

# Functional Material

## Premium, High Performance Anti-fog Coating and PET Film

**Richard Chang**

Vice President and General Manager, FSI Coating Technologies

**Masanori Iwazumi**

Anti-Fog Coatings and Film Team Leader, FSI Coating Technologies

### ABOUT US

FSI Coating Technologies (FSICT), formerly Film Specialties, Inc. was founded in 1986 to develop and market more effective anti-fog and scratch resistant products for commercial and industrial products. Our anti-fog coatings and films meet the challenging demands of the worlds' most prestigious brands. Today, FSICT is the recognized leader in the development, manufacture, and distribution of premium patented anti-fog technology.

Leveraging the unique integration of nanotechnology with sol-gel chemistry has led to the development of new technologies that transform the performance of coating. The FSICT science team has developed a variety of unique patented proprietary anti-fog and abrasion resistant solutions that meet a variety of specialized requirements.

FSICT offers a wide variety of premium, high performance, anti-fog solutions. Applications include medical, military, safety, and sports eyewear, as well as industrial sheet and PET (polyester) film for commercial freezer display doors. Protective abrasion and anti-fog coatings and films can be applied to virtually any product, piece, or part made of glass, plastic, or metal substrates to enhance durability and appearance.

We differentiate ourselves with cutting-edge technology, world-class operations, and a large distribution network in the Americas, Europe, and Asia to support global customer relationships. Our global Customer Care team is regionally located to support you in your local language and time zone.

### EVOLUTION

Initially marketed as a thin-film laminate with an adhesive backing, the company has broadened its product line, and strengthened its reputation as the pioneering champion of condensation control material science. The product breadth includes innovative anti-fog coated film to liquid and hard coating systems that enhance the performance and durability

of products in a wide variety of industries.

In 2010 SDC Technologies, Inc., a subsidiary of Mitsui Chemicals, Inc., acquired FSICT. SDC Technologies is the global leader in performance-based abrasion resistant coatings used in a variety of applications from aerospace and automotive parts to vision eyewear. Mitsui Chemicals, Inc. (MCI) is the leading manufacturer and supplier of value-added specialty chemicals, plastics, and performance materials for multiple industries including agriculture, automotive, building and civil engineering, electronics, energy, healthcare, packaging, and ophthalmic industries. Headquartered in Japan, MCI is also an innovator of premium high-index optical monomers, globally recognized under the MR Series MR-8, MR-7, MR-10, and MR-174 brand names used in ophthalmic lens materials.

Combining and leveraging these expanded resources accelerates our ability to develop best-in-class products and bring them to market rapidly and globally. The objective is to provide comprehensive anti-fog solutions, powered by innovation and delivered rapidly to help our customers maintain a competitive edge.

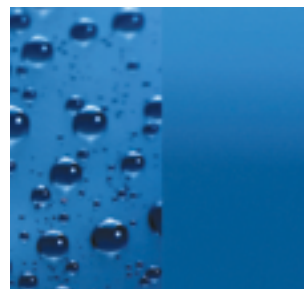
### PRINCIPLE BEHIND ANTI-FOG COATING

Anti-fog solution treatments were first developed by NASA on transparent glass and plastic surfaces for optical applications on helmet visors during the Gemini 9A space program in 1966. Today, FSICT's Visgard anti-fog film is specified for the USA Space Station face helmets, used by astronauts to ensure optical clarity during space exploration missions.

The principle behind anti-fog technology is to create a hydrophilic surface that attracts and absorbs moisture and creates condensation. Water condensation is caused when warm air, which holds more moisture, meets a colder surface onto which water can condense and settle. When too much moisture settles, this leads to water accumulation that needs to go somewhere, resulting in water droplets.

Fog develops in numerous ways as a result of changing climate or dramatic temperature conditions such as freezing or humidity forming condensation as a result of radiation, moist air passing over a surface from wind, or precipitation, creating a visibility hazard where optical clarity is imperative.

Anti-fog agents are chemicals which prevent condensation of water droplets on a surface that resembles fog. These agents may also include hydrophobic properties which repel water and are unable to dissolve or mix with water. Anti-fog agents might include surfactants to minimize the surface



tension of water such as detergents, hydrophilic coatings using polymers, and hydrogels, as well as hydrophilic colloids and nanoparticles such as titanium dioxide which become highly hydrophilic under ultraviolet light. Anti-fog agents are available in various application formats including spray, cream, gel, and wet wipes. Higher performing fog resistant versions are applied during the manufacturing process using anti-fog coatings on a thin coated film applied to the surface of an object.

FSICT anti-fog products eliminate issues associated with condensation, fogging, or misting, providing a long-term solution combined with improved abrasion resistance. These coatings are formulated with anti-fog agents chemically bonded or "locked" into the polymer matrix of the coating, delivering permanent water washable fog protection.

Unlike alternative anti-fog coatings, FSICT anti-fog technology will remain effective after repeated cleaning and, in many cases, will outlast the useful life of the coated article. FSICT products do not require the use of lens cleaners which are designed to temporarily replace the anti-fog agents depleted by daily use. Additionally, these coatings are flexible and formable, suitable for a wide variety of substrate and industry applications.

## ANTI-FOG COATING CHARACTERISTICS AND PHYSICAL VALUES

### Anti-Fog Product Suite

FSICT's premium, comprehensive, patented, anti-fog coating product suite delivers the high-performance, permanent, and water washable anti-fog durability required in today's de-

manding markets. These products offer superior water sheeting action and anti-fog properties for optimum clarity. FSICT provides the world's most recognizable brands with premium polyurethane or polysiloxane-based anti-fog protection for a variety of substrates, including additional features to further enhance product specifications such as abrasion, chemical, and impact resistance. Available in primer and primer-free versions, these coatings are also thermoformable, tintable, and flexible for spin, flow, roll-to-roll, and dip coat applications.

### FSICT innovative patented technologies include:

- Abrasion, Chemical, Impact and Scratch Resistant Coatings
- Anti-Fog Film, Sheet, as well as Complimentary Coatings & Primers
- Flexible, Thermoformability & Anti-Reflective Compatible
- Environmentally Friendly, Energy Saving Product Solutions
- Specialty Custom Application Development

### Easy to Integrate into Your Existing Operations

Taking coating performance to a whole new level, the benefits of using FSICT coating systems include:

- Products provide best-in-class performance in a single application
- Primer-free product offerings economically accelerate the production process
- Easy to use and highly stable products, can be stored at room temperature
- Cost-effective, long product service life reduces frequent tank change outs

### FSICT Coating and Film Features Include:

#### COATING FEATURES

- Abrasion Resistant
- Anti-reflective Compatible
- Anti-static
- Chemical Resistant
- Compatibility with Metalizing Treatments
- Environmental Stability
- Flexible
- Hydrophilic
- Impact Resistant
- Mirror Coating Compatible
- Meets or Exceeds Standards (EN-166, EN-168)
- Optical Clarity
- Scratch Resistant
- Tintability
- Water Sheeting

#### APPLICATION METHODS

- Dip
- Flow
- Roll-to-Roll
- Spin
- Spray (Coating Applications)
- Wet or Dry Lamination (film applications)

#### COATING CATEGORIES

- Anti-fog (Permanent, Water Washable)
- Formable
- Primer & Primer-free
- Thermal Cure

#### SUBSTRATE MATERIALS

- Acrylic
- CR-39 & RAV 7
- Glass
- High-index Lens (MR Series MR-8, MR-7, MR-10, and R-174)
- PET Film and Sheet
- Polyamide (Optical Nylon)
- Polycarbonate and Other plastics
- RAVolution and Trivex

#### PART TYPES

- Cast
- Fabricated
- Film (for coating applications)
- Injection-molded
- Sheet

- Environmentally friendly, PET anti-fog film maximizes visual merchandising while reducing freezer display door energy consumption
- Products meet the most demanding industry test requirements in the harshest environments, uniquely capable of accommodating the most dynamic production needs
- Products can easily be integrated into your coating operations, requiring no pre-mixing or special equipment
- Available globally, multi-substrate compatible coating solutions streamline manufacturing, dramatically improving your yields and profitability
- Access to FSICT's global technical support team for all your product validation and application requirements

## Differences between Anti-Fog Coating & Film Product Solutions



FSICT permanent anti-fog coatings are best suited to products that have a unique or highly curved or three-dimensional (3D) shape, where dip coating may occur simultaneously on both sides of an object or material. For example, ski goggles can be treated

with abrasion resistance coating on the exterior lens surface and anti-fog coated on the backside to prevent fog caused by human breathing. Optically clear, this typical application provides the best of both worlds—protection from scratching on the outside and anti-fog on the inside where it's needed most, serving to extend the product use life and appearance. Other applications benefiting from double coated protection include swimming goggles, sports, sun, safety, and military eyewear where optimal visibility is imperative.

Hard coats are more expensive than film alternatives because coating equipment is necessary. However, the advantage of coatings over film is that they are permanent and can be applied during manufacturing in flow, dip, or spin application processes. Films

are best suited to flatter surfaces with minor shape variance, and are a less expensive disposable alternative that does not require coating equipment. Simply peel the film off the item and replace when needed. Film is most commonly used on motorcycle windshields or windscreens as well as safety helmet visors.



## Anti-Fog Film Applications



FSICT provides innovative anti-fog solutions for numerous industries, delivering premium durability for use on medical and electronic devices. These products enhance the clarity of commercial display freezer cases, face shields, visors, masks, and other sports

equipment. FSICT also offers anti-fog treated PET film designed for applications ranging from simple lens laminations to complex multi-functional instrument panel overlays.

## ABOUT ANTI-FOG FILM

### History of the development of polyester films

PET Film (polyethylene terephthalate) referred to as polyester film, was originally patented in 1941 by British chemists John Rex Whinfield and James Tennant Dickson, employees of the Calico Printer's Association of Manchester and first manufactured by Imperial Chemical Industries (ICI). Further research led to polyesters made from chemical substances found mainly in petroleum which are manufactured in fibers, films, and plastics. Dupont purchased the patent rights to the polyester research and later developed a much stronger polyester PET film in the early 1950s. Today many products are made using PET films under generic and branded names such as Dupont Teijin Film's Mylar and Teijin.

## GENERAL PRODUCT TECHNICAL SPECIFICATIONS AND CHARACTERISTICS

### Visgard Abrasion, Chemical and Scratch Resistant Anti-Fog Coatings

FSICT coating and film solutions are designed to improve the utility and quality of "Your Brand."

FSICT anti-fog coatings are applied to a variety of plastic substrates in film, sheet, and molded part form. These best-in-class technologies are used in applications such as automotive lighting, architectural glazing, commercial freezer doors, and disposable surgical masks.

Fogging occurs when water forms tiny droplets on the surface of a lens resulting in obscured vision. All FSICT anti-fog products are hydrophilic so moisture sheets out invisibly on the coated surface providing for clear, unobstructed vision. Unlike competitive technologies, the anti-fog agents are not lost after water immersion or repeated cleaning. FSICT anti-fog products will not saturate and fail as will competitive materials that function



by absorbing condensation.

Visgard coatings offer an unmatched combination of properties for optical applications, incorporating permanent resistance to fogging, scratching, and chemical attack. The coating is intended for use on polycarbonate,

CR-39, nylon, and certain other clear plastics, without primers. Suggested applications include lenses, visors, windows, and mirrors. A primer is available for applications on glass.

The unique combination of abrasion and fog resistance properties allows products to be coated once with a single solution rather than coating one side to protect against scratching and the other side for fog resistance. Visgard coatings are elastic and non-brittle polyurethanes that do not degrade the impact strength of molded parts. Visgard will not crack when flexed and coated parts can be thermoformed to small radius bends without loss of performance.

### **Cutting-edge technologies, advancing the scientific development of anti-fog coatings and films.**

Visgard scratch resistance is equal to many commercial anti-scratch finishes. Anti-fog properties are retained after repeated washings and years of use. Most other anti-fog coatings lose their active ingredient or become saturated and fail after washing only once. Visgard consists of cross-linked hydrophilic polymers that cause condensed moisture to spread invisibly rather than forming droplets which appear as fog. Anti-static properties are an added benefit; however, the magnitude will vary with humidity. Chemical resistance is also very good.

### **Visgard key performance properties include:**

- Superior Abrasion, Chemical, Scratch Resistance
- Exceptional Optical Clarity
- Primer-free Adhesion to Polycarbonate (PC)
- Thermoformable & Flexible
- Tintable at Room Temperature

### **Typical Anti-Fog Film Applications:**

- Architectural & Building (Conservatories/Greenhouses, Mirrors)
- Automotive & Transit (trains, planes, automobiles, motorcycles, buses/coaches)
- Commercial Freezer Display Cases
- Electronics (HUD, LED, LCD)
- Medical & Safety

### **Anti-Fog Film Products**

FSI Coating Technologies can deliver a variety of anti-fog coated films for a large assortment of medical, industrial, and commercial applications. Our anti-fog coatings can be used on a variety of substrates including polycarbonate sheets and films to special order parts and appliquéés.

Our anti-fog treated PET film was designed for use in applications ranging from simple lens laminations to complex multi-functional instrument panel overlays.

### **Anti-Fog PET Film Products**



Vistex treated PET films prevent fogging under all extreme temperature and humidity conditions. This product consists of a unique optically clear, cross-linked polymer cured on clear polyester film. These films differ from alternative products in that anti-fog properties are not

lost after water immersion or repeated cleaning. The anti-fog coating is not adversely affected by brief exposure to most industrial chemicals and organic solvents. Vistex films are in stock in a width of 58". Custom widths and appliquéés are available upon request.

Our film can be properly installed using a pressure roll lamination machine or by a professional window film installer for application to plastic, metal, and glass substrates. We also offer 2 mm and 4 mm thickness; custom thicknesses are available upon request. The untreated surface has an adhesion promoting treatment for laminating and printing.

### **Typical PET Anti-Fog Film Applications:**

- Architectural Glazing (Conservatories/Greenhouses)
- Bathroom & Shower Mirrors
- Commercial Freezer & Deli Display Case Doors
- Industrial Safety & Sports Visors, Eyewear & Masks
- Instrument Crystals & Display Lenses

### **Handling & Use**

For best results use dip withdrawal speeds of 2.5 to 5 mm/sec. (6 to 12 inches per min.) in a clean-room environment. A solution viscosity range from 20 to 40 cps is desirable; although good coatings can be produced over a much wider viscosity range by adjusting percent solid, dip speed, air dry time, and solution temperature. Target coating thickness is 5 to 7 microns dry. Abrasion resistance and anti-fog performance increase with coating thickness.

## Typical Anti-fog Product Range Physical Characteristics

Appearance*	Light blue to blue-green
Density	0.930-0.990 g/cc
Solid Content (by weight)	29.5-30.5%
Solvents	Diacetone Alcohol, Glycol PM Ether, Texanol
Refractive Index	1.532
Viscosity (Brookfield)	30—55 cps

\*This coating will appear colorless on treated parts. The blue is added to enhance brightness.

### Cure

The best cure is obtained by heating for one hour at 125°C (257°F). Check actual surface temperature with temperature indicating labels.

### Chemical Resistance

Visgard coatings will resist exposure to most alcohols, ethers, and aliphatic hydrocarbons, including gasoline and jet fuel. They will also withstand commercial glass and lens cleaners, even those containing ammonia.

### Shelf Life

Six (6) months from date of shipment if stored in tightly sealed containers in a cool, dry place - longer if refrigerated.

### Tinting

Cured Visgard coatings will accept commercial ophthalmic dyes at room temperature without sacrificing their anti-fog properties. Usually only 1 to 5 min. dip time is required, and gradient tints are easily produced by controlled withdrawal.

## APPLICATIONS

### Multiple anti-fog coated film applications include:

- Freezer, refrigerated, and deli display cases to prevent fogging
- Bathroom mirrors and shower doors to eliminate steaming and water sheeting or spotting
- Greenhouses or conservatories, anti-fog coating prevents moisture and condensation build up as well as provides anti-yellowing UV protection to polycarbonate building structures
- Sports, military, safety, and motorcycle visors, shields, and goggles where anti-fog performance and optical clarity are imperative
- Transportation industry products such as car instrument display lenses and motorcycle windscreens

## MARKETS SERVED

### Automotive & Transit



Anti-fog and abrasion resistant water-washable hard coatings can be used on a variety of materials where scratch resistance and UV protection are required. Applications include meter lens and headlight assemblies, rearview and side mirrors, instrument panels, displays and gauges for airplanes, automobiles, buses/coaches, boats, trains, and motorcycles. FSICT anti-fog coatings can also be applied to the windows of aircraft, marine, and automotive vehicles to prevent fog and condensation, delivering optimum visual clarity.

### Electronics



FSICT products are well-suited to electronics lending scratch resistance, durability, and process performance to products often characterized by small form factors and multiple components of varying substrates. We provide superior coating solutions for devices such as MP3 Players, PDAs, mobile phone windows and casings, LCD and plasma screens, HUD (heads-up displays), LED, and digital billboard displays as well as cameras and watches.

### Medical & Safety



To address the current trend for anti-fog condensation control, we offer high-performance anti-fog film, sheet, and complementary coatings specifically designed to meet the industry's high standards and testing requirements. Medical and safety applications range from safety eyewear, visors, and face shields to medical devices such as surgical camera equipment, cardiovascular stents, and vascular implant devices.

## Military & Security



Our anti-fog coatings are a natural fit for military and security face shields and visors, where uncompromising visual clarity is imperative. Additional features such as abrasion, chemical, impact, and scratch resistance also provide protection for bullet or shatter proof security glass.

## Specialty & Custom Applications



From simple to more complex designs, our support team can assist you with initial product design to production. Recognizing each customer's unique needs, our expert scientists carefully review product requirements to determine the best existing product, or develop an alternative customized coating formulation. We also offer contract manufacturing services for appliqué shapes and perimeter adhesive, custom die-cut lenses, specialized laminations, and metalized and tinted films.

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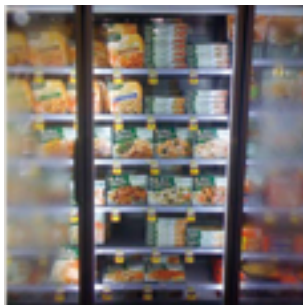
## Sunglass & Sports Eyewear



Available globally, our products provide premium anti-fog, abrasion, impact, and scratch resistance durability for sunglasses and sports eyewear applications including swimming goggles. These coatings can be used on tinted or clear substrates such as polycarbonate, polyamide, cast resins, and acrylic.

## Visgard Anti-Fog Film Increases Sales

### Commercial Freezer Display Cases



FSICT's Visgard anti-fog film is a PET substrate with a specialized anti-fog coating that allows water droplets to lay flat on its surface. This flattening of water droplets provides fog-free viewing on the freezer's glass door. The film is easy to

install on the interior of the glass doors with a simple squeegee using wet or dry lamination techniques.

FSICT PET (polyester) film and sheet anti-fog solutions for cold room and supermarket freezer display cases supports environmental leadership and sustainability initiatives. This application optimizes energy efficiency, typically saving energy consumption for freezer and compressor operations. These films are easy to install, maintain, and replace with either wet or dry lamination application techniques. These films are also available with or without pressure sensitive adhesive on the reverse side protected by a release liner and a clear masking that protects the coated surface during installation. By preventing freezers from fogging up, these optically clear films also improve product merchandising.

This innovative technology combines premium anti-fog performance at  $-25^{\circ}\text{C}$ , while also providing superior abrasion and chemical resistance for exceptional clarity to maximize visual merchandising. Highly stable, Visgard Premium Film has excellent long-term adhesion under extreme temperature and high humidity conditions and prevents fogging and water sheeting even after repeated cleaning.

Optically clear and non-yellowing, the anti-fog coated film can be screen or digitally printed for in-store branding or food manufacturer advertising space, offering an opportunity for additional revenue streams. Unlike competing products on the market today, Visgard Premium Anti-Fog Film eliminates all fog on the glass of reduced energy consumption freezer doors, even when left open for up to two minutes.

Visgard Premium Film along with energy controllers reduces the energy consumed by the freezer and compressors that heat the doors by as much as 35 percent, with a payback in less than one year. In addition to saving energy, this helps increase the number of units sold from the display case resulting from the improved visual quality of the glass door. This is particularly important since grocery stores operate under extremely tight margins.

### Patented Technology

Visgard Premium Film is uniquely formulated to meet the demanding standards of grocery stores' Class 3 operating climate conditions. Employing FSICT's patented technology, this revolutionary coated film provides an exceptional water washable, anti-fog surface that is easy to install and maintain with common household glass cleaners. Class 3 conditions outside the freezer are  $+25^{\circ}\text{C}$  room temperature, 60% relative humidity (test conditions at  $-23^{\circ}\text{C}$  inside the freezer).

## Anti-Fog Film Improves Greenhouse Plant Quality and Growth

Plastics (particularly polyolefin) films have rapidly gained global market share because they are economical and offer increased lightweight durability, translucency, flexibility, and toughness combined with improved UV radiation levels to optimize the transference of sunlight. However, films may have disadvantages when it comes to optical clarity and may attract dust and moisture. FSICT Anti-fog coatings resolve many of these issues. Our non-yellowing, optically clear anti-fog coating controls condensation, providing a superior water sheeting surface on greenhouses and conservatories. Anti-Fog coated film also helps to control light transmission and enhance plant growth conditions. In greenhouse applications, the advantage of making the film hydrophilic with anti-fog additives is to migrate water to the surface so water sheets off the film, removing all traces of fog.

### Why is anti-fog coated film beneficial and how does it work?

With condensation, water can drop from the film onto plants, causing spots which damage and encourage disease. Drops of water on the film surface can also attract additional sunlight which may increase the risk of scorching plants. Discrete water droplets on the surface can also reflect light away from the greenhouse and reduce light transmission by 15 to 50 percent, also increasing the incidence rate of certain diseases, compromising plant quality and growth.

Anti-fog coated film contains additives that alters the surface tension of the film, and encourages water to condense not as droplets but to create a water sheeting effect. As a result, water flows off as a very thin film layer down the slope into the gutters instead of remaining on the greenhouse in a beaded droplet. This anti-fog or anti-drip effect occurs over time and under different environmental conditions.

Water can also condense on the film surface if there is moisture in the greenhouse atmosphere when the outside temperature is cold enough. In humid environments, fogging in the form of small droplets commonly occurs on plastics due to temperature differences inside and the plastic greenhouse enclosure. Condensation increases with higher relative humidity and can be further influenced by the plants which transfer water vapor from the soil to the air through their leaves. Fog formation can lead to a reduction of transparency and light transmission, resulting in burning plant tissues from the lensing effects of large water droplets. Small drops grow in size and begin to drip, increasing to the point of causing plant damage, especially to seedlings. These fog droplets form from the difference in surface tension from the polar water droplet and non-polar

polymer surface.

Additional ventilation or heating may be necessary to remove moisture and misting from the greenhouse by bringing in warmer air from the outside. Anti-fog films are usually made from grades of polyethylene which retain heat well in a greenhouse. There will also be a temperature lift because of the increased light transmitted; the water layer on the film surface also adds to the heat retaining properties.



### Benefits of condensation control in a greenhouse include:

- More light transmission (15-50%)
- Higher crop yields, quality, and commercial value
- Earlier harvesting
- Fewer diseases and reduced need for pesticides

## CUSTOMIZED PRODUCT DEVELOPMENT

### Initial Product Design and Verification to Production

We are a values-driven company, focused on pushing the envelope of technology excellence. Our goals are to embark on a continuous journey building sustainable relationships through mutual trust, respect, and information exchange with our customers; to function as a key contributor to our customer's competitive product development and corporate strategy; to partner and work with our customers as an extension of their integrated team; to create and build business value, forging long-term partnerships with customers; and to supply our customers with world-class research and development, global technical support, and customer care to support their ground breaking product development efforts. By leveraging our dedicated technical support and expert scientific team, we strive to continuously improve the performance of products in multiple industries.

FISCT has a large array of solutions to suit your specific product needs. Customized product development ranges from (but is not limited to) creating appliqué shapes with perimeter adhesive, customer die-cut lenses, and specialized lenses to metalized and tinted film applications. From simple to more complex designs, the FSI Coating Technologies distinguished scientific and technical support teams are available globally. We can assist you from initial product design and verification to the production phase. We also offer contract manufacturing services for your company's custom appliqué development and application.

## FUTURE DEVELOPMENTS

### Collaborative technology to achieve scientific excellence

FSICT is committed to the research and development of permanent anti-fog coating systems to meet the challenging demands of your business. Our mission is to exceed our customer's expectations by delivering uniquely innovative world-class coating solutions available only at FSICT. The scientific team works closely with our strategic business units to improve manufacturing processes and accelerate advancements in new product development. Our long-term goal is to delight our customers with a broader range of coating products coupled with outstanding service to exceed customer expectations and engagement.

Future strategic business initiatives center on bringing a full-service approach to the development of innovative anti-fog coating systems combined with a whole new generation of complimentary coatings and primers. Embraced by world-class technical support, we aim to raise the bar on enhancing the performance and durability of products at unprecedented levels. Ultimately, our goal is to collectively generate cutting-edge technologies and products, growing as a company that contributes to society for decades to come.

Plans are currently underway to launch a new series of high performance coatings using our global distribution network. Visit our website at [fsicti.com](http://fsicti.com) for a list of distributors or to find information on the latest innovative product releases.

### Trademarks

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### About the Contributing Authors



Richard Chang is the Vice President and General Manager for FSI Coating Technologies, with global responsibility for business growth through technology and process innovation as well as operational excellence. As a member of the Executive Leadership Team, Richard participates in the development and execution of global corporate strategies, business development, and marketing activities for both FSICT and its parent company, SDC Technologies.

Prior to joining SDC and FSICT in 2011, he held several director level positions over the past 12 years at Valspar Corporation as Director of Business Development, Quality and Technology. A 15-year veteran of the specialty chemicals industry, Richard has delivered significant revenue and operating profit growth in a wide variety of markets and industries.

Richard holds a Bachelor of Engineering in Chemical Engineering from McGill University in Montreal, Quebec, Canada and an Executive MBA (with honors and distinction) from Southern Methodist University (Cox) in Dallas, TX.



Masanori Iwazumi is the Anti-Fog Coatings and Film Team Leader for FSI Coating Technologies and its parent SDC Technologies. A native of Japan, he is a key research and development employee of Mitsui Chemicals, Inc. (MCI). SDC is a wholly-owned subsidiary of MCI. Masanori is instrumental in leading the strategic product development, sales, and commercialization efforts of FSI Coating Technologies patented anti-fog product portfolio, and is a recipient of numerous employee awards for his dedication and outstanding scientific achievements.

Before joining SDC, Masanori worked eight years for MCI in product development, responsible for new process and additive development for performance chemicals such as high-refractive index monomers and other functional polymers.

Masanori holds a Bachelor of Engineering in Chemistry and Biotechnology, and a Master of Engineering in Applied Chemistry, both from the University of Tokyo, Japan.