener) and functional agent. Coated and dried on plastic films, such as oriented polypropylene (OPP), polyethylene terephthalate (PET), or substrates (glass, metal, rubber, etc.), ORGATIX SIC is able to form a coating film which meets the needs of users.



Make to Order

| Products Name | Functions | Reaction | Appearance/ Viscosity (25°C) | Diluent Solvent/ Diluent rate | Drying | Applications |
|------------------------|----------------|--------------------------|------------------------------|-------------------------------|------------------------------|--|
| ORGATIX SIC-330 | Easy release | Condensation curing type | Colorless liquid 1-5mPa·s | Ethyl acetate 5-factor | 90°C to 120°C for 30 seconds | Silicone release coatings |
| ORGATIX SIC-434 | Medium release | | | | | <ul style="list-style-type: none"> • Film • Rubber • Tape |
| | | | | | | Sealing materials |

ORGATIX® Anchor-Coating Lineup

<Anchor Coating Agent>

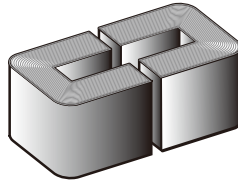
ORGATIX AC is an anchor coating (AC) material exclusively for extruded laminates. The lineup includes two products: one is a solvent coating primarily composed of organic titanates and the other is an aqueous coating primarily composed of titanium-modified water soluble resin. Both have a long track record over the years in the fields of food packages, etc.

Stock

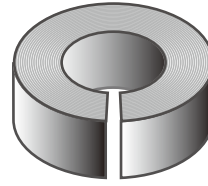
| Products Name | Component | Base | Appearance/ Content | Diluent Solvent Diluent rate | Functions |
|-----------------------|---------------|---|---|--------------------------------|---|
| ORGATIX TA-40 | One (Solvent) | Organic titanate | Colorless to pale yellow clear liquid 95% | Toluene 20 to 30 -factor | High initial bond strength Low temperature drying Available to off-line coating Possible for applying MST and vapor deposited film |
| ORGATIX WS-700 | One (Aqueous) | Polyethylenimine modified with a water soluble titanate compound. | Slightly milky liquid 9.5% | Water Alcohol 20 to 30 -factor | Applicable for various kinds of films Provide higher bond strength, compared with conventional polyethylenimine based products, |

<Acrylic impregnation resin for cut cores>

VISTEX is a one-component acrylic impregnating adhesive developed for use in fixing transformers and motors. As compared with epoxy impregnating adhesive, it requires a shorter time for impregnation and curing, and offers higher workability. VISTEX is widely used in the core industry.



Cut core



Gap core



Lamination core

| Stock | | | | | | |
|---------------|--------------------|------------------|------------------|----------------------------|--|---|
| Products Name | Appearance | Viscosity (25°C) | Curing | Impregnation | Functions | Applications |
| VISTEX V-4000 | Pale yellow liquid | 50-60 mPa·s | 170°C for 2hours | Vacuum impregnation system | Applicable for various metals Heat - resistant Easy to be used Low odor | Adhering for cut core, gap core, lamination core, motor core, |

| Make to Order | | | | | | |
|---------------|--------------------|------------------|------------------|----------------------------|-------------------------------|--------------------------------------|
| Products Name | Appearance | Viscosity (25°C) | Curing | Impregnation | Functions | Applications |
| VISTEX V-2000 | Pale yellow liquid | 15-25 mPa·s | 150°C for 3hours | Vacuum impregnation system | • Low Core loss • Low odor | Specializing for silicone steel core |

<Productivity comparison between VISTEX and epoxy adhesive>

| Adhesive | Production process | | | | | | |
|--------------------------------|--|----------------|--------------------------------|---------------------|---------------------|---------------------|--|
| VISTEX® | Preparatory drying of cores | Air cooling | Dipping or vacuum impregnation | Draining | Curing (Oven) | Air cooling | |
| | 120°C 30min. | 50°C 30min. | Room temp 30min. | Room temp 30min. | 170°C 2hours | Room temp 30min. | |
| | [Advantages] Shorter time required for impregnation, draining and curing. | | | | | | 5 hours 15 minutes for the entire process |
| Epoxy adhesive (one-component) | Preparatory drying of cores | Air cooling | Dipping | Vacuum impregnation | Draining | Curing (Oven) | Air cooling |
| | 120°C 30min. | 50°C 30min. | Room temp 30min. | Room temp 1hours | Room temp 1hours | 170°C 12hours | Room temp 90min. |
| | | | | | | | 17 hours for the entire process |

※Example with a 300 W transformer core (core weight:800 g).

Typical package (Example)

- (1) 18L can NET: 15kg
(2) 200L drum NET: 180kg

Other remarks

1. Instructions for use

Organic titanium compounds have particularly low toxicity among the products listed in the catalogue.

An example of acute oral toxicity in rats (LD50)

| | |
|----------------------------------|-----------------------------------|
| ORGATIX TA-8: 7,500mg/kg | ORGATIX TA-30: 2,000mg/kg |
| ORGATIX TA-21: 3,122mg/kg | ORGATIX TC-100: 2,125mg/kg |

Most products in the catalogue are flammable materials. ORGATIX SI and some products have high toxicity (SI-400: LD50 (mouse) = 371 mg). Make sure to read the Safety Data Sheet of each product before use.

2. Instructions for storage

The products listed in the catalogue are generally susceptible to hydrolysis and react with water and moisture in the air. Caution should be exercised in storage and handling of the products. Deterioration or discoloration may occur if they are exposed to direct sunlight and high temperatures for a long period of time. Avoid exposure during storage. Keep the container tightly closed and store in a cool, dark place (below 25°C unless otherwise specified).

3. Available supply quantity

Some products may be limited in supply. Contact your local sales representative before placing an order.

The information provided in the catalogue is based on the knowledge available as of the date of issuance and the data measured by Matsumoto Fine Chemical under certain conditions. No warranty is made as to the fitness of products for individual purposes.

FAQ

Q. Do you offer sample free of charge?

A. Yes. We offer samples in a 100 ml glass container (with some exceptions).

Q. I found white precipitate in the sample. What caused the deposits?

A. The precipitate are metal oxide produced by hydrolysis. Deposits may occur if you open and close the cap of the container repeatedly. If there are precipitate in unopened sample, contact us and we will send you a new sample for replacement.

Q. The entire product (sample) is frozen. What should I do?

A. Some products have a high melting point and may be frozen. If your sample is frozen, melt it unopened in a hot water bath (at 40°C to 60°C). High-melting-point products include ORGATIX TA-8 (17°C), TC-750(28°C) and SI-400 (26°C).

Q. The product to which ORGATIX was applied is colored. What caused this?

A. Organic titanium compounds readily cause coloration. It is primarily because of "color development by chemical reaction." This occurs when an organic titanium compound forms a coordinate bond particularly with a substance having a conjugated double bond such as acetylacetone and phenol. Coloration in yellow to red-brown tends to occur. Organic zirconium compounds, on the other hand, are less likely to cause such coloration.

ORGATIX®



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