

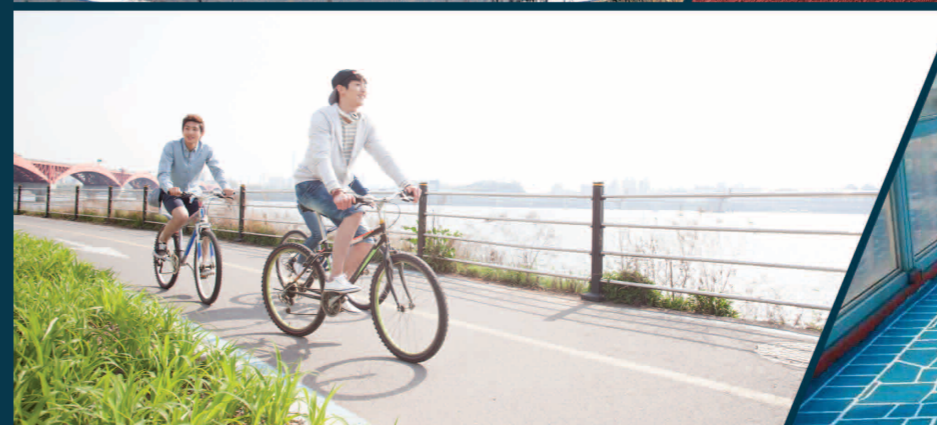
# NOROOWAY

## MMA Functional Road Paving

Bicycle lane, Nonslip paving, Stencil paving, Thermal barrier paving

NOROO

NOROO Paint & Coatings



\* All data is based on the test results and experiential bases of NOROO but might vary with the actual working environment and applying condition. Due to continuous quality improvement activities, these data would be changed without notice. Applying volume could be adjusted depending upon climate, application method, surface condition and form. Please consider these conditions before use.

# NOROOWAY MMA

## NOROOWAY MMA Functional Road Paving

NOROO Paint high strength MMA paving system which overcomes normal road paving

NOROOWAY Series is fast hardening flooring composed of high strength MMA resin. It is suitable for road paving and overcomes the disadvantages of existing flooring because it has durability, nonslip, adhesion, weatherability, chemical resistance and flexibility properties. It is the most ideal functional MMA flooring system.



### ■ Ecofriendly

Does not contain heavy metals such as formaldehyde, ammonia, organic solvent and lead

### ■ Superfast hardening

Dries in 1 hour after each type application

### ■ Polymerization

Perfect reaction by radical, Superior flexibility, chemical resistance, weatherability and abrasion resistance by denaturalized acrylic

### ■ Low temperature hardening

Applicable in  $-25^{\circ}\text{C}$  and hardened in 1 hour



### ■ MMA Functional Road Paving

	MMA resin	Epoxy resin	Polyurethane resin
Reaction mechanism	Radical polymerization	Addition polymerization	Addition polymerization
Applicable temperature	$-25^{\circ}\text{C} \sim 45^{\circ}\text{C}$	$5^{\circ}\text{C} \sim 50^{\circ}\text{C}$	$5^{\circ}\text{C} \sim 50^{\circ}\text{C}$
Chemical resistance	Very good to acid and alkali	Good to acid and alkali	Good to acid and alkali
Time to mechanical solidity	1 hour	3~7 days	2~5 days
Time to walk after construction	1 hour	14~18 hours	12~16 hours
Elongation rate(20 $^{\circ}\text{C}$ )	80~120%	1.5 ~ 3%	6 ~ 10%
Floor whitening	No	Yes	Yes



# NOROOWAY A-PT

## Nonslip Road Paving

NOROOWAY A-PT(for ascon surface paving) optimizes the safety and quality of a road

NOROOWAY A-PT(for ascon surface paving) is nonslip road paving. NOROOWAY A-PT has excellent adhesion, durability, wear resistance and shock resistance. It shortens construction time and is applicable in winter.

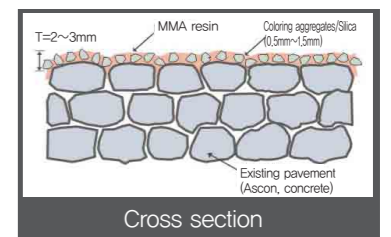
### Product uses

Children protection zone, school zone, crossroad, senior protection zone, intersection, slope, accident hazard zone, etc. where a clear view has to be secured for safety reason

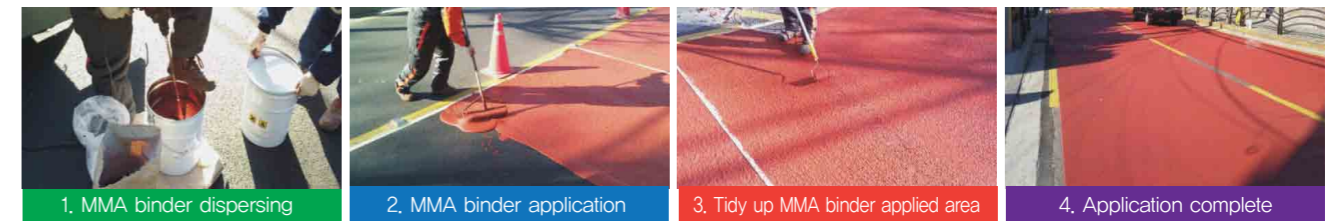
### Features

Crack doesn't appear thanks to good durability. Adjustable slip resistance figure prevents accidents. You can save the cost and time of construction because you can apply NOROOWAY A-PT over existing paving.

- ▷ Application in room temperature
- ▷ Low toxic and solventless
- ▷ Not discolored by UV light
- ▷ Strengthen ascon and concrete
- ▷ Ductility prevents crack
- ▷ Cure limit temperature  $-25^{\circ}\text{C}$  (applicable in winter)
- ▷ Fast drying (cured in 30 minutes)
- ▷ Shock resistant and edge crack doesn't appear during curing



### Nonslip paving process



### Application example



# NOROOWAY B-PT

## Bicycle Lane Paving

Eco-friendly high strength concrete provides you with the best bicycle lane paving which is quite ridable

NOROOWAY B-PT(Bicycle lane paving) is an eco-friendly material and harmless to humans. It has superior durability, adhesion, wear resistance and compression strength authorized by national certificate authority. Its nonslip property prevents accidents even on the wet pavement.



### Product uses

Bicycle lane, trail, footpath, light traffic route, etc.

### Features

- ▷ Application in room temperature
- ▷ Low toxic and solventless
- ▷ Not discolored by UV light
- ▷ Strengthen ascon and concrete
- ▷ Ductility prevents crack
- ▷ Cure limit temperature  $-25^{\circ}\text{C}$  (applicable in winter)
- ▷ Fast drying (cured in 30 minutes)
- ▷ Excellent nonslip effect

### Application example



Geumcheon-gu, Seoul



Yeongdeungpo-gu, Seoul



Gwangju-si



Songdo International Business district, Incheon

### Bicycle lane paving process



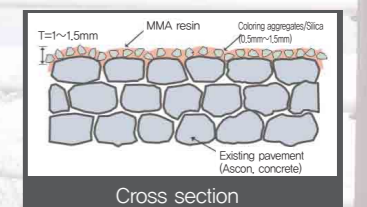
1. Tidy up paving area



2. Paving application



3. Tidy up applied area and cure



Cross section

### Bicycle lane and footpath paving comparison

	Color ascon	NOROOWAY Bicycle lane MMA	Water penetration color concrete	Elastomeric flooring
Photo				
Cross section				
Application method	Same application method as general ascon (5cm) Top coating	Tidy up area Sanding area(AP removal)-depending on working environment Colored MMA binder apply Tidy up applied surface Cure	Same application method as general ascon Install guideline Floor coating	Surface cleaning Primer application CHIP dispersing CHIP application Use HEATING ROLLER
Advantage	Same application method as general ascon	Cure limit temperature ( $-25^{\circ}\text{C}$ ~ $45^{\circ}\text{C}$ ) Not discolored by UV light Ductility prevents crack Easy maintenance Fast drying (30 minutes)	Cheap construction expenses Many application cases	Good elasticity
Disadvantage	When enough curing time is not secured, contamination and discoloration may occur. Color hold out by surface coating	Impurities on substrate can cause peeling off. Before construction, enough curing time after new ascon and concrete application must be given.	Crack and peel off Hard to spot repair Whitening and discoloration may occur. When pore is blocked, water penetration is lost.	Harmful to environment Difficult maintenance Expensive Frequent flaws

# NOROOWAY S

## Pattern Forming Stencil Paving

Various patterned stencil has pedestrian safety accident prevention effect.

NOROOWAY S changes an existing monotonous road into a various patterned three-dimensional road. It is of high quality and travelable in 30 minutes after application.

### Product uses

Main street, Rodeo Street, theme street, trail, safe footpath, pedestrian overpass, parking lot floor, etc.

### Features

Good adhesion enables various colors and patterns. It has been inconvenient to control road for paving but a fast drying technique enables NOROOWAY S to be travelable in 30 minutes after application.

- ▶ Spraying in room temperature
- ▶ Low toxic and solventless
- ▶ Strengthen ascon and concrete
- ▶ Cure limit temperature  $-25^{\circ}\text{C}$  (applicable in winter)
- ▶ Fast drying (cured in 30 minutes)

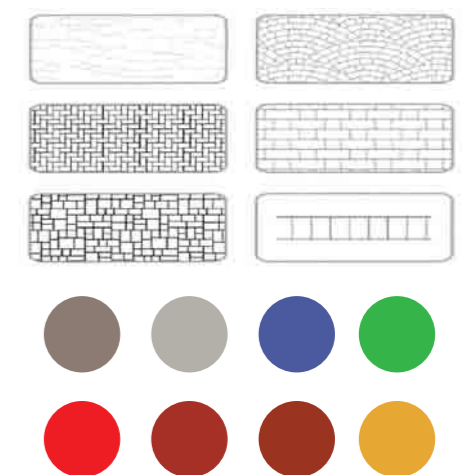


Dry film thickness 2~3mm  
 MMA topcoat  
 Stencil (pattern)  
 Base application  
 Paved layer (Ascon, concrete)

### Stencil paving process



### Stencil pattern and color



### Application example



Seobinggo station overpass, Seoul    Bucheon station overpass, Gyeonggi-do    Uijeongbu specific street, Gyeonggi-do    Seodaemun safe footpath, Seoul    Gyeongin market, Incheon

# NOROOWAY ESR

## Thermal barrier paving

An extraordinary product which controls road surface temperatures in summer

NOROOWAY ESR, composed of special pigment and resin, absorbs visible rays and reflects infrared rays. It minimizes the urban heat island effect in summer and lowers road and city temperatures more than 10°C.

### Product uses

Road, expressway, main road, etc.

### Features

▶ Restrain road surface temperatures from increasing by near-infrared ray reflection characteristic.

It reflects near-infrared ray which takes almost 50% of sunlight energy intensity and decreases thermal energy which pavement absorbs.

▶ Improves fluidity resistance

Normal asphalt road surface temperatures go up to 60°C in summer but NOROOWAY ESR maintains them in 8~12°C.

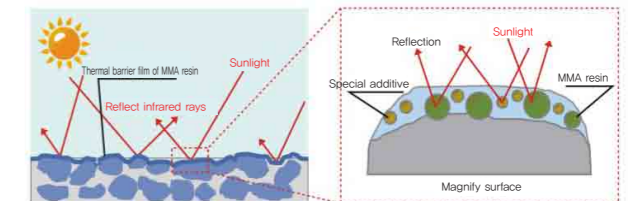
▶ Does not lower the drainage function

When pavement base is drainage asphalt mixture, NOROOWAY ESR does not lower the drainage function.

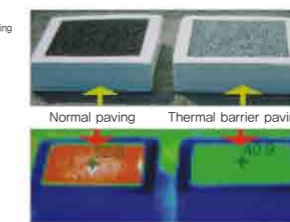
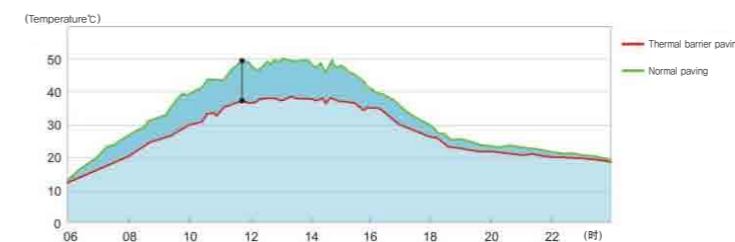
▶ A road is travelable in a short time.

Thermal barrier paving dries in 30~60 minutes.

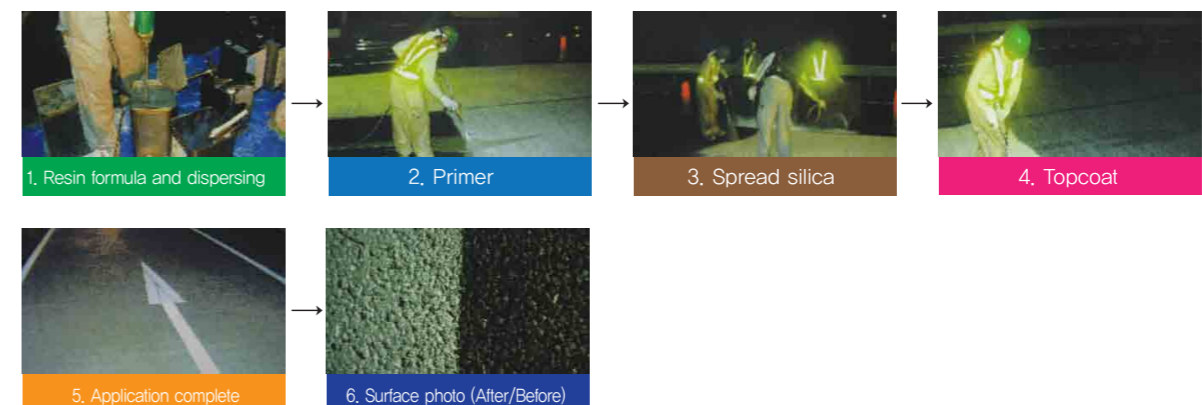
### Concept map of thermal barrier paving



### Ascon sample surface temperature comparison between normal paving and thermal barrier paving



### Application procedure



# NOROOWAY (Road marking)

Road marking paint which dries fast regardless of temperature

# NOROOWAY (KSM-6080 Type 5 MMA Road Marking)

NOROOWAY is an eco-friendly product and has longlasting reflexivity. It has good durability because it has superior brightness at night or in wet weather.

## ■ Product uses

Road, expressway, main road and the place where visibility at night and in fog is required

## ■ Features

NOROOWAY is a road marking paint composed of acrylic oligomer and MMA monomer. It dries fast in all seasons and minimizes vehicle control. Satisfactory film properties (weatherability, chemical resistance, durability, visibility) and workability are obtainable.

## ■ Product information

1. Paint type : Acrylic / 2K
2. Color: White, Yellow
3. Solids content by volume :  $99\pm 1\%$

## ■ Application procedure



1. A trial before application



2. Prepare road marking vehicle #1



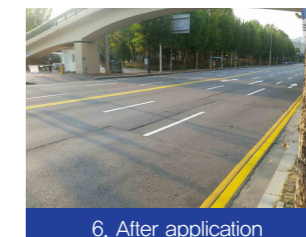
3. Prepare road marking vehicle #3



4. Put up traffic cones

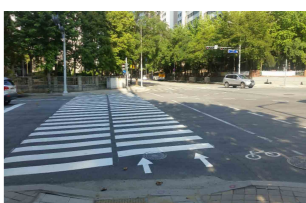


5. Road marking



6. After application

## ■ Application example (Anyang-si, Gyeonggi-do)



# NOROO WAY (specification)

## ■ Spreading rate

- ▶ NOROO WAY A-PT : 3.2kg/m<sup>2</sup>(2.5~3.0mm)
- ▶ NOROO WAY B-PT : 1.6kg/m<sup>2</sup>(1.0~2.0mm)
- ▶ NOROO WAY C-100 : 0.4kg~0.6kg/m<sup>2</sup>(400~600μm)

\* Spreading rate might vary with surface porosity, profile, application method and competence of workers.

## ■ Mixing ratio

Unit : %

Product name	NOROO WAY A-PT			NOROO WAY B-PT			NOROO WAY C-100		
	Mixing ratio	BPO(50%)	Catalyst	No. 3 silica	BPO(50%)	Catalyst	No. 5 silica	BPO(50%)	Catalyst
Substrate temperature	50°C	-	-	-	-	-	20	-	-
	40°C	-	-	-	-	-	-	-	-
	30°C	0.5	-	15	0.78	-	-	2	-
	20°C	1	-	20	1.2	-	-	2.5	-
	10°C	1.25	-	-	1.5	-	-	3.5	-
	5°C	1.5	0.25	-	2.3	0.4	-	5	1
	0°C	1.75	0.5	-	2.7	0.8	-	6	2
	-10°C	1.75	1	-	2.7	1.5	-	6	4
	-20°C	1.75	1.25	-	2.7	2	-	6	6
	-30°C	1.75	1.5	-	2.7	2.3	-	7	7

\* Fierce reaction might occur when you put catalyst and hardener together.

## ■ Physical properties

Elongation strength	Material age 7 days(-10°C)	22.5	Mpa
	Material age 7 days(-20°C)	8.5	
	Material age 7 days(-60°C)	3.7	
Elongation rate	Material age 7 days(-10°C)	33	%
	Material age 7 days(-11°C)	92	
	Material age 7 days(-12°C)	153	
Compressive strength	Material age 24 hours	21.9	Mpa
Specific gravity	NOROO WAY A-PT	1.8	
	NOROO WAY B-PT	1.6	
	NOROO WAY C-100	1	

## ■ Application method

1. Stir thoroughly for 3-5 minutes using an electric disperser after mixing hardener.
2. Scraper, roller, spray application is available depending on the paint type.
3. Check substrate condition before application.
4. Dry film functions well in 1 hour after drying.

## ■ Caution

### 1. Application cautions

- In case of new ascon, it is recommended to apply after 1 month when oil on the surface is fully dried.
- In case of new silicon, it has to be completely cured before application. (Moisture content 5% or below)
- For repairing painting, please completely remove old film by scraper, wire brush or sanding machine.
- Recommendable surface temperature for application is -25°C~45°C.
- Rain and high humidity (85% or above) might cause drying and adhesion problems. Thus please avoid application on those days.
- Minimum coverage is 0.3kg/m<sup>2</sup>. If you apply thinner than this, hardening problem happens except P-100.

### 2. Handling cautions

- Please ventilate the workplace properly.
- If paint is on skin, wash with plenty of soap and water. If paint is in the eye, please consult a doctor immediately.
- Stir thoroughly if you subdivided paint.
- Do not use thinner to adjust viscosity because it causes hardening problem.
- Please use this paint in pot life because it is 2K paint, Paint after pot life might have poor adhesion.

### 3. Storage cautions

- NOROO WAY is flammable and dangerous goods.
- Hardener is organic solvent thus should be avoided the direct light and stored in cool dark place.
- Catalyst and hardener must be stored separately.
- Please keep away from direct sunlight, heat, sparks and flames.
- Store locked up and upright in dry dark place. (5~28°C)

# Patent certificate

