

AQUAPATCH

Technical documents

(Feb.2026)



MAEDA ROAD



Challenge the status quo

INFRONEER
Holdings Inc.

Overview

"AQUA PATCH" is a new type of bagged asphalt mixture that hardens simply by pouring water on it and tamping it down. Compared to the conventional Cold-mix, it hardens faster and has durability equal to or more than that of Hot-mix. This makes it suitable not only for road repair, but also for new applications such as paving around residential areas and in fire-free zones, which have previously been difficult to apply.



Photo-1 Implementation Examples

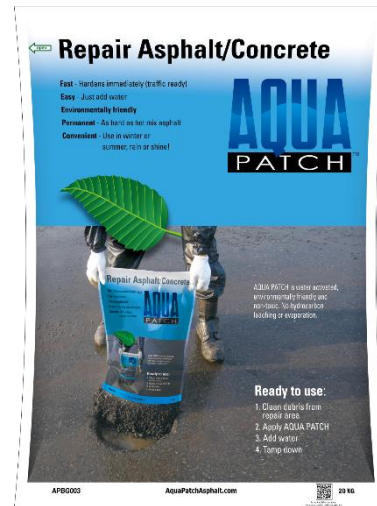


Photo-2 Package appearance

Feature

The main features of AQUA Patch are as follows.

■ Easy

No special construction equipment is required.

it can be applied in the same way as conventional cold-mix asphalt.

■ Fast

AQUA PATCH sets up immediately after pouring water and tamp!

The road can be opened to traffic immediately after application.

■ Hard and Durable

AQUA PATCH perform as strong and durable as Hot Mix Asphalt!

■ Convenient (All-weather product)

AQUA PATCH can be used any time in all weather!

It can be applied in rainy weather and standing water, and can also be used during the winter.

■ Long-term storage capacity

Shelf life is 1 year from manufacturing date

■ Environmentally friendly

We replace around 50% of the asphalt binder with bio-based materials.

Applications

[Pavement Repair]

- **Pothole repairs** on roadways.
- **Restoration** after gas or electrical utility work.
- **Railway platforms.**
- **Walkways and park paths, etc.**

Specifically suited for areas requiring high durability and immediate reopening to traffic.

[Residential Use]

- **Weed prevention** for entrances, property boundaries, and gardens.
- **Restoration** of puddles and depressions.

Mechanism of Strength Development

The curing concept of AQUA PATCH is shown in Figure 1. AQUA PATCH ensures workability at ambient temperatures by coating the surface of the asphalt film with a special lubricating oil. Since this lubricating oil has the property of solidifying upon reaction with water, the oil, reaction aids, and water undergo a chemical reaction to harden when water is sprinkled during the leveling process.

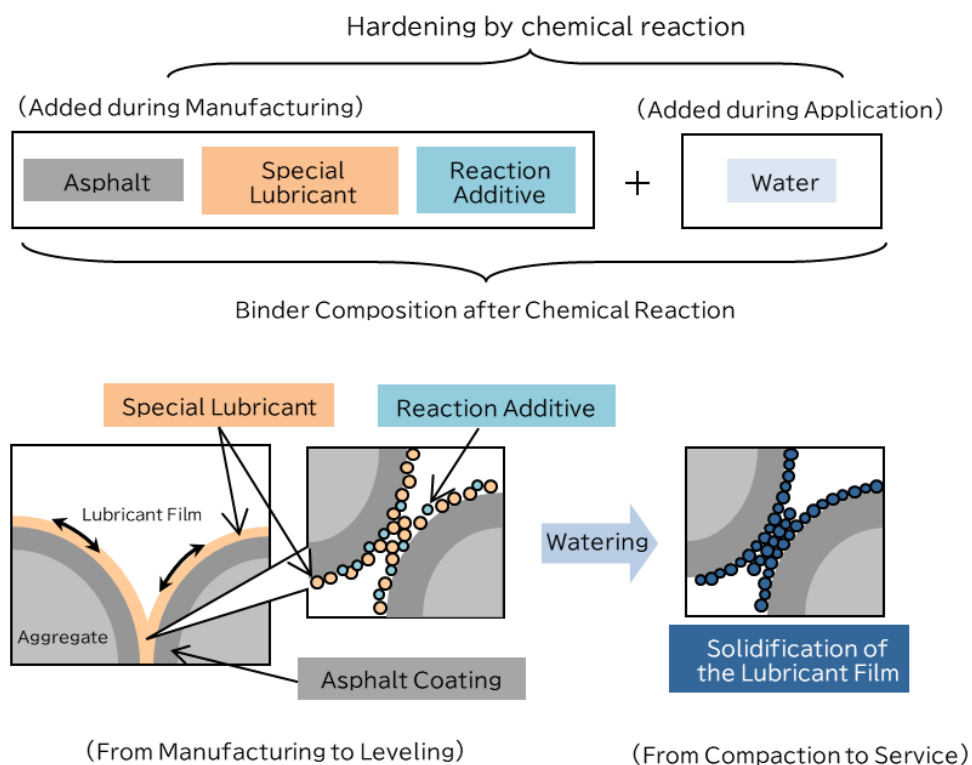


fig-1 The curing concept of AQUA PATCH

Standard Mix Design and Target Values

The features of the standard Aqua Patch mix, maximum aggregate size, grading range, target Marshall stability values, and applications are shown in Table 1. Additionally, it can be customized to comply with the standards of the country where it is sold.

Table 1: Features and Target Values by Mix Type

Item		AQUA PATCH 【5mm Type】	AQUA PATCH 【13mm Type】
Applicable Thickness		2 cm or more	3 cm or more
Key Features		<ul style="list-style-type: none"> • High rut resistance • Fine-textured finish • Easy feathering (tapering) 	<ul style="list-style-type: none"> • High rut resistance • Finish equivalent to standard pavement
Max. Aggregate Size		5mm	13mm
Total % By weight Passing	19.1 mm	100	100
	13.2 mm	100	95~100
	4.75 mm	90~100	60~75
	2.36 mm	50~70	45~60
	75 μ m	4~10	4~8
Marshall Stability (kN)		4.9 or higher Curing: 7 days @ 20°C Pre-test: 30 min @ 60°C	4.9 or higher Curing: 7 days @ 20°C Pre-test: 30 min @ 60°C
Wheel Tracking Test(t imes/mm)		3000 or higher Curing: 163h @ 20°C Pre-test: 5h @ 60°C	3000 or higher Curing: 163h @ 20°C Pre-test: 5h @ 60°C

■ Standard Coverage and Compaction Density

• Refer to Table 5 for the estimated amount of AQUA PATCH and the volume of water required per 1 m².

Table 5: Estimated Coverage and Water Volume per 1 m²

Thickness	Quantity	Required Water Volume	Compaction Density
4 cm	100kg・5bags	5L	2.3g/cm ³
5 cm	120kg・6bags	6L	

Technical Properties and Workability

■ Strength Development of AQUA PATCH (13mm Type)

The relationship between Marshall stability and curing time is shown in Figure 2. After watering and compaction, Marshall stability increases over time, with strength development generally leveling off after approximately 168 hours (7 days).

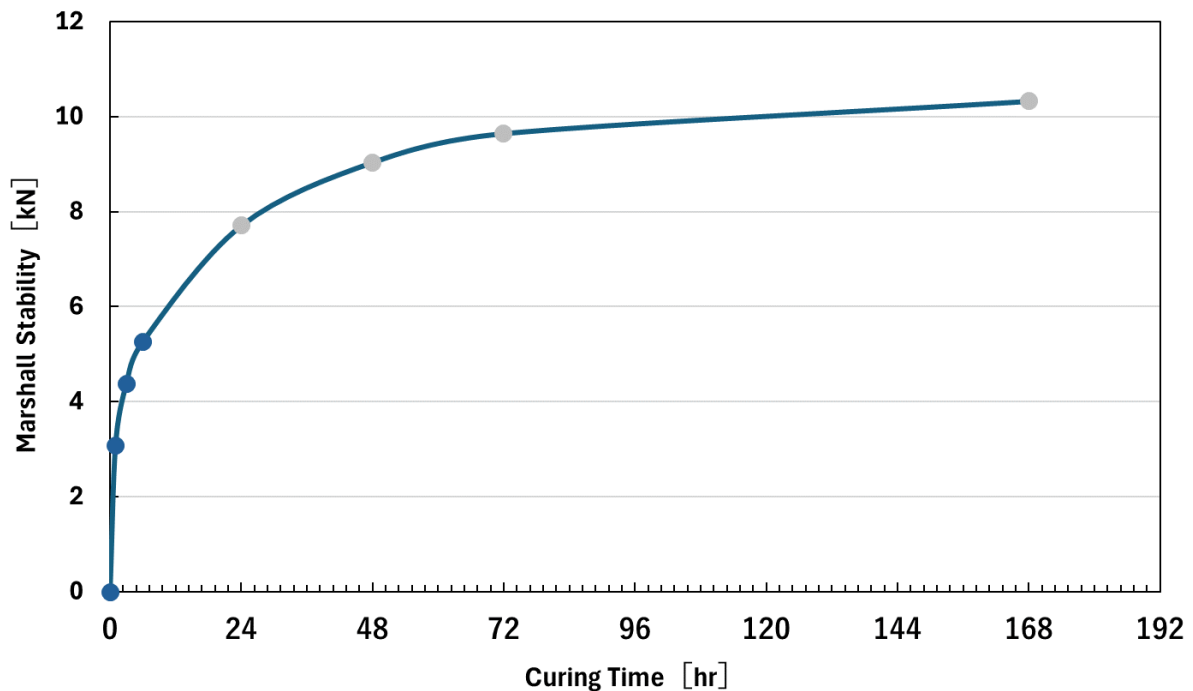


Figure 2: Relationship between Marshall Stability and Curing Time
(AQUA PATCH [13mm Type])

***Curing and Testing Conditions**

- 1h – 6h post-application: Air-cured at 20°C (Unsoaked)
- 24h onwards: Pre-test soaking for 30 min at 60°C

■ Workability at Low Temperatures

Workability at low temperatures was evaluated based on the **ease of loosening** the mixture. As illustrated in **Figure 3**, this evaluation was conducted by applying a load to a specimen—simulating the material in a bagged state—and measuring the **time until the specimen collapsed** (specifically, the time at which the rate of deformation reached its maximum).

As shown in **Table 4**, the results indicate that the current product (Aqua Patch) takes less time to loosen compared to conventional products, demonstrating **significantly improved workability** even in cold conditions.

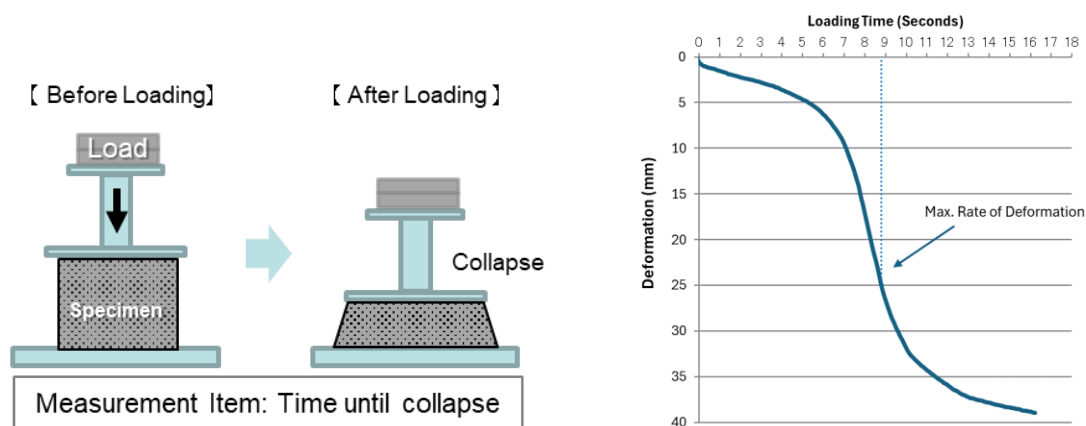


Figure 3: Method for Evaluating Loosening Properties (Simulation of Bagged State)

Table 4: Evaluation Comparison of Loosening Properties (13mm Type)

	Current Product	Conventional Product
Time to Collapse (sec)	6.5	8.9

*test temp.: @0℃

Traffic Opening Guidelines

■ Estimated Traffic Opening on Roadways (AQUA PATCH [13mm])

For application on roadways, the following guidelines apply when a vibratory plate compactor is used for compaction:

- **Standard Road Sections (Straight-line driving):** The road can be reopened to traffic immediately after compaction for passenger cars traveling in a straight line.
- **Intersections and High-Stress Areas (Where tire twisting occurs):** In areas subject to steering maneuvers, such as intersections or curved sections, allow at least 2 hours of curing time before reopening the roadway to traffic

Table 2: Estimated Time for Reopening Roadways to Traffic (13mm Type)

	Passenger Cars (Straight driving)	Passenger Cars (Turning / Tire twisting)
Curing Time	Immediately after compaction	After approx. 2 hours

■ Estimated Time for Reopening Sidewalks to Traffic (AQUA PATCH [5 mm])

The estimated time for reopening to pedestrian traffic after applying AQUA PATCH on sidewalks is shown in Table 3. The strength of Mild Patch increases gradually after application.

- **Standard Walking (e.g., Sneakers):** The surface can be walked on approximately **30 minutes** after application.
- **Concentrated Loads (e.g., High Heels):** For footwear that applies concentrated pressure, such as high heels, please allow approximately **6 hours of curing time** before walking.

Table 3: Estimated Time for Reopening Sidewalks to Traffic (5mm Type)

	Pedestrians (Walking)	Bicycles (Riding)	Bicycles (Using kickstand)	High Heels (Walking)
Curing Time	After 30 min	After 1 hour	After 2.5 hours	After 6 hours

Note: Curing times may vary depending on the ambient temperature and the degree of compaction. Strength development may be slower in lower temperatures.

Application Method (Pavement Repair)

■ Follow these steps for optimal repair results



Step 1: Cleaning

Remove debris and dust from the pothole. Small amounts of water are acceptable, but remove excess mud.



Step 3: Spreading

Spread the material evenly using a shovel or similar tool.



Step 5: Compaction

Compact the material thoroughly using a vibratory plate or your feet. Since Mild Patch begins to react once water is applied, please compact it immediately (within 5 minutes) after watering.



Step 2: Filling

Pour AQUA PATCH into the pothole. As a guide, the filling amount should include a surcharge (extra height) of approximately 30% of the repair depth.



Step 4: Watering

Sprinkle water evenly over the surface. As a guide, the amount of water should be at least 1 liter per 20kg bag of Mild Patch. Excess water will not cause any issues.



Step 6: Completion

The area can be opened to traffic immediately after compaction. However, for areas subject to tire twisting, restrict access for approximately 2 hours until fully hardened.

Installation Guide for Home Use

■ The following is the application procedure at home



Step 1: Cleaning

Remove debris and dust from the site. Small amounts of water are acceptable, but remove excess mud.



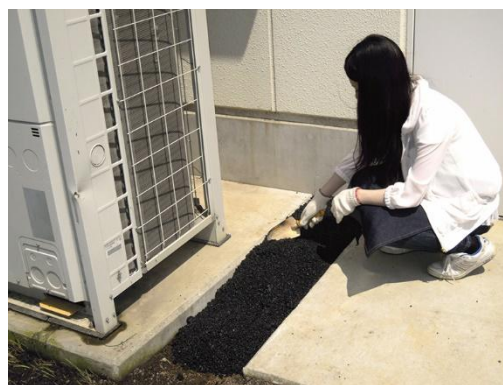
Step 2: Filling

Pour AQUA PATCH into the site. As a guide, the filling amount should include a surcharge (extra height) of approximately 30% of the repair depth.



Step 3: Spreading

Use a shovel or similar tool to spread the material evenly across the site.



Step 4: Watering

Sprinkle water evenly. Use at least 1 liter per 20kg bag. Excess water will not cause any issues.



Step 5: Compaction

Compact the material immediately (within 5 minutes) after watering by treading on it or using a tamper.



Step 6: Completion

Free yourself from the risk of tripping and the chore of weeding.

Precautions for Application and Storage

■ Precautions for Application

- **Mandatory Watering:** To develop sufficient strength, ensure that water is always applied.
- **Immediate Compaction:** Compact the material immediately after watering.
- **No Additional Compaction:** A certain level of hardening can be observed approximately 20 minutes after watering. At this stage, do not perform additional compaction or continue applying vibration with machinery, as it may cause cracking or scattering.
- **Minimum Thickness:** Do not apply the material in extremely thin layers (2 cm or less), as this can lead to cracking and scattering.
- **Tapered Edges (Feathering):** When performing "zero-taper" (feather-edge) applications, there is a risk of scattering from the edges. In such cases, please use it in combination with our "SMART PATCH" product.
- **Layered Construction:** If the application thickness exceeds 5 cm, apply the material in two separate layers.
- **Outdoor Use Only:** AQUA PATCH is designed for outdoor use. Please refrain from indoor applications or bringing specimens inside buildings for extended periods.

■ Precautions for Storage

- **Use Immediately After Opening:** Use the entire contents promptly once the bag is opened. If you must store any remaining material, seal the opening strictly, as AQUA PATCH will harden even from moisture in the air.

Handle with Care: Do not drag the bags, as they may tear.

Storage Location: Store in a location away from direct sunlight and protected from rainwater.

Stacking Limit: Do not stack more than 10 bags high, as excessive weight may cause pinholes in the packaging.

Reference Materials

■ Typical Mixture Properties (AQUA PATCH [13mm])

To evaluate the properties of the AQUA PATCH mixture, tests were conducted to assess its initial stability and durability during service. The typical properties are shown in Table 6.

Table 6: Initial Stability Evaluation Test and Typical Values

Test Item	Condition	Test Results
WT Test	Curing: 5h@60°C test: @60°C	155 passes/mm
Initial Marshall Stability (at Room Temp.)	Curing: 1h@20°C test: @20°C	5.4kN
	Curing: 6h@20°C test: @20°C	00kN

Table 7: Post-Curing Durability (After 7 Days) and Typical Values

Test Item 【standards】	Condition	Test Results
Marshall Stability 【AASHTO:T-245-15】	Curing: 167.5h@20°C Pre-test: 0.5h@60°C test: @60°C	00kN
Cantabro Test (Mass Loss) 【AASHTO:TP108-14】	Curing: 162h@20°C dry: 4h@52°C Pre-test: 2h@25°C test: @25°C	00%
Hamburg Wheel Track Test (HWTD) 【AASHTO:T324-19】	50°C、60°C	SIP: 0000times
WT Test	Curing: 163h@20°C Pre-test: 5h@60°C test: @60°C	5,730 passes/mm

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Established : DEC. 2014
Revised : Feb. 2026

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