NOROOWAY
MMA Functional Road Paving
Bicycle lane, Nonslip paving, Stencil paving, Thermal barrier paving

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 Functional Road Paving

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

- **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℃ and hardened in 1 hour

### MMA Functional Road Paving

<table>
<thead>
<tr>
<th></th>
<th>MMA resin</th>
<th>Epoxy resin</th>
<th>Polyurethane resin</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reaction mechanism</strong></td>
<td>Radical polymerization</td>
<td>Addition polymerization</td>
<td>Addition polymerization</td>
</tr>
<tr>
<td><strong>Applicable temperature</strong></td>
<td>~25℃ ~ 45℃</td>
<td>5℃ ~ 50℃</td>
<td>5℃ ~ 50℃</td>
</tr>
<tr>
<td><strong>Chemical resistance</strong></td>
<td>Very good to acid and alkali</td>
<td>Good to acid and alkali</td>
<td>Good to acid and alkali</td>
</tr>
<tr>
<td><strong>Time to mechanical solidity</strong></td>
<td>1 hour</td>
<td>3~7 days</td>
<td>2~5 days</td>
</tr>
<tr>
<td><strong>Time to walk after construction</strong></td>
<td>1 hour</td>
<td>14~18 hours</td>
<td>12~16 hours</td>
</tr>
<tr>
<td><strong>Elongation rate(20℃)</strong></td>
<td>80~120%</td>
<td>1.5 ~ 3%</td>
<td>6 ~ 10%</td>
</tr>
<tr>
<td><strong>Floor whitening</strong></td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Nonslip Road Paving
NOROWAY A-PT (for ascon surface paving) optimizes the safety and quality of a road.

NOROWAY A-PT (for ascon surface paving) is nonslip road paving. NOROWAY 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 NOROWAY 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°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**

  - Haeundae-gu, Busan
  - Mapo-gu, Seoul
  - Guri-si, Gyeonggi-do
  - Deogyusan National Park
  - Seongbuk-gu, Seoul
  - Seodaemun-gu, Seoul
  - Guro-gu, Seoul
  - Gurye-gun, Jeollanam-do
Bicycle Lane Paving

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

NOROWAY 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℃ (applicable in winter)
  - Fast drying (cured in 30 minutes)
  - Excellent nonslip effect

- **Application example**
  - Geumcheon-gu, Seoul
  - Yeongdeungpo-gu, Seoul
  - Gwangju-si
  - Sonipo International Business District, Incheon

- **Bicycle lane paving process**

- **Bicycle lane and footpath paving comparison**

<table>
<thead>
<tr>
<th>Photo</th>
<th>Cross section</th>
<th>Application method as general ascon (5cm)</th>
<th>Top coating</th>
<th>Paint color</th>
<th>Cure limit temperature</th>
<th>Fast drying</th>
<th>Easy maintenance</th>
<th>Good elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Same application method as general ascon</td>
<td></td>
<td>Paint color</td>
<td>Cure limit temperature</td>
<td></td>
<td></td>
<td></td>
</tr>
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</table>
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℃ (applicable in winter)
  - Fast drying (cured in 30 minutes)

- **Stencil paving process**
  1. Before application
  2. High-pressure water cleaning
  3. Base application
  4. Stencil (pattern)
  5. Spraying topcoat
  6. After application

- **Stencil pattern and color**

- **Application example**
  - Seobinggo station overpass, Seoul
  - Bucheon station overpass, Seonggi-ri
  - Gyeonggi-do Uijeongbu specific street
  - Gyeonggi-do Seodaemun safe footpath
  - Seoul Gyeongin market
  - Incheon

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

- **Product uses**
  Road, expressway, main road, etc.

- **Features**
  - Restrains 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℃ in summer but NOROOWAY ESR maintains them in 8~12℃.
  - 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.

- **Ascon sample surface temperature comparison between normal paving and thermal barrier paving**

- **Application procedure**
  1. Resin formula and dispersing
  2. Primer
  3. Spread silica
  4. Topcoat
  5. Application complete
  6. Surface photo (After/Before)
NOROOWAY (Road marking)
Road marking paint which dries fast regardless of temperature

NOROOWAY is an eco-friendly product and has longlasting reflectibility. 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±1%

- **Application procedure**
  1. A trial before application
  2. Prepare road marking vehicle #1
  3. Prepare road marking vehicle #2
  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/m² (2.5~3.0mm)
- **NOROO WAY B-PT**: 1.6kg/m² (1.0~2.0mm)
- **NOROO WAY C-100**: 0.4kg/m² (400~600μm)

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

### Mixing ratio

<table>
<thead>
<tr>
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<th>NOROO WAY A-PT</th>
<th>NOROO WAY B-PT</th>
<th>NOROO WAY C-100</th>
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</thead>
<tbody>
<tr>
<td>Spreading rate</td>
<td>3.2kg/m²</td>
<td>1.6kg/m²</td>
<td>0.4kg/m²</td>
</tr>
<tr>
<td>Physical properties</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substrate temperature</td>
<td>20℃</td>
<td>30℃</td>
<td>40℃</td>
</tr>
<tr>
<td>BPO(50%) Catalyst No. 3 silica</td>
<td>1.0</td>
<td>0.8</td>
<td>0.6</td>
</tr>
<tr>
<td>BPO(50%) Catalyst BPO(50%)</td>
<td>1.3</td>
<td>1.1</td>
<td>0.9</td>
</tr>
<tr>
<td>BPO(50%) Catalyst No. 5 silica</td>
<td>1.7</td>
<td>1.5</td>
<td>1.3</td>
</tr>
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* Spreading rate might vary with surface porosity, profile, application method and competence of workers.

### 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℃~45℃.
   - 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/㎡. 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℃)

### Physical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>NOROO WAY A-PT</th>
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<tr>
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### Unit

<table>
<thead>
<tr>
<th>Product name</th>
<th>Spreading rate</th>
<th>Physical properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOROO WAY A-PT</td>
<td>3.2kg/m²</td>
<td>Elongation: 8.5</td>
</tr>
<tr>
<td>NOROO WAY B-PT</td>
<td>1.6kg/m²</td>
<td>Elongation: 6.5</td>
</tr>
<tr>
<td>NOROO WAY C-100</td>
<td>0.4kg/m²</td>
<td>Elongation: 4.5</td>
</tr>
</tbody>
</table>

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

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

### Patent certificate

[Patent certificate image]

Korean Standards Association

KSA

[Further information and certifications from various authorities and organizations related to the product's quality, safety, and environmental compliance.]

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