

# SPUR+\* 1015 Prepolymer



MARKETING BULLETIN

SILANES - ADHESIVES & SEALANTS ADDITIVES

SPUR+ 1015 prepolymer is a silylated polyurethane resin for manufacturing one-part, moisture-curing sealants and adhesives. Plasticizer-free and of relatively low viscosity, it is an excellent base resin for low modulus sealants in building and construction applications where good elastic recovery is required.

## Key Features and Typical Benefits

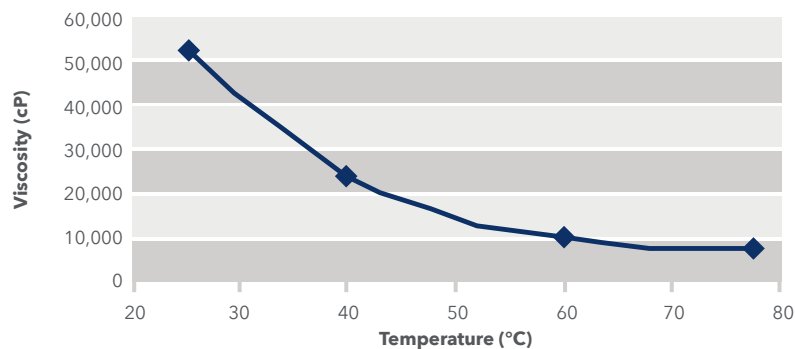
- Broad formulation latitude
- Easy application characteristics
- Excellent adhesion to many surfaces without primer
- High durability indoors and outdoors
- Good water and chemical resistance
- High elastic recovery
- Long shelf life

## Typical Physical Properties

Appearance	Clear, viscous liquid
Viscosity cP at 25 °C	~ 50,000
Shelf Life	≥ 12 months
Tensile Strength (psi)	~75
Elongation (%)	~280
100% Modulus (psi)	~41
Shore A Hardness	~17

Typical properties are average data and are not to be used as or to develop specifications.

Figure 1: Viscosity vs. Temperature



## Key Features of SPUR+ Prepolymer Technology

Silane-terminated polyurethanes have become increasingly attractive to manufacturers of adhesives, sealants and coatings. This high-performance hybrid technology is a result of the synergy between the silane-curing mechanism and polyurethane backbone properties.

Formulations based on SPUR+ prepolymers offer fast room-temperature cure and good durability: the sealants or adhesives are free of unreacted isocyanate. Benefits also include freedom from bubbling during cure and a broadening of the formulation latitude compared to conventional polyurethane technologies. SPUR+ prepolymers allow the formulator the use of a wide variety of additives and adhesion promoters to meet performance needs, including:

1. Good elasticity and durability
2. Primerless adhesion to both organic and inorganic, porous and non-porous substrates
3. Superior chemical resistance, such as to automotive fluids (e.g. glycols, motor and transmission fluids)
4. Minimal shrinkage
5. Excellent weatherability
6. Immediate paintability
7. Non-staining of porous substrates
8. Candidate for clear adhesives
9. Lower VOC formulated products

## Performance of SPUR+ 1015 Prepolymer Sealants

The following generic sealant formulae may be used to evaluate the performance characteristics of SPUR+ prepolymers.

Ingredients (wt%)	Sealant A	Sealant B
SPUR+ 1015 prepolymer	23.1	22.9
Plasticizer (DIDP)	18.5	18.4
Moisture Scavenger (Silquest A-171* silane)	0.4	0.3
Calcium Carbonate	55.5	55.1
UV Stabilizers	0.5	0.5
Thixotropic Agent (SiO <sub>2</sub> )	0.2	1.1
Colorant (such as TiO <sub>2</sub> )	1.2	1.2
Adhesion Promoter (Silquest* A-1110 silane)	0.58	-
Adhesion Promoter (Silquest A-1120 silane)	-	0.57
Catalyst (dibutyltin dilaurate)	0.05	0.03

The mechanical properties are measured after curing the sealant for 2 weeks at 23°C/50% relative humidity and then tested according to ISO 37 or ASTM D 412 respectively for tensile strength and elongation, and ISO 868 or ASTM C 661 for hardness.

SPUR+ 1015 Sealant	Sealant A	Sealant B
Test Methods	ISO	ASTM
Tensile Strength at Break (psi)	313.3	214.6
Modulus at 100% Extension (psi)	137.8	100.0
Elongation at Break (%)	420	430
Hardness Shore A	37.3	36
Tack Free Time (hr.)	1	3

(These figures are intended as guideline, not specifications)

Adhesion is measured after curing the sample species for 2 weeks at 23°C/50% relative humidity, and tested according to ISO 8510-2 (dry adhesion) followed by water immersion for four days and one day at room temperature according to ISO 10591 (wet adhesion). For Sealant B, the peel strength is measured according to ASTM C 794 test method and tested soon after water immersion for seven days (wet adhesion).

Substrates <sup>†</sup>	Sealant A		Sealant B
	Dry Adhesion <sup>(1)</sup> (lbs/in / %CF)	Wet Adhesion <sup>(2)</sup> (lbs/in / %CF)	Wet Adhesion <sup>(3)</sup> (lbs/in / %CF)
Aluminum	12.4/100%CF	17.2/100%CF	22.4/100%CF
Anodized Aluminum (ALMg1) 5005A	11.8/100%CF	16.4/100%CF	n.d.
Galvanized Steel Dx51 D+Z275	16.1/100%CF	17.5/100%CF	n.d.
Glass	17.1/100%CF	19.1/100%CF	18.3/100%CF
PVC (standard)	20.5/100%CF	23.8/100%CF	18.4/100%CF
PVC (Komadur ES)	26.9/100%CF	n.d.	n.d.
Polycarbonate (Lexan 9030)	16.1/100%CF	n.d.	n.d.
ABS	n.d.	n.d.	19.7/100%CF
Polystyrene	n.d.	n.d.	22.0/100%CF
Concrete (method 1 in ISO13640)	12.5/50%CF	n.d.	n.d.
Concrete (method 2 in ISO13640)	9.1/30%CF	n.d.	n.d.
Concrete (from US markets)	n.d.	n.d.	22.4/25%CF (dry)

(These figures are intended as guideline, not specifications)

CF = cohesive failure

<sup>†</sup> Most of the testing substrates were kindly supplied by Rocholl GmbH

(1) ISO 8510-2; (2) ISO 10591; (3) ASTM C-794

The results showed the SPUR+ 1015 sealants provide balanced mechanical properties and excellent adhesion to a wide range of substrates, both inorganic and organic. In addition to the above-mentioned advantages, this SPUR+ 1015 prepolymer provides additional features of non-yellowing and improved tack free and deep section cure performance. These performance advantages provide formulators with more freedom to optimize their products for market needs.

## References

- [1] Huang, M.W., Lacroix, C. and Waldman, B.A.; "A New Low Viscosity, Plasticizer Free SPUR+ Prepolymer", PU TECH 2005, New Delhi, India; *presented at A&SC fall convention 2005*.
- [2] Huang, M.W. and Handel, R.; "New Developments in Silylated Polyurethane Technology"; *Adhesives, Age*, April 1999.
- [3] Johnston, R.R. and Lehmann, P.; US 5,990,257.
- [4] Landon, S.J., Dawkins, M.B., Waldman, B.A. and Johnston R.R.; "The Adhesion of Hybrid Resins to Plastic Substrates"; *Adhesives Age*, April 1997.
- [5] Feng, T.M. and Waldman, B.A.; "Silylated Urethane Polymers Enhance Properties of Construction Sealants"; *Adhesives Age*, April 1995.
- [6] Landon, S.J., Guillet, A. and Johnston, R.R.; "Silylated Urethane Polymers for Sealants"; *European Adhesives and Sealants*; Dec. 1995.

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.

Limitations

Customers must evaluate Momentive Performance Materials products and make their own determination as to fitness of use in their particular applications.

Product Safety, Handling and Storage

Customers should review the latest Safety Data Sheet (SDS) and label for product safety information, safe handling instructions, personal protective equipment if necessary, emergency service contact information, and any special storage conditions required for safety. Momentive Performance Materials (MPM) maintains an around-the-clock emergency service for its products. SDS are available at [www.momentive.com](http://www.momentive.com) or, upon request, from any MPM representative.

For product storage and handling procedures to maintain the product quality within our stated specifications, please review Certificates of Analysis, which are available in the Order Center. Use of other materials in conjunction with MPM products (for example, primers) may require additional precautions. Please review and follow the safety information provided by the manufacturer of such other materials.

Customer Service Centers

**Worldwide**

Email: [commercial.services@momentive.com](mailto:commercial.services@momentive.com)

**Americas**

+1 800 295 2392  
+1 614 986 2495

**Europe, Middle East,  
Africa and India**

00800 4321 1000  
+40 213 044229

**Asia Pacific**

**China**  
800 820 0202  
+86 21 3860 4892

**All Other Countries**  
+60 3 9206 1543

**Japan**  
0120 975 400  
+81 276 20 6182

Disclaimer

DISCLAIMER:

THE MATERIALS, PRODUCTS AND SERVICES OF MOMENTIVE PERFORMANCE MATERIALS INC. AND ITS SUBSIDIARIES AND AFFILIATES (COLLECTIVELY "SUPPLIER"), ARE SOLD SUBJECT TO SUPPLIER'S STANDARD CONDITIONS OF SALE, WHICH ARE INCLUDED IN THE APPLICABLE DISTRIBUTOR OR OTHER SALES AGREEMENT, PRINTED ON THE BACK OF ORDER ACKNOWLEDGMENTS AND INVOICES, AND AVAILABLE UPON REQUEST. ALTHOUGH ANY INFORMATION, RECOMMENDATIONS, OR ADVICE CONTAINED HEREIN IS GIVEN IN GOOD FAITH, SUPPLIER MAKES NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, (i) THAT THE RESULTS DESCRIBED HEREIN WILL BE OBTAINED UNDER END-USE CONDITIONS, OR (ii) AS TO THE EFFECTIVENESS OR SAFETY OF ANY DESIGN INCORPORATING ITS PRODUCTS, MATERIALS, SERVICES, RECOMMENDATIONS OR ADVICE. EXCEPT AS PROVIDED IN SUPPLIER'S STANDARD CONDITIONS OF SALE, SUPPLIER AND ITS REPRESENTATIVES SHALL IN NO EVENT BE RESPONSIBLE FOR ANY LOSS RESULTING FROM ANY USE OF ITS MATERIALS, PRODUCTS OR SERVICES DESCRIBED HEREIN. Each user bears full responsibility for making its own determination as to the suitability of Supplier's materials, services, recommendations, or advice for its own particular use. Each user must identify and perform all tests and analyses necessary to assure that its finished parts incorporating Supplier's products, materials, or services will be safe and suitable for use under end-use conditions. Nothing in this or any other document, nor any oral recommendation or advice, shall be deemed to alter, vary, supersede, or waive any provision of Supplier's standard Conditions of Sale or this Disclaimer, unless any such modification is specifically agreed to in a writing signed by Supplier. No statement contained herein concerning a possible or suggested use of any material, product, service or design is intended, or should be construed, to grant any license under any patent or other intellectual property right of Supplier covering such use or design, or as a recommendation for the use of such material, product, service or design in the infringement of any patent or other intellectual property right.