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The AGC logo, consisting of the letters 'AGC' in a bold, blue, sans-serif font, with a small red square above the letter 'C'. The logo is positioned in the top right corner of the page.

PREMINOL™

EXCESTAR™

Your Dreams, Our Challenge

What's PREMINOL™ EXCESTAR™



AGC Inc. KASHIMA PLANT in JAPAN

AGC Polyurethanes Division

AGC produces polyether polyols integratedly for the polyurethane industry from Propylene Oxide(PO), the major raw material for the production of polyols, so that we can supply products to customers stably.

AGC started producing polyether polyols in 1975, and then we developed high molecular weight & ultra-low monol content polyether polyol(PREMINOL™). Furthermore, we enhanced its features(PREMINOL™S) and developed them for various applications. AGC also produce and commercialize silane modified polyether (EXCESTAR™) as the moisture-curable polymer based on the PREMINOL™ technology.

Vertically integrated production system from upstream to downstream



PREMINOL™

Polyether polyols for CASE applications and polyurethane foam

AGC has high molecular weight and ultra-low monol content polyether polyols (PREMINOL™) which are produced by our unique catalyst technology. PREMINOL™ gives good performances in the mechanical properties, workability, and environmental characteristic to the CASE* products. PREMINOL™ is applied for various applications like NCO terminated prepolymer, urethane acrylate and silane terminated polyurethane by modifying reactive groups.

*CASE : Coating, Adhesive, Sealant, Elastomer

EXCESTAR™

Silane modified polyether for sealant and adhesive

EXCESTAR™ is liquid polymer for silane modified polyether sealant and adhesive. Its unique properties such as high flexibility, safety and non-staining property enable EXCESTAR™ to apply at various markets including; Construction, Industrial and Electronics.

PREMINOL™ / EXCESTAR™ APPLICATIONS

Construction

Sealant

- ▶ Polyurethane
- ▶ Silane modified polyether
- ▶ Plasticizer

Adhesive

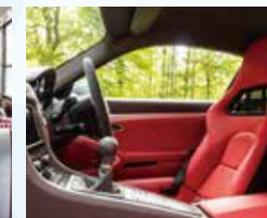
- ▶ Polyurethane
- ▶ Silane terminated polyurethane
- ▶ Silane modified polyether



Industrial

Adhesive for Automotive, Train, Elevator

- ▶ Polyurethane
- ▶ Silane terminated polyurethane
- ▶ Silane modified polyether



Electronics

UV curable adhesive or OCR

- ▶ Urethane acrylate

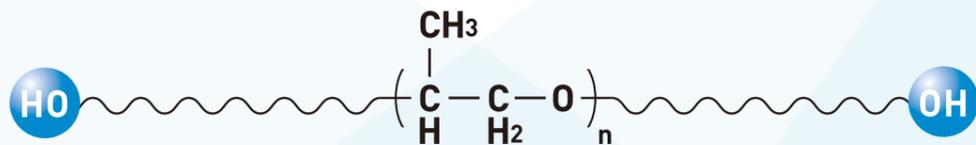
Pressure sensitive adhesive for protecting film

- ▶ Silane terminated polyurethane



PREMINOL™

High molecular weight &
Ultra-low monol content polyether polyol



PROPERTIES

Ultra-Low monol content*

- ▶ Good mechanical properties, Fast curing

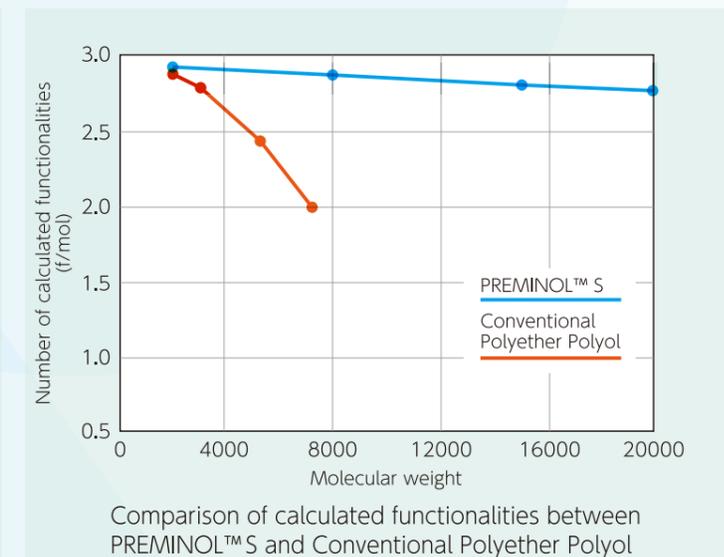
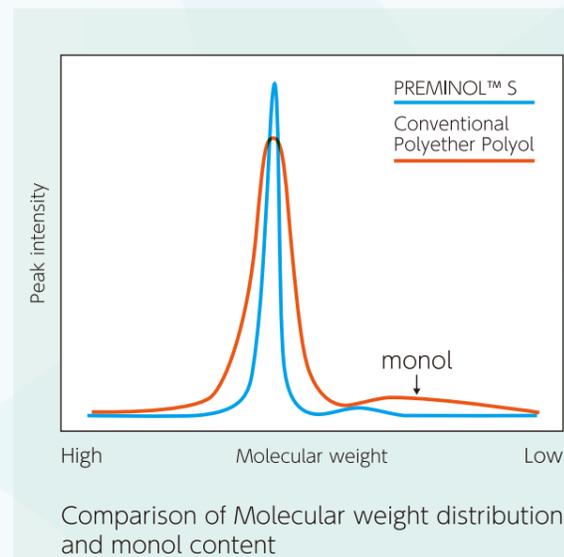
*monol : by-product

High molecular weight

- ▶ High flexibility, Good durability

Narrow molecular weight distribution

- ▶ Good workability



PERFORMANCE ADVANTAGES

Good mechanical properties

- ▶ High flexibility and high cohesive force are suitable for elastic adhesive.

Good durability

- ▶ High mechanical strength and high elongation enable to provide high durability sealants

Good workability

- ▶ Low viscosity of formulation enables to seal easily even at low temperature.

Fast curing

- ▶ Fast cure enables to shorten the total process time.

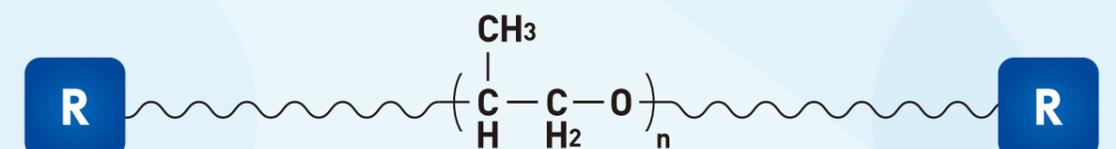
Environmentally friendly (Plasticizer free, Solvent free)

- ▶ High flexibility and low viscosity polymer enables to reduce the amount of plasticizer and solvent in the formulation

APPLICATIONS

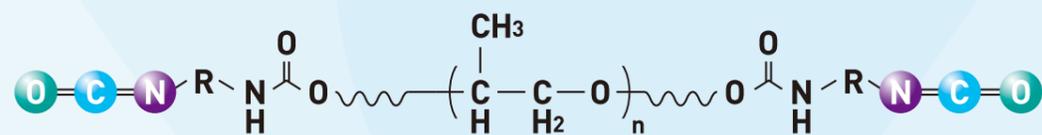
PREMINOL™ can be applied to a wide variety of curable polymers, by modifying terminal hydroxyl groups.

- ▶ NCO terminated prepolymer
- ▶ Urethane acrylate
- ▶ Silane terminated polyurethane
- ▶ Silane modified polyether (EXCESTAR™)



PREMINOL™ APPLICATION : Construction / Industrial

PU Adhesive / Sealant (PU : Polyurethane)



PERFORMANCE ADVANTAGES

- ▶ High cohesive force
- ▶ Good workability
- ▶ Fast curing
- ▶ Good flexibility

APPLICATIONS

Construction

House / Building

- ▶ Siding panel sealant (ALC panel, sash, etc.)
- ▶ Reinforced Concrete wall joint sealant
- ▶ Floor adhesive
- ▶ Decorative panel / Composite panel adhesive

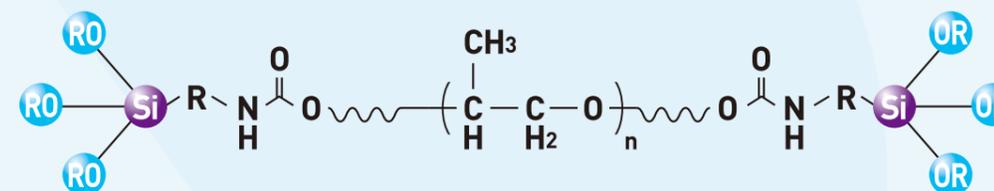
Industrial

Automotive

- ▶ Various interior materials adhesive



Hybrid Adhesive / Sealant



PERFORMANCE ADVANTAGES

- ▶ Environmentally friendly
- ▶ Fast curing
- ▶ Good adhesion
- ▶ Good flexibility
- ▶ Good workability

APPLICATIONS

Construction

House / Building

- ▶ Floor (wood, concrete) adhesive
- ▶ Decorative panel / Composite panel adhesive

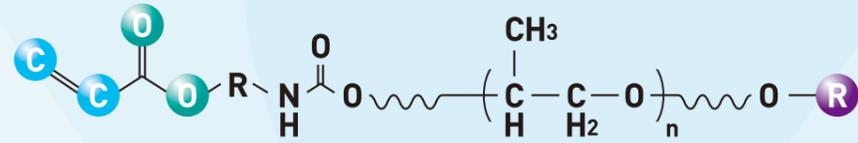
Industrial

Transportation

- ▶ Automotive interior and exterior adhesive
- ▶ Container sealant
- ▶ Elevator assembly adhesive



UV Curable Adhesive



PERFORMANCE ADVANTAGES

- ▶ Low viscosity
- ▶ Forming soft membrane
- ▶ Good curability
- ▶ Low shrinkage and non volatility

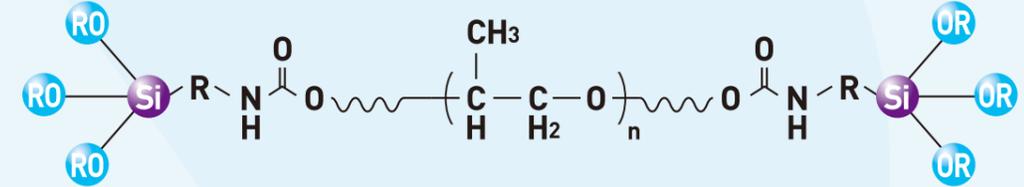
APPLICATIONS

Electronics

- ▶ Electric component adhesive
- ▶ OCR/OCA
(Optical Clear Resin/ Optical Clear Adhesive)



Hybrid Pressure Sensitive Adhesive



PERFORMANCE ADVANTAGES

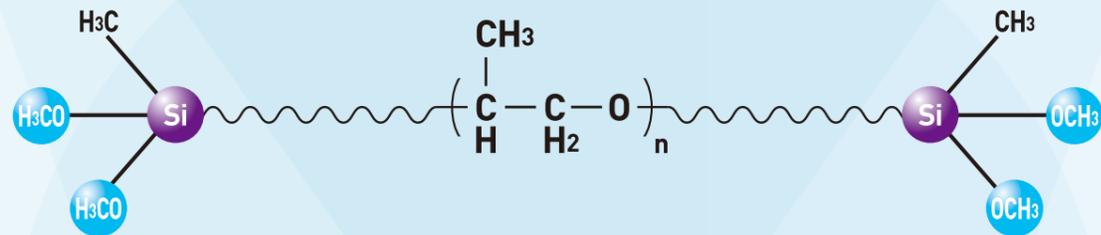
- ▶ Good balance between adhesive force and wettability
- ▶ Good workability
- ▶ High solid content
- ▶ Low rate of adhesive force increase

APPLICATIONS

Electronics

- ▶ PSA for film screen protector of polarization plate, prism and cover glass
(PSA:Pressure Sensitive Adhesive)





PERFORMANCE ADVANTAGES

Environmentally friendly / Safe

- ▶ Solvent free, toxic (amine, isocyanate) free and low VOC material
- ▶ Good for interior adhesion such as automotive and construction

Elasticity

- ▶ Suitable for an application which requires expansion and contraction, high vibration resistance
- ▶ Keeping elasticity for a long time

Good adhesion

- ▶ Excellent adhesion for metal, plastics and coating material

Non-staining

- ▶ Pollutant (low molecular weight compound) free
- ▶ Keeping various adherend (tile, stone, metal panel etc.) clean for a long term

Good weatherability

- ▶ Suitable for outdoor use

Good paintability

- ▶ Paintable with various kinds of paints

PROPERTIES

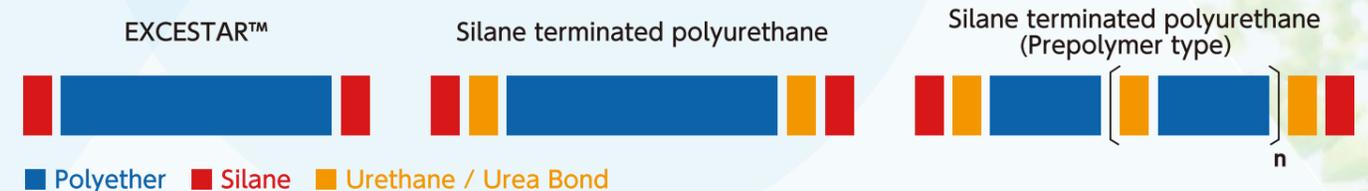
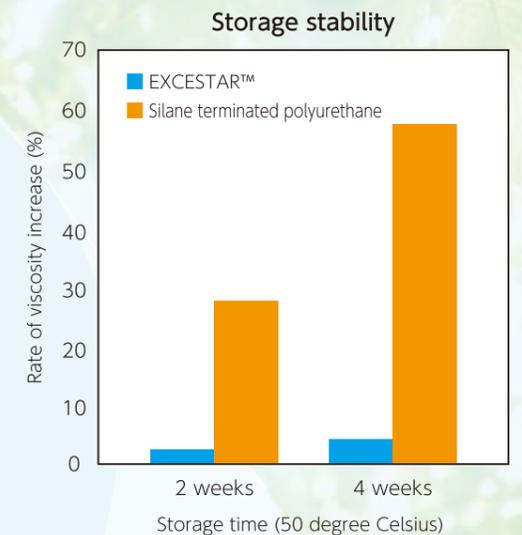
SMP demonstrates the excellent properties compared with other resin.

| | | SMP | Silicone | PU | Epoxy |
|--------------------|------------------------------|-----------|-----------|---------|-----------|
| Sealant | Paintability | Excellent | Poor | Good | - |
| | Non-staining | Good | Poor | Good | - |
| | Weatherability | Good | Excellent | Poor | - |
| | Durability | Good | Excellent | Average | - |
| Sealant / Adhesive | Flexibility | Excellent | Excellent | Average | Poor |
| | Bubble free curing | Excellent | Excellent | Poor | Excellent |
| | Environmental Characteristic | Excellent | Good | Poor | Poor |
| | Storage stability | Excellent | Good | Average | Poor |
| | Curing rate | Excellent | Excellent | Poor | Average |
| Adhesive | Strength | Average | - | Good | Excellent |
| | Adhesion | Good | - | Poor | Excellent |

FEATURES OF EXCESTAR™

EXCESTAR™ has multiple advantages compared with silane terminated polyurethane.

- ▶ Elongation
- ▶ Heat resistance
- ▶ Weatherability
- ▶ Storage stability and production stability



Plasticizer for SMP

Construction

House

- ▶ Metal roof sealant
- ▶ Exterior / Interior sealant
- ▶ Interior adhesive (flooring, wall, ceiling)

Building

- ▶ Metal / pre-cast concrete curtain wall joint sealing
- ▶ Reinforced Concrete joint sealing



Industrial

Automotive

- ▶ Interior materials adhesive
- ▶ Millar / window shield adhesive

Train

- ▶ Interior adhesive
- ▶ Joint sealing (panel, glass)

Elevator

- ▶ Panel adhesive



Electronics

- ▶ Electronics component adhesive



PERFORMANCE ADVANTAGES

- ▶ Non-staining
- ▶ Excellent paintability
- ▶ Environmentally friendly



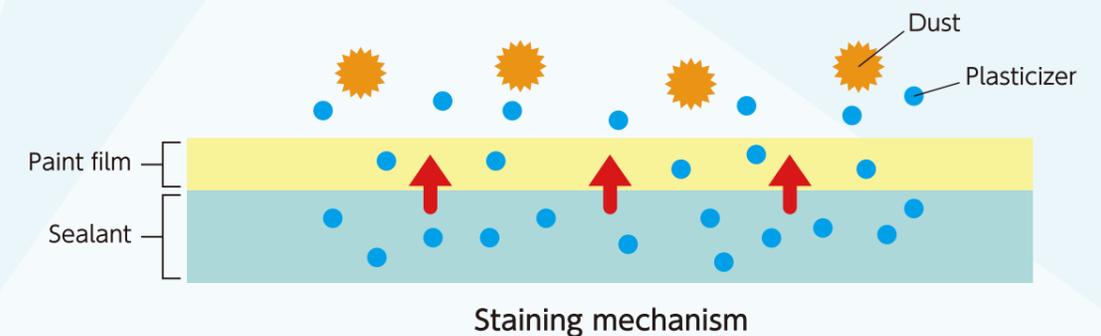
Formulation

- 20 - 40%** EXCESTAR™
- 10 - 20%** plasticizer
- 1 - 2 % water scavenger
- 40 - 60% fillers (calcium carbonates)
- 2 - 4 % silane coupling agent, antioxidant, ultraviolet absorber etc.
- 0.1 - 1.0% catalyst

PROPERTIES

PREMINOL™ is suitable for a plasticizer combined with SMP sealant.

| | PREMINOL™ A | PREMINOL™ B | Conventional PPG | DINP |
|------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Molecular weight | Average | High | Average | Low |
| Environmentally friendly | Good | Good | Good | Poor |
| Workability | Good | Average | Good | Good |
| Non Bleed (Resistance to staining) | Good | Excellent | Poor | Poor |
| Appearance (after staining test) |  |  |  |  |



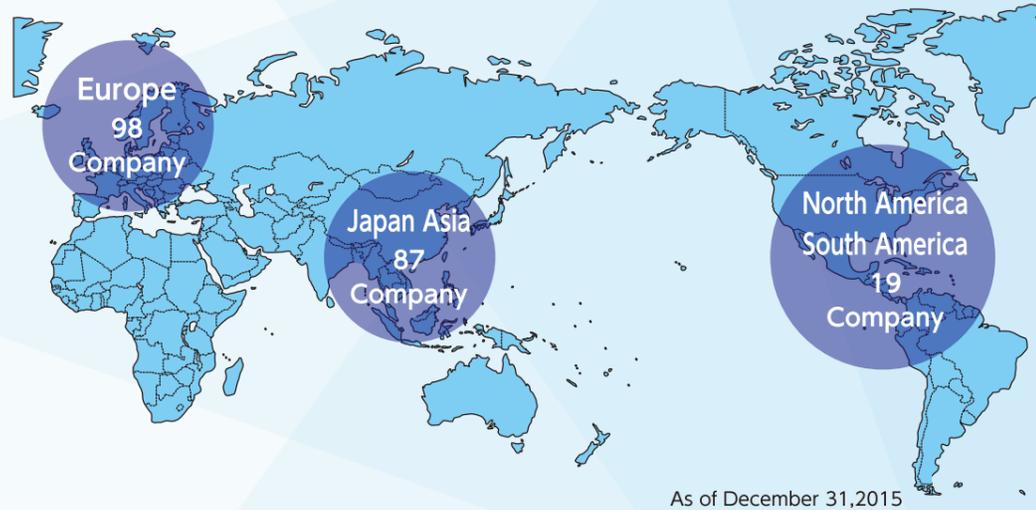
The AGC Group strives to be a company trusted by all its stakeholders, a company that meets the expectations of the world business community to grow and develop responsibly, and a company that slightly contributes to a healthier global society.

Name AGC Inc.
Founded September 8, 1907



AGC Group's Global Network

AGC Group has sales and production sites in more than 30 countries.



Business Overview

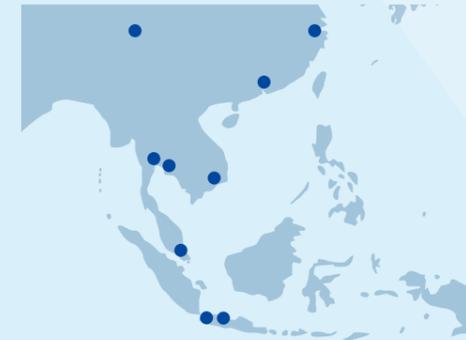
- ▶ AGC Group consists of 4 companies; Glass, Chemicals, Electronics, and Ceramics.
- ▶ Each company has unique technology and develops many kinds of products.



We believe that chemistry has the power to achieve all these goals without compromise at AGC Chemicals we're working toward a future that restores the glory of our planet's past. Creating a safe, secure, comfortable and eco friendly world with chemical technology.

AGC Chemical's Global Network

- ▶ We have many sales and production sites.
- ▶ We can offer technical support all over the world.



● : Sales/Production site in Asia



AGC Chemicals America



AGC Chemicals Europe

Chemical chain

