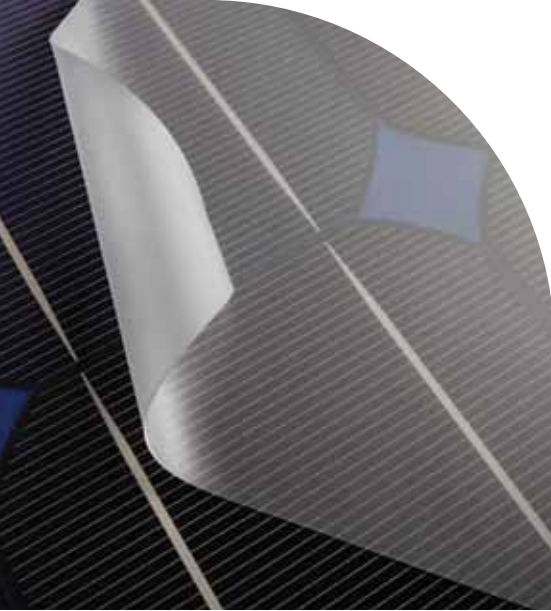


# POLYMER SOLUTIONS

for Solar Applications

LightSwitch™

SolarBond®



Courtesy of United Solar Ovonic LLC



Top: EVA film with rigid module.

Center: Flexible module application.

Bottom: Residential rigid panel application.

## HOW OUR PRODUCTS ARE ADVANCING SOLAR TECHNOLOGY

As solar energy continues to gain momentum, Saint-Gobain Solar is speeding up its growth in the field of renewable energies by being active in three segments: photovoltaic, thermal solar (hot water production) and solar thermodynamic (solar concentrators). Today, Saint-Gobain provides the most comprehensive range of materials solutions for your module manufacturing needs, from glass to encapsulants to tapes. We continue to develop new products with outstanding performance and improved production efficiency to help you achieve grid parity. As your strategic partner, Saint-Gobain will work closely with you to deliver innovative products for solar modules that are cost effective, efficient and long lasting.

### SAINT-GOBAIN SOLAR PRODUCTS

#### Films

- LightSwitch™ Frontsheet
- LightSwitch™ Encapsulant
- LightSwitch™ Frontsheet Complete

#### Frame and Junction Box Sealing

- SolarBond® Frame Tape and SolarBond® InFrame sealant
- SolarBond® J-Box Tape
- SolarBond® Rail Tape

#### Processing Consumables

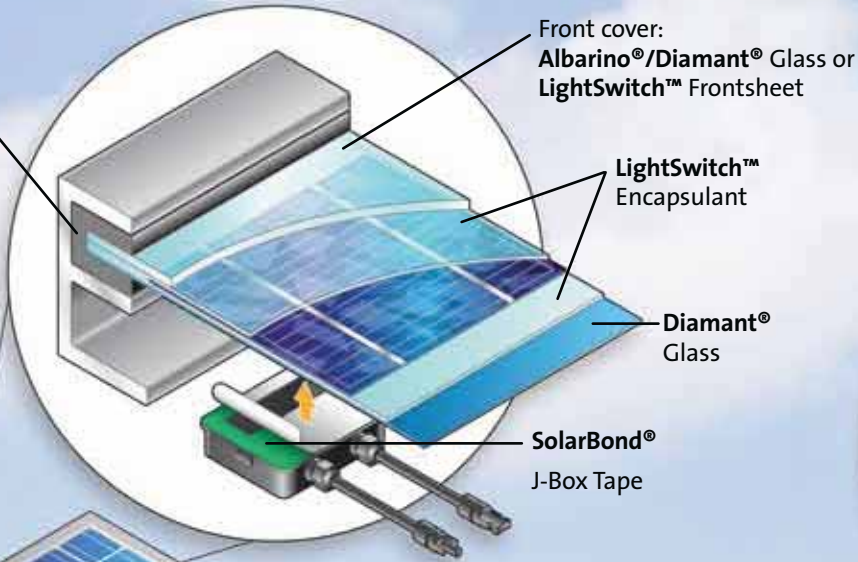
- CHEMFAB® Specialty Coated Fabrics
- COHRIlastic® Solid Silicone Rubber
- CHR® Pressure-sensitive Adhesive Tapes



# SAINT-GOBAIN SOLAR PRODUCTS IN RIGID AND FLEXIBLE MODULES

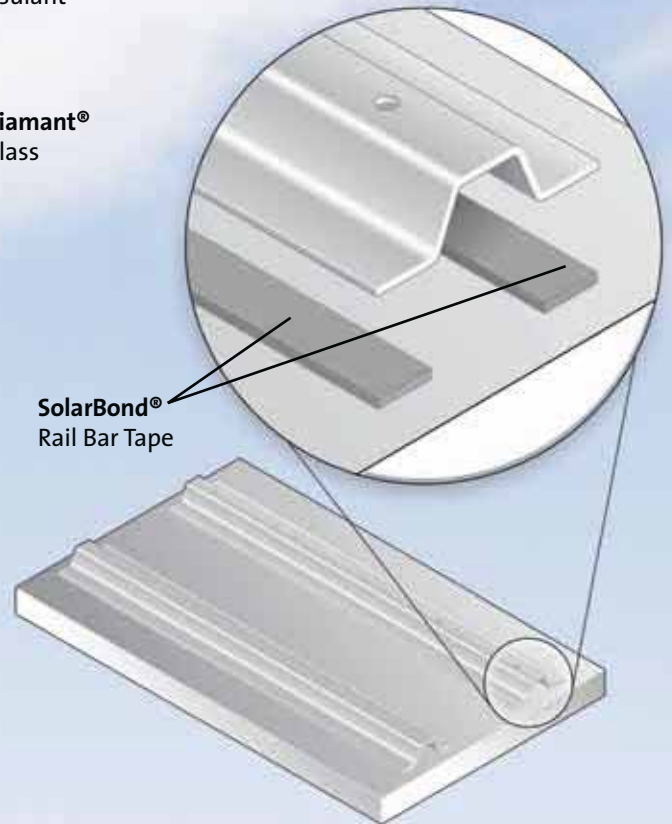
## RIGID MODULE – FRONT

SolarBond®  
Frame Tape or  
SolarBond®  
InFrame

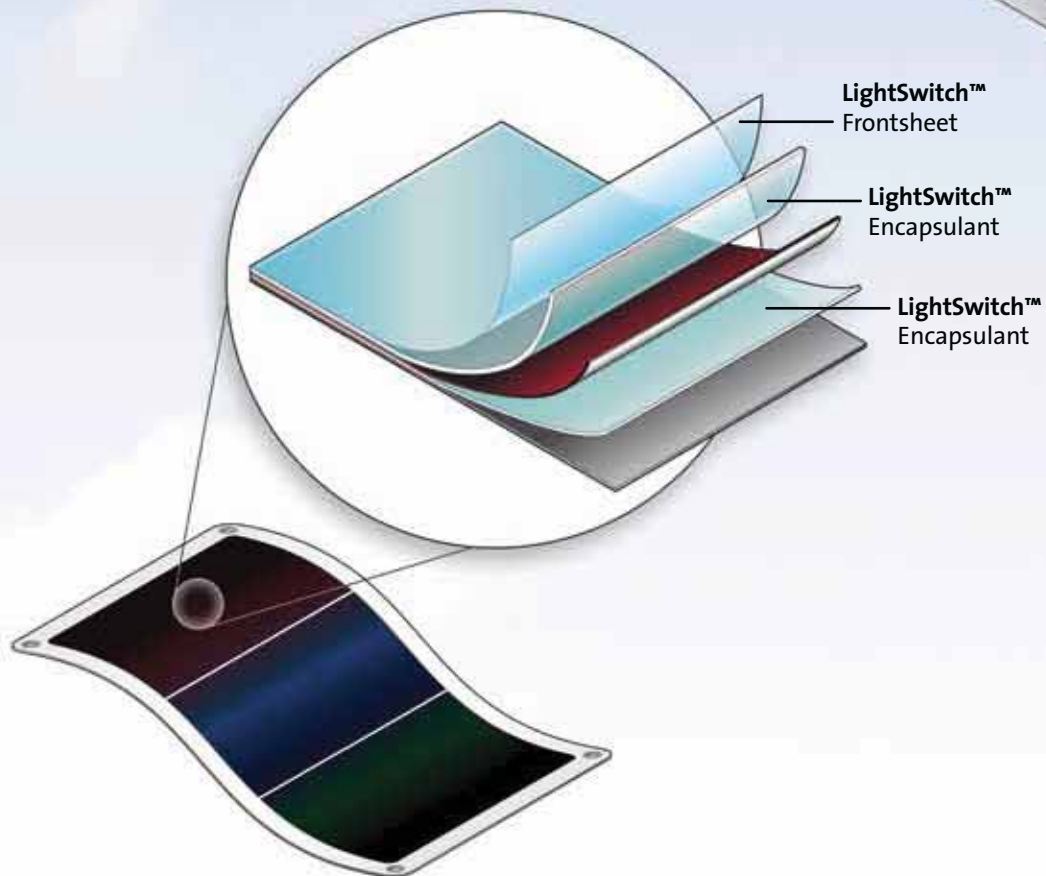


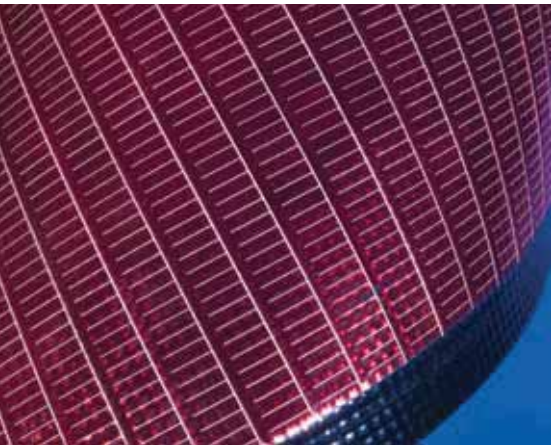
## RIGID MODULE – BACK

SolarBond®  
Rail Bar Tape



## FLEXIBLE MODULE





Courtesy of VHF Technologies SA

Top: LightSwitch™ Frontsheet Complete.

Center: Flexible panel.

Bottom: Flexible solar panel application.

## FILMS FOR SOLAR MODULES

### LightSwitch™ High-Performance Films

Protecting solar cells and circuitry from the environment (wind, rain, ice, snow, UV rays, etc.) is critical to a module's performance and lifetime, regardless of the cell technology or module design. With over 40 years of experience in providing durable and high performance films for various outdoor, electronics and aerospace applications, Saint-Gobain Performance Plastics is your ideal material partner for both rigid and flexible module encapsulation.

### LightSwitch™ Frontsheet

LightSwitch™ frontsheet films belong to a family of melt-processable fluoropolymers well known for their superior weatherability and UV resistance. Tough and flexible, these highly transparent films offer excellent protection for lightweight solar modules. LightSwitch™ frontsheets are surface-treated for superb adhesion to a variety of encapsulant materials.

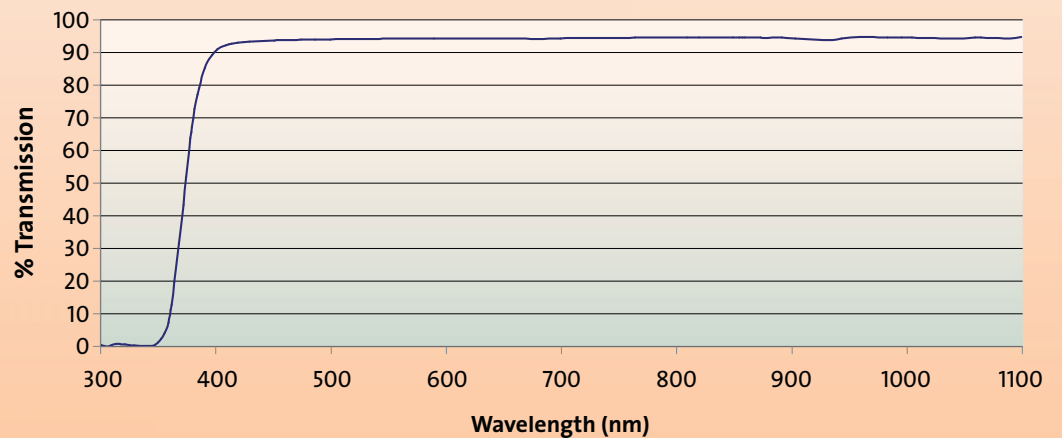
### LightSwitch™ Adhesive Encapsulant

LightSwitch™ encapsulant provides cushioning and structural support to solar cells and circuitry, while allowing transmission of sunlight for energy conversion. Its outstanding weathering properties means the solar module will be protected for years to come. LightSwitch™ encapsulant is suitable for both flexible and rigid modules, as it exhibits high adhesion to other photovoltaic module components including glass, frontsheets and backsheet laminates.

LightSwitch™ Frontsheet Complete is a pre-laminate combining frontsheet and encapsulant. Frontsheet Complete features all the performance benefits of both with improved production efficiencies, including reduced wrinkles and precise alignment.

Frontsheet	Light Transmission ASTM E424	Tensile Strength ASTM D882	Elongation ASTM D882
LightSwitch™ Frontsheet ETFE	> 96%	7000 psi (48 MPa)	300%
LightSwitch™ Frontsheet FEP	> 97%	3500 psi (24 Mpa)	300%

### LightSwitch™ Encapsulant EVA Light Transmission at 0.660mm Thickness



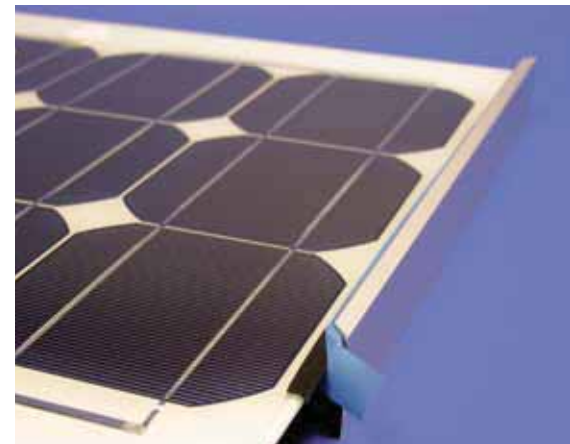
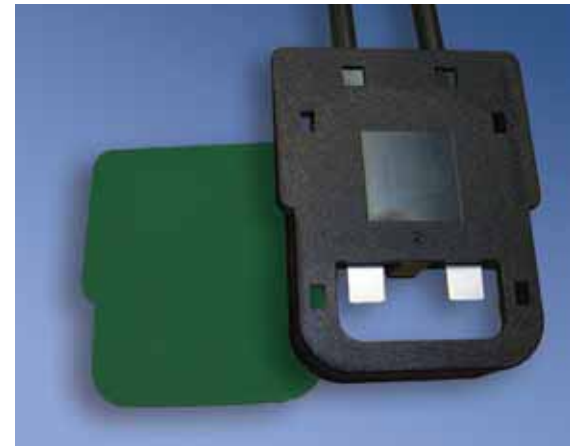
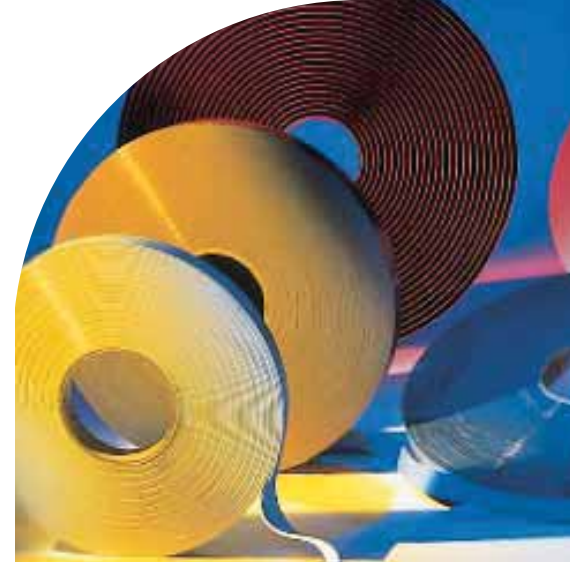
## FRAME AND JUNCTION BOX SEALING AND RAIL BAR BONDING

### SolarBond® High Performance Foam Bonding Tapes

Today, many solar module producers utilize enhanced assembly techniques incorporating high performance pressure-sensitive adhesive tapes and new generation foam in place SolarBond® InFrame sealant materials to seal and bond the PV laminate to the aluminum frame. Tapes provide cleaner and more efficient alternatives, replacing liquid silicone or butyl adhesives. Liquid sealants are messy to apply, difficult to apply consistently in the frame, and normally require cleaning of excess material from

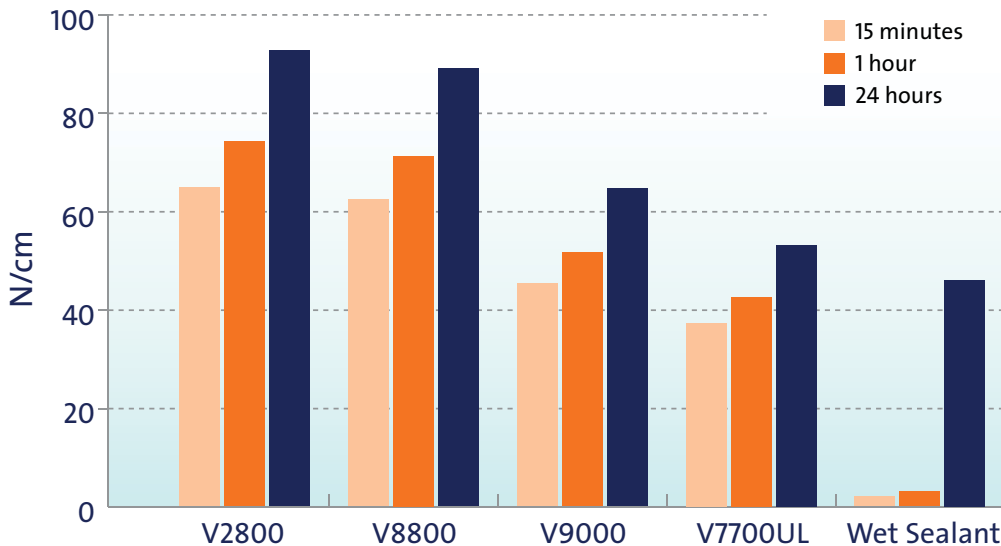
the front glass. The same applies to the junction box sealing and bonding process. The use of pressure-sensitive tapes will simplify this process, so the junction box can be positioned precisely via “pick and place” technology.

The Saint-Gobain product range incorporates an advanced elastomeric foam core with high performing acrylic adhesives, and new generation frame sealant materials designed for automated assembly systems. All of these alternatives provide fast adhesion and long-term durability to improve fabrication efficiency and cost savings.



SolarBond® Series	Framing	Junction Box	Rail Bars	Description
V7700UL	●			PE, black/white
V2800	●	●		PUR, black
V8800	●			PUR, black
V9000	●			PUR, white
A0300		●		Acrylic, grey
A0500			●	Acrylic, grey
SolarBond® InFrame	●			Modified polymer

### Pluck Adhesion from Frame Edge



Top: Saint-Gobain Performance Plastics foam tapes.

Center: Detail of a junction box.

Bottom: Detail of frame tape with liner release.



Top: CHEMFAB® PTFE-coated fabrics.

Center: COHRLastic® silicone rubber products.

Bottom: CHR® pressure-sensitive adhesive tapes.

## PROCESSING CONSUMABLES

Saint-Gobain supplies a broad range of fabrics and tapes that are used during the solar module vacuum lamination process.

### CHEMFAB® PTFE – Non-stick Release Sheets and Belt Solutions

CHEMFAB® PTFE-coated fabrics provide long-lasting release properties and excellent surface finish for single-bed and multi-stack laminators. Custom-specific belt design for high efficiency processing is available, as well as customer specific logos.

CHEMFAB® Description	Thickness [mm]	Width* [mm]	Performance Benefits
CF110-2	0.26	2600	High strength and super-smooth surface with superior release.
CF114-1	0.34	1000 1525 2000 2600	High tensile and tear strength PTFE coated fabric for mechanical and dimensional stability. Superior chemical resistance over a wide temperature range.
CF210-2AS	0.24	2600	High strength product, smooth and anti-static surface with good thermal transfer.
CF214-1AS	0.35	2600	Smooth and anti-static surface, plus top coat to avoid black residue on modules.
CF310 XPS	0.25	2600	High tensile and tear strength fabric for mechanical and dimensional stability. Improves flex life and protects against creasing and tearing.
CF7330	0.79	2450	Very strong fabric with textured surface.
CF7544 FLEX	0.89	3860	High strength textured product coated with special PTFE formulation to increase flexibility and tear resistance.
CF313X	0.66	2260 3940	Very strong fabric with coating designed to resist ridging, puckering, and creasing with a moderately textured surface.
CF1590 CF9014	0.84	4400	Open mesh fabric for superior module front sheet laminations.
CF8915 CF9035	0.65 0.7	3150 3000	Open mesh glass fabrics with different mesh sizes for specific airflow, as well as aramid (Kevlar®) fabrics for higher mechanical stresses. Anti-static versions also available.

### COHRLastic® Solid Silicone Rubber

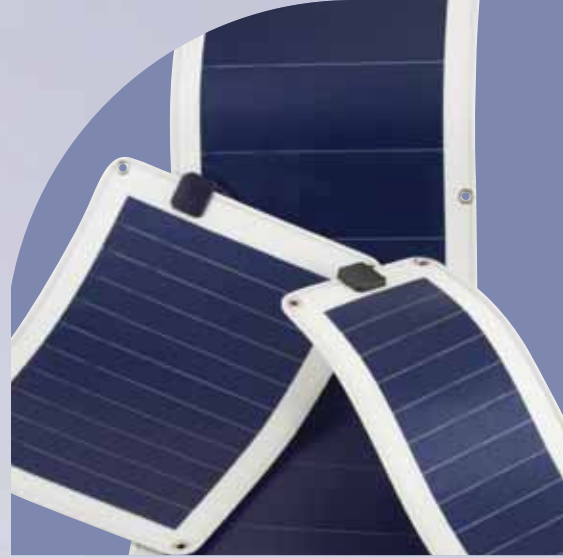
COHRLastic® solid silicone rubber offers excellent thermal and mechanical properties, chemical inertness and long service life. It is specifically designed to be used as a vacuum blanket in photovoltaic panel laminators.

COHRLastic® Part Number	Description	Gauges	Widths
9260PV	Silicone Rubber	0.079" – 0.394" (2-10mm)	Up to 110" without seam (2800mm)
5260PV-M	Modified Silicone Rubber	0.079" – 0.394" (2-10mm)	Up to 110" without seam (2800mm)

### CHR® Pressure-sensitive Adhesive Tapes

CHR® pressure-sensitive adhesive tapes comprise a full range of products for dielectric insulation and masking functions.

Substrate	Service Temperature	Adhesive Systems		
		Rubber -20°F to +425°F (-29°C to +218°C)	Silicone -100°F to +500°F (-73°C to +260°C)	Acrylic -40°F to +375°F (-40°C to +188°C)
Polyester	-100°F to +350°F (-73°C to +177°C)	M851, M852, M855	M832, M8324	NA
Polyimide	-100°F to +500°F (-73°C to +260°C)	NA	K201, K202	NA
PTFE Coated Fabric	-100°F to +500°F (-73°C to +260°C)	NA	SG25-03, -5	SG23-03, -05



## WHEN PERFORMANCE MATTERS...

Count on the Brands  
from Saint-Gobain  
Performance Plastics

LIGHTSWITCH™  
FRONTSHEET AND  
ENCAPSULANT

SOLARBOND®  
BONDING TAPES

SOLARBOND®  
INFRAME SEALANT

## Saint-Gobain Performance Plastics: A Tradition of Innovation



*The invention of making glass by casting it onto a table marked a change from older, traditional processes such as glass blowing. This new process revolutionized glassmaking for years to come and would continue to be virtually the only method until the 1920s.*

*Detail from a painting depicting glass being cast in Saint-Gobain in 1824. Painting by Edouard Pingret. (Saint-Gobain collection)*

Our tradition of excellence goes back more than 300 years through our connection to Compagnie de Saint-Gobain, one of the world's top 100 industrial corporations and a leader in the production of engineered materials. Since its founding in 1665 as a glassmaker in France, Saint-Gobain has continued to find new and innovative ways to transform materials ranging from plastics to glass.

Today, Saint-Gobain is a global leader in each of its businesses, including flat glass, construction products, innovative packaging, and building materials distribution.

Saint-Gobain Performance Plastics carries on Saint-Gobain's commitment to quality as the world's leading producer of engineered high performance polymer products for virtually every industry around the globe, using resins such as fluoropolymers, silicones and high-temperature thermoplastics.

Backed by a proud heritage of product innovation, technological expertise and market leadership, Saint-Gobain Performance Plastics is dedicated to working with our customers to solve today's application issues and the challenges that lie ahead.

### THE AMERICAS

#### Saint-Gobain Performance Plastics

150 Dey Road  
Wayne, NJ 07470-4699  
Tel: (800) 526 7844  
Fax: (973) 696 4056

#### Saint-Gobain Performance Plastics

One Sealants Park  
Granville, New York 12832  
Tel: (800) 724 0883  
Fax: (518) 642 2793

#### Saint-Gobain Performance Plastics

717 Plantation Street  
Worcester, MA 01605  
Tel: (508) 852 3072  
Fax: (508) 852 3259

### ASIA

#### Saint-Gobain Performance Plastics

6th floor, Fuchu South Building  
1-40 Miyamachi  
Fuchu-city, Tokyo 183-0023  
Japan  
Tel: (81) 42 352 2104  
Fax: (81) 42 358 2887

#### Saint-Gobain Performance Plastics

Room 302, 3F-1  
147 Jianguo North Road, Section 2  
Taipei, Taiwan, 104  
Tel: (886) 2 2503 4201  
Fax: (886) 2 2503 4202

#### Saint-Gobain Performance Plastics

1468 Kun Yang Road  
Minhang Development Zone  
Shanghai, 200245  
China  
Tel: (86) 21 5472 1568  
Fax: (86) 21 5472 2378

#### Saint-Gobain Performance Plastics

Devanahalli Road  
Via Old Madras Road  
Bangalore 560 049  
India  
Tel: (91) 80 2847 2900  
Fax: (91) 80 2847 2616

#### Saint-Gobain PPL Korea Co., Ltd.

13TH FL., Dongshin Building 141-28  
Samsung-Dong, Kangnam-Ku  
Seoul 135-090 Korea  
Tel: (82) 2 508 8206  
Fax: (82) 2 554 1550

#### Saint Gobain Sekurit Thailand Co., Ltd.

Performance Plastics Division  
539/2, 13th Sri Ayutthaya Road  
Ratchathewi, Bangkok 10400  
Thailand  
Tel: (66) 2 640 5438  
Fax: (66) 2 640 5439

### EUROPE

#### Saint-Gobain Performance Plastics

Pampus GmbH  
Am Nordkanal 37  
47877 Willich  
Germany  
Tel: (49) (0) 2154 60 0  
Fax: (49) (0) 2154 60 310

#### Saint-Gobain Performance Plastics

Avenue du Parc 18  
4650 Chainieux  
Belgium  
Tel: (32) 87 32 20 11  
Fax: (32) 87 32 20 51

#### Saint-Gobain Performance Plastics

13 Earlstrees Road  
NN17 4NP Corby, Northants  
Great Britain  
Tel: (44) 1536 276 00  
Fax: (44) 1536 203 427

Brought to you by:



Saint-Gobain Performance Plastics  
150 Dey Road  
Wayne, NJ 07470-4699  
Tel: (800) 526-7844  
Fax: (973) 696-4056



**Limited Warranty:** For a period of 6 months from the date of first sale, Saint-Gobain Performance Plastics Corporation warrants this product(s) to be free from defects in manufacturing. Our only obligation will be to provide replacement product for any portion proving defective, or at our option, to refund the purchase price thereof. User assumes all other risks, if any, including the risk of injury, loss or damage, whether direct or consequential, arising out of the use, misuse, or inability to use this product(s). SAINT-GOBAIN PERFORMANCE PLASTICS DISCLAIMS ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

**NOTE:** Saint-Gobain Performance Plastics Corporation does not assume any responsibility or liability for any advice furnished by it, or for the performance or results of any installation or use of the product(s) or of any final product into which the product(s) may be incorporated by the purchaser and/or user. The purchaser and/or user should perform its own tests to determine the suitability and fitness of the product(s) for the particular purpose desired in any given situation.

LightSwitch™ is a trademark of Saint-Gobain Performance Plastics. CHEMFAB®, CHR®, COHRLastic® and SolarBond® are registered trademarks of Saint-Gobain Performance Plastics.

[www.pv.saint-gobain.com](http://www.pv.saint-gobain.com)