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SSG4400 UltraGlaze*
silicone structural glazing adhesive

Product Description

SSG4400 UltraGlaze structural glazing adhesive is a high-modulus neutral curing structural silicone elastomeric adhesive which may be an excellent candidate for use in the fabrication and shop glazing of curtainwall modules. SSG4400 UltraGlaze structural glazing adhesive is a two-component product (part A + part B) that offers a fast and thorough deep-section cure. Uncured, both the A and B components are thixotropic pastes and, when mixed, cure quickly to a high strength durable silicone rubber adhesive and sealant at room temperature with primerless adhesion to many substrates.

Typical Performance Properties

Performance

- **Silicone durability** - exhibits excellent long term resistance to ultraviolet radiation, ozone, high and low temperatures, rain, snow and natural weathering.
- **Primerless adhesion** - bonds to most conventional substrates and finishes including: glass, glass coatings, ceramic frits, fluropolymer and powder coated paints, conversion-coated and anodized aluminum. Some finishes may require a primer.
- **Fast durometer and adhesion build** - enhances early stability of assembled parts.

Application

- **Adjustable work life** - variable ratio of parts A and B to accommodate assembly and application under varying conditions.
- **Low pumping viscosity** - provides for longer pump life and reduced maintenance on equipment.
- **High application rate** - faster and more thorough joint filling capability with easier tooling effort.
- **Low sag or slump** - which may be used for application to horizontal, vertical or overhead surfaces.
- **Compatible** with these GE sealants insulating glass grades:† IGS3703, IGS3713-D1, IGS3729, IGS3723, IGS3733, IGS3703E.
- **Compatible** with these GE sealants weatherproofing series grades:† SCS2000, SCS2700, SCS9000, SCS2900, Multisil and Silglaze N.
- **Compatible** with these GE sealants structural grades:† SSG4000, SSG4000AC, SSG4800J, SCS2000, SSG4000E and SSG4600.
- No kit matching required.
- Low odor.

†depending on regional availability

Basic Uses

- SSG4400 UltraGlaze structural glazing adhesive may be an excellent material of choice for use in structural glazing applications such as factory glazing of curtainwall units and modules for unitized and panelized systems.
- SSG4400 UltraGlaze structural glazing adhesive can also be used as a weatherseal product, when movement expected in the joint does not exceed its movement capability (±12.5%).
- SSG4400 UltraGlaze structural glazing adhesive has been validated in designs as an excellent option for use in *protective glazing* applications.

Packaging

SSG4400 UltraGlaze structural glazing adhesive is available as a "kit" consisting of a 200 liter (55-gallon) drum of Base and a 20 liter (5-gallon) pail of curing agent (Catalyst). Both the drum and the pail are straight-sided for use in commercially available pumping equipment.

Base: SSG4400A UltraGlaze structural glazing adhesive base, white paste in 200 liter (55 gallon) drum (containing 265.6 Kg) with a polyethylene bag liner.

Catalyst: SSG4400B UltraGlaze structural glazing adhesive catalyst for use with SSG4400A UltraGlaze structural glazing adhesive base is supplied in a 20 liter (5-gallon) plastic pail (containing 20.4 Kg) and a 25 liter metal pail (containing 20.4 Kg).

Colors

SSG4400 UltraGlaze structural glazing adhesive is available in black and grey.

Limitations

- Structural glazing industry guidelines (ETAG002, 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. SSG4400 UltraGlaze structural glazing adhesive should be used in structural glazing applications only after Momentive Performance Materials has reviewed shop 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.
- SSG4400 UltraGlaze structural glazing adhesive is compatible with many types of coated glass, metal finishes, glazing gaskets, setting blocks and spacers. 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 SSG4400 UltraGlaze structural glazing adhesive with such materials.
- Do not apply acid-curing (Acetoxy) silicone sealants to SSG4400 UltraGlaze structural glazing adhesive, as this may cause loss of adhesion of SSG4400 UltraGlaze structural glazing adhesive to glass, and/or other substrates used in the system.
- Not recommended for water immersion applications.

Technical Services

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

Applicable Standards

SSG4400 UltraGlaze structural glazing adhesive meets or exceeds the requirements of the following specifications for two-component sealants.

U.S. Federal Specifications:

- TT-S-227E (COM-NBS)

ASTM Specifications:

- C1184, Type M, Use G and O (aluminum)
- C920, Type M, Grade NS, Class $12^1/_2$, Use G and A

European Specification:

- Meets ETAG002 requirements
- EOTA approved; ETA-10/370
- Carries CE marking

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: $h_c \geq a\ W/2\ \sigma_{des}$ [short side dimension of the glass pane (m) x relevant combined actions of the wind, snow and self weight (Pa)] divided by 2 times the tension design stress. A minimum sealant thickness of 6 mm between substrates is required to accommodate thermal expansion and contraction (see Figure 2) of most systems and should be used in order to assure 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.

The following materials are required to be submitted to Momentive Performance Materials to receive suggestions for the use of SSG4400 UltraGlaze structural glazing adhesive.

- Architectural and shop 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 SSG4400 UltraGlaze structural glazing adhesive is intended to adhere (*i.e.,* 215-R1 anodized or if paint; manufacturer, finish system and ID#).

Momentive Performance Materials will provide the following, after reviewing the materials above:

- Determination as to whether the submitted joint dimensions meet the minimum design criteria necessary for the use of SSG4400 UltraGlaze structural glazing adhesive.
- Short-term adhesion data using (typically) the ETAG002, ASTM C794 and/or ASTM C1135 test method. Other test methods may be employed.
- Short-term compatibility test results on gaskets, spacers and setting blocks and other accessories per ETAG002, ASTM C1087 or GE sealants test method for compatibility.
- Information regarding suggested primers, when required.

Figure 1:

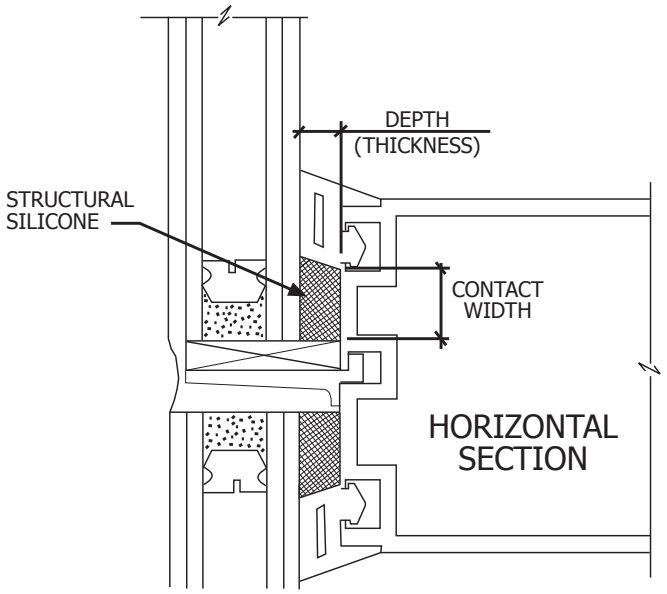
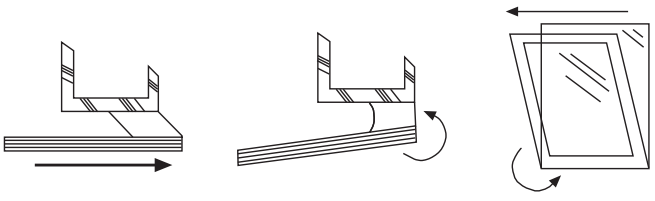


Figure 2: Movement from thermal expansion and contraction and/or glass rotation.



Joint Designs and Dimensions (continued)

Momentive Performance Materials will not:

- Design sealant joints.
- Provide comments on the structural integrity of overall framing system(s).
- Provide long-term performance data.

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.

The ETAG002/ASTM C1401 Standard Guide for Structural Sealant Glazing provides a thorough overview of design topics and information for use in SSG systems.

STANDARD CURE SPEED GRADES

SSG4400A UltraGlaze+SSG4400B UltraGlaze → BLACK

Typical Properties

Uncured Properties	**Base**	**SSG4400A UltraGlaze**
Color	White	Thixotropic Paste
Specific Gravity	1.43	ISO 1183
Shelf Life	18 months(1)	
Uncured Properties	**Catalyst**	**SSG4400B UltraGlaze**
Color	Black	Thixotropic Paste
Specific Gravity	1.03	ISO 1183
Shelf Life	12 months(1)	

Mixed Compound Properties

SSG4400A UltraGlaze+SSG4400B UltraGlaze @ 12:1 mix ratio, ambient conditions		
Color	Black	Thixotropic Paste
Specific Gravity	1.37	ISO 1183
Ratio Range	9:1 to 14:1	By weight
Tooling Time	Up to 45 minutes	Depends on mix ratio
Snap Time	45-60 minutes	Depends on mix ratio
Consistency/Sag	0.1" (2.5 mm)	Non-sagging
VOC Content	27 g/l	

Cured Properties

14 days @ 21°C (70°F), 50% R.H. SSG4400A UltraGlaze+SSG4400B UltraGlaze @ 12:1 mix ratio

Property	**Value**	**Test Method**
Hardness, Durometer (Shore A)	43	ASTM D2240, ISO 868
Ultimate Tensile Strength	1.9 MPa (275 psi)	ASTM D412, ISO 37, S2
Ultimate Elongation	200%	ASTM D412, ISO 37, S2
Tensile at 25% Elongation	0.40 MPa (58 psi)	ISO 8339
Tensile at 50% Elongation	0.60 MPa (87 psi)	ISO 8339
Ultimate Tensile Strength	0.97 MPa (141 psi)	ISO 8339
Ultimate Elongation	80%	ISO 8339
Tear Strength; die B	0.60 MPa (87 psi)	ETAG002
Shear Strength (@ 6 mm (1/4") thickness)	0.65 MPa (94 psi)	ETAG002
Peel Strength (average); aluminum, glass (14-day cure @ 21°C (70°F) 50% RH)	3 N/mm	ASTM C794
Service Temperature Range (after cure)	-48°C to +100°C (-55°F to +212°F)	
Weathering and U.V. Resistance	Excellent	GE 20 yr. study
Movement Capability	±12.5%	ASTM C717
Full Cure (most common bead sizes)	2-7 days	

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

Installation

Prior to production, a sample of A base and B catalyst 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 user 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 and Toluene have also been found useful on many substrates.
- Use clean, white cloths free of lint or other lint-free wiping materials.
- Use a clean, narrow-blade putty 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 soiled. It is easier to see the soiling 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

SSG4400 UltraGlaze structural glazing adhesive 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. 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 GE sealants 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 possible or practical.
- Drop cloths can be used to cover any surfaces likely to collect excess sealant removed during tooling operations.

Structural Glazing

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 4°C (40°F) or if frost or moisture is present on the surfaces to be sealed.
- SSG4400 UltraGlaze structural glazing adhesive works best when applied to surfaces below 60°C (140°F).
- Due to the smooth consistency of SSG4400 UltraGlaze structural glazing adhesive, tooling agents such as water, soap or detergent solutions are not necessary or recommended. Dry tooling is recommended.

Mixing, Pumping and Dispensing

- SSG4400 UltraGlaze structural glazing adhesive 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.
- Kit matching of the A and B components of SSG4400 UltraGlaze structural glazing adhesive is not required.
- SSG4400 UltraGlaze structural glazing adhesive has been 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 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 SSG4400A UltraGlaze structural glazing adhesive base + SSG4400B UltraGlaze structural glazing adhesive catalyst at approximately a 12:1 ratio, the material will become tack-free at about 2 hours under ambient conditions of @ 21°C (70°F), 50% R.H. Under these conditions approximately 80% of strength should develop within 24 hours. Development of maximum properties requires full evaporation of cure by-products and will normally be achieved within 7 days.
- 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 50°C/120°F) 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,* <4°C/40°F 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.

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. Maximum bond strength will typically be reached within 7 days.

Maintenance and Repairs

If repairs are required, the following products are candidates for use: SSG4400 UltraGlaze structural glazing adhesive, SSG4000E 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.

HANDLING AND SAFETY

Material Safety Data Sheets are available @ www.ge.com/silicones or, upon request, from a Momentive Performance Materials representative. Similar information for solvents and other chemicals used with GE sealants products should be obtained from your suppliers.

Structural Glazing (continued)

Storage Information

SSG4400A UltraGlaze Structural Glazing Adhesive Base
Store in the original unopened container at 24°C (75°F) or lower.

SSG4400B UltraGlaze Structural Glazing Adhesive Catalyst
Store in the original unopened container at 24°C (75°F) or lower.

Availability

Information on ordering can be obtained from Momentive Performance Materials; the sales office nearest to you, or an authorized GE sealants' product distributor. For information regarding cost, contact your local distributor or area manager. Our Customer Service number is: 00.800.4321.1000.

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

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:

Location	Momentive Performance Materials Products	All Chemical Products
Mainland U.S., Puerto Rico	+1.518.233.2500	CHEMTREC: 800.424.9300
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.

CUSTOMER SERVICE CENTERS

North America	**E** cs-na.silicones@momentive.com		
	• Specialty Fluids	**T** +1.800.523.5862	**F** +1.304.746.1654
	• UA, Silanes and Specialty Coatings	**T** +1.800.334.4674	**F** +1.304.746.1623
	• RTVs and Elastomers	**T** +1.800.332.3390	**F** +1.304.746.1623
	• Consumer Sealants & Construction Sealants and Adhesives	**T** +1.877.943.7325	**F** +1.304.746.1654
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	• Brazil	**T** +55.11.4534.9650	**F** +55.11.4534.9660
	• Mexico & Central America	**T** +52.55.2169.7670	**F** +52.55.2169.7699
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