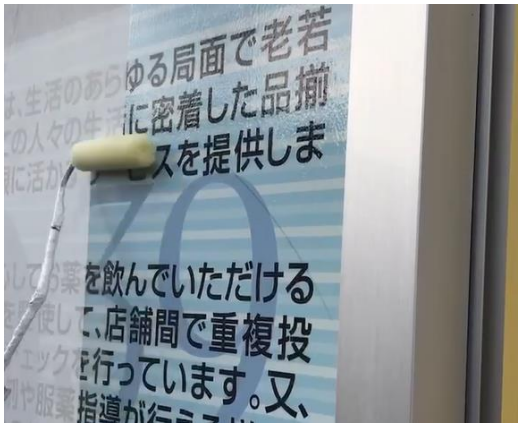
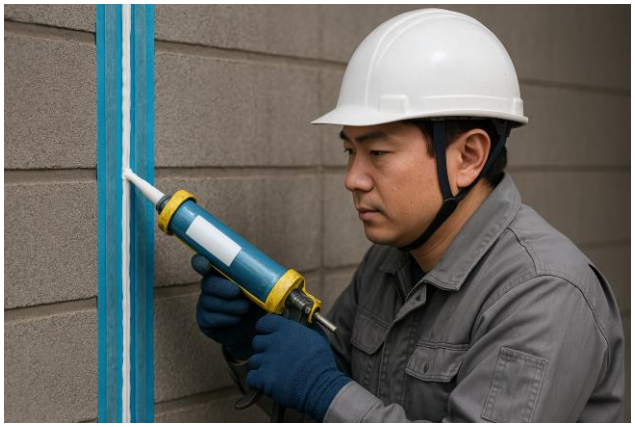
Polyurea Continues to Evolve – Entering a New Phase

Easy Repairs & Reinforcement with Roller Application –
High Performance & Multi-functionality with 3rd Generation
Japanese Aliphatic Polyurea

Heat Shield pu for rooftop



UV Shield pu for signboard



Pu Shield for Sealant

Sketch

Sketch Business Management

Reasons Why Aliphatic Polyurea Has Not Gained Traction in Japan – and How to Solve Them

Since around 2010, aromatic polyurea has been introduced to the Japanese market. However, its adoption has remained extremely limited. One major reason is the requirement for specialized heated spray equipment costing around 10 million yen (approx. USD 70,000), along with the need to transport this equipment using a 2-ton truck or larger with a team of 2–3 workers. These logistical and technical demands restricted application to a small number of specialized contractors.

Moreover, due to the complexity of the application process, the industry has relied on a framework of certified contractors under strict standards and organizational oversight, which made large-scale adoption difficult. The high cost of application—typically 25,000 to 30,000 yen per square meter—also limited its use to very specific, high-value projects.

In contrast, Sketch Business Management is now promoting a domestically produced **aliphatic polyurea** that resolves these issues. Unlike the aromatic type, it requires no large-scale equipment and can be easily applied with a roller—just like conventional polyurethane or acrylic coatings.

Designed for waterproofing, anti-corrosion, heat shielding, and thermal insulation, this product supports long-term building protection and energy savings.

With a lifespan of over 20 years, the initial application cost can be amortized in less than 10 years, making it one of the most promising energy-saving solutions moving forward.

Aromatic polyurea Application

Aliphatic polyurea Application

Difference Between Aromatic and Aliphatic Polyurea

•Aromatic Polyurea
Aromatic polyurea requires heated spray application using large-scale equipment and multiple personnel. The process generates significant overspray, making masking essential and limiting its use in urban environments.
Each spray pass applies 500–800 microns, and with back-and-forth passes, total film thickness typically exceeds 1,500 microns. Its primary applications are waterproofing and anti-corrosion.
Due to the high material consumption from thick film buildup, the cost of application ranges between ¥25,000 and ¥30,000 per square meter. This high cost has made it impractical for general-purpose use, restricting it to niche applications.

•Aliphatic Polyurea
In contrast, aliphatic polyurea can be applied with a roller at a film thickness of around 200 microns. It requires no complex machinery and can be applied by a small team, enabling efficient coating and spot repairs that were previously difficult with aromatic systems.
One major drawback of aromatic polyurea is yellowing under UV exposure, which necessitates a topcoat. Aliphatic polyurea, however, offers excellent UV resistance, maintains appearance for over 20 years, and eliminates the need for a topcoat. Furthermore, it provides more than double the weatherability and waterproofing performance compared to urethane, acrylic, or silicone coatings, which are prone to hydrolysis. These features make it ideal for long-life building solutions with clear differentiation in the market.

•Synergy with Sketch BM Coatings
When combined with Sketch BM's **anti-static, super-hydrophilic self-cleaning topcoat**, the **white reflective type** delivers exceptional heat-shielding performance and long-term durability. This pairing is recognized as one of the most advanced and energy-efficient coating solutions available today.

•Market Advantage
Aliphatic polyurea is superior in durability and functionality compared to common coatings like urethane, acrylic, and silicone, which account for over 90% of the current market. With over 20 years of proven weather resistance, waterproofing, and anti-corrosion capabilities, it is the optimal choice for future needs in **building longevity** and **energy-saving strategies**. Its long lifespan also ensures a significant cost-performance advantage.

The Development and history of Polyurea

U.S. Army Coating & Chemical Laboratory
A Report on Polyurea in 1969

Productization

The Polyurea Commercialization Project Was Launched in 1987

Texaco Chemical (Now: Huntsman)

Dudley J. Primeaux II

Expanded to the Private Sector

U.S.-Made Polyurea

HUNTSMAN Enriching lives through innovation

LINE-X

SWD

RHINO LININGS

SHERWIN-WILLIAMS.

NUKOTE

Chinese-Made Polyurea

Innovation, Growth, and Global Leadership

1998: The First Year of Polyurea in China
Adopted for national projects and expanded nationwide.
•Qindao Dolphin Aquarium – the first example
•Beijing Olympic "Bird's Nest" Stadium
•The world's longest overwater bridge in Qingdao
•Beijing–Shanghai High-Speed Railway
China became No.1 in the world in both application area and material consumption.

Dr. Weibo Huang

上海SWD **中国人民解放軍**

Global Paint and Coatings Market Size

Type	Market Size (2024)	Growth Rate
Polyurea	¥176.5 billion	7.60%
Polyurethane	¥13.7 trillion	4.40%
Epoxy	¥2.025 trillion	5.90%
Acrylic	¥3.5 trillion	4.80%
Fluoropolymer	¥280 billion	6.85%

1st Generation
: Two-Part Aromatic Polyurea

90% or more

Polyurea Market Share in Japan

Rank	Company Name (EN)	Market Share (%)
1	Kanamori-Touhei Shoji (NUKOTE - USA)	14.7
2	Polyurea Japan	11.5
3	Rhino Japan	9.9
3	Sugiyama	9.9
5	RyoYo	8.9
5	Lexport	8.9
7	Armored Products	7.3
8	Jing Planning	5.8
9	Polyurea Global	4.7
10	Econ	4.7

VS

3rd Generation
: Aliphatic Polyurea

We aim to become the industry leader in hand-applied aliphatic polyurea, specializing in products that offer over 20 years of superior weather resistance compared to urethane.

Aliphatic Polyurea, Proudly Made in Japan

Application Development, Product Manufacturing, and Sales Support

Sketch Business Management
Dainichiseika
Shanghai SWD

In terms of both cost and quality, Shanghai SWD holds a competitive advantage in hand-applied aliphatic polyurea.

Promotion of Domestic Aliphatic Polyurea

Japan Aliphatic Polyurea Promotion Council (General Incorporated Association)

What is 3rd Generation Aliphatic Polyurea?

Polyurea Continues to Evolve – Toward a New Phase

Polyurea is Evolving from Aromatic to Aliphatic

1st Generation
Heated Two-Component Spray
Aromatic Polyurea

- Cures in 5 Seconds – Rapid Film Formation
- Requires Specialized Spray Equipment
- Can Be Applied in Thicknesses Over 2mm at Once

2nd Generation
Single-Component Brush-On
Aromatic Polyurea

・Specialized molecular end-group control technology allows for extended working time, enabling application by brush, roller, air spray, or airless spray.

3rd Generation
Roller-Applied by Hand
Aliphatic Polyurea

- With over 20 years of weather resistance, it is ideal for maintaining the appearance of exterior materials and integrates primer and topcoat into one. Applicable using standard painting methods.

1st Generation Aromatic Polyurea Entered the Waterproofing Market — **Over 90% Share**

Contains a benzene ring and is prone to degradation from UV and oxidation, but offers high mechanical strength and excellent abrasion resistance. Ideal for cost- and strength-focused applications such as indoor use, factory floors, pipe protection, and tanks.
When used for exterior applications, a topcoat to prevent yellowing and oxidation is required every 10 years.

3rd Generation Aliphatic Polyurea – Ideal for Maintaining Exterior Aesthetics

With a C-N hydrocarbon group and no benzene ring, it exhibits strong resistance to UV rays and oxidation. It resists yellowing and degradation from UV exposure, offering excellent color stability and long-term aesthetic preservation, making it ideal for outdoor and exterior applications.
Its weather resistance of over 20 years makes it cost-effective and ideal for maintaining appearance, which suggests strong future market potential.
It is particularly suitable for waterproofing, rust prevention, heat shielding, and structural protection of corrugated metal roofs, slate roofs, and concrete roofs—outperforming other products as an energy-saving solution.

The Difference Between 1st Generation Aromatic Polyurea and 3rd Generation Aliphatic Polyurea

【 1st Generation Aromatic Polyurea 】

Coating for Waterproofing and Abrasion Resistance

■Feature

① **2 liquid type, Dry within 10 sec.**

② **Weak UV resistance;**
one of the following countermeasures is required

- Topcoat application is required as a UV protective layer.
  → Repainting Required Every 10 Years
- Apply a blended product with polyurethane to prevent UV degradation.
  → Some products are marketed as polyurea even with only 70% purity. The lower the purity, the more the performance of polyurea declines.

■Application

① Applied using RIM spray costing around 10 million yen;
thickness: 2 mm or more
(Only contractors with the equipment can apply it)

② Cures in 10 seconds using a two-component system
at approximately 60℃ ※ Fast drying shortens Application time
→ Mainly used for large-scale projects

③ Darker colors are preferred for UV protection
(White and other light colors yellow easily from UV.).

■Cost ① Material cost is lower than aliphatic type — about half the cost

② Due to thick-film application, construction cost is high

③ As a highly weather-resistant waterproofing solution:
from 25,000 JPY/sqm

VS

【 3rd Generation Aliphatic Polyurea 】 Sketch

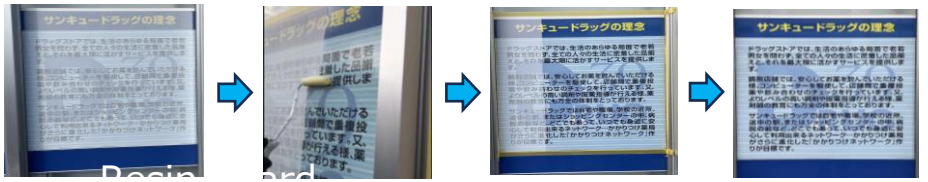
Mainly for Extending Building Life & Energy Efficiency

■Feature ①**2 liquid type ※ Room-temperature curing in 1 hour**

② **Highly UV-resistant and can be applied as a topcoat**

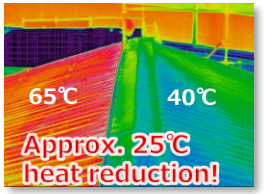
【Only 1 Strategy of Sketch BM】

①Focused on ultra-weather resistance, not just waterproofing
②Targeting repair and caulking markets with 20-year durability
③UV-fade prevention for 20 years
④20-year heat-shielding coat for energy and rust protection
⑤Specialized in non-yellowing aliphatic polyurea



■Application ①Simple application by roller or brush

②Standard painting work with a thin film of 200–300μm



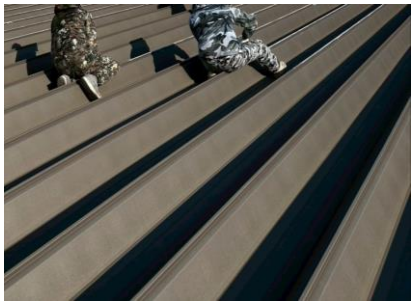
■Cost

①Material cost is higher than aromatic types

②Thin-film application makes the construction cost relatively low

③Signboard coating: up to ¥12,000/sqm
Roof coating: ¥10,000–¥12,000/sqm

Aliphatic Polyurea / Long-Life Coating Implementation Examples



Corrugated metal roof coating of 3,228 m² completed
in March 2025 at a warehouse in Kagoshima Prefecture

Heat-shielding coating applied to a shutter
at a drugstore in Osaka – May 2025

In June 2025, a sign pole at a drugstore in Hiroshima Prefecture
was coated for rust prevention.

Rust prevention coating inside a cubicle
at a seaside supermarket in Nagasaki – June 2025

Comparative Analysis of Coating Performance

Advantages of Aliphatic Polyurea

・Polyurea contains C-N bonds, which are stronger than the C-O bonds found in polyurethane. This results in superior heat resistance, thermal deformation resistance, and elasticity, allowing it to better follow substrate movement and cracks. Being 100% hydrophobic, it is highly resistant to hydrolysis caused by moisture and does not lose strength over time.

・It offers ultra-high weather resistance for over 20 years, with minimal degradation, discoloration, or yellowing, making it ideal for waterproofing and extending the lifespan of exterior materials.

・Once cured, it is highly resistant to water and UV exposure, maintaining coating performance for over 20 years. Its ultimate weather durability can exceed 50 years.

・Compared to polyurethane, it has significantly higher abrasion resistance, corrosion resistance, and anti-rust properties, with dramatically enhanced weather resistance.

Comparison Item	Aliphatic Polyurea (Roller / Simple Spray)	Aromatic Polyurea (Heated Spray)	Silicone / Urethane Paint	Fluorine Paint
Weather Resistance	◎ Over 20 years	◎ Over 20 years	△ ~10 years	○ ~15 years
Initial Cost	○ Slightly High	△ High	◎ Standard	○ Slightly High
Running Cost	◎ Low	◎ Low	△ High	○ Slightly High
Maintenance Frequency	◎ Low	◎ Low	△ High	○ Slightly Low
Long-Term Waterproofing	◎ High	◎ High	△ Low / Hydrolysis	○ Average
Quick Crack Following	◎ Yes	◎ Yes	△ None	△ None
UV Resistance	◎ Strong	△ Normal / Yellows	△ Normal	○ Slightly Strong
Cost per sqm	Approx. ¥8,000	Approx. ¥25,000	Approx. ¥5,000	Approx. ¥7,000

Common Building Deterioration Points – Solved with Aliphatic Polyurea

Degradation Location	Common Types of Degradation	Effectiveness of Aliphatic Polyurea Measures
Roof	Direct exposure to UV, rain, and temperature fluctuations causes the fastest degradation. Leads to leakage and reduced insulation performance.	・UV resistance prevents degradation and fading. Maintains building and signage appearance for over 20 years. ・Waterproof, stretchable, and flexible properties prevent cracks and follow structural movement. Reduces repair and maintenance costs. ・Chemical resistance and high weather durability extend the lifespan of coatings and caulking to over 20 years.Reduces maintenance frequency to once or twice. ・Strong adhesion, long-term waterproofing, and abrasion resistance. ・Reduces total building maintenance costs by 50%.
Exterior Wall	UV, rain, and temperature changes cause cracks and peeling paint. Waterproofing degrades, increasing the risk of water intrusion. Affects appearance due to fading of siding boards and coatings.	
Sealing Materials (Caulking)	Sealing materials around joints and windows degrade due to UV, temperature changes, and oxidation. Easily cracks and needs periodic repair every 5–8 years.	
Signboards & Signs	Direct exposure to UV, rain, and temperature fluctuations causes rapid fading of signage. Degradation impacts company image.	
Balcony / Veranda	Poor drainage and deterioration of waterproof sheets cause water pooling and seepage.	
Window Frames / Sashes	Condensation, degraded packing and sealing materials cause leaks and mold.	
Foundation / Concrete	Cracks (hairline) and ground subsidence lead to problems. Water ingress causes rebar corrosion, impacting structure.	
Interior Materials	Damage from humidity, sun exposure, and wear.	
Near the Sea	Salt damage causes metal corrosion.	
Hot Spring Areas	Hydrogen sulfide and chemical substances cause deterioration.	

Differences from Other Companies' Heat and Thermal Insulation Products: Reasons for Industry-Leading Performance.

Triple Guard Coat : 4 steps

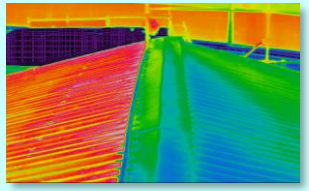
「Rust Shield」

1. Anti-Rust
2. Auxiliary waterproof

For corrugated metal roofs, a 10-year anti-corrosion warranty is provided.

「Thermo ECO Shield」

3. Heat insulation
4. Sound insulation



:With 60% special hollow beads in the coating, the industry's highest level,

「Heat Shield Pu」

5. Heat reflection
6. Ultra Weather Resistance

:A heat-reflective coating with 20-year weather resistance based on aliphatic polyurea.

「Super Glass Barrier」

7. Anti-Static
8. Super-hydrophilic
9. Maintain infrared reflectance

: Maintains high reflectivity with excellent anti-stain performance.

VS

"Other Companies' Heat Insulation Paint - 2 Steps."

General Primer Sealer

× No anti-corrosion or waterproofing performance.

\+

3. Heat reflection
4. Heat Insulation

× Significant Difference in Weather Resistance.

With over 20 years of weather resistance, it is possible to reduce the cost of one repainting cycle.

VS

Acrylic and urethane require repainting every 10 years, while fluorine coatings require repainting every 15 years.

× Significant Difference in Heat Reflective Performance

Infrared reflectivity decreases due to dirt, reducing heat reflective performance.

Development of High-Performance Coating Using Hand-Applied Polyurea by Sketch Co., Ltd.

Challenges and Desired Improvements for Exterior Coatings

1、Cracks

2、Water Leakage

3、Fading and UV Degradation

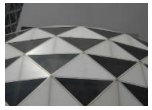
4、Mold and Algae

5、Peeling and Spalling

6、Heat Shielding & Thermal Insulation

7、Rust

8、Exterior Dirt



Developed specifically for superior weather resistance of over 20 years
— exceeding that of conventional urethane, using aliphatic polyurea

Rust Shield＋（Thermo ECO Shield）＋Heat Shield Pu＋Super Glass Barrier

A High-Performance Energy-Saving Heat-Reflective Coating for Corrugated Metal Roofs
By applying a rust prevention base layer (*Rust Shield*) with a 10-year anti-corrosion warranty, followed by a thermal insulation midcoat, and then coating with a white aliphatic polyurea that reflects infrared radiation and provides over 20 years of weather resistance, we have achieved unmatched long-term durability.
The system is completed with an antistatic, super-hydrophilic topcoat, resulting in an energy-saving heat-shielding solution with superior 20+ year performance that no competitor can match. **Price: ¥10,000/sqm**

Anti-Seepage Primer＋ Waterproof Reinforcement Aromatic Polyurea ＋Heat Shield Pu＋Super Glass Barrier

To address issues such as asbestos dispersion from deteriorated slate roofs, this system enhances structural strength and extends service life while also delivering energy-saving performance with 20-year weather resistance.
Using a penetrating primer specifically for slate as a reinforcement base, it is coated with aliphatic polyurea that provides over 20 years of heat-shielding and weather resistance.
Finally, an antistatic, super-hydrophilic topcoat is applied, resulting in a highly durable, energy-saving coating system. **Price:¥12,000/sqm**

Anti-Seepage Primer＋ Waterproof Reinforcement Aromatic Polyurea ＋Heat Shield Pu＋Super Glass Barrier

High-Performance Waterproof & Heat-Reflective Coating for Rooftop Concrete
A waterproof primer is first applied to the rooftop concrete to block moisture penetration. This is followed by a midcoat layer of aromatic polyurea for waterproofing, offering a **10-year waterproof warranty**.
Then, a white aliphatic polyurea coating provides **over 20 years of heat-shielding and weather resistance**.
Finally, an **antistatic super-hydrophilic topcoat** is added to enhance energy efficiency.
Price: ¥15,000/m²

UV Shield Pu : Long-Lasting Protection for Signs and Coated Surfaces

- **Blocks 95%+ UV rays**, prevents fading for over 15 years
  → **50%+ cost reduction** on repaint/replacement
- **90% gloss retention** after 10 years of outdoor exposure
- **Waterproof & anti-rust** protection with polyurea
- **Restores color** on murals, tiles, signs, emblems, and prevents acrylic yellowing

From ¥12,000/sqm

Target Substrates and Problem-Solving Approaches by Aliphatic Polyurea

Target Substrate	Current Issues	Solution with Aliphatic Polyurea
Corrugated Metal Roof	No heat or thermal insulation measures. Corrosion accelerates deterioration, leading to high maintenance costs. Severe rust issues in coastal areas.	10-year anti-rust warranty with insulation layer. Over 20-year weather-resistant polyurea heat-shielding coat. Additional anti-static topcoat ensures long-term energy savings and structural protection.
Slate Roof	Cracks and breakage cause leaks. Moss growth. Rust on metal fixtures. Aging increases repair costs. Asbestos in aged slate requires expensive disposal or sealing. Metal overlaying adds further costs.	Reinforces aged slate roofs. Prevents particle dispersion. Over 20-year weather-resistant polyurea coating plus anti-static topcoat ensures long-term energy efficiency and substrate protection. Effective for sealing asbestos.
Concrete Rooftop	Lack of insulation leads to cracks and leaks due to aging. Carbonation causes strength loss and spalling. Frequent waterproofing needed. Leaks weaken the structure.	Combination of water-blocking primer and aromatic polyurea ensures 10+ years waterproofing. Over 20-year heat-shielding with weather-resistant polyurea and anti-static topcoat ensures energy savings and waterproofing.
Signs / Exterior Walls	Fading and deterioration occur in 5–8 years, requiring repainting. Uneven weathering based on orientation. Poor impression for company and product branding. Pole rust on freestanding signs is also an issue.	UV-cut coating based on ultra-weather-resistant aliphatic polyurea prevents fading for over 15 years. Restores discolored signs and surfaces. Achieves significant cost reduction.

Application Price List by Roof Material Type

Roof Substrate	Coating Materials	Application Price in Japan※
Corrugated Metal Roof Heat-shielding & Anti-rust	**10-Year Anti-Rust Warranty / 20-Year Durable Heat-Shielding Coating** Rust Shield(75μm) + White Heat Shield pu(150μm) + Super Glass Barrier（200nm)=225μm～	¥8,000/sqm
Corrugated Metal Roof Heat-shielding & Thermal Insulation, Anti-rust & Waterproofing	**10-Year Anti-Rust Warranty / 20-Year Durable Heat-Shielding & Thermal Insulation Coating** Rust Shield(75μm) +Thermo ECO Shield(150μm) + White Heat Shield Pu (150μm) +Super Glass Barrier(200nm)=375μm～	¥10,000/sqm
Slate Roof Heat-shielding, Waterproofing & Reinforcement	**10-Year Waterproof Warranty / 20-Year Durable Heat-Shielding Coating** Slate Primer(200~400μm) +Water proof & Reinforcement Polyurea(400μm) +White Heat Shield pu（80μm) +Super Glass Barrier(200nm)=880μm～	¥10,000/sqm
Slate Roof Heat-shielding/Thermal Insulation, Waterproofing & Reinforcement	**10-Year Waterproof Warranty / 20-Year Durable Heat-Shielding & Thermal Insulation Coating** Slate Primer(200~400μm) + Water proof & Reinforcement Polyurea(400μm) +Thermo ECO Shield(150μ) +White Heat Shield pu（80μ) +Super Glass Barrier(200nm)=1030μm～	¥12,000/sqm
Concrete Roof Heat-shielding & Waterproofing	**10-Year Waterproof Warranty / 20-Year Durable Heat-Shielding Coating** Penetration blocking-primer(200~400μm) + Water proof & Reinforced Polyurea(400μm) + White Heat Shield pu（80μm) +Super Glass Barrier(200nm)=880μm~	¥12,000/sqm
Concrete Roof Heat-shielding/Thermal Insulation, Waterproofing	**10-Year Waterproof Warranty / 20-Year Durable Heat-Shielding & Thermal Insulation Coating** Penetration blocking-primer(200~400μm) +Water proof & Reinforced Polyurea(400μm) +Thermo ECO Shield(150μ) + White Heat Shield pu（80μ) +Super Glass Barrier(200nm)=1030μm～	¥15,000/sqm

※Additional costs such as general expenses, safety measures, and welfare charges will be added separately.