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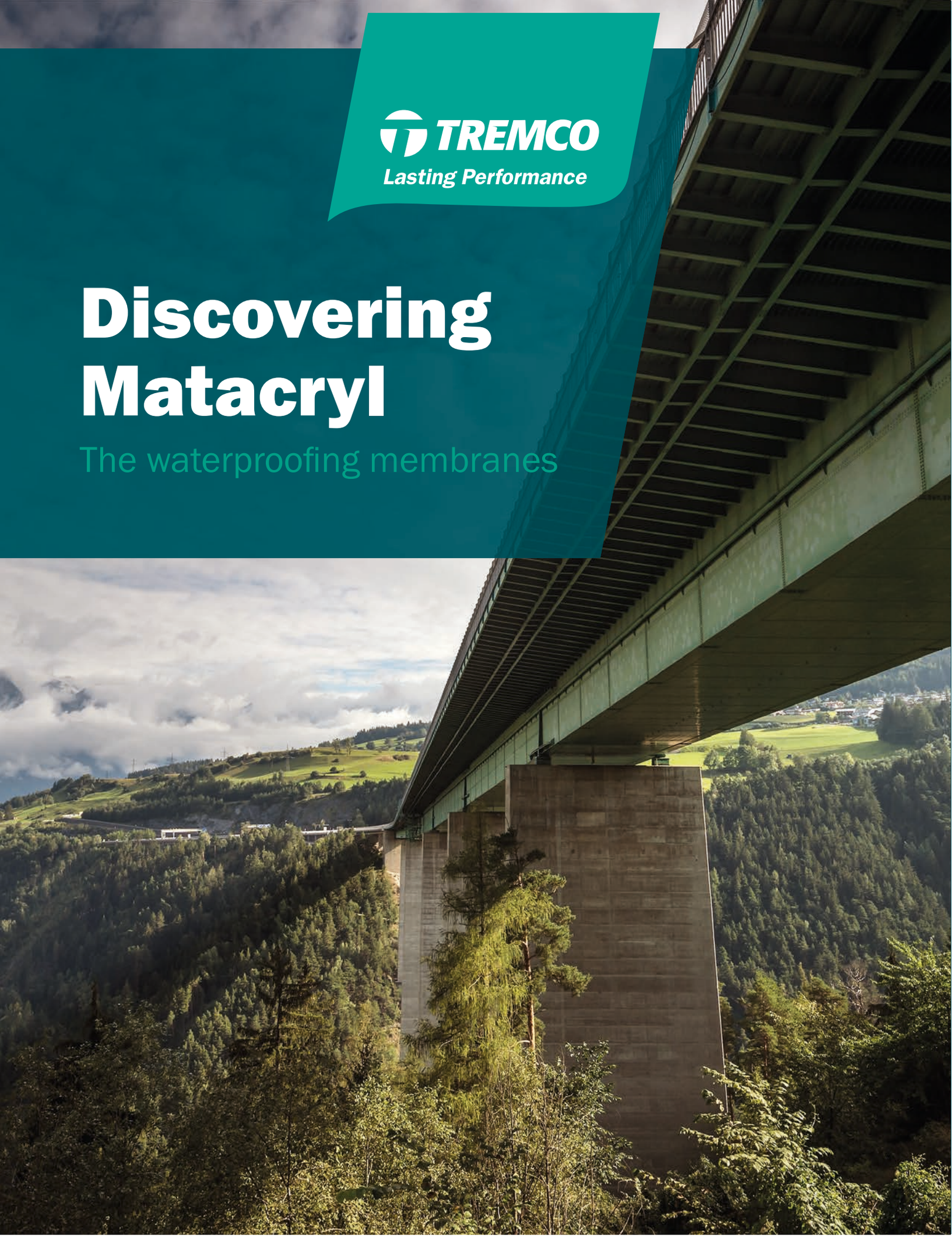
Lasting Performance

Discovering Matacryl

The waterproofing membranes



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Introduction

"Bridge Deck" waterproofing systems, based on PUMA resin, are used as a response to the limitations offered by conventional methyl methacrylate (MMA) and other resin-based systems, especially with regard to the inadequate capacities of those technologies when it comes to bridging cracks, especially in cold climates and extreme weather conditions.

Matacryl membranes are such PUMA 'hybrid' systems, reacting like MMA but performing like a PU system, taking the best characteristics from each.

For example, the fast-curing characteristics of MMA make it suitable and practical for use, as the hardening properties are not adversely affected by the ambient temperature.

In fact, MMA systems can be applied at temperatures as low as -20°C and will usually be ready for use in around 60 minutes.

Repair work

PUMA systems are unique in the way that successive layers bond. When a new layer is applied to an existing layer, the bottom layer will swell and open, thereby allowing the second layer to merge with the layer below. This ensures that the two coatings virtually "become one", which is highly beneficial when it comes to subsequent repairs or replacement.

In the event that a new coating is needed, the existing coating simply requires abrasion, cleaning and drying before the subsequent coating is applied. In the same way (assuming that non-destructive tests such as chloride ion dust samples, etc. are carried out), any holes made, for example, can be filled with PUMA resin mixed with filler to create a fluid mortar followed by a Matacryl coating.

When used as a protected membrane – that is, between the bridge deck surface and the asphalt – the membrane is generally not subject to any wear and tear and will require little to no repair when the asphalt needs replacing. Milling or any similar handling will therefore cause practically no damage to the membrane. However, if damage were to occur, the affected membrane would simply need to be replaced by performing a perfectly square cut, followed by re-coating in the usual manner.

Whenever a new coating is applied to an existing one, the layering of both must have an overlap of 10 cm. For repairs with a thickness below 25 mm, Matacryl resin mixed with quartz aggregates can be used for reshaping or filling.

Conclusions

Matacryl is easy to install by experienced application technicians and is not usually sold through general contractors except in rare cases. It can be applied year-round, regardless of the ambient temperature, and will provide the required resistance against chloride ions, de-icing salts, as well as resistance to other harmful chemicals.

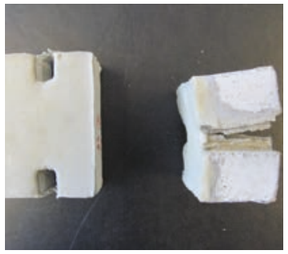
Possibly the most notable benefit from a performance standpoint is the fact that it will bridge dynamic cracks even at extremely low temperatures – which is paradoxically when concrete is most vulnerable to the ingress of harmful liquids. It is easy to repair, if necessary, but its longevity is expected to exceed that of the bond when applied as a protected membrane.

Installations and regulations

- The installation should only be performed by certified and approved application technicians who have proven experience in this type of application.
- Personal protective equipment should include shoes with steel toe caps, knee pads, helmets, eye protection, gloves, etc.
- The installation equipment must be suitable for PUMA resin applications and include specialised mixers, spray equipment if required, and a variety of tools such as spiked rakes, scrapers, spiked rollers, rollers, carts to transport a mix of products, pails, low-speed hand drills, etc.
- Tremco CPG Europe staff will be present when work begins to help with application recommendations.

Installation procedure

- A surface treatment is required to create roughness or a surface profile equivalent to U4.
- Measurement of the surface integrity with a “schmidt” hammer or equivalent to confirm a minimum compressive strength of 40 N/mm^2 or 40 MPa.
- Check the humidity % on the concrete surface using suitable instruments to verify values below 5–6% humidity.
- Add and mix the corresponding amount of catalyst at the specified % with the resins (the table that defines the amount of catalyst based on variable environmental conditions is included in the installation manual).
- Roller application of Matacryl Primer using specified quantities (e.g. 0.40 kg/m^2).
- Application of Matacryl or Matacryl membrane via roller or spray at the specified thickness (2.60 kg/m^2). Note: The spiked roller must be applied immediately after manual application of Matacryl.
- Application of Matacryl STC Tack Coat in the specified thickness (0.50 kg/m^2).
- Broadcast 2–3 mm aggregate over wet Matacryl STC Tack Coat to provide adequate grip for subsequent layers of hot-rolled asphalt.



Installation benefits

Matacryl PUMA membranes offer several unique advantages:

- The viscosity of Matacryl does not change with temperature fluctuations and the product does not require heating or conditioning in colder climates to adjust viscosities. In contrast, resins based on polyurea or polyurethane, for example, require heating in colder climates for viscosities to properly adapt, which is why large quantities of components A and B can adversely affect the product performance.
- Owing to the above, the only storage and installation condition required is a dry environment – the products can be stored in unheated storage facilities and applied at very low temperatures.
- The membrane is available in manual-application or spray formulations, allowing the applicator to make a selection based on access or site conditions, etc.
- Solvent-free and low VOC levels.
- Matacryl’s only requirement is mixing with a catalyst to initiate the curing reaction. Curing times can be adjusted to suit the environmental and application site conditions, etc.
- The stipulated 2 mm membrane can be applied in one (via spray) or two coats (manual application) depending on the installation method used.
- Matacryl systems cure and dry quickly, allowing work to continue without long waiting periods between coats or successive coats. For example, once the primer has cured, the membrane can be applied while the next primer application begins in the adjacent area. Once the membrane has cured, the next coat can be applied while the next primer and membrane applications are being performed simultaneously in adjacent areas, etc.
- No special precautions are needed when disposing of cured materials, as these are chemically inert and can be disposed of with household waste.
- A cover plate is not required when hot-rolled asphalt (HRA) is applied or after installation, which allows the remaining industrial work to begin.

Installation considerations

- Successive layers and coatings can only be applied once the previous layer or coating has cured. This usually takes around 20 to 35 minutes but will depend on environmental conditions.
- On vertical surfaces such as plinths, curbs or supports, etc., spraying is the best option, but care must be taken to ensure that the coverage is such that the system does not drip or run down. This is ideally accomplished in two passes or coats to achieve the specified dry film thickness.
- If spraying is the preferred option, this normally takes two coat applications, whereby the first coat is applied from top to bottom and the second coat from left to right.
- To ensure correct coverage levels and thickness, a qualified application technician must measure the wet film thickness using a suitable tool or instrument. This must be performed on the wet surface immediately after installation. If material gaps are identified, another spray pass must be carried out to solve this problem. This essential procedure must be observed throughout the course of the installation, whereby project managers must carry out random checks for control and inspection.
- There is no limitation with regard to installation time – the issue will rather be related to the moisture content values mentioned above.

Installation limitations

- The moisture content of the concrete surfaces to which Matacryl will be applied must be below 5-6%.
- Concrete and steel surfaces require surface preparation to establish good surface profiles free of oil, grease and other disruptive or damaging substances and matter, etc.
- The system cannot be applied in rain, snow or extreme wind conditions.
- An odour is emitted while the membrane is still wet. Although this is completely harmless, it may be necessary to put up signs informing the public about this to alleviate any concerns.

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Performance benefits

Matacryl PUMA resins outperform systems based on MMA and conventional resins for the following reasons:

- Sufficiently resistant, even just 45 to 60 minutes after application, to allow the team responsible for applying the hot-rolled asphalt to walk on the Matacryl membrane without any type of protection.
- Extreme impact resistance when tested in accordance with AREMA standards.
- Excellent adhesion to dry, clean surfaces, including steel pipe outlets, etc.
- The membrane bonding is superior to the tensile or cohesive strengths of the concrete.
- Sufficient flexibility to bridge cracks larger than 3.5 mm in conditions well below zero degrees.
- Resistant to rain and snow within 45–60 minutes of application.
- Extremely easy to repair in the event of accidental damage.
- Rapid preparation and curing allow very short activity interruptions and rapid subsequent handoff regardless of environmental conditions.
- ETA033, BBA & ASTM certification.

Performance limitations

- PUMA is not resistant to repeated solvent spills.
- A minimum membrane thickness of 2 mm is required.
- Matacryl is very difficult to remove once cured.

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