

UltraGlaze* SSG4600

adhesivo de silicona para encristalado estructural

Descripción del producto

El UltraGlaze* SSG4600 de GE es un adhesivo y sellador de alta resistencia elastomérico de silicona de 2 componentes para utilizar en aplicaciones de encristalado estructural, en especial en la fabricación y encristalado en taller de sistemas de pared de cortina de cristal (curtainwall). El SSG4600 es un producto de dos componentes (parte A + parte B) que brinda una rápida formación de la adherencia y la resistencia; una vez mezclado, UltraGlaze cura rápidamente como un caucho de silicona durable, de muy alta resistencia y resistente al desgarramiento.

Propiedades de desempeño típicas

Desempeño

- Durabilidad de silicona: el caucho de silicona curado exhibe excelente resistencia de largo plazo a los agentes atmosféricos naturales como temperaturas extremas, radiación ultravioleta, lluvia y nieve, sin cambios apreciables en su elasticidad.
- Adherencia sin imprimación: permite lograr fuertes uniones con muchos sustratos y acabados convencionales sin necesidad de utilizar un primario.
- Baja viscosidad de bombeo: asegura una vida útil más prolongada de las bombas y una reducción del mantenimiento de los equipos.
- Formación rápida de la adherencia: contribuye a la pronta estabilidad de las piezas ensambladas.
- Encristalado protector: el SSG4600 ofrece una excelente combinación de resistencia, flexibilidad y resistencia al desgarramiento para contrarrestar las fuerzas de huracanes, impactos y cargas explosivas.

Aplicación

- Tiempo de trabajado ajustable: relación variable de las partes A y B para la adaptación a condiciones variables de ensamble y aplicación.
- Alta velocidad de aplicación: capacidad de llenado de juntas más rápido y exhaustivo, con menor esfuerzo en el trabajado.

Estética

- Opciones de catalizador: el catalizador no inflamable se ofrece en colores negro y gris.
- Materiales: compatible con muchos tipos de vidrio recubierto, acabados metálicos, juntas de encristalado, bloques de apoyo y espaciadores.

Compatibilidad de productos

- Vidrio aislante y siliconas estructurales y de sellado climático de GE.

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Adhesivo de silicona para encristalado estructural **UltraGlaze* SSG4600**

Usos básicos

- El SSG4600 es apto para su empleo en aplicaciones de encristalado estructural, como el encristalado en fábrica de unidades y módulos de pared de cortina de cristal (curtainwall) para sistemas unitarios y panelizados.
- El SSG4600 es apto para su empleo como producto de sellado climático, cuando el movimiento previsto de la junta no supere su capacidad de movimiento ($\pm 25\%$).
- El SSG4600 es un candidato excelente para utilizar en aplicaciones de *encristalado protector*.

Presentación

El SSG4600 se suministra en forma de un juego o 'kit' que contiene lo siguiente:

Base: base UltraGlaze SSG4600A, pasta blanca en un tambor de 208.1 L (55 galones) con revestimiento interior de polietileno.

Catalizador: existen dos opciones de catalizador para utilizar con la base UltraGlaze SSG4600A, y se suministran en un balde de 18.9 L (5 galones).

- Catalizador **UltraGlaze SSG4607B**, pasta negra que luego de la mezcla y el curado da un acabado de caucho de silicona gris.
 - Catalizador **UltraGlaze SSG4603B**, pasta negra que luego de la mezcla y el curado da un acabado de caucho de silicona negro.
- Tanto el tambor como el balde tienen lados rectos, para su empleo con los equipos de bombeo comerciales.



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SSG4600 UltraGlaze*

silicone structural glazing adhesive

Product Description

GE SSG4600 UltraGlaze* is a high-strength, 2-part silicone elastomeric adhesive/sealant for use in structural glazing applications, specifically in the fabrication and shop glazing of curtainwall systems. SSG4600 is a two-component product (part A + part B) that provides fast adhesion and strength build; when mixed, UltraGlaze cures quickly to a very high strength, tear-resistant durable silicone rubber.

Typical Performance Properties

Performance

- Silicone durability - cured silicone rubber exhibits excellent long term resistance to natural weathering including: extreme temperatures, ultraviolet radiation, rain and snow, with negligible change in elasticity.
- Primerless adhesion - attains strong bonds to many conventional substrates and finishes without the need of a primer.
- Low pumping viscosity - provides for longer pump life and reduced maintenance on equipment.
- Fast adhesion build - enhances early stability of assembled parts.
- Protective glazing - SSG4600 offers an excellent combination of strength, flexibility and tear resistance to aid in countering the higher forces from hurricane, impact and blast loads.

Application

- Adjustable work life - variable ratio of parts A+B to accommodate assembly and application under varying conditions.
- High application rate - faster and more thorough joint filling capability with easier tooling effort.

Aesthetics

- Catalyst options - non-flammable catalyst available in black or grey.
- Materials - compatible with many types of coated glass, metal finishes, glazing gaskets, setting blocks and spacers.

Product Compatibility

- GE Insulating Glass, Structural and Weathersealing silicones.

Momentive Performance Materials is an exclusive licensee of General Electric. Momentive Performance Materials provides versatile materials as the starting point for its creative approach to ideas that help enable new developments across hundreds of industrial and consumer applications. We are helping customers solve product, process, and performance problems; our silanes, fluids, elastomers, sealants, resins, adhesives, urethane additives, and other specialty products are delivering innovation in everything from car engines to biomedical devices. From helping to develop safer tires and keeping electronics cooler, to improving the feel of lipstick and ensuring the reliability of adhesives, our technologies and enabling solutions are at the frontline of innovation.



Licensed
Products

SSG4600 UltraGlaze* silicone structural glazing adhesive

Basic Uses

- SSG4600 is suitable for use in structural glazing applications such as factory glazing of curtainwall units and modules for unitized and panelized systems.
- SSG4600 is suitable for use as a weatherseal product, when movement expected in the joint does not exceed its movement capability ($\pm 25\%$).
- SSG4600 is an excellent candidate for use in *protective glazing* applications.

Packaging

SSG4600 is available as a "kit" containing the following:

Base: SSG4600A UltraGlaze base, white paste in 55 gallon drum with a polyethylene liner.

Catalyst: There are two catalyst options for use with SSG4600A UltraGlaze base and are supplied in a 5 gallon pail.

- **SSG4607B UltraGlaze** catalyst, black paste mixes and cures to grey silicone rubber
 - **SSG4603B UltraGlaze** catalyst, black paste mixes and cures to black silicone rubber
- Both the drum and pail are straight-sided for use in commercially available pumping equipment.

Colors

SSG4600 UltraGlaze is available in black and grey.

Black: SSG4600A & SSG4607B

Grey: SSG4600A & SSG4603B

Limitations

- Structural glazing industry guidelines (ASTM C1401) suggest that drawings and details are to be reviewed by all parties involved in the manufacture of an SSG system and for each building project. SSG4600 should be used in structural glazing applications only after Momentive Performance Materials has reviewed detailed design drawings and has performed adhesion and compatibility tests on project substrates and spacer materials. Review and testing is done on a project-by-project basis. No blanket approval is given by Momentive Performance Materials for structural glazing applications.
- Momentive Performance Materials policy is to test on a project-by-project basis each substrate and component used in a structural glazing assembly for adhesion and compatibility to assure optimum performance. No blanket approvals will be issued relative to adhesion or compatibility of SSG4600 with such materials.
- Not recommended for water immersion applications.

Technical Services

Additional technical information and literature is available from Momentive Performance Materials. Laboratory facilities and application engineering are available upon request from Momentive Performance Materials.

Applicable Standards

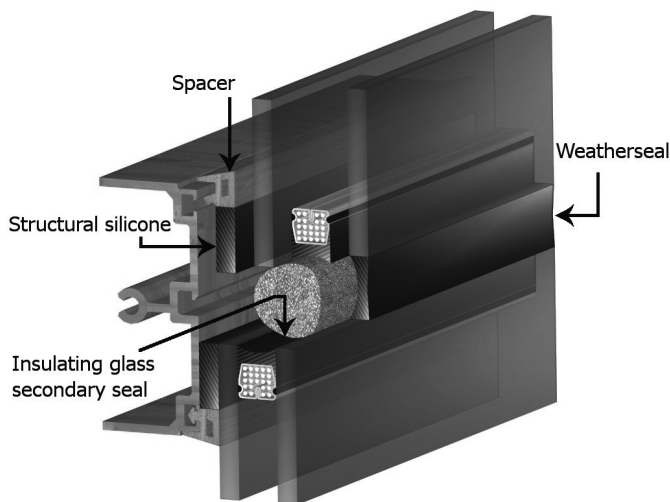
SSG4600 meets or exceeds the requirements of the following specifications for two-component sealants.

ASTM Specifications:

- C1184, Type M, Use G and O (aluminum)
- C920, Type M, Grade NS, Class 25, Use G and A

China Specification:

- GB16776-2005



Typical SSG configuration

Joint Designs and Dimensions

Silicone contact width and thickness (see Figure 1) will vary by project with the design wind load and glass size. Contact width can be calculated using the following formula:

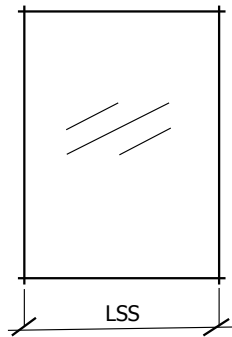
CW – Contact Width (inches or millimeters)

DWL – Design Wind Load (pressure in PSF or kPa)

LSS – Longest Short Span (largest piece of glass; shorter side)

$$CW = \frac{DWL \text{ (PSF)} \times LSS \text{ (Ft)}}{480}$$

$$CW = \frac{DWL \text{ (kPa)} \times LSS \text{ (mm)}}{276}$$



Allowable Sealant Stress:

Dynamic (wind) loading: ≤20 psi (138 kPa)

Permanent (dead) loading: ≤1 psi (7 kPa)

A minimum sealant thickness of 1/4" (6mm) between substrates is required to accommodate thermal expansion and contraction (see Figure 2) of most systems and should be used in order to ensure that sealant can be injected into the structural cavity obtaining full contact with both the glass and metal surfaces while remaining free of air voids. Greater joint thickness may be required to accommodate movement in some larger-sized SSG systems. Momentive Performance Materials can be contacted to assist in determination of proper joint thickness to accommodate expected movement in structurally glazed applications.

Soliciting Manufacturers Suggestions

Required materials for submission:

- Architectural and design drawings for review and comment
- Design wind load requirement(s) for project
- Glass or panel sizes
- Production samples of metal, glass, gaskets, spacers and setting blocks with type and manufacturer identified
- Specification and/or identification of paint or finish to which SSG4600 is intended to adhere (*i.e.*, 215-R1 anodized or if paint, or powder coat; manufacturer, finish system and ID#)

Recommendations & information provided after review:

- Determination as to whether the submitted joint dimensions meet the minimum design criteria necessary for the use of SSG4600.
- Short-term adhesion data using (typically) ASTM C794, ASTM C1635, ISO 8340, ISO 8339, ISO 10591 and/or ASTM C1135 test method. Other test methods may be requested for a nominal charge.
- Short-term compatibility test results on gaskets, spacers and setting blocks and other accessories per ASTM C1087 or GE sealants test method for compatibility.
- Information regarding suggested primers, when required.

Figure 1:

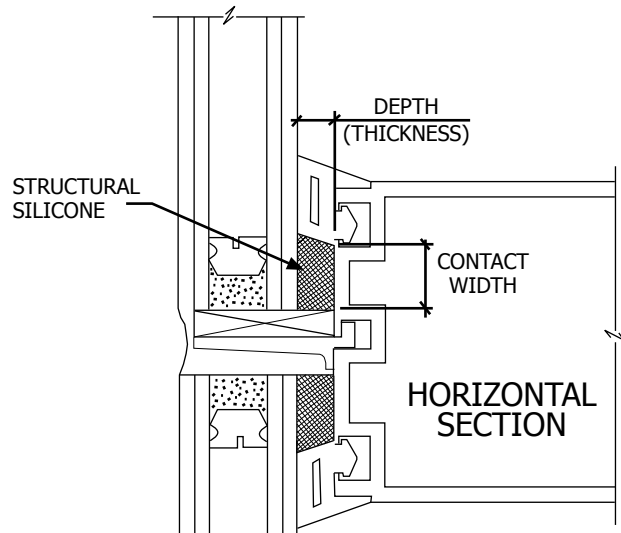
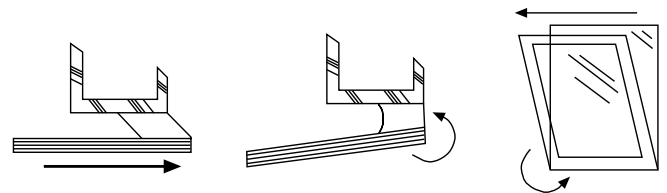


Figure 2: Movement from thermal expansion and contraction and/or glass rotation.



Momentive Performance Materials will not:

- Provide comments on the structural integrity of overall framing system(s).

The design professional has final responsibility for the determination of structural sealant joint dimensions based on project conditions, design wind load(s), glass or panel sizes, anticipated thermal, seismic or other movement of the system.

Industry References

The ASTM C1401 Standard Guide for Structural Sealant Glazing provides a thorough overview of design topics and information for use in SSG systems.

ETAG 002 guideline for European Technical Approval for structural sealant glazing kits provides an overview of the requirements of materials appropriate for this application.

China's national standard offers curtainwall design guidance related to SSG. Ref. GB JC/102-2003.

SSG4600 UltraGlaze* silicone structural glazing adhesive

Typical Properties

Uncured Properties	Base	SSG4600A
Color	White	Thixotropic Paste
Specific Gravity	1.40	
Shelf Life	18 months ⁽¹⁾	
Viscosity	132.3 / 132,300	10 r/s, Pa·s / centipoise
Uncured Properties	Catalyst	SSG4603B
Color	Black	Thixotropic Paste
Specific Gravity	1.04	
Shelf Life	12 months ⁽¹⁾	
Viscosity	129.6 / 129,600	10 r/s, Pa·s / centipoise
Uncured Properties	Catalyst	SSG4607B
Color	Grey	Thixotropic Paste
Specific Gravity	1.05	
Shelf Life	12 months ⁽¹⁾	
Viscosity	129.6 / 129,600	10 r/s, Pa·s / centipoise

Mixed Compound Properties

SSG4600A+SSG460XB		
Color	Black or Grey	Thixotropic Paste
Specific Gravity	1.38	Mixed at 12:1 weight
Mix Ratio Range	9:1 to 14:1	By weight
Work Life	20-60 minutes	Depends on ratio, temp. & RH
Tack Free Time	1-2 hours	Depends on ratio, temp. & RH
Consistency/Sag	0.1" (2.5 mm)	Non-sagging
VOC Content	21 g/l	Mixed at 12:1 weight

Cured Properties⁽³⁾

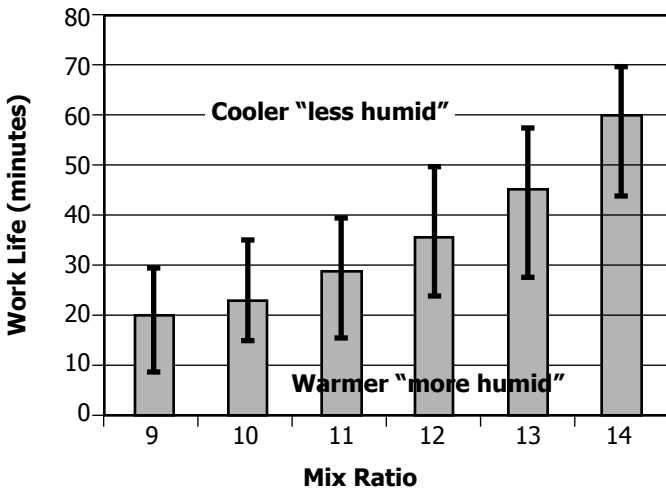
Full Cure at Standard Laboratory Conditions SSG4600A+SSG460XB @ 12:1 mix ratio		
Color	Black or Grey	SSG4603B or SSG4607B
Hardness (type A indenter)	40	ASTM D2240
Ult. Tensile Strength	192 psi (1.3 MPa)	ASTM C1135; t=0.25in
Modulus @ 25% extension	64 psi (0.44 MPa)	
Modulus @ 50% extension	105 psi (0.72 MPa)	
Ult. Elongation	256%	
Tensile Adhesion Strength after 2 hours	63 psi (0.43 MPa)	ASTM C1135
Tensile Adhesion Strength after 4 hours	104 psi (0.72 MPa)	ASTM C1135
Tear Strength	64 ppi (11.2 N/mm)	ASTM D624, die B
Shear Strength	124 psi (0.85 MPa)	ASTM C961, 6mm thickness
Elastic Recovery	99%	ISO 7389; ETAG 002
Elastic Modulus (E) / Shear Modulus (G)		
Resistance to Tearing	Category 1, >95% / No Propagation	ETAG 002 / ASTM C1681
Resistance to Water Immersion	Excellent, no adhesion loss ⁽²⁾	ISO 10591
Accelerated Weathering, 5000 hours	Excellent, no degradation	ASTM C1184
Heat Resistance	300°F (149°C)	
Thermal Conductivity	0.30 W/m·K (cal/cm·s °C)	ASTM E1461
Cyclic Movement Capacity	±25%	ASTM C719

(1) When properly stored; see section on storage.

(2) Tested to glass and the following aluminum finishes: polyester powder coat, PVDF, anodized.

(3) Typical value, actual value may vary.

SSG4600 Work Life



Weight to Volume	Ratio Correlation
9:1 by weight	(6.8:1 by volume)
10:1 by weight	(7.5:1 by volume)
11:1 by weight	(8.3:1 by volume)
12:1 by weight	(9:1 by volume)
13:1 by weight	(9.8:1 by volume)
14:1 by weight	(10.5:1 by volume)

Installation

Prior to production, a sample of base (part A) and catalyst (part B) should be taken from each lot of material to be used, weighed to the desired A/B ratio, mixed and checked for proper curing before placing material in production.

Surface Preparation

Sealants may not adhere or maintain long-term adhesion to substrates if the surface is not prepared and cleaned properly before sealant application. Using proper materials and following prescribed surface preparation and cleaning procedures is vital for sealant adhesion. Momentive Performance Materials can provide quality control information and suggestions to users upon request.

Materials

- Use clean, fresh solvent as recommended by the sealant manufacturer’s test report. When handling solvents, refer to manufacturer’s MSDS for information on handling, safety and personal protective equipment. Isopropyl Alcohol (IPA) is commonly used and has proven useful for most substrates encountered in SSG systems. Xylene, MEK and Toluene have also been found useful on many substrates. Do not use Denatured Alcohol. Denatured Alcohol is not suggested because of the variability of additives, which may or may not provide reproducible results.
- Use only clean 99.9% pure industrial grade solvents. Do not use diluted solvents.
- Use clean, white cloths free of lint or other lint-free wiping materials.
- Use a clean, narrow-blade tooling knife when tooling structural silicone into the cavity.
- Use primer when required.

Cleaning Procedures

- Remove all loose material (such as dirt and dust), plus any oil, frost or other contaminants from the substrates to which the structural silicone will be adhered.
- Do not use detergent to clean the substrate as residue may be left on the surface.
- Clean the substrates receiving the sealant as follows: Using a two-rag wipe technique. Wet one rag with solvent and wipe the surface with it, then use the second rag to wipe the wet solvent from the surface BEFORE it evaporates. Allowing solvent to dry on the surface without wiping with a second cloth can negate the entire cleaning procedure because the contaminants may be re-deposited as the solvent dries.
- Change the cleaning rags frequently, as they become dirty. It is easier to see dirt if white rags are used. Do not dip used wipe cloths into solvent as this can contaminate the solvent. Cleaning with contaminated solvent can result in sealant adhesion issues. Always use clean containers for solvent use and for solvent storage.
- When cleaning deep, narrow joints, wrap the cleaning cloth around a clean, narrow-blade putty knife. This permits force to be applied to the cleaned surface.
- Clean only as much area as can be sealed in one hour. If cleaned areas are again exposed to rain or contaminants, the surface must be cleaned again.

Primers

SSG4600 will bond to many clean surfaces without the aid of a primer. For difficult-to-bond substrates, the use of a primer or special surface preparation should be evaluated. An evaluation should be made for each specific application/substrate to determine quality of bond. When properly used, primers help assure strong and consistent sealant adhesion to surfaces that may be difficult to bond. Most primers are a blend of organic and inorganic chemicals, resins and solvents. NEVER APPLY PRIMER TO GLASS SURFACES OR TO CURED SILICONE RUBBER WITHOUT PRIOR CONSULTATION WITH MOMENTIVE PERFORMANCE MATERIALS TECHNICAL SERVICES. Obtaining the proper materials, as well as following the prescribed procedures, is vital to ensure the successful use of primers. PRIMER APPLICATION IS NOT A SUBSTITUTE FOR SURFACE PREPARATION. Consult primer datasheet(s) for specifics and recommendations for use.

CAUTION

Primers may contain solvents. When handling solvents, refer to manufacturer’s MSDS for information on handling, safety and personal protective equipment.

Masking

- To simplify clean up of excess sealant, use easy to release, pressure sensitive tape to mask adjacent surfaces before applying the structural silicone sealant.
- Start from the top down and overlap the runs. Tool in direction of over-lap so that masking is not disturbed during tooling.
- Remove masking immediately after application of silicone or as soon as practical.
- Drop cloths can be used to cover any surfaces likely to collect excess sealant removed during tooling operations.

SSG4600 UltraGlaze* silicone structural glazing adhesive

Sealant Application

- Apply the sealant by pushing the bead ahead of the nozzle and making sure that the entire cavity is filled. Tooling should be done neatly, forcing the sealant into contact with the sides of the joint, thus helping to eliminate any internal voids and assuring good substrate contact. AIR POCKETS OR VOIDS WITHIN THE STRUCTURAL CAVITY ARE NOT ACCEPTABLE.
- Sealant application is not recommended when the temperature is below 50°F (10°C) or if frost or moisture is present on the surfaces to be sealed.
- SSG4600 works best when applied to surfaces below 140°F (60°C).
- Due to the smooth consistency of SSG4600, tooling agents such as water, soap or detergent solutions are not necessary or recommended. Dry tooling is recommended.
- Work life and cure rate may be adjusted by changing the A base to B catalyst ratio. Ratio must be within recommended range to achieve desired cured material property profile.
- Work life and cure rate can be affected by temperature and humidity levels. Mild heat (*i.e.*, around 120°F/49°C) will shorten the work life of the material, but will not significantly reduce the time required for complete cure. Cooler temperatures and lower humidity (*i.e.*, <50°F/10°C and <30% R.H.) tend to slow the cure and adhesion process.
- The B catalysts are sensitive to prolonged exposure to atmospheric moisture and the storage containers should be kept tightly closed whenever possible to maximize useful life.
- The catalyst may require mixing before placing container in pumping equipment if settling of components has occurred. Contact Momentive Performance Materials technical services for additional information.

Mixing, Pumping and Dispensing

- SSG4600 should be mixed and dispensed using two-component mixing equipment, which is available from several equipment manufacturers. These mixing / pumping systems are specifically designed to meter precise proportions of A base and B catalyst, in an air-free environment, and mix and dispense material at proper pressures and volumes to insure thoroughly mixed air-free material.
- Consult equipment manufacturer or system handbook for startup and shutdown procedures that cover proper operating pressures, mixing devices, and purging requirements.
- Hand mixing of A base + B catalyst is not recommended, except for pre-use testing to confirm cure.
- Kit matching of the A and B components of SSG4600 is not required.
- SSG4600 can be used successfully in both "In-line" mixing systems and on "purgeless" after-the-gun mixing equipment. Consult equipment manufacturer and/or Momentive Performance Materials for information on mixing device options.
- When properly mixed, the material should be a solid, homogeneous color (gray when using SSG4607B UltraGlaze catalyst, black when using SSG4603B UltraGlaze catalyst) free of any swirling or marbling of colors. If incomplete mixing is noticed, cease use of the material until equipment has been adjusted and confirmed that complete mixing is being attained.

Curing

- When mixing SSG4600A UltraGlaze base + SSG4600B UltraGlaze catalyst at approximately a 12:1 weight ratio, the material will become tack-free at about 1 hour under ambient conditions of @ 70°F (21°C), 50% R.H. Under these conditions approximately 70% of strength should develop within 24 hours. Development of full properties requires full evaporation of cure by-products and will normally be achieved within 7 days. Full properties will take additional time in colder climates or deeper SSG cavities.

Adhesion

Development of maximum bond strength will depend on substrate finish, joint configuration, primer use, adhesive thickness, substrate preparation and ambient conditions at location of use. Minimum stress should be applied to the adhesive bond for 24 hours. The adhesive strength of the bond should eventually exceed the cohesive strength of the silicone rubber adhesive.

Maintenance and Repairs

If repairs are required, the following products are candidates for use: SSG4000 UltraGlaze structural glazing adhesive, SSG4000E UltraGlaze structural glazing adhesive, SSG4000AC UltraGlaze structural glazing adhesive, SSG4800J UltraGlaze structural glazing adhesive and SCS2000 SilPruf* structural glazing adhesive and weatherproofing sealant. Contact Momentive Performance Materials technical services for suggested reglazing procedures and specific product suggestions prior to repairs.

Availability

Information on ordering can be obtained from Momentive Performance Materials, Waterford, NY, the sales office nearest to you, or an authorized GE sealants product distributor. For information regarding cost, contact your local distributor or territory manager. Our Customer Service number is: +1-877-943-7325.

SSG4600 UltraGlaze* silicone structural glazing adhesive

Patent Status

Nothing contained herein shall be construed to imply the nonexistence of any relevant patents or to constitute the permission, inducement or recommendation to practice any invention covered by any patent, without authority from the owner of the patent.

Product Safety, Handling and Storage

SSG4600A base and SSG4603B or SSG4607B catalyst must be stored at or below 80°F (27°C). Keep containers out of direct sunlight for prolonged periods.

Customers considering the use of this product should review the latest Material Safety Data Sheet and label for product safety information, handling instructions, personal protective equipment if necessary, and any special storage conditions required. Material Safety Data Sheets are available at www.ge.com/silicones or, upon request, from any Momentive Performance Material representative. Use of other materials in conjunction with Momentive Performance Materials sealants products (for example, primers) may require additional precautions. Please review and follow the safety information provided by the manufacturer of such other materials.

Emergency Service

Momentive Performance Materials maintains an around-the-clock emergency service for its products. The American Chemistry Council (CHEMTREC) and CareChem24 International also maintain an around-the-clock emergency service for all chemical products:

<u>Location</u>	<u>Momentive Performance Materials Products</u>	<u>All Chemical Products</u>
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Alaska, Hawaii	+1.518.233.2500	CHEMTREC: 800.424.9300
Canada	+1.518.233.2500	CHEMTREC: 800.424.9300
Europe	+1.518.233.2500 (Albanian, Czech, Danish, Dutch, English, Finnish, French, German, Greek, Hungarian, Italian, Lithuanian, Norwegian, Polish, Portuguese, Romanian, Russian, Serbo-Croatian, Slovak, Spanish, Swedish, Turkish, Ukrainian)	+44.(0)208.762.8322 (UK)
Middle East, All countries, except Israel	+1.518.233.2500	+961.3.487.287 (Lebanon)
Middle East, Israel	+1.518.233.2500	+44.(0)208.762.8322 (UK)
Latin America, Asia/Pacific, all other locations worldwide	+1.518.233.2500	CHEMTREC: +1-703.527.3887 (collect)
At sea	Radio U.S. Coast Guard, which can directly contact Momentive Performance Materials at +1.518.233.2500 or CHEMTREC at +1.800.424.9300.	

DO NOT WAIT. Phone if in doubt. You will be referred to a specialist for advice.

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• Consumer Sealants & Construction Sealants and Adhesives	T +1.877.943.7325	F +1.304.746.1654

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