

FOSPIA

Optical Solution Provider

Fast UV-curable / Low Refractive Index

Primary & Secondary Coating Resin

Low Refractive Index Polymer Cladding Resin

UV Curable Ink

Ribbon Matrix Resin / Cable

3D Printing Resin



About us

Fospia was founded on 2016 and stands at the R&D forefront of next generation materials in optics and photonics as well as in optical solutions that support display, telecommunication, military, medical, sensing, and industrial laser. We aim to build a brighter future through better optical solutions.

Fospia takes pride in developing some of the world highest performance UV coating materials at manufacturing scale. Approved by the Korean government, Fospia's R&D center is equipped with state-of-the-art facilities that include the full line of measurement and characterization tools and production facilities. This includes a cleanroom that is maintained at 1,000pcs. Our highly motivated and skilled labor force with decades of experience guarantee customers' satisfaction along with the most effective and efficient management.

To meet customers industrial development and production requirements, we pay attention to our customers voices and communicate closely with our customers to provide best solution. Our dedication to excellence brings the world's best portfolio for standardized and customized optical materials.

We are capable of customizing polymer cladding resins according to customers' needs, such as refractive index, viscosity, modulus, adhesion, curing methods and etc.

Your trust will undoubtedly motivate Fospia to endeavor for developing the world's most reliable products with the highest quality.

Fospia welcomes your challenges and requests for optical materials.

Do not hesitate to contact us.

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EFiRon SPC Series

Environmentally
Non-hazardous

- Refractive Index from 1.325 to 1.452 (Numerical Aperture from 0.00 to 0.61 at 852nm)
- PFOA and PFOA Precursor Free, satisfying the environmental regulations by EPA.
- Optical Applications : Laser Fiber, Fiber Recoating, POF(PMMA), HPCS Fiber Biomedical Fibers, Medical Device and etc.

EFiRON SPC is world's first **environmental friendly** commercialized UV-curable Fluorine-acrylate polymers based on the patented fluorine technology. It provides customers with a wide range of low refractive Index.

EFiRON SPC can serve as a cladding for silica optical fibers, and optical waveguides with very low attenuation and excellent optical guidance from 350nm to 2,000nm. It can be applied for telecommunication, imaging, and optical sensing

EFiRON SPC can ensure environmentally healthy conditions for both manufacturer and end users in specialty optical fibers, along with various biomedical applications

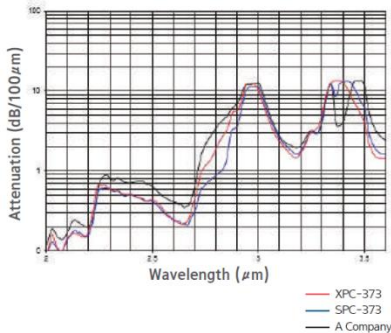


EFiRon XPC Series

High Thermal Resistance
High Glass Adhesion

- High thermal and high power resistance
- Enhanced endurance and moisture resistance, and excellent adhesion to silica
- Optical Application
 - High power laser fiber
 - High temp. thermoplastic coated specialty fiber

Fospia shares some of the customers' feedbacks for XPC!



EFiRon XPC has faster curable properties(0.5J/cm²) and high modulus. High modulus allows it to be applied to high temperature high voltage(400~1,000 watt) application with a proper cooling device.

EFiRon XPC has low attenuation (20~30% lower than major competition) in high pressure, high temperature and corrosive environment.

EFiRon XPC has excellent high power resistance, showing 1.5 times higher maximum pump than other competing polymer resins.

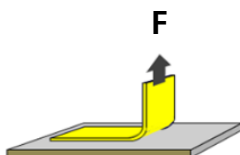
EFiRon XPC is suitable for high power single coating application due to no stickiness on the surface after cured, resulting in no need to overlaid the fiber.



EFiRon HDC Series

High Glass adhesion
Good water repellency

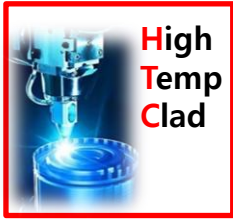
- Refractive Index from 1.360 to 1.383
- High Glass adhesion
- Water proof characteristics
- Optimize the adhesion



| Samples | Adhesion (N/25mm) |
|---------|-------------------|
| SPC | < 1.0 |
| HDC | > 3.0 |



Low refractive index Polymer Cladding resin

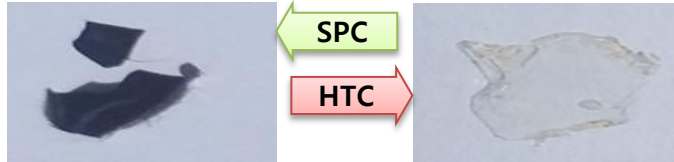


**High
Temp
Clad**

EFiRon **HTC** Series

Excellent Thermal Resistance
High Glass Stickiness

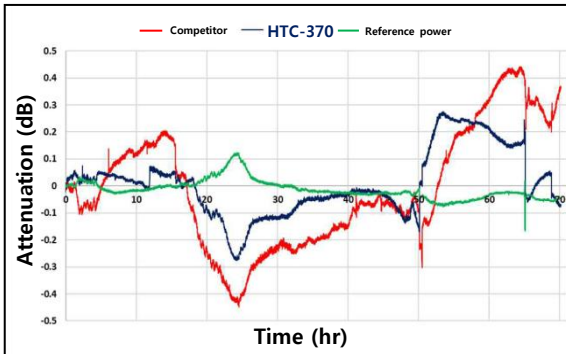
- Refractive Index from 1.36 to 1.37
- High thermal resistance
- Optical Application
 - YDF laser fiber
 - High power laser
 - Military & Industrial laser



Heat test at 300°C 1hr

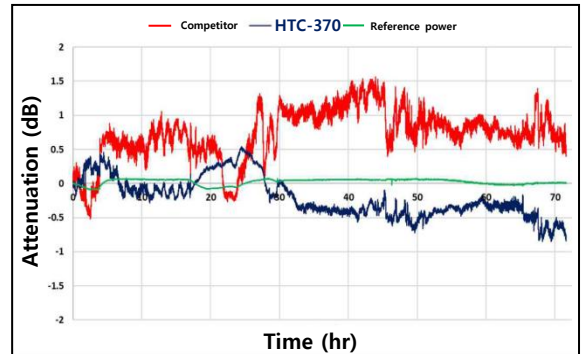
EFiRON HTC was developed with brand new polymer backbone for the high power laser application

YDF laser Water sock test (80oC, 72hr)



| Samples | Attenuation (dB/m) | Scattering fluctuation | Coating damage |
|----------------|--------------------|------------------------|----------------|
| Competitor | 0.037 | Large scattering | Damage |
| HCT-370 | -0.007 | similar | None |

YDF laser Heat test (150oC, 72hr)



| Samples | Attenuation (dB/m) | Scattering fluctuation | Coating damage |
|----------------|--------------------|------------------------|----------------|
| Competitor | 0.041 | similar | None |
| HCT-370 | -0.078 | similar | None |



Low refractive index Polymer Cladding resin



Modulus

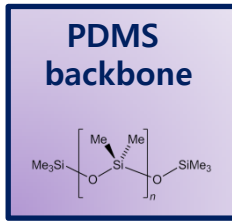
Adhesion

EFiRon **APC** Series

High modulus
Good Glass adhesion

- Refractive Index from 1.36 to 1.383
- Combination of high modulus & good adhesion
- Water/thermal resistance application
- Formulated with newly developed silane technology
- Optical application : Special optical fiber, High power

Low refractive index Polymer Cladding resin



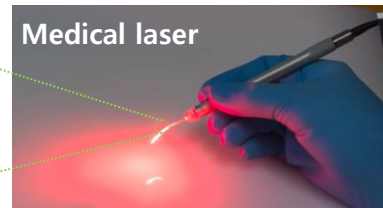
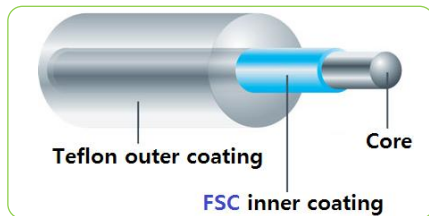
EFiRon FSC Series

High Thermal Resistance
High Glass Stickiness
High Teflon Adhesion

- Refractive Index from 1.404 to 1.490
- High thermal resistance
- Optical Application
 - Medical laser fiber
 - Inner coating with **Teflon** outer coat

EFiRON FSC was developed with PDMS(polydimethylsiloxane) backbone which has high thermal durability and good glass stickiness.

EFiRON FSC can be applied as the inner coating for the medical laser fiber due to its high thermal resistance and good adhesion to the **PTFE** polymer surface.



High refractive index UV-Resin

HPC Series

HPC Series

High Refractive & Adhesive
High Modulus 200

- High Adhesive to glass & plastic surface
- Organic & Organic-Inorganic hybrid
- Refractive Index from 1.5 to 1.65
- Applicable in Display

Single Coating Resin

SC Series

SC Series

One-stop coating on fiber
Good peeling off properties



- The remarkable combination of flexible primary and protective secondary minimizes light loss and maximize durability.
- The lower sensitivity to micro bending is excellent for the development of special optical fibers designed to be less sensitive to bending, resulting in fewer complications during cable routing, operating, and handling.

Primary & Secondary Coating Resin

Fospia's UV curable coating products are suitable even for harsh environment including colder regions. The coating resin has high-quality homogeneity and clarity along with the distinctive properties;

Primary Coating : High Elongation and Adhesion to glass and Low modulus and Tg providing high flexibility and minimizing the potentials for production complication.

Secondary Coating : High modulus and Tg providing high protection

- The remarkable combination of flexible Primary and protective Secondary minimizes light loss and maximize durability.
- The lower sensitivity to micro bending is excellent for the development of special optical fibers designed to be less sensitive to bending, resulting in fewer complications during cable routing, operating, and handling.



UV Curable Ink

UV ink is optimized for coloring of optical fibers, with custom designed colors, high solvent resistance, good adhesion and optimal viscosity along with rapid cure property. The highest clarity with no particle enhances the performance of high speed automation systems.

- Fospia UV ink has the fastest curing rate (line speed can be applied to 3000mpm).
- Its vividness in color and excellent properties yield 15%~30% less dosage, resulting in cost reduction.
- It creates less dark fume reducing maintenance expenses and production problems.



Ribbon Matrix

UV curable polymer matrix material for fiber ribbons uniformly coats fiber ribbons. There are two types; one with easiness to strip and the other with enhanced adhesion. Both can be removed without debris to allow efficient splicing.

Ribbon Matrix Cables for 4, 8, 12 fiber ribbons

- Excellent striping breakout capability
- Highspeed spooling
- Optimized Young's modulus for post process
- High chemical and water resistance



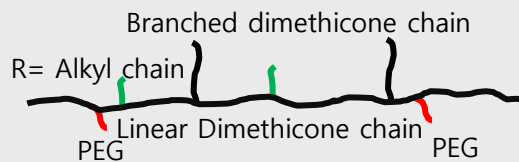
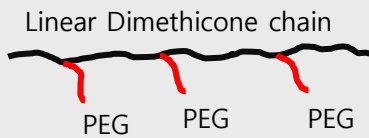


Silicone Surfactants

Fospia silicone surfactants are colorless to light yellow, transparent liquid that is composed of PEG-n Dimethicone or alkyl modified branched silicone emulsifier. Due to its good compatibility in silicones, organic oils, and esters, these silicone surfactants can be used in skin care, makeup, and sun care applications.

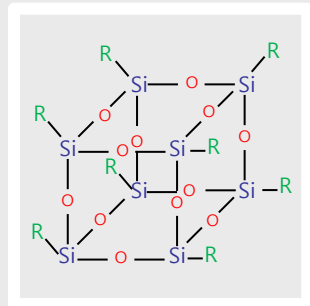


***INCI: PEG-10 Dimethicone / Lauryl PEG-9 Polydimethylsiloxyethyl Dimethicone**



Silicone Film Formers

Fospia silicone film formers are used in skin care, sun care, and more specifically color cosmetics. Exhibits characteristics such as wash-off resistance, long lasting color, non-transferability and enhanced shine. Shows pigment compatibility and compatibility with organic sunscreens.



***INCI: Cyclopentasiloxane (and) Polypropylsilsesquioxane**



Silicone Elastomers

Fospia silicone elastomers are colorless to light yellow paste to gel that is slightly hazy to cloudy and is composed of Dimethicone and Dimethicone/Vinyl Dimethicone Crosspolymer. This silicone elastomer is a thickening agent with a mat effect that has good compatibility with silicones and leaves the skin with a soft feeling. It is used for skin care and make-up applications.



***INCI: DIMETHICONE (AND) DIMETHICONE/VINYL DIMETHICONE CROSSPOLYMER**



Patents

Primary/Secondary Coating(4 patents in Korea)

- 10-1018357, "Photo-curable coating composition having improved hot waterresistance", KR
- 10-1006989, "UV curable coating composition having improved water resistanceand optical fiber....", KR
- 10-1021577, "Radiation curable composition", KR
- 10-1001656, "Radiation curable resin composition and optical fiber made by usingthereof", KR

Low RI Polymer Cladding(3 Patents in Korea and 1 in USA)

- 10-0500191, "UV-curable resin composition for cladding layer of optical fiber", KR
- 10-1003002, "Resin composition for cladding layer of optical fiber", KR
- 10-1051287, "Radiation curable oligomer, radiation curable resin composition comprising... ", KR
- 10/527,372, "Radiation curable oligomer, radiation curable resin composition for optical fiber", USA

Ribbon Resin(2 Patents in Korea, 1 in USA)

- 10-0579007, "Photo-curable and antistatic resin composition for optical fiber coating", KR
- 10-05714575, "Photo-curable resin composition for coating optical fiver ribbon". KR
- 09/69027, "Resin composition for manufacturing optical fiber ribbon and method for preparing resin for....", USA

UV curable Ink(2 Patents in Korea)

- 10-1025721, "Non-Solvent Type, UV-Curable White Ink Composition", KR
- 10-0586492, "Photo-curable polymeric resin composition for optical fiber in-linecoating", KR

Functional Polymer Materials(8 Patents in Korea, 1 in USA)

- 10-0498189, "Method for producing a preform for graded-indexplastic opticalfiber by high speed revolution.", KR
- 10-0610230, "Fabrication of polymer waveguide using UV-Molding method", KR
- 10-0487025, "Photo-curable resin composition for optical waveguide and Type,UV-Curable White Ink...", KR
- 10-0387535, "Optical adhesive composition comprising colloidal silica filler andmethod for preparing the same", KR
- 10-0387536, "Optical Adhesive composition for manufacturing optical adhesivefiller and a method for...", KR
- 10-0502993, "Optical Adhesives for optical transmission parts", KR
- 10-0348702, "A method for preparation of transparent conductive thin-film byrapid thermal annealing....", KR
- 10-0401134, "Methods for preparing organic-inorganic hybrid, hard coating liquidcomprising the hybrid...", KR
- 10/515,574, "Methods for preparing plastic optical fiber preform", USA

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